Hackney Wick & Fish Island District Heating Study – Supporting the SPD

14th April 2016
This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.
Executive summary

Hackney Wick and Fish Island exhibit potential for heat network development, but considerable public investment may be required to de-risk possible schemes and enable private sector investment.

This study was carried out on behalf of London Legacy Development Corporation (LLDC) to assess the opportunity for a district heat network within the Hackney Wick and Fish Island Character areas.

The heat mapping exercise revealed 25 heat loads suitable for connection to a network. These included loads arising from both existing and planned developments. Several buildings were excluded on the grounds of their incompatible heating systems (e.g. electric resistive heating or individual boiler systems), low annual heat demands or lack of available information.

The Study Area is characterised by the presence of canals. These present technical and economic challenges to the development of a heat network. A preferred network route was proposed based on the most feasible means of crossing the two obstructing canals as follows:

- Use of the existing White Post Lane bridge to cross the River Lee Navigation and access the King’s Yard energy centre.
- Use of the existing Wansbeck Road bridge to cross the Hertford Union canal and access Fish Island.

Another significant barrier to a network is the Overground rail tracks serving Hackney Wick Station. Here, the proposed pedestrian underpass is recommended as the superior option for accessing loads north of the station including all loads in the Hackney Wick Station Masterplan Development.

Further investigation is required to confirm the proposed heat network (HN) route is feasible and to ensure all necessary wayleaves or easements are obtainable.

In response to the risks associated with the canal crossing, we developed four possible configurations, three of which present alternatives to crossing one or both of the canals. These are:

- Case 1: Network connected to King’s Yard energy centre
- Case 2: Standalone network serving Hackney Wick and Fish Island
- Case 3: Standalone network serving Hackney Wick
- Case 4: Standalone network serving Fish Island

A techno-economic assessment of these networks was carried out to indicate which network scheme could be most viable. Where required, the networks were optimised to demonstrate the best possible financial performance without compromising their scale. By this process, loads that are relatively small and/or expensive to connect are excluded from the network as modelled for this study.

The results suggest that only Case 4 could be commercially viable as a private Energy Service Company (ESCo) without some form of additional financial support. All other cases could be viable as a public ESCo venture. However, to meet the returns attractive to a private ESCo, gap funding support would be required. This support ranged between £450,000 and £1.1m.

In light of objectives to deliver a wide reaching network with the maximum possible carbon reductions, Case 1 is considered the most attractive option based on the analysis undertaken, due to the following key points:

- Along with Case 2, it connects the largest number of loads:
- It presents the highest carbon saving potential because it is supplied by the King’s Yard energy centre which contains a low carbon mix of energy supply plant including biomass boilers and gas CHP. Note that the networks were not evaluated on a carbon parity basis due to the difficulty of simulating a system equal in cost and performance to the Engie Heat Network; and
- Although, unlike Case 4, Case 1 was not found to be commercially viable as a private ESCo in comparison to case 2 and 3, it had the lowest gap funding to reach a 12% IRR. Subject to changes in the cost of the White Post Lane bridge crossing, funding of £0.5m could be sufficient to attract a private ESCo.

Next Steps

The next steps in progressing a network opportunity should be focused on developing the feasibility of a preferred network route, in particular:

- Confirming the feasibility and cost of the River Lee Navigation and Hertford Union canal crossing.
- Introduce mechanisms to obtain agreement from developers in the area to connect to a network.
- Review funding sources available to commence development of appropriate business model to deliver and operate a network.

Delivery Considerations

Three approaches to develop a chosen network are suggested. These are framed in light of the recommendation to pursue option 1 but apply to all other cases as well. The possible development approaches include:

a) Public funding could be used to finance the canal crossings of the heat network, facilitating the Engie Heat Network expansion.

b) Public funding could be leveraged to coordinate a joint market approach of developers for a private sector ESCo to design, fund, operate and maintain a standalone network. Note that this approach alone would not be sufficient to make a scheme commercially viable for a private ESCo.

c) A Public ESCo could be created by purchasing bulk heat from Engie, or supplying its own heat from an alternative energy centre. Once operational, LLDC as the funder could sell the asset to a private sector company based on future asset value.

Note that these development scenarios were developed to inform future discussions and development of a detailed approach. This is a topic of considerable complexity, and therefore these approaches have only been partially explored in the report; they provide interchangeable concepts, as well as very different risk/reward levels.

Recommended Development Option

This approach would involve confirming the feasibility and cost of the River Lee Navigation and Hertford Union canal crossing, along with risk possible schemes and enabling private sector investment.

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Introduction
This study includes a high level assessment of district heating viability west of the Lee Navigation Canal.

The Appointment
Arup was appointed by the London Legacy Development Corporation (LLDC) to carry out a district heating study on the Hackney Wick and Fish Island areas (referred to as The Study). The Study was aimed at supporting the Supplementary Planning Document (SPD) which was being concurrently written by LLDC.

Background
The Study builds on previous work to develop a utility strategy and energy strategy to support the wider masterplan of the Hackney Wick station development area.

The Study Area
The Study area was defined as the same as the area covered by the SPD, that is, the Hackney Wick and Fish Island Character Areas. The figure shows the area boundary referred to as the “Study Area” throughout the report.

The Brief
The brief for the study was developed with LLDC to bring maximum value to the study which included the following scope items:

1. The section ‘Existing and Planned Heat Networks’ covers findings of research into existing and planned heat networks in and around the Study Area.
2. ‘Demand Assessment’ presents the map of existing and future heat demand opportunities as identified through the Study.
3. The section ‘Supply Assessment’ covers an assessment of heat supply options that could provide heat to a network for the Study Area. The scope limited the study to two options (a) connection to the Olympic Park and (b) standalone CHP based energy centres.
4. The section ‘District Heating Routing’ covers the findings and conclusions of the routing study that was undertaken to identify a primary spine route to connect possible heat loads in the Study Area.
5. ‘Techno-economic Assessment’ covers the methodology and results of a high-level analysis of the economic viability of district heating and carbon saving potential.

6. The final section ‘Delivery Considerations’ includes Arup’s roundup of the outcomes of the Study and advice on how a heat network might be developed West of the Lee Navigation Canal from both a technical and commercial perspective.

Figure 1 shows the Study Area delimited by the dotted line.
Source: extract from the 2015 LLDC Local Plan.
Existing and Planned Heat Networks
Summary of findings

The Study researched, identified and mapped existing and planned district heating networks in the Study Area. The findings are represented on the map shown on the right. Each main element is numbered and discussed below:

Existing Heat Networks
1. The principal existing heat network is the Queen Elizabeth Olympic Park (QEOP) district heating and cooling network. Engie (formerly Engie) operate the network and hold a concession that mandates connection to the network within the QEOP boundary. Hackney Wick and Fish Island are outside the concession area. The QEOP network is supplied from the energy centre at Kings Yard.
2. Within the Hackney Wick area three social housing blocks on Berkshire Road were identified to have communal heating systems supplied from gas boilers within each block. Gainsborough Primary School was also thought to have a central boiler room supplying the site.

Planned Heat Networks
3. The Neptune Wharf development in Fish Island has a proposed site wide district heating network supplied from a central energy centre. This would include either a CHP or connect to the QEOP district heating network if this were to be extended by the concession operator, Engie.
4. The Hackney Wick Station Masterplan Area has a proposed heat network connection to the QEOP energy centre at Kings Yard. The site utility strategy shows a proposed heat network spine running through a proposed utility corridor under the station.
5. With a longer term strategic view, the Lee Valley Heat Network (LVHN) has been identified to have a vision to connect to the QEOP heat network and would pass near by. This is represented indicatively.
Demand Assessment
Methodology

The Study included collection and build-up of existing and future heating demands to identify opportunities for district heating.

Area of focus
Heat demand data was collected for the areas within the Study Area located West of the Lee Navigation Canal. This area was the focus of the study. The remainder of the area within the SPD is within the QEOP heat network concession area and is mandated for connection.

Existing Heat Loads
Existing heat load data was collected from a series of resources:
- London Heat Map download of Hackney and Tower Hamlet Boroughs (see figure on the right)
- Review of the previous studies*
- Consultation of the National Heat Map, although a data download was not possible as this would need to be purchased by LLDC.
- Display Energy Certificates (DEC) downloaded from the national register for public buildings.

Proposed Heat Loads
Proposed development heat load data was collected and developed as follows:
- Energy Statements were downloaded for developments in planning from LLDC planning portal. Heat loads are often provided from the opportunity in these documents, but not always.
- LLDC provided proposed numbers of residential units and commercial floor space for each development. This was used to calculate the heat loads when energy statements were not available.
- The calculations were carried out based on benchmarks derived from our internal database of SAP compliant calculations as approved by the building regulations.

Load Assessment
The study undertook a load assessment to identify loads suitable for connection to a district heating network. Only the identified loads were then included in the techno-economic analysis of the schemes towards determining economic viability.

The following procedure was applied:
- Existing heat loads below 100MWh were excluded from the analysis. This is a frequently used threshold below which connection is rarely cost effective.
- Private residential schemes and small commercial warehouses with individual gas boilers or resistive electric heating were excluded. Experience suggests that required levels of retrofit required to connect these loads to a HN would not be cost effective.

Demand Assessment
Existing Loads

The demand assessment identified around 15 sites within the Study Area with heat loads above the minimum threshold of 100 MWh.

Suitable for Connection
Of these, 11 loads were identified as attractive for connection to a heat network. These loads were all identified to be supplied by communal boiler systems. These are particularly suitable for connection to a heat network given the distribution pipework within the building is already installed.

Referring to the notes on the Figure to the right:
1. There are four social housing blocks supplied by communal boilers on Berkshire Road. These are located centrally at the top of the central stair well in a plant room.
2. Five further blocks supplied by communal boilers are on the Trowbridge Estate (Daintry Way, Southmoor Way and Corsley Way).
3. Gainsborough Primary School is likely to have a large central boiler supplying the school or entire blocks. This study wasn’t able to verify this, but has assumed this.
4. Trowbridge Day Centre also has communal boilers and was identified as a likely load for connection.

Not included in the analysis
A number of more recent constructions were also listed as potential heat loads, however based on the data sources and external inspection we were unable to confirm the heating systems currently serving these buildings. It has therefore been assumed these buildings mainly include electrical resistive heating. These were not included as likely connections given they are private, multi-address buildings where retrofit would be costly and disruptive.

A further 18 loads of reasonably large magnitude located outside the Study Area were also recorded given their relative proximity.

A full data schedule of heating demands is included in Appendix A.
Demand Assessment

Future Loads

Future loads were identified from key sites identified in the local plan, pre-planning and planning information provided by LLDC and supplemented by download of energy statements downloaded from LLDC planning portal.

**Loads included**

A large future heat demand was identified as likely arising from development totalling circa ~13GWh per year.

This load derives from 14 sites of which the Hackney Wick Station Masterplan area is a considerable part ~6GWh (note 1).

Neptune Wharf (note 2) was categorised as an existing site for the purposes of the analysis. This is given the site was being cleared at the time of the Study, and it is likely to proceed with a stand alone CHP energy centre. This would be ready for connection, however a connection charge could not likely be leveraged.

**Loads excluded**

Two sites were excluded given no data was available.

The Hamlet Industrial Estate site was in pre-planning at the time of the Study and there was no information available with regards to the extent of development (note 3).
Supply Assessment

The supply assessment was limited by the scope of the Study to assessing a connection to the Olympic Park District Heating system and to stand alone CHP based systems.

**QEOP connection**
The connection to the Engie heat network would take place at the Kings Yard energy centre as determined by the Utility Strategy of the Hackney Wick Masterplan. The Kings Yard energy centre is believed to hold sufficient capacity to expand and connect all identified loads on the Hackney Wick and Fish Island areas, based on information obtained during a site visit in 2015. The energy centre has capacity for an additional two CHP 3MWe CHP engines and space for additional 40MW of peaking gas boilers.

The techno-economic analysis was based on the energy centre requiring new CHP capacity as sized by the heat load offered by the new loads.

**CHP**
CHP based energy centres were sized for the various cases studied. These systems typically supply 60-70% of heat from CHP and the remainder from top-up gas boilers. These systems were sized and costed for the analysis depending on the connected loads.

**Other sources not considered but that could be:**
- Water source heat pump extracting heat from the Lee-navigation Canal; This option could offer considerable carbon savings compared to CHP. This may also be a more future proofed solution given the benefits of CHP may be eroded as the electrical grid is de-carbonised.
- Using the communal gas boilers as heat sources or backup for the heat network. This is unlikely to be a cost effective solution due to the cost of maintaining a large number of units dispersed around the buildings connected to the network.
- Should the Neptune Wharf development go ahead with a stand alone CHP system, this CHP engine could provide a heat source to a future network.
District Heating Routing Study

Scope
The Study included a district heating routing study. A desk based study was initially undertaken to examine routes for connecting heat loads identified and possible canal crossing points. This was complemented by a site visit to inspect the route for additional constraints or opportunities.

Routing summary
The routing study identified main routing options shown on the right.

With regard to the crossing of the River Lee Navigation, White Post Lane bridge crossing was considered as the preferred option. All other options including the Gainsborough bridge, H10 and H14 bridges were rejected on the basis of the incompatibility with their structure and the vicinity to residential buildings. In addition information of H16 was not available at the time of the study.

This conclusion was based on the findings from the routing study in relation to accessing the Hackney Wick Station Masterplan from King’s Yard energy centre carried out by Arup in 2015.

Preferred route
Preferred routing options were identified as a basis for the techno-economic study. These are shown on the next page.

Figure 7
District Heating Routing Assessment
Preferred Route Option

**Purpose**
The complexity of considering multiple route options for techno-economic studies can increase the cost and time resource required to undertake them beyond the scope of this study.

For this reason, a preferred spine routing option was used to model the network, and was based on the HN routing study.

**Preferred routing option**
The option (see adjacent map) proposed is to cross the Hertford Union canal adjacent to the Wansbeck Road Bridge. This would mean that the view across the canal would be unobstructed and thus would be less visually intrusive.

This option would result in services running within the Hepscott Road development site. Permission to access this site will need to be negotiated with the landowner.

The preferred route for the northern part of the network is to go through White Post Lane under the proposed pedestrian underpass. This was identified as a preferred route in the Hackney Wick Station area masterplan due to the lack of space available for HN pipes in Wallis Road.

Figure 8
Techno-Economic Assessment
Methodology

Scope
Our task was to carry out a "high level commercial analysis of the viability of a HN based on new identified loads, possible major existing loads and proposed routing options. Our analysis was to consider at least two options:
(a) Connection to the Olympic Park heat network
(b) Standalone CHP based energy centre

Cases considered
We identified two key risks to the feasibility of an area-wide network in Hackney Wick, namely the crossing of the Lee River Navigation and the Hertford Union Canal. We have therefore considered four scheme configurations three of which present alternatives to crossing one or both of the canals. These are
Case 1: Network connected to King’s Yard energy centre
Case 2: Standalone network serving Hackney Wick and Fish Island
Case 3: Standalone network serving Hackney Wick
Case 4: Standalone network serving Fish Island

Figure 9
Techno-Economic Assessment

Methodology

The techno-economic assessment has been carried out to determine the financial viability of a heat network in Hackney Wick. Commercial viability is driven by the financial returns expected by the owner of the network. For the purposes of this study, we have accounted for two ownership structures:

1. Public-owned ESCo
2. Private-owned ESCo

Based on previous experience of this type of infrastructure, private ESCos will need to achieve a 12% internal rate of return (IRR). A public venture on the other hand would typically aim for 6% IRR.

We have therefore calculated the net present value (NPV) of the scheme over 25 years with a 6% and 12% discount rate.

Scope of ownership

For simplicity we have assumed that any ESCo (whether public or private) would cover the capital cost of any new equipment up to and including the heat interface units within flats. The main elements to be included in the CAPEX were:

- Additional plant including CHPs and boilers
- Energy centre construction and fit-out.
- Secondary and primary pipework

Substations with heat exchangers
- Heat interface units in new dwellings

The tertiary network, that is the pipework from the substation to the flats, has not been accounted for.

As a result of this approach, the network operator would be entitled to request a contribution from developers erecting new buildings. Typically this takes the form of a connection charge per new dwelling. The connection charge reflects the so called "avoided" cost on the developer of having to provide their own heating systems and meeting any carbon reduction targets. Within a previous study for a new development in the LB Harrow, we calculated the avoided cost per dwelling as approximately £2,500.

Additionally, the network operator would collect heat sales for the provision of heating to the connected loads. A typical bill for a heat network is made up of:

- Variable heat tariff
- Fixed standing charge
- Fixed service charge

The first two charges are typical for gas bills for a building or dwelling connected to the gas network. The last charge is added to cover the maintenance of energy supply and distribution systems, equivalent to servicing or replacing an installed gas boiler. In total, these costs aim to provide a saving of at least 10% on an individual boiler solution.

Presentation of financial results

The financial results will be reported in the following way:

- 25 year NPV of scheme at a 6% and 12% discount rate and calculation of the connection charge per new dwelling required to make the NPV in each case equal to zero.
- 25 year NPV of scheme at a 6% and 12% discount rate assuming a developer contribution of £2,500 per new dwelling connected.

The validity of results are strongly dependent on the assumptions these are based upon. A table of key assumptions can be found in the Appendix D. Given this is a high level feasibility study, certain cost and technical assumptions may need to be revisited when progressing to a more detailed appraisal stage. Heat pricing and connection charges will be subject to agreements with the respective building owners and may vary on a case by case basis.

Carbon Calculations

The method used to calculate carbon savings was based on SAP 2012 three year average carbon factors.

The carbon intensity of heat networks with a new energy centre will be different to that of those connected to Kings Yard on the QEOP given it uses various modes of generation. Carbon intensity value used: 0.074 kgCO₂/kWh*

NPV of carbon saved

In response of the different carbon performance of networks, a further sustainability metric was developed. ‘NPV of carbon saved’ is the NPV of the network over the carbon savings achieved vs BAU on the same time frame.

A negative number indicates a negative NPV, so a cost of carbon abatement

A positive number indicates that implementing the system, pays to save carbon.

Techno-Economic Assessment
Case 1 – Connection to Olympic Park Heat Network

Scheme Description
The scheme consists of a network from the Olympic Energy Centre connected to all suitable loads within the Hackney Wick and Fish Island characteristic areas.

We have assumed the River Lee Navigation is crossed over the White Post Lane bridge as recommended by the HN routing study. It has not been possible to obtain a definitive price for the standalone pipe. For the purposes of this study we have used £1m as an approximate price between the £400,000 figure provided by Engie for a similar crossing by the H14 footbridge and Arup benchmarks which suggest the price could be as high as £2m.

Optimisation
We have carried out an optimisation exercise to improve the commercial viability. The result is a scheme that excludes the council estates at the northern end of the network namely Daintry Way, Corsley Way and Southmoor Way as well as the exclusion of planned developments Swan Wharf, Wick Lane, Vittoria Wharf, and Bream Street on the southern end of the network.

The commercial analysis indicated these loads did not warrant the cost of the additional pipework. Future studies should revisit these exclusions to ensure that opportunities for future network growth are considered.

Equipment Sizes
- CHP capacity: 1.1 MW
- Boiler Capacity: 6 MW

Technical Performance
- Heat load: 11,300 MWh
- Peak load on network: 4.6 MW
- Spine length: 1,900 m
- Annual Carbon Saving: 1,500 tCO₂
- Approximate Energy Centre Size: N/A

Economic Performance
- CAPEX: £8,100,000
- 25 year NPV (6% discount rate): - £1,400,000
- Developer contribution per new dwelling to achieve 6% IRR: £1,100
- 25 year NPV (12% discount rate): - £3,500,000
- Developer contribution per new dwelling to achieve 12% IRR: £2,900

Economic Performance with £2,500 per new dwelling developer contribution (or connection charge)
- 25 year NPV (6% discount rate): £1,700,000
- NPV of carbon saved: £40 per tCO₂e
- 25 year NPV (12% discount rate): - £450,000
- NPV of carbon saved: - £11 per tCO₂e
Techno-Economic Assessment
Case 1 – Connection to Engie

Summary of conclusions
At first sight, the network is not commercially viable under a private ESCo ownership model because the NPV remains negative even under a £2,500 per dwelling connection charge. However a slight increase of the connection charge up to £2,900 could be sufficient to make this scheme viable. Subject to negotiating this level of connection charge therefore, this scheme may be viable for an ESCo such as Engie. A distinct advantage of this option is the superior carbon performance of the heat from Engie due to the inclusion of biomass boilers within the energy supply mix.

On the other hand, a public-owned scheme could be viable. The IRR of the scheme approaches 10% under the £2,500 connection charge. This option may be attractive to LLDC given profits could be redistributed into to fund other investments.

An alternative is for LLDC to assist with the gap funding of £500,000 to make the network financially attractive to a private ESCo developer.

These results are highly dependent on the cost of the bridge crossing as well as interest from the selected new build developers.
Techno-Economic Assessment
Case 2 – Stand Alone (Hackney Wick & Fish Island)

Scheme Description
This scheme is identical to Case 1 expect for the disconnection from the King’s Yard energy centre. This scheme offers an alternative to crossing the Lee River Navigation because of both concerns around cost and feasibility.

Due to the lack of information on potential locations for the energy centre, we have provisionally placed it in the centre of the network within the Hackney Station Masterplan Area.

Although this option avoids the crossing of the Lee River Navigation, there is the need to provide an Energy Centre with a cost approaching £2m assuming a stand-alone Energy Centre.

Optimisation
The optimised network is identical to that of Case 1 in that the loads on Daintry Way, Corsley Way, Southmoor Way and new developments of Swan Wharf, Wick Lane, Vittoria Wharf, and Bream Street on the southern end of the network were excluded.

As with Case 1, these exclusions should be revisited in future studies

Equipment Sizing
- CHP capacity = 1.1 MW
- Boiler Capacity = 6 MW

Technical Performance
- Total Heat Load: 11,300 MWh
- Peak Heat Load on Network: 4.6 MW
- Spine Length: 1,800 m
- Annual Carbon Saving: 1,300 tCO₂
- Approximate Energy Centre Size: 300 m²

Economic Performance

- CAPEX: £8,800,000
- 25 year NPV (6% discount rate): - £2,000,000
- Developer contribution per new dwelling to achieve 6% IRR: £1,600
- 25 year NPV (12% discount rate): - £4,200,000
- Developer contribution per new dwelling to achieve 12% IRR: £3,400

Economic Performance with £2,500 per new dwelling developer contribution (or connection charge)

- 25 year NPV (6% discount rate): £1,100,000
- NPV of carbon saved £37 per tCO₂e
- 25 year NPV (12% discount rate): - £1,100,000
- NPV of carbon saved - £36 per tCO₂e
Summary of conclusions

The capital cost of this scheme is greater than Case 1 scheme because the cost of the stand-alone energy centre is higher at £2m than the estimated cost for the pipe along the bridge.

Similar to Case 1, a scheme built and operated by a private ESCo is not commercially viable at the proposed connection charge. According to our results, viability is achieved with a connection charge of £3,400 per dwelling, likely too high to be acceptable to developers.

Again the most commercially attractive option is that of a public-owned scheme based on a connection charge of £2,500 per dwelling resulting in a positive NPV of over £1m that can serve for reinvestment in public services.

The alternative is for a private ESCo owned scheme where LLDC commits to funding the gap in capital finance of just over £1m to reach break-even on the NPV.

These results are highly dependent on the cost of the bridge crossing as well as interest from the selected new build developers.
Techno-Economic Assessment
Case 3 – Standalone Hackney Wick

Scheme Description
The Case 3 scheme is for a network serving loads in Hackney Wick only. For the purposes of this study, the energy centre for hosting the CHP and boiler plant has been located in the Hackney Wick Area Masterplan approximately at the centre of the network.

Optimisation
In this case, the commercial performance improved when the council estates on Daintry Way, Southmoor Way and Corsley Way were excluded as well as the Trowbridge Day Centre and planned development on Hepscott Way.

As we have seen in the previous cases, the council estates are not viable because they are at the end of the network.

Trowbridge Day Centre and the development on Hepscott Way are both comparably small loads (272 MWh and 178 MWh respectively) and under the proposed configuration of the network require relatively long pipework lengths to be reached.

Equipment Sizing
- CHP capacity = 1 MW
- Boiler Capacity = 5 MW

Technical Performance
- Total Heat Load: 9,300 MWh
- Peak Heat Load: 3.8 MW
- Spine Length: 620 m
- Annual Carbon Saving: 1,300 tCO₂
- Approximate Energy Centre Size: 260 m²

Economic Performance
- CAPEX: £5,700,00
- 25 year NPV (6% discount rate): £1,400,000
- Developer contribution per new dwelling to achieve 6% IRR: £1,600
- 25 year NPV (12% discount rate): £2,700,000
- Developer contribution per new dwelling to achieve 12% IRR: £3,200

Economic Performance with £2,500 per new dwelling developer contribution (or connection charge)
- 25 year NPV (6% discount rate): £800,000
- NPV of carbon saved: £31 per tCO₂e
- 25 year NPV (12% discount rate): £600,000
- NPV of carbon saved: £22 per tCO₂e
Summary of conclusions
Similar to cases 1 and 2, the most commercially attractive option is that of a public-owned scheme. Expected returns are in the order of £800,000 (the NPV at 6% discount rate). The IRR of the scheme is just over 8%.

The private ESCo owned option is unlikely to be viable without additional external assistance as the required connection charge at £3,200 is higher than our expected acceptable price. The gap funding required is approximately £600,000.
Techno-Economic Assessment
Case 4 – Stand Alone Fish Island

**Scheme Description**
The Case 4 scheme is the sister option to Case 3 connecting the Fish Island loads only. The proposed Energy Centre was located in the Neptune Wharf given an energy centre is already planned for this new development.

**Optimisation**
It has been found that for this compact network that connects only new developments, optimisation is not necessary as the scheme is commercially viable.

**Equipment Sizing**
- CHP capacity = 0.5 MW
- Boiler Capacity = 2.5 MW

**Technical Performance**
- Total Heat Load: 5,000 MWh
- Peak Heat Load on Network: 2.1 MW
- Spine Length: 530 m
- Annual Carbon Saving: 500 tCO₂
- Approximate Energy Centre Size: 130 m²

**Economic Performance**
- CAPEX: £3,900,000
- 25 year NPV (6% discount rate): £200,000
- Developer contribution per new dwelling to achieve 6% IRR: £300
- 25 year NPV (12% discount rate): -£1,400,000
- Developer contribution per new dwelling to achieve 12% IRR: £1,900

**Economic Performance with £2,500 per new dwelling developer contribution (or connection charge)**
- 25 year NPV (6% discount rate): £1,600,000
- NPV of carbon saved: £43 per tCO₂e
- 25 year NPV (12% discount rate): £400,000
- NPV of carbon saved: £37 per tCO₂e
Techno-Economic Assessment
Case 4 – Stand Alone Fish Island

Summary of conclusions
This scheme is the only network to be commercially viable without optimisation. This is observed under both a private ESCo and public ESCo model. The IRR for the network is just under 16%.
However, as can be seen in the adjacent map, the network is compact serving only eight new developments and no existing buildings, as opposed to the other proposed options which have much wider reach and impact in carbon savings.
Techno-Economic Assessment Summary

Commercial Performance Discussion
Case 4 (Fish Island Standalone) was the only option which was found to be commercially viable without some form of additional support. The other cases show the need for some form of additional support to attain commercial viability, or would only be viable under a public ESCo model with a lower 6% IRR hurdle rate.

Carbon Performance Discussion
The carbon saving potential of Case 1 was observed to have a superior performance due to the lower carbon factor of the Engie heat network in comparison to the stand alone CHP based energy centre of Case 2.

Preferred Scheme
In light of objectives to deliver a wide reaching network with the maximum possible carbon reductions, the Case 1 is considered the most attractive option:
- With Case 2, it connects the largest number of loads
- It has the highest carbon saving performance of all cases.
- Unlike Case 4, it is not commercially viable under a private ESCo model. However, in comparison to Case 2 and 3, it has the lowest gap funding to reach a 12% IRR. Subject to re-estimation of the cost of the bridge crossing, funding of half a million could attract a private ESCo.

<table>
<thead>
<tr>
<th>Equipment sizing</th>
<th>Case 1</th>
<th>Case 2</th>
<th>Case 3</th>
<th>Case 4</th>
</tr>
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<tr>
<td>CHP capacity (MW)</td>
<td>1.1</td>
<td>1.1</td>
<td>1.0</td>
<td>0.5</td>
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<tr>
<td>Boiler capacity (MW)</td>
<td>6.0</td>
<td>6.0</td>
<td>5</td>
<td>2.5</td>
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<table>
<thead>
<tr>
<th>Technical performance</th>
<th>Case 1</th>
<th>Case 2</th>
<th>Case 3</th>
<th>Case 4</th>
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</thead>
<tbody>
<tr>
<td>Total building’s heat load (MWh)</td>
<td>11,300</td>
<td>11,300</td>
<td>9,300</td>
<td>5,000</td>
</tr>
<tr>
<td>Peak network heat load (MW)</td>
<td>4.6</td>
<td>4.6</td>
<td>3.8</td>
<td>2.1</td>
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<tr>
<td>Spine length (m)</td>
<td>1,900</td>
<td>1,800</td>
<td>620</td>
<td>530</td>
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<tr>
<td>Annual Carbon saving (tCO₂)</td>
<td>2,000</td>
<td>1,500</td>
<td>1,300</td>
<td>200</td>
</tr>
<tr>
<td>Approximate Energy Centre size (m²)</td>
<td>n/a</td>
<td>280</td>
<td>230</td>
<td>130</td>
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</table>

<table>
<thead>
<tr>
<th>Economic performance (25-year NPV)</th>
<th>Case 1</th>
<th>Case 2</th>
<th>Case 3</th>
<th>Case 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAPEX</td>
<td>8,400,000</td>
<td>8,800,000</td>
<td>5,700,000</td>
<td>3,900,000</td>
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<tr>
<td>Developer contribution per new dwelling to achieve 6% IRR (£)</td>
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<td>1,600</td>
<td>1,600</td>
<td>300</td>
</tr>
<tr>
<td>Developer contribution per new dwelling to achieve 12% IRR (£)</td>
<td>2,900</td>
<td>3,400</td>
<td>3,200</td>
<td>2,000</td>
</tr>
<tr>
<td>No connection charge 6% discount rate, Cost (£)</td>
<td>-1,400,000</td>
<td>-2,000,000</td>
<td>-1,400,000</td>
<td>-200,000</td>
</tr>
<tr>
<td>No connection charge 12% discount rate, Cost (£)</td>
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<td>-4,200,000</td>
<td>-2,700,000</td>
<td>-1,400,000</td>
</tr>
<tr>
<td>Connection charge: £2,500 6% discount rate, Cost (£)</td>
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<td>1,100,000</td>
<td>800,000</td>
<td>1,600,000</td>
</tr>
<tr>
<td>Connection charge: £2500 12% discount rate, Cost (£)</td>
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<td>-1,100,000</td>
<td>-600,000</td>
<td>400,000</td>
</tr>
<tr>
<td>NPV of Carbon Saving (£/tCO₂) over 25 years, with developer contribution</td>
<td>6% discount case</td>
<td>40</td>
<td>37</td>
<td>31</td>
</tr>
<tr>
<td>12% discount case</td>
<td>-11</td>
<td>-36</td>
<td>-22</td>
<td>37</td>
</tr>
</tbody>
</table>

Table 1
Delivery Considerations
Introduction

This section considers how a heat network might be developed in the Study Area taking into account the findings of this Study.

The possible development approaches that are set out include:

a) Public funding is used to pay for the canal crossings of the heat network, facilitating the Engie heat network expansion.

b) Public funding is leveraged to coordinate a joint market approach of developers for a private sector ESCo to design, fund, operate and maintain a stand alone network.

c) A Public ESCo is created purchasing bulk heat from Engie, or supplying itself from an alternative energy centre. LLDC as the funder could sell the asset to a private sector company based on future asset value.

We considered also the common development barriers:

1. The main technical risk was assumed to be the feasibility of the various canal crossings.

2. The main commercial risk is Demand Risk, which is the risk of not being able to secure sufficient development connections in a timely manor to allow investment in the network.

3. All networks except for Case 4 appeared to require additional grant funding; a series of options are covered.

The decision on commercial approach needs to take account of:

- Allocation of roles. See adjacent table for more details on what these roles consist of.
- Where a role is not automatically allocated (e.g. funder), consideration of the means by which a given party could be influenced to take on that role. What are their drivers? What are their barriers?
- Forms of contract
- Procurement routes and State Aid implications

Each of these elements are highly interdependent. It is very important that all parties are engaged and their commitment tested before completion of the business plan and adoption of certain delivery vehicle.

By the time contracts are drawn up and procurement undertaken, the main parties and their roles should be identified and in most cases fully committed.

<table>
<thead>
<tr>
<th>Role</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promotion</td>
<td>Entity which takes responsibility for driving delivery of network.</td>
</tr>
<tr>
<td>Customer</td>
<td>Purchases heat delivered by the heat network.</td>
</tr>
<tr>
<td>Governance</td>
<td>Body that prescribes policies and rules of conduct and oversees performance. Contract(s) should establish the rules.</td>
</tr>
<tr>
<td>Regulation</td>
<td>As heat networks are currently not subject to statutory regulation, local regulatory arrangements should be established to ensure consumer protection.</td>
</tr>
<tr>
<td>Funding</td>
<td>The funder arranges finance either in cash, loans or grants.</td>
</tr>
<tr>
<td>Asset Ownership</td>
<td>Legal owner of the physical assets of the network. These can be split for different systems and vary over time e.g. generation assets, primary network etc.</td>
</tr>
<tr>
<td>Development of Property</td>
<td>Owner of buildings that are connecting to loads. They need to be involved to provide tertiary network and heat delivery systems.</td>
</tr>
<tr>
<td>Land Ownership</td>
<td>The role of land owner is to grant leases and easements for the siting and access of network assets.</td>
</tr>
<tr>
<td>Landlordship</td>
<td>The landlord may take over from the developer of new build property and have responsibility for network systems in the building.</td>
</tr>
<tr>
<td>Installation</td>
<td>The installer designs and installs the heat network. Installation can be combined with operation as a single integrated contract.</td>
</tr>
<tr>
<td>Operation</td>
<td>Party responsible for the operation and maintenance of the heat network.</td>
</tr>
<tr>
<td>Sale of Heat</td>
<td>Unlike the vertically decoupled electricity and gas markets, heat network operators typically also sell heat to customers. Landlords may take responsibility for revenue collection from tenants.</td>
</tr>
<tr>
<td>Supplier of Last Resort</td>
<td>This role involves taking over delivery and sale of heat in the case of insolvency or end of concession period with no other party to take responsibility for network.</td>
</tr>
</tbody>
</table>

Table 2
Delivery approaches

**Approach A – ‘Toll Bridge’**

As we have seen from the results of the financial analysis, the most attractive heat network scheme is that of Case 1 where the network is supplied by the King’s Yard Energy Centre. The gap in funding for this scheme is in the order of £500,000 for a private ESCo funded and operated network.

The bridge crossing has been identified as a major risk to the feasibility of a network extension from the King’s Yard Energy Centre to Hackney Wick loads. The estimated price for the bridge crossing could range anywhere between £400,000 and £2m.

Public funding of the construction cost for the crossing would significantly reduce the risk profile to the scheme and could make it commercially attractive to an ESCo such as Engie.

The proposed approach would be for LLDC to secure its own funding, either grant or loan, to cover the cost of the pipe crossing and then recoup this capital cost through a use payment from the ESCo using the pipework. This section of the network asset would therefore be owned by LLDC until either the ESCo or other party purchased the asset.

As with any form of public funding, procurement and state aid implications of the approach will need to be considered carefully.

**Approach B – ‘Joint Market Approach’**

The role of promoter is essential for taking a network from feasibility stage to delivery. Identifying who can take on this role can be difficult given many of the stakeholders, such as building developers, who lack the motivation to make a heat network project work. Their drivers are misaligned and too short term to be willing to invest towards a successful heat network.

In particular, where a network will serve public owned buildings and it is in the interest of LLDC to deliver a network, then the LLDC (or other local councils) may be best placed to take on the role of promoter.

This role would usually take the form of identifying an individual within LLDC who ensures:

- all necessary preliminary studies are completed;
- coordinates engagement with and between stakeholders;
- a robust business plan is developed;
- drives procurement of the scheme.

LLDC would need to fund this individual and all associated reports. It should be noted that this public support may not be sufficient to deliver a network given all Cases except for Case 4 are not commercially viable under a private ESCo model.

**Approach B – ‘Public ESCo’**

The financial results indicate that all proposed network options can achieve an IRR above 6%, the internal rate of return typically appropriate for a public sector investment. The public ESCo model therefore would be a way to deliver a network in the Hackney Wick and Fish Island areas.

By this approach, LLDC would be responsible for funding the network and subject to appetite, owning and operating the network. The ownership of generating assets might be split, notably in the case of a connection to the Engie Energy Centre.

The most common structure for delivery would involve establishing an arm’s length company or special purpose vehicle (SPV) that is responsible for the delivery of the infrastructure through subcontracting all services.

The public body approach presents the most economically advantageous opportunity to qualify for low interest finance.

After fulfilling the role of funder and demonstrating suitable performance, the network assets could be sold to a private ESCo, thereby liberating public sector body from the management burden and risks of owning this type of infrastructure long term.
Common Development Barriers

The common development barriers include:

1. The main technical risk is proposed as the feasibility of the various canal crossings namely the Lee River Navigation and Hertford Union Canal. This risk is also an economic risk given the crossing will have cost implications which will affect the financial viability of a scheme.

2. The main commercial risk is considered to be Demand Risk, which is the risk of not being able to secure sufficient development connections in a timely manner to allow investment in the network. For the largest network (Case 1 and Case 2) there are over ten developers with different construction timescales which may be difficult to align with a network build out. Neptune Wharf presents a particularly high risk because construction has commenced and the site already has plans to develop its own site network served by a CHP.

3. All networks except for Case 4 appeared to require additional grant funding. There are funding sources available however the level and focus of support will vary. Options include:
   - Heat Network Delivery Unit (HNDU) funding: HNDU funding is available to local authorities for the delivery of heat networks. So far funding has been granted to support the design and development stages including feasibility studies, design, business case development and procurement. Capital of £300m for heat networks was announced in the October 2015 Autumn Statement.
   - Greater London Authority will be allocating funding for the development of networks. This is likely to be similar to HNDU but restricted to London projects (Energy for London).
   - Community Infrastructure Levy: Local authorities can request a CIL payment from developers.
   - Loans: Local authorities and public bodies can access low interest loans from banks. As an example of precedent, LB Enfield recently secured EIB capital to finance its strategic heat network.
   - Low carbon finance options: These come in the form of loans or grants provided a scheme can demonstrate a carbon reduction against Business as Usual.
Next Steps

The district heating study revealed the opportunity to develop a heat network to the west of the Lee River Navigation Canal. To develop the opportunity, a series of focused studies are recommended:

• **A detailed feasibility and cost study into the canal crossings.** Under the preferred network route, the White Post Lane bridge has been recommended for crossing the Lee River Navigation. A cost assessment of this pipe crossing will help determine whether the Case 1 option is definitively more economic than Case 2. Additionally, within the District Heating Routing assessment (see Appendix B), we have proposed two options for crossing the Hertford Union canal. Although crossing the Wansbeck Road bridge has been indicated as a preferred option, the alternative of crossing at a new footbridge has been highlighted as a means to cross the canal. Further information is therefore required on the possibility of a new footbridge proceeding.

• **Engagement with developers should be prioritised.** LLDC may want to consider including a S106 requirement on new developments in the area to provide design measures for connection to a network. Where planning permission has already been granted, we would encourage LLDC to agree MoUs with the developers to encourage their support.

• **Review funding sources and level of support available to commence development of appropriate business model to deliver and operate a network.**
Appendix A – Heat Load Data Set
<table>
<thead>
<tr>
<th>Building</th>
<th>Address</th>
<th>Typology</th>
<th>Non-resi floorspace (m²)</th>
<th>Number of dwellings</th>
<th>Total building heat demand (MWh)</th>
<th>Data source</th>
<th>Included in Techno-economic model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berkshire Road</td>
<td>Berkshire Road</td>
<td>Residential</td>
<td></td>
<td>0</td>
<td>87</td>
<td>624</td>
<td>HM</td>
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<td>Berkshire Road</td>
<td>Residential</td>
<td></td>
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<td>60</td>
<td>436</td>
<td>HM</td>
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<td>Gainsborough Primary School</td>
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<td>1-2 Hepscott Road</td>
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<td>178</td>
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<td>34-38 Wallis Road</td>
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<td>333</td>
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<td>4 Roach Road</td>
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<td></td>
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<td>302</td>
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<td>115 Wick Lane</td>
<td>115 Wick Lane</td>
<td>Resi + commercial (retail, office and café)</td>
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<td>199</td>
<td>1269</td>
<td>1,266</td>
<td>Benchmark calculation</td>
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<tr>
<td>52-54 White Post Lane (Mr Bagel)</td>
<td>52-54 White Post Lane (Mr Bagel)</td>
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<td>Hackney Wick Station Masterplan Area</td>
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<td></td>
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<td>Hackney Wick Fish Island</td>
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<td>Southmoor Way</td>
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<td>HM</td>
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<td>RON WORKS</td>
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<td>HM</td>
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<td>Biggs Square Estate</td>
<td>Biggs Square / Felstead Street</td>
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<td>675</td>
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<td>Education</td>
<td></td>
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<td>HM</td>
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<td>HOMERTON HOSPITAL NHS TRUST</td>
<td>Homerton Row</td>
<td>NHS</td>
<td></td>
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<td>John Howard Centre</td>
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<td>HM</td>
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<tr>
<td>27 EASTSIDE MEWS</td>
<td>27 EASTSIDE MEWS LONDON</td>
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<td>694</td>
<td>HM</td>
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<tr>
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<td>79 FAIRFIELD ROAD LONDON</td>
<td>Residential</td>
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<td>0</td>
<td>65</td>
<td>663</td>
<td>HM</td>
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<tr>
<td>ARLINGTON BUILDING</td>
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<td>HM</td>
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<tr>
<td>BOW SCHOOL</td>
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<td>Education facilities</td>
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<td>0</td>
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<td>HM</td>
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<td>ELTON HOUSE</td>
<td>FLAT 1 CANDY STREET LONDON</td>
<td>Residential</td>
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<td>62</td>
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<td>HM</td>
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<td>LEXINGTON BUILDING</td>
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<td>MANHATTAN BUILDING</td>
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<td>HM</td>
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<td>OMEGA WORKS</td>
<td>UNIT 56 4 ROACH ROAD LONDON</td>
<td>Residential</td>
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Appendix B – District Heating Routing Study
District Heating Routing Assessment
Overview

Introduction
This report investigates potential route options for a district heating (DH) system for the Hackney Wick and Fish Island development area (shown right) and assesses their viability based on a range of factors.

Assessment Criteria
The route options have been developed and assessed with consideration of the following:
- Location of potential heat loads and positioning of routes to allow connection to these
- Known developments in the area including the Hackney Wick Masterplan
- The location of existing utilities in roads and the pavements; and the
- ability to reroute those utilities
- Land ownership areas within public highway, or owned by public bodies would be preferred over a route through private land, where possible.
- Possible canal crossing locations
- Location of Overground rail line and potential crossing points
- Route length. This would be minimised to ensure adequate efficiency.

Site Investigation
A desktop utilities survey (Type D, PAS 128) has been carried out for the Hackney Wick and Fish Island development area where underground utilities have been identified through the collation and analysis of existing paper and online utility records.
These records were supported and validated by the visual inspection of physical evidence during a site visit in February 2016 (survey Type C, PAS 128).
The original accuracy of the utility information received from the Statutory Undertakers cannot be relied upon for site excavation. Prior to any intrusive ground investigation work, the Contractor should use the appropriate utility detection procedures to ensure the area is clear of utilities.
Pipes would ideally be laid horizontally in section to allow for adequate access for maintenance. Insulation would be required around pipes and therefore each pipe's overall diameter could reach up to 450mm. The insulation is up to 100mm thick and therefore maximum overall diameter is 650mm.

Two pipes (one flow, one return) with additional spacing requirements could result in trenches up to approximately 2m wide, shown below.

In areas where space is limited, the pipes could temporarily stack vertically through the pinch points before transitioning back to horizontal.

Pipes would be pre-insulated as shown in the diagram below right.

In areas where space is limited, the pipes could temporarily stack vertically through the pinch points before transitioning back to horizontal.

Pipes would be pre-insulated as shown in the diagram below right.

Cross Section of trench at pinch points

Cross Section of typical trench
District Heating Routing Assessment
Primary Route Identification

Corridor Identification
The potential corridors in which DH pipes could be routed have been determined by considering the assessment criteria outlined in the previous section.

The DH system would be fed from the existing Kings Yard Energy Centre south of the Copper Box Arena in the Queen Elizabeth Park, from a newly constructed energy centre or there could be a couple of smaller centres around the Hackney Wick and Fish Island site, as identified with the 4 economic case studies in the techno-economic assessment report.

Where possible, the network would run within public roads or in public land. The exceptions to this are through the Hepscott Road development and across Network Rail owned land where the corridor utilises the proposed pedestrian underpass and through the proposed Hackney Wick Station area development. In areas where the services run through private land, way-leave agreements would need to be put in place for access and maintenance.

This report will discuss the options for accessing the northern and southern parts of the site as shown.

River Lee Navigation Crossing
Arup carried out a study in 2015 to assess the options for crossing the River Lee Navigation from the Kings Yard Energy Centre to the Hackney Wick Masterplan area. Four (4) existing bridges were identified as potential crossing points:
- H14 Footbridge
- White Post Lane Bridge
- H10 Footbridge
- Gainsborough Bridge

These are shown in green (left). The White Post Lane bridge was found to be the superior option because it avoids crossing the Thames Water 42inch water mains and the route avoids the Queen's Yard which raised issues of land ownership. Notwithstanding, there remain concerns of the interaction with existing services. The feasibility of this crossing therefore needs to be investigated further. The Gainsborough Bridge and the H10 footbridge have been deemed unsuitable due to their structural form and proximity to buildings respectively. The H14 footbridge has also been discounted for the reasons provided by LLDC during the original district heating routing study which included the challenge to incorporate DH pipes and meet highway standards, the need to make structural changes which would require planning permission and likely interference with other utilities. As a result, only the White Post Lane bridge crossing will be considered. For more details of the assessment that led to these conclusions see the Arup report titled District Heating Routing Study_v2 150421.

Potential Route Options
Three potential route options have been identified and are shown overleaf. The options vary depending on the location of the Hertford Union canal crossing and traversing the Overground rail line.
District Heating Routing Assessment
Potential Route Options

Southern Leg Options

Option 1 – Cross Hertford Union Canal at Wansbeck Road

Option 2 – Cross Hertford Union Canal via the existing footbridge or a new pipe/footbridge

Option 3 – Cross Hertford Union Canal at two locations which reduces pipe lengths to some of the buildings
District Heating Routing Assessment

Potential Canal Crossings

**Wansbeck Road Bridge**

This crosses the Hertford Union Canal west of the footbridge described above and adjacent to the A12. On either end of this bridge are the Neptune Wharf and the Hepscott Road development sites.

A vegetated area (shown below right) between the bridge and Neptune Wharf could provide the corridor for the DH south of the pipe bridge.

The northern approach to the pipe bridge would need to route through the edge of the Hepscott Road Development at the point which the road starts to incline. This would need to be discussed to form a wayleave agreement with the land owner.

The ability to penetrate the boundary wall of the Hepscott Road development would need to be investigated further.

**Hertford Union Canal Footbridge**

The Footbridge over the Hertford Union Canal, shown right, is a cable suspended structure with a steel trussed deck. Electrical cables, which supply up lighting, run underneath the deck (left, below). The bridge is considered too shallow to accommodate DH services within its depth and the nature of the structure means that suspending services on one side would be difficult from a stability perspective. The addition of visible pipes alongside the bridge would also detract from its architectural integrity.

By visual inspection, the soffit of the bridge deck is thought to be too low to accommodate suspended district heating pipes and retain adequate headroom for canal boats. This footbridge is therefore discounted as a possible crossing location.

However, LLDC has indicated the possibility for a new or replacement footbridge to be constructed close by. In this case, DH pipes could be integrated into its design. Crossing this canal as far east as possible reduces the length of pipe required to reach the properties near Roach and Stour Road.
District Heating Routing Assessment
Utility Constraints

Methodology
Potential DH corridors have been assessed against existing utilities by conducting a desktop based study using Statutory Undertaker asset records provided by Groundwise.

The principal utility routes within the potential DH corridors have been identified and shown right.

The existing utilities along this route have been highlighted to determine which areas are particularly congested and should therefore be avoided by the DH route.

Identified Congested Areas
The bridge underneath Hackney Wick Overground Station appears to be congested because of the number of utilities running through such a narrow width (approx. 8.7m).

Wallis Road and Berkshire Road also appear to contain a large number of services including a trunk combined sewer in the centre of the carriageway and this area would ideally be avoided.

The White Post Lane area contains two 42” potable water mains and construction in the vicinity of these should be avoided where possible.

Smeed Road is the route through which the majority of the Fish Island area’s utilities are fed, including a mainline combined sewer, and thus is congested. This should be avoided where possible.
District Heating Routing Assessment
Utility Constraints Within Route
Photographs of Congested Areas

The arrows pinpoint access covers which indicate the presence of utilities.
District Heating Routing Assessment
Utility Constraints Within Route

Photographs of Congested Areas

Images of Dace Road help identify the utilities present in the area with a lack of information available from Groundwise utilities records. The arrows pinpoint access covers which indicate the presence of utilities.
District Heating Routing Assessment

Cross-Sections

Two cross sections have been created for key parts of the route where there appears to be a large number of utilities to determine the potential space available for the district heating trenches.

Cross Section A-A – Hackney Wick Underpass

Cross Section B-B – Berkshire Road
In conclusion, for the northern part of the network, it is considered preferential to go through the proposed pedestrian underpass for the Hackney Wick Station. This has already been identified as a preferred route in the Hackney Wick Masterplan due to the lack of space available in Wallis Road.

With regard to the southern end of the network, the crossing options highlighted in Option 2 and 3 (see slide 34) are selected as the preferred options. Option 3 was discounted on the grounds of a longer pipe route and the increased cost associated with two crossings of the Hertford Union Canal.

Option 1 proposes to cross the canal adjacent to the Wansbeck Road Bridge. This would mean that the view across the canal would be unobstructed and thus would be less visually intrusive.

Option 2 proposes to cross the canal via a new or replacement footbridge. This would need to be coordinated with the developer at an early stage to ensure allowances are made for the services to cross.

Both options would result in services running within the Hepscott Road development site. This would require negotiations to take place with the landowner.

For the purposes of the techno-economic assessment, the route presented in Option 1 will be considered given the uncertainty around the development of a new footbridge across Hertford Union Canal.
District Heating Routing Assessment

Next Steps

- Obtain utility records drawings for the area near Dace Road and Wick Lane to inform the location of services.
- Liaise with private landowners regarding routing through their developments.
- Engage with key stakeholders, identified as:
  - Thames Water
  - UKPN
  - BT
  - Engie
  - London Borough of Hackney/ Tower Hamlets
  - Network Rail
  - Canal River Trust
  - TFL
- Agree a preferred route for the primary network
- Confirm viability of crossing White Post Lane Bridge
- Discuss further the possibility of the replacement footbridge over the Hertford Union Canal providing a crossing point for DH services.
- Constraints and challenges associated with selected route to be reviewed in more detail.
- Carry out ground penetration surveys and trial trenches to confirm the location of existing services.
- Design development of preferred route in coordination with district heating network providers.
District Heating Routing Assessment
Utility Records
Thames Water Potable Water
District Heating Routing Assessment
Utility Records
Thames Water Sewers
District Heating Routing Assessment
Utility Records
National Grid Gas
Appendix C – Assumptions
## Assumption for techno-Economic Assessment

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<td>Cost of pipework</td>
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Appendix D – Un-optimised Results
Un-optimised results summary.
These results are of the networks without the optimisation process of eliminating loads that were not economically beneficial to the schemes.

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For further information this submission please contact:

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