

SUPPORT LETTER

1. Task Summary

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|-----------------------------------|-----------------|---|----------------|---|
| Task ref / title | d | Name of Project: Kingston district heat network – addition of hospital site | | |
| Workstream / project codes | DEEP | 80814 | | |
| Type (✓): | e.g. New | | Change | ✓ |
| Budget: | Original budget | £49,000 | Revised budget | £83,500 (additional £34,500 for this study) |
| Programme dates | Start date | 22 June 2020 | Finish date | 28 Aug 2020 (extension until 30 Sept 2020) |

Change History

| Revision | Issue Date | Description | Budget |
|----------|------------|-------------|--------|
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2. Project Description

The GLA has funded a detailed feasibility study of creating a viable zero carbon district heating system in Kingston, which exploits the 50 GWh pa heat expelled from the Thames Water Hogsmill waste water treatment plant. BuroHappold were selected to do the DFS, following a competitive tender process using the GLA's DEEP framework.

Kingston Council has used the DFS, and earlier GLA funded studies, to make the business case to HNDU for detailed project design funding. This was agreed and the DPD commences in October 2020. The information provided in the DPD will enable Kingston Council, Thames Water and Kingston Hospital Trust to make an investment decision in December 2020.

Kingston Council has requested an extension of the DFS to include the Kingston Hospital site legacy energy systems, which require major revision to enable a viable connection to the Hogsmill based district heat network scheme. The results will be entered into the evidence collected in the DPD.

3. Scope of Task

The work undertaken under this Task Order comprises of:

Detailed Feasibility Stage Update (£34.5k) – addendum to existing DFS for connection of the hospital to the Hogsmill Heat Network. This will be a lighter touch update than a typical DFS but with sufficient detail to establish the Hospital's inclusion into the DPD

- Stage 1 – Long list of energy supply options
(3 weeks from receipt of hospital information)
 - RFI to Hospital and undertake review:
 - previous Hospital studies including site engineering reports from Ameresco and Carbon Architecture
 - half-hourly energy data for the site and energy prices, metered data for individual buildings. (note the total Hospital heat load is 23 GWh/a)
 - latest masterplan for the Hospital campus
 - current NHS Trust policy for decarbonisation
 - Estimate future loads and phasing including cooling (for possible heat recovery). Benchmarking from existing projects and Health Technical Memorandum (HTM) Standards for future building
 - Identify technical potential for heating, cooling and private wire opportunities and desteaming the on-site network
 - Scope out scenarios for the hospital i.e. around connection to DHN, de-steaming, retaining steam network
 - Review of long list of scenarios and score qualitatively against carbon, cost, space take, GLA / RBK / Hospital requirements.
 - Present findings back to hospital to agree core options to take to Stage 2.
- Stage 2 – Comparison of viable options
(6 weeks following Stage 1 agreed options)
 - Develop technical potential for heating, cooling and private wire opportunities and desteaming the on-site network
 - Focus the study on the agreed core options from Stage 1 and test certain sensitivities within those. The functionality to change certain sensitivities such as energy prices, % heat fractions from each technology, capex, funding etc is already built within the techno-economic model. The 3 core options that I had set out I would expect to be as follows, but these will be agreed in Stage 1:
 1. Steam network plus low temperature network (BAU)
 - A. On-site CHP + gas boilers
 2. De-steamed and Low temperature network extended to full site
 - A. On-site CHP + HP + gas boilers (including HP based on GLA steer that they would be expecting element of decarbonisation with the masterplan)
 - B. On-site HP + gas boilers
 2. Import of zero carbon heat from Hogsmill in varying quantities
 - A. DHN supply. Gas boiler top-up (% heat fraction can be varied in the model). 'Goal seek' to find threshold price point for network to be viable.
 - Reduced import costs of electricity from grid will be considered where CHP is used.
 - Cooling will be assumed as electricity except where CHP is present (absorption cooling only in scenario where CHP is retained). Heat recovery potential to be considered on a de-steamed network where centralised cooling systems are planned/exist
 - High level plant room sizing estimates will be made for each scenario
 - Update the existing detailed feasibility technical scheme to include the hospital
 - update technical design at the energy centre - energy modelling, plant sizing, network routing / sizing
 - desk-based network routing study (assumed utilities surveys excluded)
 - costing for additional plant, network etc.

- Engagement with the hospital (meetings / calls) to establish
 - Suitability of buildings for connection and conversion to LTHW (de-steamed) and any other residual steam requirements
 - Key constraints / opportunities / strategic risks
 - Appetite for heat network connection
 - Investigate whether the Trust could host some of the 'back-up' boilers likely to be needed
- High-level Techno-economic modelling of full scheme including CRE and Hospital with sensitivity testing
- Identify and quantify commercial opportunities including funding and savings (e.g. EU-ETS payments)
- Carbon calculations
- Outputs
 - Presentation to hospital
 - Final report and exec summary
 - Dashboard tool to provide summary of modelling outputs (e.g. capex, energy revenue costs and carbon emissions) which allows user to change heat fractions and other sensitivities developed in the modelling.
- Outline programme – 8 weeks from receipt of Hospital studies and energy data

4. Approach

The DFS extension will be carried out in full cooperation with the Kingston Hospital Trust, which is adopting carbon emission savings targets and wishes to consider procuring an external supply of zero carbon heat.

5. Outputs

| Agent | Deliverable | Deliverable date | Project Week |
|-------------|---|---|--------------|
| BuroHappold | <ol style="list-style-type: none"> 1. <input type="checkbox"/> Presentation to hospital 2. <input type="checkbox"/> Final report and executive summary 3. <input type="checkbox"/> Dashboard tool to provide summary of modelling outputs (e.g. capex, energy revenue costs and carbon emissions) which allows user to change heat fractions and other sensitivities developed in the modelling. 4. <input type="checkbox"/> Outline programme – 8 weeks from receipt of Hospital studies and energy data | <p><i>12 October 2020 (draft report sent 29 Sept)</i></p> <p><i>With support from Kingston Council, KHT will make a PSDS application based on evidence in the GLA</i></p> | |

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| | | <i>funded document</i> | |
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6. Budget

£34,500 is the total budget for the BuroHappold work and final report.

7. Document Verification

| Revision | Date | Filename | Kingston DFS extension to hospital support letter final.docx | | |
|----------|-------------------|-------------|---|------------|-------------|
| | 01 September 2020 | Description | Detailed Feasibility Stage extension re connection of Kingston Hospital to Hogsmill Heat Network. | | |
| | | | Prepared by | Checked by | Approved by |
| | | Name | [REDACTED] | [REDACTED] | [REDACTED] |
| | | Signature | [REDACTED] | [REDACTED] | [REDACTED] |
| | | | | | |

8. Final GLA Authorisation

Name [REDACTED]

Signed

[REDACTED]

Date 15 December 2020