Cory Decarbonisation Project

Responses to Deadline 1 and Deadline 2 submissions on behalf of Landsul Limited and Munster Joinery (U.K.) Limited

Introduction

1. This submission is prepared on behalf of Landsul Limited ("Landsul") and Munster Joinery (U.K.) Limited ("Munster Joinery") and summarises their response to the D1 and D2 submissions. It also includes a request for permission to question the Applicant's experts under s94(4) Planning Act 2008, and should be read together with Landsul and Munster Joinery's previous submissions and the attached reports.

The Munster Joinery land is not required to construct the scheme

2. Landsul and Munster Joinery maintain its position that the Munster Joinery land is not required to construct the proposed scheme and that there is no compelling case for compulsory acquisition.

3. A supplementary expert report has been prepared by Dr Craig Edgar which is attached as Annex A (the "Report"). The Report considers and responds to the information and submissions made by the Applicant at D1 and D2 along with additional information supplied by the Applicant (as set out in the Introduction to the Report). It also includes, at Appendix A, an updated alternative layout ("AL") reflecting this additional information and details the areas where Dr Edgar has used a similar or the same approach as the Applicant and the areas where there is a disagreement with the Applicant.

4. The report concludes, and the AL demonstrates, that:

   4.1. it is still possible for all necessary plant to be accommodated to the north of the Munster Joinery land;

   4.2. the AL would be operationally equivalent to the Applicant's layout and would most likely offer an improved financial return for the Applicant; and

   4.3. it is not necessary to acquire the Munster Joinery land in order to construct and operate the Applicant's proposed scheme.

Heat Transfer Station

5. One area of disagreement set out in the Report is whether there is a need for a heat transfer station ("HTS") as part of the proposed scheme. The Report concludes that there is no need as, based on the Combined Heat and Power Feasibility Review commissioned by the Applicant (appended at Annex B) (the "Feasibility Review"), there is no identified demand for the heat that is to be produced by the proposed scheme.

6. Paragraph 2.3 of the Feasibility Review confirms that the *"capacity and grade of heat available from RRRF* [Riverside 1] *aligns strongly with the projected network heat demands"* and that any *"Additional heat demand beyond that which RRRF could supply independently could be met by REP* [Riverside 2]*".* As such, based on the Feasibility Review, any identifiable demand for heat can be serviced by RRRF and supplemented by REP. The application contains no further justification for the HTS; the Feasibility Review is the Applicant's latest quantitative assessment of viably served heat demand in the area.

7. At Annex C is a transcript of the discussion of the HTS in ISH1 which highlights that it is not clear whether the HTS is designed for heat transfer from the proposed scheme only or from Riverside 1 ("RRRF") and Riverside 2 ("REP") too and, if the latter, how heat would be transferred from RRRF and REP if the proposed scheme was not granted. The Applicant was asked by the Examining Authority to prepare a note setting this out. The Applicant prepared a Heat Network Interaction Note (REP1-026) however it neither sets out whether the HTS is required to facilitate heat from RRRF and REP nor the requirements for a HTS within RRRF and REP.

8. We contend that there is no need for a HTS or any other equipment within the proposed scheme to facilitate the transfer of heat from RRRF and REP, and such provision would not be associated development and should not be consented. The conditions of the permission for RRRF and the requirements of the DCO for REP include provision for any necessary equipment to be installed within each of RRRF's and REP's application boundaries respectively.

9. In the case of RRRF, the Applicant is required to ensure that RRRF is heat export ready and must provide any necessary equipment for the transfer of heat from RRRF up to the boundaries of RRRF as follows:

    9.1. Condition 30 of Permissions 21/01744/ALA (appended at Annex D) and Permission 16/02167/FUL (appended at Annex E) requires RRRF to be provided with and space reserved for certain items of equipment to facilitate district heating schemes; and

9.2. Condition 31 of Permissions 21/01744/ALA and 16/02167/FUL requires submission of a feasibility review assessing commercial opportunities for use of heat from RRRF and, where such viable opportunities for heat transfer from RRRF are identified, a scheme for the necessary plant and pipework to the boundary of the RRRF site. Such plant and pipework must then be installed to the boundary of the RRRF site in accordance with that approved scheme. The Feasibility Review was approved under 16/02167/FUL02 (appended at Annex F) and identified viable opportunities for the transfer of heat from RRRF. Subsequently, the Applicant obtained approval of the proposed location of the necessary plant and pipework within the application boundaries of RRRF under 16/02167/FUL03 (appended at Annex G).

10. Additionally, planning permission has been granted under reference 22/00728/FUL for the installation of a district heat network pipeline in Norman Road connecting to RRRF (appended at Annex H) to distribute the heat from the RRRF boundaries to the wider network.

11. In the case of REP, the Applicant is similarly required to ensure that REP is heat export ready and, if a combined heat and power review determines that there is sufficient certainty about the heat district network, provide all necessary equipment and pipework for the distribution of heat to the boundaries of REP as follows:

    11.1. Requirement 2 of the REP DCO requires details of a heat network to be approved and demonstration that there is sufficient space to support a HTS within REP. This requirement was discharged under 19/00998/ALA14 (appended at Annex I);

    11.2. Requirement 23 of the REP DCO requires a phasing programme to be approved for the construction of certain works to facilitate heat distribution to be completed at the anticipated date of final commission of Work No. 1A or 2B (as applicable). This requirement was discharged under 19/00998/ALA15;

    11.3. Requirement 24(1) of the REP DCO requires:

        11.3.1. REP to be constructed to produce combined heat and power through the provision of and reservation of space for certain items of equipment necessary to facilitate a heat transfer;

        11.3.2. that a working group be set up to, amongst other things, assess potential commercial opportunities for the export of heat from REP and state whether

there is sufficient certainty about the likely district heat network to enable the undertaker to install the necessary combined heat and power pipework; and

11.3.3. where there is sufficient certainty, to install the necessary pipework within the boundaries of REP.

12. As the Applicant is already required to provide HTSs as part of RRRF and REP, there is no need for any HTS within the proposed scheme to facilitate the transfer heat from RRRF and REP to meet the demand identified in the Feasibility Review. The need for a HTS within the proposed scheme should therefore be assessed on whether there is a demand for the heat produced by the proposed scheme, which there is not.

Inadequate Socio-economic assessment

13. Landsul and Munster Joinery maintain its position that the Environmental Statement does not contain a proper and comprehensive assessment of the impacts of the loss of the business from the Munster Joinery land.

14. The Applicant's deadline 2 submissions have been reviewed by socio-economic development experts at Lichfields, whose supplementary report is attached at Annex J, who conclude that the Applicant has failed:

    14.1. to provide sufficient further justification or evidence on the basis of their approach; and

    14.2. to fully capture the extent of the potential significant adverse socio-economic effects and associated mitigation measures, including reasonable alternatives to compulsory acquisition.

15. Consequently, the negative socio-economic impacts insofar as they relate to the Munster Joinery land have been significantly understated.

Request for Permission to question Applicant's experts

16. Annex K contains an application under s94(4) Planning Act 2008 to question the Applicant's experts at CAH2.

Conclusion

17. Landsul and Munster Joinery remain firmly opposed to the acquisition of the Munster Joinery land. The supplementary expert reports enclosed further confirm that the proposed scheme can be delivered without this land and that the compulsory acquisition, and socio-economic impacts arising from said acquisition, are not justified.

18. These matters and the expert evidence submitted will need to be considered and examined by the Examining Authority at Compulsory Acquisition Hearing 2 and for such matters to be effectively examined, Landsul and Munster Joinery should be granted permission to question the Applicant's experts at that hearing.

For and on behalf of Landsul and Munster Joinery

January 2025

ANNEX A

Supplementary Expert Report by Dr Craig Edgar

Expert Report

Supplementary Report for Deadline 3

Cory Decarbonisation Project

Landsul Ltd and Munster Joinery (U.K.) Ltd

Report Details

Client	Landsul Ltd and Munster Joinery (U.K.) Ltd
Project	Cory CCS
Project Number	2409
Report Number	2409_R_003

Document History

Revision	Date	Prepared By	Notes
0	15/1/25	Craig Edgar	First Draft
1	17/1/25	Craig Edgar	Issued

Notice

Abbreviations, Acronyms and Definitions

Applicant	Cory Environmental Holdings Ltd
BLEVE	Boiling Liquid Expanding Vapour Explosion
CHP	Combined Heat and Power
EA	Environment Agency
EfW	Energy from Waste
DCC	Direct Contact Cooler
DCO	Development Consent Order
HNIP	Heat Networks Investment Project
HTS	Heat Transfer Station
ISH	Issue Specific Hearing
PINS	Planning Inspectorate for England
Proposed Development	The carbon capture, liquefaction and storage project
SLD	Single Line Diagram

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1. INTRODUCTION

A. Purpose of report

1.1 This report supplements my earlier expert report (2409_R_001) which was submitted on 22nd November 2024 for Deadline 1. Since preparing that report, I have been provided with further information, in particular:

(a) Informal / without prejudice explanations / information provided in a meeting with Mr Tony Alderson (WSP) on 13th December 2024.

(b) Informal / without prejudice explanations / information provided in a meeting with the wider Applicant team including representatives from Cory and WSP on 8th January 2025.

(c) Written Summary of the Applicant's Oral Submissions At Issue Specific Hearing 1 (ISH1): 9.8

(d) Applicant's Response to Landsul and Munster Joinery's Deadline 1 Submission Number : 9.14

(e) Riverside Resource Recovery Facility Combined Heat and Power Feasibility Review. Fichtner Engineering Consultants Ltd on behalf of Cory. S2383-0030-0020JB2. June 2021

(f) Single Line Diagrams, 70090329-WSP-01-XX-SLD-EL-0001 to 0005

(g) Response to Information Request from Landsul received by e-mail on 2nd January 2025

1.2 Based on the additional information, I have made some modifications to my own Alternative Layout for the plant.

1.3 This report should be considered additional to my earlier expert report and, unless otherwise expressly noted, the information and opinions in that earlier report remain valid.

B. Expert Declaration

1.4 I am a chartered engineer and member of the Institute of Chemical Engineers with a first class engineering degree and a doctorate from the University of Strathclyde in chemical engineering. I have more than 20 years' experience in process engineering and project development – primarily within the power generation sector. This includes experience in the development of carbon capture facilities. A copy of my CV was provided with my initial report.

1.5 I, Craig Robert Edgar, declare that:

(a) I confirm that I have not entered into any arrangement where the amount or payment of my fees is in any way dependent on the outcome of the case.

(b) I know of no conflict of interest of any kind, other than any which I have disclosed in my report.

(c) I do not consider that any interest which I have disclosed affects my suitability as an expert witness on any issues on which I have given evidence.

(d) I will advise the party by whom I am instructed if there is any change in circumstances which affect my answers to points b and c above.

(e) I have shown the sources of key information I have used.

(f) I have exercised reasonable care and skill in order to be accurate and complete in preparing this report.

(g) I have endeavoured to include in my report those matters, of which I have knowledge or of which I have been made aware, that might adversely affect the validity of my opinion. I have clearly stated any qualifications to my opinion.

(h) I have not, without forming an independent view, included or excluded anything which has been suggested to me by others including my instructing lawyers.

(i) I will notify those instructing me immediately and confirm in writing if for any reason my existing report requires any correction or qualification.

1.6 I confirm that the contents of this report are true to the best of my knowledge and belief.

2. UPDATED ALTERNATIVE LAYOUT

2.1 I have included an updated Alternative Layout in appendix A. The key differences to the previous layout (which I will discuss in more detail below) are:

(a) The Heat Transfer Station (HTS) is now a fully segregated facility to match the Applicant's proposal.

(b) The liquid CO_2 storage tanks have been relocated further away from Norman Road to address concerns raised by the Applicant in respect of their previous location in the Alternative Layout.

(c) The water storage tank is now an underground tank to match the Applicant's proposal.

(d) The Welfare Facilities and Control room have increased in size to match assumptions given by the Applicant.

(e) The footprint for the cooling towers has been changed to match that of the Applicant.

(f) The Water Treatment Plant footprint has been changed to match that of the Applicant.

3. AREAS WHERE MY APPROACH IS SIMILAR TO / THE SAME AS THE APPLICANT

3.1 As was the case in my initial report, in terms of the majority of the key process equipment I agree with the Applicant in terms of need, duty and footprint. There are some exceptions to this which I discuss in the next section.

3.2 Like the Applicant, I have adopted a 2-line approach even though a single line could have resulted in a smaller footprint. The key reason that I had done this is that even with a 2-line approach, it is still possible to accommodate the carbon capture facility without requiring the Munster Joinery Land and I have followed the general principle of attempting to maintain as much similarity with the Applicant's approach as possible. However, it remains

worthy of note that a single line is an entirely viable option (and might even be preferred if minimising capital cost is the priority).

3.3 In the Issue Specific Hearing (ISH), the Applicant provided clarity on the proposed approach in terms of running the carbon capture facility as a separate operational entity. Whilst it would have been entirely possible to integrate it with the EfW facilities (and hence reduce footprint requirements for items such as welfare facilities and carparking) this decision is primarily a commercial one rather than technical and therefore I have now adopted the same philosophy as the Applicant. In terms of welfare facilities, control room, gatehouse and car parking I have used the same footprint assumptions as the Applicant.

3.4 The Applicant has also explained[1] that the Heat Transfer Station (HTS) will be a fully separate facility which will be run by a third party. This means that my original positioning of this facility would not be appropriate. However, it also means that, self-evidently, if the HTS is to be a segregated, stand-alone facility run by a third party there is no need for it to be part of the contiguous site.

3.5 In any case, I have now adopted the same assumptions as the Applicant in terms of the HTS and located it to the south of the carbon capture development. Notwithstanding the inclusion of the HTS in my layout, as I discuss in 4.5 to 4.15, it is highly questionable as to whether there is actually a need for this equipment at all in light of additional information I have reviewed since my initial report.

3.6 The Applicant has provided a further breakdown on the cooling loads[2] as follows:

(a) *total cooling load of 362.3 MW, broken down as follows:*

(i) *Capture Plant Train 1: 155.5 MW*

(ii) *Capture Plant Train 2: 155.5 MW*

(iii) *Liquefaction, Refrigeration, Balance of Plant: 51.3 MW*

(b) *within each capture plant train, the major cooling loads are as follows:*

(i) *Direct Contact Cooler Cooling Water Cooler: 79.9 MW*

(ii) *Absorber Wash Water Cooler: 35.3 MW*

(iii) *Lean Solvent Cooler: 19.3 MW*

3.7 Whilst, as I noted in my previous report, the total cooling load appears high compared to benchmark figures, I have adopted the same cooling load in my own design. I have also adopted the same footprint as the Applicant for the cooling towers.

4. AREAS OF DISAGREEMENT WITH APPLICANT

A. Sustainability Considerations

4.1 The Applicant has correctly noted[3] that in my development of the site layout, I have not carried out ecological surveys or sought to provide planting / biodiversity improvements. However, I do not agree with the Applicants contention that this means that the Alternative Layout is not deliverable. As part of the Applicant's response, a "Contextual Indicative Equipment Layout" drawing has been provided to support this argument. Figure 1 below contains an extract from that drawing.

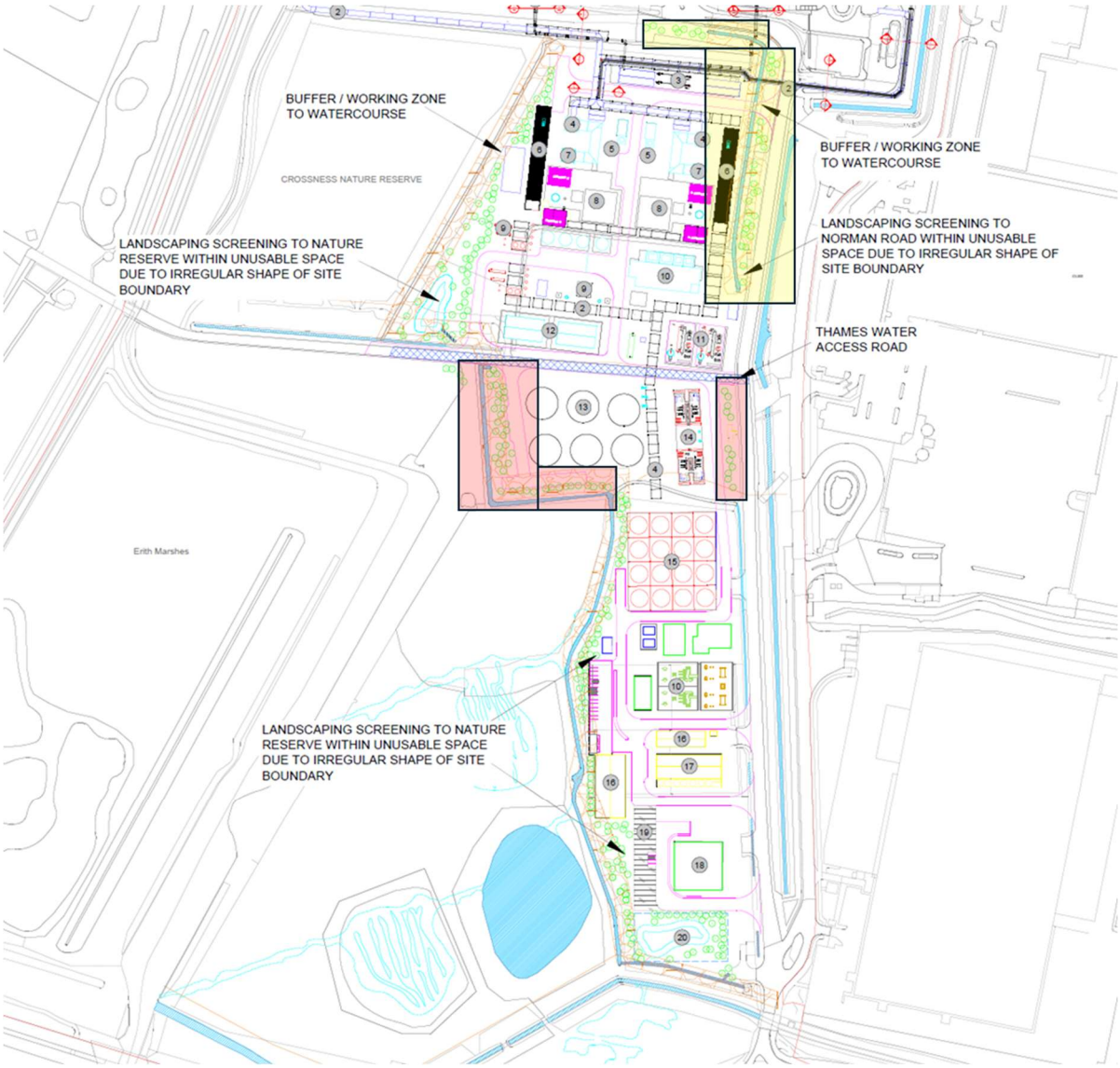


Figure 1 – Contextual Indicative Equipment Layout

4.2 In Figure 1, I have highlighted (yellow and red boxes) a number of areas of planting. As can be seen from the Applicant's text on the figure, it is contended by the Applicant that (at least for the yellow areas) this is "unusable space due to the irregular shape of site boundary". I do not agree that this space is irregular – it is actually quite rectangular and would be entirely useable as part of the operational area. It is less clear whether the Applicant also makes this contention for the areas highlighted in the red boxes but, again, I would not consider these spaces either irregular or unusable.

4.3 For context, my estimate is that the planting shown in the yellow and red boxes has a footprint of approximately 7,000 m^2.

4.4 It is also important to note that in terms of the planting to west of the northern part of the site, my Alternative Layout would enable very similar planting / screening to what the Applicant proposes. For the planting to the west of the southern part of the site (which is a genuinely irregular shaped boundary) the Alternative Layout again is similar to the Applicant's scheme and would thus enable similar planting / screening to what the

Applicant proposes. Finally, the smaller footprint of the Alternative Layout clearly can reduce the visual impacts of the development and enable significantly more planting should that be required. For instance, the entire area south of the Munster Joinery land could be planted if so desired in the Alternative Layout.

B. Heat Transfer Station

4.5 Subsequent to the preparation of my original report, I have been provided with a copy of a Combined Heat and Power Feasibility Review[4] that was prepared by Fichtner Consulting Engineers on behalf of Cory. The Applicant was asked to identify whether there was a more recent equivalent assessment of heat demand and feasibility of connection, but no such assessment has been provided.

4.6 The Fichtner report carried out a thorough review of the potential heat demand within a 10km radius of the Riverside facility in accordance with the requirements set out in Section 4 of the EA's CHP Ready Guidance. The report considered both existing heat demand from the residential, transport, industrial and retail sectors as well as seven additional prospective residential and commercial developments. Figure 2, taken from that report, shows the projected heat demand showing both daily and seasonal variation.

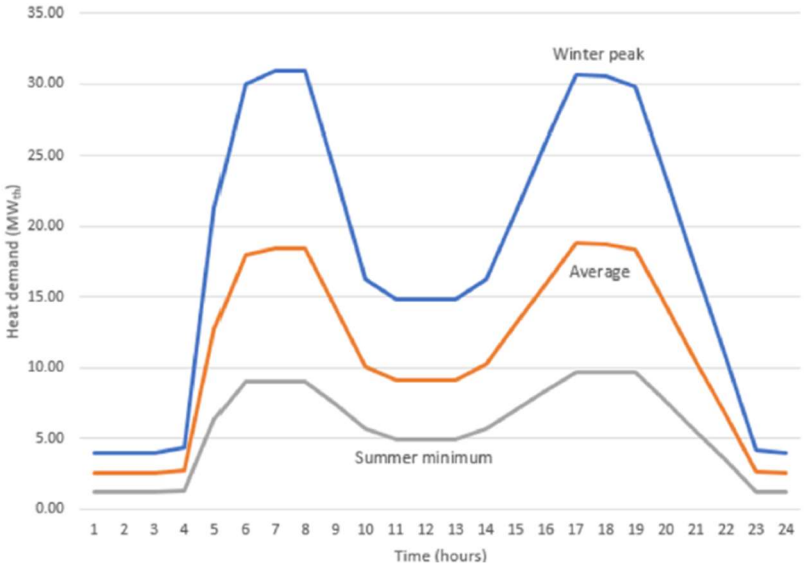


Figure 2 – Projected Heat Demand

4.7 The shape of the heat profile is typical but does indicate the challenge in developing this sort of infrastructure as there is significant variation both on seasonal and daily basis. This means that whilst a significant capacity (and hence capital cost) is required to meet peak winter demand the relatively lower annual demand means that it can be challenging to recover this capital investment through heat sales. This is noted by Fichtner in section 2.4 of the report where it is stated that "*the net present value (before financing and tax) over 33 years is negative*". However, in May 2021 Cory was awarded a £12.1 million grant through the Government's Heat Network Investment Project (HNIP) to help improve the economic feasibility of the scheme.

4.8 Fichtner has also provided the following heat load duration curve (each data point is the instantaneous heat demand at each hour of the day for each month) which is shown in Figure 3. The orange horizontal line shows the available heat load from Riverside 1.

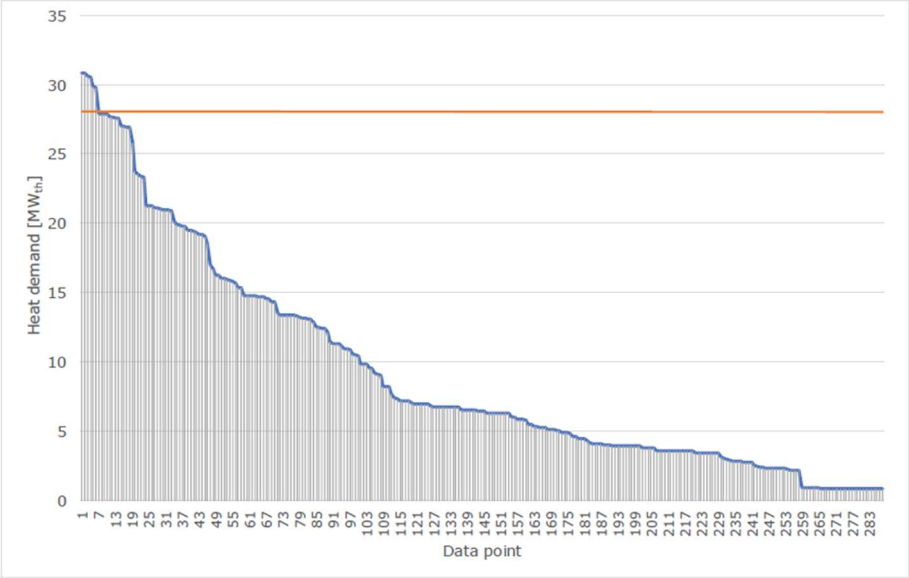


Figure 3 – Heat load duration curve

4.9 It can be seen that, for the vast majority of the time, the heat that can be exported by Riverside 1 is significantly higher than the demand.

4.10 The Applicant suggests that the carbon capture plant will provide 100 MWt[5] of heat. However, in the context of the report that Cory themselves commissioned, it would appear that there is no identified demand for this heat.

4.11 My understanding, from a meeting with the Applicant and subsequent correspondence[6] is that Cory is now looking at supplying heat towards central London and the City of Westminster and City of London in particular. I have not been provided with any detailed feasibility assessments of these opportunities and can only assume that these are at an early stage of consideration.

4.12 It is a general principle of heat networks that installation costs in existing cities are high and also that heat losses become prohibitive as distance between the heat supply source and heat demand centre increase. For both the City of Westminster and City of London, there would also be the significant challenge of providing a connection across the River Thames.

4.13 Section 5.2.4 of the Fichtner report would seem to concur as it is concluded that "*Based on our engineering assessment, connecting to sites to the north of the River Thames would not be feasible*" and "*Additionally, without additional anchor loads nearby, connection costs to the heat loads in remote locations are likely to be prohibitive.*"

4.14 As noted in 4.7 above, the economics of the current heat export scheme are challenging even with the benefit of the HNIP grant funding. It would be expected that supply of heat to more distant consumers, which would be more costly in terms of capital and less efficient in terms of heat losses during operation, would also be challenging from a commercial standpoint.

4.15 Based on the above, it seems that the Applicant's plans for heat export are aspirational and evidence has not been presented to demonstrate that there is a real need for the additional heat from the carbon capture plant. Therefore, the heat transfer station has not been demonstrated to be required in terms of the carbon capture development.

C. Liquid CO2 Storage

4.16 With the current focus on developing more carbon capture, storage and transportation schemes, work is being carried out to better understand the health and safety risks associated with the storage and transport of liquid CO_2. A recent publication[8] funded as part of the EU's Horizon 2020 programme gives a good review of the key issues. As explained in that publication, a release of CO_2 is dangerous at even low concentrations (exposure to 4% CO_2 by volume is classified as immediately dangerous to life or health). A further issue with CO_2 is that because it is heavier than air, in the event of a release it does not disperse as readily as a lighter gas would.

4.17 For the proposed carbon capture development, perhaps the most significant hazards are from the liquid CO_2 pipeline and the liquid CO_2 buffer tanks.

4.18 One difference between the Alternative Layout that I have developed and the Applicant's is the size and number of tanks used for the buffer storage of the liquid CO_2. Both schemes look to provide circa. 24,000 m^3 of liquid CO_2 storage but the Alternative Layout does so using 3 x circa. 8,000 m^3 tanks whilst the Applicant uses 6 x circa. 4,000 m^3 tanks.

4.19 A larger number of tanks increases the required footprint but the Applicant has clarified that the decision to use 6 tanks is driven by concerns over the extent of any release in the event of a catastrophic failure of any tank[7]. A smaller tank contains less CO_2 and therefore in the event of a catastrophic failure of the tank, less CO_2 is released and the area of exposure (and danger to life) from the CO_2 is reduced. However, doubling the number of tanks doubles the likelihood of a catastrophic failure of a tank.

4.20 A potential cause of catastrophic tank failure is a Boiling Liquid Expanding Vapour Explosion (BLEVE)[9]. A BLEVE results from very sudden depressurisation of a pressurised liquid (such as CO_2) which creates a superheated liquid phase that suddenly vaporises in an explosive manner. This may give a transient overpressure peak inside the vessel, which may lead to a powerful burst of the whole vessel, with total loss of content, a resulting blast wave and risk of flying fragments. A concern here is that those fragments cause damage / rupture to neighbouring plant and equipment. In the case of the Cory development, the concern would be that a catastrophic failure of one tank causes the failure of another tank and therefore an increase in the total inventory of CO_2 released.

4.21 Taking the above into account, it is important that in assessing the safety risk from the storage tanks, the solution is not driven purely by the extent of the release but also by the likelihood and that the potential of damage to other tanks is taken into account. Therefore, I do not agree that 6 tanks are necessarily safer than 3 tanks. As such, I have continued to use 3 tanks in my Alternative Layout. However, like the Applicant I have now relocated the CO_2 storage tanks further from Norman Road although in the event of a catastrophic failure it seems very likely that the area impacted by such an event would extend well beyond the site boundaries regardless of where the tanks are placed.

4.22 It is also worthy of note that the CO_2 pipeline is a significant hazard in the plant. As this does not impact my brief in terms of required footprint, I have not sought to analyse this. However, it might be that it is the risk of release from the pipeline (given its proximity to

Norman Road, public footpaths and the Thames Walkway) that is the most significant plant hazard rather than the liquid CO_2 storage tanks in any case.

D. Electrical distribution

4.23 Since my previous report, the Applicant has provided detail on the design for the electrical distribution system – in particular, a full set of Single Line Diagrams (SLDs) for the scheme[10]. The figure below shows a simplified overview of the Applicant's philosophy.

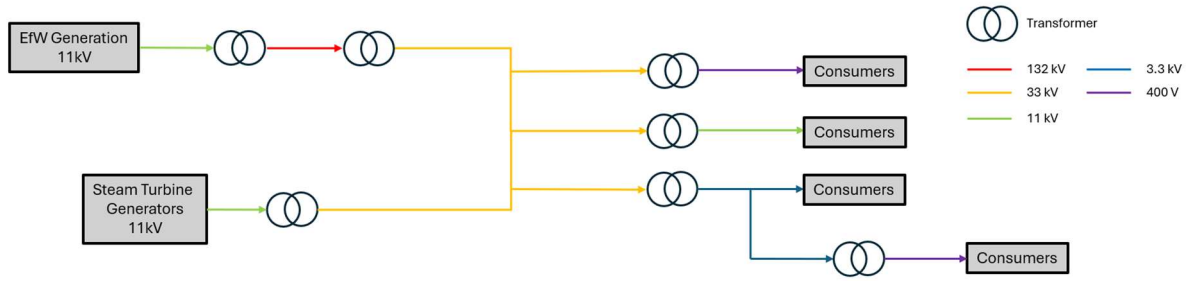


Figure 4 – Applicant's Electrical Distribution Philosophy

4.24 The design of any electrical distribution system requires the designer to select the most appropriate voltage for distribution. In general, the higher the voltage, the larger and more costly the equipment. However, larger loads require higher voltages and higher voltages also result in lower distribution losses which reduces operating costs. Balancing that however are transformation losses whereby every time the voltage is stepped-up or stepped-down (changed to a lower or higher voltage) losses occur.

4.25 In terms of the end consumers, the carbon capture plant requires voltages of between 400V and 11kV[10].

4.26 As I have highlighted in my initial report (paragraphs 2.19 to 2.21) the Applicant has included space allowance for a large switchyard as part of the indicative equipment layout. The reason for this switchyard is driven by the electrical distribution philosophy as the use of multiple voltages (in particular the 132kV and 33kV systems) requires significant electrical plant.

4.27 However, it is not clear why the Applicant has selected such high voltages. The following table[11] provides some guidance on typical distribution / transmission voltages.

Voltage	Plant Load	Motor Sizes	Comments
400V or 415V	<2MW	<185kW	Used to supply small motors and auxiliary loads. Rarely used for generation except for very small plants. Power can only be run small distances (<500m).
690V	special (<3MW)	<350kW	This is 400V configured in a different way (star wound). It is sometimes used when plant load is low, but fractionally too much for a 400V system, but avoidance of an MV system is desired. Common on offshore facilities and ships.
3.3kV	2MW to 15MW	<750KW	Rarely used as the cost is almost identical to 6.6kV. It is commonly used in conjunction with an 11kV system.
6.6kV	2MW to 30MW	1MW to 5MW	A common voltage for small-medium sized plants. Cheap and flexible design options are possible as motors can be switched with Vacuum Contactors.
11kV	10MW to 50MW	1MW to 10MW	A common voltage that is useful for large motors (10MW+) and distributing power over moderate distances (10-20km). More expensive than 6.6kV as motors require Circuit Breakers.
20kV	50MW to 100MW	10MW+ via a captive transformer	An uncommon voltage but sometimes used instead of 33kV as it eliminates the need for Gas Insulated Switchgear (GIS).
33kV	50MW to 150MW	10MW+ via a captive transformer	Used only in large plants with high power demand, or when distributing power over large distances (20km+). Main power generators will usually require step-up transformers.
110kV or 132kV	150MW to 500MW+	N/A	Used only for the very largest facilities, design at this level requires special considerations and specialist advice. Equipment cost is increased significantly.

Figure 5 - Guidance for distribution / transmission voltage selection

4.28 It is important to understand that the primary source of electricity for the carbon capture facility will be generated by the back-pressure steam turbine plant. Electricity from the waste to energy facilities will only be required for top-up, start-up or in the event of a failure of the steam turbine generator plant.

4.29 It should be recalled that the total electrical load for the carbon capture facility has been confirmed by the Applicant to be 42MWe[12]. It is clear from Figure 5 above that for a load of this size, 132kV is a very high voltage. In reality, electricity would be supplied by both Riverside 1 and Riverside 2 so each of the two 132kV lines would only be supplying 21MWe peak but for the vast majority of the time, the actual voltage supplied would be zero (assuming the primary generation from the back-pressure steam turbines is sufficient) or less than 5MWe if a small amount of top-up power was required.

4.30 It follows that, in my opinion, there is no requirement to distribute electricity from the Riverside 1 and Riverside 2 plants at as high a voltage as 132kV.

4.31 It appears from the SLDs that the Applicant intends to distribute within the carbon capture facility at 33kV. There are 6 different 33kV circuits identified on the SLD and the load is distributed between these different circuits. However, even if the entirety of the load was

on just one of these circuits (which it is not) then this could still be achieved at 11kV. Again, in my opinion, there is no requirement for distribution at as high a voltage as 33kV.

4.32 In contrast to the Applicant's philosophy, the Alternative Layout envisages distribution from the Riverside 1 and Riverside 2 facilities at 11kV and distribution around the carbon capture facility also at 11kV. This philosophy eliminates the need for significant quantities of electrical switchgear saving footprint but also saving significant capital costs.

4.33 The downside of using a lower voltage for distribution is that the distribution losses will increase. As discussed above, because the supply from the two energy from waste stations is only for back-up / top-up this is not a significant concern for those supplies. For the distribution around the site, it should be remembered that the distances involved are small in electrical distribution terms – the site for the Alternative Layout is less than 400m long and less than 200m wide. When compared to the guidance in Figure 5 which suggests that 11kV is suitable for distribution of electricity over distances of 10km to 20km it is clear that distribution at 11kV is eminently feasible for the carbon capture facility and that the losses should not be excessive.

4.34 Indeed, given that there will be a reduction in transformation losses for this alternative philosophy, combined with the significant capital cost savings, it is likely that the lifecycle costs for distribution at 11kV will be lower than for the Applicant's electrical distribution philosophy.

4.35 It will be evident from the above that it remains my opinion that the large switchyard proposed by the Applicant is not required.

E. Contiguous Site

4.36 As I discuss in paragraphs 2.64 to 2.69 of my initial report, I do not agree with the Applicant's contention that a contiguous site is essential for the entirety of the proposed development. The Applicant appears to treat this argument in a "one size fits all" manner whereby the need to have contiguous access to key process equipment such as the absorber columns, reformers or compressors is considered the same as for ancillary plant such as water storage tanks or, by the Applicant's own argument, a HTS that is required to be segregated from the main carbon capture facility.

4.37 In reality, the impact of site separation is very different depending on the particular process equipment involved and hence the services that need to be connected and the level of operation and maintenance required.

4.38 For instance, in terms of services, bringing the flue gas from the EfW facilities to the carbon capture facility requires large diameter ductwork that is sensitive to total distance due to the low pressure driving force available. This is why the Applicant has needed to bring this over on a pipe bridge running through the Crossness Nature Reserve and why both the Applicant and myself have sought to keep the length of that flue gas ductwork as short as possible.

4.39 However, the situation is very different for services such as electricity, hot water and low pressure steam. These services are routinely run underground for long distances (many kilometres). My understanding is that there are already electrical cables for the Riverside Campus running along the Norman Road corridor and that part of the Norman Road

corridor, with reference 1-019 in the Land Plans[13] is owned by Riverside Resource Recovery Limited, which is a part of the Cory Group.

4.40 Given the location of the Munster Joinery Land, the viability or otherwise of a non-contiguous site is potentially a particularly important argument in determining whether or not it is required for the carbon capture development. Whilst, as I have explained elsewhere in this report, my Alternative Layout can be accommodated entirely to the North of the Munster Joinery Land, the Applicant's Layout requires the Munster Joinery Land and land to the South. This can be seen from Figure 6 below which is an extract from the Applicant's updated layout[14].

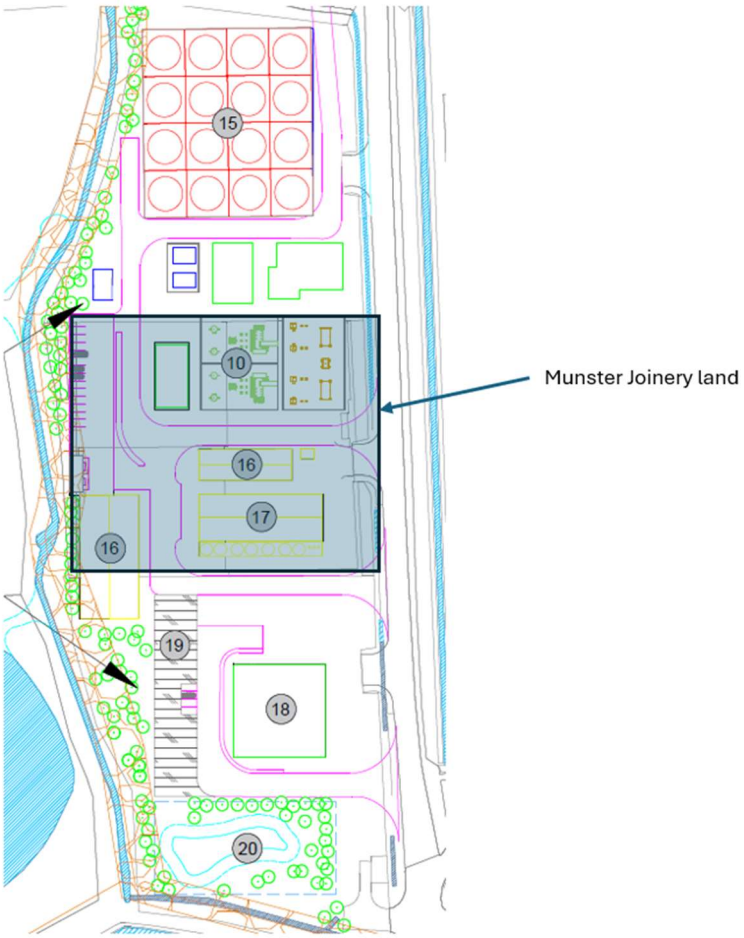


Figure 6 - Southern Extent of Applicant's Layout

4.41 The table below shows the plant and equipment that, in the Applicant's layout, is accommodated either on the Munster Joinery Land or south of it this along with the required footprint for that equipment.

Plant Item / Building	Approximate Footprint
Switchyard (10)	4000 m^2
Control Room and Welfare Buildings (16)	1000 m^2
Water Treatment Plant (17)	1000 m^2
Operational Laydown (19)	1000 m^2
Heat Transfer Station and Compound (18)	4000 m^2
Underground Water Storage Tank (20)	2000 m^2

4.42 Whilst approximately half of the switchyard is actually to the North of the Munster Joinery Land I have included the full switchyard area in the above table.

4.43 It is important to note that, because the water storage tank is underground, it would be possible to locate plant or buildings above this provided that suitable manhole access is maintained for maintenance. For instance, in my layout I have included operational laydown above. In contrast, the Applicant has put landscaping / planting above the water tank.

4.44 It can be seen from Figure 6 that in terms of the use of the Munster Joinery Land and areas to the south, the Applicant only uses a relatively small amount of this for process equipment. Indeed, of the approximately 19,000 m^2 of land, the Applicant has used approximately 5,000 m^2 for planting. There is then 9,000 m^2 of above ground equipment (counting only the half of the switchyard that is in this area) with the remainder being roads, car parking and additional space.

4.45 I have already highlighted that given the Heat Transfer Station is to be a segregated and separately operated facility, there is no reason why this requires to be part of a contiguous site from an operational access standpoint. In terms of process services, these will be some or all of water, low pressure steam and electricity all of which can easily be run in existing corridors along Norman Road.

4.46 For the water storage tank, because it is underground this gives considerable flexibility as to its location. This can be accommodated under other parts of the facility rather than using the space above the tank for landscaping / planting. Even if it were placed to the south, it is clear that operational access requirements would be occasional and the services would again be water / electricity which could easily be accommodated.

4.47 Therefore, in terms of buildings and equipment that would be preferrable to be accommodated to the North of the Munster Joinery Land this is the control room and welfare facilities, the water treatment plant and the switchyard as well as space for operational laydown, carparking and roads. This only accounts for about one third of the land that is currently being asked for by the Applicant.

4.48 It is clear to me that, in terms of a non-contiguous site, there is no technical impediment to achieving the required process and electrical connections to ancillary / supporting plant such as the HTS or water storage tank.

F. Thames Water Access Road

4.49 In the Alternative Layout, access for Thames Water is achieved without the need to cut through the carbon capture facility whereas in the Applicant's scheme the access bisects the plant requiring additional security and access arrangements to be made. I would consider that the Alternative Layout offers advantages in this regard to both the operator of the carbon capture facility and Thames Water.

5. DISCUSSION

5.1 The previous sections have set out the technical rationale for why I consider my own Alternative Layout to be appropriate and where I have concerns with / challenges to the Approach and assumptions made by the Applicant. In this section I will highlight the impact of these matters on the required footprint.

5.2 Firstly, in terms of overall site footprint, the comparison is:

(a) Applicant's Indicative Layout (total footprint) = 74,000 m^2

(b) Alternative Layout (total footprint) = 51,000 m^2

5.3 Both of these totals are based on an estimate of the total land that would be acquired to permit the development and therefore in both cases there is a significant amount of land that would not be used for process plant and equipment or other site infrastructure but would instead be used for boundary planting / screening etc. The relevant comparisons are:

(a) Applicant's space used for planting / landscaping = 18,000 m^2

(b) Alternative Layout space available for planting = 4,000 m^2

5.4 In terms of the Applicant's Layout, this includes the planting / landscaping (approximately 2,000 m^2) located on top of the underground water storage tank.

5.5 In terms of the Alternative Layout this assumes planting along the northern end of the development between the site and Norman Road plus planting between the Heat Transfer Station and the Munster Joinery Land as well as some planting to the Western side of the Heat Transfer Station.

5.6 In Figure 7 below, I present a waterfall chart that shows the key drivers in the footprint reduction between the Applicant's Contextual Layout and the Alternative Layout that I have prepared.

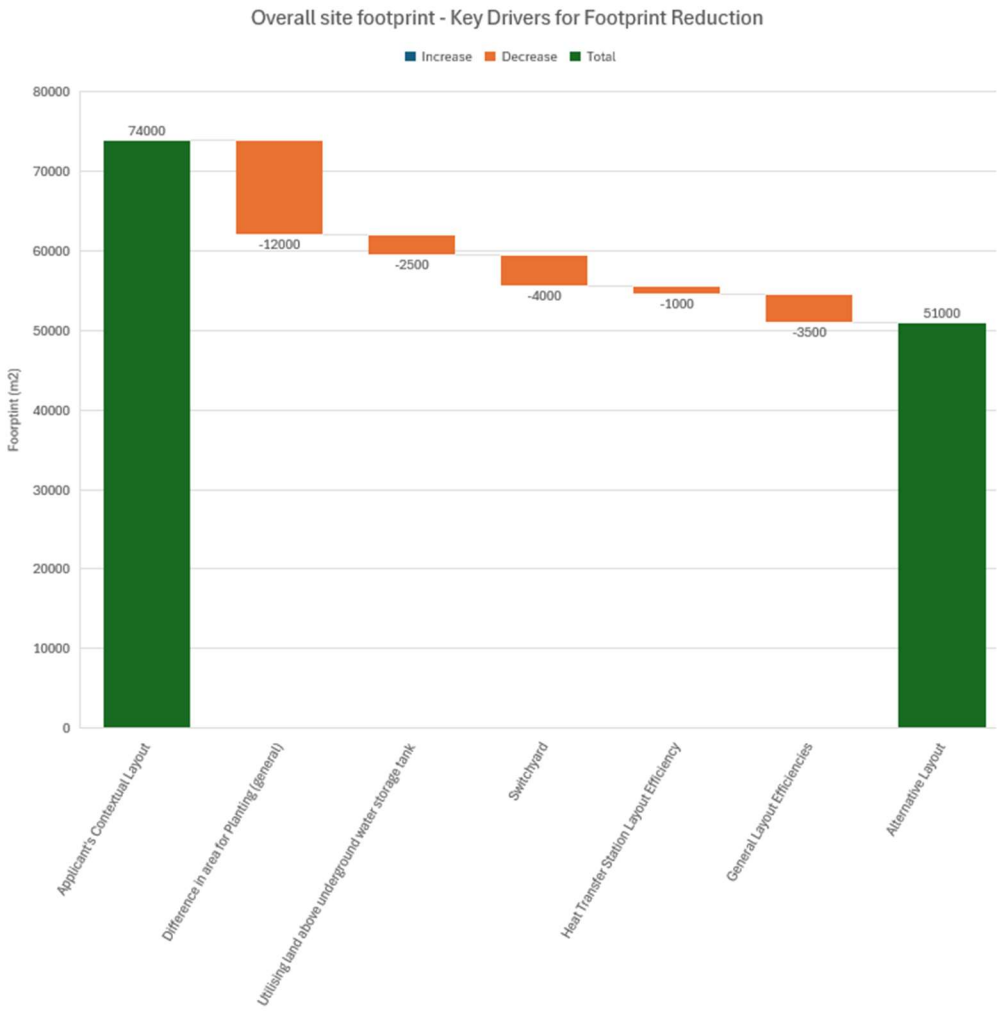


Figure 7- Key Drivers for Footprint Reduction

5.7 In addition to the above, further reductions in footprint could be achieved by:

(a) Moving to a single line plant rather than two line (saving estimated at 2,500 m^2 – see section 4.6 of my Initial Report)

(b) Removal of the Heat Transfer Station (saving approximately 4,000 m^2 in terms of total land required based on my revised Alternative Layout)

6. CONCLUSIONS

6.1 In this report I have provided supplementary analysis and opinion taking into account additional information that has been received since my initial report.

6.2 This has resulted in a revised Alternative Layout which would allow all necessary plant to be accommodated to the North of the Munster Joinery Land. In my view, the Alternative Layout would be operationally equivalent to the Applicant's Layout and would, primarily by virtue of its smaller size and simpler electrical distribution philosophy, most likely offer an improved financial return for the Applicant. It would also improve the access arrangements for Thames Water.

6.3 I have carefully considered the Applicant's comments made at Deadline 2. I do not consider that they demonstrate that the Alternative Layout is not a technically feasible means of achieving the objectives of the proposed scheme.

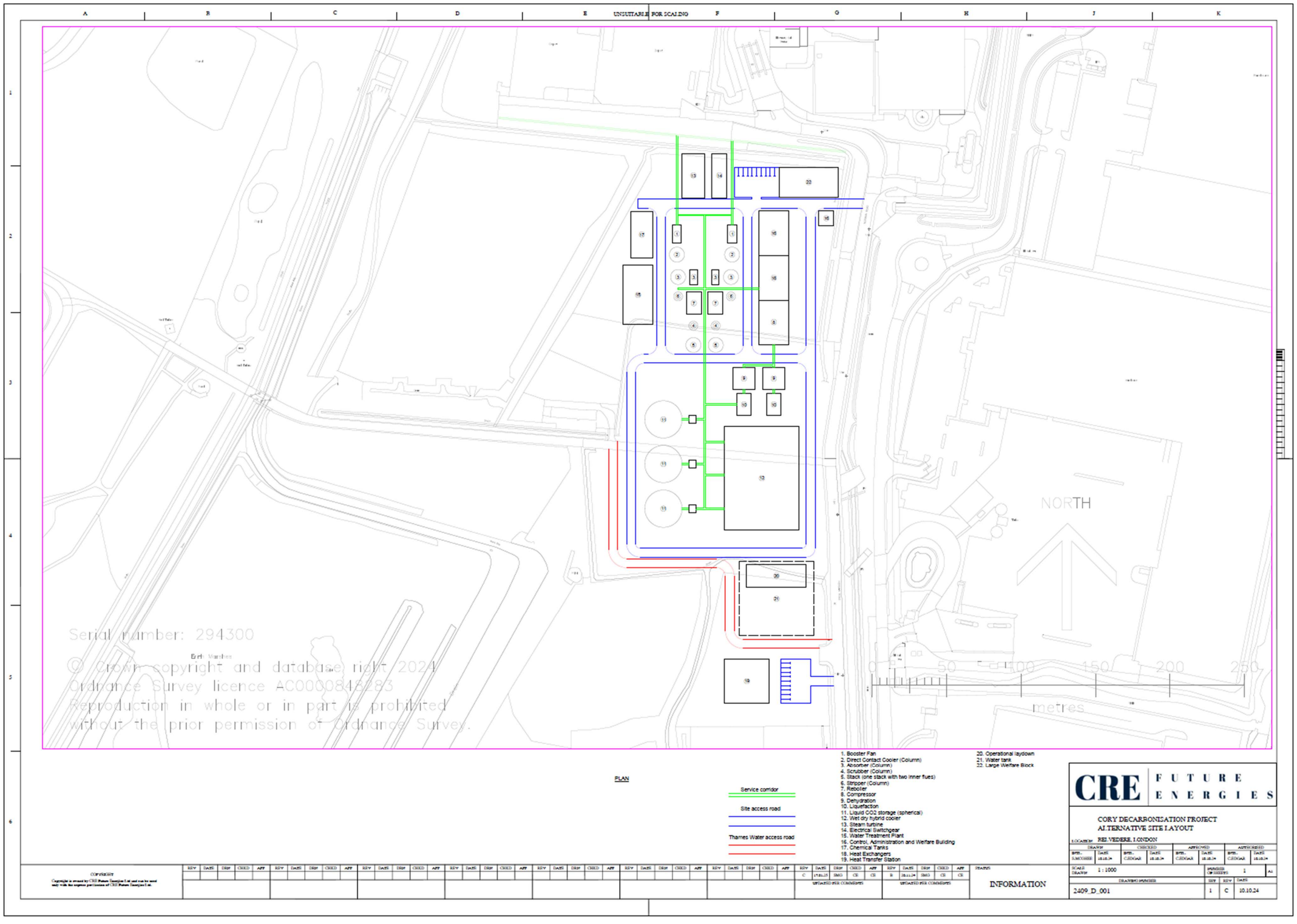
6.4 It remains my opinion that it is not necessary to acquire the Munster Joinery Land in order to construct and operate a carbon capture scheme for the Riverside 1 and 2 EfW facilities.

7. REFERENCES / CITATIONS

[1]	9.14 Applicant's Response to Landsul and Munster Joinery's Deadline 1 Submission, p10, 2.2.21
[2]	Response to Information Request from Landsul, 20th December 2024 (section 1)
[3]	9.14 Applicant's Response to Landsul and Munster Joinery's Deadline 1 Submission, p5, 1.2.14
[4]	Riverside Resource Recovery Facility Combined Heat and Power Feasibility Review. Fichtner Engineering Consultants Ltd on behalf of Cory. S2383-0030-0020JB2. June 2021
[5]	Environmental Statement - Chapter 2: Site and Proposed Scheme Description, paragraph 2.2.107
[6]	Email from Cory's Solicitors to Landsul/Munster Joinery's solicitors dated 10 January 2025 timed at 11:30
[7]	Response to Information Request from Landsul, 20th December 2024 (section 3)
[8]	Safety in CO_2 logistics, ConsenCUS-D8.6-Safety report on CO_2 logistics – version 1 – 2404 (April 30th 2024)
[9]	CCS CO_2 Risk Management – New Industry Guidance, Holt, Helle and Brown DNV (2012)
[10]	Single Line Diagrams, 70090329-WSP-01-XX-SLD-EL-0001 to 0005
[11]	https://aurora-power.co.uk/power-system-design/
[12]	E-mail : RE: Cory / Landsul next steps Ref Tozers:MA:L03102-0002 [PM-AC.FID5236074] from Matthew Fox (Pinsent Masons) to Kelly Burns (Tozers) on 14th November 2024.
[13]	2.2 Land Plans, October 2023 Revision P04
[14]	9.14 Applicant's Response to Landsul and Munster Joinery's Deadline 1 Submission, p29, Appendix A

Appendix A

Alternative Site Layout


UNSUITABLE FOR SCALING
NORTH
0 50 100 150 200 250
metres
Serial number: 294300
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PLAN
Service corridor
Site access road
Thames Water access road
1. Booster Fan
2. Direct Contact Cooler (Column)
3. Absorber (Column)
4. Scrubber (Column)
5. Stack (one stack with two inner flues)
6. Stripper (Column)
7. Reboiler
8. Compressor
9. Dehydration
10. Liquefaction
11. Liquid CO2 storage (spherical)
12. Wet dry hybrid cooler
13. Steam turbine
14. Electrical Switchgear
15. Water Treatment Plant
16. Control, Administration and Welfare Building
17. Chemical Tanks
18. Heat Exchangers
19. Heat Transfer Station
20. Operational laydown
21. Water tank
22. Large Welfare Block
CRE FUTURE ENERGIES
CORY DECARBONISATION PROJECT
ALTERNATIVE SITE LAYOUT
LOCATION: BELVEDERE, LONDON
INFORMATION
SCALE: 1 : 1000
DRAWING NUMBER: 2409_D_001
REV: C
DATE: 10.10.24

CRE | FUTURE ENERGIES

49 Callaghan Crescent, East Kilbride, South Lanarkshire, Scotland, UK

E-mail : [redacted]

Web : [redacted]

ANNEX B

Feasibility Review

Riverside Resource Recovery Facility

Combined Heat and Power Feasibility Review

Cory

June 2021

CORY

Executive Summary

Riverside Resource Recovery Limited (RRRL) operates the Riverside Resource Recovery Facility (RRRF) at land situated off Norman Road in Belvedere bordering the River Thames, within the London Borough of Bexley (LBB). Fichtner Consulting Engineers (FCE) has been commissioned by its parent company, Cory Environmental Holdings Limited (trading as Cory) to undertake a feasibility review of commercial opportunities within the locality for exporting heat as a combined heat and power (CHP) operation, to address requirements of RRRF's planning permission and Environmental Permit (EP).

A review of the potential heat demand within a 10 km radius of RRRF has been undertaken in accordance with the requirements set out the Environment Agency's (EA's) CHP Ready Guidance. The conclusions of the analysis indicate that there is sufficient heat demand in the region to require heat supply from both RRRF and the proposed Riverside Energy Park (REP), and that synergy opportunities exist in terms of reliability and displacing fossil fuelled back-up plant, if both facilities were to supply heat to a network. REP was granted a Development Consent Order on 9 April 2020. There are separate requirements (including heat) that will need to be submitted to and approved by the London Borough of Bexley (LBB) prior to that development commencing. This submission relates to RRRF and is submitted to LBB for approval pursuant to RRRF's planning permission.
Seven prospective residential and commercial developments have been identified to the west of RRRF in Thamesmead, which form part of 20,000 home development ambitions for the area. These consumers present the preferred solution for a district heating (DH) network, and offer an optimum solution with respect to reduced system operating temperatures and social benefit. Discussions with Peabody, LBB's principal housing development partner, indicate its preference to accept heat from RRRF as part of a low carbon DH network. Cory announced in May 2020 that it's partnering with specialist district heating and low carbon energy company Vattenfall with the aim of developing one of the largest heat networks in the UK. In May 2021, Cory was awarded £12.1 million through the Government's Heat Network Investment Project (HNIP) to progress commercialisation and construction of the proposed DH Network[1]. Cory and Vattenfall are currently progressing DH Network design and commercial discussions.

A generic heat profile has been developed and estimates that technically feasible opportunities exist to export an annual average of 10.9 MWth and a peak of 30.9 MWth (accounting for diversity and heat loss) to the proposed developments. Heat supply infrastructure can be accommodated on the RRRF site by constructing a heat exchanger platform, located between the air-cooled condenser and the turbine hall. Additional demand beyond what RRRF can supply could be met by REP, subject to that consent being implemented and when it comes online. There is potential for additional capacity to be added to the heat network, both within the town of Woolwich / West Thamesmead (along the proposed DH pipeline corridor), and within Burt's Wharf to the south-east of RRRF, comprising mostly industrial heat consumers. The heat export medium for these industrial consumers would need to be explored further if this option were pursued.

Based on heat supply to the preferred DH network (residential and commercial developments in Thamesmead), the RRRF scheme would achieve at least 10% savings in primary energy usage compared to the separate generation of heat and power. It would thus qualify as high efficiency cogeneration as defined in the Energy Efficiency Directive (EED). The scheme would not qualify (on a technical basis) as 'Good Quality' CHP under the Combined Heat and Power Quality Assurance

1 [redacted]

(CHPQA) scheme Standard issue 3, due to the lack of uplift offered by this standard for non-subsidised generators.

Economic assessment of the scheme indicates that it is unlikely to be viable based on heat sales revenue alone, with a negative net present value resulting from the EA's cost-benefit assessment (CBA) toolset. However, Cory has secured funding under the Government's Heat Network Investment Project (HNIP) which improves the economic case[2].

Cory has actively engaged with local authorities and housing developers to pursue opportunities for heat export. This has predominantly been through involvement in the Bexley District Heating Partnership Board, which has been recognised and welcomed by Peabody. Cory is also actively supporting Ramboll, who has been engaged to evaluate the techno-economic feasibility of establishing a borough wide district heating network on behalf of LBB.

[2] [redacted]

Contents

1 Introduction

RRRL operates the Riverside Resource Recovery Facility (RRRF) on land off Norman Road in Belvedere bordering the River Thames, within the London Borough of Bexley.

Condition 31 of RRRF's Planning Permission (LPA Ref: 16/02167) and condition 1.3.1(b) within the Environmental Permit (ref: BK0825IU) requires the operator to regularly review and record suitable opportunities to improve the energy efficiency of the Facility focussing on the potential for a district heat network.

Fichtner Consulting Engineers (FCE) has been commissioned by Cory to undertake a review of commercial opportunities for heat export to satisfy the ongoing commitment under RRRF's planning permission and EP. The heat demand investigation has built on detailed assessment undertaken as part of the Development Consent Order (DCO) application for Riverside Energy Park (REP), an integrated energy park now consented and in the process of being developed by Cory on the adjoining site.

1.1 Background

RRRF processes approximately 750,000 tonnes of residual municipal solid waste per annum via three incinerating lines, and since 2014 is permitted to process up to 785,000 tonnes per annum. The heat released by the combustion of waste on three combustion lines is recovered in water tube boilers, which produce (in combination with superheaters) high pressure superheated steam supplying a single turbine-generator. The steam turbine has three extraction bleeds which are utilised to serve internal process heating demands. The steam turbine currently operates in fully condensing mode (i.e. designed to export power only).

Consent for RRRF was secured on the basis that the facility was constructed to generate power only, but included a condition to facilitate potential development of a heat export system in the future. RRRF can export up to 28.6 MW_{th} of heat (subject to heat export conditions) when operating in CHP mode.

1.2 The site

RRRF is located on the south bank of the River Thames, approximately 2.3 km north north-east of Belvedere and lying within LBB. It is accessible both by river, via a purpose-built jetty, and by road from Norman Road off the A2016.

2 Summary of conclusions

2.1 Technical solution

The most likely solution for implementing a DH network would be to transfer heat to a closed hot water circuit via a series of condensing heat exchangers. It is typical to supply hot water to consumers through a pre-insulated buried pipeline, before being returned to the plant for reheating. This technology is well proven and highly efficient. It would be technically feasible to construct a platform on the RRRF site, located between the air-cooled condenser and the turbine hall, to accommodate heat station infrastructure for a DH network, and route DH pipes to the site boundary for onward distribution of hot water.

2.2 Heat demand investigation

A review of the potential heat demand within a 10 km radius of RRRF has been undertaken in accordance with the requirements set out in Section 4 of the EA's CHP Ready Guidance. The area surrounding RRRF comprises heat demand predominantly from the residential, transport, industrial and retail sectors, primarily due to high proportion of industrial estates, distribution centres and warehousing facilities located to the south and east. A total demand of approximately 8,300 GWh/annum exists across a registered 534,734 addresses within 10 km of RRRF.

Seven prospective residential and commercial developments have been identified to the west of RRRF in Thamesmead. Cory is engaging with the developer (Peabody), and local planning authorities regarding feasibility of connecting up to 20,000 new residential dwellings and additionally commercial premises. Connecting to new developments exclusively will have the benefit of reducing system operating temperatures, which will reduce heat losses and increase the amount of heat that can be supplied to end consumers.

Of the four existing large heat consumers identified (using the BEIS UK CHP Development Map) only Archer Daniels Midland, a rapeseed oil refinery, is located on the south bank of the River Thames and could therefore present a connection prospect. This potential consumer may offer an anchor load for future connections to businesses in at Burt's Wharf. However, the heat demand requirements of individual businesses, and whether RRRF could supply the heat grade required, is unknown. Given the industrial nature of the sites, it is likely that high grade heat (steam) may be required and the practicality of collecting and returning condensate is unknown. Supplying heat to consumers at Burt's Wharf therefore offers a less optimal solution relative to new build housing developments.

Developing a DH network to initially serve new-build consumers within Thamesmead would present the most favourable configuration. Work undertaken in the LBB Energy Masterplan has also identified this option as a realistic and deliverable prospect. With the exception of one scheme which is currently under construction, the prospective developments are due to complete mid 2020s and therefore align with a possible construction programme for a DH network. Cory has worked with LBB on developing the Energy Masterplan which has strong support from key stakeholders, such as the CHP working group including LBB and Peabody.

Cory announced in May 2020 that it's partnering with specialist district heating and low carbon energy company Vattenfall with the aim of developing one of the largest heat networks in the UK. Vattenfall is the largest operator of district heating networks in western Europe and provides heat network services to 1.7 million households across the EU. In May 2021, Cory was awarded £12.1

million through the Government's Heat Network Investment Project (HNIP) to fund commercialisation and construction of the proposed DH Network[3]. Cory and Vattenfall are currently progressing DH Network design and commercial discussions.

Cory

2.3 Heat network profile

Based on publicly available development proposals, FCE has estimated the heat demand of the preferred DH network, and a heat demand profile has been developed to model seasonal and diurnal variation. Accounting for network heat losses and diversity, a heat demand of 114,385 MWh/annum is projected, equating to an average and peak demand of 10.9 MWth and 30.9 MWth respectively. The capacity and grade of heat available from RRRF aligns strongly with the projected network heat demands. Additional capacity could potentially be added to the network by connecting existing developments in the town of Woolwich / West Thamesmead, which is located along the proposed DH pipeline corridor. Subject to the level of uptake achieved on deployment of a DH network and final pipe routing, owners of these existing developments will be approached to determine appetite for, and feasibility of, connection. Additional heat demand beyond that which RRRF could supply independently could be met by REP, subject to implementation of the consent and construction. Operational commencement is scheduled for 2024. Adding REP to the network would also increase network resilience of the heat supply system, and could be utilised to offset or eliminate the need for conventional fossil fuelled back-up boilers and associated carbon emissions.

2.4 Economic assessment

FCE has assessed the costs and revenues associated with the construction and operation of the proposed heat network and input these values into the CBA template provided by the EA. The CBA takes account of heat supply system capital and operating costs, heat sales revenue and lost electricity revenue as a result of diverting energy to the heat network.

The results of the CBA indicate that the estimated £14 million capital cost is unlikely to be offset by heat sales revenue alone. The results of the CBA indicate that the nominal project internal rate of return (before financing and tax) over 33 years is 6.5%. The net present value (before financing and tax) over 33 years is negative.
. In May 2021, Cory was awarded £12.1 million through the Government's Heat Network Investment Project (HNIP) to fund commercialisation and construction of the proposed DH Network[4]. The grant therefore improves the economic feasibility of the scheme. .

2.5 Energy efficiency measures

In order to qualify as high-efficiency cogeneration as defined in the EED, the scheme must achieve at least 10% savings in primary energy usage compared to the separate generation of heat and power. When operating in CHP mode and exporting heat to the proposed DH network, RRRF would achieve PES of 14.3%.

[redacted]

To be considered fully 'Good Quality' CHP under the CHPQA scheme (Standard issue 3), the quantity of heat exported to a heat network must be sufficient to achieve a Quality Index (QI) of at least 105 at design stage and 100 during operation. Based on the estimated average heat export, the proposed heat network will result a QI score of 62.5 and RRRF would therefore not fully qualify as 'Good Quality' CHP. This result is primarily a result of relatively low coefficients defined by CHPQA in its Standard issue 3, which do not offer any uplifts for RRRF (since it is not supported by the Renewables Obligation or Contracts for Difference), despite being a renewable generator. In any event, proposals to export heat have been developed in collaboration with key stakeholders to deliver heat in an efficient manner.

The actual energy efficiency performance of the scheme will be dependent on the number of consumers brought forward, subject to build out rates of proposed housing developments in Thamesmead. In the event of connection to industrial developments at Burt's Wharf (as an alternative), the QI score will also depend on the heat grade required by businesses willing to enter into a commercial agreement for heat offtake.

Continuing engagement with the housing developers and local planning authorities LBB and Royal Borough of Greenwich (RBG) is pivotal to realise the scheme. Cory has advanced progress through involvement in the Bexley District Heating Partnership Board, of which Cory was a founding member, and has supported Ramboll, who has been engaged to evaluate the techno-economic feasibility of establishing a borough wide DH network on behalf of LBB. Cory has appointed Vattenfall as a strategic project partner to progress the DH network development and intends to enter into a commercial agreement with housing developers as development proposals are advanced, subject to viability and agreement on commercial terms.

3 Legislative requirements

3.1 CHP-Ready guidance

In February 2013, the EA produced a guidance note titled '*CHP Ready Guidance for Combustion and Energy from Waste Power Plants*'[5]. This guidance applies to the following facilities, which will be regulated under the Environmental Permitting (England and Wales) Regulations 2016:

- new combustion power plants (referred to as power plants) with a gross rated thermal input of 50 MW or more; and
- new energy from waste (EfW) plants with a throughput of more than 3 tonnes per hour of non-hazardous waste or 10 tonnes per day of hazardous waste.

The ERF at RRRF will be regulated as a waste incineration facility with a throughput of more than 3 tonnes per hour, so the above guidance applies.

The EA requires developers to demonstrate best available techniques (BAT) for a number of criteria, including energy efficiency. One of the principal ways of improving energy efficiency is through the use of CHP, for which three BAT tests exist. The first involves considering and identifying opportunities for the immediate use of heat off-site. Where this is not technically or economically possible, the second test involves ensuring that the plant is built to be CHP Ready. The third test involves carrying out periodic reviews to determine whether the situation has changed and if there are opportunities for heat use off site.

3.2 Energy Efficiency Directive

From 21st March 2015, operators of certain types of combustion installations are required to carry out a CBA of opportunities for CHP when applying for an EP. This is a requirement under Article 14 of the EED and applies to a number of combustion installation types. FCE has adopted this assessment framework for the purpose of assessing the commercial viability of the proposed DH network to be served by RRRF.

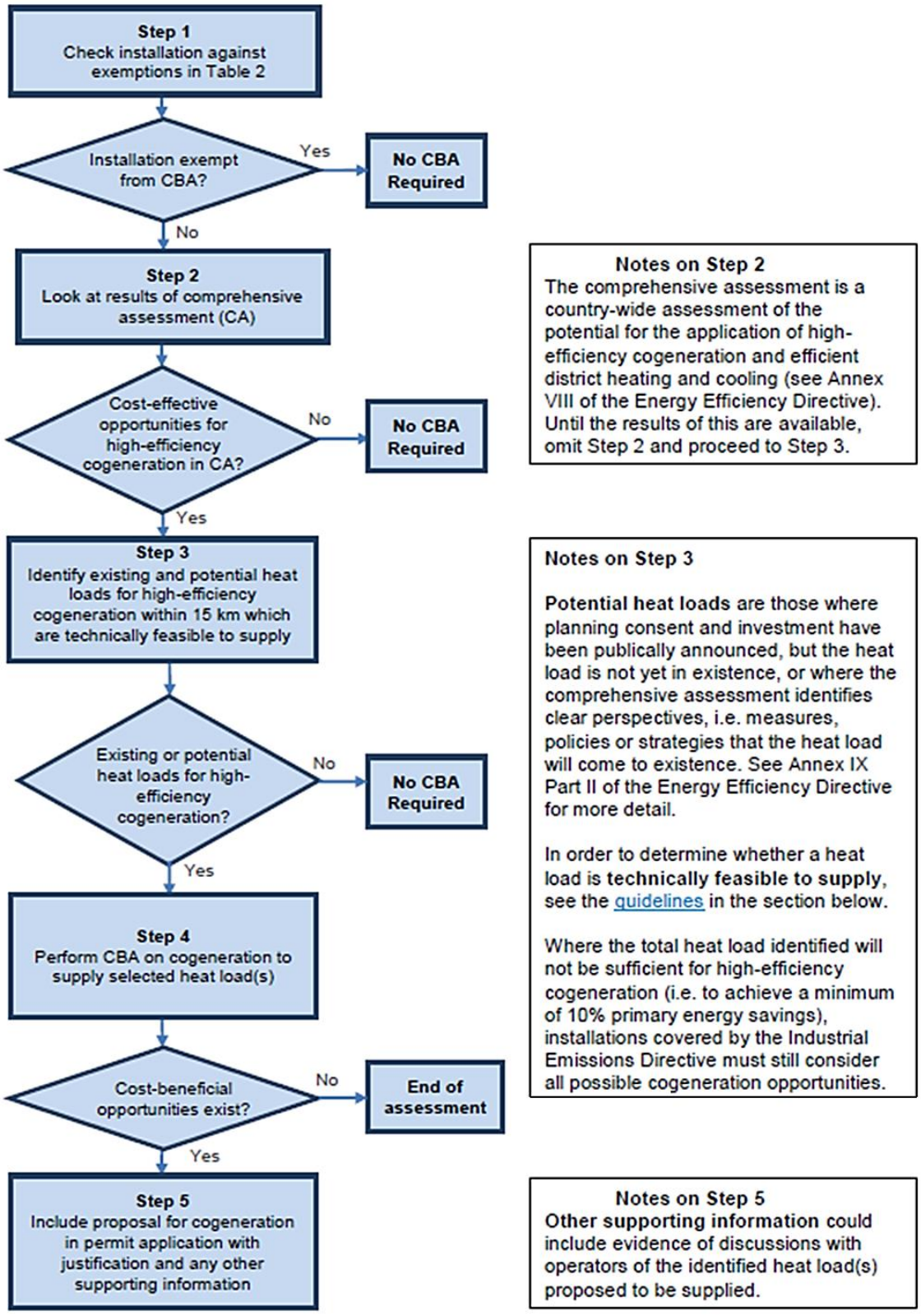
As an electricity generation installation with a total aggregated net thermal input of more than 20 MW, RRRF would be classified as an installation type 14.5(a).

In April 2015, the EA issued draft guidance on completing the CBA, entitled '*Draft guidance on completing cost-benefit assessments for installations under Article 14 of the Energy Efficiency Directive*'[6]. The following methodology describes the process that must be followed for type 14.5(a) and 14.5(b) installations.

[5] CHP Ready Guidance for Combustion and Energy from Waste Power Plants, published 25 February 2013 on www.gov.uk

[6] Draft guidance on completing cost-benefit assessments for installations under Article 14 of the Energy Efficiency Directive, V9.0 April 2015

Figure 1: CBA assessment methodology for type 14.5(a) and 14.5(b) installations



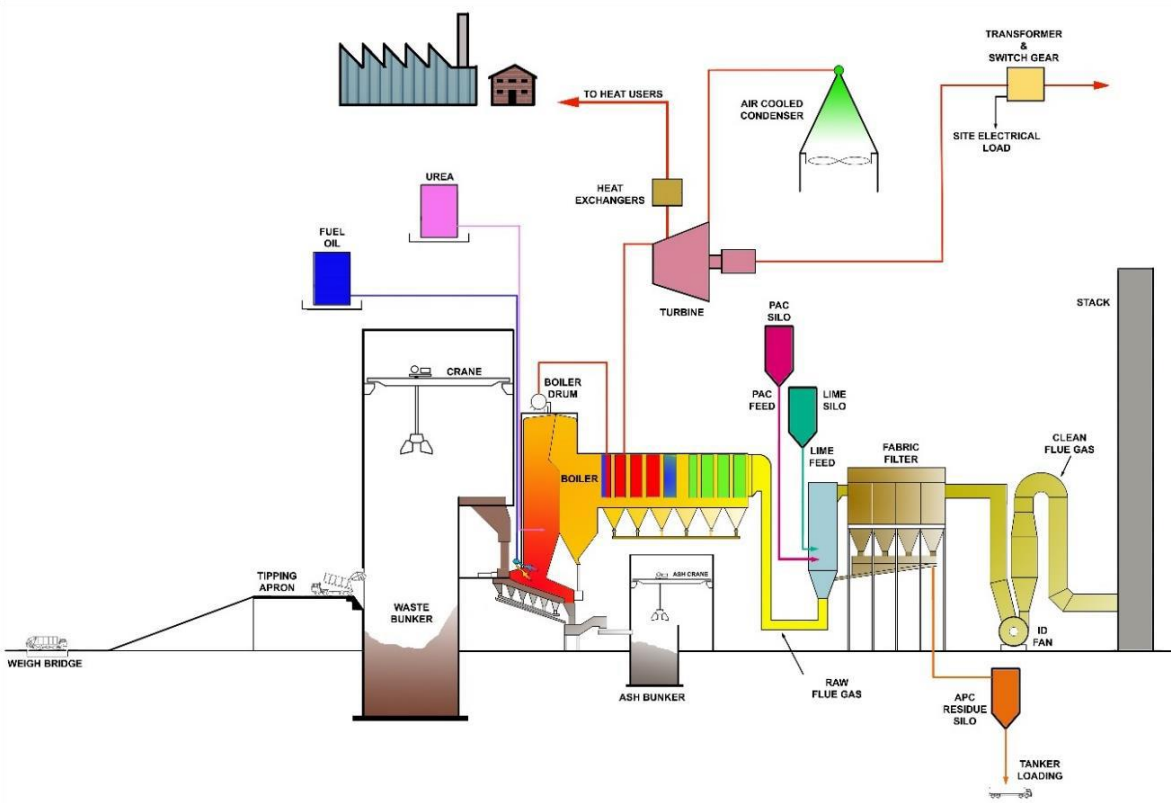
Source: Energy Efficiency Directive

4 Description of technology and heat network

4.1 The Facility

RRRF is permitted to process up to 785,000 tonnes per annum, through three combustion lines, of municipal solid waste. The fuel has a net calorific value (NCV) of approximately 9.6 MJ/kg. RRRF is permitted to process up to 32.4 tonnes per hour per boiler line, and achieves an annual operational availability of at least 8,000 hours per annum. The process is illustrated in the following schematic.

Figure 2: Process schematic of RRRF



Waste derived fuel is combusted on a moving grate to ensure continuous mixing of the fuel and hence promote good combustion. The heat released by the combustion of the fuel is recovered in a water tube boiler, which is integral to the furnace and produces (in combination with superheaters) high pressure superheated steam. The steam from the boiler feeds a steam turbine-generator used to generate electricity. Exhaust steam is then cooled using an air-cooled condenser (ACC).

In fully condensing mode, the steam turbine is permitted to generate up to 72.6 MW_e. Heat export is available through low pressure steam extraction. Subject to technical and economic feasibility, a heat supply system will be included to export heat to users, as discussed in the following sections.

4.2 Heat supply system

Within RRRF, low pressure (LP) steam at approximately 4.5 bar(a) is supplied from the steam turbine via a 'sliding-bleed' arrangement comprising two bleeds connected to a common LP header.

At high inlet steam flows to the turbine, the lower-pressure bleed supplies steam to the LP header; at reduced inlet steam flows, the lower-pressure bleed is closed and steam is supplied from the higher-pressure bleed.

The higher pressure bleed is referred to as 'LP1' and the lower-pressure bleed as 'LP2'. The separate low-low pressure bleed (at approximately 0.7 bar(a)) is referred to as 'LLP'. The function of the steam bleeds is as follows.

1. During operation at nominal plant load, LP1 is out of operation. LP1 normally operates during steam turbine part load operation (approximately 85% and below) instead of the LP2 bleed.
2. LP2 is the main steam extraction for plant auxiliaries and is directed via a steam header to the boiler selective non catalytic reduction (SNCR) system, primary and secondary combustion air preheaters and deaerator. The nominal flow through this extraction is 11.2 kg/s.
3. Steam is exported through the LLP bleed to supply a first preheating stage of the condensate at nominal flow rate of 5.4 kg/s.

When the turbine is operating in low load or is out of operation, no steam is available for feeding consumers from the LP header. To maintain supply of steam in this case, steam is supplied directly to the LP header from the high pressure live steam via a pressure reducing valve.

In June 2015, Cory installed isolation valves on the LP steam header to facilitate steam extraction for the proposed heat export system. If implemented, the underlying operational principles of the plant would remain largely unchanged, but would enable steam pipework and downstream heat export equipment to be installed. RRRF is therefore able, with relatively minimal modifications, to supply heat to offsite consumers as part of a DH network in the future.

As part of previous feasibility studies, Cory has considered arrangements for exporting heat in the form of either hot water or steam (subject to heat consumer type), as detailed in the following sections.

4.2.1 Heat export via hot water

The heat supply infrastructure as a whole has been sized to enable the maximum anticipated export capacity to be recovered through two primary heat exchangers and then delivered through a buried pre-insulated pipe system to the heat customer. Pipe technology is well proven and can provide a heat distribution system with a 30 year plus design life, enabling hot water to be transferred large distances without significant losses. Additional pipe work can be added retrospectively, and it is reasonably straightforward to add branches to serve new developments.

The heat exchangers would be supplied by dedicated steam pipework from the turbine extractions, via the LP header, to facilitate heat transfer to the hot water circuit. Condensate pipelines would return low grade water to the RRRF condensate system.

At the connection point with the heat customer, the hot water would supply heat to a series of absorption chillers to meet the cooling demand. The water circuit would be continuously pumped back to the primary heat exchangers for reheating. Pumps are operated with 100% standby capacity to maintain heat in the event of a pump fault. Pumps are likely to utilise variable speed drives to minimise energy usage.

The scope of works for the hot water system would include the following equipment.

1. Two steam pipes, including valves, from the LP steam header and turbine extraction to the primary heat exchangers located on the heat exchanger platform.

2. Two condensate return pipes, including valves, from the primary heat exchangers to a condensate collection tank. A common condensate return pipe, including valves, from the condensate collection tank to the main plant condensate system.
3. Two shell and tube steam to water heat exchangers.
4. Two duty/standby condensate pumps and invertors per heat exchanger (four in total).
5. Two controlled steam extraction valves and associated control system.
6. All pipework within the heat exchanger platform including pipe supports, valves, etc.
7. Pre-insulated district heating pipework from the heat exchanger platform to termination points at the heat customer site, as well as a third branch for future network expansion, including all civil works.
8. Three heat network circulation pumps and invertors (two duty, one standby) to allow for system capacity increase as build program progresses.
9. Pressurisation system, water softener and chemical dosing, including make-up water connection.
10. Heat meter to measure quantity of energy exported from the plant and on each of the branches connecting the North and South sites.
11. Elevated steelwork platform to house the heat export equipment.
12. Control system fully integrated with the RRRF control system.
13. All instrumentation.
14. All associated civil works including heat exchanger platform.
15. 415V power supply to the heat exchanger platform.

4.2.2 Heat export via steam

As a result of land ownership restrictions in the area surrounding the plant, it is anticipated that steam flow and return pipework would be routed in an underground duct. Pipe gradients and steam traps would need to be considered in the detail design stage of the project to protect against condensate formation in the system. Since steam is much less dense than water the space requirements and capital cost of the pipework will be increased. In addition, expansion loops may be required, which would increase the overall pipe length.

The scope of works for the steam system would include the following equipment.

1. Two controlled steam extraction valves and associated control system.
2. Insulated steam and condensate pipework from the steam turbine to termination points at the heat customer site, as well as a third branch for future network expansion, including all civils works.
3. If physical separation between the RRRF water/steam circuit and the heat customer is required, two steam to steam heat generators.
4. Two duty/standby condensate pumps located downstream of the chiller bank at each of the North and South sites (four in total).
5. Heat meter to measure quantity of energy exported from the plant and on each of the branches connecting the North and South sites.
6. Control system fully integrated with the RRRF control system.
7. All instrumentation.
8. All associated civil works including heat exchanger platform (if required).
9. 415V power supply to the heat exchanger platform (if required).

4.2.3 Possible plant equipment (hot water option)

The following spatial models were developed to provide an indication of a feasible layout for the heat network equipment which could be located at RRRF. The equipment has been sized to meet the maximum anticipated heat export capacity and includes all equipment required to export heat in a water circuit (not including thermal stores in this case). There would be some differences in the selection of equipment if the steam export scenario is implemented.

At RRRF, there is space to locate heat network equipment between the ACC and the turbine hall. To enable heat offtake Cory proposes to construct a platform to provide a suitably sized area for installation of the heat exchangers/steam generators and associated equipment. Locating the heat exchanger platform a relatively short distance from the turbine extractions acts to reduce the capital cost of steam admission and condensate return pipework.

Figure 3: Heat exchanger platform, facing south-east

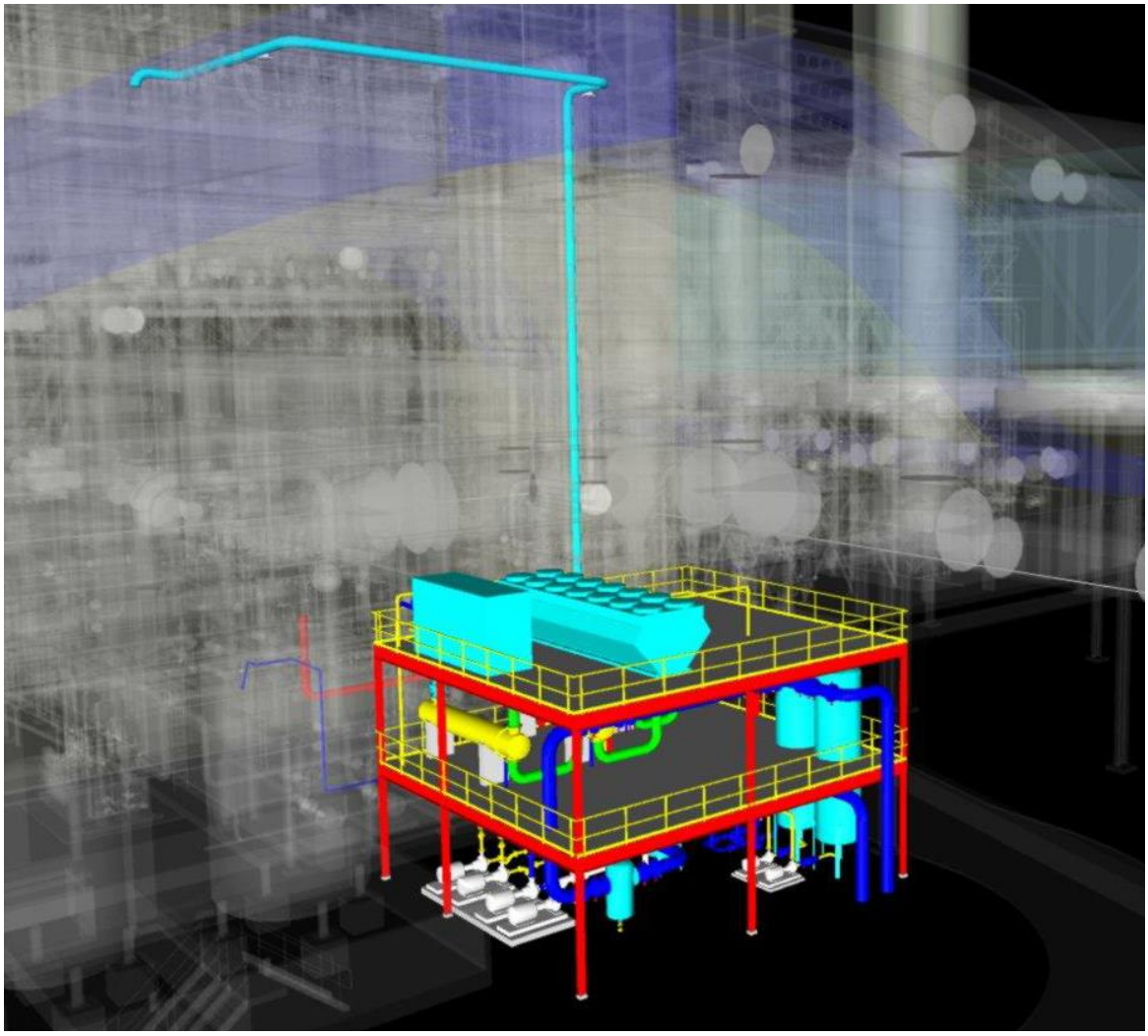
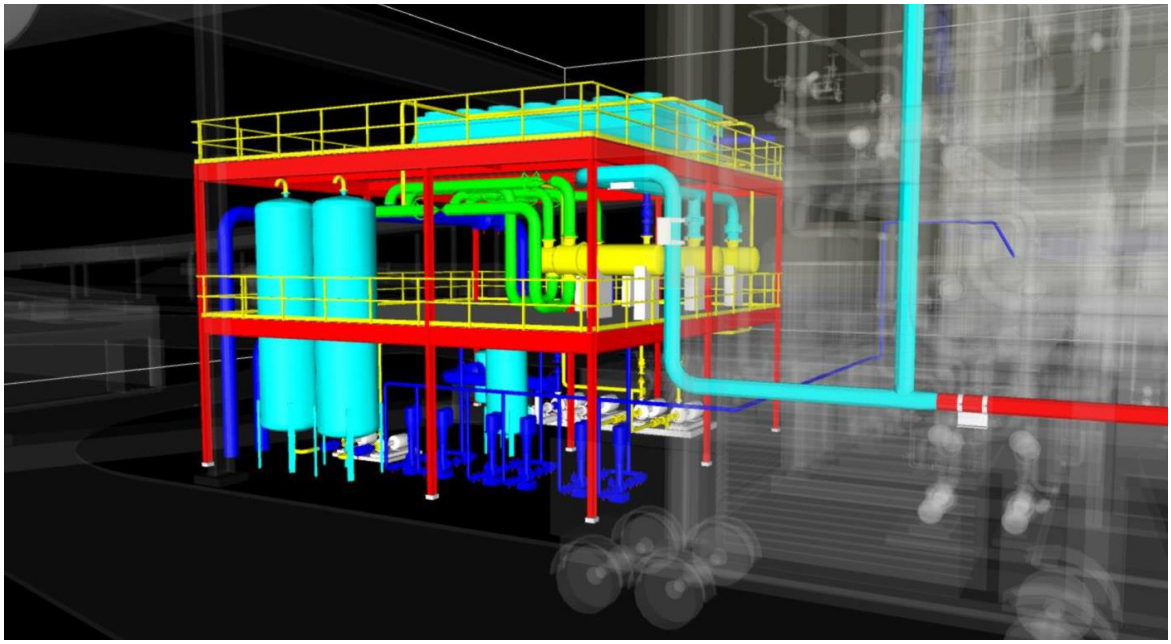


Figure 4: Heat exchanger platform, facing north-west



It is anticipated that the platform will have three levels, each separated by 4m to coincide with the existing plant floor levels, with lifting beams and sufficient space to carry out all foreseeable operation and maintenance activities, in the following arrangement.

1. Level 1 (0 m) – heat network circulation pumps, condensate return pumps, pressurisation system (including expansion vessel and pumps), air/dirt separator and chemical dosing system.
2. Level 2 (4 m) – heat exchanger steam header, heat exchangers, hot water supply header and hot water return header.
3. Level 3 (8 m) – air conditioning chiller and associated adiabatic cooler, to supply plant air conditioning demand.

FCE can confirm that, subject to detail design and based on the maximum heat export capacity anticipated, it is possible to accommodate the required infrastructure on a heat exchanger platform, made up of three levels each with a floor area of approximately 150 m^2.

5 Heat demand investigation

A review of the potential heat demand within a 10 km radius of RRRF has been undertaken to assess potential known or consented future developments that may require heat and to identify any existing major heat consumers. This enabled the initial design of proposed heat network options to be developed. Potential heat consumers have been identified using a review of publicly available datasets on fuel use in the region, heat mapping tools and visual inspection of satellite imagery, as discussed in the following sections.

The viability of connecting potential identified heat users to a DH network has been considered on the basis of maximising carbon savings and delivering the highest Primary Energy Savings (PES), while minimising heat losses through pipe route optimisation. Larger heat consumers and those closer to RRRF have been prioritised ahead of other consumers on the basis they are more likely to yield an economically viable solution.

5.1 Previous studies

The Secretary of State for Business, Energy and Industrial Strategy (SoS) granted Cory a DCO to construct and operate Riverside Energy Park (REP) (Riverside Energy Park Order (2020) as amended), an integrated energy park which will be located on land adjacent to RRRF. As part of the DCO application, Cory commissioned a Combined Heat and Power (CHP) Assessment[7], dated November 2018, to consider the opportunities for heat export in the surrounding area. Through the DCO examination process, this initial assessment was supplemented with a Combined Heat and Power Supplementary Report[8] issued in May 2019. The heat demand investigation developed within these studies has been used as a basis for assessing potential commercial opportunities for use of heat from RRRF also.

As concluded through the examination process, there exists sufficient heat demand within a 10 km radius of the RRRF and REP sites to require heat supply from both facilities. These heat demands are discussed in the following sections.

5.2 Wider heat export opportunities

A review of the heat demand wider heat opportunities surrounding RRRF has been undertaken in accordance with the requirements set out in Section 4 of the EA CHP-Ready Guidance and Article 14 of the EED, which requires that the results of the National Comprehensive Assessment (NCA) be considered.

5.2.1 The National Comprehensive Assessment

The *'National Comprehensive Assessment of the Potential for Combined Heat and Power and DH and Cooling in the UK'*[9], dated 16th December 2015, was published by Ricardo AEA Ltd on behalf of the Department of Energy and Climate Change (DECC). The report was produced to fulfil the

[7] https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010093/EN010093-000213-5.4%20Combined%20Heat%20and%20Power%20Assessment.pdf

[8] https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010093/EN010093-000475-Cory%20Environmental%20Holdings%20Limited%20-%205.4.1%20Combined%20Heat%20and%20Power%20Supplementary%20Report_Redacted.pdf

[9] National Comprehensive Assessment of the Potential for Combined Heat and Power and DH and Cooling in the UK, Ricardo AEA, December 2015

requirement (under Directive 2012/27/EU on energy efficiency) on all EU Member States to undertake a National Comprehensive Assessment (NCA) to establish the technical and socially cost-effective potential for high-efficiency cogeneration. The report also sets out information pertaining to heat policy development in the UK.

Section 3 of the report presents the results of the NCA. RRRF is located 2.3 km to the north of Belvedere in the London Borough of Bexley, which falls within the London region of the assessment. Aggregated 2012 heat consumption and equivalent figures projected to 2025, split by sector, are presented in the following table.

Table 1: Heating consumption in London

Sector	2012 consumption [TWh/annum]	2025 consumption [TWh/annum]
Industry (including agriculture)	2	2
Commercial services	3	2
Public sector	3	2
Residential	34	30
Total	**42**	**37**
We assume that the apparent discrepancy in the figures is due to rounding errors. We do not have access to the underlying data to verify this.		

Source: National Comprehensive Assessment

Evidently there is a downward trend in heating consumption anticipated in subsequent years. The energy projections take account of climate change policies where funding has been agreed and where decisions on policy design are sufficiently advanced to allow robust estimates of policy impacts to be made, including measures such as building regulations.

Similarly, current and projected space cooling consumption data is reported as follows. Given the paucity of publicly available data on energy consumption for cooling, these figures are estimates based on consumption indicators, building types and floor areas; consequently, they should be considered as indicative.

Table 2: Cooling consumption in London

Sector	2012 consumption [TWh/annum]	2025 consumption [TWh/annum]
Industry (including agriculture)	3	3
Commercial services	13	11
Public sector	1	1
Total	**18**	**15**
We assume that the apparent discrepancy in the figures is due to rounding errors. We do not have access to the underlying data to verify this.		

Source: National Comprehensive Assessment

Due to the low resolution of the data, the results of the NCA can be considered as an overview only. Heat demand from the residential sector is above the national average, while demand from industrial consumers is lower than average. A high cooling demand from the commercial services sector is also apparent. A conventional DH network serving a number of low-grade heat consumers would therefore likely be a favourable solution in the area under consideration.

Higher resolution heat demand data is ascertained from heat mapping, as explained in the following sections.

5.2.2 National heat mapping

Potential heat loads have been identified using a review of publicly available datasets on the Department for Business, Energy and Industrial Strategy (BEIS) (formerly the Department of Energy and Climate Change, DECC) National Heat Map[10]. This allows the heat demand in the area local to RRRF to be determined. The tool geographically represents the heat demand across various sectors within England and helps to identify locations where implementation of heat networks is likely to be most economic.

Table 3 shows the heat demand, in MWh per year, for all sectors and building types within 10 km of RRRF. This is represented as coloured contour areas in Figure 5, with each colour band representing a range of heat demand density values.

Table 3: Heat demand within 10 km search radius

Sector	Heat demand [MWh/annum]	Heat demand [%]	Number of addresses
Commercial offices	120,420	1.5%	4,714
Education	203,744	2.5%	637
Government buildings	107,238	1.3%	196
Health	73,880	0.9%	1,108
Hotels	145,770	1.8%	1,282
Industrial	538,389	6.5%	817
Mining	991	0.0%	3
Other	38,525	0.5%	430
Postal	8,661	0.1%	340
Recreational	98,642	1.2%	1,285
Residential	5,829,745	70.2%	507,786
Retail	469,550	5.7%	13,145
Science	66	0.0%	3
Transport	663,975	8.0%	2,988
Total	**8,299,596**	**100.0%**	**534,734**

Source: National Heat Map

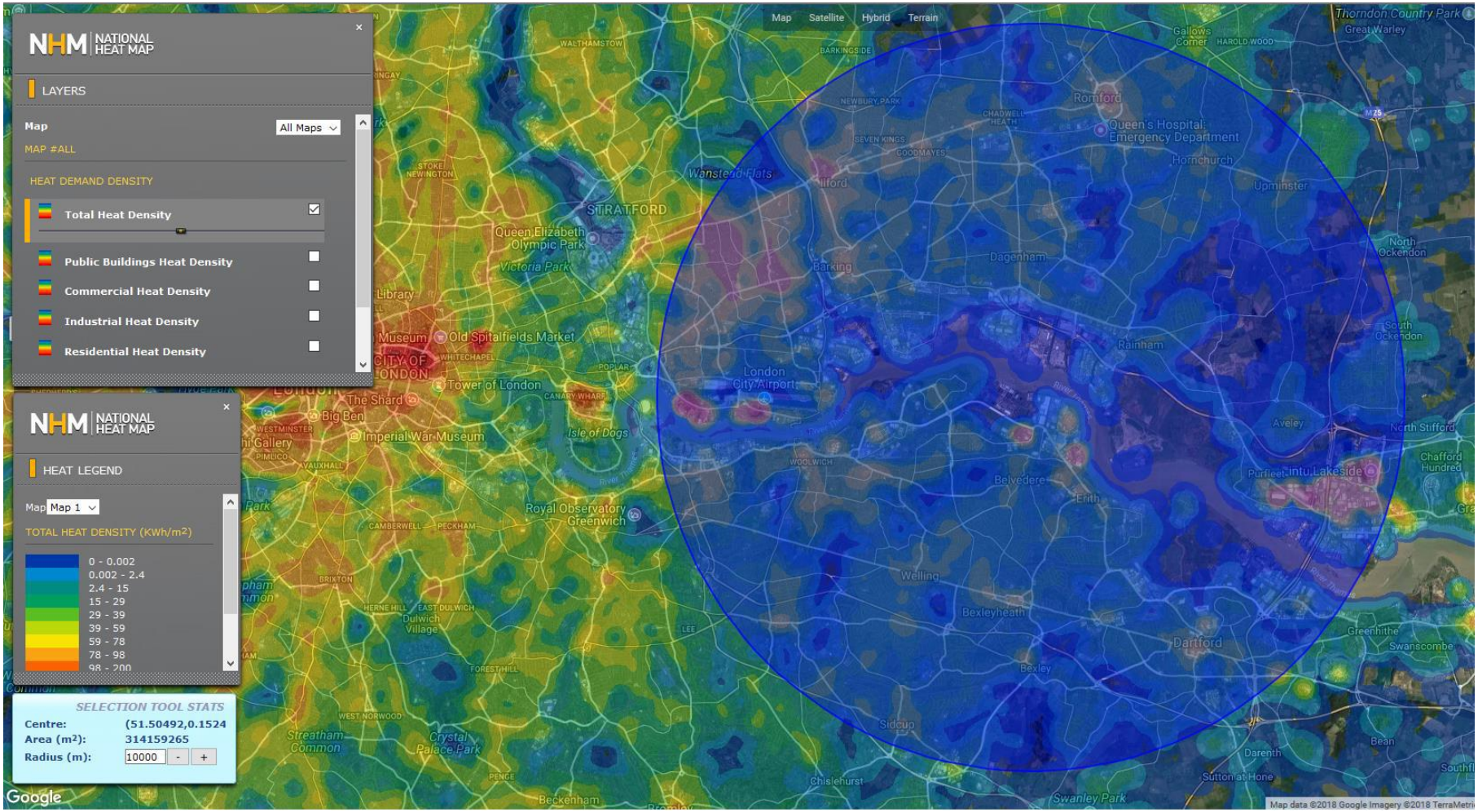
With the exception of public buildings, the heat map is produced entirely without access to the meter readings or energy bills of individual premises. Therefore, the results should be taken as an estimate only.

The area surrounding RRRF comprises heat demand predominantly from the residential, transport, industrial and retail sectors. This differs from the typical distribution observed throughout the UK as a result of the high proportion of industrial estates, distribution centres and warehousing facilities located in close proximity to RRRF.

[redacted]

In most cases, existing domestic buildings are typically unsuitable for inclusion in a DH network as a result of the prohibitive costs of replacing existing heating infrastructure and connecting multiple smaller heat consumers to a network. However, new housing developments can represent a viable option and are discussed further in Section 5.3.

Figure 5: Local heat demand density, all sectors



Source: National Heat Map

5.2.3 London heat map

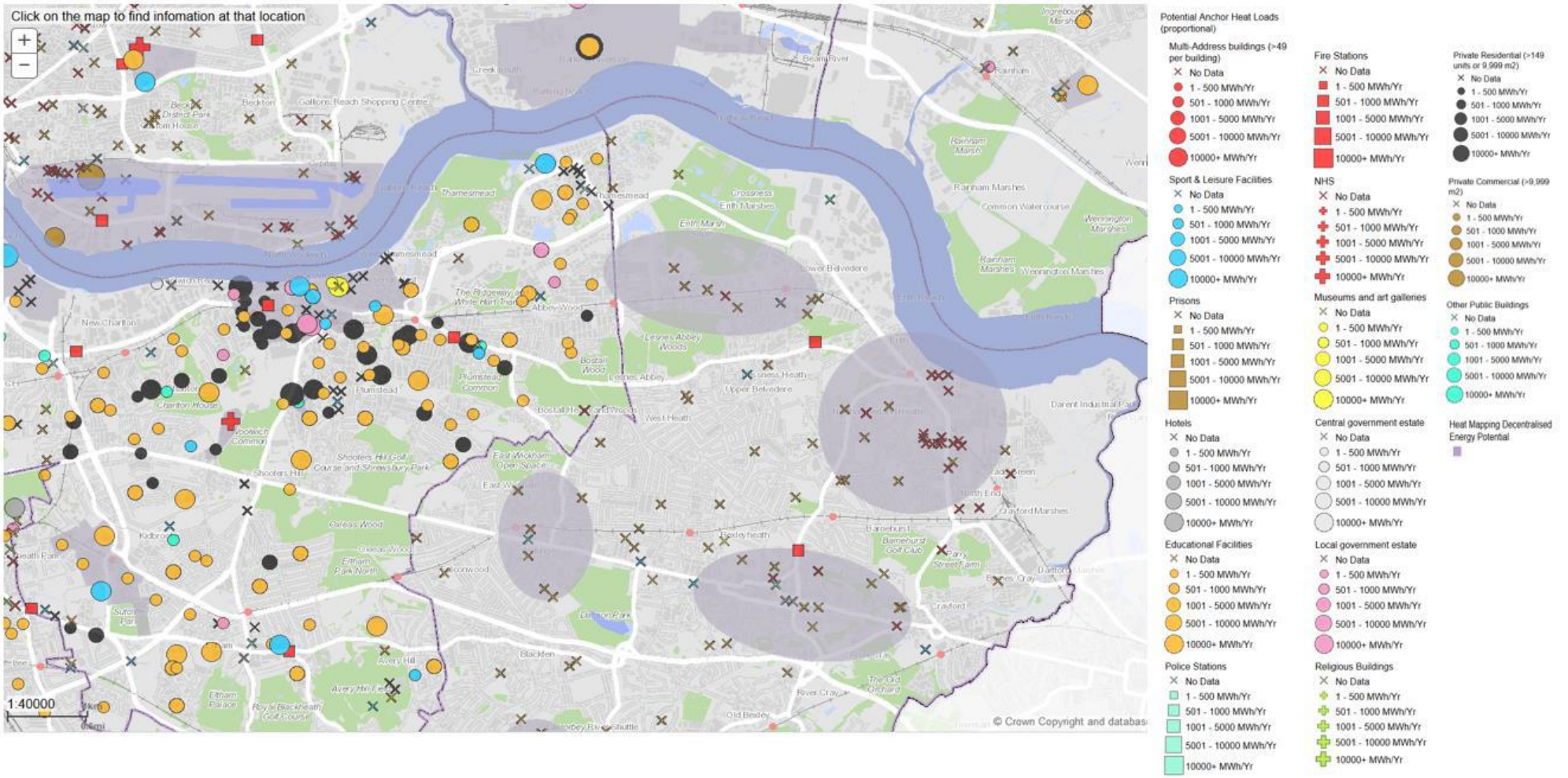
The London Heat Map[11] was developed by the GLA to assist authorities and developers in identifying opportunities for decentralised energy projects in London. The map was created to drive the delivery of the Mayor's overreaching energy policies. Despite being decommissioned in April 2018, the map remains a useful approximation tool and has been consulted here.

The map indicates that there are no existing DH networks in LBB but decentralised energy potential in the locality of RRRF is reported as high. Potential heat consumers superimposed with areas of decentralised energy potential are presented in Figure 6, summarised as follows.

- Lower Belvedere, located directly to the south of RRRF, presents high potential for DH network deployment. Given the nature of heat demand in the locality (multiple smaller residential units and education facilities), connecting to heat consumers within Lower Belvedere would only be feasible in conjunction with connection to larger prospective developments in the area (as discussed in Section 5.3).
- The town of Erith, located 3.1 km to the south-east of RRRF, also appears to contain a reasonable degree of heat demand, but with a much higher proportion of existing residential properties, for which connection costs are likely to be prohibitive. The North Kent railway line also presents a barrier to heat pipe routing in the area.
- The town of Woolwich / West Thamesmead, located 6 km to the west of RRRF, presents high potential for DH deployment. There are a range of existing public establishments and private commercial premises, in addition to a number of proposed developments (as discussed in Section 5.3).
- Areas of DH potential in the towns of Welling and Bexleyheath, located 5.7 km and 5.9 km respectively to the south of RRRF, are unlikely to offer realistic connection prospects. Anchor loads within the areas are limited and therefore unlikely to offset connection costs, and any pipeline would have to negotiate both the North Kent and Bexleyheath railway lines.

[11] https://www.london.gov.uk/what-we-do/environment/energy/london-heat-map/view-london-heat-map

Figure 6: Decentralised energy potential



Source: London Heat Map

5.2.4 Large heat consumers

Four large heat consumers (point heat demands greater than 5 MWth) were identified within 10 km of RRRF using the BEIS UK CHP Development Map[12] tool.

Table 4: Large heat consumers

Site	Heat demand [MWh/annum]	Distance from RRRF	Postcode
London City Airport	145,161	7.2 km	E16 2PX
Unknown operator	124,648	2.5 km	RM9 6SA
Archer Daniels Midland	213,204	1.8 km	DA8 1DL
Unilever Foods	65,155	8.1 km	RM19 1SD

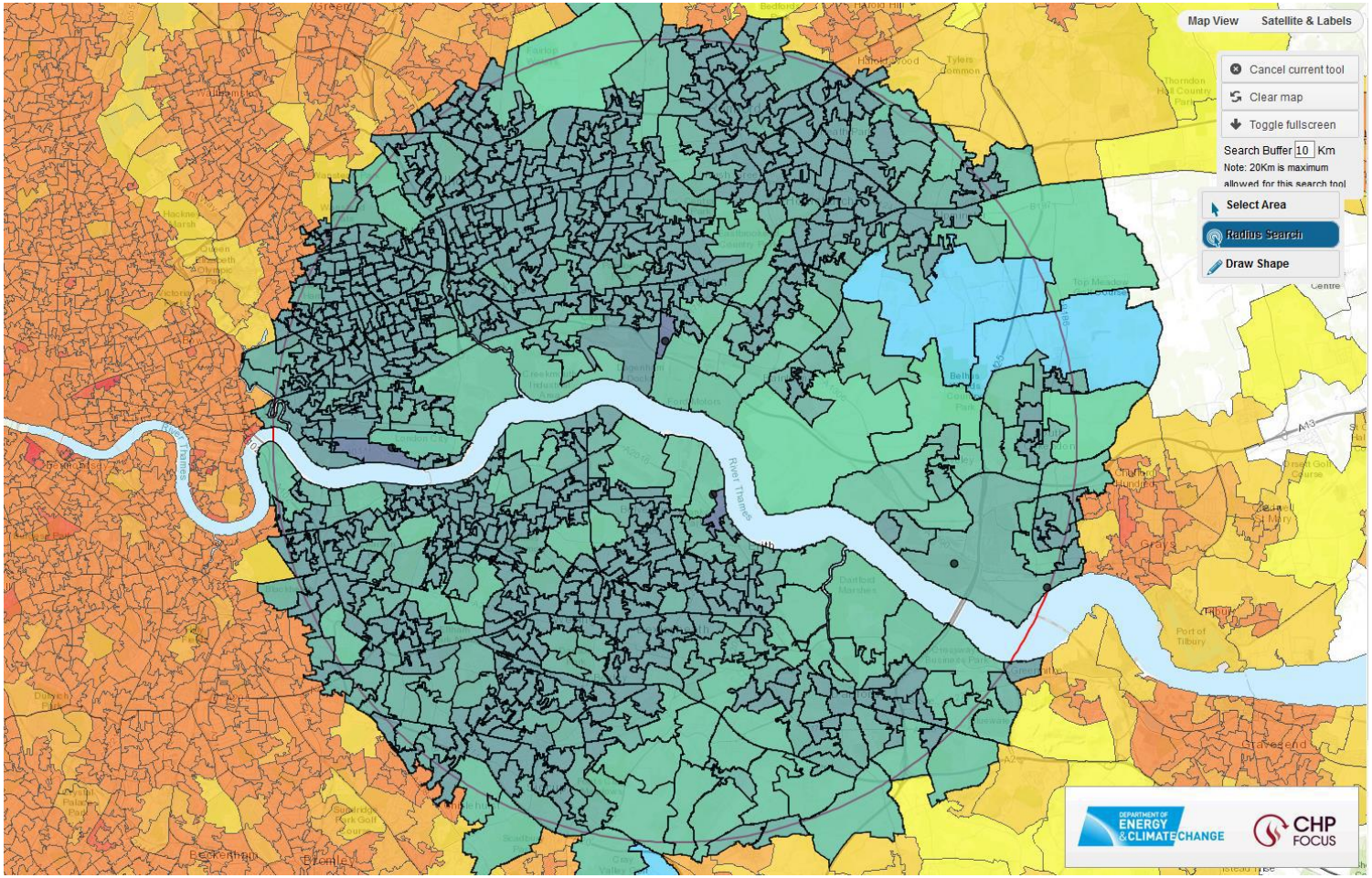
Source: BEIS UK CHP Development Map

Of the identified large heat consumers, only Archer Daniels Midland, a rapeseed oil refinery, is located on the south bank of the River Thames. Given the industrial nature of the site, it is likely that high grade heat (steam) may be required and the practicality of collecting and returning condensate is unknown. These considerations are likely to worsen the technical and economic feasibility of a connection. Additionally, the business owner would need to be willing to contribute to the cost of upgrading existing heating systems to accept heat from a network, and to accept the resulting operational interruptions, which may present major barriers.

The remaining large heat loads have been discounted on the basis of connection feasibility. Based on our engineering assessment, connecting to sites to the north of the River Thames would not be feasible. The grade of heat required for the remaining large heat loads, and whether RRRF could meet this requirement, is unknown. Development types (where known) include existing heat supply infrastructure on site, which would further reduce connection prospects. Additionally, without additional anchor loads nearby, connection costs to the heat loads in remote locations are likely to be prohibitive.

[12] http://chptools.decc.gov.uk/developmentmap/

Figure 7: Large heat consumers showing intensity of heat requirements as yellow to red (outside the 10 km search radius) and blue to dark green (within the 10 km search radius)



Source: UK CHP Development Map

5.2.5 Visual inspection

Broad assumptions were made regarding the estimated heat demand from existing potential heat consumers. Heat demands have been calculated based on benchmark figures from the Chartered Institution of Building Services Engineers (CIBSE) Guide F (Energy Efficiency in Buildings)[13]. This document provides good practice benchmark figures based on energy performance of existing buildings. In the CIBSE Guide, loads are expressed in terms of kWh per square metre of floor space per year of fossil fuel use (natural gas is typically assumed). Based on estimates of floor areas and an assessment of the development type, it is possible to estimate annual energy usage. Converting natural gas use to actual heat loads (which can be provided by a hot water distribution system) requires an assumption of gas-fired boiler efficiency; an efficiency of 85% is assumed, based on industry norms.

A list of potential heat consumers identified within 10 km of RRRF, applying engineering judgement to screen out unfavourable routes, is provided in Appendix A. A corresponding map is provided in Appendix B, and includes buildings and businesses within Burt's Wharf, which comprises an area of relative high density industrial heat demand.

5.3 Prospective developments

Engagement with potential developers is a key aspect of delivering a DH network. Cory has engaged in discussions with LBB, RBG, GLA, and Peabody (LBB's housing development partner) regarding heat export opportunities to proposed developments in Thamesmead.

Up to 20,000 dwellings and commercial properties are proposed as part of a Thamesmead regeneration programme[14], although the development proposals are at various stages within the planning process and may therefore be subject to change. Publicly available information on developed schemes have been used to inform heat demand projections, which are listed in Table 5. Locations of the proposed developments are included in Appendix B.

[13] CIBSE Guide F: Energy Efficiency in Buildings

[redacted]

Table 5: Proposed developments as part of Thamesmead regeneration

Scheme	Development proposals	Estimated heat demand [MWh/annum]		Estimated average heat demand [MWth]		Estimated peak heat demand [MWth]	
		Residential	Commercial	Residential	Commercial	Residential	Commercial
Thamesmead Waterfront	Masterplan has been developed outlining the potential to deliver up to 11,500 homes and 94,000 m^2 of commercial floorspace. Scheduled completion date mid-2020s.	79,181	5,194	9.09	0.60	30.86	1.70
Land at Binsey Walk	To provide up to 329 residential units and 1,050 m^2 of commercial floorspace. Scheduled completion date 2024.	3,780	178	0.43	0.02	1.47	0.06
Southmere Village	525 homes, public lakeside square, library, cafes, convenience store and community facilities. Scheduled completion date 2024.	1,647	521	0.19	0.06	0.64	0.17
Land at Coraline Walk	To provide up to 549 residential units and 3,225 m^2 of commercial floorspace. Scheduled completion date 2024.	3,780	178	0.43	0.02	1.47	0.06
Land at Sedgemere Road	To provide up to 219 residential units and 3,225 m^2 of commercial floorspace. Scheduled completion date 2024.	1,508	178	0.17	0.02	0.59	0.06
The Reach	A mix of 1,2 & 3 bedroom homes and 66 commercial units. Under construction - scheduled completion date 2019.	339	219	0.04	0.03	0.13	0.07
West Thamesmead Gateway	1,300 residential units and 5,763 m^2 of commercial floorspace. Scheduled completion date mid 2020s.	7,522	318	0.86	0.04	2.93	0.10
Total		**97,758**	**6,787**	**11.22**	**0.78**	**38.10**	**2.22**

Community heating in the UK has been difficult to implement historically due to the existence of an extensive natural gas network and a regulated energy supply market which allows customers the freedom to change suppliers to obtain preferential commercial terms. The high cost of infrastructure is also a barrier to community heating, with a notable lack of domestic pipe suppliers. Developers of private residential properties are reluctant to utilise community heating as it often increases development costs.

Community heating can be successful in circumstances where:

- new-build housing developments are aligned with low carbon heat sources in terms of timing and proximity;
- developments offer heat demand density, for example apartment blocks;
- there is a high level of Local Authority / housing association properties; and
- additional (non-residential) consumers are also connected to the network to improve network diversity and offset seasonality issues.

These preferential circumstances exist in the case of RRRF.

With the exception of The Reach scheme, which is currently under construction, developments are due to complete in the mid-2020s. Since retrofitting a network connection to The Reach scheme, which represents a relatively small demand, is unlikely to offer an economically viable case, the scheme has not been included within the proposed DH network solution.

5.4 Heat consumer screening

This section seeks to review the various potential network options and heat supply considerations that feed into the financial modelling based on the estimated heat demands and physical constraints.

Physical constraints imposed by local infrastructure and topology have a significant impact on which consumers can viably be connected. Both river and rail crossings exist in the area surrounding RRRF and present obstructions to connect some consumers. Engineering a bridge crossing will likely require detailed structural assessments and the consent of the bridge owner. Trenching in road crossings will require traffic management and permission from the highway authority. Taking these factors into account, we have identified two potential DH network options, which are distinguished primarily on the basis of heat consumer location and whether the developments are existing or proposed.

1. **Option 1** – Connect prospective new housing and commercial developments to the west of RRRF. Based on indicative build out profiles for developed schemes (listed in Table 5), the total demand (included distribution losses) is calculated at 114 GWh/annum. When accounting for the entirety of the proposed development volume (20,000 dwellings and commercial properties) there is a surplus of heat demand which could not be satisfied by RRRF exclusively.

   Timing of network installation will be crucial to avoid retrofitting of heating systems and associated high costs. Collaboration from the developer and local planning authorities will be required to drive forward non-conventional heating systems. Connecting to new developments exclusively will have the benefit of reducing system operating temperatures, which will reduce heat losses and increase the amount of heat that can be supplied to end users. Additional environmental benefits could be attained through integration with other low carbon heat sources.
2. **Option 2** – Connect businesses located to the south and east of RRRF at Burt's Wharf. An estimated total heat demand of 291 GWh/annum has been identified following screening of

buildings which would be unviable to connect. These areas have a high heat demand density with a number of high heat demand premises. However, the heat demand requirements of individual businesses, and whether RRRF could supply the heat grade required, would need to be explored further. Additionally, business owners would need to be willing to contribute to the cost of upgrading existing heating systems to accept heat from a network, and to accept the resulting operational interruptions, which may present major barriers.

For the reasons explained above, Option 1 is the preferred solution and has been taken forwards for consideration. An economic assessment of the preferred DH network solution is presented in section 7.

5.5 Heat network profile

Generic heat demand profiles were developed to model the seasonal and diurnal variation in heat demand for each of the individual heat consumers identified, by integrating the estimated annual heat demands (in MWh). This allowed the annual average and peak heat demands (in MWth) to be calculated. A combined heat demand profile for the proposed heat network was then derived from the sum of the individual heat load profiles of the selected consumers.

The heat network profile for the proposed heat network, shown in Figure 8, includes heat demand from the proposed residential and commercial developments in Thamesmead (with the exception of The Reach). The heat network profile illustrates the variation in heat demand during a typical day in different seasons, accounting for network heat losses and demand diversity.

Figure 8: Projected heat network profile showing daily and seasonal variation

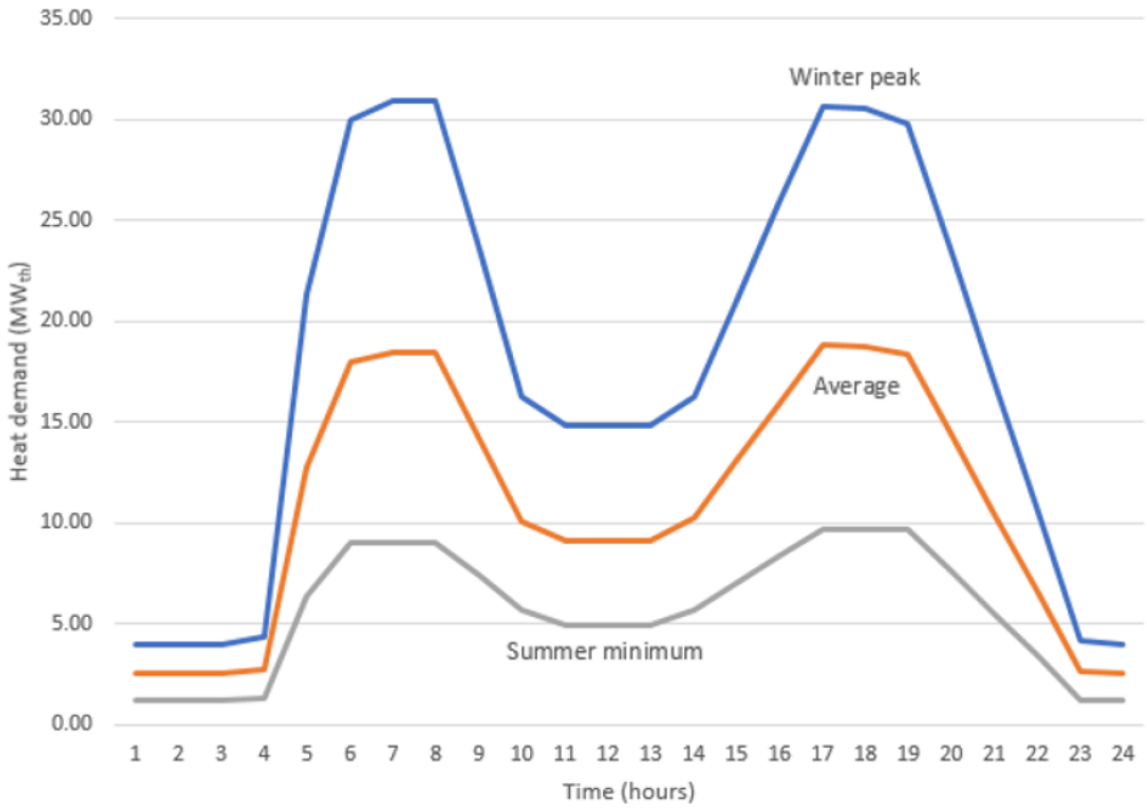


Table 6: Preferred district heating network parameters

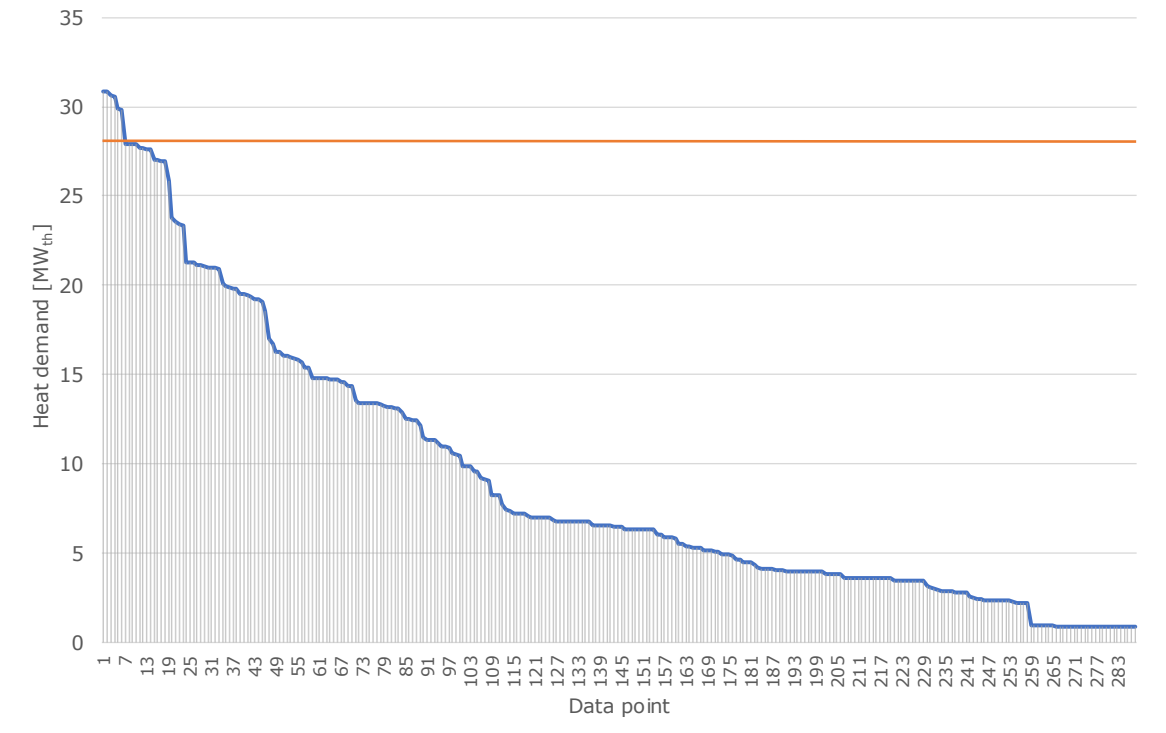
Consumers connected	Estimated heat demand [MWh/annum]	Estimated average heat demand [MWth]	Estimated peak heat demand [MWth]
1, 2, 3, 4, 5 and 7 (see map in Appendix E)	114,385	10.9	30.9

Based on the generic heat network profile developed, the preferred DH network offers a heat demand which aligns with the capacity and grade of heat available from RRRF. FCE note however that additional public establishments and private commercial premises exist in the town of Woolwich / West Thamesmead, which is located along the proposed DH pipeline corridor. Subject to the level of uptake achieved on deployment of a DH network and final pipe routing, owners of these existing developments will be approached to determine appetite for and feasibility of connection. For the purposes of this report, given the scale of heat demand offered by prospective developments, existing developments have not been explored further at this stage.

5.5.1 Heat load duration curve

The heat load duration curve presented in Figure 9 displays the instantaneous heat demand for the proposed heat network, arranged in order of decreasing magnitude, across the year. We have developed the heat load duration curve based on instantaneous heat demand at each hour of the day for each month, producing a total of 288 data points (24 hours/day x 12 months/year).

Figure 9: Heat load duration curve



The estimated peak demand of the proposed DH heat network is 30.9 MWth, but, based on current heat export proposals, RRRF includes a heat export capacity of up to 28.6 MWth (given for reference as the orange line in Figure 9 above). Therefore, the peak heat load could not be met by RRRF independently, unless thermal stores were incorporated into the scheme.

FCE estimates that the heat demand would exceed the maximum heat export capacity for approximately 2% of the year, so the shortfall is marginal. Thermal stores can be used to manage peak heat demand to avoid the use of fossil fuelled peak lopping boilers, by storing excess heat generated during off-peak periods for supply at times of peak heat demand (reducing the total installed capacity of plant required). This approach decouples heat production from heat demand, improving the operational flexibility of a CHP plant. Heat accumulators are typically large water tanks; as heat is absorbed the temperature rises and as heat is extracted the temperature decreases

Alternatively, a DH network supplied by both RRRF and REP (both low carbon heat sources) could be configured to minimise / eliminate the use of peak lopping boilers. This approach would also increase the resilience of the heat supply system.

5.5.2 Demand diversity

Significant daily and seasonal variation in heat demand is typical for heat networks serving residential and commercial consumers, which form the basis of the proposed DH network. Increasing the number and type of consumers connected to a DH network diversifies heat demand and helps to reduce the impact of the peak demand of any individual consumer, since it is less likely that peak demands will coincide. In calculating the diversified heat demand, we have assumed a diversity factor of 0.7, in accordance with CIBSE AM12[15], which is considered best industry practice for mixed use networks.

5.6 Heat network design

Heat distribution between RRRF and offsite heat consumers would use buried pipework. Pre-insulated steel pipes are used to supply pressurised hot water to the customer, and to return cooler water. Where pipes are small, two pipes may be integrated within a single insulated sleeve. For larger heat demands, large bore pipes are installed as a single insulated run. Pipe technology is well proven and can provide a heat distribution system with a 30-year plus design life. Additional pipe work can be added retrospectively, and it is reasonably straightforward to add branches to serve new developments.

Modern heat-insulated piping technology enables hot water to be transferred large distances without significant losses. Where the topography creates challenges, heat exchangers and additional pumping systems can be installed to create pressure breaks, enabling the network to be extended.

Heat delivery arriving at a consumer's premises usually terminates using a secondary heat exchanger. The heat exchanger is typically arranged to supply heat to a tertiary heating circuit upstream of any boiler plant. The water in the tertiary circuit is boosted to the temperature required to satisfy the heating needs of the building.

Water is pumped continuously around the system. Pumps are operated with 100% standby capacity to maintain heat in the event of a pump fault. Pumps are likely to utilise variable speed drives to minimise energy usage.

The following design criteria relate to a typical hot water network utilising conventional heat extraction (as detailed in Section 4.2) and have been used to size the heat transmission pipe diameters. Flow and return temperatures have been selected to align with operating temperatures for newer heating systems, with a view to reducing network heat losses.

[15] CIBSE AM12 Combined Heat and Power for Buildings, 2013

Table 7: District heating network typical design criteria

Parameter	Value
Water supply temperature to consumer	90°C
Water return temperature from consumer	60°C
Distance between flow and return pipes	150 mm
Soil temperature	10°C
Depth of soil covering (minimum)	600 mm

Using the above design criteria and taking into account the estimated heat demand for the preferred network, the primary hot water transmission pipe size has been calculated as DN400. This is an indicative figure and will be subject to heat demand verification and subsequent network design.

5.7 Back-up heat source

RRRF has been constructed to achieve an availability of over 90% (i.e. at least c. 8,000 operational hours per year). During periods of routine maintenance or unplanned outages of all boiler lines the plant will not be operating, however the heat consumers will still require heat. There is therefore a need, within the heat distribution system, to provide a back-up source of heat to meet the needs of the heat consumers.

The back-up heat source could be provided by the consented REP, which could be configured to feed into a common heat network with RRRF. This configuration would displace carbon emissions associated with conventional fossil-fuelled back-up boiler plant, and thus provide additional carbon savings. Additionally, since back-up boilers are typically located as close as practicable to the heat consumer (to minimise heat losses from carbon intensive generators), relying on REP for back-up would lessen air quality impacts close to residential areas. Since both facilities would be owned by Cory, staggering maintenance outages to ensure that heat supplies are maintained year-round would be possible.

Alternatively, standby plant could comprise oil or gas-fired hot water heaters (boilers) with a separate dedicated stack. Back-up boilers are typically designed to ensure that the peak heat export capacity can be met but also provide sufficient turndown to supply smaller summer loads with reasonable efficiency. It would be preferential to locate the boilers in close proximity to the heat consumers to minimise heat losses when running on fossil fuel.

Subject to detailed heat demand modelling, once heat consumers are known with more certainty, opportunities for installing thermal stores will be considered to lessen reliance on the back-up plant by storing excess heat generated during off peak periods for use during times of peak heat demand.

5.8 Additional heat sources

To maximise the benefits associated with developing a heat network, a review of heat sources in the area surrounding RRRF has been undertaken. Additional heat sources could be used to increase the capacity of the heat network and the associated benefits.

According to the National Heat Map, there are six point heat sources within 10 km of RRRF.

1. Barking Reach, a 1,000 MWe combined cycle gas turbine (CCGT) power station, located approximately 1.8 km to the north of RRRF, was decommissioned in 2014;

2. Littlebrook D, a 1,475 MWe oil-fired power station, located approximately 7.6 km to the south-east of RRRF, but was decommissioned in 2015;
3. A 19.5 MWe CHP installation is located approximately 7.5 km to the west of RRRF at the Thames Refinery;
4. A 3.8 MWe CHP installation is located approximately 2.5 km to the north east of RRRF at Maple Lodge Sewage Treatment Works;
5. A 10.0 MWe CHP installation is located approximately 7.1 km to the south east of RRRF at Arjo Wiggins Ltd; and
6. A 3.5 MWe CHP installation is located approximately 7 km to the south east of RRRF at Longreach Sewage Treatment Works.

Given the stated electrical capacities, the quantity of surplus heat (if any) available from these CHP installations is likely to be too small to make any connection viable. Additionally, the location of operational heat supply assets does not align with areas of high DH network potential, as identified in preceding sections of this study. On this basis, inclusion of additional heat sources captured on the National Heat Map are not considered feasible.

As discussed previously, Cory is applying to construct and operate a new integrated energy park (REP) on land adjacent to RRRF. REP is planned to include a number of energy sources, including an energy recovery facility (ERF) with CHP infrastructure for exporting up to 30 MWth of heat. Once operational, this will present a robust back-up heat source, with availability and thermal export capacity broadly equivalent to that of RRRF. This additional source of heat could be used to increase the capacity of a heat network in the region, and/or act as a back-up source of heat for periods when RRRF is not available.

5.9 Indicative pipe route

An indicative layout of the preferred DN network is provided in Appendix C. The routing is indicative; a detailed engineering assessment would be required to determine the optimum route, which is not appropriate for this initial study.

The predominant engineering issue associated with the supply of heat by hot water relates to the installation of the heat supply pipeline. The pipeline required to supply hot water is likely to be a pair of large diameter pipes which must be installed in a trench. Determining a feasible route for such a pipeline is complex as outlined below.

Existing buried services may obstruct the most direct route to end consumers. Infrastructure crossings may be required and the supply and return pipelines would need to be routed along public highways. These issues have a direct bearing on the cost and installation time.

To install heat supply infrastructure, such as pre-insulated DH pipes, in the public highway, the installer would need to comply with the requirements of the New Roads and Street Works Act 1991 (NRSWA). This lays out the legal obligations that apply to both statutory and non-statutory undertakers wishing to install apparatus in the public highway.

The provisions of the NRSWA do not apply to works carried out in private land, which would include RRRF where consent to install DH pipes would likely be secured as a permitted development within the site boundary. Outside of RRRF, DH pipes would be brought forward by the associated heat load developer or relevant local authority.

6 Stakeholder engagement

Cory has been actively engaging with local authorities and local housing developers to pursue opportunities for heat export. This has predominantly been through involvement in the Bexley District Heating Partnership Board, established in 2018 to provide a collective approach to heat network development. The Partnership Board is attended by representatives from LBB, London Borough of Greenwich (LBG), the GLA, housing developers Peabody and Orbit Homes, and Cory. These discussions have been used to inform the technical design and commercial parameters for the proposed heat network, taking account of stakeholder requirements.

Through the Partnership Board the Applicant has engaged proactively with Peabody, LBB's development partner for the Thamesmead and Abbey Wood area of the Borough. Peabody has recognised and welcomed Cory's approach in respect of these efforts, as detailed in a letter of support (dated 17th April 2019), provided as Appendix A to the Combined Heat and Power (CHP) Assessment[16] prepared for the REP DCO application, which states:

"We [Peabody] write in support of the effort and commitment shown by Cory Riverside Energy in seeking to progress the development of a district heating network to serve Belvedere, Thamesmead and other neighbouring areas…Cory have attended all Partnership Board meetings and has played an integral role in progressing the development of a CHP heat network scheme…Peabody support Cory's ongoing support and commitment to the collective goal of developing a heat network in Thamesmead and Belvedere to serve the local area which will utilise hear from RRRF and REP."

Cory is also actively supporting Ramboll, who has been engaged to evaluate the techno-economic feasibility of establishing a borough wide district heating network on behalf of LBB.

[16] https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010093/EN010093-000213-5.4%20Combined%20Heat%20and%20Power%20Assessment.pdf

7 Economic assessment

7.1 Fiscal support

The following fiscal incentives are available to energy generation projects.

1. Capacity Market for electricity supplied by the plant

Under the Capacity Market, subsidies are paid to generators to ensure long-term energy security for the UK. The Capacity Market does not prioritise low-carbon energy or specific technologies. The Capacity Market was suspended in November 2018 following a ruling by the European Court of Justice, but was reinstated in October 2019. Cory has active agreements in place for supplying power to the grid under the Capacity Market.

2. Renewable Heat Incentive (RHI)

The RHI was created by the Government to promote the deployment of heat generated from renewable sources. RHI funding has been announced to March 2021. To be eligible, the plant in question must not receive any other support or subsidy from public funds. On the basis that Cory is a recipient of Capacity Market support, Cory would not be eligible for the RHI.

3. Contracts for Difference (CfD)

CfD has replaced the Renewables Obligation (RO) as the mechanism by which the Government supports low carbon power generation. CfD de-risks investing in low carbon generation projects by guaranteeing a fixed price (the Strike Price) for electricity over a 15-year period. In the third CfD allocation round (executed on 1st May 2019) no funding was allocated for EfW plants, with or without CHP, on the basis that these are now considered established technologies. On this basis, RRRF would not be eligible for support under the CfD mechanism.

4. Heat Network Investment Project (HNIP) funding

The HNIP aims to deliver carbon savings and create a self-sustaining heat network market through the provision of subsidies, in the form of grants and loans, for heat network projects. £320 million has been made available to fund the HNIP over the next five years. Following a pilot scheme, which ran from October 2016 to March 2017, BEIS launched the main scheme (open to both private and public sector projects in England and Wales) in October 2018, with funding available from April 2019. Cory announced in May 2020 that it's partnering with specialist district heating and low carbon energy company Vattenfall with the aim of developing one of the largest heat networks in the UK. In May 2021, Cory was awarded £12.1 million through the Government's Heat Network Investment Project (HNIP) to fund commercialisation and construction of the proposed DH Network[17]. Cory and Vattenfall are currently progressing DH Network design and commercial discussions.

Technical feasibility

Step 3 of the CBA methodology requires identification of existing and proposed heat loads which are technically feasible to supply, as carried out in Section 5 of this study. The draft Article 14 guidance states that the following factors should be accounted for when determining the technical feasibility of a scheme, pertaining to a type 14.5(a) installation.

[redacted]

The compatibility of the heat source(s) and load(s) in terms of temperature and load profiles

The preferred DH network solution is intended to supply heat, in the form of hot water, to new-build residential and commercial developments in Thamesmead. On this basis, it will be possible to reduce system operating temperatures and heat losses in line with best industry practice.

Development proposals indicate that a DH supply temperature of circa 90°C will be sufficient to meet the requirements of the anticipated end users. The indicative heat and mass balance (provided in Appendix C) demonstrates that RRRF would be designed to supply hot water at up to 100°C, and as such the heat source and loads are considered compatible.

Heat export will be facilitated through steam extraction from the turbine, prioritised as follows to maximise energy efficiency.

1. When RRRF is operating at full load, steam will be supplied through a low pressure bleed at 0.7 bar(a), corresponding to 28.6 MWth export.
2. In low load operation or when network demand exceeds capacity available through the low pressure bleed, steam will be supplied through a low pressure steam header, supplied via a turbine bleed at 4.1 bar(a), corresponding to 28.6 MWth export.

Connecting to new developments exclusively will have the benefit of reducing system operating temperatures, which will increase the amount of heat that can be exported and reduce heat losses. Additional environmental benefits could be attainted through integration with other low carbon heat sources.

As FCE has undertaken an analysis using generic consumer heat profiles, consumer requirements (in terms of hot water temperature and load profiles) will need to be verified prior to the implementation of a heat network.

Whether thermal stores or other techniques can be used to match heat source(s) and load(s) which will otherwise have incompatible load profiles.

A thermal store or back-up supply from REP (as detailed in section 5.7) will likely be included in the DH network to ensure continuity of supply. The thermal store will take precedence over any peak lopping plant to ensure that low carbon energy provision is prioritised. The specific arrangement will be selected when there is more certainty over heat loads.

Whether there is enough demand for heat to allow high-efficiency cogeneration

'High-efficiency cogeneration' is cogeneration which achieves at least 10% savings in primary energy usage compared to the separate generation of heat and power. Primary Energy Saving (PES) are calculated in section 8.3.

7.2 Cost-benefit assessment

Under Article 14 of the EED, operators of certain types of combustion installations are required to carry out a CBA of opportunities for CHP when applying for an EP. FCE have followed the EA's methodology, as outlined in the draft Article 14 guidance[18], in order to appraise the economic feasibility of implementing the proposed heat network.

The CBA uses an Excel template, '*Environment Agency Article 14 CBA Template.xlsx*' provided by the EA, with inputs updated to correspond with the specifics of this CHP Study. The CBA model considers:

[18] Draft guidance on completing cost-benefit assessments for installations under Article 14 of the Energy Efficiency Directive, V9.0 April 2015

1. revenue streams (heat sales and fiscal benefits);
2. expenditure streams (construction and operational, including back-up plant); and
3. lost electricity sales revenue, over the lifetime of the scheme.

The following assumptions have been made.

1. The scheme will commence operation in 2022.
2. The heat export infrastructure is estimated to have a capital cost of approximately £14.0 million, split over a two-year construction programme.
3. Operational costs have been estimated based on similar sized projects.
4. No back-up boiler or fuel costs have been applied on the assumption that heat supply from REP will be utilised for periods when RRRF is unavailable.
5. Triad payments at the commencement of operations will be approximately £3 / kW following Ofgem's announcement[19] to reduce triad payments to embedded generators. Due to their marginal value, other embedded benefits have not been accounted for.
6. Lost electricity sales revenue will be £53 / MWh. This has been taken from Annex M of BEIS 2018 power price projections[20] for 2022, assuming a wholesale volume-weighted power price in the reference scenario.
7. Heat sales revenue will be £20.50 / MWh, taken from BEIS 2018 updated power price projections. We have assumed a retail heat price equivalent to the counterfactual scenario (gas). The ownership boundaries for delivery and operation of the distribution pipework and consumer connections (and therefore heat price) will be subject to the heat offtake agreement strategy pursued.
8. No additional fiscal support (see section 7.1) has been obtained. This provides a base-case financial scenario.

The results of the CBA indicate that the nominal project internal rate of return (before financing and tax) over 33 years is 6.5%. The net present value (before financing and tax) over 33 years is negative. Without some form of fiscal incentive, the returns based on heat sales revenue alone are unattractive and carry a reasonable level of uncertainty at this stage. Therefore, alternative funding is necessary to improve the economic case.

Cory announced in May 2020 that it's partnering with specialist district heating and low carbon energy company Vattenfall with the aim of developing one of the largest heat networks in the UK. In May 2021, Cory was awarded £12.1 million through the Government's Heat Network Investment Project (HNIP) to fund commercialisation and construction of the proposed DH Network[21]. Cory and Vattenfall are currently progressing DH Network design and commercial discussions.

[19] https://www.ofgem.gov.uk/publications-and-updates/ofgem-proposes-lower-payments-embedded-generators-reduce-costs-consumers

[20] Updated energy and emissions projection: 2018. Source: https://www.gov.uk/government/publications/updated-energy-and-emissions-projections-2018

[redacted]

8 Energy efficiency measures

8.1 Heat and power export

The Z ratio, which is the ratio of reduction in power export for a given increase in heat export, can be used to calculate the effect of variations in heat export on the electrical output of the plant. A value of 5.3 has been applied based on thermodynamic modelling of RRRF.

FCE has modelled heat and power export across a range of load cases and the results are presented in Table 8.

Table 8: Heat and power export

Load case	Heat export [MW_{th}]	Net power exported [MW_e]	Z ratio
1. No heat export	0	67.1	N/A
2. Average estimated heat export	10.9	65.1	5.35
3. Maximum heat export	28.0	61.8	5.35

8.2 CHPQA Quality Index

CHPQA is an energy efficiency best practice programme initiative by the UK Government. CHPQA aims to monitor, assess and improve the quality of CHP in the UK. In order to prove that a plant is a 'Good Quality' CHP plant, as required under the CHP-Ready Guidance, a QI of at least 105 must be achieved at design stage and 100 when operational. The QI for CHP schemes is a function of their heat efficiency and power efficiency according to the following formula.

$$QI = X\eta_{power} + Y\eta_{heat}$$

where:

η_{power} = power efficiency; and

η_{heat} = heat efficiency.

The power efficiency within the formula is calculated using the gross electrical output and is based on the gross calorific value (GCV) of the input fuel. The heat efficiency is also based on the GCV of the input fuel. The coefficients X and Y are defined by CHPQA based on the total gross electrical capacity of the scheme and the fuel / technology type used.

The following factors apply to RRRF when adopting CHPQA Standard issue 3[22]:

- X value = 220; and
- Y value = 120.

These correspond to a facility burning category E fuel with gross generation greater than 25 MW_e.

FCE has calculated the QI and efficiency values (based on a GCV of 11.1 MJ/kg) in accordance with CHPQA Standard Issue 3 for three load cases and the results are presented in Table 9.

[22] CHPQA Standard Issue 3, January 2009

Table 9: QI and efficiency calculations

Load case	Gross power efficiency [%]	Heat efficiency [%]	Overall efficiency [%]	CHPQA QI
1. No heat export	24.8	0.0	24.8	54.5
2. Average estimated heat export	24.1	3.6	27.7	57.4
3. Maximum heat export	23.0	9.3	32.4	61.9

The results indicate that RRRF will achieve a QI score below the 'Good Quality' CHP threshold for the average estimated heat load of the preferred DH network. This is a result of the relatively low X and Y coefficient values introduced by CHPQA under Standard 3, which is the version stipulated under Planning Permission Condition 31. Despite being a renewable generator, RRRF does not benefit from RO or CfD support, so cannot take benefit of the higher coefficients.

The actual energy efficiency performance of the scheme will be dependent on the number of consumers brought forward, subject to build out rates of proposed housing developments. Or, in the event of connection to industrial development at Burt's Wharf, the heat grade required by businesses willing to enter into a commercial agreement.

8.3 Primary Energy Savings

In order to be considered high-efficiency cogeneration, the scheme must achieve at least 10% savings in primary energy usage compared to the separate generation of heat and power. PES have been calculated in accordance with Directive 2012/27/EU Annex II part (b), using the following assumptions.

1. Throughput of 32.4 tonnes per hour per boiler line.
2. Fuel NCV of 9.6 MJ/kg based on average historical fuel composition.
3. Gross electrical output (fully condensing mode) of 72.6 MW_e, based on performance test results.
4. Parasitic load of 7.2 MW_e, based on performance test results.
5. Z ratio of 5.35, ascertained from thermodynamic modelling.
6. Efficiency reference values for the separate production of heat and electricity have been taken as 80% and 25% respectively, as defined in Annexes 1 and 2 of Commission Delegated Regulation (EU) 2015/2402[23].

When operating in fully condensing mode (i.e. without heat export) RRRF will achieve PES of 12.8%. The inclusion of heat export at the level anticipated for the proposed heat network increases PES to 14.3%. On this basis, RRRF will qualify as a high-efficiency cogeneration operation when operating in CHP mode.

[redacted]

Appendices

A Potential existing heat consumers

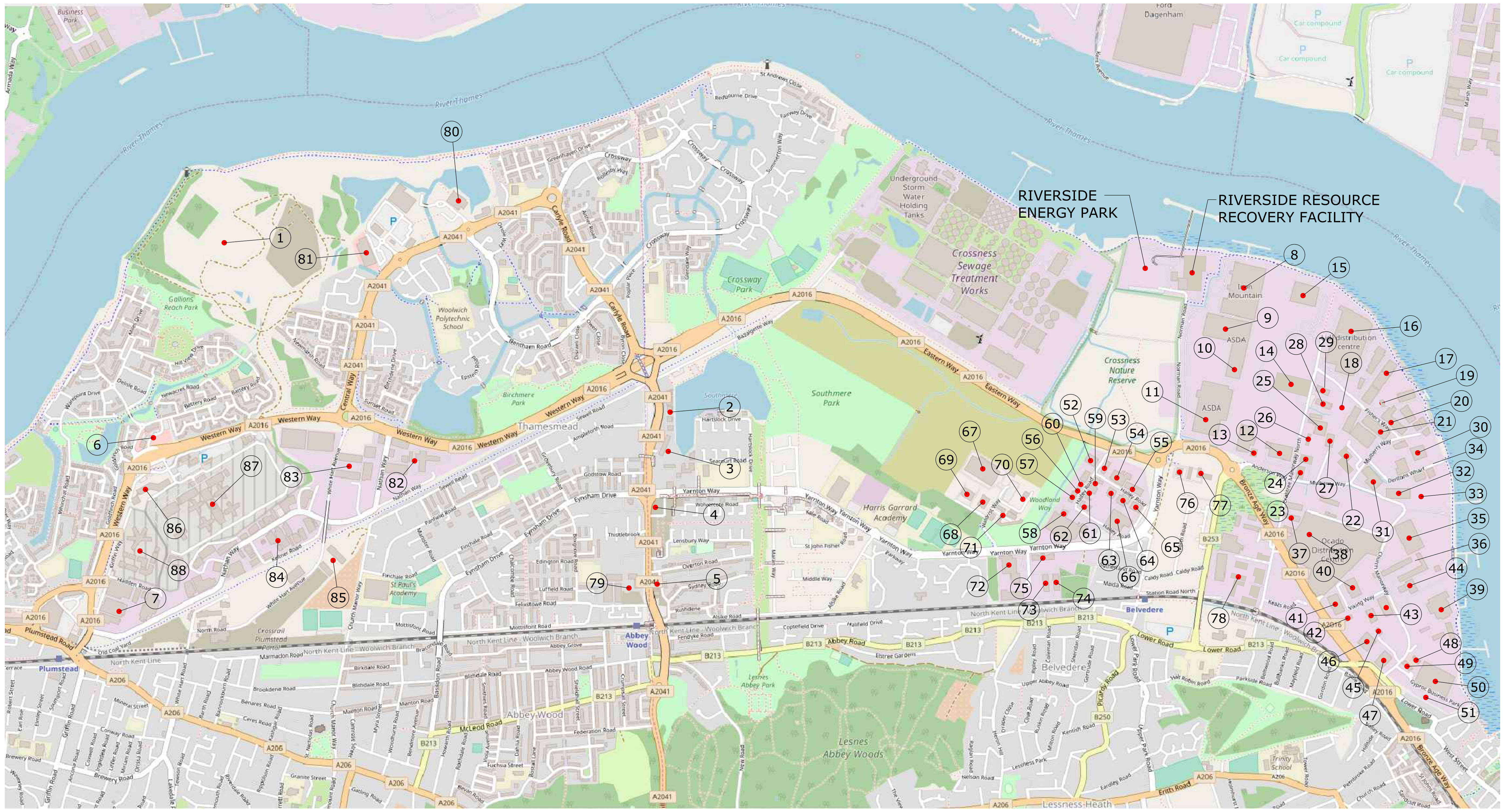
Site	Use	Postcode	Est heat demand [MWh / annum]
Iron Mountain	Digital information and asset storage	DA17 6JY	1,701
Wernick Hire	Modular building manufacturer / portable building hire	DA17 6JY	5,119
Asda	Chilled distribution centre	DA17 6JY	942
Asda	Cross dock centre	DA17 6JY	2,429
Asda	Recycling Centre	DA17 6BG	1,651
Jablite	Expanded polystyrene products manufacturer	DA17 6BG	1,650
Amazon	Distribution centre	DA17 6AS	922
London City Roast	Coffee roasters	DA17 6AX	2,947
Lidl	Distribution centre	DA17 6BS	2,895
Belvedere Industrial Estate	Industrial estate	DA17 6BS	1,006
Performance Chemicals	Cleaning and maintenance chemical supplier	DA17 6BS	604
Tarmac (Mulberry)	Construction materials supplier (asphalt and concrete)	DA17 6BS	28
Thames Steel Services	Steel fabricator	DA17 6BS	3,099
D&X London	E-commerce distribution centre	DA17 6AN	1,162
FM Conway	Construction contractor	DA17 6AN	184
CMT Group	Construction equipment supplier	DA17 6AN	222
Concorde Metals	Scrap yard	DA17 6AZ	108
CCF	Insulation and interior building product supplier	DA17 6AS	187
GPM Hire & Supplies	Construction products and equipment supplier	DA17 6AS	65
Display Developments Limited	Thermoplastic products fabricator	DA17 6AS	385
Tuffnells Parcels Express	Distribution centre	DA17 6BT	113
HTC Van Centre	Commercial vehicle storage	DA17 6BT	148
River Wharf Business Park	Various warehouses	DA17 6AR	926
Belvedere Warehousing & Distribution	Distribution centre	DA17 6AN	452
Gilray Plant Ltd	Scaffolding supplier	DA8 1DE	225
Tarmac (Erith Wharf)	Construction materials supplier (aggregates)	DA8 1DE	9

Site	Use	Postcode	Est heat demand [MWh / annum]
Hanson UK	Construction materials supplier	DA8 1DE	194
Tesco	Dot Com Distribution Centre	DA8 1DE	870
Archer Daniels Midland	Rapeseed oil refinery	DA8 1DL	213,204
Oyo Business Units	Warehouse units	DA17 6AX	317
Ocado	Distribution Centre	DA8 1DF	3,954
Edible Oils	Seed oil bottling site	DA8 1DL	2,110
Olleco (London East)	Food waste collection depot	DA8 1EW	391
Neville UK	Catering equipment supplier	DA8 1EW	204
Buildbase	Building materials supplier	DA8 1EW	32
Unknown	Unknown	DA8 1EW	110
HMRC	Storage Depot	DA8 1EW	307
Select Plant Hire	Construction equipment supplier depot	DA8 1DG	98
Unknown	Unknown	DA8 1EX	176
WT Henley	Electrical distribution equipment manufacturer	DA8 1EX	1,077
Saint-Gobain (British Gypsum)	Training centre	DA8 1DE	36
Stanmore Contractors Ltd	Drywall and façade subcontractor	DA8 1DE	91
KnowHow	Electrical goods repair and storage	DA8 1EX	1,561
Landor Cartons Ltd	Packaging manufacturer	DA8 1NP	672
Home Move Box	Gift box supplier	DA18 4AP	102
Howdens Joinery	Building materials supplier	DA18 4AP	58
Europa Worldwide Logistics	Transport and logistics provider	DA18 4AU	271
Intersped Logistics (UK) Ltd	Transport and logistics provider	DA18 4AA	249
Halvey Engineering	Vehicle maintenance and repair	DA18 4AP	318
Finesse Colour Ltd	Printing service	DA18 4AP	49
Brew Bros Fabrications Ltd	Steel fabricator	DA18 4AP	330
Kent Precision Tooling	Plastic products manufacturer	DA18 4AA	341
Seropa Ltd	Catering equipment manufacturer	DA18 4AA	342
Freshasia Food Ltd	Food producer	DA18 4AA	338
Ferndale Foods Ltd	Food producer	DA18 4AR	297
Begg & Co Thermoplastics Ltd	Thermoplastic products fabricator	DA18 4AW	313

Site	Use	Postcode	Est heat demand [MWh / annum]
Smart Freight Solutions Ltd	Transport and logistics provider	DA18 4AA	188
Citipost Ltd	Distribution service	DA18 4AA	181
Unknown	Unknown	DA18 4AA	350
Booker Retail Partners	Food wholesaler	DA18 4AG	1,886
Thames Innovation Centre	Business centre	DA18 4AL	109
British Loose Leaf	Stationary manufacturer	DA18 4AL	546
Horizon Business Centre	Industrial business park	DA18 4AJ	1,057
Kencot Close Business Park	Industrial business park	DA18 4AB	992
Würth	Assembly materials wholesaler	DA18 4AE	551
Anchor Bay Construction Products Ltd	Building materials supplier	DA18 4AF	101
Forsite Construction Accessories Ltd	Building materials supplier	DA18 4AF	102
Allied Hygiene Systems Ltd	Cleaning wipe manufacturer	DA18 4AF	1,876
The Morgan	Restaurant	DA17 6FD	656
Snap Fitness Belvedere	Gym	DA17 6FD	379
Capital Industrial Estate	Industrial Estate	DA17 6BJ	9,805
Cross Quarter	Retail Park	SE2 9NU	455
Thamesmere Leisure Centre	Leisure Centre	SE28 8RE	1,712
Cannon Retail Park / Thamesmead Shopping Centre	Retail Park	SE28 8RD	347
Birchmere Business Park	Industrial business park	SE28 0AF	479
White Hart Triangle	Industrial Estate	SE28 0GU	2,428
West Thamesmead Business Park	Industrial business park	SE28 0AB	766
Ash Poultry Wholesalers Ltd	Meat wholesaler	SE28 0GU	714
HMP Belmarsh	Prison	SE28 0EB	683
HMP Thameside	Prison	SE28 0DF	5,832
Belmarsh Magistrates' Court	Courthouse	SE28 0HA	1,516

B Location of potential heat consumers

	PROPOSED DEVELOPMENTS
1	THAMESMEAD WATERFRONT
2	LAND AT BINSEY WALK
3	SOUTHMERE VILLAGE
4	LAND AT CORALINE WALK
5	LAND AT SEDGEMERE ROAD
6	THE REACH
7	WEST THAMESMEAD GATEWAY
	EXISTING DEVELOPMENTS
8	IRON MOUNTAIN
9	WERNICK HIRE
10	ASDA CHILLED DISTRIBUTION CENTRE
11	ASDA CROSS DOCK CENTRE
12	ASDA RECYLING CENTRE
13	JABLITE
14	AMAZON DISTRIBUTION CENTRE
15	LONDON CITY ROAST
16	LIDL DISTRIBUTION CENTRE
17	BELVEDERE INDUSTRIAL ESTATE
18	PERFORMANCE CHEMICALS
19	TARMAC (MULBERRY)
20	THAMES STEEL SERVICES
21	D&X LONDON
22	FM CONWAY
23	CMT GROUP
24	CONCORDE METALS
25	CCF, INSULATION AND INTERIOR BUILDING PRODUCTS
26	GMP HIRE & SUPPLIES
27	DISPLAY DEVELOPMENTS LIMITED
28	TUFFNELLS PARCELS EXPRESS
29	HTC VAN CENTRE
30	RIVER WHARF BUSINESS PARK
31	BELVEDERE WAREHOUSING & DISTRIBUTION
32	GILRAY PLANT LTD
33	TARMAC (ERITH WHARF)
34	HANSON UK
35	TESCO DOT COM DISTRIBUTION CENTRE
36	ARCHER DANIELS MIDLAND
37	OYO BUSINESS UNITS
38	OCADO DISTRIBUTION CENTRE
39	EDIBLE OILS
40	OLLECO (LONDON EAST)
41	NEVILLE UK
42	BUILDBASE
43	UNKNOWN
44	HMRC STORAGE DEPOT
45	SELECT PLANT HIRE
46	UNKNOWN
47	WT HENLEY
48	SAINT-GOBAIN (BRITISH GYPSUM)
49	STANMORE CONTRACTORS LTD
50	KNOWHOW
51	LANDOR CARTONS LTD
52	HOME MOVE BOX
53	HOWDENS JOINERY
54	EUROPA WORLDWIDE LOGISTICS
55	INTERSPED LOGISTICS (UK) LTD
56	HALVEY ENGINEERING
57	FINESSE COLOUR LTD
58	BREW BROS FABRICATIONS LTD
59	KENT PRECISION TOOLING
60	SEROPA LTD
61	FRESHASIA FOOD LTD
62	FERNDALE FOODS LTD
63	BEGG & CO THERMOPLASTICS LTD
64	SMART FREIGHT SOLUTIONS LTD
65	CITIPOST LTD
66	UNKNOWN
67	BOOKER RETAIL PARTNERS
68	THAMES INNOVATION CENTRE
69	BRITISH LOOSE LEAF
70	HORIZON BUSINESS CENTRE
71	KENCOT CLOSE BUSINESS PARK
72	WÜRTH
73	ANCHOR BAY CONSTRUCTION PRODUCTS LTD
74	FORSITE CONSTRUCTION ACCESSORIES LTD
75	ALLIED HYGIENE SYSTEMS LTD
76	THE MORGAN
77	SNAP FITNESS BELVEDERE
78	CAPITOL INDUSTRIAL ESTATE
79	CROSS QUARTER
80	THAMESMERE LEISURE CENTRE
81	CANNON RETAIL PARK/THAMESMEAD SHOPPING CENTRE
82	BIRCHMERE BUSINESS PARK
83	WHITE HART TRIANGE
84	WEST THAMESMEAD BUSINESS PARK
85	ASH POULTRY WHOLESALERS LTD
86	BELMARSH MAGISTRATES COURT
87	HMP BELMARSH
88	HMP THAMESIDE



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NOTES:

REV.	DETAILS OF REVISION	DRAWN	CHKD	DATE
R1	PRELIMINARY	AO	RLB	02.06.20

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CLIENT: RIVERSIDE RESOURCE RECOVERY LIMITED

SITE: RIVERSIDE RESOURCE RECOVERY FACILITY

PROJECT: CHP FEASIBILITY REVIEW

TITLE: POTENTIAL HEAT CONSUMERS

DRAWING STATUS:	PRELIMINARY		
DRAWN BY:	AO	DATE: 15.03.18	
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OFFICE OF ISSUE:	STOCKPORT		
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DRAWING No.: 2383-002	Sheet 1 of 1	REVISION: R1	

C Indicative pipe route

REV.	DETAILS OF REVISION	DRAWN	CHKD	DATE
R2	PRELIMINARY	DTW	JB2	02.06.20
R1	PRELIMINARY	AO	RLB	29.03.18

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CLIENT:
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SITE:
RIVERSIDE RESOURCE RECOVERY FACILITY

PROJECT:
CHP FEASIBILITY REVIEW

TITLE:
INDICATIVE PIPE ROUTE

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REVISION: R2

D Cost-benefit assessment inputs and key outputs

INPUTS — Version Jan 2015

Scenario Choice (dropdown box): 1 — Power generator (Heat Source) same fuel amount

Technical solution features

Heat carrying medium (hot water, steam or other) (dropdown box)	Hot water
Total length of supply pipework (kms)	10.9
Peak heat demand from Heat User(s) (MWth)	30.89
Annual quantity of heat supplied from the Heat Source(s) to Heat User(s) (MWh)	*Lines 49 & 79*

Key: 2 Participant to define; 2 Regulatory prescribed; 2 Calculated; 2 Prescribed - but possibility to change if make a case

DCF Model Parameters

Discount rate (pre-tax pre-financing) (%) - 17% suggested rate	17%
Project lifespan (yrs)	30
Exceptional shorter lifespan (yrs)	0

Cost and revenue streams

Construction costs and build up of operating costs and revenues during construction phase

	% operating costs and revenues during construction phase	Heat Supply Infrastructure - used in Scenarios 1, 2, 3 and 5	Heat Station - used in Scenarios 1, 2 and 3	Standby boilers (only if needed for Scenarios 1, 2 and 3)	Industrial CHP - used in Scenario 4 *
Project asset lifespan (yrs)		30	30	30	
Exceptional reason for shorter lifespan of Heat Supply Infrastructure, Standby Boiler and/ or Heat Station (yrs)					
Construction length before system operational and at steady state (yrs)	2				
Number of years to build		2	2	0	0
	% (ONLY IF APPLICABLE)	£m	£m	£m	£m
Year 1 costs (£m) and build up of operating costs and revenues (%)	0%	5.883085952	1.103633493		
Year 2 costs (£m) and build up of operating costs and revenues (%)	0%	5.883085952	1.103633493		
Year 3 costs (£m) and build up of operating costs and revenues (%)					
Year 4 costs (£m) and build up of operating costs and revenues (%)					
Year 5 costs (£m) and build up of operating costs and revenues (%)					

Non-power related operations

OPEX for full steady state Heat Supply Infrastructure on price basis of first year of operations (partial or steady state) (£m)	0.2
OPEX for full steady state Heat Station on price basis of first year of operations (partial or steady state) (£m)	0.0
OPEX for full steady state Standby Boilers on price basis of first year of operations (partial or steady state) (£m)	0.1
OPEX for full steady state Industrial CHP on price basis of first year of operations (partial or steady state) (£m) *	
Additional equivalent OPEX to pay for a major Industrial CHP overall spread over the life of the asset (£m) on price basis of first year of operations (partial or steady state) (£m) *	
Other 1 - Participant to define (£m)	
Other 2 - Participant to define (£m)	
Total non-power related operations	**0.4**
Annual inflation for all non-power related OPEX from first year of operations (full or partial) (%)	2.0%

Unit Energy Prices, Energy Balance, Fuel Related Operational costs and Revenue Stream

	Scenario used	1 Power generator (Heat Source) same fuel amount	2 Power generator (Heat Source) same electrical output	3 Industrial installation (Heat Source) - use waste heat	4 Industrial installation (Heat Source) - CHP set to thermal input	5 District heating (Heat User)
Heat sale price (£/ MWh) at first year of operations (partial or full)	20.50	20.50				
Annual quantity of heat supplied from the Heat Source(s) to Heat User(s) at steady state (MWh)	114,385	114,385				
Equivalent heat sales if first year of operations is steady state (£ m)	2.3					
Heat sale price inflation from first year of operations (full or partial) (% per year)	2.0%	2.0%				
Percentage of heat supplied by Standby Boiler (if relevant)	0%	0%				
'Lost' electricity sale price (£/ MWh) at first year of operations	53.00	53.00				
Z-ratio (commonly in the range 3.5 - 8.5)	5.60	5.60				
Power generation lost at steady state (MWh)	20,426	20,426				
Equivalent 'lost' revenue from power generation if first year of operations is steady state (£ m)	1.08					
Electricity sale price inflation from first year of operations (full or partial) (% per year)	2.0%	2.0%				
Industrial CHP electricity sale price (£/ MWh) at first year of operations (full or partial)	0.00					
Industrial CHP electrical generation in steady state (MWh)	0					
Equivalent revenue from power generation if first year of operations is steady state (£ m)	0.00					
Industrial CHP electricity price inflation from first year of operations (full or partial) (% per year)	0.0%					
Fuel price for larger power generator/ CHP at first year of operations (full or partial) (£ / MWh)	0.00					
Z-ratio (commonly in the range 3.5 - 8.5)	0					
Power efficiency in cogeneration mode (%)	0					
Additional fuel required per year for larger power generator / CHP in steady state (MWh)	0		#DIV/0!			
Equivalent additional fuel costs if first year of operations is steady state (£ m)	0.00					
Fuel price inflation from first year of operations (full or partial) (% per year)	0.0%					
Fuel price for Standby Boiler at first year of operations (£ / MWh)	17.40	17.40				
Boiler efficiency of Standby Boiler (%)	80%	80%	80%	80%		
Additional fuel required per year for Standby Boiler in steady state (MWh)	-	-	-	-		
Equivalent additional fuel costs if first year of operations is steady state (£m)	-					
Fuel price inflation for Standby Boiler from first year of operations (full or partial) (% per year)	2.00%	2.0%				
Heat purchase price (£/ MWh) at first year of operations (partial or full)	0.00					
Annual quantity of heat supplied from the Heat Source(s) to Heat User(s) at steady state (MWh)	0					
Equivalent cost of heat purchased if first year of operations is steady state (£ m)	0.0					
Heat purchase price inflation from first year of operations (full or partial) (% per year)	0.0%					
Fuel price (£ / MWh) at first year of operations (partial or full)	0.00					
Boiler efficiency of district heating plant	0%					80%
Fuel avoided per year in steady state (MWh)	0					-
Equivalent fuel savings if first year of operations is steady state (£m)	0.0					
Fuel price inflation from first year of operations (full or partial) (% per year)	0.0%					4.0%
Fiscal benefits (£m) in first year of operations assuming it is at steady state **	0.00	0.00				
Fiscal benefits inflation rate from first year of opeations (full or partial) (%) **	0.0%					

* In the case of Industrial CHP a separate model template is available for typical indicative CAPEX, non-power related OPEX, additional equivalent OPEX to pay for a major overall, MWh of electricity generated in the steady state and the additional fuel required.

** Operator only needs to enter a value for fiscal benefits (£m) and the annual fiscal benefit inflation rate (%) if the NPV without fiscal benefits is negative at the specified discount rate

OUTPUTS

Nominal Project IRR (before financing and tax) over 32 years	6.5%
Nominal NPV (before financing and tax) (£m) over 32 years	-6.80

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ANNEX C

Transcript of Part of ISH1

ISH 1 Part 2

00:58:34:11 - 00:59:14:05 Miss Berry, on behalf of the applicant. So, uh, yes, the scheme, uh, includes, uh, as a planner I am going to get this technical information wrong, but the heat exchange sort of kit that would be required for, um, any heat from the carbon capture facility to be integrated into a heat network distribution. Cory have employed, um, a managing director of heat to progress heat, uh, to progress a heat distribution scheme. Um, but it's it would be, um, primarily reliant on the heat coming from Riverside one and two, which are the, um, uh, previously consented and currently operational facilities.

00:59:14:07 - 00:59:23:03 So it's a part of that heat distribution. It's work in progress, but it's it's something which would be benefited from using the heat from this scheme. 00:59:23:24 - 00:59:25:18 It's just that I 00:59:25:20 - 00:59:31:29 I missed that was it that the heat network would primarily be from Riverside one and two. Was that what was said? I misheard 00:59:33:20 - 00:59:34:18 the full sentence. That's what I think. 00:59:34:20 - 00:59:35:09 you said, wasn't it?

00:59:37:09 - 01:00:14:08 Yes, sir, I think so. I mean, I'm I'm not the technical expert here in all of this, but Riverside one and two. Sorry, Miss Berry, on behalf of the applicant, Riverside 1 and 2 have both been built BCHP enabled. let me start again. Riverside one has been built to be BCHP enabled. Currently exports only electricity, but it could be readily, uh, upgraded to export heat. Riverside 2 is being built to be BCHP enabled. Uh, they both have um they've both they've been there's an expectation for both those facilities to be able to export heat at some point. 01:00:14:10 - 01:00:35:06 And the applicant has employed a role to progress that. The carbon capture facility includes the project in front of you today, sir. includes the, uh, kit required to contribute to that heat distribution network should it be delivered, which we hope it will.

01:00:35:18 - 01:00:37:17 Sir could I just add that? 01:00:38:29 - 01:01:11:13 Yeah Matt Fox on behalf of the applicant. So just just to be clear on, um, for the DCO for Riverside 2 has a requirement relating to, um, heat networks. And you would have seen in the latest version of the DCO for this project, um, in AS014 that we have added a requirement to kind of essentially bring everything together on the, on the campus, um, to recognize that this is built and this is, being developed piecemeal over time to three different plants, and that they will need to be a kind of consolidated approach to it. 01:01:11:15 - 01:01:24:27 But to just re-emphasize on what Miss Berry said, is that what we have within the scheme is related to the heat that the scheme produces, and it being able to be added to the overall network that would be built on the campus as a whole.

Ok, thank you

1:01:26 – 1:02:17 James Hewett without affiliation, I wonder if the route of the pipeline for the heat network should be considered and also the heat loss from any other facilities in the carbon capture scheme that will be affected by that heat loss

Again I will ask the applicant if they have got any comments on that. Ok, Mr Fox on behalf of the applicant so the this submission allows for the heat network to be built in what we call noman road corrider so work number 3 so there is a number of different utilities that would go in to norman road one of which would be heat pipes. Thank you

1:02:16 – 1:04:35 the next part of the question which is a long one is the storage the temporary storage of the captured CO2. There seem to be 6 spheres or cylinders and I wonder what their capacity is and I will ride you to that, if the number of vessels is going to be taking it away is reduced by having larger vessels then you are going to need you may need more spheres if its less then maybe you can build the spheres or storage in the River Thames on piles.

I think there are two parts to that comment, the capacity and the implication for onward transport and Mr Norris were you just talking about the storage being on piles in the river.

Yes and the storage is to be and the CO2 is to be taken away by river why not have the storage by the river rather than the other side of the site.

Understood has the applicant got some comments on that. Tony Alderson on behalf of the applicant in terms of the storage capacity it is currently proposed to have 24,000 cubic metres of storage capacity this is based on the maximum ship size of 20,000 cubic metres, therefore giving some buffer margin above the cargo capacity of the ship to allow for some delay to a ship arrival etc. um, regarding the second point of having storage on the river, I think there is maybe more environmental considerations to that so I will to defer to any colleagues who may wish to respond to that point.

Andrew Tate for the applicant I think on that if we may we will come back and answer that in writing.

Okay will just make a note of that.

Yes, I think the point was that the current proposal has storage as part of the contiguous site with the pipeline leading to the jetty and the question is could that effectively be the other way around. Okay thank you

Final thing, sorry James Hewett without affiliation as was mentioned by Mr Turney that there is either single line process line or dual if there is um concerns about efficiency and feasibility of carbon capture as there may well be from other schemes around the country then maybe it will expedient to have only one pipe line, um process line at all and if that is the case then perhaps I know it has been covered to some extent then the amount of area needed would be reduced it would be

financially prudent in my opinion to only have one because of the risks of it not succeeding, Thank you

Thank you, again I will give the opportunity to the Applicant if they want to respond to that

01:05:30:24 - 01:06:03:16 Tony Alderson on behalf of the applicant. yes, there would be a capital cost saving of a single line against two lines, the magnitude of which would have to be determined as work progresses. But as I mentioned earlier, there is an implication in terms of the the overall annual CO2 capture quantity because of maintenance outages of a single line versus two lines. So so the various factors have to be sort of balanced, you know, including performance, cost, um, efficiency, land take, etc. so that's work that is ongoing at the moment to determine which is going to be the preferred option going forward

Thank you – Mr Turney another question.

01:06:18:07 - 01:06:43:03 Richard Turney for Landsul and Munster. I just wanted to clarify, on the basis of what was said in answer to the question about the heat transfer, is the heat transfer station that's shown in the indicative layout, sized for heat transfer from the CCF proposal that's before you or is it designed for heat transfer from, uh, Riverside 1 and Riverside 2?

01:06:44:22 - 01:07:03:02 So so as I understand, you're asking whether the what's shown on the, uh, the, the engineering drawings is that just to deal with, uh, surplus heat from the the the proposal, or would it be a combined one to deal with as, uh, I think Mr. Fox pointed out the the requirement for for all three facilities. 01:07:14:08 - 01:07:24:17 Uh, so, uh, Miss Berry, on behalf of the applicant. Uh, yes, I've just, uh, consulted and the heat transfer station within the within the development area is purely for the carbon capture facility. 01:07:25:17 - 01:07:26:02 Yes. 01:07:29:25 - 01:07:35:09 I think sir we'll need to come back to you on this. Um, because I misunderstood the conversation we've. 01:07:35:11 - 01:07:38:14 Just had. So it's not just for the. Oh, you need to. 01:07:38:16 - 01:07:47:07 I think I as I said earlier, sir, I'm a I'm a planner rather than a technical person, so I should, uh, confirm and we'll need to come back to you on that.

01:07:47:27 - 01:07:49:20 Can Mr Alderson answer that at all. 01:07:53:00 - 01:08:05:12 Tony Alderson, on behalf of the applicant, the the heat transfer station would be required whether or not there is heat recovery from the carbon capture plant that is integral to the to the base um district heating scheme, which recovers heat from Riverside 1 and Riverside 2.

01:08:06:23 - 01:08:17:25 I think the point is, yes, but does it have to be on the CCF site? Because presumably if the CCF site wasn't happening, it would have to go

somewhere else. If I've understood what the point was. 01:08:19:29 - 01:08:27:13 It would have to go somewhere. Where Somewhere is? Yeah. that is the site is currently allocated. But. 01:08:28:00 - 01:08:43:14 Uh, I think Mr. Fox said that that was a requirement of, uh, of the DCO for Riverside two. So presumably, um, that to connect to the, uh, the heat network. So presumably that would have to have to happen, wouldn't it? 01:08:45:24 - 01:08:50:16 I'll let Miss Berry just explain what the REP requirement did, because. Yeah.

01:08:52:16 - 01:09:36:01 Uh, yes, sir. So the the requirement for Riverside 2 which off the top of my head is requirement 24, uh, is uh multi multi functional has many strands to it. We've just um worked through the first element of it, which is to set up, uh to agree terms of reference for a working group. Um, and our next step will be to convene that working group, uh, that will consider that will consider three consultants, I believe, or a range of consultants to be selected to undertake a review of CHP opportunities from Riverside 2 the, uh, and that will be progressing that along alongside this examination. 01:09:37:00 - 01:09:47:22 Uh, separately, Riverside 2 DCO requires the facility to have space on site to, uh, enable, uh, the heat 01:09:49:10 - 01:10:08:04 to be extracted. um planner, um, and that is contained, uh, the area I pointed to earlier to the east of the main energy recovery facility. So there is the ability to have the kit to put on to the heat. This is why we need to come back to you, sir, because I am not the right person to. 01:10:08:06 - 01:10:27:28 Think it will be helpful just because I think the question was was a reasonable one. Is that, um. Yeah. Will, what's shown on the the engineering sort illustrative engineering drawings for this scheme, would that effectively replace some things that would have happened elsewhere. Uh, uh, with within within the Riverside campus?

01:10:28:00 - 01:10:59:25 Yes. Miss Berry on behalf of Applicant. Just just a final point on this. We will come back to you with full submissions, but just say the added complication or the added element to all of this is that a planning permission has been granted to, um, a district heat network provider, um, separately through the TTPO process. And that includes the location of a heat exchange unit, um, on land to the west of Norman Road. So within this this little allocation area within the area that we are, um, proposing for the carbon capture facility. 01:10:59:27 - 01:11:08:07 So there's a number of previous consents and requirements and elements, um, which we will need to set out clearly for you, sir. 01:11:08:26 - 01:11:26:00 Okay, well, I think it would be helpful if that could just be explained just so I can unpick, um, what what's going to happen and particularly for particularly what, what the difference is with if if there was a note, uh, you know, if the scheme didn't proceed, what the implications would be and what the implications would be if the scheme would, would proceed.

ANNEX D

Permission 21/01744/ALA

Variation of consent dated 13 March 2015[1]
Variation of consent dated 17 December 2021[2]

DEPARTMENT FOR BUSINESS, ENERGY AND INDUSTRIAL STRATEGY

VARIATION OF CONSENT UNDER SECTION 36C OF THE ELECTRICITY ACT 1989

CONSTRUCTION AND OPERATION OF A GENERATING STATION AT NORMAN ROAD, BELVEDERE, BEXLEY, KENT

The Secretary of State in exercise of the powers conferred on him by section 36C of the Electricity Act 1989 hereby varies the consent granted for the energy from waste generating station at Norman Road, Belvedere in the London Borough of Bexley and the County of Kent in accordance with the variations shown in the italic text in the Annex.

17 December 2021

Gareth Leigh
Head of Energy Infrastructure Planning
Department for Business, Energy and Industrial Strategy

Annex – Variation of Section 36 Consent

DEPARTMENT ~~OF TRADE AND INDUSTRY~~ *FOR BUSINESS, ENERGY AND INDUSTRIAL STRATEGY* [2]
ELECTRICITY ACT 1989
TOWN AND *COUNTRY* PLANNING ACT 1990
CONSTRUCTION AND OPERATION OF A GENERATING STATION AT NORMAN ROAD, BELVEDERE, BEXLEY, KENT

1. Pursuant to section 36 of the Electricity Act 1989 the Secretary of State for ~~Trade and Industry~~ *Business, Energy and Industrial Strategy*[2] (the Secretary of State) hereby consents to the construction by Riverside Resource Recovery Limited (the Company), on the area of land outlined red on drawing no. D1.2 of an energy from waste generating station at Norman Road, Belvedere, Bexley in the County of Kent, and to the operation of that generating station.

2. Subject to paragraph 3(1), the development shall be of up to ~~72MW~~ *80.5MW*[2] capacity and comprise:

(a) one or more steam turbines and heat recovery boilers;

(b) air cooled condensers;

(c) pier, jetty and approach arm including bridge over flood defence walls and riverside footpath and works to raise the level of footpath 3;

(d) ancillary plant and equipment and buildings to accommodate the development, including provision for continuous environmental monitoring;

(e) not more than three waste processing streams consisting of a reciprocating grate incinerator and associated air pollution control system in each stream~~. The design capacity not to exceed 670,000 tonnes per year of mixed municipal waste, including a proportion of waste from commercial and industrial premises, based on an overall average calorific value of 10.2MJ/kg and 7800 hours operation. The annual average capacity of 585,000 tonnes specified in the application for project consent and the accompanying Environmental Statement is based on an average calorific value of waste of 11MJ/kg and the average throughput over the life of the plant. With all three streams in operation the hourly tonnage of waste burned would vary between 66-96 tonnes, dependent of the calorific value of the waste~~[1];

(f)~~ associated open storage areas for ash container storage,~~[2] landscaping, car parking and habitat creation with any related fencing or boundary treatments;

(g) accesses to the site from Norman Road together with the improvement/upgrading of Norman Road, provision of footpath and cycleways and footpath linkages; and

(h) the demolition of existing buildings and structures on the site, including any remnants of the former Borax Wharf.

3. This consent is granted subject to the following conditions:

(1) Except where otherwise required by virtue of ~~the~~ *a*[1] planning permission *deemed to have been granted by the Secretary of State or granted by the* ~~deemed to be granted by paragraph 4,~~ *London Borough of Bexley,*[1] the development shall be ~~constructed and~~[1] operated in accordance with the details contained in the Company's application of 29 September 1999, as varied by ~~– the Company's letter of 28 June 2002 and shown on drawing nos. D10.2; D2.4A; D2.5-10; D2.11A-12A; D10.1A; D10.2B-3B; D10.4A and PA117 Rev A.~~[1]

(i) *the Company's letter of 28 June 2002 and drawing nos. D1.2; D2.4A; D2.5-10; D2.11A-12A; D10.1A; D10.2B-3B; D10.4A and PA117 Rev A;*[1]

(ii)the Company's variation application of 25 September 2014[1]*;*

(iii)*the Company's variation application of 25 August 2016; and*[2]

(iv)*the Company's variation application of 15 April 2021*[2].[1]

~~(2) The commencement of the development shall not be later than five years from the date of this consent, or such longer period as the Secretary of State may hereafter direct in writing.~~[1]

Annex – Section 90(2) Direction

DIRECTION UNDER SECTION 90(2) OF THE TOWN AND COUNTRY PLANNING ACT 1990 TO DEEM PLANNING PERMISSION TO BE GRANTED

CONSTRUCTION AND OPERATION OF A GENERATING STATION AT NORMAN ROAD, BELVEDERE, BEXLEY, KENT

The Secretary of State in exercise of the powers conferred on him by section 90(2) of the Town and Country Planning Act 1990 hereby directs that planning permission for the development be deemed to be granted subject to the following conditions:

CONDITIONS AND REASONS

1. Except where otherwise required by virtue of a planning permission deemed to have been granted by the Secretary of State or granted by the London Borough of Bexley, the development shall be operated in accordance with the details contained in the Company's application of 29 September 1999, as varied by

   i. the Company's letter of 28 June 2002 and drawing nos. D1.2; D2.4A; D2.5-10; D2.11A-12A; D10.1A; D10.2B-3B; D10.4A and PA117 Rev A;
   ii. the Company's variation application of 25 September 2014;
   iii. the Company's variation application of 25 August 2016; and
   iv. the Company's variation application of 15 April 2021.

Reason: To prevent any unacceptable deviation from the approved plans.

2. In these conditions, unless the context otherwise requires

   "BS 4142" means the British Standard 4142: 2014 method for rating and assessing industrial and commercial sound or any nationally recognised successor document;

   "bank holiday" means a day that is or is to be observed as a Bank Holiday or a holiday under the Banking and Financial Dealings Act 1971;

   "bulk materials" means dry, loose aggregates, cement and soil;

   "CHPQA Standard issue 3" means the CHPQA Standard document issued in January 2009 which sets out definitions, criteria and methodologies for the operation of the UK's CHP Quality Assurance (CHPQA) programme;

   "the Company" means Riverside Resource Recovery Limited and its assigns, transferees and successors;

   "the Council" means the London Borough of Bexley and its successors;

   "the development" means the project as described in paragraph 2 of the consent granted by the Secretary of State under section 36 of the Electricity Act on 15 June 2006, as varied on 13 March 2015;

   "emergency" means circumstances in which there is a reasonable cause for apprehending imminent injury to persons, serious damage to property or a danger of serious pollution to the environment of the locality;

   "Environment Agency" means the currently constituted body or any successor competent authority;

"heavy commercial vehicle" has the meaning given by section 138 of the Road Traffic Regulation Act 1984;

"jetty outage" means circumstances caused by factors beyond the Company's control in which waste has not been or could not be received at the jetty or ash containers have not been or could not be despatched from the jetty for a period in excess of 4 consecutive days;

"operation of the development" begins from the date on which the plant commences to receive waste, excluding any period of commissioning and trials. Operational and operated shall be construed accordingly;

"plant" means the energy from waste generating station forming part of the consented development;

"the site" means the area of land outlined in red on drawing no. D1.2; and

"steam purging" means any planned release of steam likely to cause noise and be perceptible at residential properties or other land uses in the locality.

Reason: To clarify the meaning of terms used in later conditions.

3. The terms of this permission and any schemes, details or consents approved or associated therewith shall be prominently displayed and maintained at the site office and shall be made known to any person or persons given responsibility for the management or control of operations at or from the site.

Reason: To ensure general knowledge of the restrictions on the permission.

4. The total tonnage of waste received at the site shall not exceed 850,000 tonnes in any calendar year.

Reason: To ensure the development is operated generally in accordance with the environmental impact assessed in the supporting documents.

5. The plant shall process only waste transported to it from a riparian waste transfer station in Greater London and the Port of Tilbury, other than the waste specified in condition 26 below.

Reason: To maximise the use of the river for transport of waste to the site.

6. No more than 115,000 tonnes of waste arising from outside Greater London shall be delivered to the plant from the Port of Tilbury in any calendar year.

Reason: To maximise the processing of waste produced within the Greater London area.

7. Except during periods of jetty outage or emergency the jetty and pier shall remain available at all times for tugs and barges transporting waste, residual materials following incineration, and consumables necessary for the operation of the development and for no other purpose (except for the development authorised by the Riverside Energy Park Order 2020 (SI No. 419)) unless with the prior written consent of the Council.

Reason: To ensure that use of the river is enabled at all times.

8. Bottom ash and co-mingled metals shall be taken from the site only via the jetty and the River Thames except in an emergency, following a jetty outage or with the prior written consent of the Council.

Reason: To ensure use of the river for transport of these potentially hazardous materials.

9. Containers used for river conveyance of waste, ash or co-mingled metals to and from the site shall be no larger than the ISO 20 foot specification.

Reason: To ensure the jetty is capable of handling containers.

10. All heavy commercial vehicles carrying bulk materials or waste into and out of the site during the operational and decommissioning phases of development shall be covered unless the load is otherwise enclosed, except when required to inspect incoming loads of waste.

Reason: In the interests of public safety.

11. Noise arising from the operation of the development, measured at any point adjacent to the site on footpaths 3 and 4, shall not (except in emergencies or during routine testing of emergency equipment for which written notification has been given to the Council not less than 48 hours in advance) exceed the following levels: 64 dB LAeq 1 hour between 7 a.m. - 7 p.m. Mondays-Fridays (excluding Bank Holidays) and 7 a.m. - 2 p.m. on Saturdays and 64 dB LAeq 5 minutes at all other times.

Reason: To protect those using the adjoining public footpaths.

12. Noise arising from the operation of the development shall not cause any exceedance (as measured within any accommodation used as offices existing at the date of this permission adjacent to the site) of a noise level of 50 dB LAeq 1 hour, except in an emergency or during routine testing of emergency equipment for which prior written notice has been given to the Council and the affected occupiers at least 48 hours in advance.

Reason: To protect the environment of those persons on and in the vicinity of the site.

13. Except in case of an emergency, or with the prior written consent of the Council the Rating Level of the noise emitted from the operation of the development shall not exceed the noise levels listed below, which are numerically equivalent to the background noise levels measured in 2003. The measurements shall be in accordance with BS4142.

Location (to be measured at or adjacent to the address below	Daytim (0700-2300)Hours LAeq 1 hour dB	Any other time LAeq 5 minutes dB
No. 27 Cherbury Close	43	40
No. 1 St. Brides Close	43	41
No. 68 North Road	47	44
No. 1 St. Thomas Road	50	46

The noise limits specified in the above table are free-field measurements.

Reason: To protect the environment of those living in the properties listed and other adjoining properties.

14. The development must be operated in accordance with a written scheme approved by the Council for the monitoring of noise. The scheme shall specify the locations from which noise will be monitored and the method of noise measurement (which shall be in accordance with BS 4142, an equivalent successor standard or other agreed noise measurement methodology appropriate to the circumstances). The scheme shall be implemented to establish baseline noise conditions. Throughout the lifetime of the development the

monitoring programme shall be reviewed following any change in plant, equipment or working practices likely to affect the baseline noise conditions and any such change shall be notified in writing to the Council; or following a written request by the Council in relation to a noise related complaint. Such review shall be submitted to the Council for its written approval within 4 weeks of the notification or request. At the measurement locations noise levels shall not exceed those specified in conditions 11-13 except in an emergency.

Reason: In the interests of public safety.

15. In any incidence where the noise levels specified in conditions 11-13 above are exceeded because of an emergency the Company shall notify, within 2 working days, the Council in writing of the nature of the emergency, the reasons for exceedance of the noise limit and its expected duration. If the period of exceedance is expected to last for more than 24 hours then the Company shall inform any consultative body established as a result of the development, the Council and adjoining occupiers or land users. Notification of the exceedance, the reasons for it and its expected duration shall also be posted on the company's internet web site and on a suitable site notice board (clearly visible from Footpaths 3, 4 or Norman Road).

Reason: In the interests of public safety and to reduce the incidence of such episodes.

16. Except in an emergency, the Company shall give at least 2 working day's' written notice to the Council of any proposed operation of emergency pressure valves or similar equipment. In any incidence where steam purging is to take place, the Company shall give 2 working day's prior written notice to local residents and businesses by informing any consultative body established as a result of the development, the Council and adjoining occupiers or land users. Notification of the incidence, the reasons for it and its expected duration shall also be posted on the Company's internet web site and on a suitable site notice board (clearly visible from Footpaths 3, 4 or Norman Road).

Reason: In the interests of public safety and to alert local residents and businesses to any such noisy events.

17. So far as reasonably practicable, steam purging shall only take place between the hours of 9 a.m. to 5 p.m. Mondays-Saturdays and not on any Sunday or Bank holiday.

Reason: To restrict these potentially noisy events so as to minimise impact on local residents.

18. The development must be maintained in accordance with acoustic design measures agreed by the Council and with the manufacturer's specifications except to the extent that the Council its written consent to any variation to the agreed measures. The acoustic design measures must be consistent with conditions 11-13 above.

Reason: To minimise any noise impact from operation of the plant..

19. The written scheme agreed with the Council setting out surface water source measures shall be implemented, except to the extent that any variation has been approved in writing by the Council, and thereafter retained for the duration of the development.

Reason: In the interests of public safety.

20. No surface water shall be discharged to ground where the soil or substrata is found to be contaminated.

Reason: In the interests of public safety and in order to prevent pollution of the ground, water courses or underground water supplies.

21. The development must be operated in accordance with a scheme of lighting approved in writing by the Council except to the extent that the Council gives its prior written consent to any variation.

Reason: To safeguard the amenities of local residents and businesses and to minimise any ecological impact from such lighting.

22. The written scheme agreed with the Council, in consultation with the Environment Agency or another competent authority, for an ecological protection and management plan to cover management of all habitats, water bodies and associated wetlands during the operation of the development shall be implemented unless the Council gives its prior written consent to any variation.

Reason: To protect the biodiversity on and in the vicinity of the site.

23. Bottom ash shall only be stored in the bunkers to the development hereby approved.

Reason: To minimise the visual impact of the development.

24. There shall be no storage of materials or equipment on roadways or landscaped areas unless written consent thereto is given by the Council.

Reason: To prevent obstruction of any roads and to protect the landscaping from any such intrusion.

25. The development shall be operated in accordance with a travel plan approved in writing by the Council, such travel plan to include positive scheduling to encourage heavy commercial vehicles carrying materials to or from the site to avoid peak hours and measures to reduce car traffic by encouraging staff and visitors to travel to or from the site by other means.

Reason: To minimise the number of HGVs travelling to and from the site.

26. Except in the case of jetty outage:-

    (1) not more than 195,000 tonnes of waste shall be delivered to the development by road in any calendar year; and

    (2) no more than 85,000 tonnes of the waste transported to the development by road in any calendar year shall be transported from outside Greater London.

Reason: To limit the amount of traffic using the highway network in the vicinity of the site.

27. In the case of jetty outage, the number of heavy commercial vehicles carrying waste in peak hours along Norman Road shall be restricted as follows: between 0730-0900 hours a maximum of 30 heavy commercial vehicle movements two-ways; between 1630-1800 hours a maximum of 30 heavy commercial vehicle movements two-ways and subject to there being a maximum of 300 heavy commercial vehicle movements two-ways between 0000 hours and 2400 hours on any day.

Reason: To restrict the number of HGVs visiting the site during peak hours on the highway network.

28. Except in the case of jetty outage or with the prior written consent of the Council, the number of two-way vehicle movements (one vehicle in and one vehicle out) made by heavy commercial vehicles delivering waste to the plant shall be limited to a maximum of 90 per day.

Reason: To limit the amount of traffic using the highway network in the vicinity of the site.

29. A documentary record of the movements of all heavy commercial vehicles to and from the site shall be made and retained for inspection by nominated officers of the Council in a form (paper or electronic) to be agreed by the Council.

Reason: To enable monitoring of such HGV movements.

30. A facility shall be provided and maintained within the development to enable steam pass-outs and/or hot water pass-outs and reserve space for the provision of water pressurisation, heating and pumping systems for off-site users of process or space heating.

Reason: To facilitate future developments in such district heating schemes.

31. Within 1 year from date on which this permission was deemed granted, the Company must prepare a Combined Heat and Power (CHP) feasibility review assessing potential commercial opportunities for use of heat from the development, which must be submitted in writing to the Council for its approval. The review must provide for ongoing monitoring and full exploration of potential commercial opportunities to use heat from the development as part of a Good Quality CHP scheme (as defined in CHPQA Standard issue 3), and for the provision of subsequent reviews of such opportunities as necessary. Where viable opportunities for the use of heat in such a scheme are identified, a scheme for the provision of the necessary plant and pipework to the boundary of the site shall be submitted in writing to the Council for its approval. Any plant and pipework installed to the boundary of site to enable the use of heat shall be installed in accordance with the agreed details.

Reason: To facilitate future CHP opportunities.

32. On the 27th anniversary of the commencement of operation of the development or upon the permanent cessation of the operation of the development whichever is the earlier, details of a scheme of restoration and aftercare of the site shall be submitted for approval in writing by the Council. The scheme shall include any proposed future uses for the site; details of structures and buildings to be demolished or retained; details of the means of removal of materials of demolition; phasing of demolition and removal; details of restoration works and phasing thereof. The approved scheme shall be implemented following the permanent cessation of the operation of the development.

Reason: To protect the long-term future of the site and its appearance.

33. Ash and recyclables shall be handled under cover at all times.

Reason: In the interests of public amenity.

34. The lorry parking areas approved by the Council shall be surfaced, drained and kept available for use unless otherwise agreed by the Council.

Reason: To ensure adequate provision of HGV parking on site at all times.

35. Where any matter is required to be agreed or approved by the Council under any of the foregoing conditions, that matter shall in default of agreement or approval,

within a reasonable time, be determined by the Secretary of State for Energy and Climate Change.

Reason: To provide for an arbitration system in the event of future disagreement between the parties.

36. Where the words, "with the prior written consent of the Council" appear, such consent may only be given in relation to immaterial changes where it has been demonstrated to the satisfaction of the Council that consent is unlikely to give rise to any materially new or materially different environmental effects from those assessed in the environmental statement.

Reason: To ensure public scrutiny of any but the most minor of changes.

37. A Low Emission Strategy for the operations at the site and its associated road transport shall be submitted for approval in writing by the Local Planning Authority 12 months from implementation of this planning decision notice.

The Low Emission Strategy shall include, amongst other matters;

i. An assessment of fleet emission specification (e.g. a commitment to current best practice towards Euro VI standards and the Major of London's emerging London wide Ultra Low Emission Zone). This should include all vehicles forming part of the operation and accessing the site, such as heavy goods vehicles, refuse collection vehicles, bulk transfer vehicles, forklifts, staff vehicles etc.
ii. An assessment of procurement policy (including planned vehicle replacement and suppliers of other goods and services)
iii. Measures such as eco-driving (driver training and technological aids to eco-driving), and policies regarding vehicle idling.
iv. An assessment of low emission vehicle technology and infrastructure (e.g. electric vehicle dedicated parking and charging, gas refuelling station etc.)

At the end of each calendar year an implementation plan shall be submitted for approval in writing by the Local Planning Authority, which shall be fully implemented in accordance with the details and measures so approved. The Low Emission Strategy shall take into account future changing standards and available technologies and be updated accordingly in agreement with the Local Planning Authority.

Reason: In the interests of maintaining/improving local air quality. Specifically London Plan Policy 7.14 requires that development proposals should minimise increased exposure to existing poor air quality and make provision to address local problems of air quality.

ANNEX E

Permission 16/02167/FUL

LONDON BOROUGH OF BEXLEY

Development Management Division
Civic Offices, 2 Watling Street,
Bexleyheath, Kent, DA6 7AT
Telephone 020 8303 7777

To: **Mr Wilkinson**
c/o Mr Roger Miles
Roger Miles Planning Limited
Three Corner Park
Calstock PL18 9RG

TOWN AND COUNTRY PLANNING ACT 1990
TOWN AND COUNTRY PLANNING (DEVELOPMENT MANAGEMENT PROCEDURE) (ENGLAND) ORDER 2015

GRANT OF PERMISSION TO DEVELOP LAND SUBJECT TO CONDITIONS	Reference Code : **16/02167/FUL**

TAKE NOTICE that Bexley Council, the Local Planning Authority under the Town and Country Planning Acts, **HAS GRANTED PERMISSION** for the development of land situated at :

Riverside Energy From Waste Facility
Norman Road
Belvedere
Kent

For Proposal under Section 73 of the Town and Country Planning Act 1990 regarding the Energy from Waste facility approved under reference 99/02388/CIRC24 dated 13.3.2015 to amend Condition 27 to allow up to 195,000 tonnes of waste to be delivered to the development by road in any calendar year and the continued operation of the plant without compliance with conditions 10 and 30 to allow the delivery of waste by river and by road on a 24/7 basis.

Referred to in the application for permission for development received on 21st December 2016.(As amended on 25th August 2016 and 21st December 2016)

SUBJECT TO THE CONDITIONS as attached.

Date of Decision: 4th October 2017

[redacted]

Head of Development Management

YOUR ATTENTION IS ALSO DRAWN TO THE NOTES ATTACHED

LONDON BOROUGH OF BEXLEY

Reference Code :

16/02167/FUL

CONDITIONS AND REASONS

1 Except where otherwise required by virtue of a planning permission deemed to have been granted by the Secretary of State or granted by the London Borough of Bexley, the development shall be operated in accordance with the details contained in the Company's application of 29 September 1999, as varied by

(i) the Company's letter of 28 June 2002 and drawing nos. D1.2; D2.4A; D2.5-10; D2.11A-12A; D10.1A; D10.2B-3B; D10.4A and PA117 Rev A; and
(ii) the Company's variation application of 25 September 2014; and
(iii) the Company's variation application of 25 August 2016.

Reason: To prevent any unacceptable deviation from the approved plans.

2 In these conditions, unless the context otherwise requires:

"BS 4142" means the British Standard 4142: 2014 method for rating and assessing industrial and commercial sound or any nationally recognised successor document;

"bank holiday" means a day that is or is to be observed as a Bank Holiday or a holiday under the Banking and Financial Dealings Act 1971;

"bulk materials" means dry, loose aggregates, cement and soil;

"CHPQA Standard issue 3" means the CHPQA Standard document issued in January 2009 which sets out definitions, criteria and methodologies for the operation of the UK's CHP Quality Assurance (CHPQA) programme;

"the Company" means Riverside Resource Recovery Limited and its assigns, transferees and successors;

"the Council" means the London Borough of Bexley and its successors;

"the development" means the project as described in paragraph 2 of the consent granted by the Secretary of State under section 36 of the Electricity Act on 15 June 2006, as varied on 13 March 2015;
"emergency" means circumstances in which there is a reasonable cause for apprehending imminent injury to persons, serious damage to property or a danger of serious pollution to the environment of the locality;

"Environment Agency" means the currently constituted body or any successor competent authority;

"heavy commercial vehicle" has the meaning given by section 138 of the Road Traffic Regulation Act 1984;

"jetty outage" means circumstances caused by factors beyond the Company's control in which waste has not been or could not be received at the jetty or ash containers have not been or could not be despatched from the jetty for a period in excess of 4 consecutive days;

"operation of the development" begins from the date on which the plant commences to receive waste, excluding any period of commissioning and trials. Operational and operated shall be construed accordingly;

"plant" means the energy from waste generating station forming part of the consented development;

"the site" means the area of land outlined in red on drawing no. D1.2; and

"steam purging" means any planned release of steam likely to cause noise and be perceptible at residential properties or other land uses in the locality.

Reason: To clarify the meaning of terms used in later conditions.

3 The terms of this permission and any schemes, details or consents approved or associated therewith shall be prominently displayed and maintained at the site office and shall be made known to any person or persons given responsibility for the management or control of operations at or from the site.

Reason: To ensure general knowledge of the restrictions on the permission.

4 The total tonnage of waste received at the site shall not exceed 785,000 tonnes in any calendar year.

Reason: To ensure the development is operated generally in accordance with the environmental impact assessed in the supporting documents.

5 The plant shall process only waste transported to it from a riparian waste transfer station in Greater London and the Port of Tilbury, other than the waste specified in condition 26 below.

Reason: To maximise the use of the river for transport of waste to the site.

6 No more than 115,000 tonnes of waste arising from outside Greater London shall be delivered to the plant from the Port of Tilbury in any calendar year.

Reason: To maximise the processing of waste produced within the Greater London area.

7 Except during periods of jetty outage or emergency the jetty and pier shall remain available at all times for tugs and barges transporting waste, residual materials following incineration, and consumables necessary for the operation of the development and for no other purpose unless with the prior written consent of the Council.

Reason: To ensure that use of the river is enabled at all times.

8 Bottom ash and co-mingled metals shall be taken from the site only via the jetty and the River Thames except in an emergency, following a jetty outage or with the prior written consent of the Council.

Reason: To ensure use of the river for transport of these potentially hazardous materials.

9 Containers used for river conveyance of waste, ash or co-mingled metals to and from the site shall be no larger than the ISO 20 foot specification.

Reason: To ensure the jetty is capable of handling containers.

10 All heavy commercial vehicles carrying bulk materials or waste into and out of the site during the operational and decommissioning phases of development shall be covered unless the load is otherwise enclosed, except when required to inspect incoming loads of waste.

Reason: In the interests of public safety.

11 Noise arising from the operation of the development, measured at any point adjacent to the site on footpaths 3 and 4, shall not (except in emergencies or during routine testing of emergency equipment for which written notification has been given to the Council not less than 48 hours in advance) exceed the following levels: 64 dB LAeq 1 hour between 7 a.m. - 7 p.m. Mondays-Fridays (excluding Bank Holidays) and 7 a.m. - 2 p.m. on Saturdays and 64 dB LAeq 5 minutes at all other times.

Reason: To protect those using the adjoining public footpaths.

12 Noise arising from the operation of the development shall not cause any exceedance (as measured within any accommodation used as offices existing at the date of this permission adjacent to the site) of a noise level of 50 dB LAeq 1 hour, except in an emergency or during routine testing of emergency equipment for which prior written notice has been given to the Council and the affected occupiers at least 48 hours in advance.

Reason: To protect the environment of those persons on and in the vicinity of the site.

13 Except in case of an emergency, or with the prior written consent of the Council the Rating Level of the noise emitted from the operation of the development shall not exceed the noise levels listed below, which are numerically equivalent to the background noise levels measured in 2003. The measurements shall be in accordance with BS4142.

Location (to be measured at or adjacent to the address below	Daytim (0700-2300)Hours LAeq 1 hour dB	Any other time LAeq 5 minutes dB
No. 27 Cherbury Close	43	40
No. 1 St. Brides Close	43	41
No. 68 North Road	47	44
No. 1 St. Thomas Road	50	46

The noise limits specified in the above table are free-field measurements.

Reason: To protect the environment of those living in the properties listed and other adjoining properties.

14 The development must be operated in accordance with a written scheme approved by the Council for the monitoring of noise. The scheme shall specify the locations from which noise will be monitored and the method of noise measurement (which shall be in accordance with BS 4142, an equivalent successor standard or other agreed noise measurement methodology appropriate to the circumstances). The scheme shall be implemented to establish baseline noise conditions. Throughout the lifetime of the development the monitoring programme shall be reviewed following any change in plant, equipment or working practices likely to affect the baseline noise conditions and any such change shall be notified in writing to the Council; or following a written request by the Council in relation to a noise related complaint. Such review shall be submitted to the Council for its written approval within 4 weeks of the notification or request. At the measurement locations noise levels shall not exceed those specified in conditions (11)-(13) except in an emergency.

Reason: In the interests of public safety.

15 In any incidence where the noise levels specified in conditions (11)-(13) above are exceeded because of an emergency the Company shall notify, within 2 working days, the Council in writing of the nature of the emergency, the reasons for exceedance of the noise limit and its expected duration. If the period of exceedance is expected to last for more than 24 hours then the Company shall inform any consultative body established as a result of the development, the Council and adjoining occupiers or land users. Notification of the exceedance, the reasons for it and its expected duration shall also be posted on the company's internet web site and on a suitable site notice board (clearly visible from Footpaths 3, 4 or Norman Road).

Reason: In the interests of public safety and to reduce the incidence of such episodes.

16 Except in an emergency, the Company shall give at least 2 working day's' written notice to the Council of any proposed operation of emergency pressure valves or similar equipment. In any incidence where steam purging is to take place, the Company shall give 2 working day's prior written notice to local residents and businesses by informing any consultative body established as a result of the development, the Council and adjoining occupiers or land users. Notification of the incidence, the reasons for it and its expected duration shall also be posted on the Company's internet web site and on a suitable site notice board (clearly visible from Footpaths 3, 4 or Norman Road).

Reason: In the interests of public safety and to alert local residents and businesses to any such noisy events.

17 So far as reasonably practicable, steam purging shall only take place between the hours of 9 a.m. to 5 p.m. Mondays-Saturdays and not on any Sunday or Bank holiday.

Reason: To restrict these potentially noisy events so as to minimise impact on local residents.

18 The development must be maintained in accordance with acoustic design measures agreed by the Council and with the manufacturer's specifications except to the extent that the Council its written consent to any variation to the agreed measures. The acoustic design measures must be consistent with conditions (11)-(13) above.

Reason: To minimise any noise impact from operation of the plant.

19 The written scheme agreed with the Council setting out surface water source measures shall be implemented, except to the extent that any variation has been approved in writing by the Council, and thereafter retained for the duration of the development.

Reason: In the interests of public safety.

20 No surface water shall be discharged to ground where the soil or substrata is found to be contaminated.

Reason: In the interests of public safety and in order to prevent pollution of the ground, water courses or underground water supplies.

21 The development must be operated in accordance with a scheme of lighting approved in writing by the Council except to the extent that the Council gives its prior written consent to any variation.

Reason: To safeguard the amenities of local residents and businesses and to minimise any ecological impact from such lighting.

YOUR ATTENTION IS ALSO DRAWN TO THE NOTES ATTACHED

22 The written scheme agreed with the Council, in consultation with the Environment Agency or another competent authority, for an ecological protection and management plan to cover management of all habitats, water bodies and associated wetlands during the operation of the development shall be implemented unless the Council gives its prior written consent to any variation.

Reason: To protect the biodiversity on and in the vicinity of the site.

23 Bottom ash storage containers, whether full or empty shall be stored not more than two high and restricted to the storage area shown on drawing no.D2.4A for that purpose.

Reason: To minimise the visual impact of the development.

24 There shall be no storage of materials or equipment on roadways or landscaped areas unless written consent thereto is given by the Council.

Reason: To prevent obstruction of any roads and to protect the landscaping from any such intrusion.

25 The development shall be operated in accordance with a travel plan approved in writing by the Council, such travel plan to include positive scheduling to encourage heavy commercial vehicles carrying materials to or from the site to avoid peak hours and measures to reduce car traffic by encouraging staff and visitors to travel to or from the site by other means.

Reason: To minimise the number of HGVs travelling to and from the site.

26 Except in the case of jetty outage:-

(a) not more than 195,000 tonnes of waste shall be delivered to the development by road in any calendar year; and
(b) no more than 85,000 tonnes of the waste transported to the development by road in any calendar year shall be transported from outside Greater London.

Reason: To limit the amount of traffic using the highway network in the vicinity of the site.

27 In the case of jetty outage, the number of heavy commercial vehicles carrying waste in peak hours along Norman Road shall be restricted as follows: between 0730-0900 hours a maximum of 30 heavy commercial vehicle movements two-ways; between 1630-1800 hours a maximum of 30 heavy commercial vehicle movements two-ways and subject to there being a maximum of 300 heavy commercial vehicle movements two-ways between 0000 hours and 2400 hours on any day.

Reason: To restrict the number of HGVs visiting the site during peak hours on the highway network.

28 Except in the case of jetty outage or with the prior written consent of the Council, the number of two-way vehicle movements (one vehicle in and one vehicle out) made by heavy commercial vehicles delivering waste to the plant shall be limited to a maximum of 90 per day.

Reason: To limit the amount of traffic using the highway network in the vicinity of the site.

29 A documentary record of the movements of all heavy commercial vehicles to and from the site shall be made and retained for inspection by nominated officers of the Council in a form (paper or electronic) to be agreed by the Council.

Reason: To enable monitoring of such HGV movements.

30 A facility shall be provided and maintained within the development to enable steam pass-outs and/or hot water pass-outs and reserve space for the provision of water pressurisation, heating and pumping systems for off-site users of process or space heating.

Reason: To facilitate future developments in such district heating schemes.

31 Within 1 year from date on which this permission was deemed granted, the Company must prepare a Combined Heat and Power (CHP) feasibility review assessing potential commercial opportunities for use of heat from the development, which must be submitted in writing to the Council for its approval. The review must provide for ongoing monitoring and full exploration of potential commercial opportunities to use heat from the development as part of a Good Quality CHP scheme (as defined in CHPQA Standard issue 3), and for the provision of subsequent reviews of such opportunities as necessary. Where viable opportunities for the use of heat in such a scheme are identified, a scheme for the provision of the necessary plant and pipework to the boundary of the site shall be submitted in writing to the Council for its approval. Any plant and pipework installed to the boundary of site to enable the use of heat shall be installed in accordance with the agreed details.

Reason: To facilitate future CHP opportunities.

32 On the 27th anniversary of the commencement of operation of the development or upon the permanent cessation of the operation of the development whichever is the earlier, details of a scheme of restoration and aftercare of the site shall be submitted for approval in writing by the Council. The scheme shall include any proposed future uses for the site; details of structures and buildings to be demolished or retained; details of the means of removal of materials of demolition; phasing of demolition and removal; details of restoration works and phasing thereof. The approved scheme shall be implemented following the permanent cessation of the operation of the development.

Reason: To protect the long-term future of the site and its appearance.

33 Ash and recyclables shall be handled under cover at all times.

Reason: In the interests of public amenity.

34 The lorry parking areas approved by the Council shall be surfaced, drained and kept available for use unless otherwise agreed by the Council.

Reason: To ensure adequate provision of HGV parking on site at all times.

35 Where any matter is required to be agreed or approved by the Council under any of the foregoing conditions, that matter shall in default of agreement or approval, within a reasonable time, be determined by the Secretary of State for Energy and Climate Change.

Reason: To provide for an arbitration system in the event of future disagreement between the parties.

36 Where the words, "with the prior written consent of the Council" appear, such consent may only be given in relation to immaterial changes where it has been demonstrated to the satisfaction of the Council that consent is unlikely to give rise to any materially new or

materially different environmental effects from those assessed in the environmental statement.

Reason: To ensure public scrutiny of any but the most minor of changes.

37 A Low Emission Strategy for the operations at the site and its associated road transport shall be submitted for approval in writing by the Local Planning Authority 12 months from implementation of this planning decision notice.

The Low Emission Strategy shall include, amongst other matters;

(i) An assessment of fleet emission specification (e.g. a commitment to current best practice towards Euro VI standards and the Major of London's emerging London wide Ultra Low Emission Zone). This should include all vehicles forming part of the operation and accessing the site, such as heavy goods vehicles, refuse collection vehicles, bulk transfer vehicles, forklifts, staff vehicles etc.

(ii) An assessment of procurement policy (including planned vehicle replacement and suppliers of other goods and services)

(iii) Measures such as eco-driving (driver training and technological aids to eco-driving), and policies regarding vehicle idling.

(iv) An assessment of low emission vehicle technology and infrastructure (e.g. electric vehicle dedicated parking and charging, gas refuelling station etc.)

At the end of each calendar year an implementation plan shall be submitted for approval in writing by the Local Planning Authority, which shall be fully implemented in accordance with the details and measures so approved. The Low Emission Strategy shall take into account future changing standards and available technologies and be updated accordingly in agreement with the Local Planning Authority.

Reason: In the interests of maintaining/improving local air quality. Specifically London Plan Policy 7.14 requires that development proposals should minimise increased exposure to existing poor air quality and make provision to address local problems of air quality.

INFORMATIVES :-

1 To assist applicants in a positive manner, the Local Planning Authority has produced policies and written guidance, all of which together with national and London wide policy, is available on the Council's website. A pre-application advice service is also offered and encouraged. Whilst no pre-application discussions were entered into, the policy advice and guidance available on the website was followed by the applicant. The applicant and the Local Planning Authority therefore worked in a proactive manner taking into consideration the policies and guidance available to them, and so the Local Planning Authority was able to deliver a positive decision in a timely manner in accordance with the requirements of the NPPF.

ANNEX F

Discharge of Condition 16/02167/FUL02

Development Management
Planning Department
Place
Civic Offices, 2 Watling Street,
Bexleyheath, Kent, DA6 7AT
Telephone 020 8303 7777

The person dealing with this matter is: Nicholas Trower
Direct Dial: 0203 045 3093
Email: Nicholas.trower@bexley.gov.uk

Our Application Reference Number: 16/02167/FUL02

Date: 27 January 2022

Mr R Wilkinson
C/O Mrs Devon Alexander
Cory
5th Floor
10 Dominion Street
London
EC2M 2EF

BY EMAIL

Dear Mr Wilkinson,

Re: Details of condition 31(Combined heat and power feasibility) pursuant to planning permission 16/02167/FUL for the proposal under Section 73 of the Town and Country Planning Act 1990 regarding the Energy from Waste facility approved under reference 99/02388/CIRC24 dated 13.3.2015 to amend Condition 27 to allow up to 195,000 tonnes of waste to be delivered to the development by road in any calendar year and the continued operation of the plant without compliance with conditions 10 and 30 to allow the delivery of waste by river and by road on a 24/7 basis.

Riverside Energy From Waste Facility Norman Road Belvedere Kent DA17 6JN

The decision on this application to determine the above condition in part has been made on the basis of the following submitted plans and documents:

RELEVANT PLANS/DOCUMENTS

- Application Form; and
- Combined Heat and Power Feasibility Review

Condition 31 (Combined heat and power feasibility)

For reasons set out in the Officer Report, the above submitted information relating to condition 31 (Combined heat and power feasibility), is considered sufficient to partly satisfy the requirements of the condition and can therefore be approved.

DECISION – Details approved.

Please note that the condition is partly discharged and that details relating to a scheme for the provision of the necessary plant and pipework to the boundary of the site is still required to be submitted to the Council. Please keep a copy of this decision for your records.

Yours faithfully

[redacted]

Mr R Lancaster
Head of Planning & Regulatory Services

ANNEX G

Discharge of Condition 16/02167/FUL03

Development Management
Planning Department
Place
Civic Offices, 2 Watling Street,
Bexleyheath, Kent, DA6 7AT
Telephone 020 8303 7777

The person dealing with this matter is: Nicholas Trower
Direct Dial: 0203 045 3093
Email: Nicholas.trower@bexley.gov.uk

Our Application Reference Number: 16/02167/FUL03

Date: 27 January 2022

Mr R Wilkinson
C/O Miss K Berry
Hendeca Ltd
4 Witan Way
Witney
OX28 6FF

BY EMAIL

Dear Mr Wilkinson,

Re: A scheme for the provision of the necessary plant and pipework pursuant to condition 31 (Combined Heat and Power) pursuant to planning permission 16/02167/FUL for the proposal under Section 73 of the Town and Country Planning Act 1990 regarding the Energy from Waste facility approved under reference 99/02388/CIRC24 dated 13.3.2015 to amend Condition 27 to allow up to 195,000 tonnes of waste to be delivered to the development by road in any calendar year and the continued operation of the plant without compliance with conditions 10 and 30 to allow the delivery of waste by river and by road on a 24/7 basis.

Riverside Energy From Waste Facility Norman Road Belvedere Kent DA17 6JN

The decision on this application to determine the above condition in part has been made on the basis of the following submitted plans and documents:

RELEVANT PLANS/DOCUMENTS

- Application Form;
- Cover letter dated 18th November 2021;
- Site location plan; and
- Application area plan.

Condition 31 (Combined heat and power feasibility)

For reasons set out in the Officer Report, the above submitted information relating to condition 31 (Combined heat and power feasibility), is considered sufficient to partly satisfy the requirements of the condition and can therefore be approved.

DECISION – Details approved.

Please note that the condition is partly discharged and that details relating to a scheme for the provision of the necessary plant and pipework to the boundary of the site is still required to be submitted to the Council. Please keep a copy of this decision for your records.

Yours faithfully

Mr R Lancaster
Head of Planning & Regulatory Services

Level 5
10 Dominion Street
London EC2M 2EF
Tel: 020 7417 5200
Fax: 020 7417 5222
Email: [redacted]

Robert Lancaster
Head of Planning & Regulatory Services
Regeneration and Growth
Civic Offices
2 Watling Street
Bexleyheath
DA6 7AT

18 November 2021

Dear Mr Lancaster

Application to Discharge Details Pursuant to Condition 31 Permission Ref 16/02167/FUL, Riverside Resource Recovery Facility, Norman Road, Belvedere, DA17 6JY

On behalf of Cory Environmental Holdings Ltd (trading as Cory) I am pleased to submit this application to discharge details under condition 31 of permission 16/02167/FUL ('2017 Permission') which was granted on 4 October 2017 under section 73 of the Town and Country Planning Act (1990 as amended).

This letter is accompanied by

- Figure 1, Site location; and
- Figure 2, Application Area presents the application area, showing the red line boundary of the application within the 2017 Permission (shown with dashed red line). The land within the applicant's control is also shown.

The application area measures 3,134m^2.

Introduction

Riverside Resource Recovery Facility (RRRF) is an operational energy recovery facility, currently treating approximately 750,000 tonnes of residual waste per year. The heat released by the combustion of waste on three combustion lines is recovered in water tube boilers, which produce (in combination with superheaters) high pressure superheated steam supplying a single turbine-generator. The steam turbine has three extraction bleeds which are utilised to serve internal process heating demands. The steam turbine currently operates in fully condensing mode (i.e. designed to export power only).

However, as confirmed in the recently submitted (July 2021) Combined Heat and Power Feasibility Review ('CHP Feasibility Review', application reference 16/02167/FUL02) there is an

Cory Environmental Holdings Limited trading as 'Cory'
Registered in England No: 05360864
Registered Office: Level 5, 10 Dominion Street, London, EC2M 2EF

identified viable market for a District Heating ('DH') network in the local area. This would initially target servicing new build consumers in and around the Thamesmead area, with possible expansion to additional locations and developments in future phases. Further detail is set out in that submission.

To deliver one of the largest DH networks in the UK, Cory is partnering with a leading specialist district heating and low carbon energy company Vattenfall. Vattenfall is the largest operator of district heating networks in western Europe and provides heat network services to 1.7 million households across the EU.

The project will be part-funded by a £12.1 million award through the Government's Heat Network Investment Project to fund commercialisation and construction of the proposed DH network. The funding comprises a £1.6 million commercialisation grant with the remainder of the support in the form of loans for construction.

Cory is pleased to submit this application as the first phase necessary to kick start delivery of a sustainable and efficient heating network for the wider community.

Condition 31

Condition 31 of the 2017 Permission states:
Within 1 year from date on which this permission was deemed granted, the Company must prepare a Combined Heat and Power (CHP) feasibility review assessing potential commercial opportunities for use of heat from the development, which must be submitted in writing to the Council for its approval. The review must provide for ongoing monitoring and full exploration of potential commercial opportunities to use heat from the development as part of a Good Quality CHP scheme (as defined in CHPQA Standard issue 3), and for the provision of subsequent reviews of such opportunities as necessary. Where viable opportunities for the use of heat in such a scheme are identified, a scheme for the provision of the necessary plant and pipework to the boundary of the site shall be submitted in writing to the Council for its approval. Any plant and pipework installed to the boundary of site to enable the use of heat shall be installed in accordance with the agreed details.

Reason: To facilitate future CHP opportunities.

Condition 31 requires that two matters are resolved.

The first of these is the submission of a feasibility review assessing potential commercial opportunities for use of heat from the development. As identified above, a submission was made in July 2021 (reference 16/02167/FUL02) addressing this element of the condition.

The second part of the condition requires that where viable opportunities for the use of the heat are identified, a scheme for the provision of the necessary plant and pipework to the boundary of the site shall be submitted in writing for approval.

This application addresses this second element and builds upon the CHP Feasibility Review.

The Proposed Development

The proposed development is the installation, operation and maintenance of DH plant and pipework within the RRRF site boundary of the 2017 Permission.

The application seeks an appropriate degree of flexibility in relation to the location of the installed pipework as final design details are prepared. Notwithstanding, this is a key element of the DH network, necessary both to secure delivery of the scheme but also to enable efficient continued operation of the heat source, RRRF.

As confirmed within the CHP Feasibility Review, the most likely solution for implementing a DH network would be to transfer heat to a closed hot water circuit via a series of condensing heat exchangers. It is typical to supply hot water to consumers through a pre-insulated pipeline, before being returned to the plant for reheating. This technology is well proven and highly efficient. It would be technically feasible to construct a heat exchanger platform at RRRF, located between the air-cooled condenser and the turbine hall, to accommodate heat station infrastructure for a DH network, and route DH pipes around the building for onward distribution of hot water.

In June 2015, Cory installed isolation valves within RRRF to facilitate steam extraction for the proposed heat export system. When implemented, the underlying operational principles of the RRRF would remain largely unchanged, and readily enables the proposed steam pipework and downstream heat export equipment to be installed. RRRF is therefore able, with relatively minimal modification, to supply heat to offsite consumers as part of the foreseen DH network.

Consequently, the proposed development comprises a heat exchanger platform and DH pipework. The heat exchanger platform would be located between the turbine hall and air cooled condensers ('ACC') (the northern third of the application area). The DH pipework would run from the heat exchanger platform to the edge of the ACC. Figures 3 and 4 of the CHP Feasibility Review present CAD drawings of an indicative heat exchanger platform. It will occupy c.150m^2 footprint.

Photographs of typical DH plant and pipework are presented in Figures 1 and 2 of this letter.

The shell and plate heat exchanger is shown in Figure 1 as that is the type assumed within the Combined Heat and Power Feasibility Review, with the unit comprising three exchangers at 5MW, 10MW and 15 MW each. The dimensions for all of them will be approximately 3m by 2m by 2m).

Figure 1 Image of Shell and Plate Heat Exchanger

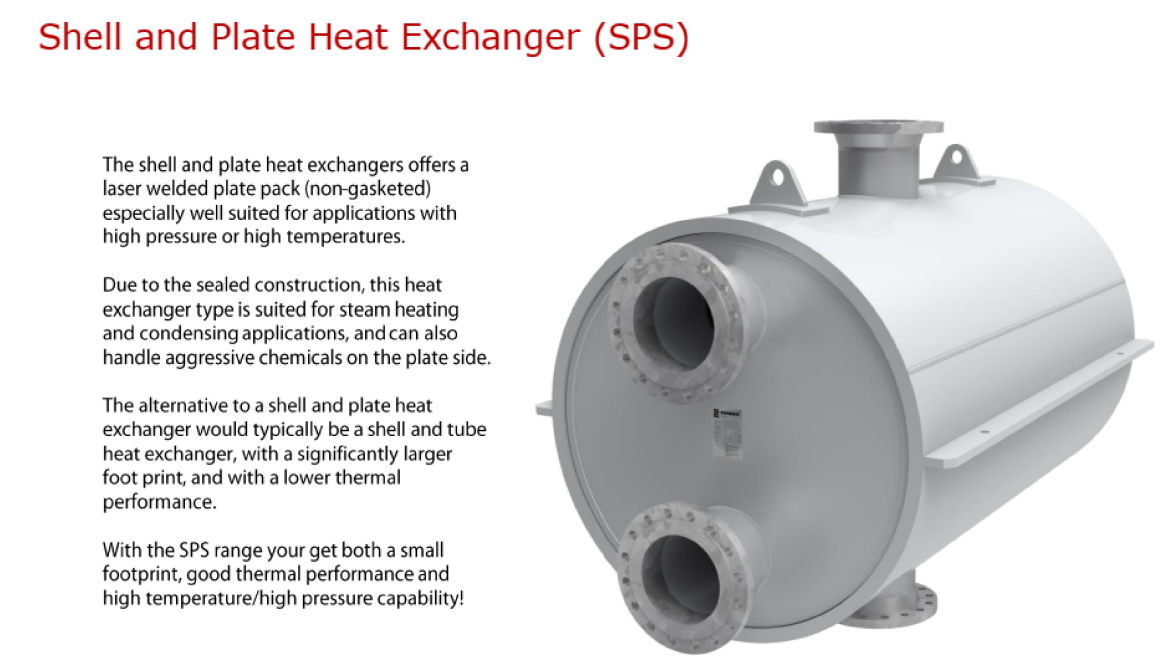


Figure 2 Photograph of typical DH pipes

The associated pipework (two steel pipes installed next to each other) would measure approximately 100m in length (depending on the route taken to the RRRF boundary). The pipes would be some 450mm in diameter with an outer casing, providing insulation to the pipes, adding a further c. 200mm. They will be installed above ground level from the heat off-take exchange unit to the edge of the ACC. The pipework is proposed above ground to avoid existing on-site utilities and services located under the ACC.

The exact route through the ACC will be determined at the detailed engineering design stage and consequently the whole zone is included within the application boundary. This approach provides appropriate flexibility in terms of final engineering design and placement for the pipework as it will be concealed within the existing built form of RRRF. The pipework would be capped off ready for connection when Vattenfall installs the next phase.

Vattenfall is currently preparing full details for the DH network planned beyond the RRRF boundary, including any other plant and pipework required to connect it to RRRF. These details will be submitted under separate planning application(s) and related regulatory approvals as required. However, by Cory taking the pipework to the ACC means that optimum connectivity is provided, enabling a range of options for the route out of the Riverside campus for the DH network to be explored and delivered by our DH partner, Vattenfall.

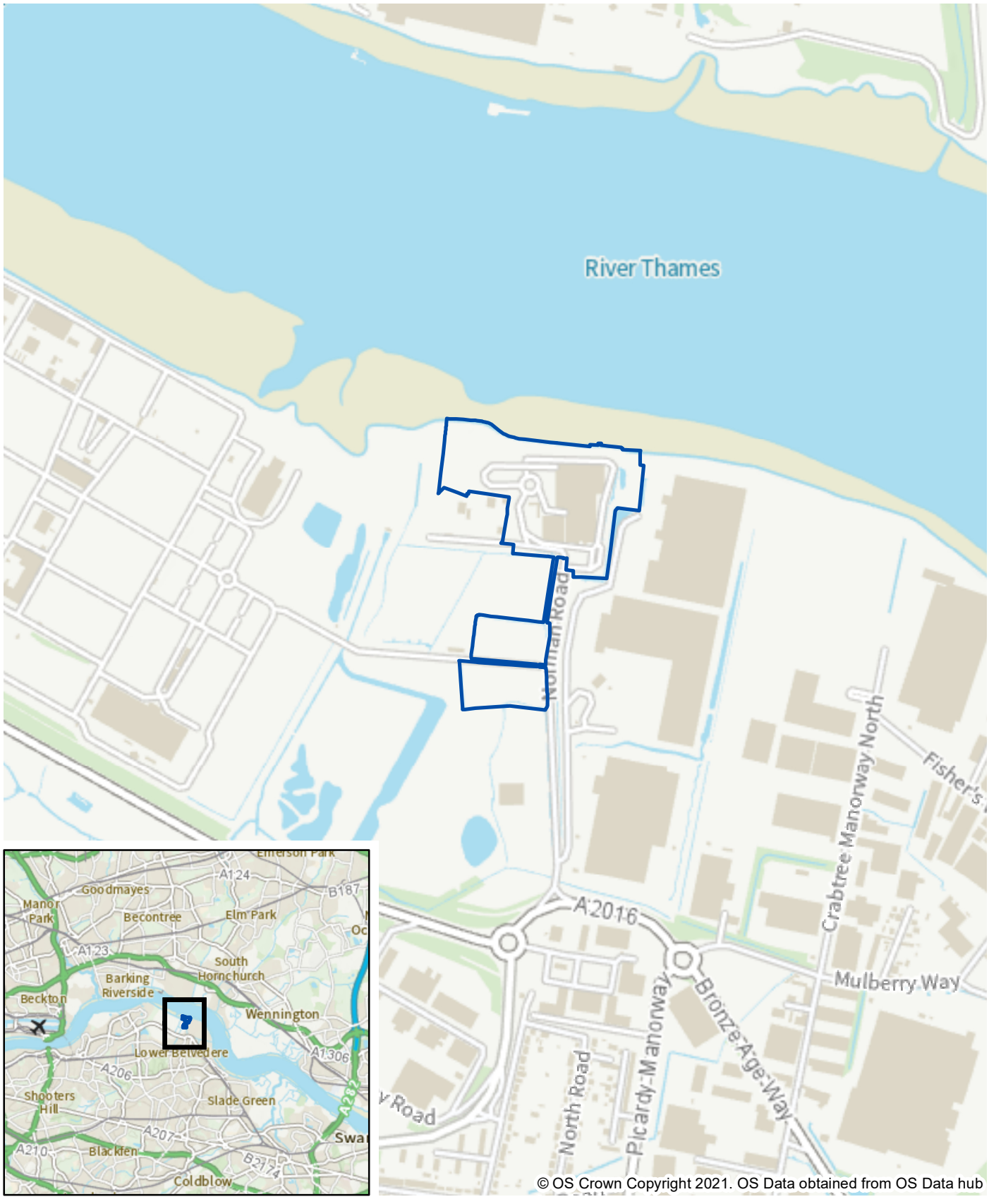
Cory is excited to be able to commence the first phase of the DH works on delivering hot water to a local district heating network from RRRF. I trust this application provides an appropriate level of detail to enable London Borough of Bexley to consider, and if acceptable, approve this application, made to discharge details required under condition 31 of the 2017 Permission.

I trust you find this application is all in order and I look forward to receiving acknowledgement of receipt.

Yours sincerely

[redacted]

pp. Richard Wilkinson
Head of Planning & Development
Cory Environmental Holdings Limited



Riverside Resource Recovery Facility

Land Within the Applicant's Control

Figure 1
Site Location

N

Metres

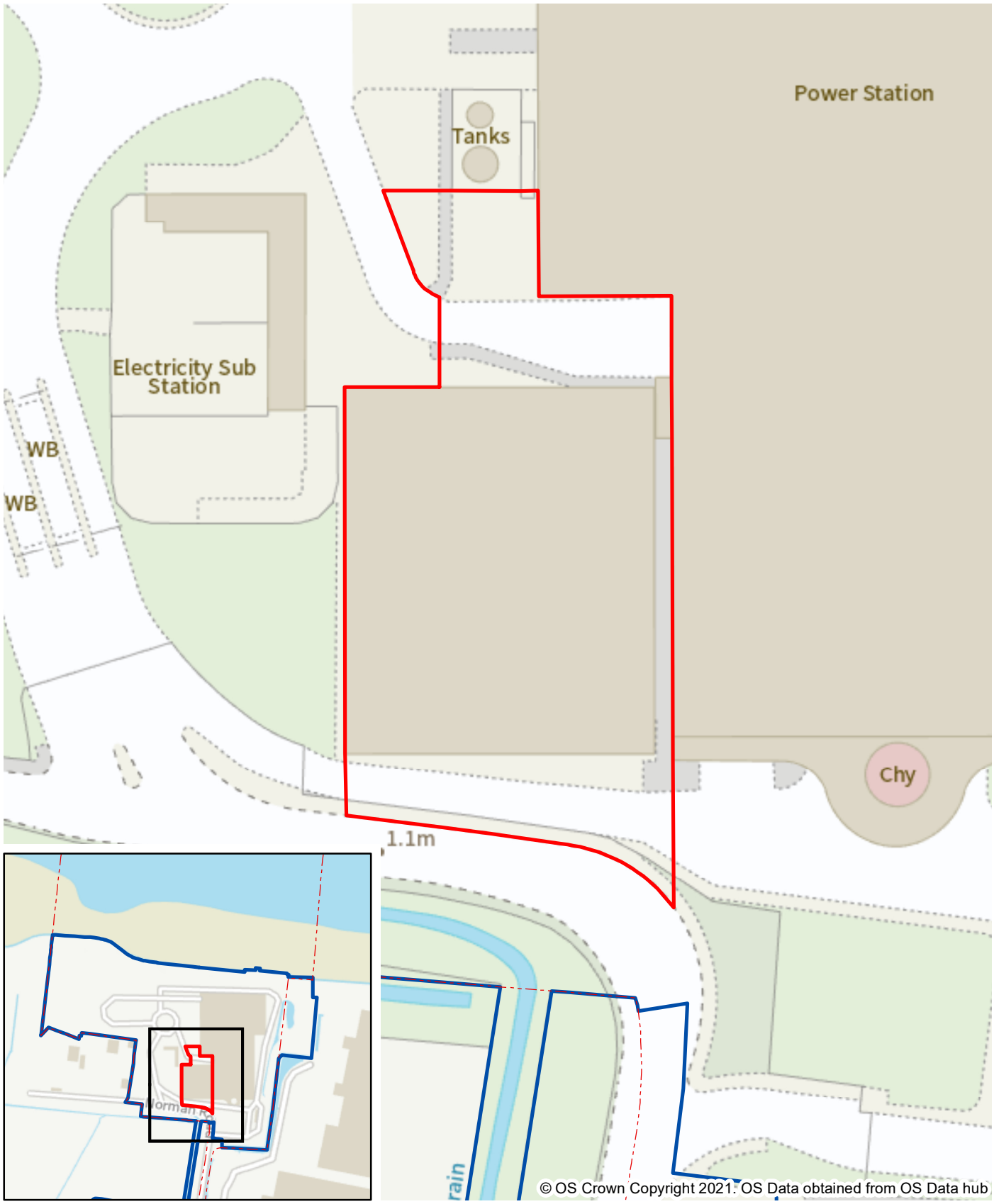
0 100 200 300 400

SCALE: 1:10,000 @ A4

CORY

hendeca

12/11/2021



Riverside Resource Recovery Facility

Application Boundary
2017 Consent Boundary
Land Within the Applicant's Control

Figure 2
Application Area

N
Metres
0 5 10 15 20
SCALE: 1:700 @ A4

CORY
hendeca
12/11/2021

ANNEX H

Permission 22/00728/FUL

LONDON BOROUGH OF BEXLEY
Trusted by Bexley residents

Development Management
Civic Offices, 2 Watling Street,
Bexleyheath, Kent, DA6 7AT
Telephone 020 8303 7777

To: **Vattenfall Heat UK Ltd**
C/o WSP
FAO: Mr G Burgess
WSP House
70 Chancery Lane
London WC2A 1AF

TOWN AND COUNTRY PLANNING ACT 1990
TOWN AND COUNTRY PLANNING (DEVELOPMENT MANAGEMENT PROCEDURE) (ENGLAND) ORDER 2015

GRANT OF PERMISSION TO DEVELOP LAND SUBJECT TO CONDITIONS	Reference Code : **22/00728/FUL**

TAKE NOTICE that Bexley Council, the Local Planning Authority under the Town and Country Planning Acts, **HAS GRANTED PERMISSION** for the development of land situated at :

Norman Road Highway Between
Riverside Energy From Waste Facility
And Picardy Manorway
Belvedere

For Hybrid application for a phased development comprising (Phase 1) full planning permission for the installation of a district heat network pipeline in Norman Road connecting to Riverside Resource Recovery Facility; and (Phase 2) outline planning permission (all matters reserved) for the provision of a bridge carrying a district heat network pipeline over the ditch to the south of Norman Road with a pedestrian walkway structure above the bridge, decked area and associated alterations and improvements around the existing pedestrian gate at the south west of Norman Road and associated works.

Referred to in the application for permission for development received on 22nd March 2022.

SUBJECT TO THE CONDITIONS as attached.

Date of Decision: 8th July 2022

[redacted]

Head of Development Management

LONDON BOROUGH OF BEXLEY
Trusted by Bexley residents

Reference Code :

22/00728/FUL

CONDITIONS AND REASONS

1 The development hereby permitted shall be begun not later than three (3) years beginning with the date on which the permission is granted.

Reason: To comply with the requirements of Section 91 of the Town and Country Planning Act 1990 (as amended by the Planning and Compulsory Purchase Act 2004) to prevent the accumulation of unimplemented planning permissions.

2 The development hereby permitted shall only be carried out in accordance with the following approved plans and documents:

Plans:

RHN-WSP-NR-XX-DR-MD-000201_P02, RHN-WSP-NR-XX-DR-MD-000300 Rev 01, RHN-WSP-NR-XX-DR-MD-000301 Rev 01, RHN-WSP-NR-XX-DR-MD-000303 Rev 01, RHN-WSP-NR-XX-DR-MD-000304 Rev 01

Reason: For the avoidance of doubt and in the interests of good planning.

3 A. If unexpected contamination is found after development has begun, development must be halted on that part of the site affected by the unexpected contamination to the extent specified by the Local Planning Authority in writing. Before development restarts at that part of the site a risk assessment and remediation scheme shall be produced by a suitably qualified person and submitted for approval, in writing, by the Local Planning Authority.

B. The development may only restart on that part of the site in accordance with the approved remediation scheme.

C. Prior to first use/occupation of the development a signed verification report shall be submitted to and approved in writing by the Local Planning Authority (whether or not contamination had been identified during construction).

Reason: To ensure that risks from land contamination to the future users of the land and neighbouring land, together with those to controlled waters, property and ecological systems, are minimised and to ensure that the development can be carried out safely without unacceptable risks to workers, neighbours and other off-site receptors.

4 The development hereby permitted shall only be undertaken in full and complete accordance with the recommendations and mitigation measures, including the recommended survey work (see table 4.1 of the Preliminary Ecological Appraisal Document produced by WSP, March 22). The mitigation measures shall be implemented in full prior to the first operation of the pipeline hereby permitted. The mitigation measures shall be retained and maintained for the lifetime of the development.

Reason: To ensure the development provides the maximum possible provision towards protection of habitats and valuable areas for biodiversity in accordance with policy G6 of the London Plan and Policies CS17 and CS18 of the Bexley Core Strategy.

5 Prior to the commencement of development of phase two, details of the following reserved matters for that phase shall be submitted to and approved in writing by the Local Planning Authority before the expiration of 3 years from the date of this permission.

a) Details of the layout, scale, external appearance, means of access and landscaping of the proposed bridge and all associated works,

b) Details of the landscaping shall include details of both l hard and soft landscaping materials.

Reason: To comply with the requirements of Section 91 1 b of the Town and Country Planning Act 1990 (as amended by the Planning and compensation Act 2004.

6 The development to which this outline permission relates must be begun not later than the expiration of 2 years from the final approval of the details referred to in condition 6 above, or in the case of approval on different dates the final approval of the last such matter to be approved.

Reason: To comply with the requirements of section 91 of the Town and Country Planning Act 1990 (as amended by the Planning and Compulsory Purchase Act 2004).

7 The reserved matters applications must be brought forward in conformity with the Site Location Plan number RHN-WSP-NR-XX-DR-MD-000201_P02 or any other plan submitted to and approved in writing by the Local Planning Authority.

Reason: In the interests of achieving an overall integrated redevelopment of the site.

8 Prior to commencement of the Pipe Bridge Crossing over the Horse Head Dyke main river, details of, and a long term inspection and management plan for, the pipe bridge crossing and the amenity feature that is to form part of it, shall be submitted to and approved in writing by the local planning authority. The submitted details and management plan shall include:

- Drawings in plan and section of the final design of the Pipe Bridge Crossing.
- A comparison between the underside soffit level of the crossing and the peak modelled flood level in the watercourse, and measures to manage the potential for the structure to collect debris.
- Demonstrating that sufficient space is provided between the existing Norman Road bridge including the proposed power cables that are to be attached to its downstream face and the new Pipe Bridge Crossing to allow for operational access to the watercourse for dewatering and other works.
- An inspection and management plan for the Pipe Bridge Crossing, and the amenity feature to be formed above it as well as any areas of ecological mitigation that are enhanced to compensate for the impact of the new crossing.
- Details for enhancing the ditch (in consultation with the Nature Reserve), to mitigate for the temporary disruption from the construction.

The inspection and management plan will be implemented for as long as the Pipe Bridge Crossing remains in place.

Reason: To prevent future maintenance of the watercourse being hindered, and an increased risk of flooding and to minimise the environmental impact of the development.

9 No development shall take place until a stage 1 written scheme of investigation (WSI) has been submitted to and approved by the Local Planning Authority in writing. For land that is included within the WSI, no demolition or development shall take place other than

in accordance with the agreed WSI, and the programme and methodology of site evaluation and the nomination of a competent person(s) or organisation to undertake the agreed works.

If heritage assets of archaeological interest are identified by stage 1 then for those parts of the site which have archaeological interest a stage 2 WSI shall be submitted to and approved by the Local Planning Authority in writing. For land that is included within the stage 2 WSI, no demolition/development shall take place other than in accordance with the agreed stage 2 WSI which shall include:

A. The statement of significance and research objectives, the programme and methodology of site investigation and recording and the nomination of a competent person(s) or organisation to undertake the agreed works

B. The programme for post-investigation assessment and subsequent analysis, publication & dissemination and deposition of resulting material. this part of the condition shall not be discharged until these elements have been fulfilled in accordance with the programme set out in the stage 2 WSI.

Reason: The planning application lies in an area of archaeological interest where there is consistent evidence for prehistoric activity.

10 Details of any external lighting shall be submitted to the Council and approved in writing prior to the installation of any lighting on the site.

Reason: To ensure the development does not prejudice existing habitats and surrounding biodiversity.

PLEASE NOTE

In dealing with this planning application, Bexley Council has worked with the applicant in a positive and proactive manner, in accordance with the requirements of paragraphs 186 & 187 of the National Planning Policy Framework, to seek solutions to problems where practicable. Detailed advice is available in the form of the Council's Development Plan as well as in the Mayor of London's and Bexley Council's Supplementary Planning Documents and Guidance. The Council also offers a full pre-application service that is available to all applicants to assist in formulating their proposals.

APPEALS

If you are aggrieved by the decision of your local planning authority to refuse permission for the proposed development or if granted subject to conditions, then you can appeal to the Secretary of State. More details of the time limits for appeals and how you go about appealing along with Purchase Notices can be found on the following websites:

https://www.gov.uk/government/organisations/planning-inspectorate

ANNEX I

Discharge of Requirement 2 – 19/00998/ALA14

Development Management
Planning Department
Place
Civic Offices, 2 Watling Street,
Bexleyheath, Kent, DA6 7AT
Telephone 020 8303 7777

The person dealing with this matter is: Ian Smith
Direct Dial: 0203 045 3775
Email: ian.smith@bexley.gov.uk

Our Application Reference Number: 19/00998/ALA14

26.01.22

Mr R. Wilkinson
c/o Miss K. Berry

BY EMAIL

Dear Miss Berry,

Re: Detailed Design Report and Associated Plans requirement- Paragraph 2 of Schedule 2 of the Infrastructure Planning- Riverside Energy Park Order, 2020.

The decision on this application to determine the above requirement in full has been made on the basis of the following submitted plans and documents:

RELEVANT PLANS/DOCUMENTS

- Cover Letter.
- Riverside Energy Park- Detailed Design Report.
- Drawing nos. VAA-WA-58000001 Rev 0.0, VAA-WA-58000002 Rev 0.0, VAA-WA-58000005 Rev 0.0, VAA-WA-58000010 Rev 0.0, VAA-WA-58000014 Rev 0.0, VAA-WA-58000020 Rev 0.0, VAA-WA-58000030 Rev 0.0, VAA-WA-58000031 Rev 0.0, VAA-WA-58000035 Rev 0.0, VAA-WA-58000036 Rev 0.0, VAA-WA-58000040 Rev 0.0, VAA-WA-58000042 Rev 0.0, VAA-WA-58000043 Rev 0.0, VAA-WA-58000044 Rev 0.0, VAA-WA-58000046 Rev 0.0, VAA-WA-58000100 Rev 0.0, VAA-WA-58000101 Rev 0.0, VAA-WA-58000105 Rev 0.0, VAA-WA-58000140 Rev 0.0, VAA-WA-58000142 Rev 0.0

Paragraph 2 of Schedule 2 of the Infrastructure Planning (Riverside Energy Park Order, 2020 states that:

(1) No part of Work No. 1A(iv), Work No. 1B(iv), Work No. 1C, Work No. 1E, Work No.2, Work No.3, Work No. 4, Work No. 5 and Work No. 6 may commence until details of the layout, scale and external appearance for that Work No. have been submitted to and approved by the relevant planning authority.

(2) No part of Work No. 1A and Work No. 3 may commence until a plan has been submitted to and approved by the relevant planning authority demonstrating that within Work No. 1A and Work No. 3 there is sufficient space to support a heat export system capable of providing at least 30 megawatts heat off–take for district heating.

(3) The details submitted for approval under sub–paragraph (2) must be submitted alongside the details submitted for approval under sub–paragraph (1).

(4) The details submitted for approval under sub-paragraph (1) must be in accordance with the design principles.

(5) The authorised development must be carried out in accordance with the approved details.

It is considered by the London Borough of Bexley that parts 1 and 2 of Paragraph 2 of Schedule 2 (Detailed Design Report and Associated Plans) of the Infrastructure Planning- Riverside Energy Park Order, 2020 have been satisfied. Parts 3,4 and 5 of the requirement are compliance elements and do not need satisfying by the Local Planning Authority.

Yours faithfully

Mr R Lancaster
Head of Planning & Regulatory Services

ANNEX J

Lichfields Report

Cory Decarbonisation DCO

Landsul Limited and Munster Joinery (U.K.) Limited Response to the Applicant's Deadline 2 submission

Formal Response to the Applicant's review of Lichfields' Socio-economic Assessment

Munster Joinery

16 January 2025

LICHFIELDS

68581/01/CGJ
33382239v1

1.0 Introduction

1.1 Lichfields, on behalf of Landsul Limited and Munster Joinery (U.K.) Limited, conducted a review of the Population, Health and Land Use [APP-063] and Socio-Economic [APP-064] chapters of the Environmental Statement (and their associated appendices) in relation to their assessment of impacts on the compulsory purchase of the Munster Joinery site and submitted in support of the Cory Decarbonisation Project Development Consent Order ('DCO'). This report (hereafter 'the Lichfields' Report') was submitted as Annex E to Landsul Limited's and Munster Joinery (U.K) Limited's written representations at Deadline 1 [REP1-059/REP1-060].

1.2 The Applicant has provided a formal response to Landsul Limited and Munster Joinery (U.K.) Limited's written representations [REP2-021], including those pertaining to the comments made in relation to socio-economics. This note sets out a number of queries and challenges to the Applicant's response within the table overleaf; Landsul Limited and Munster Joinery (U.K.) Limited consider that these matters require further consideration by the Applicant.

2.0 Summary of Issues

Paragraph	Summary of issues identified	Landsul Limited & Munster Joinery (U.K.) Limited Response
1.1.5/3.1.2	The Applicant states at paragraph 3.1.2 that the loss of operations at Munster Joinery's Norman Road site was considered within the Environmental Statement as a worst-case scenario. However, the Applicant also maintains that they do not agree that the DCO would result in the loss of Munster Joinery's business from Belvedere (paragraph 1.1.5).	As Landsul Limited and Munster Joinery (U.K.) Limited have not agreed to a relocation, the DCO would result in the loss of the Munster Joinery site and existing facilities on Norman Road. Within the Environmental Statement, the loss of Munster Joinery from Belvedere should be considered as the central, rather than worst-case, scenario and the impacts assessed on this basis.
3.1.3	The Applicant outlines that the loss of jobs at Munster Joinery was considered as part of the operational human health assessment (within Chapter 14 of the Environmental Statement [APP-063]) alongside the permanent jobs generated from the Proposed Scheme, as the job losses associated with Munster Joinery would be permanent.	As outlined within the Lichfields Report, the loss of jobs at the Munster Joinery site would occur as a result of the construction of the Proposed Scheme rather than from the operation of the Proposed Scheme; it is therefore inaccurate to consider these within the operational human health assessment. Additionally, the Applicant fails to provide justification for the approach adopted within Chapter 15 of the Environmental Statement [APP-064] and does not provide reasonable evidence as to why the assessment of the loss of employment at the Munster Joinery site was considered within the operational assessment, when it should have been considered within the assessment of effects during the construction phase. Within Environmental Impact Assessment, effects are assessed at the stage or phase they are expected to occur. It is not the case, as stated by the Applicant, that all permanent effects can be assessed together without regard to when they would occur. In their approach, the Applicant fails to recognise that the adverse effects of the permanent job losses at Munster Joinery would occur several years before the Project would be fully operational and the benefits from permanent job creation realised. As such, an individual assessment of the loss of jobs at Munster Joinery on human health should be considered for the construction phase. By considering the loss of jobs at Munster Joinery in tandem with the permanent jobs generated from the scheme in net terms, the adverse effects on human health resulting from the loss of jobs are understated within the Applicant's assessment in Chapter 14 of the Environmental Statement [APP-063]. This is

		also true of the approach within Chapter 15 [APP-064] which considers the job losses from Munster Joinery at the operational phase, when in reality these job losses would occur during the construction phase.
3.1.4	The Applicant states that Chapter 15 of the Environmental Statement [APP-064] has "considered the impacts on the local and regional economy".	As outlined within paragraph 2.25 of the Lichfields Report, Chapter 15 of the Environmental Statement [APP-064] defined the local study area as the London Borough of Bexley (LBB) while the Regional Study Area is Greater London. However, the assessment of employment is only considered at a Greater London level. This results in an incomplete assessment of the effects of the Proposed Scheme on local employment, which is critical when considering the potential loss of jobs at the Munster Joinery site.
3.1.5	The Applicant highlights that there is no set methodology for socio-economic assessments undertaken for the purposes of an Environmental Impact Assessment, and that the assessment carried out in Chapter 15 of the Environmental Statement [APP-064] was based on information available at the time of writing, in accordance with the Additionality Guide.	Paragraphs 3.2 and 3.3 within the Lichfields Report acknowledges that there is no UK legislation or guidance for the preparation of socio-economic assessment. However, the Applicant requires a stronger methodological framework to define both sensitivity and magnitude criteria, in line with wider Environmental Impact Assessment best practice and the approach established for the wider Environmental Statement and set out within Chapter 4: EIA Methodology [APP-053]. The Applicant has failed to provide justification for the omission of the application of sensitivity and magnitude criteria within the assessment in Chapter 15 of the Environmental Statement [APP-064] and therefore has not provided sufficient evidence to support the conclusions of their assessment.
3.1.6/3.1.7	The Applicant considers the employment estimates provided within the Lichfields Report to be high and that actual employment numbers should have been provided.	As stated within Section 2.0 of the Lichfields Report, the reassessment was undertaken using industry standard, best-practice methodologies and information on the public domain to provide an accurate evidence-based assessment of the adverse effects- utilising information that would have been available to the Applicant at the time the assessment was prepared. In order to undertake a representative re-appraisal of the assessment, Lichfields has made use of the same level of detail as was available to the Applicant. Paragraph 3.14 of the Lichfields Report estimates an existing baseline employment at the Munster Joinery site that is only marginally higher than the estimates set out within Chapter 15 of the Environmental Statement [APP-064]. This is attributable to a more detailed breakdown of floorspace uses based on the extant planning permission for the site and the floorspace recorded by the Valuation Office Agency ('VOA'), both of which are in the public domain and available to the Applicant.

		The Lichfields Report goes beyond the Applicant's assessment by considering the future baseline, i.e., the total floorspace that would be delivered at the site once it has been fully developed in line with the extant planning permission. This full consideration of the future baseline scenario, which is notably absent in the Applicant's assessment, results in a higher estimate of the potential number of jobs that would be lost at Munster Joinery as a result of the Proposed Development but provides a more granular estimate of employment.
3.1.9	The Applicant outlines that it does not agree that the effects the local study area (London Borough of Bexley) would be "significant in the context of the local employment market".	The Lichfields assessment has been based on a pre-defined set of criteria for both magnitude and sensitivity. As outlined within paragraph 3.21 and 3.22 of the Lichfields Report, the sensitivity and magnitude criteria applied to the assessment, as well as the justification for each category applied, provide a more robust framework for the overall assessment of effects. As noted above, the Applicant's assessment within Chapter 15 of the Environmental Statement [APP-064], fails to provide an assessment of employment in the local study area. The assessment also fails to set out a methodology which defines and applies both sensitivity and magnitude criteria to the assessment of effects.
3.1.10	The Applicant states that they do not anticipate a significant effect on business and commercial activity within the local study area.	As outlined at paragraphs 3.25 to 3.35 inclusive within the Lichfields Report, the Munster Joinery site at Norman Road is an integral part of the company's operations within the UK. Munster Joinery is one of the largest producers of energy efficient doors and windows in the UK, and the Norman Road site serves as its sole distribution centre for London and the South East, which forms a significant proportion of Munster Joinery's customer base. The Norman Road site has a strategic location, with easy access to the M25 allowing efficiency in distribution while also offering good public transport accessibility for their employees. Additionally, Munster Joinery intend to expand their operations on the site; this expansion has extant permission under 13/00918/FULM and the foundations have been laid on site. The compulsory purchase and loss of Munster Joinery from the site would not only result in the loss of future employment and business output growth, but also the sunk costs of investment in the expansion of the facilities would become redundant.

		The Applicant has failed to recognise that Munster Joinery's products are highly specialised, and the business operates within a market characterised by a small number of firms. As highlighted at paragraph 3.30 of the Lichfields Report, the company is a supplier to several major housebuilders, and the loss of the Munster Joinery site could have knock-on implications for the construction sector and, ultimately, housing delivery in London and the South East. The Applicant notes that Greater London is a well-connected economy, which further highlights how the loss of Munster Joinery would have an adverse impact on a range of commercial businesses within the region. Following the defined sensitivity and magnitude criteria established within the Lichfields Report – based on an industry standard and best-practice approach – this impact is considered to be significant. No alternative magnitude and sensitivity criteria are proposed by the Applicant.
3.1.11	The Applicant sets out that they are seeking to reach an agreement on a relocation of the Norman Road site to support existing business operations and avoid job losses.	As outlined within the Lichfields Report and in the responses outlined above, the Applicant has not fully assessed the potential adverse effects on Munster Joinery resulting from the Proposed Scheme. As set out within Landsul Limited and Munster Joinery (U.K.) Limited's written representations [REP1-059/REP1-060] relocation of the existing site facilities would not be a viable solution given the scale of investment that has been already made at the site and the plans for future expansion (which has extant planning permission) and the wider disruption to business operations and the local workforce. The distribution site at Norman Road is supplied from Munster Joinery's main manufacturing centre located in Wellesbourne, Warwickshire, and employs over 900 staff. The site in Wellesbourne has been recently expanded to accommodate increased demand in the products developed by Munster Joinery from the market in London and the South East. The compulsory purchase would not only have significant adverse effects at the site at Norman Road but would have significant knock-on effects for the wider business. In this context, it is incumbent upon the Applicant to have considered the job losses and wider business disruption resulting from the compulsory purchase of the Munster Joinery site on Norman Road as the central scenario within the impact assessment, and hence to provide evidence and justification for their assessment and consideration of the associated mitigation measures.

3.0 Summary

3.1 The Applicant has provided a formal response [REP2-021] to the Lichfields Report, submitted as Annex E to Landsul Limited's and Munster Joinery (U.K.) Limited's written representations to the Cory Decarbonisation Project DCO [REP1-059/REP1-060]. This submission sets out Lichfields' responses to the matters raised by the Applicant, on behalf of Landsul Limited and Munster Joinery (U.K.) Limited, jointly.

3.2 There are a number of areas where the Applicant has not provided sufficient further justification or evidence on the basis for their approach, and accordingly, fails to fully capture the extent of the potential significant adverse socio-economic effects and associated mitigation measures, including reasonable alternatives to compulsory purchase. The negative socio-economic impacts insofar as they relate to the Munster Joinery site and existing facilities are, therefore, significantly understated.

3.3 Accordingly, Landsul Limited and Munster Joinery (U.K.) Limited maintain their position that the Applicant must revisit the assessment of socio-economic effects to ensure an appropriate range of impacts from the Proposed Scheme on Munster Joinery is considered and to provide an accurate, precise and justified evaluation.

3.4 Consequently, as mitigation for the significant adverse effects identified within the Lichfields Report, the design and footprint of the Proposed Scheme should be reconsidered to avoid the compulsory purchase of the Munster Joinery site on Norman Road, and the resulting disruption to local labour markets and wider business stability.

ANNEX K

Application to question Applicant's experts

Cory Decarbonisation Project

Application to cross examine on behalf of Landsul Limited and Munster Joinery (U.K.) Limited

1. By this application, Landsul and Munster Joinery seek permission to cross examine the Applicant's expert(s) in respect of the need for the compulsory acquisition of Landsul's land.

Legal framework and practice

2. By s 94(4) Planning Act 2008, the ExA may decide:

> "(a) whether a person making oral representations at the hearing may be questioned at the hearing by another person and, if so, the matters to which the questioning may relate;
>
> ...
>
> (b) the amount of time to be allowed at the hearing—
>
> ...
>
> (ii) for any questioning by another person."

3. Section 94(7) further provides:

> "(7) In making decisions under subsection (4)(a), the Examining authority must apply the principle that any oral questioning of a person making representations at a hearing (whether the applicant or any other person) should be undertaken by the Examining authority except where the Examining authority thinks that oral questioning by another person is necessary in order to ensure—
>
> (a) adequate testing of any representations, or
>
> (b) that a person has a fair chance to put the person's case."

4. Where the issue concerns compulsory acquisition, there is a need for particular scrutiny of the applicant's case. This is because:

   a. The law requires there to be a "compelling case" for that acquisition (s 122(3) Planning Act 2008);

   b. The existence of an alternative to compulsory acquisition is a reason to refuse to authorise such acquisition, even if the proposal itself has clear policy support (see *R (FCC Environment) v SSECC* [2015] Env LR 22;

c. Compulsory acquisition amounts to an interference with the owner's human rights as protected under Article 1 of the First Protocol of the European Convention on Human Rights, and accordingly a deprivation may only occur with the procedural protections guaranteed by Article 6 ECHR, relating to a fair trial.

5. The common law recognises that it may be necessary to permit cross examination to allow a fair hearing. There is no fundamental right to cross examine, but the facts of the case may require it. The seriousness of the dispute, and the nature of the issue between the parties are relevant. In *R (Bonhoeffer) v GMC* [2011] EWHC 1585 (Admin), the Divisional Court found that cross examination was necessary in disciplinary proceedings relating to a serious allegation that would end the career of the claimant, when the issue was in essence one person's word against another. Cross examination was required to resolve direct conflicts of evidence, and fairness could not be achieved by allowing the tribunal to make its own assessment of credibility. Similarly, in *R (S) v Knowsley NHS Primary Care Trust* [2006] EWHC 26 (Admin), the High Court held that cross examination was necessary for the claimant to show that the "evidence is worth less than might cumulatively appear on paper".

6. The general approach in DCO hearings is not to permit cross examination. However, by way of example, in the Thames Tideway DCO the ExA allowed limited cross examination in respect of the selection of work sites and the tunnel drive strategy to ensure that interested parties had a fair chance to put their case (see ExAR 1.36 and 17.11). The issue in that case was whether the need for a tunnel "drive site" at a particular location (Carnwath Road, Fulham) could be avoided by carrying out a single, longer, tunnel bore. The key objector (LB Hammersmith and Fulham) submitted an expert report explaining why such an approach would be feasible. Faced with two contradictory expert opinions, the resolution of which was determinative of the need for the land in question, the ExA permitted cross examination on this issue.

Reasons for permitting cross examination here

(i) The fundamental dispute between the parties requires competing expert evidence to be tested

7. Dr Edgar's evidence is that there is a feasible means of achieving the objectives of the project without the compulsory acquisition of Landsul's land. If he is right, then it follows that the compulsory acquisition of that land cannot lawfully be authorised. Dr Edgar has set out his qualifications and experience, and confirmed that his reports are prepared in accordance with the duties on an expert witness.

8. By contrast, the Applicant's case that Dr Edgar is wrong is not set out in any expert evidence. It is limited to a series of assertions in the Applicant's D2 submissions. The credibility of those assertions has not been tested, and should be tested in cross examination.

(ii) The issue to be resolved is a serious one relating to a direct interference with Convention rights

9. The expropriation of Landsul's land, and the consequent impacts on Munster Joinery's property and business, amount to a complete deprivation of property rights. The seriousness of the issue warrants the most thorough scrutiny being applied to the Applicant's evidence.

(iii) There are specific issues which, if resolved, are likely to determine whether the land can lawfully be expropriated

10. The points of dispute are focused and are likely to determine whether the land can lawfully be expropriated. The specific points of dispute can be divided into those which are illustrated in Dr Edgar's alternative layout, and those which could generate further space savings or different layouts. As to the Alternative Layout the points are:

    a. Electrical distribution and the need for the substantial electrical switchyard;
    b. The use of land above the water storage tank;
    c. Liquid CO2 storage – tank capacity and number required;
    d. General layout efficiency;
    e. Planting.

11. As to further space saving/different layouts, the points are:

    a. The use of a single line plant;
    b. The need for the heat transfer station;
    c. The potential to locate the water tank and heat transfer station to the south of Landsul's land.

(iv) The Applicant's evidence is inconsistent

12. In certain respects, the Applicant's evidence is inconsistent or contradictory. In oral evidence at ISH2, the Applicant's team failed to give any clear explanation as

to whether the heat transfer station is required for the carbon capture facility or to serve Riverside 1 and Riverside 2. When asked to clarify this in writing, it failed to do so. When presented with its own report which indicates that the heat demand could not justify the construction of a new heat transfer station, it has failed to provide any explanation for the inconsistency.

Directions sought

13. Landsul and Munster Joinery seek permission to cross examine, for up to 90 minutes, a suitably qualified representative of the Applicant. Such cross examination would focus on the matters set out in paragraphs 10 and 11 above, with the purpose of:

    a. Testing the Applicant's case that Dr Edgar's alternative layout is not feasible;

    b. Testing the Applicant's case in respect of the need for a two line plant, the need for a heat transfer station, and the claimed unfeasibility of locating certain infrastructure to the south of Landsul's land.

14. Dr Edgar will be available for questioning and there is no objection to him being cross examined on similar terms.

Richard Turney KC

Landmark Chambers

17 January 2025