

<b>Committee(s)</b>	<b>Dated:</b>
Barbican Residents Consultative Committee -For Information Barbican Residential Committee – For decision	25/11/2024 9/12/2024
<b>Subject: Proposed Heating Study</b>	
<b>Which outcomes in the City Corporation’s Corporate Plan does this proposal aim to impact directly?</b>	Providing Excellent Services and Leading Sustainable Environment
<b>Does this proposal require extra revenue and/or capital spending?</b>	<b>Yes</b>
<b>If so, how much?</b>	<b>£234,900</b>
<b>What is the source of Funding?</b>	<b>CAS &amp; Service Charge</b>
<b>Has this Funding Source been agreed with the Chamberlain’s Department?</b>	<b>No</b>
<b>Report of: City Surveyor</b>	
<b>Report authors: Emma Bushell &amp; Dan Sanders</b>	

### Summary

The purpose of this report is to provide a high-level overview of a proposed study to deliver a set of bespoke data backed solutions that will address ongoing and longstanding issues and concerns with the performance and cost of the existing communal electric underfloor heating system.

### Recommendation

The Barbican Residents Consultative Committee is asked to:

- Approve the cost commitment

### Main Report

#### Background

1. There have been longstanding issues and concerns with the performance and more recently the cost of the communal electric underfloor heating system that provides background heating to most of the residential properties on the Barbican Estate.
2. The heating system is switched on between October and April, during the set hours of 3.00 – 7.30am with a boost at 1.30pm – 4.30pm and 9pm – 1.30am. During the set hours, the heating system will automatically switch on when the external temperature, as registered by a single thermostat, is below 15°C and during the boost hours is below 11°C.
3. There are significant variations in thermal envelope and fabric efficiency across the estate. The resulting variations in heating requirements lead to issues being reported by residents that include overheating in some flats, lack of individual control and high costs.

#### Progress to Date

4. Following the closure of the Cyclo heating control system in 2004 a resident Underfloor Heating Working Party was charged with designing and implementing a new future-proofed control system that was integrated into the BEO’s Building Information Management System. This resulted in the Schneider control system which is now in place.

5. Since then, the Working Party have developed a range of initiatives aimed at improving residents' comfort and understanding of the system. It has been successful in implementing some "soft changes" like the seasonal load change initiatives. These required no physical intervention and occupied little officer time.
6. In 2022 Love Design Studio were appointed to undertake an 'Interventions Financial Feasibility Study'. Love Design Studio used Dynamic Simulation Modelling to evaluate a set of interventions suggested by the Underfloor Heating Working Party. These measures included external thermal insulation to roofs and soffits, ventilation improvements and upgrades to the heating controls.

### **Current Situation**

7. A number of these measures were further investigated by the City Surveyor's Energy Team but unfortunately found to be unsuitable at this stage due to a lack of building regulation compliant materials. A subsequent study by Ramboll found the recommended upgrade to individual heating controls to be financially prohibitive.

### **Proposed Study Approach**

8. The intention is to appoint an independent, specialist consultant to gather in-use data to generate calibrated energy models which can then be utilised to evaluate several potential strategies. Ambue Ltd, founded by Hamish McMichael, a Conservation Architect and Retrofit Coordinator, offer a unique set of services that are needed to undertake such a bespoke study. Their proposal will take a data driven approach to tackle the technical challenges of retrofitting existing housing properties. See Appendix for more detailed information on the proposal.

#### Measurement.

9. The proposal is to install data sensors in each room of sample dwellings to collect data on existing performance (temperature (air and surface), CO<sub>2</sub>, occupancy and relative humidity) and couple this with data from loggers installed on the incoming electrical supply to each dwelling to measure electricity usage of the heating system.
10. Geometry surveys will be undertaken using Lidar scans internally and externally with the drone. Fabric performance will be assessed through U-value surveys to calculate heat loss and air tightness tests.

#### Modelling

11. A Building Information Model (BIM) and building physics models will be generated to calculate the fabric performance, identify thermal bridges and condensation risk.
12. The measurement data will then be used to calibrate the modelling for the baseline condition, and then the implications of various potential upgrades.

#### Drone Surveys

13. Drone surveys will be used to undertake external Thermal Imaging with an Infra-Red camera. This survey (flown at night when heating is on and no solar warming on the surfaces) will help identify the areas of heat loss through the façade, around windows, openings, services. It will also identify the relative rate of heat loss transmission between different areas of the thermal bridges, with the exposed concrete structure. This information can be used to help target upgrade interventions.

## **Outcome**

14. By using actual measured data derived from sensors, data loggers, geometry surveys and drone surveys the study will evaluate a series of interventions to include alterations to the existing system, a range of supplementary heating solutions, ventilation and fabric upgrades.
15. The goal of the study is to recommend a bespoke mix of solutions for a given archetype that will deliver quantified energy cost reductions and improved comfort as compared to the current situation.

## **Corporate and Strategic Implications**

### Strategic implications

16. This report contributes to the outcomes “Providing Excellent Services” and “Leading Sustainable Environment” in the Corporate Plan.

### Financial implications

17. The total cost of the study is £234,900 which is broken down into £64,050 for the sensor monitoring, £69,300 for the geometry surveys and modelling, £56,550 for the drone surveys and £45,000 for the analysis and report.
18. A contribution of £100,000 from Climate Action Strategy funding has been secured.
19. Remaining £134,900 to be met through the service charge.

### Legal implications

20. There are no legal implications.

## **Conclusion**

21. This paper recommends the Committee approve the commissioning of a study to deliver data driven solutions to the longstanding issues associated with the communal electric underfloor heating system at the Barbican Estate.

## **Appendices**

Appendix 1 – Ambue Proposal – Barbican Feasibility Study V2.pdf

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