Committees:	Dates:	
Community and Children's Services Committee Projects Sub	11 January 2019 18 January 2019	
Subject: Crescent House/Cullum Welch House Heating Replacement	**Gateway 3/4 Options Appraisal (Regular)**	**Public**
Report of: Director of Community & Children's Services **Report Author:** Jason Crawford		**For Decision**

Recommendations

1. That the contents of this report are noted, and Option 2 communal heating is approved.
2. Note the total estimated cost of £3,146,321 (inc expenditure to date).
3. That the expenditure to date of £18,207 (+VAT) is noted.
4. That additional budget of £132,000 is approved to reach next Gateway 5.
5. That the costed risk of £215,000 is noted. This is not included in the total estimated cost but is intended as a contingency and will only be drawn down if required.

Summary

Dashboard:

Project Status	Green
Timeline	• Gateway 3/4 approvals – Jan 2019 • Appoint Consultant to do the employers requirements – Jan/Feb 2019 • Invitation to Tender (works) – Mar 2019 • Tenders received and analysed – Mar/Apr 2019 • Gateway 5 – May 2019 • Start on Site – Jun 2019
Programme Status	Regular
Latest estimated total costs (including fees)	£3,146,321
Expenditure to date	£18,207 (+VAT)

Progress to date:

The original Gateway 3/4 report was submitted to committee in July 2015 and a number of options were put forward, with the recommended option of replacing boilers on a like-for-like basis being approved.

However, due to the listed status of Crescent House and Cullum Welch House, and the complexities around planning/legislative requirements around fluing it soon became apparent that we couldn't proceed on a like-for-like basis for

Crescent House and Cullum Welch House and that this was holding up the works across the wider estate.
Consequently an issues report was submitted and approved at committee in 2016, allowing us to separate these two blocks from the original heating replacement programme whilst we investigated alternative solutions.

We initially engaged with a consultant to explore the viability of renewable technologies such as ground source or air source heat pumps. We considered the practicalities around both systems and it quickly became apparent that while we may be able to overcome planning and legislative requirements around the fluing issue, these systems would not be practical for a number of wider reasons.

Firstly, the air source heat pump option would require fitting the heat pump units to the rooftops of the buildings and it was considered that this would not meet planning approval. Secondly, the ground source heat pumps would require drilling bore holes and the only suitable site was the Tennis Courts at the Fusion leuisure centre, situated within Golden Lane Estate. Due to the disruptive nature of these works and the uncertainty as to whether it was viable, a decision was taken not to explore these options any further.

We then engaged with a ventilation consultant to explore options around communal fluing. However, it became apparent that this would not be a viable option either, as it would involve situating chimney stacks in the communal areas (such as the light wells in Crescent House). It was considered that this would not be an option that would meet planning requirements and would in fact be detrimental to the appearance and character of the building and local surrounds.

Having discounted these options we engaged with Phoenix Compliancy Management (PCM) to provide an updated feasibility report. PCM were instructed to focus solely on Crescent House and Cullum Welch House and to make recommendations on replacement or upgrading of the existing equipment and services.

The premise was to consider capital costs, maintenance and running costs of a considered life cycle for each option, so short term capital costs are considered along with long term running costs and maintenance costs. Furthermore, consideration around carbon emissions and sutainability was to be included.

Overview of Options:

The options are considered from a technical nature in terms of feasibility, practicality, functionality and end users.

In terms of regulatory considerations the options account for the requirement that the heat source cannot be served from a worse fuel source than is already installed without written consent (i.e. where systems are installed that use electrical as the primary heat source they can be upgraded to a gas or communal based system, whereas a system which uses gas as the primary heat source generally cannot be changed to electricity as the primary fuel but can be replaced to be served by a communal system).

Bearing in mind that some options had already been considered and discounted, there were a limited number of options left to present. Whilst PCM did include sub options around renewable technologies, such as ground source and air source heat pumps, we will not be presenting these as options as these weren't considered feasible during earlier considerations.

Option 1 – Individual Systems (not recommended)

The information detailed within this option allows for the Building Regulations Part L1B requirements regarding switching fuels, ensuring carbon emissions are improved and the listed building requirements to remove boiler flues from the external façade of the building.

In principle it is not allowable to switch from a gas fired system to an electric on-peak/off-peak system. However, where existing gas boilers are to be removed due to the flue not being allowed the regulations does allow for the use of an Electric Flow boiler.

The majority of the existing properties within both Crescent House and Cullum Welch House are provided with either gas fired or electric type heating. This option would involve replacing like-for-like and, where the location of the flat is such that a gas boiler cannot be used, and the existing system is a water based system the use of an Electric Flow boiler could be considered. This would enable similar operation of the system as already experienced, the heating system within the flat would also be replaced/updated in line with Building Regulation requirements.

Whilst the provision of combination boilers may be the obvious choice it should be noted that to install combination type boilers would possibly mean the upgrade of the gas mains network to meet the required boiler operating pressure and peak demand.

The installation of individual systems within the properties as outlined will not cause much of a change from the current levels of CO2 emissions. Due to the increased efficiency of modern plant and building regulation requirements less fuel would be consumed. This is likely to be a reduction in order of 5 to 10%.

Option 2 – Communal Heating (recommended)

Although communal heating was considered in the original Gateway 3/4 report in 2015 and discounted on the basis of cost, we consider that this option is now a much more viable solution, both from a cost perspective and the fact that we can potentially connect to Citigen at a later date once the connections are in place to the COLPAI and Denizen (formerly known as Bernard Morgan) sites.

The major benefits of this is that all associated carbon emissions can be reduced to one source only and that once the infrastructure is in place to connect to a Heat Network connection (such as Citigen) we can lower overall consumption costs whilst higher system efficiencies can be achieved.

Furthermore, the connection to a Communal System does not reduce the level of control individual property owners/occupiers would have as the intention is to install individual heat metering to each property. Heat metering, whilst not a new technology has recently become a popular method to meet changes in legislation associated with providing building occupants the means to measure heat usage and thus encourage energy savings.

The intented approach will be to install a shielded “hard wired” system as this does not suffer from connectivity problems sometimes associated with systems that utilise telephone networks where signal strength in certain blocks may be weak. A hard wired system is therefore more suited this type of building. Heat metering equipment installed in the heating flow and return branches to each flat can be wired back to a central monitoring station, which can be monitored either physically or remotely by land telephone line.

The hard wired method is the preferred means of reading the meter at a central point. However the final metering strategy will be part of the specialist meter reading organisations brief. We are currently consulting with Switch2 who are the managing agents appointed to manage a similar system based at the 12 Acres development to assess which metering system would be best utilised.

New boiler plant could be located within the old empty oil storage area within the lower ground area of Great Arthur House (adjacent to existing Great Arthur House Boiler Room). Alternatively, it could be situated in the existing plantroom as there is adequate space (equipment will need to be separated from the existing plant for Fusion).

The plant would consist of high efficiency gas fired boilers, interconnecting pipework, heating system pressurisation plant, buffer vessel and pumps. From the plant room distribution pipework would extend through communal areas connecting to each dwelling. At each dwelling an interface between the internal dwelling system and the main distribution network would be installed. The interface between the two would act as a hydraulic break and as a means to control the amount of heat supplied through a heat meter.

Within each dwelling the system would operate and be controlled in the same way as an individual system with programmers, room thermostat and/or thermostatic radiator valves. The interface unit would also contain any heat metering equipment to enable individual billing of each dwelling, and all systems and pipework would be installed in accordance with any listed building consent and building regulation requirements.

Estimating any Carbon Emission savings from a communal system is always difficult at feasibility stage given the fact that the heat generation mix has not been selected and other factors not currently considered may have significant bearing. However what can be indicated is that the larger the system the greater the carbon reduction estimate will be, which is due to the level of diversity that can be applied to a communal system when selecting the capacity of the heat generating plant.

It can be shown that providing a boiler to an individual gas fired system which has a cylinder, the capacity of that boiler would be around 11kW (heating load around 8kW Hot water load 3kW as an example). If you are looking at a gas fired system using a combination boiler the boiler output would be around 24kW to achieve a satisfactory hot water supply, whereas when considering the same property connected to a Communal System of around 218 properties the diversity factor is 0.1 i.e. 90% reduction.

Proposed way forward

Option 2 is recommended.

The estimated values shown in Appendix 2 show that the initial cost of an individual system installation is the least cost, however when factoring in running and replacement costs over a 35yr period it becomes more expensive than the communal system. Option 1 is also the least secure when considering fuel security and cost.

Whilst the communal system it is not initially the least cost, this is the least expensive choice over the 35 year life cycle cost evaluation, as shown in Appendix 2.

It should also be noted that the installation of the communal plant will facilitate connection of the remaining blocks across the estate should this become a requirement in future. Furthermore, once the infrastructure is in place we may have the option to connect to Citigen and by doing so it is anticipated that we can further reduce overall running costs and carbon emissions, as well as providing the benefits of lower running costs to our residents.

We will be allowing Leaseholders at Crescent House and Cullum Welch House the option to “buy in” to the communal system and if we connect other blocks at a future date this will be extended to Leaseholders in those blocks. We have undertaken an initial consultation with residents and whilst turnout was relatively low, the feedback was very positive and early indications from the Leaseholders present would suggest that some would want to buy in.

Procurement approach

Tailored procurement process, in conjunction with City Procurement, to ensure value can be achieved from specialist suppliers.

Table with Financial Implications

Estimated Works Cost	Consultancy Fees & Staff Costs 12.5%	Total (inc. expenditure to date)	Estimated Service Charge Contribution*	Estimated HRA Contribution
£ 2,780,546	£ 347,568	£ 3,146,321	£ Nil	£ 3,146,321

** Leaseholders will be given the opportunity to buy in but there is no obligation. Any that do buy in would pay a contribution to future maintenance going forward.*

Options Appraisal Matrix

See attached.

Appendices

Appendix 1	PT 4 Procurement Form
Appendix 2	Whole life costing
Appendix 3	Costed Risk
Appendix 4	Cover Sheet

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Options Appraisal Matrix

	Option 1 - Individual Systems	*Option 2 – Communal System*
1. Brief description	Replacement system using individual heating systems.	Replacement system using gas powered communal heating system.
2. Scope and exclusions	Scope: All residents (tenants) at Crescent House & Cullum Welch House Exclusions: Leaseholders	Scope: All residents (tenants) at Crescent House & Cullum Welch House. Leaseholders will be given the option to "buy in". Exclusions: Wider Estate (although infrastructure will be in place to allow other blocks to connect in future)
Project Planning		
3. Programme and key dates	• Gateway 3/4 approvals – Jan 2019 • Appoint Consultant to do the employers requirements – Jan/Feb 2019 • Invitation to Tender (works) – Mar 2019 • Tenders received and analysed – Mar/Apr 2019 • Gateway 5 – May 2019 • Start on Site – Jun 2019	
4. Risk implications	Access to individual properties being hard to arrange could delay the project.	Access to individual properties being hard to arrange could delay the project. However this is mitigated by the fact that most of the infrastructure can still be installed up to the point of access to the property.

	Option 1 - Individual Systems	*Option 2 – Communal System*
	An approach cannot be agreed with Planning regarding some boiler flues and outlet pipes meaning that this option cannot be fully implemented. Potential additional cost for cold water booster pumps which may be required to these blocks as modern 'combination' boilers draw immediately from the water supply rather than the tanks. The electrical risers may also need to be upgraded to accommodate the usage of modern boilers. Objections from residents who may be forced to convert to Electric Boilers as a result of Planning / legal requirements.	Objections from residents not being able to choose their own suppliers / tariffs. However this can be offset through the potential savings negotiated by CoL with utility providers on a corporate contract. An approach cannot be agreed with Planning re the communal pipework/infrastructure. However, options to utilise exiting conduits have been considered as a viable option and detailed involvement with Planning will be undertaken.
5. Benefits and disbenefits	Benefits: • Where gas boilers are acceptable, they are replaced, meaning the majority of residents keep the same service. • Where gas boilers are unacceptable, a viable alternative is provided, such as electric boilers. • Improved energy efficiency can be achieved by installing modern individual gas boilers (however not nearly as much as through a communbal system). • The majority, if not all, are individual systems which allow residents to remain independent	Benefits: • A new communal system would offer a solution to the planning concern regarding individual flues and outlet pipework. • This will have a positive impact on the future windows replacement programme. • The environmental impact (carbon emissions) is much lower through a communal system. • Potential for lower operating costs and fuel consumption for residents. • Positive effect in reducing fuel poverty through lower consumption and fuel costs.

	Option 1 - Individual Systems	***Option 2 – Communal System***
	• Replacing traditional system boilers with 'combi' boilers will enable the removal of hot water storage tanks which releases space for resident storage. Disbenefits: • Electric boilers have lower levels of energy efficiency and they are more expensive for residents to run. The installation of electrical boilers will be kept to a minimum. • Where residents refuse electric boilers we may have to take enforcement action or seal openable windows if they do not meet the distance requirements from the flues. • The current configarations mean that some venting is through the glazed window panes and this will have a direct impact on the future windows replacments. • The electrical mains within the building may need to be upgraded to accommodate the additional demand. • Over the 35 year lifecycle, we may need to replace individual boilers at least 2 times. Accounting for the energy consumption this works out approximately £24,000 more expensive per property.	• Individual billing can still be achieved through use of heat metering. • Across the 35 year lifecycle (accounting for costs of energy consumption), when compared to costs of (2x) installations of new individual boilers during the same period the communal system works out approximately £24,000 cheaper per property. Disbenefits: • Whilst there are challenges in installing a distribution network owing to the decay of previous routes we anticipate that much of the pipework can be accommodated within existing conduits. • Planning – gaining Listed Building Consent would be challenging for major changes to the appearance of the building in both internal and external areas of the blocks. However the use of existing conduits will mitigate this and keep visual changes minimised. • Tenants may also object to the change of service. However this equally applies to option 1 where some residents may be forced to convert to Electric boilers.

	Option 1 - Individual Systems	*Option 2 – Communal System*
6. Stakeholders and consultees	Members, Ward Members, Residents. Departments of Town Clerk's, City Surveyor's and Chamberlain's including CLPS. The Planning team within the Department of the Built Environment will be a key consultee; they may in turn consult with English Heritage and other organisations as required.Residents of the affected blocks will be advised about potential works.	
Resource Implications		
7. Total Estimated cost	£2,045,939. (inc consultancy fees & staff costs) For ease of comparison, this is based on full replacement of all boilers in both blocks.	£3,146,321 (inc consultancy fees & staff costs) For ease of comparison, this is based on communal heating based on full take up.
8. Funding strategy	HRA - The works solely apply to tenants homes, therefore there is no financial recovery from leaseholders. However, should leaseholders elect to opt-in to a communal system, they would be charged for connection, and would have an obligation to contribute towards future maintenance costs. The anticipated unit price is £14,000.	
9. Estimated capital value/return	N/A	
10. Ongoing revenue implications	As per existing equipment – circa £120 per gas boiler for the annual CP12 safety checks. Where Electric Systems are the only option there may still be an obligation to undertake the safety checks if tenants have a gas cooker.	The rate at which heating and hot water provision is made to the Golden Lane Estate would be variable dependent upon the contract with the supplier of the communal system. The operating costs for the system would be funded by the City of London Corporation, however if leasholders

	Option 1 - Individual Systems	***Option 2 – Communal System***
	Operating costs are the sole responsibility of the resident.	opt in they will have an obligation to contribute to future maintenance. Level of contributions would be purely dependant upon the number that decid to “opt-in”. Appendix 2 has whole life cost estimates & a comparison of costs for both systems. Residents would be billed individually for their energy usage through the implementation of individual heat metering. Whilst the billing administration is not currently a City of London liability we are engaging with Housing Management to establish if a Management Company might be appointed under a service contract, or whether an existing contract such as the one at Twelve Acres (Switch2) can be amended to accommocate the two blocks at golden Lane. N.B. residents would no longer have the option of switching utility suppliers for gas to achieve a better deal. However contract negotiations with suppliers enable bulk buying of energy and the potential of achieving lower unit costs.
11. Investment appraisal	The works are a necessary replacement of existing facilities. Mixed approach of Gas & Electric Boilers and approximately hald of the properties in Crescent House would be forced to revert to Electric boilers.	The works are a necessary replacement of existing facilities. Uniform approach across both blocks. All tenanted properties served from one source and Leaseholders will be encouraged to buy in.

	Option 1 - Individual Systems	*Option 2 – Communal System*
	Costs can be stated with a good level of certainty owing to the fact works of this type are frequently carried out both as planned projects and reactive repairs. Service Life: A gas boiler has a service life of 15-20 years, so a similar project will be required in 2030-2035	There is a likelihood of variation in the cost estimates, as these have been based upon visual appraisal and desktop feasibility assessment rather than detailed structural survey and analysis. Service Life: The length of contract for district heating supply will be negotiated. Pipework has a service life of 40 years and Heat Interface Units (HIUs) – where the communal system is connected to the property and metered – have a service life of 15 years.
12. Affordability	Individual gas boilers offer the least expensive installation option and the least expensive running costs of the individual systems. Installing electric boilers is a low costs option, however, they have higher operating costs. Therefore, careful consideration around fuel poverty should be given to the installation of electric boilers. Initial outlay cost is lower but when compared to the 35 year life expectancy of a communal system, the whole life cost is more expensive.	Installing a communal heating system has a greater cost uncertainty. Although the communal system has a higher initial cost outlay, over the 35 year life expectancy this is the more cost effective option. When compared against individual installations the costs difference is in the region of £5 million. Contract negotiations with utilities providers can provide greater economies of scale which can benefit residents and assis in alleiviating fuel poverty.
13. Legal implications	There are currently inter-related legal implications of breaches of safety and breaches to planning consent regarding the existing gas-fired boilers in Crescent House and Cullum Welch House.	Contracts would need to be agreed with suppliers of district heating and hot water and/or suppliers of utilities to power a communal system. This project will resolve the issues around the siting of flues and secure a solution for future installations.

	Option 1 - Individual Systems	*Option 2 – Communal System*
14. Corporate property implications	It is important that the City's assets remain in good, safe and statutory compliant condition. Therefore all necessary action should be taken to ensure that assets are kept as such throughout the assets' lifetime.	
15. Traffic implications	Any necessary traffic arrangements for contractor's vehicles will be made locally on site.	
16. Sustainability and energy implications	Due to the increased efficiency of modern plant and building regulation requirements less fuel would be consumed. This is likely to be a reduction in order of 5 to 10%.	Connection of 218 properties to a Communal System would be expected to achieve a 90% reduction.
17. IS implications	N/A	The communal system will be monitored using Building Management IS systems.
18. Equality Impact Assessment	The City of London Corporation has a duty of care towards residents, particularly those who are vulnerable such as the elderly and those with children. This project will assist in combating fuel poverty by providing modern, more efficient equipment to enable them to keep their homes warm.	
19. Recommendation	Not recommended	Recommended
20. Next Gateway	Gateway 5 - Authority to Start Work	Gateway 5 - Authority to Start Work

	Option 1 - Individual Systems	*Option 2 – Communal System*
21. Resource requirements to reach next Gateway		

Item	**Reason**	**Cost (£)**
Staff Time	Managing the design, procurement and contract-letting process.	£20,000
Architect	Listed Building Certificate Application	£10,000
Design Consultant	Help develop Employees Requirements and system design.	£85,000
Principle Designer	Satisfy the legal requirements of the CDM Regulations 2015	£10,000
Pre-planning Fees	City of London building regulations application	£7,000
	TOTAL	**£132,000**
Funding Source	HRA (including proportional recovery from long leaseholders)	