Committees: Corporate Projects Board - for decision OPPSC - for decision	**Dates:** 09 March 2022 30 May 2022
Subject: ***BEMS Upgrade Programme – Phase 2*** **Unique Project Identifier:** PV ID 12331	**Gateway 2:** **Project Proposal** Regular
Report of: City Surveyor **Report Author:** Brendan Crowley	**For Decision**
PUBLIC	

Recommendations

1. Next steps and requested decisions	**Project Description:** The City Surveyor's Corporate Energy Team has oversight of the Building Energy Management System (BEMS) which monitors and controls the building plant (& other engineering systems) across the CPG estate. This is the second phase of a larger estate-wide upgrade of the corporate BEMS. This involves the replacement of critical end-of-life components for core services – heating cooling and ventilation and life-safety systems. The BEMS upgrades of these sites support the Climate Action Strategy (CAS) by providing the backbone for a Smart Buildings network and will be an essential tool to control and monitor the City's buildings into the future – allowing us to quantify the effects of the many carbon reduction projects planned as part of the CAS. This is also business resilience project not a direct energy efficiency project (this is reflected in the modest direct energy savings shown the table below) however, the new BEMS system will prevent significant energy waste resulting from the legacy BEMS failure. A failure will also prevent visibility of plant, increasing the risk of energy waste and increased carbon emissions. The new BEMS will be providing vastly improved energy management capabilities & ability to integrate with other building systems including IoT devices and sensors. Energy and maintenance savings resulting from the project are estimated to be in the region of £12,000/ann. Below is a breakdown the total project cost for *BEMS Upgrade Project-CPG Estate – Phase2:*

Site	Est. Savings kWh/ann.	Est. Savings £/ann.	Est. Carbon Savings TCo2e/yr.	Est. Reactive Maintenance Savings £/ann.	Total Est. savings, £/ann.	Estimated Project Cost (excl. Risk)	Total project est. Cost (incl. Risk)
Heathrow Animal Reception Centre	76,230	£3,855	15	3,422	7,277	106,860	113,382
The Warren	22,045	£915	4	2,069	4,078	33,951	40,473
The View	12,112	£509	2			26,391	32,913
Harrow Rd Pavilion	5,632	£384	1			25,159	31,681
The Temple	4,730	£202	1			25,029	31,551
Total	**120,749**	**5,865**	**24**	**5,491**	**11,355**	**217,391**	**250,000**
City Cash Total	-	-	-	-	-	-	*£150,000*
City Fund Total	-	-	-	-	-	-	*£100,000*

Table 1. Sites involved in Phase 2

See Appendix 3 for additional details.

Funding Source:

Central funding – Agreed in principle via capital bid. Drawdown of funds via RASC

Next Gateway: Gateway 3/4 - Options Appraisal (Regular)

Next Steps:

Engage Consultants/Building Controls Contractors to develop outline design and provide technical detail (RIBA stage 3) to progress to Gateway 3/4. This will include more accurate project cost estimates.

Engage IT networking contractors to assess network capacity in the three buildings to support the new BEMS hardware architecture.

Conduct asbestos surveys where deemed necessary.

Requested Decisions:

1.1 Subject to agreement from RAsC, that a budget of **£35,000** is approved to be taken from the allocated capital funding to reach the next Gateway.

1.2 Subject to agreement from RAsC, that a Costed Risk Provision of £**5,000** is approved (to be drawn down via delegation to Chief Officer in consultation with Chamberlains) to reach the next Gateway.

1.3 Note the total estimated cost of the project is (excluding risk); **£217,391**

1.4 Note the total estimated cost of the project is (including risk); **£249,891** (which is £217,391 + costed risk of £32,500)

1.5 Note the total project funding agreed at project brief stage is £250,000

2. Resource requirements to reach next Gateway

Item	Reason	Funds/ Source of Funding	Cost (£)
Consultant BEMS Engineers	To review the current GHC GYE BEMS DesOps, control software to deliver a Functional Description for the new system & provide detailed projects costs. The output will be a RIBA design stage 3 IGP proposal, including options appraisal on technical aspects of the project.	See below	£28,500
Asbestos Survey	Quantify asbestos risk and mitigation cost	See below	£4,000
IT Network Survey	Determine capacity for increasing IP devices on IT network, and compliance with IT security	See below	£2,500
Staff Costs	Staff costs are to be covered from existing resource		n/a
Total	**From City Fund Reserves** **From City Cash Reserves**	**£21,000** **£14,000**	**35,000**

Item costs are split between City Fund and City Cash in accordance with the works for each sub-project and which funding source there are allocated to.
At this stage, staff costs are to be covered from existing resource. From GW 3/4 funding shall be requested for the recruitment of a fixed term client-side Project Manager.

Costed Risk Provision requested for this Gateway: £5,000

This is to cover the risk of the additional consultancy & IT services.

3. Governance arrangements

3.1 Corporate Asset Sub-Committee

3.2 SRO: Graeme Low, Head of Energy & Sustainability.

3.3 It is proposed a dedicated client Project Manager is recruited who will update the Project Board. The board may include Graeme, Pete Collinson, Jonathon Cooper, Open Spaces and HARC Management representative.

Project Summary

4. Context	The Current BEMS platform is obsolete, end-of-life & increasingly unreliable. Why change is necessary: 4.1 To mitigate the Life Safety Risk posed by the failure of the obsolete system which monitors &, in some cases, controls the fire & smoke emergency plant with the installation a new, fit-for-purpose BEMS. 4.2 To mitigate this significant business risk to the City with the upgrade of the system to the latest BEMS platform, Schnieder EcoStruxure. 4.3 Essential investment in innovation to supporting the City's Carbon Action Strategy which is a commitment to reaching net zero carbon by 2027. Having a modern BEMS platform is a key enabling technology for other building energy efficiency measures. The Energy and Sustainability Team are currently working to implement a pipeline of projects & measures in advance of the 2027 target. 4.4 To use the new BEMS as a platform to implement further innovative smart building technologies and to allow for integration with other systems e.g. CAFM software, energy management software, lighting controls, IoT sensors etc. To invest in a modern, flexible & easily optimised control system for the CPG estate building assets.
5. Brief description of	5.1 The legacy BEMS hardware and software at these sites is now obsolete and unsupported by the provider. To invest in a modern, flexible & easily optimsed control system for Corporate estate buildings and which removes the risk of failure of business-critical assets. Bringing with it increased occupant comfort and productivity and improved building energy preformance and, in doing so, supporting the Carbon Action Strategy which is a commitment to reaching net zero carbon by 2027. 5.2 To use the new BEMS as a platform to implement further innovative smart building technologies and to allow for integration with other systems e.g. CAFM software, energy management software and lighting controls.
6. Consequences if project not approved	6.1 Obsolete, ageing & unsupported BEMS hardware has high risk of failure. 6.2 The selected sites are particularly vulnerable to BEMS control system failure, putting essential services such as those at Heathrow Animal reception Centre at risk. 6.3 Replacement parts are not available due to obsolescence. 6.4 Significant increase in energy consumption and carbon emissions at these sites if the now-obsolete BEMS equipment fails, main plant will run out of control.
7. SMART project objectives	7.1 To install a secure, resilient BEMS which meets customer needs and improves occupant comfort for the 3 sites selected in phase 1 7.2 To optimise the operation of building assets via a new BEMS platform and via integration with energy management software, resulting in energy consumption savings of circa £6,000 in year 1. 7.3 To increase the life cycle of building assets through better control resulting and reduce the BEMS reactive cost by circa £5,500 in year 1. *7.4* First step towards a centralised BEMS command centre, where assets on all CPG sites are monitored and optimised centrally by a dedicated BEMS team based at Guildhall.
8. Key benefits	8.1 Fully supported modern BEMS system, with webrowser access for all users offering enhanced graphics, alarms handling and plant schedules interfaces. User access possible from tablet or smart phone devices. 8.2 Reduced maintenance costs (circa £5,500 in year 1) and increased asset life cycles.

	8.3 Reduced building energy consumption, costs (savings of circa £6,000 year 1) and 24 tC02e reduction in emissions, with optimised asset operation 8.4 Key supporting technology for the essential building energy efficency projects needed reach net zero carbon by 2027, which is set out in the City's Carbon Action Strategy. 8.5 Significantly improved environment control within critical environment at HARC. 8.6 Enhanced building occupant well-being, with improved environment control and air quality monitoring 8.7 The system will form the bases for a smart building strategy to help the City's various building data be converged together on to one platform for significantly improved building operation and energy performance analysis and improvement.
9. Project category	7a. Asset enhancement/improvement (capital)
10. Project priority	A. Essential
11. Notable exclusions	N/A

Options Appraisal

12. Overview of options	*List the options that will be explored* 12.1 A specific options appraisal will be carried out for each of the 5 sites mainly focused on the scope of the installation and its impact on the return on investment (capital costs and simple payback). Including installation new Cat 6 communication network. This will be delivered in one Gateway report.

Project Planning

13. Delivery period and key dates	**Overall project:** GW3/4 approval Oct-22, subsequent months for design and procurement, and GW5 approval Mar-23. Delivery scheduled over the next 7 months for expected delivery - Oct 2023 **Key dates:** See Appendix 3 for additional details. **Other works dates to coordinate:** TBC
14. Risk implications	**Overall project risk:** Medium 14.1 The costed risk post-mitigation is estimated at **£12,030** 14.2 CRP for GW2 is **£5,000** 14.3 Gateway 2 Risks: • Addition IT surveys required

	- £1,000 • Consultant Engineers Fee Quote higher than expected - £4,000 Other risks: • Extra IT network infrastructure required CoL IT to meet security policy • Other risks include: • Global supply crisis causes delay to BMS IT networking parts delivery and the potential for requirement for removal of asbestos • Principal Contractor Work Quote higher than expected • Site changes result in early redundancy of installed assets
15. Stakeholders and consultees	

1. Corporate Property	Pete Collinson, Alison Bunn, Jonathan Cooper, Paul Friend, Mark Lowman
2. IT	Matt Gosden
	Dawn Polain
	David Clelland
3. Chamberlains	John James Hazel Lerigo Simon Owen
4. Procurement	Kayleigh Rippe Mike Harrington James Carter
5. Communications	TBC
6. Property specific stakeholders	See Appendix 3.

Resource Implications

16. Total estimated cost	**Likely cost range (excluding risk):** *£180,000-220,000* **Likely cost range (including risk): £210,000 – 250,000**	
17. Funding strategy	Choose 1: All funding fully guaranteed	Choose 1: Internal - Funded wholly by City's own resource

	<table><tr><th>Funds/Sources of Funding</th><th>Cost (£)</th></tr><tr><td>City Cash Reserve incl. Risk</td><td>100,000</td></tr><tr><td>City Fund Reserve incl. Risk</td><td>150,000</td></tr><tr><td>BHE</td><td>-</td></tr><tr><td>Total incl. Risk</td><td>250,000</td></tr></table> This project received in principle funding from Resource Allocation Sub Committee meeting in December 2021.
18. Investment appraisal	Whole-life-cost assessment will be undertaken. This will compare the energy and maintenance cost savings and other relevant revenue implications over the anticipated life of the replaced asset. The business case will be verified through post-installation monitoring of actual energy consumption and the results reported at Gateway 5. Note: This project isn't an energy efficiency (spend to save),project, but it will provide energy and maintenance savings as a by-product and is an enabling project for future energy efficiency projects. It is an essential project to ensure continuity of business operations for these Corporate operational buildings. If the current obsolete BEMS fails, the buildings can't be heated/cooled properly, life safety systems could be prevented from working correctly etc.
19. Procurement strategy/route to market	The Consultant BEMS Engineer can be procured via the Procurement Authorisation Report. Both the Asbestos Survey and IT Network Survey can be procured at the Officer's discretion as they are both below the £10K threshold.
20. Legal implications	*21.1 None*
21. Corporate property implications	22.1 Heat Decarbonisation plans will be drawn up for each of these sites as part of the Climate Action Strategy. This may impact how the BESM at these site sis design and will need to be taken into account at design stage. 22.2 BEMS upgrade works at these sites may align with other potential M&E projects at these sites. These will be identified through good stakeholder engagement (especially FM) working towards the next gateway.
22. Traffic implications	*None*
23. Sustainability and energy implications	The project will achieve best practice/ industry leading standards through procurement of energy efficiency technology, Schneider Electric BEMS system is an industry leader for energy savings, as demonstrated in the EU standard EN 1523255. Schneider also have

	a Green Premium ability to measure Embodied Carbon – you can search products here (https://www.reach.schneider-electric.com/CheckProduct.aspx?cskey=l9oe8efz5u8ueikrl14r). For example if you search for our automation server(Part no. : SXWASPXXX10001) It should bring up all of the relevant sustainability materials and compliance documentation. This project provides enabling works for upcoming energy projects – colleagues in the Energy Team have inputted into this project to ensure it aligns with other measures. These including PSDS phase 4 and Climate Action Strategy surveys and measures.
24. IS implications	24.1 IS network will need to be extended to support new BEMS controllers, this may include new/extra managed switches, structure cabling and MCC data points. Will conduct IT surveys to quantify requirements before GW34. We work closely with CoL IT PMO and ROC technologies.
25. Equality Impact Assessment	*Select one of the following options:* • *An equality impact assessment will not be undertaken*
26. Data Protection Impact Assessment	• *The risk to personal data is less than high or non-applicable and a data protection impact assessment will not be undertaken*

Appendices

Appendix 1	BEMS Upgrade Phase 2 Project Briefing V1.4
Appendix 2	Risk Register
Appendix 3	Additional Project information

Contact

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