

Zero Emission Pumping Appliance Project - Requesting Approval to Spend

Report to

Date

Deputy Mayor's Fire Resilience Board
London Fire Commissioner

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Report by

Report number

Assistant Director, Technical and Commercial

LFC-0440

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Executive Summary

The Zero Emission Pumping Appliance Project (ZEPA1) objective is to deliver the UK's first Zero Emission (no tailpipe emissions) or Zero Emission Capable (hybrid, capable of performing part of its operation in zero emission mode) appliance, supported by dedicated heavy vehicle charging at the trial station. The ZEPA1 Project, and associated project budget of [REDACTED], was approved as part of the broader Ultra Low Emission Fleet (ULEF) Programme (LFC-0034-D) - established to meet the Mayor of London's emission reduction targets for London Fire Brigade. This report outlines the progress of the work so far and requests approval to [REDACTED] of the allocated budget for the appliance ([REDACTED]) and associated recharging infrastructure ([REDACTED]) necessary to deliver the project.

Recommended decisions

For the London Fire Commissioner:

The London Fire Commissioner in turn delegates authority to the Assistant Director, Technical and Commercial in consultation with the Director of Corporate Services to sign all relevant agreements and incur expenditure for the following items:

- a) [REDACTED] to be spent on the Zero Emission Pumping Appliance during 2021/22 based upon the recommended solution resulting from the formal procurement process.

This includes [REDACTED] (FLEET's standard recommended figure) to cover any uplifts or alterations during project delivery.

- b) Up to £[REDACTED] for the installation of dedicated heavy charging infrastructure at Hammersmith Fire Station during 2020/21-2021/22.

Introduction and Background

Ultra-Low Emission Fleet Programme

1. The Mayor of London has outlined in the London Environment Strategy (LES) the approach to tackling London's air quality problem and making London a Zero Carbon City by 2050. As part of this, the Mayor has set emission reduction targets for the London Fire Brigade and London's other emergency services.
2. The emissions reduction targets are as follows:
 - all cars in support fleets to be zero emission capable by 2025;
 - all new cars and vans (less than 3.5 tonnes), including response vehicles, being zero emission capable from 2025;
 - all heavy vehicles (greater than 3.5 tonnes) to be zero emission capable or fossil fuel-free from 2030;
 - zero emission fleet by 2050.
3. In order to plan and deliver these Mayoral targets, the Ultra Low Emission Fleet (ULEF) Programme was established (LFC-0034-D) to ensure the rollout of zero emission vehicles in the fleet will be as efficient and effective as possible.
4. Full details of the ULEF Programme and LFC Decision are featured in *Appendix 2 and Appendix 3*.

Zero Emission Pumping Appliance Project

5. The Zero Emission Pumping Appliance (ZEPA1) Project was approved as part of the broader ULEF Programme - established to meet the Mayor of London's emission reduction targets for London Fire Brigade. The London Fire Commissioner approved the full budget requirement () set out in the () for ZEPA1 ().
6. The ZEPA1 Project will develop a Zero Emission (ZE) or Zero Emission Capable (ZEC) frontline pumping appliance, supported by dedicated heavy vehicle charging at the trial station.
7. The ZEPA1 Project is the first of three projects, focussed on delivering ZE/ZEC solutions for LFB's pumping appliances:
 - ZEPA1:** Design and build of prototype pumping appliance (4-5 years)
 - ZEPA2:** Procure, select, build & test up to 10 appliances (1-2 years)
 - ZEPA3:** Full Fleet Rollout in line with Mayoral targets (4-5 years)
8. The ZEPA appliance will be trialled at Hammersmith Fire Station (approved by ULEF Programme Board on 15 May 2020) as a frontline pumping appliance – shadowed by a standard diesel Series 3 pumping appliance for backup. The purpose of the trial is to test this new technology under real life, challenging operations and assess how it meets LFB's key requirements for a pumping appliance – notably a range of 280 miles and the requirement to pump continuously for 4 hours.
9. The ZEPA1 project board requested the Strategy and Risk Department to provide a list of potential two pump stations suitable for deployment of the trial pumping appliance. The 10

stations across the estate that have the least impact on response across London were identified. Hammersmith was the preferred station chosen by the project board as its central location meant that the operational performance of ZEPA1 would be fully tested in a busier location.

10. The ZEPA1 Project is at a pivotal stage in its development– after investing time and resources engaging with technology suppliers (for the appliance and recharging solutions), industry representative organisations and Government (including Innovate UK, Office for Low Emission Vehicles, Defence Science and Technology Laboratory and the Home Office) , the project has succeeded in receiving proposals that meet the technical and commercial requirements of the project. LFB has benefitted significantly from being a global leader in this field – and this is best demonstrated by receiving competitive proposals lower than originally indicated by leading suppliers.

UK Context

11. The transition to zero emission vehicles is also reflected in UK policy in order to address the air quality challenges across towns and cities, and to meet carbon reduction targets – including the target of “net-zero” emissions by 2050.
12. As part of the “10-point plan” for achieving net-zero, the Government announced on 18 November 2020 the end of the sale of new petrol and diesel cars in the UK by 2030. This includes the following steps:
 - Step 1: phase-out date for sale of new petrol and diesel cars and vans brought forward to 2030.
 - Step 2: all new cars and vans to be fully zero emission at the tailpipe from 2035.
13. This announcement builds upon *The Road to Zero Strategy (UK Government, July 2018)*, which outlined how the government will support the transition to zero emission road transport and reduce emissions. This strategy addresses all road vehicles including vans and trucks, and includes a commitment to reducing emissions from heavy goods vehicles (HGVs).
14. This UK context highlights the broader transition to zero emission technologies and more specific policies to build on initial commitments. This transition also offers the opportunities for LFB as a leader in this sector to benefit from early funding initiatives and market developments, as well as being a key stakeholder to ensure developing technologies and regulations meet the needs of the brigade.

Alternative Options Considered and Consultation

15. Alternatives for the ZEPA appliance were considered during the formal procurement process, outlined below and in [REDACTED]
16. Alternative technological approaches for the recharging infrastructure were also considered and laid out in more detail in the sections below.

[REDACTED] The LFC has proposed a balanced budget submission for 2021/22 which will be presented to the Mayor. This position has been achieved through [REDACTED] of saving proposals, use of reserve and recruitment freeze. Looking ahead to 2022/23 the LFC is currently forecasting an [REDACTED] revenue

budget deficit. The proposed 2021/22 capital programme will be funded by [REDACTED] capital receipts and [REDACTED] external borrowing, in 2022/23 a further [REDACTED] of external borrowing is required to deliver the capital programme. Options to achieve a sustainable budget position will be reviewed as part of the next Integrated Risk Management Plan and as part of future budget setting processes.

18. In light of these budgetary challenges facing LFC and expectations to achieve significant savings in these challenging times, an alternative option is to either cancel the ZEPA project in its entirety or the specified rapid charging at the trial station.
19. By cancelling or adjusting the scope of the project at this stage, LFC will be able to achieve savings up to [REDACTED] from the original ZEPA1 Project budget of [REDACTED].
20. By cancelling or adjusting the scope of the project, all teams contributing to the ZEPA Project could apply resources to alternative projects or workstreams that may be deemed a priority.
21. However, if the ZEPA1 Project does not proceed at this stage, this will impact on LFB's ability to prepare, deliver and operate a ZE/ZEC fleet effectively, efficiently and on time for the Mayor's targets. This in turn has associated financial costs (to recover learning and employ more resources to deliver work in a shorter time period) and political costs:
 - i. It will not be possible to test whether a ZE/ZEC pumping appliance is capable of meeting LFB's demanding real world challenges.
 - ii. The absence of first hand, real world data and learning from ZEPA1 will impact on teams from across the LFB to understand and prepare for a ZE/ZEC fleet. This includes the ability to plan and deliver vehicles and recharging infrastructure across the organisation; training packages for the entire operational workforce; and risk modelling and strategic planning.
 - iii. Delivering the ULEF Programme requires long term planning and resourcing in order to achieve this transformation across LFB. The cancellation or postponement of all or some parts of the ZEPA1 Project will send the message to LFB teams this work is currently not required.
 - iv. There is a risk that some, or all, of the corporate knowledge developed through the ZEPA1 Project will be lost or side-tracked. This will take time and additional investment to recover this resource (in a shorter space of time) in order to deliver a zero emission fleet effectively and on time for the Mayor's targets.
 - v. After initial reticence, Babcock Critical Services Limited has demonstrated a willingness to support the ZEPA1 Project and assess how it will deliver and maintain a ZE/ZEC fleet. Cancellation or adjustments to the ZEPA1 Project will send a message to Babcock Critical Services Limited that preparation for a ZE/ZEC fleet is not required from Babcock at this stage, enabling them to maintain focus on their business as usual operations.
 - vi. LFB will lose its reputation as a leader in this transition towards zero emission technology – this in turn will reduce the likelihood of suppliers providing attractive "one off" commercial offers; innovative companies wanting to collaborate in innovative and externally funded R&D Projects. LFB has also benefitted from strong links to influential organisations such as Innovate UK, Advanced Propulsion Centre and the Knowledge Transfer Network – this has led to feasibility studies, technical advice at no cost, early sight of external funding opportunities, recommendations of industry partners and the opportunity to influence

decision making to ensure LFB's interests and requirements are considered and met. Postponement or cancellation in turn will reduce these opportunities and influence.

22. In summary, the ZEPA1 Project is critical in informing the entire ULEF Programme and delivery of the Mayor's targets – as a result, it is recommended that spending is approved for the ZEPA appliance and dedicated recharging solution at the trial station.

Consultation - Workforce

23. During the project, the FBU have been informed about the progress and technological solutions available. To date consultation has been informal, and this will move into the formal Brigade Joint Committee for Health and Safety at Work (BJCHSW) arena in due course.
24. Early engagement with Hammersmith FS has taken place and further work is scheduled following on from securing approval to proceed to the delivery stage of the project. The ZEPA Board also decided that Borough Commander, Hammersmith and Fulham will be invited on to the ZEPA1 Project Board.

Consultation – GLA Group

25. As part of the GLA Family Fleet Group, LFB collaborates with the GLA, Transport for London and the Metropolitan Police Service as well as the London Ambulance Service, British Transport Police and City of London Police. LFB collaborates with members of this group to share information and explore opportunities to work together.

Consultation – Fire & Rescue Services

26. Engagement with other fire services has been important to i) demonstrate the market value for suppliers; ii) ensure key requirements are as consistent as possible to help suppliers meet demand; iii) share information and best practice about approaching this work
27. Internationally, members of the ZEPA Project Board have engaged with Berlin Fire Rescue Service, Swedish fire services from regions and cities (including Stockholm, Gothenburg and Malmo), Copenhagen, Amsterdam, Oslo and New York. Nationally, LFB held a meeting with fire services from across the UK in Autumn 2018 following the establishment of the ZEPA Project and ULEF Programme. Consultation has continued with UK fire services directly and also via the National Fire Chiefs Council (NFCC) Transport Officers Group, and Environment & Sustainability Group.

Objectives and Expected Outcomes

28. The ZEPA Projects are critical in setting the path towards a ZE/ZEC fleet for London Fire Brigade and meeting the Mayor's emissions reductions targets (outlined above). ZEPA1 will enable LFB to understand and address the multi-faceted challenges associated with this transition - these include:
- working with suppliers to ensure they understand and address the complex and large power requirements of pumping appliances
 - technical and financial challenges of providing suitable recharging infrastructure across the LFB estate

- staffing and training implications for operational and maintenance staff
- impacts on mobilisation
- impacts of performance and operations on risk modelling

This work and learning will be applied at a broader level in the Ultra Low Emission Fleet Programme to ensure successful rollout of zero emission solutions across London Fire Brigade.

I. ZEPA1 – Appliance

29. As a result of the procurement process (outlined below) the request to spend [REDACTED] for the ZEPA appliance is based upon Babcock Critical Services Limited's recommendation to procure the Emergency One, EV0 Vehicle. Full details of the assessment and bids are outlined in Babcock Critical Services Limited's Product Description & Financials for ZEPA1 [REDACTED]

| | Bidder | Tender Score | Build programme | Total Acquisition cost |
|------------------------|----------------------------------|--------------|--|------------------------|
| 1 st Option | Emergency One (Gen 0 - Volvo) | 87.92% | 7 Months (est. August 21 based upon decision to proceed) | [REDACTED] |

Procurement

30. The procurement of the ZEPA appliance is a tender process, managed by Babcock Critical Services Limited following the standard process for asset replacement projects.
31. Babcock Critical Services Limited is LFB's maintenance and service provider and manage the Vehicles and Equipment contract on behalf of the Brigade. This contract was awarded in 2014 and runs until 2035. As part of this contract Babcock Critical Services Limited replace, service and repair all items listed within the Vehicle and Equipment contract. All vehicles and equipment have a life schedule, at the end of which they must be replaced. Extensions to the life of vehicles and equipment can be agreed by the Brigade's Engineering Fleet Manager, if it is possible for these vehicles, or equipment to be safely maintained. All additional asset life costs remain constant and will be managed via the 2014 Vehicles and Equipment contract provided by Babcock.
32. Considering the innovative nature of the ZEPA1 Project and the absence of "off the shelf" market solutions in 2019/20, Babcock Critical Services Limited carried out a more extensive consultation process with LFB to ensure the procurement approach (re. suppliers, requirements and evaluation) would test the market and deliver appropriate proposals – this featured:
 - a. More extensive engagement with suppliers from outside of the fire market – including major engineering companies and smaller innovative suppliers of zero emission solutions. This included a Supplier Day at Ruislip Workshops at the beginning of the formal procurement process in March 2020. This day demonstrated three key points:
 - i. The heavy vehicle market was not at the same maturity level as the light vehicle market regarding "off the shelf" Zero Emission vehicles

- ii. The market was ready for the ZEPA1 challenge with a number of heavy vehicle prototypes and proof of concepts already in place. The pumping requirements for this project were identified as the biggest challenge by most suppliers
 - iii. Whilst major commercial vehicle suppliers were interested in ZEPA1 they did not see themselves as the prime contractor and were looking to partner with specialist vehicle convertors or engineering firms.
- b. The Output Based Specification, the document that outlines LFB's key requirements for the vehicle, was set out in a focused document to encourage engagement and innovative proposals.
- c. In recognition of the innovative nature of ZEPA1, it was agreed that the evaluation model featured higher weighting for the technical evaluation than on standard asset replacement projects. The scoring criteria applied was as follows:
 - 56% Technical
 - 25% Commercial
 - 8% Warranty & Through Life Support
 - 5% Corporate Social responsibility
 - 4% Contract Management and Project Management
 - 1% Training
 - 1% Description of company and capability

33. The evaluation model also features a Whole Life Cost (WLC) assessment in line with other heavy vehicle replacement projects. This current process is based upon a comparison between the proposed solutions and assesses the following cost components:

- Acquisition
- Slot price
- Workshop training/equipping
- Operator training
- Station infrastructure
- Fuel

With an emphasis on modular design and construction (with interchangeable components to enable easier repairs, replacements or adaptations), the ZEPA1 Project will inform future projects in order to align to the Brigade's WLC policy.

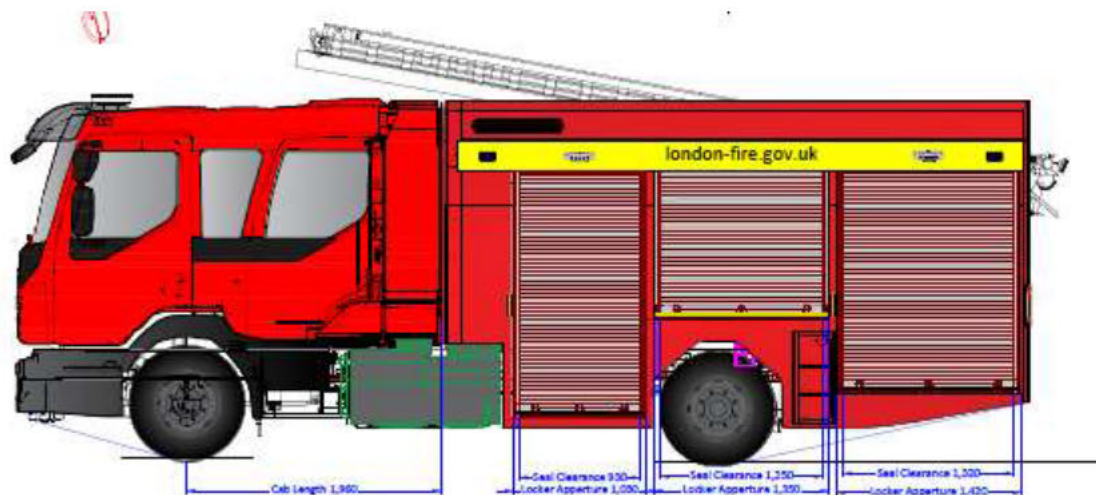
34. Full details of the procurement of the ZEPA appliance was agreed with the ZEPA1 Project Board and outlined in [REDACTED].
35. Throughout the procurement process, key commercial and technical information has been reported to the ZEPA Project Board. The project board has made key decisions throughout (such as to tender solely for a battery electric solution as opposed to hydrogen or broader technologies, and the approval to downgrade to two suppliers in the final presentation stages), based on recommendations from Babcock Critical Services Limited and other subject matter experts on the board.

Technical Summary

Hybrid appliance – battery electric vehicle with petrol range extender.

Volvo FL 16T 4x2 chassis with Volvo ESTEPE 300mm extension crew cab. The cab has a capacity of 6 - featuring driver and front officer at the front and 4 occupants along with a BA set for each and stowage under the seats.

Build time: 7 months.



The following table outlines how the Emergency One, EV0 Vehicle meets LFB's key output-based requirements.

| Key Requirement | Emergency One |
|---|---------------|
| LFB drive cycle requirements | X |
| Pump continuously for 4 hours | X |
| Comply with BSEN1846 (Key regulations for Firefighting and rescue service vehicles for safety and performance) | X |

| | |
|--|--|
| Vehicle dimensions | Compliant at Hammersmith, not all stations |
| Stow all essential equipment on Series 3 DPL | X |
| Rapid charging capability (150kW DC) | X |
| Transport 6 LFB personnel | X |

Cost & Programme:

36. The total cost for the ZEPA solution is [REDACTED]. Payments will be made by LFB to Babcock Critical Services Limited on delivery of the completed appliance.
37. The recommended appliance (EVO Gen 1) is already complete and based at Emergency One - as a result, the project does not have a build programme with associated stage payments as per standard asset replacement projects.
38. The "build programme" is specified as 7 months - factoring in time for reconfiguration of locker stowage to better match LFB requirements, promotional activity committed by Emergency One (the Project Board will make a decision about the value of LFB participating at an early stage) and testing. Delivery and handover is estimated for August, based on the contract award in March 2021 (subject to approval) and project start in the same month.

II. Charging Facility

39. Dedicated heavy charging infrastructure at Hammersmith Fire Station has been specified to recharge the large battery pack on the ZEPA appliance. LFB Property will input their expertise and resource to deliver a suitable solution at station.
40. The ZEPA1 project board agreed the concept of providing 1x150kW DC charge point for the ZEPA1 trial. Rapid 150kW DC charging was decided to ensure that ZEPA1 has sufficient "up time" for a successful trial. This charging speed was also recommended by suppliers of charging points and heavy vehicles.
41. Alternative approaches to recharging were assessed by LFB's FLEET and Property Teams, and then considered by the ZEPA Project Board - this included:
- use of public charging*: rapid DC charging is available at a limited number of refuelling stations. Discarded for ZEPA1 Project as research highlighted there was high demand (including by taxi drivers), long wait times, accessibility challenges as the bays are designed for cars, and concerns about resilience by existing users.
 - charging at lower speeds at stations*: Slower DC charging (eg. 50-100kW) or slow AC charging (eg. 11kW) would significantly increase the charge time and decrease the availability of ZEPA1 and value of the trial.

- c. *opportunities for shared infrastructure*: in recognition of the challenge for all of London's emergency services and Transport London, shared infrastructure has been discussed and raised at GLA Group Fleet meetings. Such initiatives require further consultation amongst the organisations as well as co-ordination and support from the GLA.

42. As the aim of the project is to test ZEPA1 in challenging operational settings as much as possible, the aforementioned options were discarded for this project. These alternative approaches to charging heavy appliances, as well as the application of other innovative solutions (such as smart charging and wireless or automated charging) will continue to be explored as part of the broader ULEF Programme and future projects.
43. The existing 11kW AC BP Chargemaster charge points (three dual points with 6 sockets) at Hammersmith will be able to provide a slow backup option if necessary.

Charging Infrastructure - Provision

Option 1: Charging infrastructure at Hammersmith FS via new substation and electrical upgrades at station

44. Following a competitive tender process, LFB Property appointed consultants Fulkers Bailey Russell in July 2020 to carry out a feasibility study to assess Hammersmith Fire Station and provide technical recommendations and estimated costs to deliver the specified 150kW DC charging.
45. Due to the demands of 150kW DC chargers, an upgrade to increase the electrical capacity is required. This design and installation includes the following key components:
- new substation (500 or 800kVA provided by UK Power Networks)
 - new housing (brick or Glass Reinforced Plastic) for substation
 - upgrade to the electrical switchgear on site to take current and proposed new electricity load
 - cabling and protection
 - move of existing diesel storage tank to another location on site away from the proposed new substation
46. The feasibility study estimates the cost to install charging facilities to meet LFB's specification is [REDACTED], inclusive of a [REDACTED]. This cost is inclusive of the following components:

| Item | Estimated costs |
|----------------------------------|-----------------|
| New substation | [REDACTED] |
| 150kW DC Charger | [REDACTED] |
| Upgrade of electrical switchgear | [REDACTED] |

| | |
|---------------------------------------|--|
| Installation and construction | |
| | |
| | |
| | |
| | |
| | |
| Estimated Overall Project Cost | |

47. The Fulkers feasibility report outlined the following steps and timings for delivering the required charging solution at Hammersmith FS (subject to planning permission and UKPN applications)

- Stage 1: Initial feasibility study complete
- Stage 2: Concept Design 50 days
- Stage 3: Developed Design 80 days
- Stage 4: Technical Design 64 days
- Stage 5: Construction 150 days
- Stage 6: Handover & Close Out 5 days
- **Total** (incl. time for planning permissions and UKPN applications) **16 months**

Option 2: Charging infrastructure at Hammersmith FS via installation of a portable battery bank unit

48. An alternative approach to providing the specified recharging infrastructure is to install a battery pack storage system to store extra power, and in turn ensure sufficient power is available to fully charge ZEPA without requiring a new substation and upgrade to the electrical switchgear on site.

49. Initial analysis (including vehicle operations at Hammersmith, current electrical capacity and ZEPA1 specifications) from UK Power Network Services (the consultancy arm of UK Power Networks) and battery unit suppliers indicates that a battery pack would meet charging requirements for ZEPA1. Indicative costs for the provision of a unit to meet ZEPA1 requirements are estimated at [REDACTED] (inclusive of battery unit, DC charger and installation)

50. Installing the specified charging at Hammersmith with a battery pack unit has the potential to deliver the following advantages in comparison to Option 1:

- **Cost:** whilst the installation of a bespoke battery pack is required this can be connected to the existing electricity supply (subject to sufficient capacity). Therefore savings are achieved by avoiding costs associated with the installation of a new substation and other components outlined in Option 1.

- *Time*: subject to approval, installation of a battery pack would be available in early Summer 2021 (or earlier if desired).
- *Portability*: the battery pack would enable the trial of ZEPA1 at another station if desired or needed in the future.
- *Minimal disruption to site during installation*: no loss of power to the site or extensive digging will be required as the battery unit will be designed plug in to the existing system.

51. Further work is currently taking place to establish the feasibility of designing and installing a recharging system including a battery pack system from a cost, time, space and practical perspective.
52. As a result of the advantages outlined above, Option 2 is currently the preferred approach for delivering dedicated charging at Hammersmith FS, however this is dependent on the assessment work currently taking place (ref. para 51). Consequently, the request to spend up [REDACTED] for dedicated recharging infrastructure is based upon the higher cost featured in Option 1 (incl. a grid upgrade with new substation) to ensure no delays are caused to the delivery of ZEPA1 and subsequent trial.
53. Upon approval of this request, the tender process will take place for the installation of charging infrastructure to meet LFB's output specifications at Hammersmith. This will be subject to LFB's standard procurement process.

III. Training

54. LFB Training are represented on the ZEPA Project Board and have been consulted throughout to ensure an appropriate training programme is in place for the trial at Hammersmith FS.
55. Based on engagement with the ZEPA Board and further discussions with representatives from FLEET, Operational Policy & Assurance and Central Operations, Training have provided packages and indicative costs in the order of [REDACTED] that is covered within the existing ZEPA1 budget.

IV. Maintenance

56. Maintenance costs for ZEPA1 have been set at [REDACTED] per annum for the period of the two-year trial. This cost is based upon the current slot price for the existing Series 3 pumping appliance and the warranty provision from Emergency One which covers the majority of the asset maintenance.
57. Maintenance costs beyond the initial trial are to be determined. ZEPA1 is a new vehicle with an innovative powertrain – as a result, future maintenance costs will be informed by the initial performance of the appliance during the trial.

V. Project Trial

58. The ZEPA1 trial at Hammersmith FS is a two year trial, originally scheduled for an early 2022 start - factoring in an estimated 12 months for a build time for the ZEPA appliance.

59. Should the appliance be delivered ahead of original estimated project schedules, or there be a delay to the installation of DC charging, it will be possible to carry out the ZEPA trial initially with slow AC charging available on site (ref. para 43). Such an approach will provide added time and value to the trial and will also be an opportunity to initially test charging heavy ZEC vehicles with slow AC charging.
60. Early engagement with Hammersmith FS has taken place and further work is scheduled to develop full details of the trial following the approval of this project request.

Impacts

Equality Impact

61. The London Fire Commissioner and decision takers are required to have due regard to the Public Sector Equality Duty (s149 of the Equality Act 2010) when exercising our functions and taking decisions.
62. It is important to note that consideration of the Public Sector Equality Duty is not a one-off task. The duty must be fulfilled before taking a decision, at the time of taking a decision, and after the decision has been taken.
63. The protected characteristics are: Age, Disability, Gender reassignment, Pregnancy and maternity, Marriage and civil partnership (but only in respect of the requirements to have due regard to the need to eliminate discrimination), Race (ethnic or national origins, colour or nationality), Religion or belief (including lack of belief), Sex, and Sexual orientation.
64. The Public Sector Equality Duty requires us, in the exercise of all LFC functions (i.e. everything the LFC does), to have due regard to the need to:
- a) Eliminate discrimination, harassment and victimisation and other prohibited conduct.
 - b) Advance equality of opportunity between people who share a relevant protected characteristic and persons who do not share it.
 - c) Foster good relations between people who share a relevant protected characteristic and persons who do not share it.
65. Having due regard to the need to advance equality of opportunity between persons who share a relevant protected characteristic and persons who do not share it involves having due regard, in particular, to the need to:
- a) remove or minimise disadvantages suffered by persons who share a relevant protected characteristic where those disadvantages are connected to that characteristic;
 - b) take steps to meet the needs of persons who share a relevant protected characteristic that are different from the needs of persons who do not share it;
 - c) encourage persons who share a relevant protected characteristic to participate in public life or in any other activity in which participation by such persons is disproportionately low.

66. The steps involved in meeting the needs of disabled persons that are different from the needs of persons who are not disabled include, in particular, steps to take account of disabled persons' disabilities.
67. Having due regard to the need to foster good relations between persons who share a relevant protected characteristic and persons who do not share it involves having due regard, in particular, to the need to:
- a) tackle prejudice, and
 - b) promote understanding.
68. The Babcock Critical Services Limited contract requires Babcock and any sub-contractor they may engage, to conform to equality legislation and LFB equalities protocol. Babcock Critical Services Limited also assess all of their providers approach to equality and ensure they are satisfied that they meet appropriate protocols, prior to them listing those companies as approved providers. Therefore, it is considered that there is an appropriate approach to equalities right through the supply chain in respect of this procurement.
69. An Equality Impact Assessment also took place as part of the original approval process for ZEPA1 (ref. Appendix 5) – it outlined that ZEPA would not have a direct impact on the equality groups.
70. The ZEPA1 Output Based Specification featured all key requirements in FLEET's standard vehicle replacement projects – this included staffing, accessibility and manual handling.
71. From a broader perspective, the ZEPA Project, and the example it sets in switching to zero emission transport, will have a benefit to London – in particular those sections of the population who are more vulnerable to the impacts of poor air quality – including London's youngest and oldest residents, Londoners with pre-existing health conditions and communities experiencing higher exposure levels.

Procurement and Sustainability

72. The Procurement impacts have been addressed in detail above for the procurement of the ZEPA appliance and recharging infrastructure
73. The ZEPA1 Project takes forward one of the first steps of the ULEF plan, which completed the action in the Sustainable Development Strategy, 2016-2020, to Investigate options for a low emission frontline vehicle.
74. This work supports the longer-term improvement of air quality and reduction of CO₂ emissions as identified in PN897 Sustainable Development and aims to deliver on targets set out in the Mayor of London's Environment Strategy.
75. The procurement process for the ZEPA1 appliance (carried out by Babcock Critical Services Limited) is aligned to LFC expectations in Responsible Procurement – this includes:
- Social values included – including reference to the avoidance of modern slavery
 - Whole Life Costing

- Ethical sourcing of raw materials

In line with the GLA Group's Responsible Procurement Policy, Emergency One and Rosenbauer procure responsibly and have policies with multiple suppliers relating to:

- anti-slavery
- sustainability
- anti-corruption
- business continuity

76. The procurement approach for the recharging infrastructure will also be aligned to LFC expectations in Responsible Procurement (as referenced in para 75).

Strategic drivers

77. As the first project under the Ultra-Low Emission Fleet Programme, and ZEPA1 informs the delivery of LFB's future fleet – it is therefore aligned to the core principles of the Transformation Plan. In particular, ZEPA1 supports transformation under the Strategic Pillars of *Seizing the Future* and *Delivering Excellence*.

78. The innovative nature of the programme will showcase the following commitment for collaboration outlined in the London Safety Plan: to identify further opportunities that maximise learning and best practice from across the country and internationally, working towards the combined vision to make London 'the safest global city' through a commitment to partnership, collaboration, innovation and co-operation.

79. The London Safety Plan identifies the need to explore the use of electric vehicles to support the Mayor's priority to restore London's air quality to legal and safe levels (London Safety Plan 2017, p 54 and 60).

80. The ZEPA project will provide LFB and Babcock Critical Services Limited with a blueprint for working in partnership to transform the entire fleet to zero emission capable vehicles

Workforce impact

81. The ZEPA1 Output Based Specification featured all key requirements in FLEET's vehicle replacement projects – particularly the Series 3 Pumping Appliance Project – this included staffing, accessibility and manual handling.

82. During the project the FBU have been informed about the progress and technological solutions available. To date consultation has been informal, and this will move into the formal BJCHSW arena in due course.

83. Early engagement with Hammersmith FS has taken place and further work is scheduled following on from securing approval to proceed to the delivery stage of the project. The ZEPA Board also decided that Borough Commander, Hammersmith and Fulham will be invited on to the ZEPA1 Project Board.

84. This report will be shared with staff side in advance of the Fire and Resilience Board meeting on 12 January 2021

Finance comments

85. This report outlines the progress of work to date on the Zero Emission Pumping Appliance Project and requests approval to spend the allocated earmarked reserve for this project.
86. LFC-0034-D approved a budget of [REDACTED] at the commencement of this project in 2018/19 with spend incurred to date [REDACTED] in 2018/19, [REDACTED] in 2019/20 and [REDACTED] in 2020/21 leaving a balance of [REDACTED] in the earmarked reserve.
87. The report sets out the request to procure an










Emergency One Fire engine has a total cost of [REDACTED] [REDACTED] factoring in a [REDACTED]

This option can be met from the earmarked reserve set aside for this purpose.
88. Other costs including recharging infrastructure at [REDACTED] maintenance at [REDACTED] and training costs at [REDACTED] applicable to either option is also affordable from the reserve set aside for this purpose.

Legal comments

89. Under section 9 of the Policing and Crime Act 2017, the London Fire Commissioner (the "Commissioner") is established as a corporation sole with the Mayor appointing the occupant of that office. Under section 327D of the GLA Act 1999, as amended by the Policing and Crime Act 2017, the Mayor may issue to the Commissioner specific or general directions as to the manner in which the holder of that office is to exercise his or her functions.
90. By direction dated 1 April 2018, the Mayor set out those matters, for which the Commissioner would require the prior approval of either the Mayor or the Deputy Mayor for Fire and Resilience (the "Deputy Mayor").
91. Paragraph (b) of Part 2 of the said direction requires the Commissioner to seek the prior approval of the Deputy Mayor before "[a] commitment to expenditure (capital or revenue) of £150,000 or above as identified in accordance with normal accounting practices...".
92. The Deputy Mayor's approval is accordingly required for the London Fire Commissioner to undertake the expenditure identified in this report.
93. Under section 7 (2)(a) of the Fire and Rescue Services Act 2004 (the 2004 Act) the Commissioner must secure the provision of personnel, services and equipment necessary to efficiently meet all normal requirements for firefighting. This includes the provision of appliances for firefighting along with the required infrastructure to operate such appliances and related training for their operation. Consequently the items identified in this report for funding all fall within the scope of the Commissioner's powers.
94. General Counsel also notes that the proposed procurement of the goods and service provider is in compliance with the Public Contracts Regulations 2015 and the Commissioner's scheme of governance.

List of Appendices

| Appendix | Title | Protective Marking |
|---|---|--|
|  |  |  |
| 2. | ULEF Programme: Commissioners Board Report (ref. LFC-0034-D) | OFFICIAL -SENSITIVE – Commercial sensitivities |
| 3. | LFC Decision: LFC-0034-D: ULEF Programme: | OFFICIAL -SENSITIVE – Commercial sensitivities |
|  |  |  |
| 5. | ZEPA1 Equality Impact Assessment | OFFICIAL |
|  |  |  |

Report title

Ultra-Low Emission Fleet Programme and Zero Emission Pumping Appliance Project

Report to

Deputy Mayor for Fire and Resilience

Date

17 July 2018

Report by

Assistant Director, Technical and Commercial

Report number

FRB-0001

OFFICIAL-SENSITIVE (COMMERCIAL)

Introduction

1. The Zero Emission Pumping Appliance (ZEPA) Project and associated funding requirement for the Project and Programme Coordinator post have been recommended for approval by the London Fire Commissioner (LFC). This funding will enable London Fire Brigade (LFB) to work towards achieving the Mayor's stringent air quality and greenhouse gas emission targets for the Greater London Authority (GLA) family as set out in the London Environment Strategy (LES) and the Memorandum of Understanding between LFB and Transport for London.
2. The total funding request of £2.1m for the initial five years will be met by the London Safety Plan 2017 implementation reserve. This funding will provide £1.8m to deliver phase one and two of the ZEPA Project, and £0.3m for the Project and Programme Coordinator post for this five-year period.
3. Due to the scale, cost and impact on LFB, the ZEPA Project has a staged structure, whereby the initiation of later stages will be dependent upon the successful completion of earlier stages. Approval will be sought from the LFC to proceed with latter project stages and to secure adequate funds.

Ultra-Low Emission Fleet Programme

4. The Ultra Low Emission Fleet (ULEF) Programme will implement LFB's ULEF Plan and fleet commitments made under the LES and the Memorandum of Understanding between LFB and Transport for London. These require LFB to achieve the following targets:
 - all cars in support fleets to be zero emission capable by 2025;
 - all new cars and vans (less than 3.5 tonnes), including response vehicles, being zero emission capable from 2025;

- all heavy vehicles (greater than 3.5 tonnes) to be zero emission capable or fossil fuel-free from 2030;
 - zero emission fleet by 2050.
5. The initial stages of the ULEF Programme and ZEPA Project have been funded by the London Safety Plan 2017 implementation reserve. However, as the programme continues at least until 2030, and will factor in the integration of new technological solutions for the vehicles (currently 451 vehicles, excluding leased cars) and supporting infrastructure, successful delivery of this work is dependent upon long term funding.

Zero Emission Pumping Appliance Project

6. The Zero Emission Pumping Appliance (ZEPA) Project is the first corporate project in the Ultra-Low Emission Fleet (ULEF) Programme and will develop a prototype of a zero-emission capable frontline pumping appliance that will meet requirements for LFB (and other fire services in the UK if possible).
7. The ZEPA project will address the following challenges:
- As outlined above, there is currently a lack of availability on the market (both UK and globally) for zero emission capable HGVs;
 - Pumping appliances have more complex and extensive power requirements than other vehicles which presents additional technical challenges;
 - Pumping appliances account for a high proportion of LFB's fleet;
 - Pumping appliances have a lifespan of 12 years and the next wave of replacements are planned for 2029.
8. Early market engagement with vehicle suppliers has clarified the need for LFB to act now to catalyse the market and drive the necessary solutions to meet the timeframes set out by the Mayoral targets.
9. The ZEPA project will help to stimulate a market for zero emission HGVs in the fire service and provide a high-profile example to encourage other organisations and businesses in London to plan and deliver zero emission vehicles. As a result, there are early indications that external grant funding opportunities may be available to support the project. Suppliers may also be interested in providing a level of investment into the Research and Development required, however the potential for grant funding and supplier investment are speculative at present and have not been factored into the project budget.

Collaboration – National Working Group

10. Air pollution in many cities throughout Britain continues to exceed the World Health Organisation limits and has been linked to some 40,000 deaths per year in the UK. Consequently, low emission zones for vehicles are being introduced in cities, and, whilst these zones (outside of London) only affect local buses, it is expected that cities will introduce more strenuous zones – such as the proposed introduction of Oxford's zero emission zone. Therefore, whilst LFB is facing the challenge to transition to a zero emission fleet now, it is likely that fire services in other UK cities will face similar targets in due course.

11. Fire services operate a comparatively small number of heavy vehicles within a much larger UK market, with very specialist requirements. As a result, it is essential that fire services work together to ensure suitable zero emission capable solutions are developed for pumping appliances and other vehicles.
12. A national working group will be established with appropriate subject matter leads of the National Fire Chiefs Council (NFCC) including Research and Development, Air Quality and the UK Fleet Managers groups to:
 - i) Raise awareness about the impacts of tackling poor air quality across the UK and the challenge this creates nationally for fire services.
 - ii) Develop a common framework towards understanding and addressing key challenges facing UK fire services in in deploying zero emission vehicles (particularly HGVs).
 - iii) Develop a common (or aligned) specification for zero emission capable pumping appliances (and other HGVs in due course) used by UK fire services – establishing a market large enough to be attractive for suppliers.
 - iv) Provide advice and expertise to LFB's ZEPA Project and ULEF Programme.
 - v) Gain investment – expertise and potentially financial support – for work that could have real benefits for other fire services (e.g. development of common specifications, assessment of alternative fuels and the development of a real-life duty cycle for pumping appliances).
13. Wider stakeholder engagement will also be an important element of the ZEPA Project and ULEF Programme in order to share experiences and learn from zero emission transformation programmes taking place. As part of the GLA Family Fleet Group, LFB collaborates with the GLA, Transport for London and the Metropolitan Police Service as well as the London Ambulance Service, British Transport Police and City of London Police. LFB will look for opportunities to collaborate with members of this group as well as other blue light services.

Decision title

Ultra Low Emission Fleet (ULEF) Programme

Recommendation by

Assistant Director, Technical and Commercial

Decision Number

LFC-0034-D

DECISION AND REPORT: NOT PROTECTIVELY MARKED APPENDIX 2: OFFICIAL-SENSITIVE (COMMERCIAL)

Summary

LFC-0034 sets out the initial steps proposed to be taken to achieve the fleet targets set out by the Mayor in the London Environment Strategy and defined in the Memorandum of Understanding between the London Fire Commissioner (LFC) and Transport for London (TfL). The approach is based on the Ultra Low Emission Fleet (ULEF) plan developed specifically for the London Fire Brigade's (LFB) fleet, a summary of which is provided in Appendix 1. The report proposes that a programme board is established to provide oversight of delivery of the ULEF plan and a Programme Coordinator post to support the programme delivery. It is intended that the programme is set out in stages, whereby delivery of successive stages will depend upon successful completion of the stage prior, with approval of subsequent stages sought from the Commissioners Board. To commence delivery of the programme approval is also sought for a corporate project and corresponding funding to take forward Stage 1, phases one and two.

Decision

The London Fire Commissioner approves the budget requirement over five years as set out within the ZEPA business case in the Confidential Appendix 2 and the Grade F Programme Coordinator post are to be funded from the London Safety Plan 2017 implementation reserve.

Dany Cotton QFSM
London Fire Commissioner



Date

9/8/18

Access to Information – Contact Officer

| | |
|------------------|--|
| Name | Steven Adams |
| Telephone | 020 8555 1200 |
| Email | governance@london-fire.gov.uk |

Full Equality Impact Assessment Template

| |
|--|
| Name of Policy and Reference Number (if available): |
| Zero Emission Pumping Appliance (ZEPA) Project |
| Purpose of Policy: |
| <p>The Zero Emission Pumping Appliance (ZEPA) Project is the first corporate project in the Ultra-Low Emission Fleet (ULEF) Programme and will develop a prototype of a zero-emission capable frontline pumping appliance that will meet requirements for LFB (and other fire services in the UK if possible).</p> <p>The ZEPA project will address the following challenges:</p> <ul style="list-style-type: none"> • there is currently a lack of availability on the market (both UK and globally) for zero emission capable HGVs; • Pumping appliances have more complex and extensive power requirements than other vehicles which presents additional technical challenges; • Pumping appliances account for a high proportion of LFB's fleet; • Pumping appliances have a lifespan of 12 years and the next wave of replacements are planned for 2029. |
| What is the impact (negative, positive or neutral) on the equality groups? |
| <p>None directly as the zero emission pumping appliances will not have an impact on LFB's operations and performance standards.</p> <p>The ZEPA Project and broader ULEF Programme will demonstrate that LFB is setting an example for Londoners to move to zero emission technology and address the air quality challenge facing the capital.</p> <p>Air pollution is known to have a disproportionate impact on London's youngest and oldest residents and those Londoners with pre-existing health conditions. Research commissioned by the GLA (ref. Updated Analysis of Air Pollution Exposure in London) shows there are considerable variations between communities, with more deprived communities experiencing higher NO2 and PM levels. The pattern is less pronounced when considering variations in exposure between different minority groups. However, those living in places with high proportions of black or mixed ethnic groups are more likely to be exposed to illegal levels of air pollution than those in areas with a high proportion of white people.</p> <p>Therefore the ZEPA Project, and the example it sets in switching to zero emission transport, will not only have a benefit on London's communities as a whole ,but also those communities referenced above experiencing higher exposure levels.</p> |
| What is the evidence or other information in support of this? |
| <p>London Environment Strategy 2018.</p> <p>Updated Analysis of Air Pollution Exposure in London.</p> |
| Who did you consult, and what was their response? |
| Consultation and approval process for the ZEPA Project and ULEF Programme |

- **4 June: Distribution to Operations and Safety & Assurance DMBs**
ULEF Programme and ZEPA Project Business Case were distributed to Heads of Service for review. Minor comments were factored into the reports.
- **12 June : Corporate Services DMB**
ULEF Programme and ZEPA Project Business Case was approved (under the proviso that minor edits were made).
- **20 June : Commissioner's Board Meeting.**
ULEF Programme and ZEPA Project presented at Commissioner's Board Meeting. The Zero Emission Pumping Appliance (ZEPA) Project and associated funding requirement for have been recommended for approval by the London Fire Commissioner (LFC).
- **17 July: Deputy Mayor's Fire Board**
ZEPA Project and ULEF Programme recommended for approval by the Deputy Mayor for Fire & Resilience.

| |
|---|
| What changes have been identified as a result? |
| None |
| How will these changes be implemented? |
| n/a |

Date to be reviewed by: ...Paul Davies

Signed: ...Paul Davies..... **Date:**30/08/2018.....

(Please list any documentation supporting this EIA)