LONDON FIRE BRIGADE

Business Case

Proposal/Project Name:	Misting Lances
Completed By:	Stewart Gordon
Proposal Project Sponsor:	Paul McCourt
Directorate/Department:	Operational Policy & Assurance

Document Version History		
Version Number	Date	Summary of Changes
2	08/10/23	Amended to reflect comments from IFB. (Aligned finance comments, H&S benefits, Option selection and FBU Consultation)

Distribution List		
Name	Title/Role	Issue Date

Approvals		
Name	Title/Role	Approval Date

LONDON FIRE BRIGADE

Business Case

1 Executive Summary

LFB operates in one of the most complex built environments in Europe.
Frontline operational effectiveness can often depend upon the rapid deployment of firefighting equipment at scale, to mitigate against the growth of fire at an incident.

London Fire Brigade does not currently carry equipment on front line appliances specifically designed to deal with fires occurring inside construction voids within buildings. This omission in LFB's tactical capability presents a risk for uncontrolled fire spread within voids, thus presenting additional risk to both public safety and to Firefighter safety at incidents.

The lack of an effective capability to deal with fire occurring inside a void does not support LFB's strategic ambitions to develop urban firefighting as a tactical core competency.

This gap in capability has previously been recognised within the Transformation Plan (Programme 3) and in LFB's Corporate Risk Registers (OD1).

Closing the capability gap through the provision of technology and training, strategically fits with LFB's CRMP Response section "continuing to make improvements in our capabilities to respond to London's highest risks by upgrading and introducing new equipment and training" (CRMP pp.33).

This business case identifies misting lances as a recognised and established control measure for dealing with fires occurring within construction voids and wildfires.

Other UK Fire & Rescue Services have already successfully adopted misting lance technology into 'business as usual' approaches to firefighting. The reported tactical advantages with misting lances are; a reduction in water required to suppress fire spread and a reduction in personnel required to cut away to extinguish.

It is also anticipated that the efficiency in tactical firefighting will support further efficiencies in operational crew availability, either through early return or a reduction in resourcing requirements, and a reduction in contamination exposure.

Misting lance technology also has a use in fighting wildfires. Lances can reduce vegetation flammability ranges by increasing humidity levels through the production of a fine spray during the construction of fire breaks. With an advantage over traditional branch watering, the lances utilise minimal water under high pressure, and can also be used in applying water into the ground to reduce sub surface fire spread. The addition of misting lances to frontline capability will support LFB's existing capability advances in wildfire firefighting.

It is recommended that 122 misting lances and associated equipment are procured for provision on all frontline Pump Ladder appliances, including training and reserve stock.

Subject to product selection and procurement, risk assessments and policies will be amended to encompass the change in tactical approach and be reflective of National Operational Guidance. Training roll-out will be via computer-based training packages and will build upon existing skills of competent firefighters.

LONDON FIRE BRIGADE

Business Case

1.1 Overview

LFB operates in one of the most complex built environments in Europe.
Frontline operational effectiveness can often depend upon the rapid deployment of firefighting equipment at scale, to mitigate against the growth of fire at an incident.
Corporately this risk is recognised through Risk Register entry OD1.

London Fire Brigade does not currently carry any equipment on front line appliances specifically designed to deal with fires occurring inside construction voids within buildings. This omission in LFB's tactical capability presents a risk for uncontrolled fire spread within voids, thus presenting additional risk to both public safety and to Firefighter safety at incidents.

The 'systemic failure' in the construction sector identified by Dame Judith Hackett (Independent Review of Building Regulations and Fire Safety) indicated that there is real potential for incorrect fire stopping in voids in some modern buildings.

LFB recognises that all buildings, regardless of age, are vulnerable to breaches in compartmentation due to damage, lack of maintenance and/or poor trade installations. Systemic failures in architecture or maintenance, have resulted in incidents that have contributed to firefighter injuries, and in some cases firefighter death.

LFB accident investigators have recommended that both equipment and training for firefighters are reviewed, to consider suitability for tackling void induced fire behaviour (SAI 288 and Managed LAI Vicarage Gate).

London's built environment presents the challenge of unseen fire spread; this is due to several factors including:

- Older building stock and those subject to multiple renovations or conversions under different building regulations, as these can present breaches of compartmentation and/or fire stopping.
- More modern buildings which are more vulnerable to unseen fire spread, due to poor standards of construction.
- Buildings made vulnerable to unseen fire spread, due to lack of maintenance and/or post-construction alterations, including the installation of utilities.

The number of compartmentation issues identified from Senior Fire Safety Officer (SFSO) reports in 2022 was 178, and therefore this can be regarded as a foreseeable risk.

1. Fires involving roofs. On average the LFB attends 100 fires per year where roofs are involved. Nine incidents are recorded where voids are directly involved, and 83 where fire has spread to roofing through gaps or voids.

2. Fires involving properties with cladding. The LFB has attended over 50 fires involving cladding materials in the past two years. The catastrophic impact of uncontrolled fires in clad buildings is universally recognised.

LFB's current initial response option is to cut open the building façade to expose the void, using saws, Halligan bars, or small tools, then applying water from a hose reel jet. LFB currently does not have a suitable solution to provide OICs with a means of early intervention to deal with this type of risk.

Misting lance technology uses a high-pressure system to deliver finely dispersed water droplets into the fire compartment from the outside. A small opening is made into the compartment wall from the outside using power tools such as combi drills, then water mist is applied through the hole using a lance.

The application of the water mist system allows firefighters to suppress the fire conditions, without the need to fully open the compartment or void. In addition to fires within hidden voids, the equipment has other associated uses including fire suppression within commercial ducting, vehicle engine compartments, roof voids, basement fires, and supporting wildfire firefighting tactics.

Misting lances are a well-established and proven technology used within Fire and Rescue Services (FRS) both domestically and internationally, with similar built environments to London. Merseyside, Leicestershire, and West Yorkshire FRSs all carry misting lance technology on their front-line appliances.

Fire & Rescue Services have also realised additional uses for misting lance technology, utilising the technology at incidents involving bin stores, bin chutes and vehicle fires (cars and vans in the load/luggage area and engine compartments).

Reports from Merseyside, Leicestershire and West Yorkshire Fire & Rescue Services have indicated reductions in time spent in attendance at incidents, as well as reductions in the quantity of water and resources required to safely resolve operational incidents.

<u>Alternative uses</u>

Misting lance technology is also used by other Fire and Rescue Services in the wildfire arena.
The advantages of deploying misting lances in addition to percolating ('holey') hose, has previously been effectively demonstrated to LFB by the NFCC Wildfire leads from Northumberland Fire and Rescue Service.

Misting Lances produce a fine spray at high pressure, using a minimal volume of water, therefore are considered an excellent option for use on wildfires.
Misting lances can create an increase in the humidity of dense vegetation, preventing fire spread through vegetative fuels. When deployed at scale, the technology can also be used for applying water to deep seated fires, as the lance can be driven into the ground, accessing fires and cooling fire gasses beneath the soil surface.

The addition of the misting lance capability will introduce a new tactical advantage for efficiently creating firebreaks in deep seated wildfires.

1.2 Summary of Recommendations

It is recommended that misting lance technology is selected and procured to provide initial Operational Incident Commanders (OIC) an improved capability.

The placement of misting lance technology on all Pump Ladders will ensure its immediate availability to the OIC in the early stages of an incident.

- It is recommended that LFB procures 112 misting lances, along with supporting battery powered drill systems. These should be positioned as one per Pump Ladder, with 10 additional lances for training and reserve stock. A total procurement of 122 misting lances
- It is recommended that training packages for misting lance technology is developed and provided for all station-based staff, and level 1 and 2 commanders.

1.3 Costs and Benefits

The total costs for the introduction of misting lances includes the procurement of supporting equipment such as combination drills, and the development of a CBT package. These overall costs including fleet fitting, are detailed in Section 4 of this business case.
National Operational Guidance recognises that water misting lances are a beneficial tactic to be deployed in fire attack plans, which support improvements to firefighter safety when dealing with compartment fires. It also recommends their use for Wildfires, for misting and to access deep seated fires in the ground.

The benefits around this project will allow firefighters the opportunity to deal with fires in voids, ducting and cladding, without contributing to the fire's development. Also, the capability to deal with compartment fires externally, reduce the risks associated with committing crews into a fire compartment.

It will have a direct benefit to the health and safety of firefighters by limiting their exposure in the fire compartment. Limiting their time in the compartment will lower the exposure to heat and the inherent hazards of compartment firefighting.

The level of exposure to contaminants would be reduced as the firefighting using the lances would be away from the carbonaceous material.

The development of Wildfire firefighting techniques, utilising misting lance technology, assists LFB to further develop approaches to dealing with incidents safely and professionally in line with NFCC guidance.

1.4 Project Approach or Methodology

- Selection and procurement of misting technology
- The upskilling of staff to use the new technology.
- Changes and amendment to Risk Assessment and Operational Policy to support use
- The arrangement of stowage on appliances

- Go Live at a single point when 75% of operational staff (FF – StnO) are trained.

2 Strategic alignment and scope

2.1 Project Objectives

- Improve Firefighter safety – external firefighting, improve conditions for offensive firefighting and reduce exposure to contaminants.
- Improve LFB's capability to respond to fires in construction voids in line with the CRMP, providing an additional control measure into LFB's Corporate Risk Register OD1
- Reduce water damage from firefighting, as the lances provide a mist of high-pressure water at low quantity.
- Improve LFB's capability to respond to wildfires in line with organisational learning outcomes identified in the 2022 Major Incident Review, Extreme Weather Period.
- The provision of an immediately available firefighting capability for duct, void and cavity incidents.
- Create efficiencies by reducing the time in attendance at incidents and increasing/returning resource availability into the mobilising system. We will create a comparative report to measure current time at incidents in roofs and voids with post introduction.
- Support the objectives of the CRMP (Response) by "continuing to make improvements in our capabilities to respond to London's highest risks by upgrading and introducing new equipment and training" (CRMP pp.33)

2.2 Strategic Alignment

CRMP (Response) by "continuing to make improvements in our capabilities to respond to London's highest risks by upgrading and introducing new equipment and training" (CRMP pp.33)

- Prevention & Protection Risk Register (OD1), by increasing options for LFB to mitigate against hazardous factors in the built environment.

- The increasing complexity of the built environment increases the risk to our communities and firefighters. This impacts LFB's ability and capacity to identify and mitigate hazardous factors in the built environment, for both new and legacy stock through Protection and Response

activities.

Delivery Plan | April 2022 – September 2023

PROTECTING YOU	Programme 3 (page 2 of 3): Adapt our services as your needs change		
Project | Updating technology used for firefighting and the training needed for this to improve our response			
Initiative	**Delivers**	**Start date**	**End date**
Positive Pressure Ventilation	• A set of recommendations on replacing the current petrol driven smoke extraction fans with up to date equipment, to remove products of combustion from buildings such as high rise, basements • Amended training packages for use of any new equipment procured as a result.	01/01/2022	01/09/2023
Ultra High Pressure Lance & Misting Lances	• A set of recommendations about procurement and deployment of misting lance equipment • Training packages for misting lance equipment if procured • Support Grenfell recommendation around using newer technologies for fire fighting	01/01/2022	01/09/2023
FF Training Strategy & Fighting Course	• Updated training interventions in fighting fires and fire behaviour • Updated skills framework • Compliance with the National Operational Guidance (NOG) training specification	01/12/2022	01/12/2023
Water Supply (Dr Stoianov Report)	• Updated incident command policy on water supply considerations in the development of tactical plans. • Updated equipment notes / policy on water supply • Updated water supply information and associated risks • Updated training based on new policies • Establish joint working exercises with water suppliers • Recommendations for new equipment • Delivery strategy for recording and assuring private and emergency hydrants	01/04/2022	01/09/2023
Marauding Terrorist Attack (MTA)	• Extending training in an MTA environment to all operational staff. • Update on station-based training schedules to include maintenance of these new skills • Procurement and issue of ballistic personal protective equipment (PPE) • Updated relevant policies • Changes to stowage for any additional PPE	01/09/2021	31/03/24

10

This project falls under Programme 3 of the Delivery plan Ultra High-pressure lances and misting lances

2.3 Scope of Work

- Identify product after testing lances,
- Procurement of lances,
- Policy to be amended,
- Training CBT package to be designed.(training on station with a familiarisation session)
- Appliances to be retrofitted.
- Training to be rolled out, equipment to be delivered to stations.

2.4 Outcomes

Refer to Section 2.1

2.5 Deliverables and Outputs

Misting lance technology provided for frontline use.
Operational risk assessments and Policy adjusted to support safe systems of work.
CBT package designed.
Crews become proficient in using misting lance technology in operational conditions.
An additional control measure is provided for Risk Register entry OD1
Contribution towards to commitments made in LFB's CRMP

2.6 Programme of Work and Milestones

High level milestone breakdown		
Key Milestone	**Start**	**End**
Trial/identify suitable product	Product identification from the identified options in section 4.1, September 2023	November 2023
Tender/procurement	November 2023	Fleet have indicated 3-4 months
Staff Training	CBT Package development commencing October 2023	CBT completion by April 2024 Practical handling/physical training completed by June 2024
Fleet Stowage Go Live	Commences when MTA and BA set modifications are complete in January 24	April 2024 June 2024

Phase	Estimated Duration
Tender/procurement (from point procurement strategy signed off)	3 months
Trial/identify suitable product	2 months
PDF Development & LFB Sign Off	2 months
ASO Development & Contract Award	1 month
Fleet Stowage	10 weeks for developing prototype and sign off, then 13 weeks to roll out

2.7 Related Projects and Dependencies

This project supports progression of the Urban Firefighting Strategy, National Operational Guidance (Phase 2) and the furthering of Programme 3 delivery outcomes. In addition, also supports LFB's response to the 2022 Extreme Weather, Major Incident Review (Wildfires).

3 Roles and Responsibilities

3.1 Project Team Roles and Responsibilities

Role	Name	Summary of Responsibilities
e.g., Project Manager	Stewart Gordon	
Project Sponsor	Paul McCourt	
Senior User		
Senior Supplier		
etc		

3.2 Resource Assessment Sheet

3.3 Change Assessment Sheet

Please see attached change assessment form for stakeholder engagement Change assessment form

3.4 Solution Requirement(s):

Create the ability to provide misting lance technology, as part of the first strike attack for fires involving construction voids, compartment fires, and wildfires.

The ability for initial crews to rapidly apply aspirated water at high pressure into compartments and building cavities, whilst reducing the risk to firefighters from contamination.

To apply water effectively in the Wildfire environment, by applying fine mist to standing fuel, and to access deep seated fires and heat sources.

LONDON FIRE BRIGADE

Business Case

Options comparison Indicator	Option1 (Do nothing)	Option2 (Preferred)	Option3
Summary description of option Provide a summary of each option and what it will deliver.	Appliances remain without the specialist equipment provision of misting lances.	Place misting lances on every Pump Ladder.	Place misting lances on every Pump (on multi-appliance stations).
Advantages Summary of the advantages of each option and how it meets the project's objectives.	No additional funding required for procurement, training or on-going costs.	This safely secures the misting lance capability within every LFB station area. This provides OICs with the available specialist equipment to support and deliver on their tactical plans, in the earliest stages of a developing incident. This ensures that the provision of misting lance capability is not affected by the availability of pumps. Increased firefighter safety by reducing exposure to the hazards and risk associated with compartment firefighting Reduction of water damage.	This provision secures the misting lance capability within LFB areas where pumps are located (on multi-appliance stations). This provides OICs with the opportunity to deploy specialist equipment to support and deliver on their tactical plans in the earlier stages of a developing incident, where pumps have been ordered and are in attendance.

Disadvantages List the disadvantages of each option stating what makes the option a less viable option.	Maintains the current risks associated of operating with non-specialist equipment, to deal with fires in voids, ducting and cavities. Associated risks include continued committal of firefighters into higher risk environments, where they may be unnecessarily exposed to extreme temperatures.	Costs associated for provision and stowage on Pump Ladders.	The location and availability of pumps during key periods of the year may limit the provision of the misting lance capability. Reduced availability of pumps in key periods provides potential for increases in attendance times, where pumps with misting lances are requested. These delays also provide associated delays in the deployment the misting lance capability. Delays in deployment may provide the opportunity for increased and unseen fire spread.
Timescale and speed to benefit Provide a high-level view of the timescales required to deliver each option, and when the benefits will be realised.		Slightly longer for appliance conversion.	
Constraints State any time, cost, or quality constraints that may limit the project work, e.g., areas that can / cannot be covered in the time available.	N/A	Time – The deadline is for this to be delivered early in the financial year of 2024 and is required as part of the Urban firefighting strategy. Cost – The project will need to stay within the requested funding	
Major Risks Provide a summary of the major risks for each option.	Firefighter and public safety & welfare.	Not being able to meet the deadlines and then not fulfilling the objectives listed above.	Due to pump availability, these may not be available on all front-line appliances, so may provide significant delays in attendance.

4 Cost Analysis

4.1 Project Cost Analysis

Supplier	Product	Discounted Unit Cost
Clan Tools	Inerting Gas Injected Nozzle	£ 298.00
Delta Fire	Delta Fog Spike System	£ 395.00
Delta Fire	Attack 100 Pro SBC	£ 385.00
Angloco	Mist Tech Branch Body	£ 472.60
Angloco	Mist Tech EV Lance	£ 480.00
Angloco	Mist Tech Branch Lance	£ 471.96

Project Cost Analysis			
Description	**Option 1**	**Option 2 - 122**	**Option 3 - 58**
Misting Lances £298 /£480		£36356.00 to £58560.00	£17,284.00 to £27,840.00
*Cost of the drill has been challenged as it appears high but will be the maximum figure. This is compatible with existing battery operated tools/		Milwaukee M18ONEFHPX drill with battery £576.00 £70272.00 Milwaukee M18ONEHPX without battery £431.94 £52696.68.00	£33,408 £25,056
SDS 25 x 250 Drill Bits £48		122 X £48.00 = £5,856.00	£2,784
HSS drill bit 25 x 150 £8		122 x £8 = £976	£464.00
SDS 25 x 205 auger bit £25		122 x £25.00 = £3050.00	£1450.00
Training package		£3000.00/£6000.00/£9000.00	£3000.00/£6000.00/£9000.00
Fleet modification		£500 per appliance £95000 to convert 190 appliances* Discussion have taken place with Fleet on stowage changes and location.	£500 per appliance £95000 to convert 190 appliances
Total Project Cost (Capital)		**£242,714.00***	**£169,946.00***

4.2 On-going Annual Charges and Future Cost Analysis

On-going Annual Charges and Future Cost Analysis (Add lines to table for additional years)			
	Option 1	**Option 2**	**Option 3**
Year 1 Misting lance Drill		122 x 60 = £ 7320 x 12 years = **£87840.00** 122 x 30 = £ 3660 x 10 years = **£36,600.00**	58 x 60 = £ 3480 58x 30 = £ 1760
Year 2		£10,980pa (plus annual indexation)	£5240pa (plus annual indexation)
Year 3			
Total Maintenance Cost (Revenue)		**£124,440** Whole Life Cost (slot price)	**£59,360** Whole Life Cost (slot price)

5 Benefit Analysis

Summary of Benefits

Benefits Category	Benefit Description	Benefit Type *	Options achievable for	Return on Investment #	Current Baseline Position	Measure of Success	Benefit owner
Non-Financial	Enhanced relationship- Reduce Damage to Buildings due to reduction in water application and less physical damage accessing the voids	Non-Financial	CRMP				Fire Stations
Non-Financial	A safer and better place to work-Allow Ff's to use safer appropriate tactics for the hazards encountered	Non-Financial	Response Strategy, Fire Stations Delivery Plan,				Fire Stations
Non-Financial	A safer and better place to work-Reduce exposure to contaminants as incidents can be tackled away from products of combustion.	Non-Financial	Response Strategy, Health & Wellbeing Agenda				Fire Stations, Health & Safety, OP&A.

Non-Financial	Future cost avoidance - Reduced time on the incident ground as access to hidden fire spread expediated	Non-Financial	Response Strategy			Comparative report for time spent at incidents available from power BI.	Fire Stations, OR (Control).
Non-Financial	Enhanced relationships- Reputation of LFB enhanced by a more professional approach	Non-Financial	CRMP				LFC, LFB Corporate, Communications.
Non- Financial	Continuity of Operations-Align to NFCC Wildfire techniques	Non-Financial	NOG				Fire Stations, Health & safety, OP&A

6 Commercial Case (if procurement is required)

The procurement process will be carried out by Babcock Critical Services and will be carried out under a competitive tender process.
This will follow the usual process, where Babcock will produce a Tender Specification which details all the LFB requirements and gives them a score, which relates to the importance that the feature. There are 4 companies that supply branches that meet the criteria detailed, so all of these will be invited to tender.
Once the tenders are received, they will be scored using the scores detailed in the tender specification. Additional scores will be included which cover the company's financial standing and ability to support the product over its expected life. In this case it would be a 7-year operational life. The scoring is divided between technical compliance and financials, with a ratio of 60% of the score attributed to the procurement and financial aspects, with 40% on the products engineering aspects. The scoring process involves OP&A, FLEET and Babcock.

The product that scores the highest will usually be the one that is accepted; however, operational tests are also carried out which may highlight issues or concerns which might override the highest scoring product.

Babcock will negotiate the contract to supply the product with the selected supplier and will manage the ongoing support and repair of the product for the full operational life.
The cost of this is covered within the slot price, which must be agreed as part of the procurement process.

7 Recommendations

The recommendation is for Option 2, the placement of one misting lance onto each Pump Ladder appliance.

Option 2 provides the maximum coverage across the London area and resolves any restow issues that may be faced, it also minimises the impact where resources are prioritised using the Priority crewing model during key periods.

Option 2 ensures that the technology will be available on the majority of incidents attended and that it can be deployed in the most expedient manner. This will realise the benefits to firefighters and the public.

The provision of this technology will greatly improve Firefighter safety and improve the efficiency and firefighting capability of London firefighters, together with the associated environmental benefits of reduced water usage at these types of incidents.

8 Next Step & Considerations

The funding for this has been set aside by finance within the OPA Budget lines from reserves.

9 Impact Assessment Engagement

Equalities	EIA Completed and signed off
Sustainability	SIA Completed and sent to team signed off pending policy
Data Protection	DPIA Completed and sent to team – not required
Health and Safety	HSIA Completed and sent to team
Training	Email engagement with DaMOP and Training team