GREATER**LONDON**AUTHORITY

REQUEST FOR DIRECTOR DECISION – DD2005

Title: THERMOS – European Union (EU) Horizon 2020 Heat Mapping Project

Executive Summary:
In January 2016 the GLA was part of a project consortium that submitted a bid for the European Union (EU) Horizon 2020 (H2020) 'EE-05-2016 - Models and tools for heating and cooling mapping and planning' Call. The GLA's role in the project will support the development and delivery of London's decentralised energy programmes and the Mayor's Climate Change Mitigation and Energy Strategy.

The aim of the THERMOS (Thermal Energy Resource Modelling and Optimisation System) project is to develop detailed energy masterplans in a more cost and time effective way accelerating the process of getting to the detailed feasibility stage for heat networks. This project will provide the methods, data, and tools to enable public authorities and other stakeholders to do this. The purpose of this is to amplify and accelerate the development of low carbon heating and cooling systems.

The bid was successful and the consortium (led by the Centre for Sustainable Energy) has been invited by the EU Commission to go into negotiations for the Grant Agreement. Approval is now being sought for the GLA's role in the project so that it can sign the project consortium agreement and become a formal member and actively participate in the project. This will allow the Centre for Sustainable Energy, the lead partner, to negotiate the grant agreement with the EU Commission with the aim of signing it by November 2016.

The EU Grant will cover 100% of the GLA's project costs, with the main cost being approximately 0.3 FTE a year for its three year duration from signing the grant agreement, estimated to be by November 2016.

Decision:

The Executive Director approves the receipt of €121,123 grant funding from the EU Commission (via the Centre for Sustainable Energy) and associated expenditure relating to activity required to participate in the THERMOS project.

AUTHORISING DIRECTOR

I have reviewed the request and am satisfied it is correct and consistent with the Mayor's plans and priorities.
It has my approval.

Name: Fiona Fletcher-Smith

Position: Director for Development, Enterprise and Environment

Signature:

Date: 25.5.2016

PART I - NON-CONFIDENTIAL FACTS AND ADVICE

Decision required – supporting report

1. Introduction and background

1.1 This project was developed in response to the challenges that London's energy systems face in meeting the Mayor's 60% carbon dioxide reduction target and his 25% Decentralised Energy target by 2025 as well as the 80% carbon dioxide reduction target for 2050 as set out in the UK's Climate Change Act. If successful it will provide an important resource for reducing the cost and accelerating the identification and development of district heating networks in London.

1.2 One of the objectives of the GLA's Environment Team is to continually scan EU funding calls to identify appropriate calls that provide opportunities to help deliver Mayoral Programmes and London's Environmental Strategies, Objectives and Targets.

1.3 It identified Horizon 2020 Call - **EE-05-2016 Models and tools for heating and cooling mapping and planning** – as a Call worth submitting a bid under as it would result in a project that would help to deliver against the Mayor's Climate Change Mitigation and Energy Strategy and support our work towards our 60% Carbon Dioxide reduction and 25% Decentralised Energy targets by 2025.

1.4 As part of the Environment Team's work programme for 2015/16 approved by the Mayor under cover of Mayoral Decision 1503, the identification of and submitting bids for appropriate EU funding calls was noted. This project emerged as part of that workstream and this project will provide a great resource for our future decentralised energy and district heating work and the nature of support that we are able to provide to relevant stakeholders.

1.5 The bid was successful and consequently we are submitting this Directors Decision (DD) to enable the GLA to negotiate (in so far as is possible) a consortium agreement with the Centre for Sustainable Energy and participate in the project. The Centre for Sustainable Energy, as project coordinator, will negotiate and sign a grant agreement with the EU Commission and they will then cascade the EU funding to project partners.

1.6 The budget for the GLA's portion of the EU Grant will cover 100% of the costs of the project to the GLA, the main cost will be 0.3 FTE a year for three years, and the GLA will not need to provide any match funding into the project. The project will run for 3 years from when the grant agreement is signed which is estimated to be by November 2016.

1.7 The Director of Resources, as with other EU projects, will sign the relevant agreements on behalf of the GLA.

1.8 The project is being led by the Centre for Sustainable Energy, who developed the GLA's London Heat Map as well as the UK Heat Map for the Department for Energy and Climate Change, and has established a knowledgeable, diverse and exciting partnership. The London partners are Islington Council and Imperial College and we also have partners from Denmark, Germany, Latvia, Poland, Portugal, Romania and Spain.

1.9 The main technical partners: Centre for Sustainable Energy, CREARA, Aalborg University and Imperial college; will be developing the methods, data, and tools for creating address-level spatial energy demand (heating, cooling and electricity) datasets.

1.10 The Pilot cities: Islington Council (London), Granollers, Warsaw and Riga; will interact with the technical partners and provide continual feedback on the methods, data and tools being produced to ensure that they satisfy the needs and requirements of cities. The approach will then be rolled-out in the main cities before being implemented by the Replication regions: Berlin and London and

the Replication cities: Cascais and Alba Ioulia; to illustrate that the approach is replicable across Europe.

1.11 There will then also be a promotion and communications workstreams that will aim to engage London boroughs, UK cities and also countries and cities across Europe to make use of the tool.

1.12 **EE-05-2016 Models and tools for heating and cooling mapping and planning**

The bid into the above call has been successful and the project is called THERMOS (Thermal Energy Resource Modelling and Optimisation System). There are a total of 15 partners from eight countries in the consortium and the UK's Centre for Sustainable Energy is the Co-ordinator and lead partner. The other partners are: Imperial College of Science, Technology & Medicine (UK), Islington Council (UK), Creara Consultores SL (Spain), Ajuntament de Granollers (Spain), Krajowa Agencja Poszanowania Energii SA (Poland), Miasto Stoleczne Warszawa (Poland), Vides Investiciju Fonds SIA (Latvia), Jelgava City Council (Latvia), Aalborg Universitet (Denmark), ICLEI Europe (Germany), Deutsche Energie-Agentur GMBH (Germany), Primaria Municipiului Alba Iulia (Romania) and Câmara Municipal de Cascais (Portugal).

1.13 The overall aim of the THERMOS (Thermal Energy Resource Modelling and Optimisation System) project is to provide the methods, data, and tools to enable public authorities and other stakeholders to undertake more sophisticated thermal energy system planning far more rapidly and cheaply than they can today. The *purpose* of this is to amplify and accelerate the development of new low carbon heating and cooling systems across Europe, and to enable faster upgrade, refurbishment and expansion of existing systems.

1.14 Ultimately the THERMOS project will provide accessible sophisticated new energy system mapping methodologies, software and associated modelling tools that empower and enable public authorities (and other agencies and stakeholders) to plan, develop, expand and upgrade city and local area heating and cooling systems significantly more quickly, efficiently and cost effectively. Specifically, we want to put local decision makers in a position to identify the right areas and routes for different types of thermal system more quickly and accurately by automating questions about possible system configurations and economics.

1.15 This approach will massively reduce planning costs, speeding up the lengthy processes currently associated with building and upgrading thermal networks (i.e. due to repeated analyses, pre-feasibility and feasibility studies of different options and routes). It will also allow national and regional planning to be based upon the same high-resolution energy system data as local project development processes.

1.16 The project is made up of six work packages (WPs) that together enable the effective and efficient delivery of this innovative and ground-breaking project:

1.16.1 **WP1- Energy System Mapping** – this WP will define and publish a standardised methodology for producing high-resolution energy system map data, covering supply, distribution and demand (at the level of individual addresses and buildings). As part of the work we will implement and test the method for and with the Pilot Cities. This will include visualisation and publication of the resulting maps using a web-mapping application.

The GLA will be involved in this WP to share our experiences and ensure along with Islington Council that the methodology will meet London's needs.

1.16.2 **WP2 - Energy System Modelling** - Development and publication of detailed algorithms required for modelling thermal energy systems, and their interactions with electrical and transport energy systems.

The GLA will be involved in this WP to share our experiences and ensure along with Islington Council that the methodology will meet London's needs.

1.16.3 **WP3 - Building and embedding the THERMOS application** – The design, specification, iterative development, and finally embedding of a new open-source software tool ("THERMOS"),

to support public authorities and other stakeholders in thermal energy system planning. The tool will have been developed with and tested on the Replication cities, including Islington Council, and will incorporate high resolution geospatial energy system representations developed in WP1 and WP2 into a user-friendly, powerful, free and open-source energy system planning tool.

The GLA will be involved in this to share our experiences and ensure along with the role of Islington Council as a Replication city that it meets London's needs.

1.16.4 **WP4 - Replication, Roll-out and Adoption** - This will replicate the THERMOS adoption model developed in the Pilot Cities on a local and regional level through a set of Regional Replication Partners (Greater London Authority & DENA focusing on the Berlin region) and smaller City Replication Partners (Cascais and Albalulia).

This is the main WP for the GLA and it will be where we develop our understanding, use and application of the tool to the London context and support its subsequent use by London boroughs and other stakeholders involved in developing district heating networks.

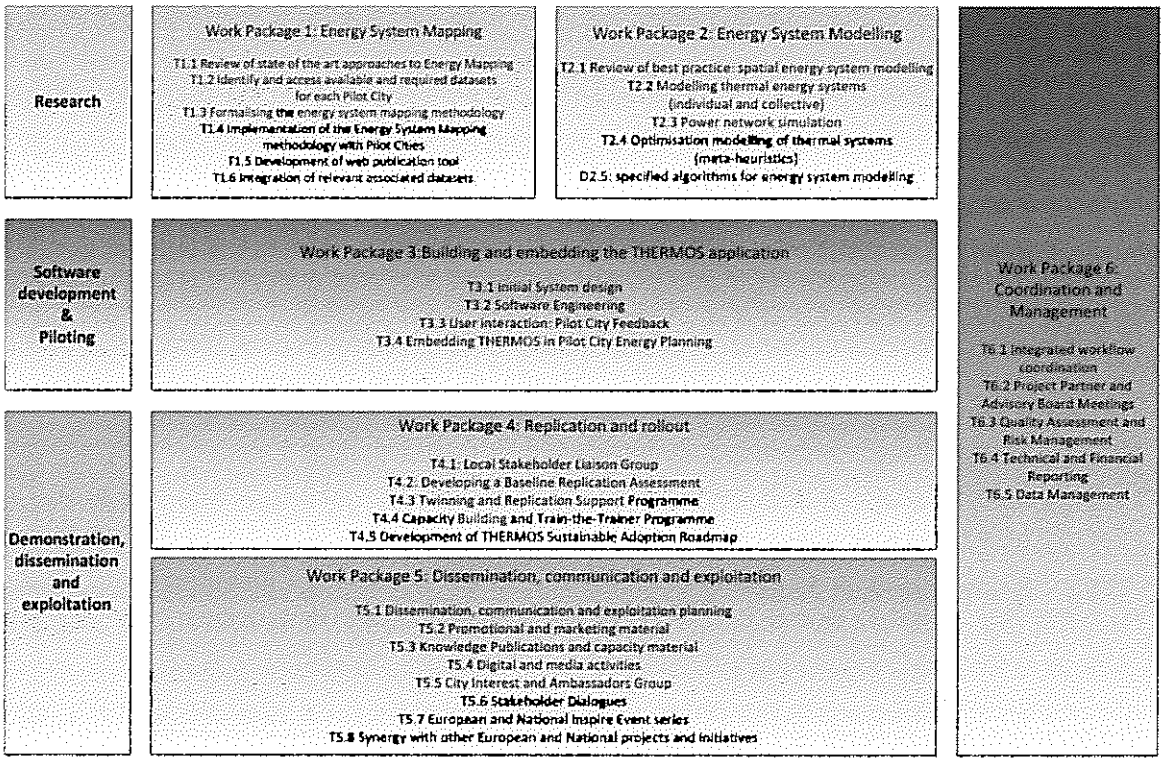
1.16.5 **WP5 - Dissemination, communication and exploitation** - This will run for the entire duration of the project and addresses all project communication and dissemination issues, ensuring that information on the project and public results are effectively exploited and widely disseminated to the relevant target groups.

The GLA has an important role here and whilst it will have an important focus on London and the UK it will also support the project's ambitions for roll-out to cities across the EU.

1.16.6 **WP6 - Project Management and Coordination** - This is where the project management and reporting, integration of activities and internal communications aspects element of the project is carried out to ensure the effective delivery of the project.

The GLA has time allocated in this along with all other partners.

1.17 Summary of THERMOS Work Packages



The GLA will be involved in all the Work Packages but the majority of its resources will be deployed in Work Package 4 – 'Replication and Roll-out'.

1.18 **Budget**

The budget for the GLA's portion of the EU Grant will cover 100% of the costs of the project to the GLA and the GLA will not need to provide any match funding into the project. The project will run for 3 years from when the grant agreement is signed which is estimated to be by November 2016.

In order for the GLA to deliver their commitments under the THERMOS project it will require the allocation of about 0.3 FTE a year over the three year duration of the project, equivalent to about 12 months of staff resources for the entire duration of the project. The GLA will receive 100% grant funding from the EU Commission towards the staff costs required to deliver these activities as part of the project.

The budget has been split up into four categories:

- Staff – this covers the staff costs required to take part in the project and is equivalent to approximately 0.3 FTE a year for three years
- Travel – This covers the travel costs required to take part in the project
- Other costs – This covers things such as hosting meetings and refreshments
- Indirect costs – This is a flat rate for overheads and is a 25% flat rate calculated from the sum of the previous three costs.

All procurement activity related to this project will be undertaken in conjunction with the Transport for London Procurement Team just as with any GLA project.

Budget breakdown in Euros (€)

	Staff	Travel	Other Costs	Indirect costs	Total EU Grant Funding
GLA	€88,499	€5,400	€3,000	€24,224	€121,123

Budget breakdown in Great British Pounds (GBP) – conversion rate of €1Euro:£0.7825GBP

	Staff	Travel	Other Costs	Indirect costs	Total EU Grant Funding
GLA	£69,251	£4,226	£2,347	£18,955	£94,779

Estimated Budget Profiles for the project – conversion rate of €1Euro:£0.7825GBP

The table below illustrates the estimated projected income and expenditure profiles for the project as currently known at this time (these will only be finalised on the signing of the grant agreement). The budget profile across the three years of the project will depend on the detailed work programme and when specifically input from the GLA is required but it is likely to be relatively evenly spread across the three years of the project.

Estimated Financial splits	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**Total**
Income in Euros	€40,374	€20,186	€40,374	€20,186	**€121,123**
Income in GBP	£31,593	£15,796	£31,593	£15,796	**£94,779**
Expenditure	€20,186	€40,374	€40,374	€20,186	**€121,123**

in Euros					
Expenditure in GBP	£15,796	£31,593	£31,593	£15,797	**£94,779**

2. Objectives and expected outcomes

2.1 Objectives:

1. To support GLA in meeting the Mayor's 60% carbon dioxide reduction target and his 25% Decentralised Energy targets each by 2025;
2. To input into the outputs and subsequent work of the London Energy Plan and enable a comprehensive strategy for decarbonising heat supply to be developed;
3. To develop a tool capable of producing detailed address level energy system maps in a more time and cost effective way than is possible at present;
4. To ensure that the tool is fit for purpose for London and EU cities generally;
5. To engage with and promote the tool to stakeholders across the EU.

2.2 Expected Outcomes:

a) To make an active contribution to the proposed workstreams of the London Energy Plan;
b) To utilise the tool, as part of the project, to support London stakeholders to develop energy system plans for parts of London where district heating networks have been prioritised;
c) To work with Islington Council to optimise the tool for the benefit of London;
d) A methodology and tool for developing time and cost effective address-level energy system maps;
e) Production of energy system maps for London and the other Pilot Cities (coverage of some layers may be national);
f) Modelling algorithms for analysing these maps and responding to a range of questions and criteria required for thermal energy system planning by city, region and national stakeholders;
g) Engage in a wider programme of dissemination and communication activities to maximise the impacts of the project outputs, during and beyond the lifetime of the project itself.

3. Equality comments

3.1 Gender Equality and Equal Opportunities are enshrined within the GLA's programmes and activities according to the Mayor's Framework for Equal Life Chances (June 2014). The framework aims to bring Londoners together rather than dividing them. It promotes outcomes for a diverse range of communities that seeks to bring real changes to the quality of life for all Londoners. Decentralised energy, along with energy efficiency, forms the framework's Environment Objective 1.2. The objective seeks to ensure protected groups such as old and young people and those who are vulnerable, are better able to afford domestic energy. DE specifically aims to help others develop and deliver energy supply projects that will reduce Londoners' energy costs by up to 10% on their current energy bills.

3.2 This is a research project looking at energy system planning in London and we will ensure that the results of the project will be relevant and applicable to all people and groups in society.

4. Other considerations

a) Key Risks

- *Change of Mayor means there is no longer support for the project* – The new Mayor talked extensively about energy supply and district heating in London and the important role that district heating has to play in our future energy systems. This projects support the realisation of that and consequently there is no expectation that the new Mayor would not be supportive of this project.
- *London not seen as a leading city within the decentralised energy and district heating sector* - By securing this funding and being engaged in the THERMOS project the GLA will ensure that we are working with a number of leading EU partners who are all at the forefront of the energy systems mapping process and our involvement will ensure that we are able to be involved in developing and implementing innovative new approaches to identifying opportunities for district heating and cooling systems.
- *Unsuccessful in negotiation process* – A good consortium has been put together, a strong and well thought through bid has been produced and consortium members will be continually updated on the EU Commission's requirements by the co-ordinator.
- *Inadequate processes in place for running the project* – The GLA is experienced in running EU projects as we now have a number that are live so we will understand the processes required.
- *The energy system mapping tool is not appropriate or relevant to cities* – We have extensive time planned for engaging with the technical partners to ensure the product is as useful as possible for London and other EU cities.
- *Fluctuation in EURO:GBP Exchange Rate* – If this fluctuates significantly it could mean that we do not receive enough EUROs to cover the costs of our activities in GBPs. The GLA has been involved in other EU projects like this and this is always an issue when applying for European funding. We will set aside an amount of funding received under the Indirect costs budget line to cover any shortfalls in the budget.

b) Links to Mayoral Strategies and Priorities

This project is explicitly linked to the Mayor's Climate Change Mitigation and Energy Strategy, published in October 2011 and also the developing London Energy Plan. Integral to the delivery of this Strategy and its 60 per cent carbon dioxide reduction target by 2025 is the 25 per cent decentralised energy target for London, which in turn is supported by the Mayor's decentralised energy and low carbon capital programmes. The project also directly relates to and supports the realisation of the energy related elements of both the Mayor's Infrastructure Plan – 2050 and his 2020 Vision.

This project is designed to develop detailed knowledge and understanding on the optimum locations for heat networks and then the optimal routes for those networks to accelerate the development of district heating projects that can be taken to market and built out. This will form an important tool for supporting the work of Energy for London as well as supporting the creation of energy masterplans for Opportunity Areas identified in the London Plan. This will support the efficient transition to a low carbon economy by supplying secure, affordable and low carbon heat through district heating systems whilst creating economic and environmental opportunities in London that are associated with this transition.

The investment opportunity for London of meeting its 25 per cent decentralised energy target is estimated at between £5-7 billion and this project will help develop real momentum towards achieving this target.

This project will make an important technical contribution to helping London meet its 25 per cent decentralised energy target in the most cost effective way. The market activity that will be stimulated through this and resulting activity in this area will also help realise the economic opportunities that delivering this target represents. It has been estimated, in annualised average figures, that our expected activity in rolling-out decentralised energy could ultimately deliver around £142m of direct GVA per year along with 848 direct jobs per year through to 2025. This could result in up to 2,500 permanent jobs being created in the decentralised energy sub-sector by 2025.

The London Low Carbon Market Snapshot Report undertaken in 2015 identified Geothermal, which includes decentralised energy and district heating, as one of London's top five sub-sectors by sales and are areas of real strength compared to other UK regions. Therefore increasing demand in sub-sectors where London already has an inherent strength will create market opportunities for London's businesses and job opportunities for London's workers. Developing this sector will not only attract inward investment but will help London's businesses develop the skills and expertise that can also be exported to other markets within the UK and globally.

Decentralised energy not only provides an investment opportunity for London and its businesses but will also make sure that London remains competitive as a global city, by contributing to the capacity and resilience of a wider, smarter, lower carbon energy network within London.

The Mayor has a portfolio of policies and programmes aimed at supporting the development and delivery of decentralised energy in London. This project forms an important part of creating that portfolio and it will enable a more cost and time-effective development phase for district heating networks. It is only by developing new innovative approaches for accelerating the roll-out and penetration of district heating systems across London that we will be able to meet our energy priorities.

c) Impact Assessments and Consultations

This project has been developed with the aim of developing and delivering a strategically important project that will contribute to the direct delivery of the Mayor's Climate Change Mitigation and Energy Strategy and his Economic Development Strategy. Decentralised energy and district heating systems have already been consulted on as part of the Mayor's Climate Change Mitigation and Energy Strategy and the specific elements of this project have been developed in response to issues and challenges that partners and stakeholders have raised in our discussions with them on developing and rolling-out district heating systems. As part of the development and delivery of the project we will continue to discuss the development and outcomes of the project with partner and replication cities and London boroughs to ensure it is as relevant as possible.

An original impact assessment was undertaken for the Climate Change Mitigation and Energy Strategy and its associated programmes. As this bid will help deliver these objectives the original impact assessment is still relevant to the project. This project isn't actually delivering any physical development but subsequent workstreams stemming from this will and those will undertake the necessary levels of impact assessments and consultation.

5. Financial comments

5.1 Director's approval is sought to approve the receipt of €121,123 grant funding from the EU Commission (via the Centre for Sustainable Energy) and associated expenditure relating to activity required to participate in the THERMOS project. This would be approximately £94,799 for the whole duration of the project (November 2016 to November 2019) at the current euro to pound exchange rate of 0.8.

5.2 The tables in paragraph 1.17 detail the proposed profile income and spend of the grant. As one of the tables indicates approximately £69,251 will be to fund a post working on the project between November 2016 to November 2019. Initially this post holder is to be resourced through the allocation of existing resources mainly from within the Sustainable Energy Delivery Team but also the wider Environment Team. If a new short fixed term post is identified as the best approach for delivering a resource intensive part of the project then approval will be sought via the Short Term Approval Form or a Head of Paid Service (HOPS) approval process.

5.3 The other costs of £2,347 will be to support hosting meetings, city delegations and demonstration workshops along with the production of various materials to develop, promote and support the roll-out of the project. The indirect costs of £18,955 will be to fund accommodation for staff, running procurement exercises, organising meetings and workshops. Some of this will be allocated to cover the costs of exchange rate differences.

5.4 As mentioned in section 4: Risks, the adverse risk of changes in exchange rate could mean that the GLA does not receive enough euros to cover the costs of the activities in pounds. This risk will be mitigated by the income under indirect costs to cover any fluctuations in the exchange rate from between signing of the consortium Agreement and completion of the project.

5.5 Initial funding is proposed to be received in advance (upfront payment of about 30% once the grant agreement has been signed) and then for annual claims will be made against costs incurred.

6. Legal comments

6.1 The foregoing sections of this report indicate that:

6.1.1 the decisions requested of the Director fall within the statutory powers, acting on behalf of the GLA, to do anything which is facilitative of or conducive or incidental to the promotion of the improvement of the environment in Greater London; and

6.1.2 in formulating the proposals in respect of which a decision is sought officers have complied with the GLA's related statutory duties to:
(a) pay due regard to the principle that there should be equality of opportunity for all people;
(b) consider how the proposals will promote the improvement of health of persons, health inequalities between persons and to contribute towards the achievement of sustainable development in the United Kingdom; and
(c) consult with appropriate bodies.

6.2 In taking the decisions requested, the director must have due regard to the Public Sector Equality Duty; namely the need to eliminate discrimination, harassment, victimisation and any other conduct prohibited by the Equality Act 2010, and to advance equality of opportunity between persons who share a relevant protected characteristic (race, disability, gender, age, sexual orientation, religion or belief, pregnancy and maternity and gender reassignment) and persons who do not share it and foster good relations between persons who share a relevant protected characteristic and persons who do not share it (section 149 of the Equality Act 2010). To this end, the director should have particular regard to section 3 (above) of this report.

6.3 Officers must ensure that:

6.3.1 they are content that they can comply with the terms of the relevant agreement(s) and ensure that they are executed by the GLA and relevant counterparties before placing any reliance on the funding in question;

6.3.2 any works/services/supplies required to enable the GLA to meet its obligations under the project are procured by TfL procurement who will determine the strategy for the same; and

6.3.3 Given the arrangements are likely to be under Belgian law (which provision would be non-negotiable), appropriate advice should be taken.

7. Planned delivery approach and next steps

Activity	Timeline
Procurement of contract [for externally delivered projects]	N/A
Announcement if bid is successful[if applicable]	21st April 2016
Delivery Start Date on signing of Grant Agreement [for project proposals]	~ October 2016
Final evaluation start and finish (self/external) [delete as applicable]:	N/A
Delivery End Date [for project proposals]	~ October 2019
Project Closure: [for project proposals]	31st March 2020

Appendices and supporting papers:

Public access to information
Information in this form (Part 1) is subject to the Freedom of Information Act 2000 (FOI Act) and will be made available on the GLA website within one working day of approval.

If immediate publication risks compromising the implementation of the decision (for example, to complete a procurement process), it can be deferred until a specific date. Deferral periods should be kept to the shortest length strictly necessary.

Note: This form (Part 1) will either be published within one working day after approval or on the defer date.

Part 1 Deferral:

Is the publication of Part 1 of this approval to be deferred? NO
If YES, for what reason:

Until what date: (a date is required if deferring)

Part 2 Confidentiality: Only the facts or advice considered to be exempt from disclosure under the FOI Act should be in the separate Part 2 form, together with the legal rationale for non-publication.

Is there a part 2 form – NO

ORIGINATING OFFICER DECLARATION:	Drafting officer to confirm the following (✓)
Drafting officer: Simon Wyke has drafted this report in accordance with GLA procedures and confirms that:	✓
Assistant Director/Head of Service: Patrick Feehily has reviewed the documentation and is satisfied for it to be referred to the Sponsoring Director for approval.	✓
Financial and Legal advice: The Finance and Legal teams have commented on this proposal, and this decision reflects their comments.	✓

EXECUTIVE DIRECTOR, RESOURCES:

I confirm that financial and legal implications have been appropriately considered in the preparation of this report.

Signature M. D. Lloyd **Date** 25.5.16