London Borough of Lambeth

# 2017 Environment Agency Thames Tidal Breach Modelling


# Strategic Flood Risk Assessment Addendum

# Contents

# 1. Introduction

This report updates the Environment Agency's now superseded 2012 Thames Breach Model for Lambeth's 2013 Strategic Flood Risk Assessment (SFRA). The existing SFRA remains relevant for all other sources of flooding. For the most up to date information on the risk of flooding from the River Thames breaching this document should be used.

## 1.1. Purpose of the document, and background information

Lambeth benefits from a significant number of flood defences, which include the Thames Barrier and flood defence embankments upstream of the Barrier. These defences provide a high standard of protection from fluvial and tidal flooding as detailed in the 2013 Lambeth Strategic Flood Risk Assessment (SFRA); however, areas behind these defences are at risk of flooding from fluvial and tidal sources should the defences breach or become overtopped. Lambeth's 2013 SFRA included the Environment Agency's Thames Tidal Breach Model that was released in 2012 to assess this risk. This model was limited to the number of breach locations, with only four breach locations located in LB Lambeth (a total of six that impact the borough).

In 2017 the Environment Agency produced an updated version of the Thames Tidal Breach Model and analysed the impact of a breach along the entire length of the River Thames defence line; this supersedes the 2012 model and outputs. As a result, LB Lambeth has produced this Addendum for the Lambeth SFRA to account for changes in the Thames Tidal Breach Scenario modelling update.

This document must be used in conjunction with the Lambeth SFRA 2013 to ensure all sources of flood risk are considered when determining the risk of flooding to a site/development. The Policy and Practice and Site Specific FRA Guidance of the 2013 SFRA remain effective and unchanged.

This report provides a brief description of the method and data used to produce the model. For full details on the model, and to obtain site specific results please contact the Environment Agency directly. Contact details can be found on https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications#contact

# 2. Updated 2017 breach scenario model

## 2.1. Study Area

The study area for the whole Thames Tidal Breach Modelling is between the Teddington Weir and Thames Barrier, see Figure 1. The breach model used the Thames Tidal Defence Line data to determine the location of the tidal defence and each breach location.

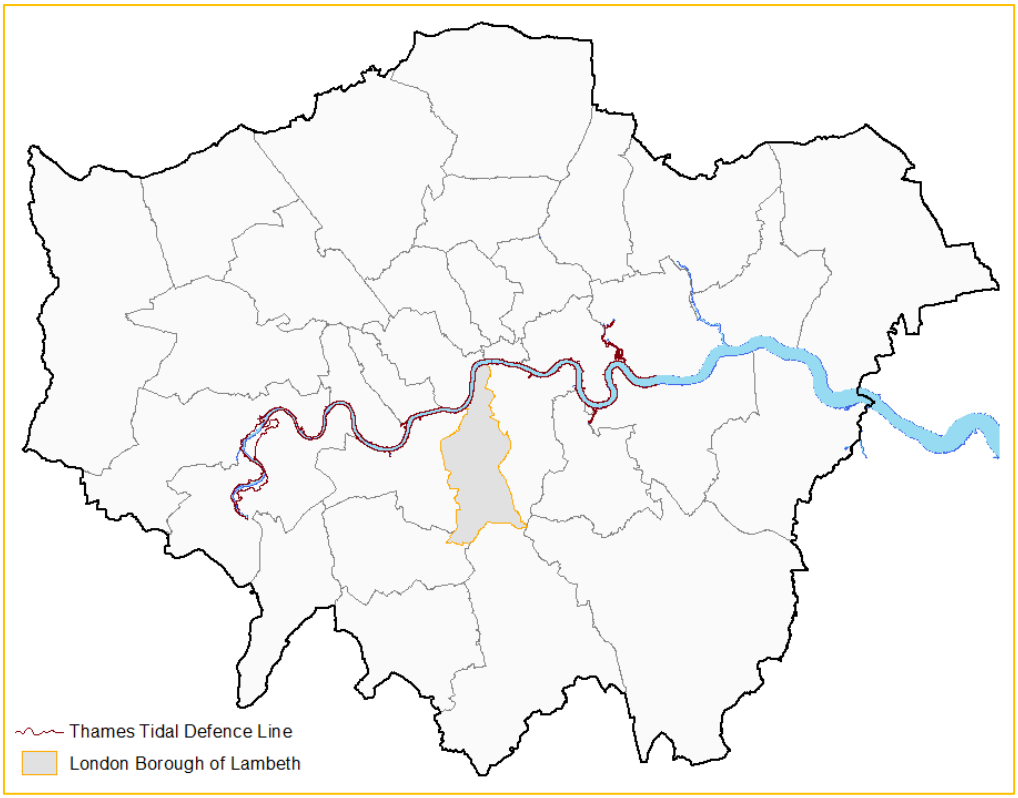



*Figure 1- Thames Tidal Defence line*

For LB Lambeth, the study area of the breach scenario model remains the same as the SFRA, the administrative boundary. However, there are outputs from breaches outside of the administrative boundary that impact the borough. Due to the nature of the final modelling outputs (i.e. composite maximum), it is not possible to distinguish which specific breach causes the resultant maximum depth or hazard using the modelling outputs provided. The administrative boundary of Lambeth is as per Figure 2.


*Figure 2 - London Borough of Lambeth administrative boundary*

# 3. Methodology

Between the Teddington Weir and Thames Barrier 5679 breach locations were individually modelled. The results were combined to obtain the maximum extent, depth, and hazard value for a breach at any point along the Thames Tidal Defences during the 2005 and 2100 epochs.

The following sections are brief outlines of the key facts, data and methodology used for the 2017 Thames Tidal Breach Modelling that is relevant to Lambeth's SFRA. For full details on the methodology used please contact the Environment Agency directly.

## 3.1. Breach locations and width

To determine the location and width of each breach site the Thames Tidal Defence line was divided into 'hard' and 'soft' defence. *'Hard' defences were considered to be a concrete wall, embankment, or similar, whilst a soft defence were considered to be an earth embankment.* Each hard and soft defence was divided into 20m and 50m wide breaches, respectively. This resulted in a total of 5679 breach sites along the Thames Tidal Defence line.

Within LB Lambeth, there is a total of 167 hard defence breach sites, as per Figure 3 - EA 2017 Thames Tidal Breach Analysis Locations

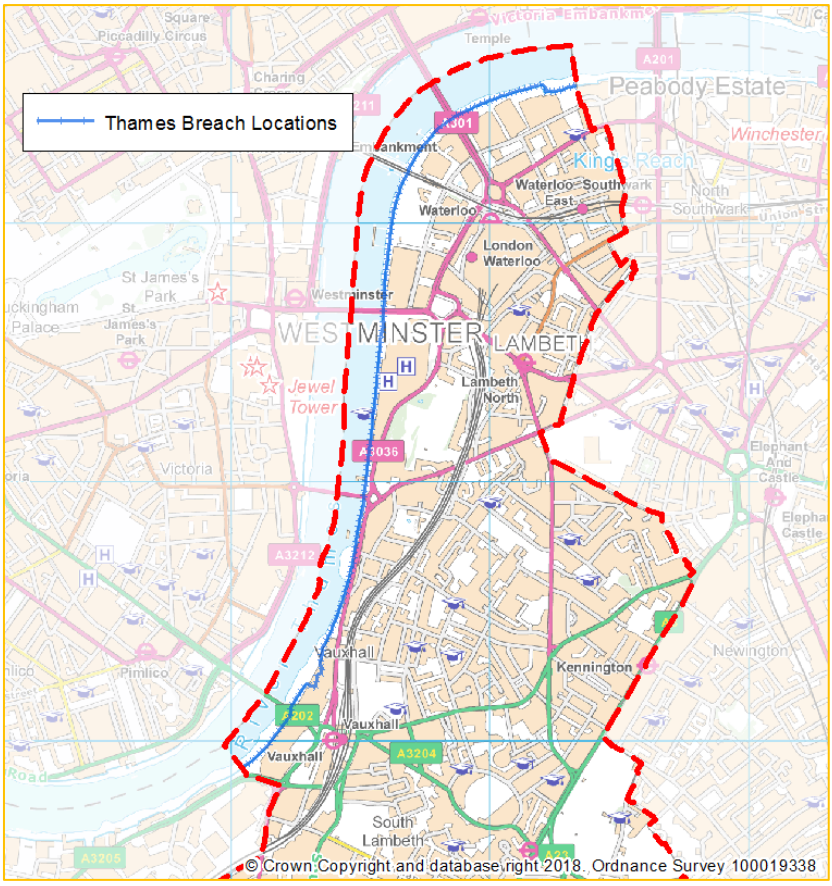



*Figure 3 - EA 2017 Thames Tidal Breach Analysis Locations*

## 3.2. Ordnance Survey MasterMap

Ordnance Survey MasterMap (OSMM) was used to inform the building outlines for the hydraulic modelling.

## 3.3. LiDAR terrain

Light detection and ranging (LiDAR) data at 1m resolution was used to represent the three dimensional terrain in a digital format (Digital Terrain Model – DTM). This data has a height accuracy of +/-15cm and a horizontal accuracy of +/- 40cm. Further information on the LiDAR accuracy is available directly from the Environment Agency.

The LiDAR used for the breach modelling was manipulated to allow for land features such as bridges to have gaps for the flood water to pass in the breach modelling.

## 3.4. Breach sill level and scour zone definition

For each breach simulation sill levels are required in order to lower the ground model (DTM) to represent the breaching of each defence and resultant scouring that would occur. The lowering of the ground was represented within a DTM used in the breach modelling. The land lowering was conducted at the start of each simulation run, and so assumes that the failure of the defence occurs before the water fully abuts the defence line.

## 3.5. Hydrology

The 1D ISIS Thames Model from the 2012 Thames Tidal Breach Model was used to extract the water level time series hydrographs.

### 3.6. TE2100 Maximum Likely Water Level Hydrograph

Thames Tidal water level profiles were obtained from the existing Thames 1D ISIS River Model (version 11), covering the extent from Teddington Weir to the Thames Barrier. Further details on methodology for the water level profiles can be found directly from the Environment Agency.

### 3.7. Modelled epochs

The epochs chosen for the modelling were the same for the breach modelling used in the previous breach modelling and Lambeth SFRA, 2005 and 2100.

## 4. Areas at risk from Thames Breach Scenario

### 4.1. Environment Agency Thames Tidal Breach Modelling outputs

The results for the Maximum Likely Water Level (MLWL) for the 2005 and 2100 epochs of the Thames Tidal Breach Modelling for LB Lambeth can be found in Appendix D – Environment Agency Thames tidal breach modelling results (2017). The Environment Agency holds site specific flood depths, hazard rating and extent. These are available through their "product 4" information package, please visit: https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications for further details on available services and how to place an order.

## 5. Policy and practice

### 5.1. Overview

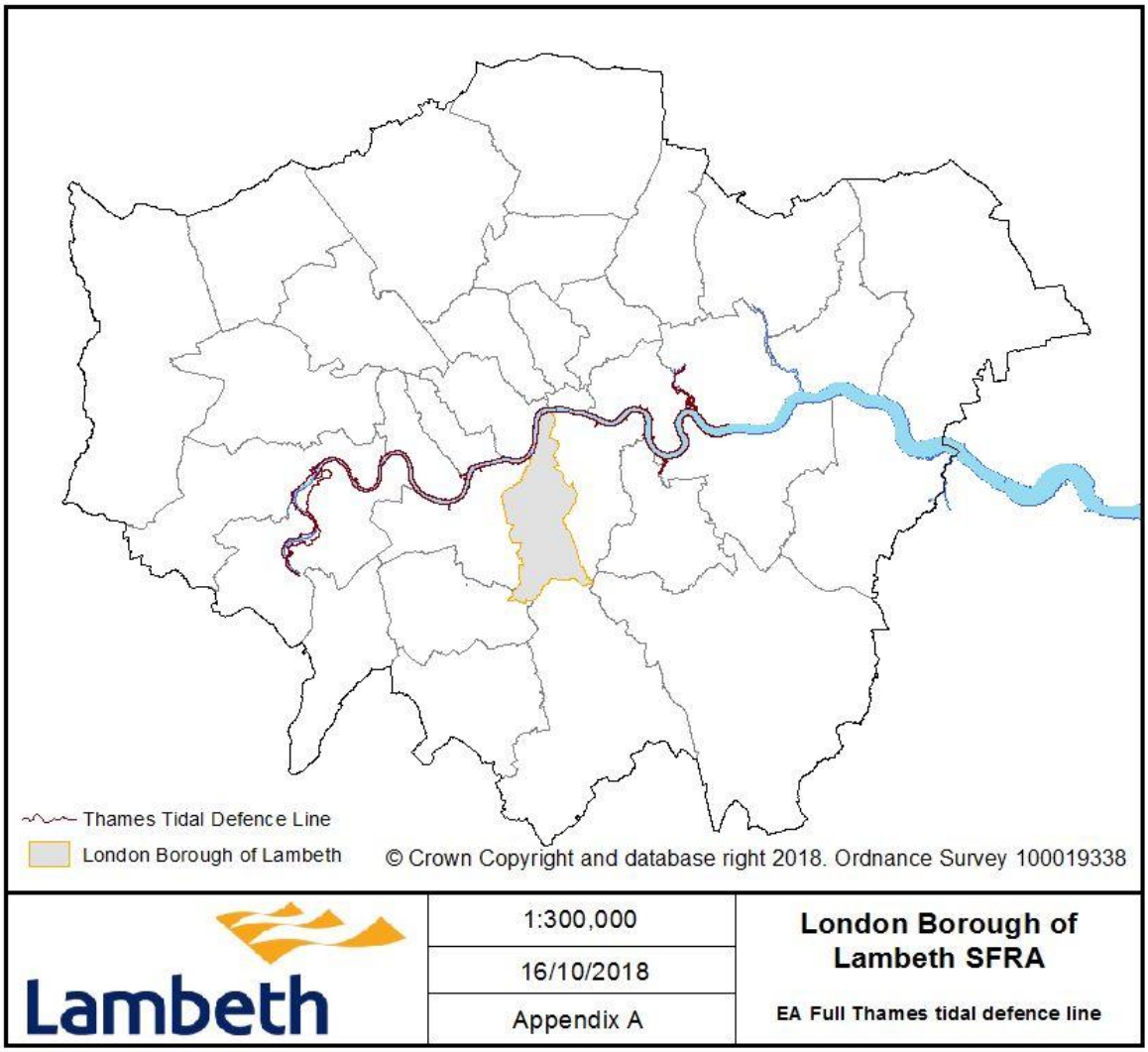
To ensure a holistic approach to flood risk management and ensure that flooding is taken into account at all stages of the planning process, the findings of this report needs to be read in conjunction with the 2013 Lambeth SFRA and incorporated into the London Borough of Lambeth's Local Plan. This will help to ensure that all flood risk is taken into account at all levels of the planning process.

### 5.2. Flood risk

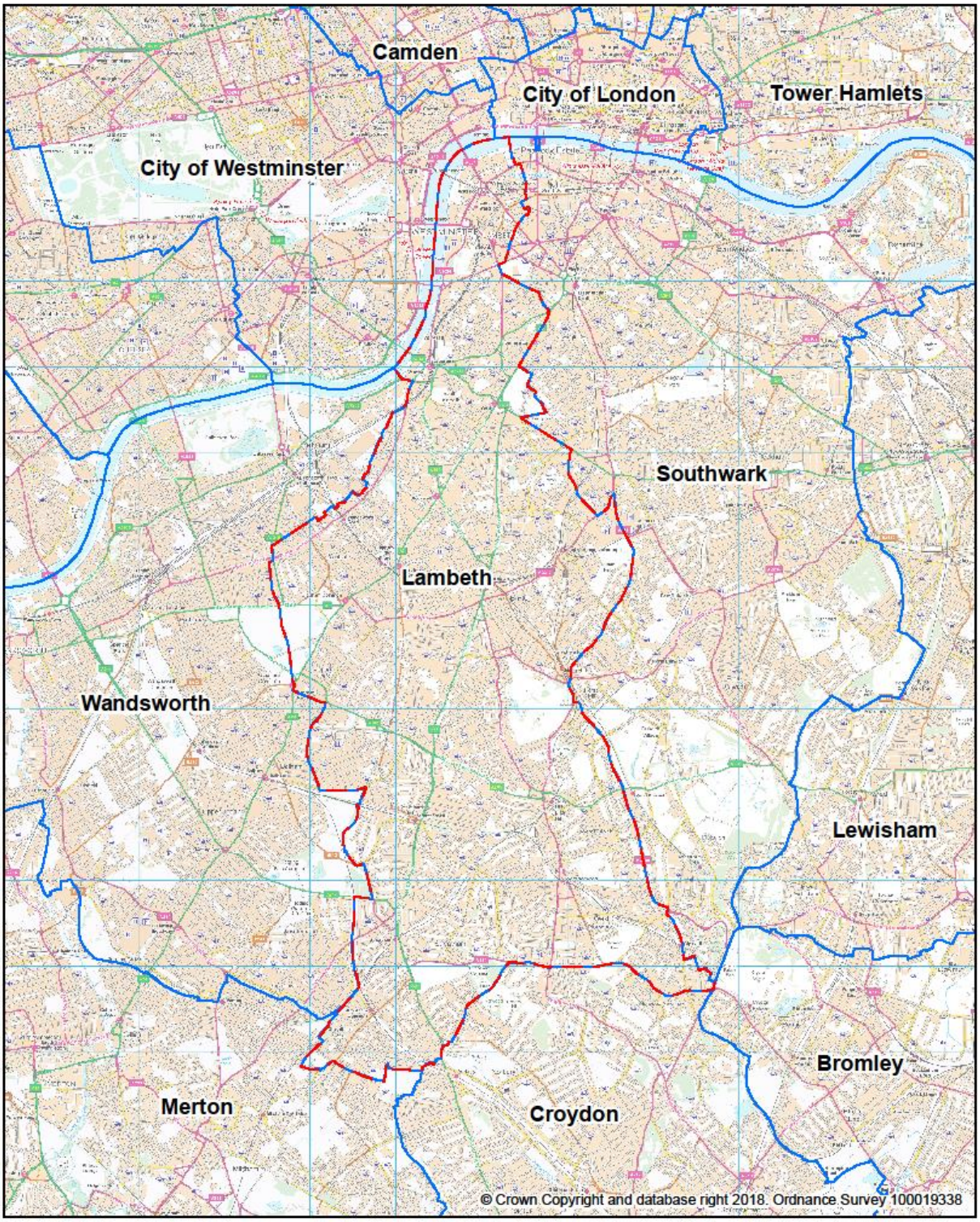
There are no additional policies relating to flood risk created by this document. For policies and practice related to flood risk in general please see the full SFRA report and the Lambeth Local Plan.

# 6. Appendices

## Appendix A - Full Thames defence line

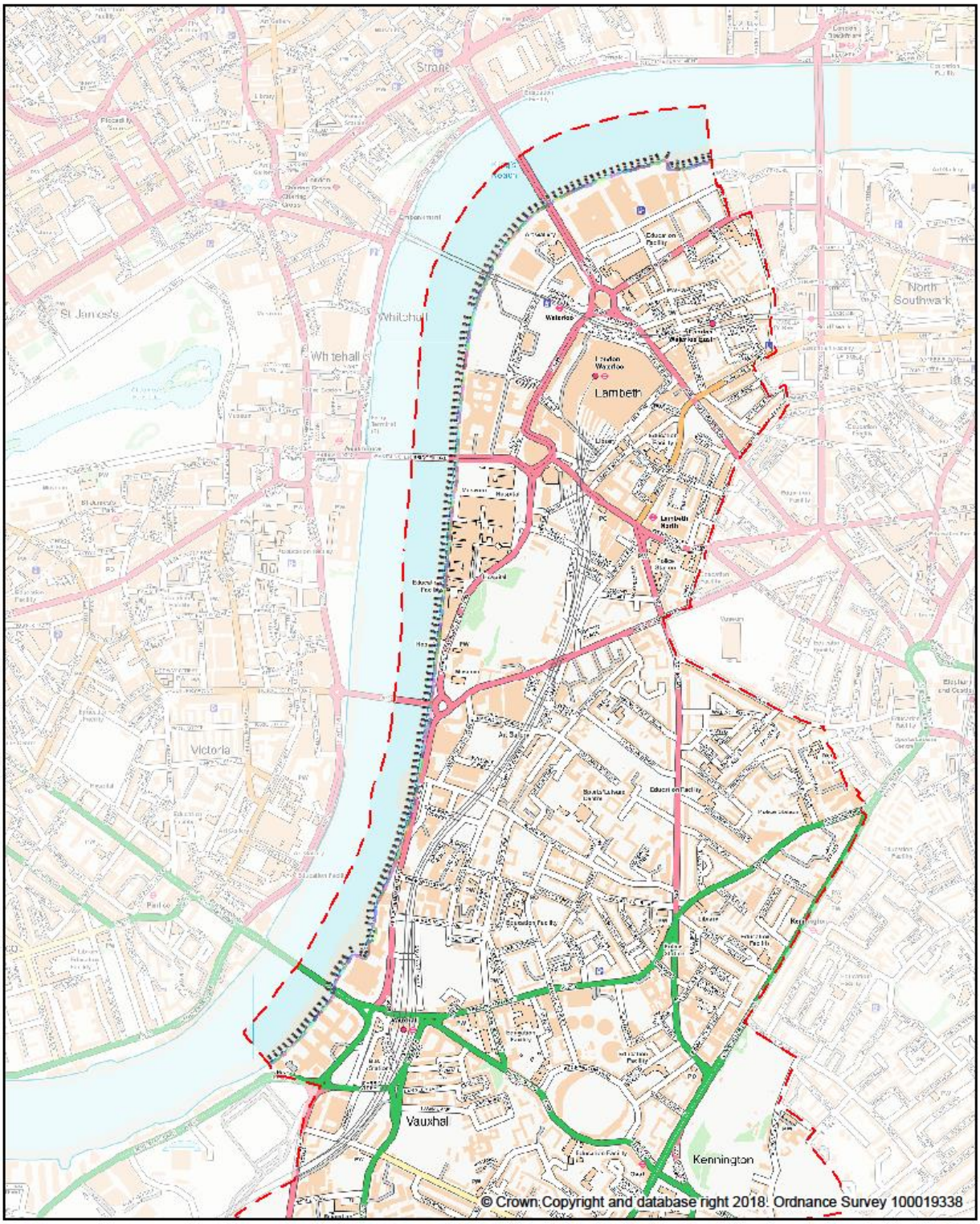


## Appendix B - Administrative Boundaries




| | | |
|---|---|---|
| | Lambeth | London Borough of Lambeth SFRA<br>Administrative boundaries |
| 0 0.5 1 1.5 2 km | 1:40,000 15/10/2018 | Appendix B |

## Appendix C - Lambeth breach locations




Borough Boundary
Thames Breach Locations

0 0.25 0.5 0.75 1 km

Lambeth

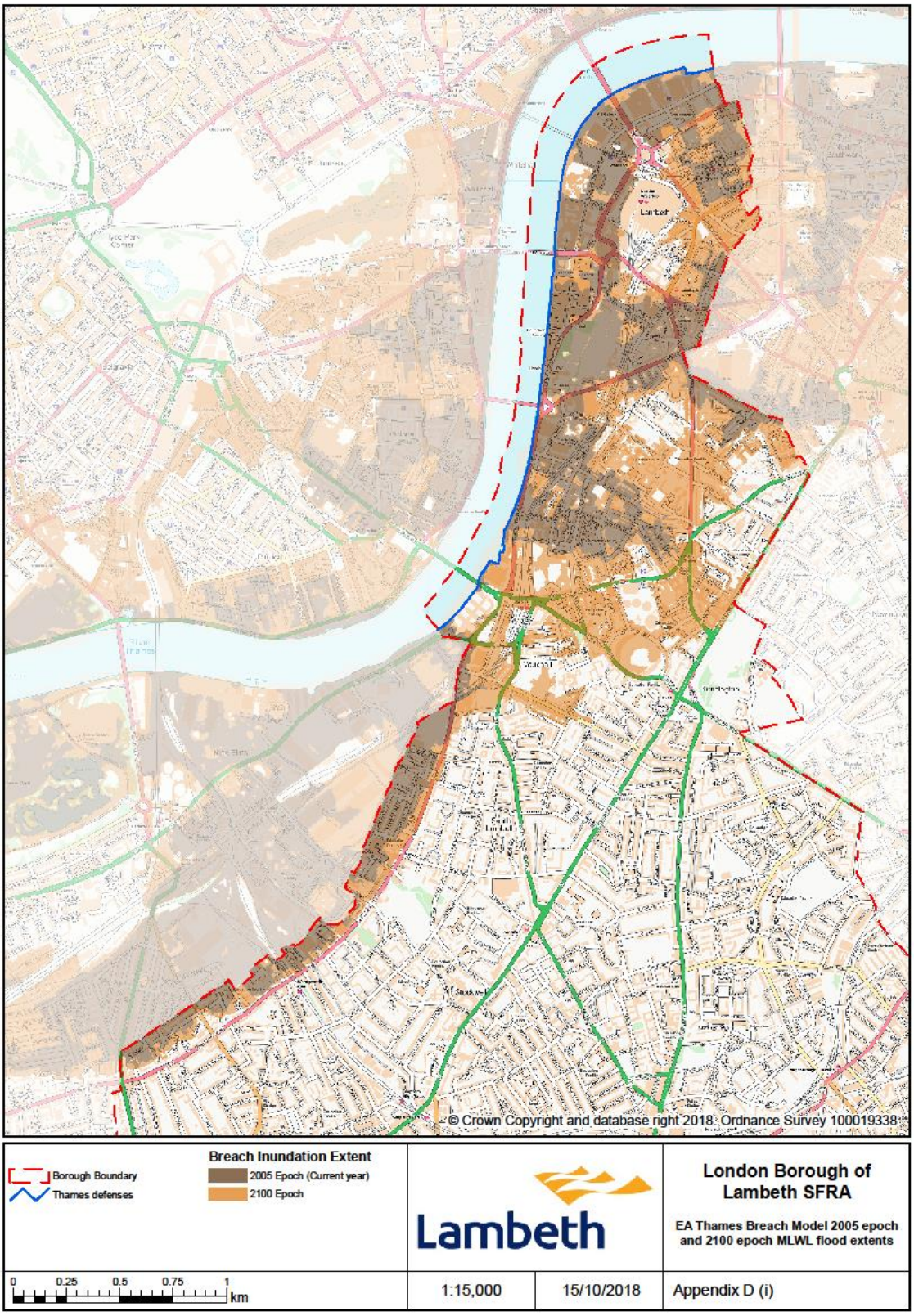
**London Borough of Lambeth SFRA**

**EA Thames Breach locations**

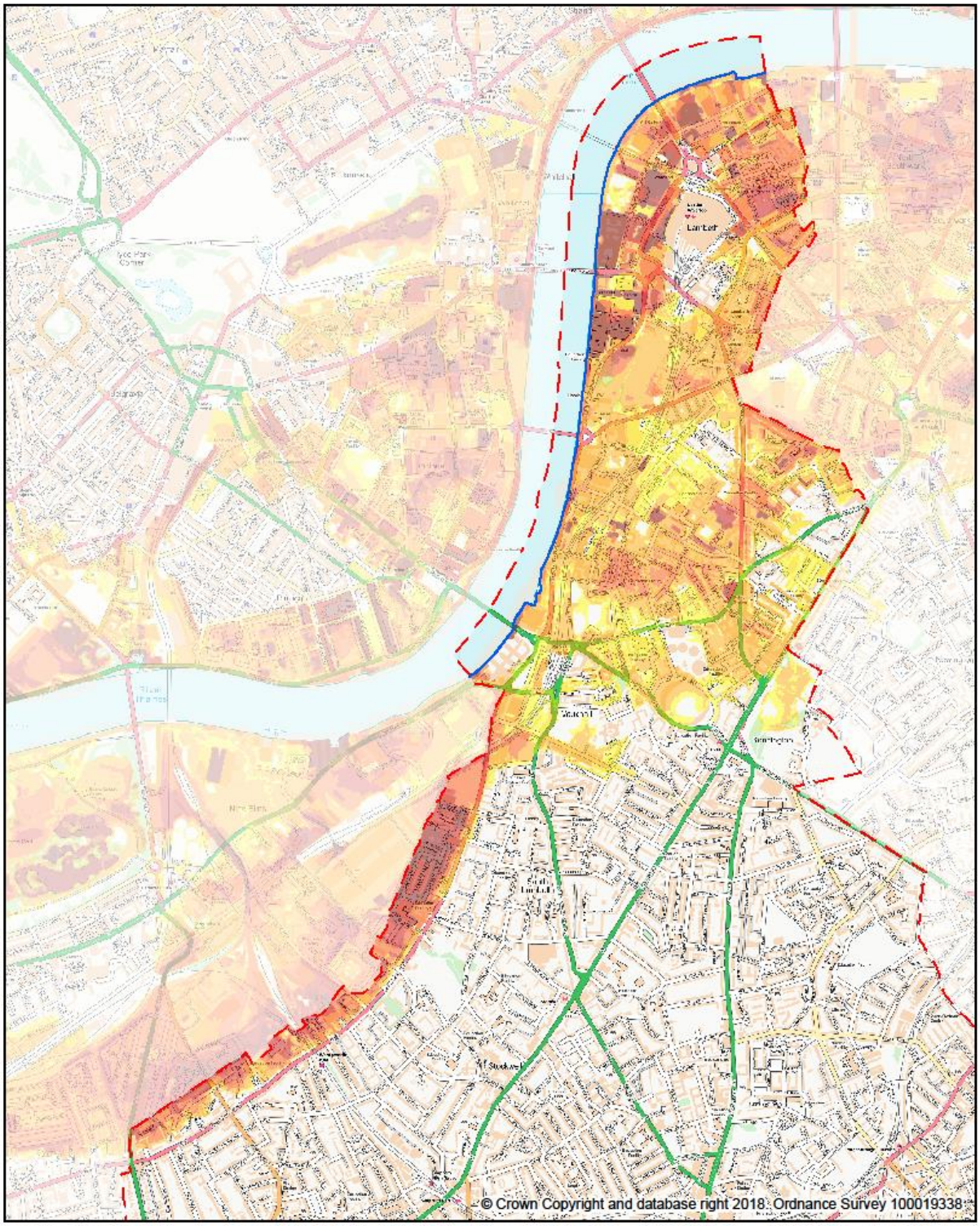
| 1:10,000 | 15/10/2018 | Appendix C |
|---|---|---|

## Appendix D – Environment Agency Thames tidal breach modelling results (2017)

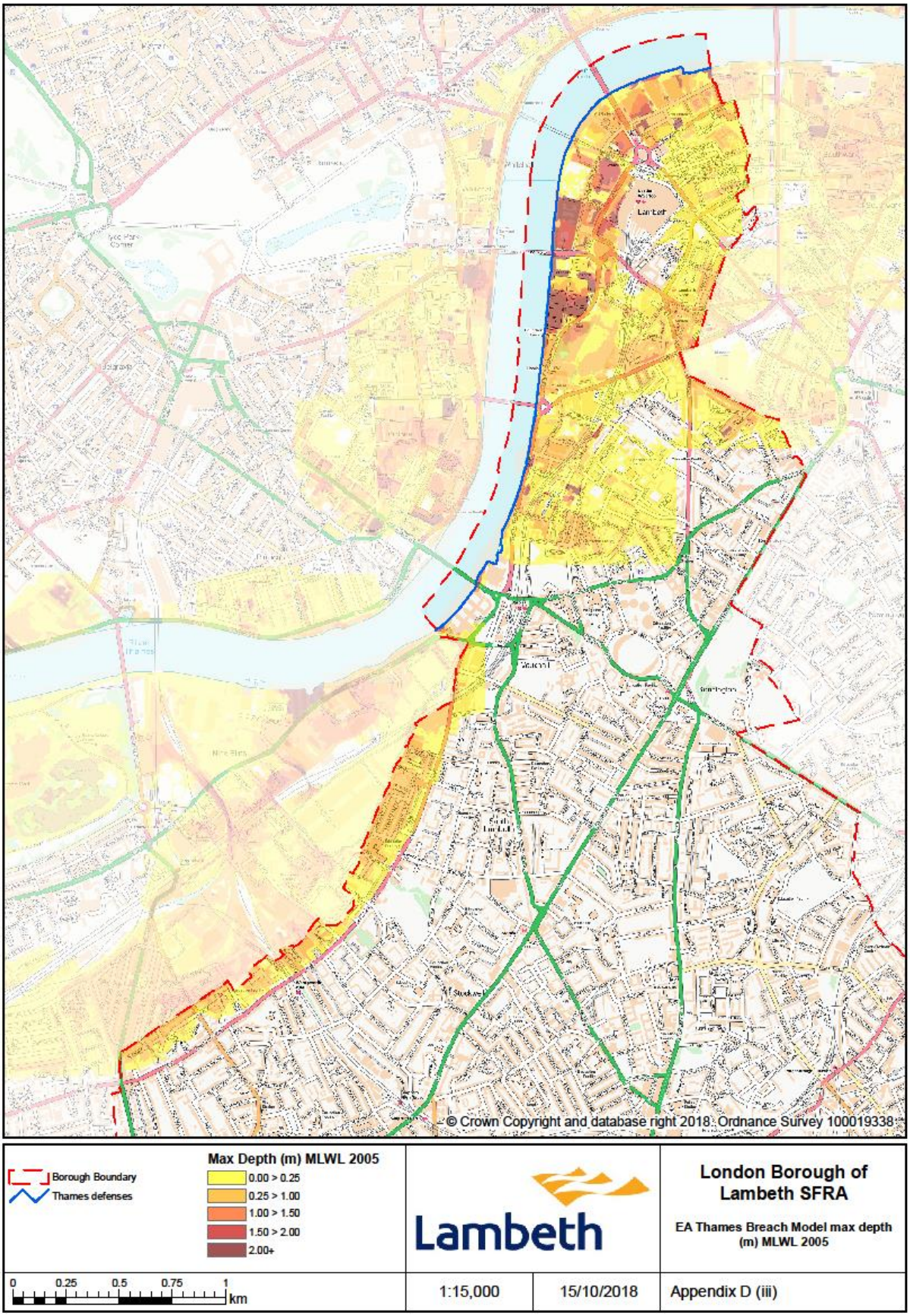
- Appendix D (i) - 2005 epoch and 2100 epoch MLWL extents



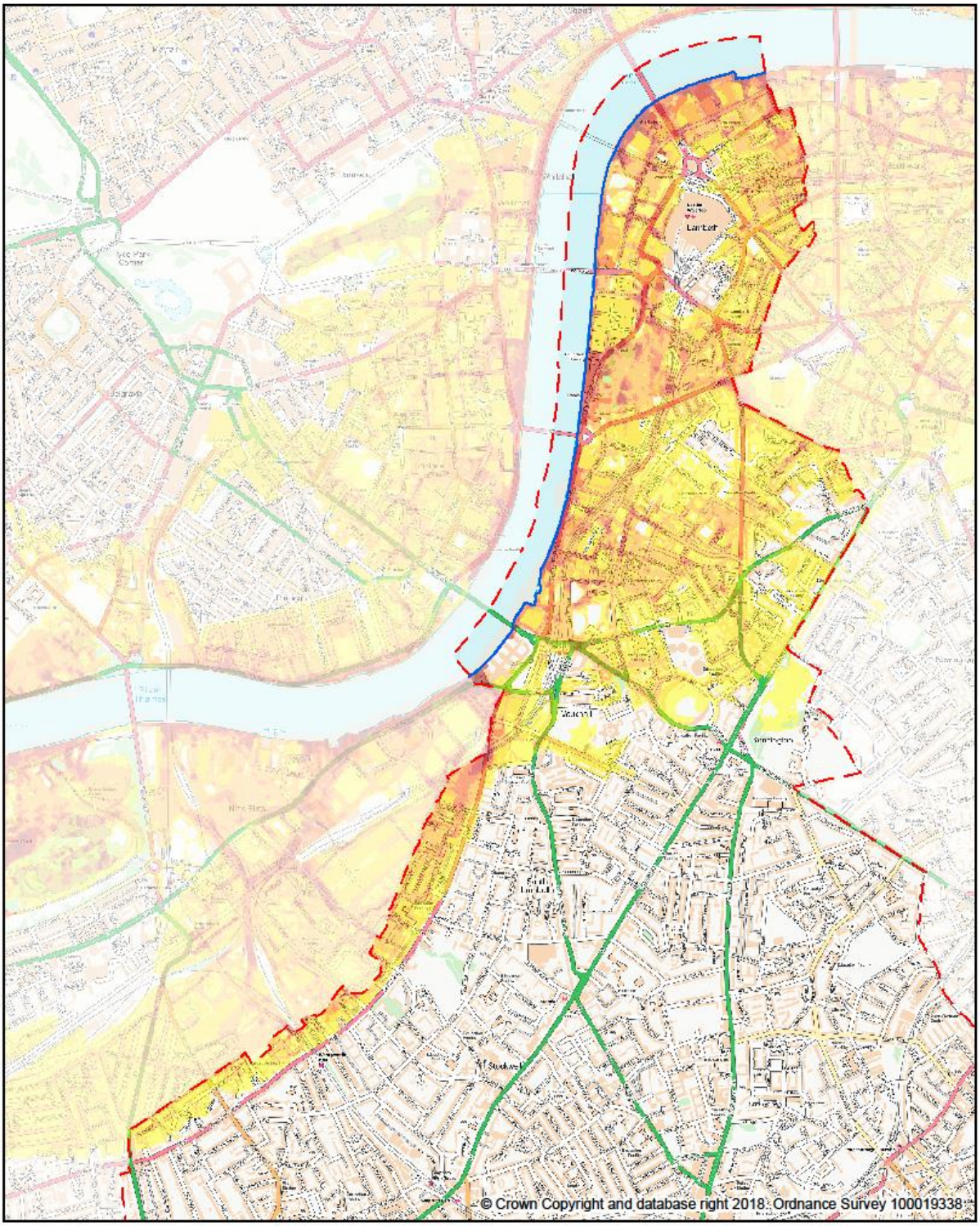
- Appendix D (ii) - Max Depth (m) MLWL 2100



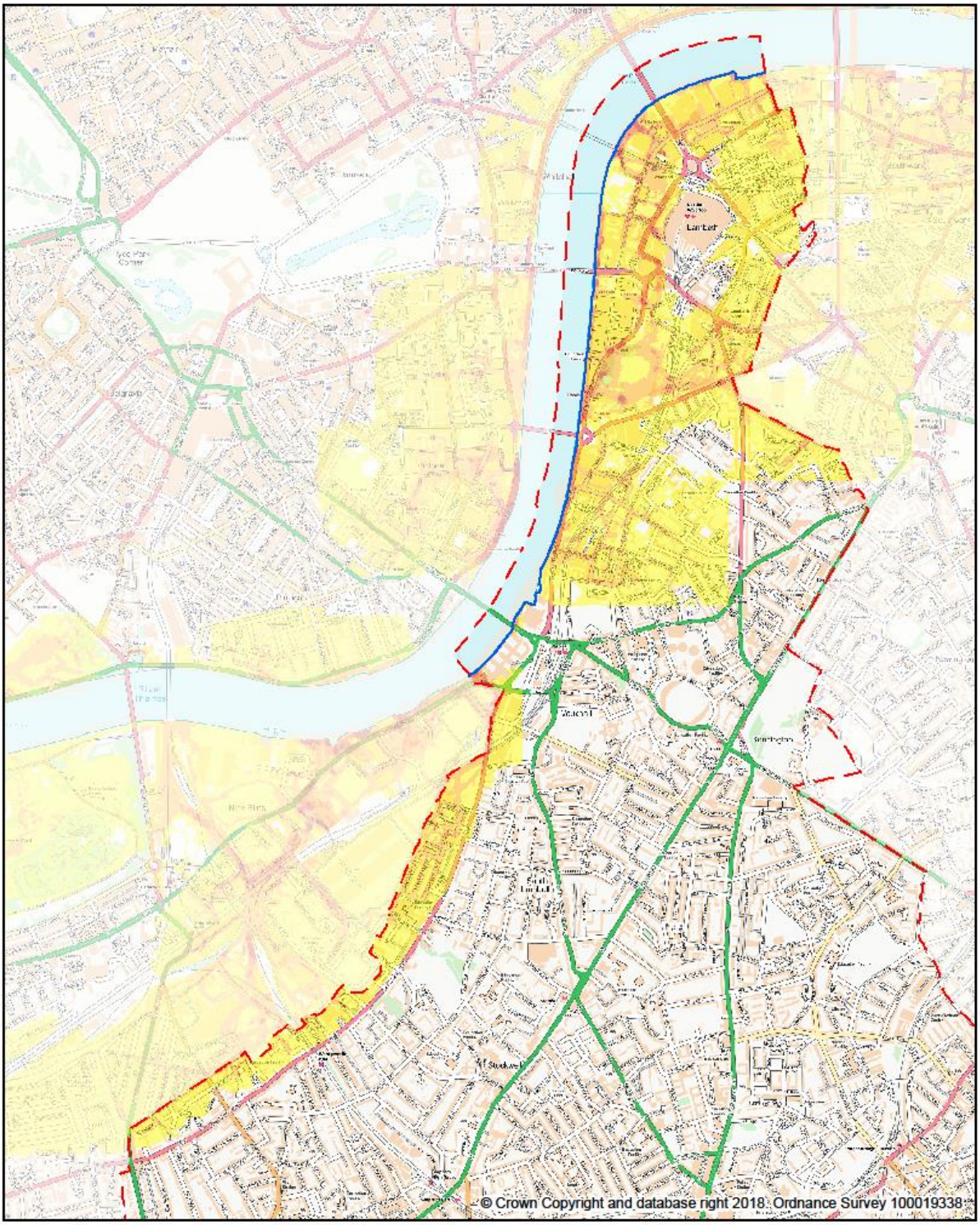
- Appendix D (iii) - Max Depth (m) MLWL 2005



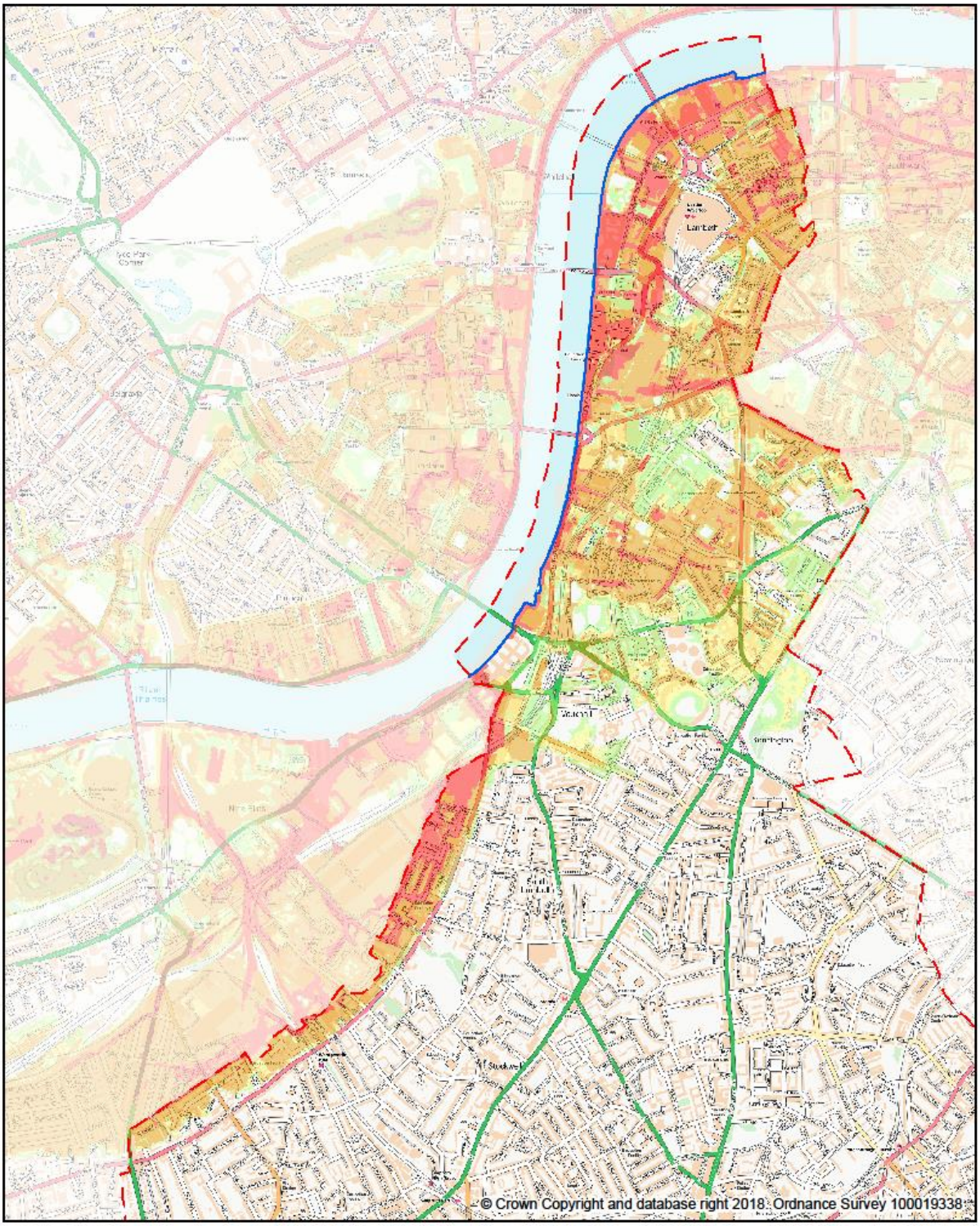
- Appendix D (iv) - Max velocity (m/s) MLWL 2100



- Appendix D (v) - Max velocity (m/s) MLWL 2005



- Appendix D (vi) - Max hazard MLWL 2100



- Appendix D (vi) - Max hazard MLWL 2100