

APPENDIX H

FORD STAMPING PLANT AND BEAM PARK

FORD STAMPING PLANT (INCLUDING CHEQUERS CORNER) AND BEAM PARK**Area Name:** Ford Stamping Plant (including Chequers Corner) and Beam Park**Location:** Dagenham**River Catchment:** Beam River, Gores Brook, River Thames**NPPF Flood Zone (majority of area):** Flood Zone 3a**NPPF Flood Zone (worst case):** Flood Zone 3a**Introduction**

The Ford Stamping Plant and Beam Park strategic development site occupies an area of approximately 0.46 km² and is located in the south-east of Barking and Dagenham (refer to Appendix A). The site is bounded by the A136 in the north, Beam River in the east, the railway line in the south and Chequers Lane in the west.

The existing land use in the area is predominantly industrial with the Ford Stamping Plant located in the west of the site, the Paint Trim and Assembly (PTA) in the centre of the site and a large area of car parking in the east of the site.

This development site is owned by the Greater London Authority (GLA) and proposals for the site include the development of residential and commercial areas in the west, with the remainder of the area returned to open green space which will provide flood storage in the event of flooding from the Beam River. A Flood Management and Drainage Study for the development of this site was completed by Mott MacDonald in 2014 to overcome the constraints that the existing flooding regime poses to the site.

Description of Flood Risk*Fluvial and Tidal*

The primary sources of flooding to the Ford Stamping Plant and Beam Park strategic development site are tidal flooding from the River Thames and fluvial flooding from the Beam River and River Roding. There is also considered to be a risk of significant fluvial flooding in this area due to the interaction between the River Thames and the Beam River, where high water levels in the River Thames could restrict outflow from the Beam River.

The majority of the development site (c. 94%) is located within the high risk Flood Zone 3a. The extents of Flood Zone 3a and Flood Zone 2 are very similar with only a nominal difference shown in the north-west corner of the site (c. 1%). The remaining c. 5% of the area is within the low risk Flood Zone 1, also located in the north-west corner. Analysis of local topography and Flood Zones indicates the flood depths are expected to reach up to 3m in areas of Flood Zone 3a.

Fluvial and tidal flooding within the Ford Stamping Plant and Beam Park strategic development site is illustrated in Figures H1 and H2A.

Surface Water

The Environment Agency Risk of Flooding from Surface Water map indicates that the Ford Stamping Plant and Beam Park area is generally at low risk of surface water flooding, however the perimeter of the existing Ford Stamping Plant building is shown to be at risk with flow depths of up to 0.6m predicted during a rainfall event with an annual probability of 1 in 100 (1%). An area of higher risk is also shown adjacent to the Fire Station (centre north of the site). The associated flood hazard at these locations is generally classified as 'moderate' (Danger to some) but has isolated areas indicating a higher 'significant' hazard (Danger to most).

Flood hazards associated with surface water flooding during the 1 in 100 (1%) annual probability event are illustrated in Figure H3.

Groundwater

The increased Potential for Elevated Groundwater map (iPEG), developed for the Barking and Dagenham SWMP, indicates that the northern part of the site, adjacent to the A1306, and the east of the area, including along the eastern boundary of the site, are within areas identified as having an increased potential for groundwater to interact with or rise to within 2m of the ground surface. For details of the iPEG map refer to the Level 1 SFRA report Section 5.3 and Appendix I. Groundwater emergence could pose flood risk to basement or below ground structures, as well as generate overland flows that are likely to pond in areas of flat topography or be similar in location to those discussed as part of the surface water flood analysis.

Defence or Reservoir Failure

All of the Ford Stamping Plant and Beam Park strategic development site benefits from flood defences on the Beam River, including the Beam Washlands and a pumping station installed as part of the Gores Brook and River Beam Flood Alleviation Scheme, and from the River Roding defences and Thames tidal defences. Areas identified to benefit from existing flood defences are illustrated in Figure H4 and H5, noting that these do not take into account the potential effects of climate change and may not fully represent flooding from the River Beam that is reported to have a lower than 1 in 100 (1%) annual probability Standard of Protection (SoP).

The Beam, Ingrebourne and Mayes Brook Flood Risk Mapping study (undertaken by Halcrow in 2013) indicates that the SoP afforded to the site by the Beam defences is between a 1 in 50 (2%) and 1 in 75 (1.33%) annual probability fluvial flood when combined with a Mean High Water Spring tide. Should a larger tidal event occur simultaneously with a large fluvial event, or in the event of a failure of the outfall to the Thames, further overtopping of the defences could occur and there may be significant flooding in the area.

The Lower Roding Flood Risk Mapping study (undertaken by Capita Symonds in 2009) indicates that the defences along the River Roding provide a SoP to the site equivalent to a 1 in 200 (0.5%) annual probability fluvial flood. This study only assessed the fluvial flood risk from the River Roding and no assessment was undertaken of a fluvial flood event occurring when the Barking Barrier is closed or when tide levels in the River Thames are high.

The River Thames tidal defences provide a present day SoP equivalent to a 1 in 2000 (0.05%) annual probability tidal flood event. It is believed that by 2030 the SoP will decrease to approximately 1 in 1000 (0.1%).

Site-specific flood risk assessments for developments within the areas benefitting from the defences along the Beam River, River Roding and the River Thames should include an assessment of the risk of overtopping of the defences, as well as the risk of a breach in the defences. This should also consider the condition of flood defences as discussed in the Level 1 SFRA.

The Environment Agency River Thames breach analysis undertaken in 2017, and the breach analysis undertaken for the Barking and Dagenham SFRA published in 2008, indicates that the degree of flood hazard in a significant proportion of the Ford Stamping Plant and Beam Park strategic development site would be 'very high' (Danger for all) should a breach in the River Thames or Barking Creek defences occur. In general the areas shown to be at risk of flooding following a breach are broadly similar to those areas identified to be at risk within the mapped Flood Zones 2 and 3.

Mapped outputs of breach analysis relevant to the Ford Stamping Plant and Beam Park strategic development site are provided in Figures H6 to H9.

Review of the available breach mapping indicates that following a breach of the flood defences along Barking Creek, flooding would occur rapidly in many areas of the site, with a predicted rate of inundation between 10 and 15 hours after the breach occurring. A breach of the River Thames tidal defences would result in a slower rate of inundation of the strategic development area, with flooding expected to occur between 15 and 20 hours after the breach occurring.

During the most recent inspections undertaken by the Environment Agency in 2015-2016, generally, the flood defence assets protecting Barking and Dagenham are in good condition; of the 120 flood defence assets surveyed, 105 were classified as being 'Good' or 'Very Good'. However, four of the surveyed flood defence assets were classified as being 'Poor' or 'Very Poor'.

Two of the flood defence assets on the River Roding, approximately 6.5km upstream from the confluence with the Thames, were assessed as being in 'Poor' condition, (Environment Agency asset numbers 8742 and 15371). A failure of flood defence asset no. 15371 would be likely to affect the Ford Stamping Plant and Beam Park strategic development site.

Part of the flood defences on the River Thames were also assessed as being in 'Poor' and 'Very Poor' condition during the Environment Agency's last inspections. These are located at the confluence with the River Beam (Environment Agency asset number 7391) and approximately 2.2km downstream of the confluence with the River Roding (Environment Agency asset number 14860) respectively. A failure of either flood defence asset would be likely to affect the Ford Stamping Plant and Beam Park strategic development site.

The Environment Agency Risk of Flooding from Reservoirs map indicates the area is shown to be at risk of flooding from the Washlands Flood Storage Area.

Flood Warning Areas

The areas identified as being at fluvial or tidal flood risk within the Ford Stamping Plant and Beam Park strategic development site are within the Environment Agency 'Tidal Thames from Mar Dyke to Barking Creek' and 'River Beam Dagenham' Flood Warning Areas.

Flood Warnings are issued to specific areas when flooding is expected. Flood Warnings apply to fluvial and tidal flooding, not to flooding from other sources such as sewer and surface water flooding.

Areas of the Ford Stamping Plant and Beam Park strategic development site which benefit from Environment Agency Flood Warnings are illustrated in Figure H10.

Impact of Climate Change

Updated guidance for considering the potential effects of climate change has been considered for the 1 in 100 (1%) annual probability event within the fluvial modelling of the Beam River, Gores Brook and Wantz Stream. The mapping, provided in Figure H2B, indicates no notable change to the fluvial flood extents within the strategic development site, although it is likely that flood depths will increase accordingly.

The effects of climate change will not only increase the risk of flooding posed to property as a result of river and/or tidal flooding, but it will also potentially increase the frequency and intensity of surface water flood risk within the Borough. A comparison of the Environment Agency 1 in 100 (1%) annual probability and 1 in 1000 (0.1%) annual probability predicted surface water flood extents, provided in the Level 1 SFRA report, indicate that the area around Kent Avenue through the centre of the Ford Stamping Plant and Beam Park strategic development site may be vulnerable to the impacts of climate change.

Planning Recommendations

Spatial Planning and Development Control

Development of the site should be undertaken in accordance with the principles as set out within Section 1 of this report and Section 7 of the Level 1 SFRA. It is understood that the proposed development within the Ford Stamping Plant and Beam Park strategic development site comprises residential and commercial development.

Proposed development within the Ford Stamping Plant and Beam Park strategic development site should be located within areas identified as Flood Zone 1 wherever possible, although it is noted that little of this site is located within Flood Zone 1. A sequential approach should be adopted that steers the most vulnerable types of development (for example residential) to those areas at lowest flood risk.

Residential development (excluding basement dwellings) would be considered acceptable in the medium probability Flood Zone 2 if necessary. Residential development may also be acceptable in the high risk Flood Zone 3a following the successful application of the Exception Test. However, it will be necessary to demonstrate that the suitability of all other sites at lower flood risk has been considered and, if so, that the location of development in Flood Zone 3a provides wider sustainability benefits to the community that outweigh flood risk. This could include the redevelopment of derelict sites, wider benefits to the local economy and the need to meet demanding housing needs.

Commercial development is classified as being 'less vulnerable' and therefore is deemed suitable for the high risk Flood Zone 3a.

Development in Flood Zones 2 and 3

A site-specific flood risk assessment is required to support any planning application in the Ford Stamping Plant and Beam Park strategic development site for development located within Flood Zone 2 or Flood Zone 3, including those areas that may benefit from flood defences. The site-specific flood risk assessment should be undertaken in accordance with Section 7.5 of the Level 1 SFRA.

The assessment of flood risk in areas that benefit from flood defences should include an assessment of risk following a breach in the flood defences, as informed by breach analysis completed by the Environment Agency. This should include an assessment of potential impacts associated with the Washlands Flood Storage Area.

For development in Flood Zones 2 and 3, it is recommended that floor levels within new development are situated a minimum of 0.3m above the predicted 1 in 100 (1%) annual probability design flood level for fluvial flooding scenarios, including an allowance for climate change effects. Within tidal areas, this should be taken as the 1 in 200 (0.5%) annual probability design flood level, including an allowance for climate change effects, calculated assuming a breach of the raised flood defences.

Where possible, development should be located outside of areas identified to be at risk following breach of the flood defences, particularly those areas that may be at risk from sudden inundation with an associated 'very high' flood hazard due to the predicted depth and velocity of flood waters in some areas. If it is not possible to locate the ground floor level of the development above the predicted 1 in 100 (1%) annual probability fluvial flood level or 1 in 200 (0.5%) annual probability tidal flood level, it is recommended that the developer strives to reduce the rate of inundation (i.e. through raising ground levels as high as practicable) to 10 hours or greater to provide sufficient time to facilitate evacuation of the site.

Dry access should be provided above the 1 in 100 (1%) annual probability fluvial flood level or 1 in 200 (0.5%) annual probability tidal flood level, calculated assuming a breach of the raised flood defences in those areas benefitting from flood defences. Where this is not possible, safe access with 'very low' flood hazard should be demonstrated for all residential development proposals, and safe access with 'moderate' flood hazard should be demonstrated for all industrial/commercial development proposals. Only where neither of these is feasible, a dedicated 'safe haven' should be provided. This may be provided in the form of a sheltered communal space within the building, accessed via internal stairs. It will be necessary to ensure that the safe haven is sufficient in size to safely house all residents/users of the building.

Development proposed within Flood Zone 3a, including that within areas identified to benefit from flood defences, should be supported by a flood evacuation plan and/or emergency response plan prepared in consultation with the local emergency planning department and emergency services.

Any loss of flood plain storage within the undefended fluvial Flood Zone 3a up to the 1 in 100 (1%) annual probability plus climate change event should be compensated for on a like-for-like basis to ensure no increased flood risk elsewhere as a result of development, unless detailed site assessment demonstrates that development within these areas causes no increased flood risk elsewhere. This may be appropriate to fluvial flood risks that may overtop the Beam defences.

Compensation is not required for areas at tidal flood risk or that are indicated to benefit from flood defences up to the 1 in 100 (1%) annual probability fluvial flood level and allowing for the potential effects of climate change.

Any basement structures within the defended or undefended high risk Flood Zone 3a or medium risk Flood Zone 2 should provide safe internal access to a level 0.3m above the 1 in 100 (1%) annual probability fluvial flood level or 1 in 200 (0.5%) annual probability tidal flood level with an allowance for climate change. Basement structures within the defended Flood Zone 3a and in areas that are indicated to be at risk following breach of the flood defences should also be protected with a continuous secondary fixed flood defence. In practical terms, this may be a raised wall incorporated into the landscaping that will withstand the ponding of water (i.e. following a breach failure), and will prevent water surging into the basement area with little or no warning. Flood resilient design techniques should be adopted for all basement uses.

Basements in the defended Flood Zone 3a where the rate of inundation is less than 5 hours are not considered appropriate. Similarly, no basement that is to be used as a habitable dwelling is considered acceptable in Flood Zone 3a and it is advisable that basements used as a habitable dwelling are also not proposed in the medium risk Flood Zone 2.

Development in Flood Zone 1

As the vast majority of the Ford Stamping Plant and Beam Park strategic development site is located within the high risk Flood Zone 3a, it is recommended that any development within this site is supported by a site-specific flood risk assessment that considers the impacts of climate change on fluvial and tidal flood risk. However, if following this analysis the site brought forward for development is found to be located entirely in Flood Zone 1, this guidance will apply.

A site-specific flood risk assessment is required for developments in Flood Zone 1 where the development is 1 hectare or greater in area or at significant risk of flooding from other sources (i.e. surface water, sewerage systems or reservoirs).

The need and scope of a site-specific flood risk assessment in Flood Zone 1 should be discussed and agreed with the Council. However, it is recommended that, at minimum, a site-specific flood risk assessment is provided for development at risk of surface water flooding up to the 1 in 30 (3.33%) annual probability event, or at risk of flooding to a depth greater than 300mm during the 1 in 100 (1%) annual probability event. It is also recommended that a site-specific flood risk assessment is provided for development at risk of flooding from reservoirs, including the Washlands Flood Storage Area.

Within a development site, a sequential approach should be adopted that takes into account the potential effects of climate change on fluvial and tidal flood risk, and that takes into account flooding from other sources.

To ensure the flood resistance of a building, it is recommended ground floor levels are situated 300mm above adjacent ground level, or above the estimated 1 in 100 (1%) annual probability flood depth.

Basement structures are considered acceptable in Flood Zone 1, although where possible they should be designed to prevent the overland flow of water entering the basement structure up to and including the 1 in 30 (3.33%) annual probability event.

Consideration should also be given to the impact of flooding from other sources to the ability to provide safe access and egress, similar to those recommendations made for sites at risk from fluvial and tidal flooding.

Sustainable Drainage Systems

SUDS techniques as discussed in Section 7.7 of the Level 1 SFRA should be promoted wherever possible. The site should seek opportunities to integrate SUDS within the design of the site and provide an exemplar of best practice techniques including good use of green space to accommodate a variety of SUDS features in order to control and clean runoff from the site.

The proposals for the Ford Stamping Plant and Beam Park strategic development site include the development of residential and commercial areas in the west with the remainder of the area returned to open green space providing flood storage for the Beam River. If the site is developed in phases it is recommended that a strategic surface water drainage assessment for the site as a whole is completed to enable an overall drainage strategy to be formulated and then followed on a plot by plot basis.

Existing urban sites, particularly those with an industrial heritage, may also contain contaminated soils. The type of SUDS techniques employed at the site may also be constrained by possible high ground water levels due to the sites proximity to the River Thames and low lying topography.

As this site is previously developed it should strive to achieve betterment over existing discharge rates. Minimum betterment of 20% is considered appropriate whilst also taking the potential effects of climate change into consideration, with developers striving to achieve pre-developed greenfield rates as far as practicable.

Where the peak discharge from the site is less than 5l/s, it may be acceptable to limit discharge to a minimum rate of 5 l/s up to the 1 in 100 (1%) annual probability event to reduce the risk of blockage. However, a flow control device that reduces peak flows below 5 l/s is still acceptable and should be promoted when:

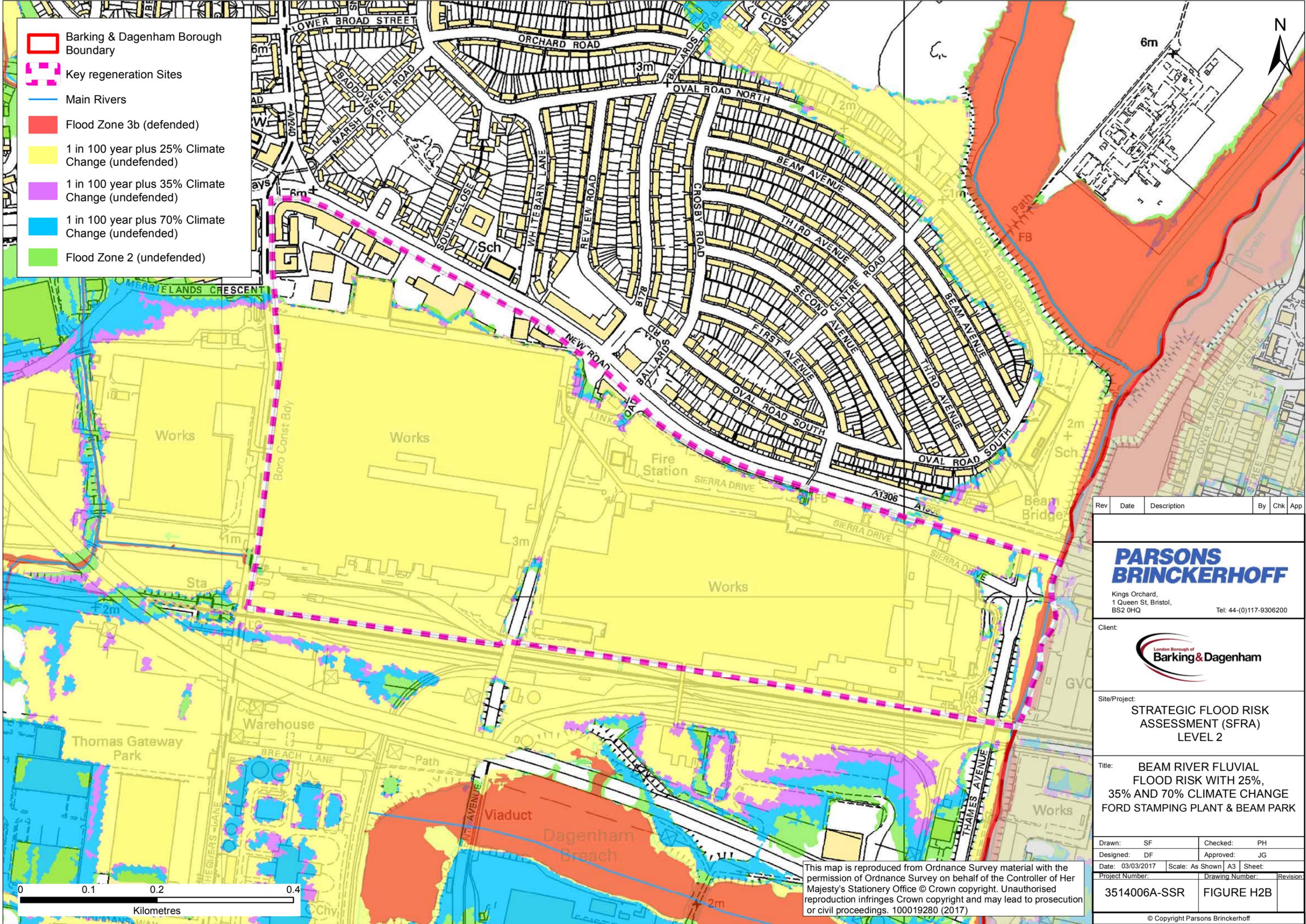
- A robust maintenance regime and appropriate maintenance contract is provided by the developer; and
- An appropriate overflow device can be included within the design that will direct flows to less vulnerable areas should the flow control device block and surcharge.

Reducing the flow rate to below 2l/s is, however, considered to pose greater risk and this would be considered an appropriate minimum discharge rate for most development unless robust controls are in place for managing residual risk.

Where the development is too small to warrant the use of storage features it is essential that SUDS techniques appropriate to the development are implemented to maximise the other benefits, principally reducing discharge during small rainfall events, maximising infiltration potential, improving resilience to climate change, providing treatment and enhancing biodiversity.

File Name: \\uk.wspgroup.com\central\data\Projects\62103xxx\62103473 - Barking and Dagenham SFRAE Models and Drawings\GIS\Mxd\Level 2\3514006A-SSR-Fluvial Flood Risk-H2B.mxd
 Login: UKSLF003
 Plot Date: 03/03/2017

-  Barking & Dagenham Borough Boundary
-  Key regeneration Sites
-  Main Rivers
-  Flood Zone 3b (defended)
-  1 in 100 year plus 25% Climate Change (undefended)
-  1 in 100 year plus 35% Climate Change (undefended)
-  1 in 100 year plus 70% Climate Change (undefended)
-  Flood Zone 2 (undefended)



This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. 100019280 (2017)

Rev	Date	Description	By	Chk	App

PARSONS BRINCKERHOFF

Kings Orchard,
1 Queen St, Bristol,
BS2 0HQ Tel: 44-(0)117-9306200

Client:

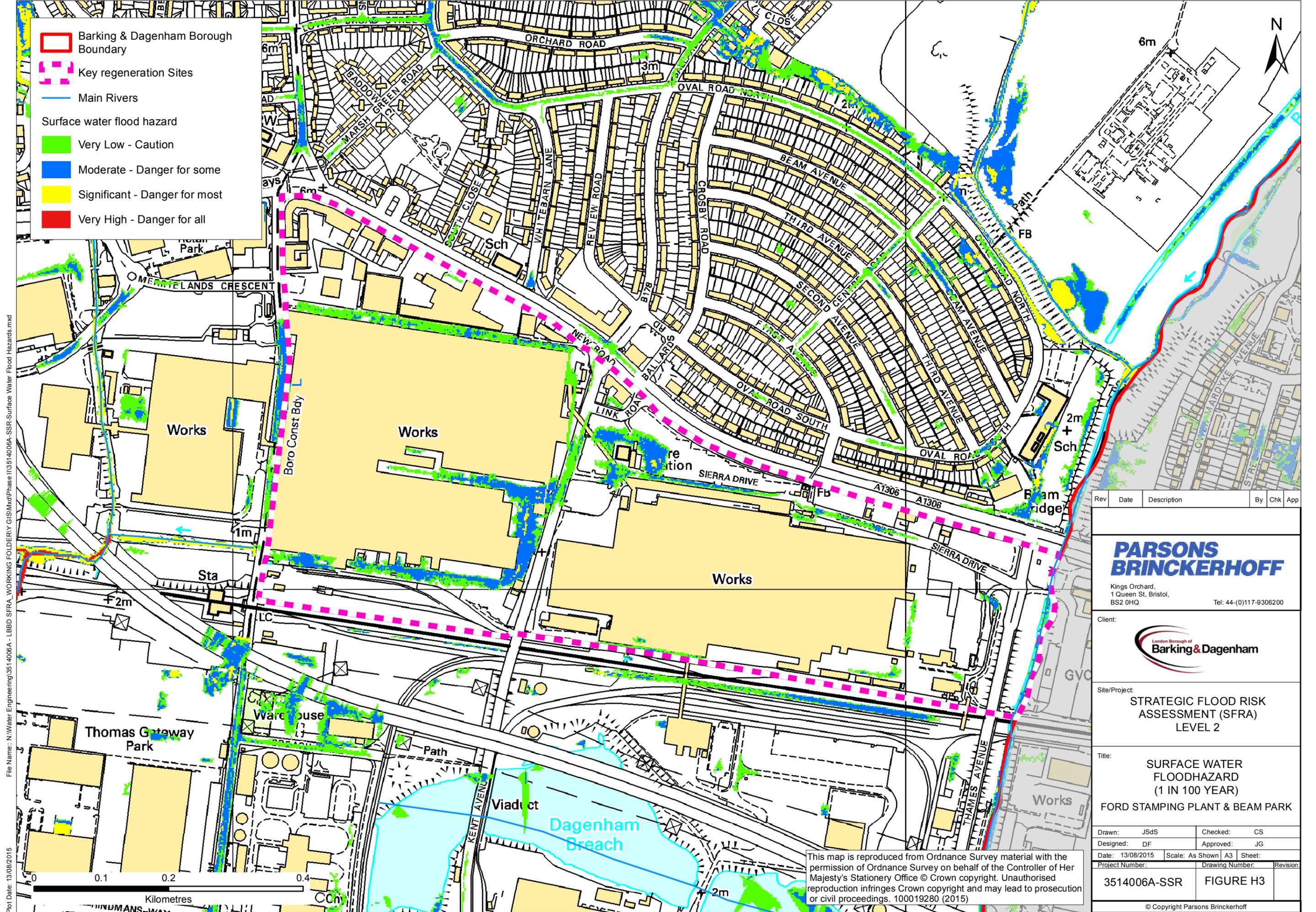


Site/Project:
STRATEGIC FLOOD RISK ASSESSMENT (SFRA) LEVEL 2

Title:
BEAM RIVER FLUVIAL FLOOD RISK WITH 25%, 35% AND 70% CLIMATE CHANGE FORD STAMPING PLANT & BEAM PARK

Drawn: SF	Checked: PH
Designed: DF	Approved: JG
Date: 03/03/2017	Scale: As Shown A3 Sheet:
Project Number:	Drawing Number: Revision:

3514006A-SSR **FIGURE H2B**



File Name: N:\Water Engineering\3514006A - LBBB SFRA - WORKING FOLDER\GIS\Map\Phase 1\3514006A-SSR-Surface Water Flood Hazards.mxd
 Plot Date: 13/08/2015
 Login: desouzaj

- Barking & Dagenham Borough Boundary
- Key regeneration Sites
- Main Rivers
- Surface water flood hazard
- Very Low - Caution
- Moderate - Danger for some
- Significant - Danger for most
- Very High - Danger for all

Rev	Date	Description	By	Chk	App

PARSONS BRINCKERHOFF

Kings Orchard,
1 Queen St, Bristol,
BS2 0HQ
Tel: 44-(0)117-9306200

Client:

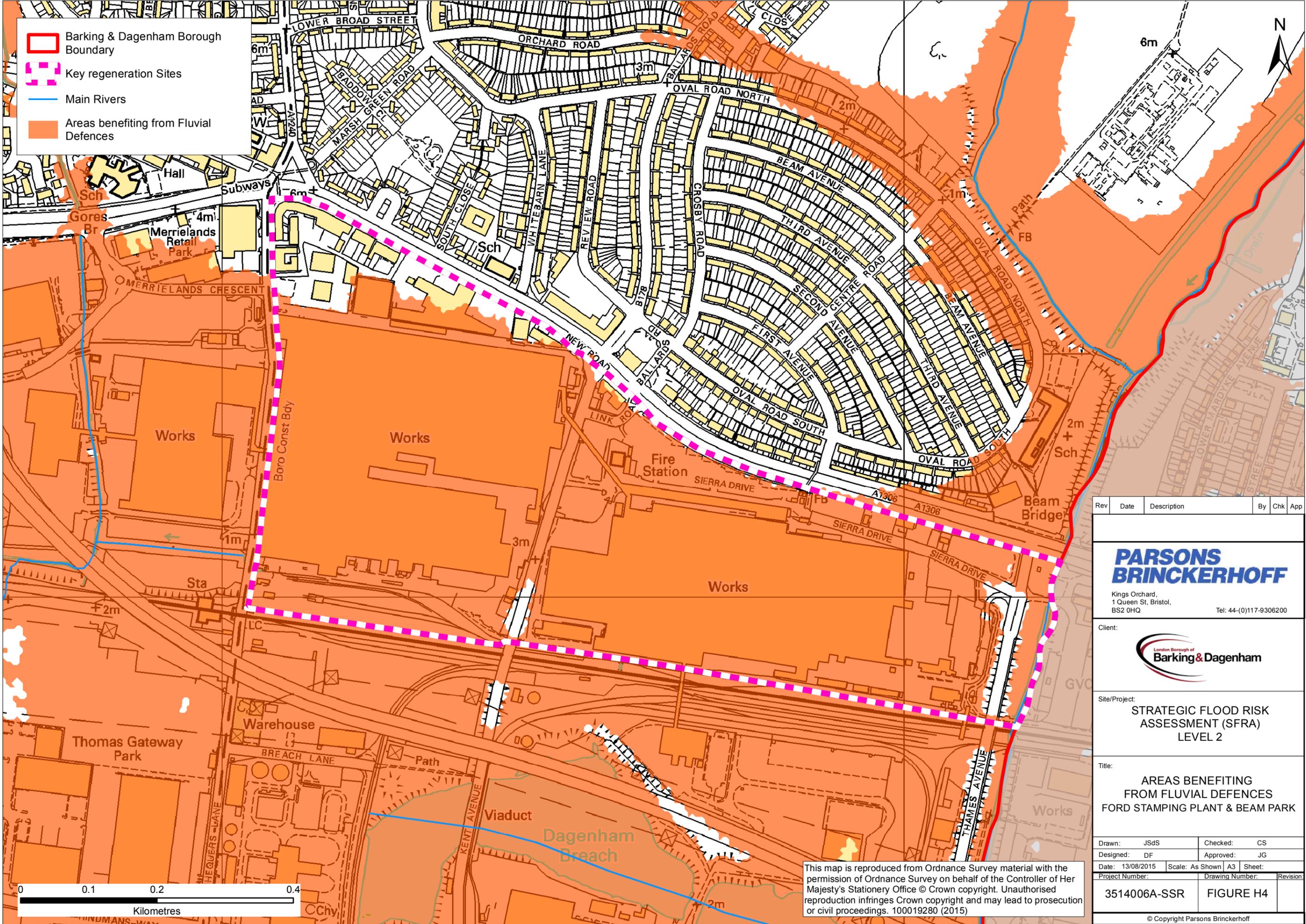
Site/Project:
STRATEGIC FLOOD RISK ASSESSMENT (SFRA) LEVEL 2

Title:
SURFACE WATER FLOODHAZARD (1 IN 100 YEAR) FORD STAMPING PLANT & BEAM PARK

Drawn: JSdS	Checked: CS
Designed: DF	Approved: JG
Date: 13/08/2015	Scale: As Shown A3 Sheet:
Project Number: 3514006A-SSR	Drawing Number: FIGURE H3
© Copyright Parsons Brinckerhoff	

This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. 100019280 (2015)

-  Barking & Dagenham Borough Boundary
-  Key regeneration Sites
-  Main Rivers
-  Areas benefiting from Fluvial Defences



File Name: N:\Water Engineering\3514006A - LBBB SFRA - WORKING FOLDER\GIS\Map\Phase 1\3514006A-SSR-Fluvial_defences.mxd
 Plot Date: 13/08/2015
 Login: desouzaj

Rev	Date	Description	By	Chk	App

PARSONS BRINCKERHOFF

Kings Orchard,
1 Queen St, Bristol,
BS2 0HQ Tel: 44-(0)117-9306200

Client:



Site/Project:
**STRATEGIC FLOOD RISK
ASSESSMENT (SFRA)
LEVEL 2**

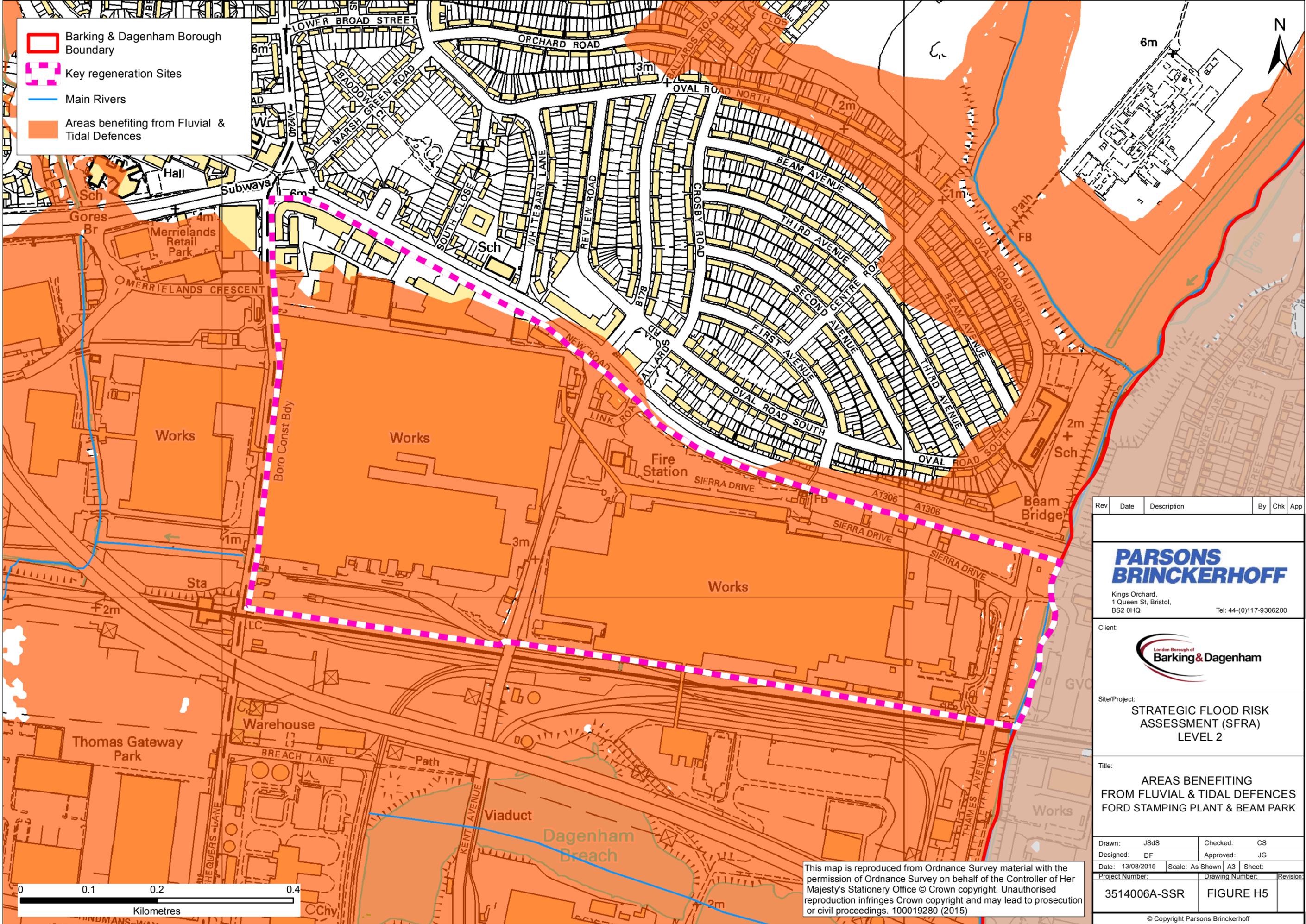
Title:
**AREAS BENEFITING
FROM FLUVIAL DEFENCES
FORD STAMPING PLANT & BEAM PARK**

Drawn: JSdS	Checked: CS
Designed: DF	Approved: JG
Date: 13/08/2015	Scale: As Shown A3 Sheet:
Project Number:	Drawing Number: Revision:

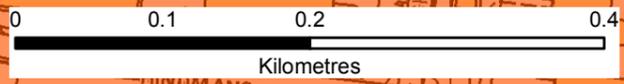
3514006A-SSR FIGURE H4

This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. 100019280 (2015)

-  Barking & Dagenham Borough Boundary
-  Key regeneration Sites
-  Main Rivers
-  Areas benefiting from Fluvial & Tidal Defences



File Name: N:\Water Engineering\3514006A - LBBB SFRA - WORKING FOLDER\GIS\Map\Phase 1\3514006A-SSR-Fluvial_Tidal_defences.mxd
 Plot Date: 13/08/2015
 Login: desouzaj



This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. 100019280 (2015)

Rev	Date	Description	By	Chk	App

PARSONS BRINCKERHOFF

Kings Orchard,
 1 Queen St, Bristol,
 BS2 0HQ
 Tel: 44-(0)117-9306200



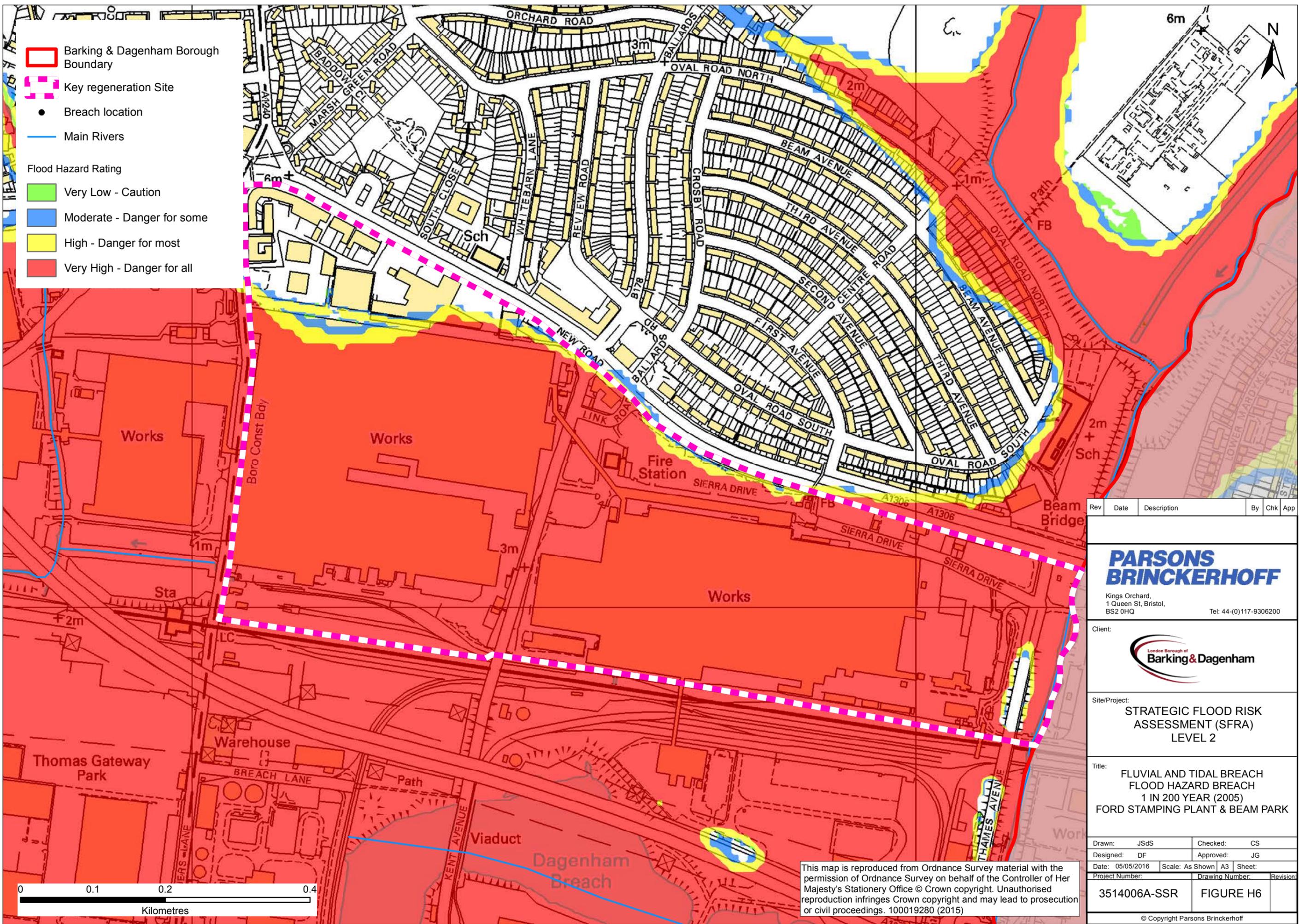
Client:
 Site/Project:
STRATEGIC FLOOD RISK ASSESSMENT (SFRA) LEVEL 2

Title:
AREAS BENEFITING FROM FLUVIAL & TIDAL DEFENCES FORD STAMPING PLANT & BEAM PARK

Drawn: JSdS	Checked: CS
Designed: DF	Approved: JG
Date: 13/08/2015	Scale: As Shown
Project Number: 3514006A-SSR	Drawing Number: FIGURE H5

© Copyright Parsons Brinckerhoff

Login: DeSouzaJ
 Plot Date: 07/06/2016
 File Name: N:\Water Engineering\3514006A - LBBD SFRA - WORKING FOLDER\GIS\Map\April 2016\3514006A-SSR-Phase_II_Flood_Hazard_2005.mxd



- Barking & Dagenham Borough Boundary
 - Key regeneration Site
 - Breach location
 - Main Rivers
- Flood Hazard Rating
- Very Low - Caution
 - Moderate - Danger for some
 - High - Danger for most
 - Very High - Danger for all

Rev	Date	Description	By	Chk	App

PARSONS BRINCKERHOFF

Kings Orchard,
1 Queen St, Bristol,
BS2 0HQ Tel: 44-(0)117-9306200



Site/Project:
**STRATEGIC FLOOD RISK
ASSESSMENT (SFRA)
LEVEL 2**

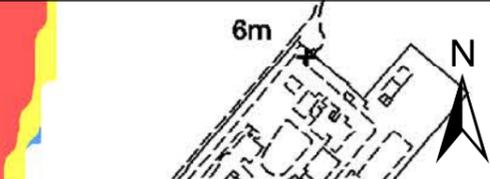
Title:
**FLUVIAL AND TIDAL BREACH
FLOOD HAZARD BREACH
1 IN 200 YEAR (2005)
FORD STAMPING PLANT & BEAM PARK**

Drawn: JSdS	Checked: CS
Designed: DF	Approved: JG
Date: 05/05/2016	Scale: As Shown A3 Sheet:
Project Number:	Drawing Number: Revision:

3514006A-SSR **FIGURE H6**

This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. 100019280 (2015)

-  Barking & Dagenham Borough Boundary
 -  Key regeneration Sites
 -  Breach location
 -  Main Rivers
- Flood Hazard Rating
-  Very Low - Caution
 -  Moderate - Danger for some
 -  High - Danger for most
 -  Very High - Danger for all



Climate change data for breaches 4 - 7 is not available and therefore the data from present day simulations has been used in the production of this map.

Rev	Date	Description	By	Chk	App

PARSONS BRINCKERHOFF

Kings Orchard,
1 Queen St, Bristol,
BS2 0HQ Tel: 44-(0)117-9306200



Site/Project:
STRATEGIC FLOOD RISK ASSESSMENT (SFRA) LEVEL 2

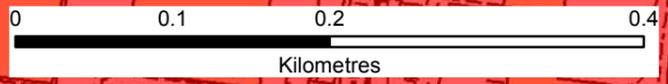
Title:
FLUVIAL AND TIDAL BREACH FLOOD HAZARD BREACH 1 IN 200 YEAR (2100) FORD STAMPING PLANT & BEAM PARK

Drawn: JSdS	Checked: CS
Designed: DF	Approved: JG
Date: 05/05/2016	Scale: As Shown A3 Sheet:
Project Number:	Drawing Number: Revision:

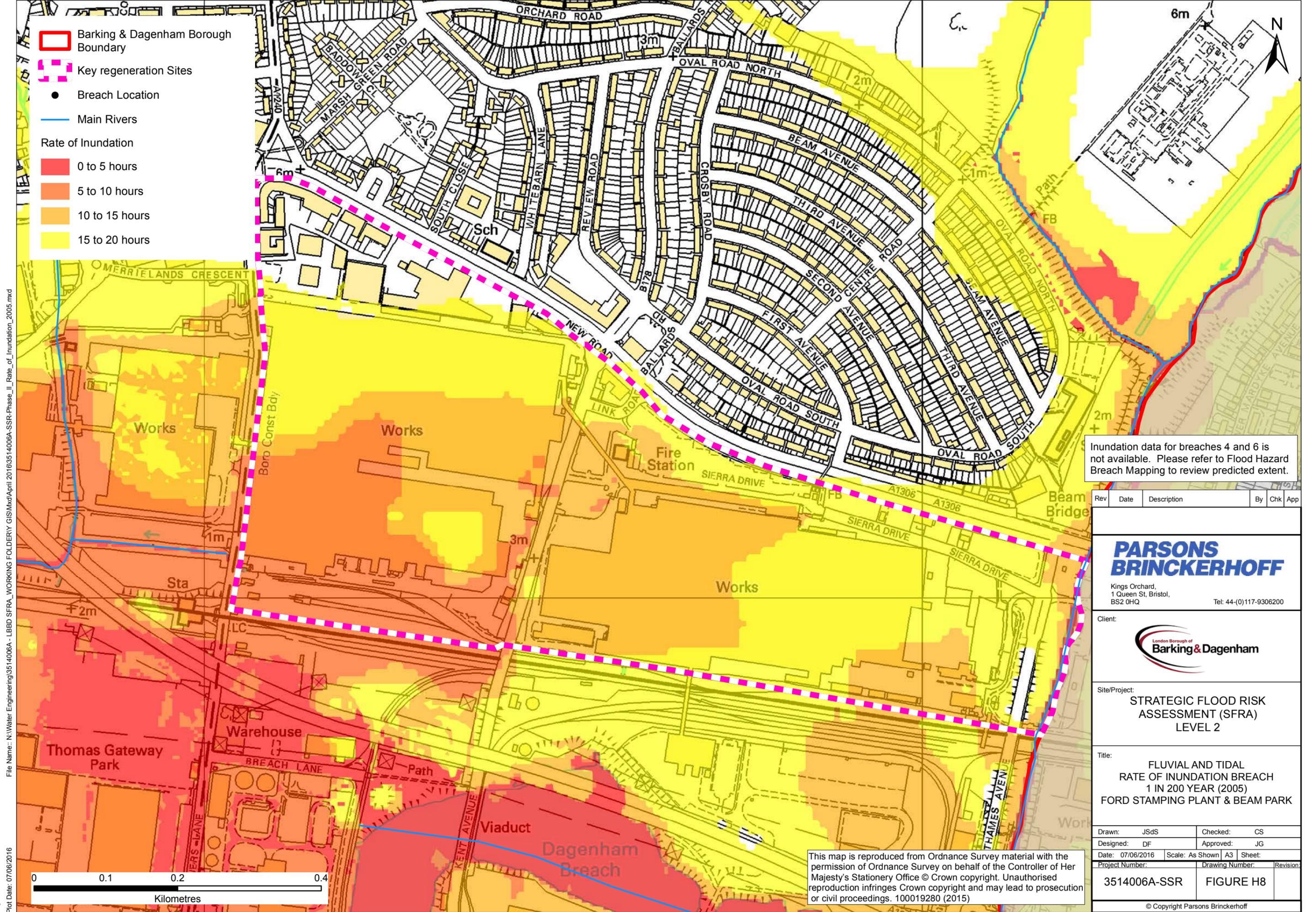
3514006A-SSR **FIGURE H7**

© Copyright Parsons Brinckerhoff

This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. 100019280 (2015)



Login: DeSouzaJ
 Plot Date: 07/06/2016
 File Name: N:\Water_Engineering\3514006A - LBBD SFRA - WORKING FOLDER\GIS\Map\April 2016\3514006A-SSR-Phase_II_Flood_Hazard_2100.mxd



- Barking & Dagenham Borough Boundary
 - Key regeneration Sites
 - Breach Location
 - Main Rivers
- Rate of Inundation
- 0 to 5 hours
 - 5 to 10 hours
 - 10 to 15 hours
 - 15 to 20 hours

Inundation data for breaches 4 and 6 is not available. Please refer to Flood Hazard Breach Mapping to review predicted extent.

Rev	Date	Description	By	Chk	App

PARSONS BRINCKERHOFF

Kings Orchard,
1 Queen St, Bristol,
BS2 0HQ Tel: 44-(0)117-9306200



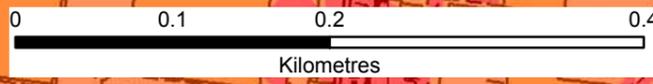
Client:
STRATEGIC FLOOD RISK ASSESSMENT (SFRA) LEVEL 2

Title:
FLUVIAL AND TIDAL RATE OF INUNDATION BREACH 1 IN 200 YEAR (2005) FORD STAMPING PLANT & BEAM PARK

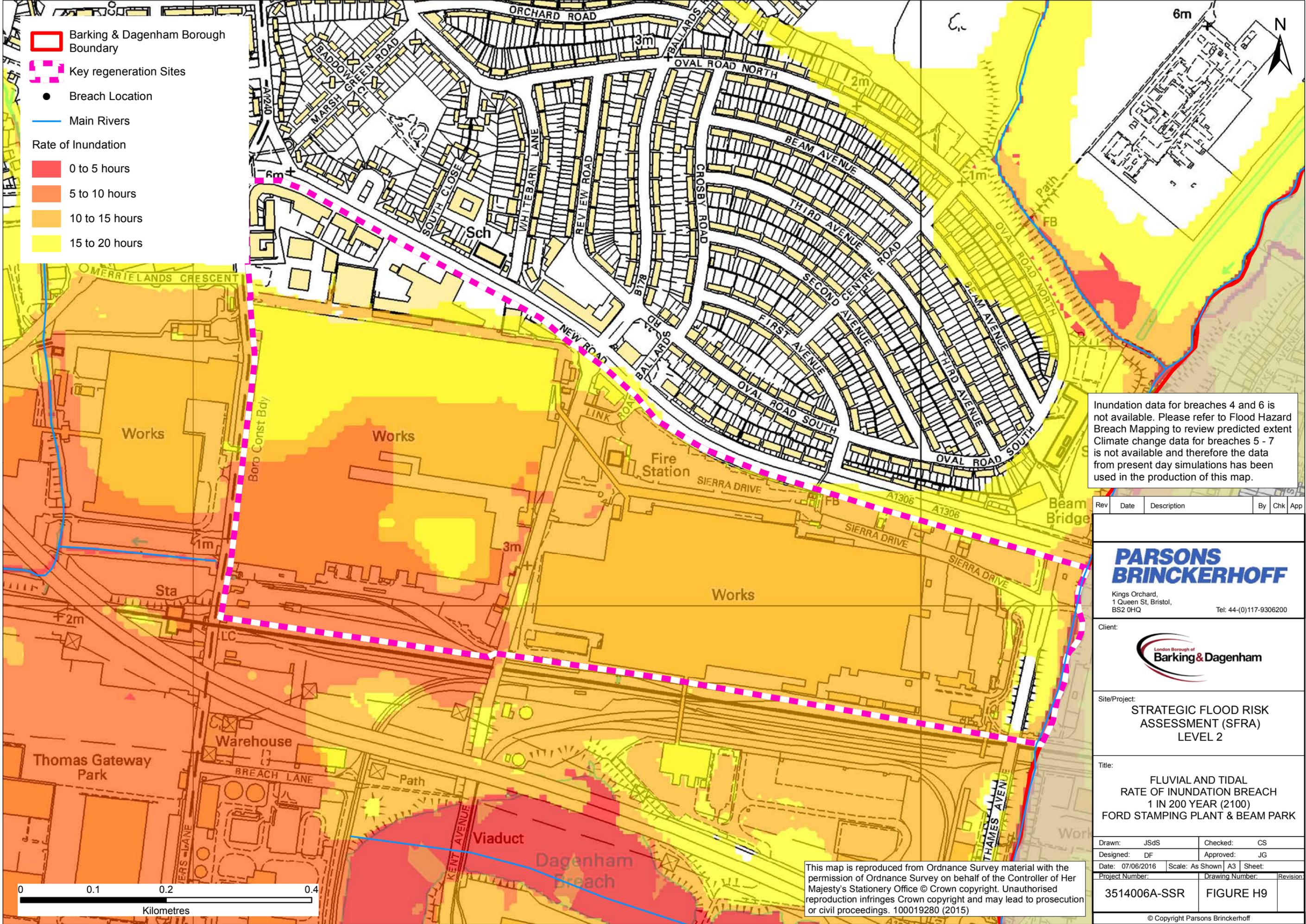
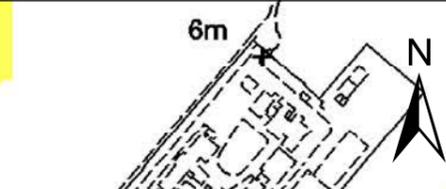
Drawn: JSdS	Checked: CS
Designed: DF	Approved: JG
Date: 07/06/2016	Scale: As Shown
Project Number: 3514006A-SSR	Drawing Number: FIGURE H8

This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. 100019280 (2015)

File Name: N:\Water_Engineering\3514006A - LBBD SFRA_WORKING FOLDER\GIS\Mxd\April 2016\3514006A-SSR-Phase_II_Rate_of_Inundation_2005.mxd
Login: DeSouzaJ
Plot Date: 07/06/2016



-  Barking & Dagenham Borough Boundary
-  Key regeneration Sites
-  Breach Location
-  Main Rivers
- Rate of Inundation
 -  0 to 5 hours
 -  5 to 10 hours
 -  10 to 15 hours
 -  15 to 20 hours



Inundation data for breaches 4 and 6 is not available. Please refer to Flood Hazard Breach Mapping to review predicted extent Climate change data for breaches 5 - 7 is not available and therefore the data from present day simulations has been used in the production of this map.

Rev	Date	Description	By	Chk	App

PARSONS BRINCKERHOFF

Kings Orchard,
1 Queen St, Bristol,
BS2 0HQ Tel: 44-(0)117-9306200



Client:
STRATEGIC FLOOD RISK ASSESSMENT (SFRA) LEVEL 2

Site/Project:
FLUVIAL AND TIDAL RATE OF INUNDATION BREACH 1 IN 200 YEAR (2100) FORD STAMPING PLANT & BEAM PARK

Drawn: JSdS	Checked: CS
Designed: DF	Approved: JG
Date: 07/06/2016	Scale: As Shown A3 Sheet:
Project Number: 3514006A-SSR	Drawing Number: FIGURE H9

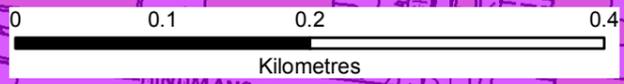
This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. 100019280 (2015)

File Name: N:\Water Engineering\3514006A - LBBD SFRA - WORKING FOLDER\GIS\Mxd\April 2016\3514006A-SSR-Phase_II_Rate_of_inundation_2100.mxd
 Login: DeSouzaJ
 Plot Date: 07/06/2016

-  Barking & Dagenham Borough Boundary
-  Key regeneration Sites
-  Main Rivers
-  Fluvial and Tidal Flood Warning Areas



File Name: N:\Water_Engineering\3514006A - LBBD SFRA - WORKING FOLDER\GIS\Map\Phase 1\3514006A-SSR-Flood Warning Areas (F&T).mxd
 Plot Date: 13/08/2015
 Login: desouzaj



This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. 100019280 (2015)

Rev	Date	Description	By	Chk	App

PARSONS BRINCKERHOFF

Kings Orchard,
1 Queen St, Bristol,
BS2 0HQ Tel: 44-(0)117-9306200



Client:
 Site/Project:
STRATEGIC FLOOD RISK ASSESSMENT (SFRA) LEVEL 2

Title:
FLOOD WARNING AREAS (FLUVIAL AND TIDAL) FORD STAMPING PLANT & BEAM PARK

Drawn: JSdS	Checked: CS
Designed: DF	Approved: JG
Date: 13/08/2015	Scale: As Shown A3 Sheet:
Project Number:	Drawing Number: Revision:

3514006A-SSR **FIGURE H10**

© Copyright Parsons Brinckerhoff