WATERSIDE BUSINESS CENTRE
RAILSHEAD ROAD, RICHMOND, TW7 7DG

FLOOD RISK ASSESSMENT

FOR

GOLDCREST LAND

August 2013

Our Ref: HLEF25703/001R

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This report has been prepared in the RPS Group Quality Management System to British Standard EN ISO 9001:2008

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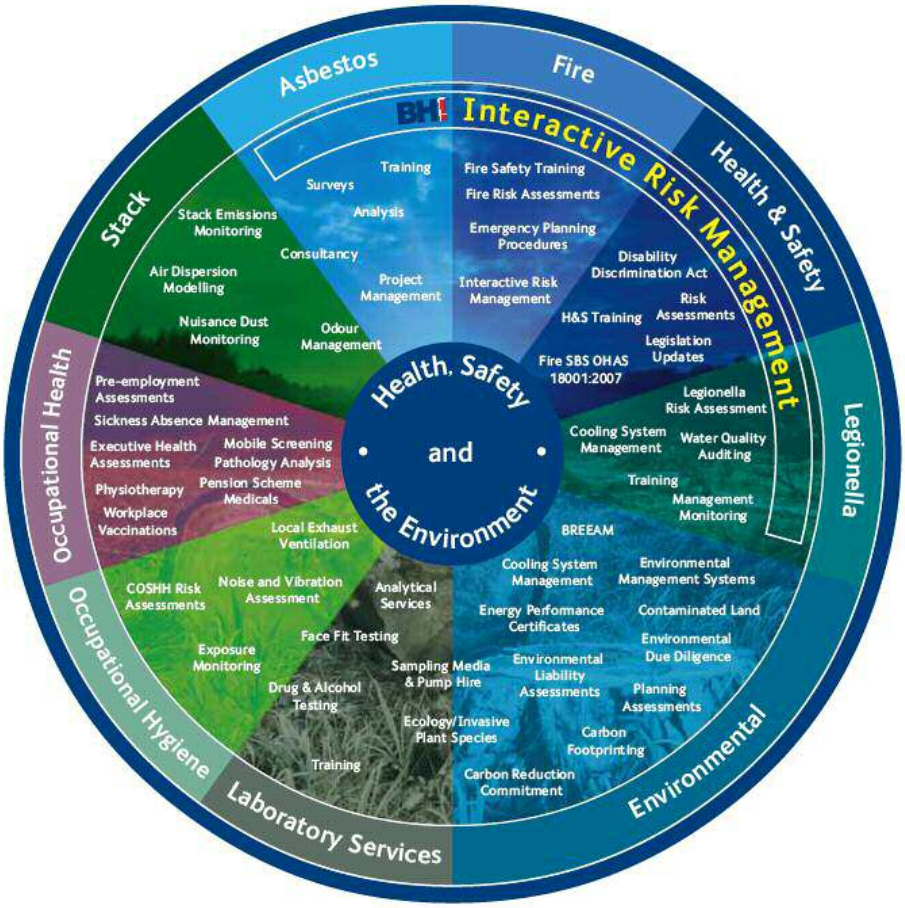

RPS HEALTH, SAFETY & ENVIRONMENT

General Notes

1. The following notes should be read in conjunction with the report:

2. This report contains only that available factual data for the site, which was obtained from the sources, described in the text. These data were related to the site on the basis of the location information made available to RPS by the client.

3. The assessment of the site is based on information supplied by the client. Relevant information was also obtained from other sources.

4. The report reflects both the information provided to RPS in documents made available for review and the results of observations and consultations by RPS staff.

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CONTENTS

1 INTRODUCTION

1.1 RPS was commissioned to undertake a Flood Risk Assessment of Waterside Business Centre, Railshead Road, Richmond, TW7 7DG in relation to the proposed redevelopment of the site for mixed residential and commercial use.

1.2 The aim of the Flood Risk Assessment is to outline the potential for the site to be impacted by flooding, the impacts of the proposed development on flooding in the vicinity of the site, and the proposed measures which could be incorporated into the development to mitigate the identified risk. The report has been produced in accordance with the guidance detailed in the National Planning Policy Framework (NPPF). Reference has also been made to the CIRIA SUDS manual (C697), the London Borough of Richmond upon Thames Strategic Flood Risk Assessment (SFRA) and the London Borough of Richmond upon Thames Surface Water Management Plan.

1.3 This report has been produced in consultation with the Partnership and Strategic Overview Team at the Environment Agency. The site is not located within an Internal Drainage Board (IDB) District.

1.4 This report is not intended to provide formal details of the final drainage design for the development. However, it provides information regarding the capabilities of the conceptual surface water drainage strategy to meet the requirements of the NPPF.

1.5 The desk study was undertaken by reference to information provided / published by the following bodies:

- Environment Agency
- British Geological Survey
- Ordnance Survey
- Thames Water

1.6 A site visit was conducted on 5th July 2012.

2 PLANNING POLICY CONTEXT

Regional Planning Policy

2.1 The development site is within the London Borough of Richmond upon Thames which is covered by The London Plan (2011). The London Plan contains various policies pertaining to flood risk and drainage, the relevant aspects of which are reproduced below.

Policy 5.11 Green roofs and development site environs

2.2 This policy promotes the use of green roofs and walls where feasible, to deliver objectives including sustainable urban drainage amongst other wider environmental and sustainability benefits.

Policy 5.12 Flood risk management

This Policy states that '*the Mayor will work with all relevant agencies including the Environment Agency to address current and future flood issues and minimise risks in a sustainable and cost effective way'.*

'Development proposals must comply with the flood risk assessment and management requirements set out in the NPPF over the lifetime of the development and have regard to measures proposed in Thames Estuary 2100 and Catchment Flood Management Plans.'

The Policy sets out requirements for developments for which the NPPF Exception Test is applicable and developments adjacent to flood defences.

Policy 5.13 Sustainable drainage

This policy states '*development should utilise sustainable urban drainage systems (SUDS) unless there are practical reasons for not doing so, and should aim to achieve Greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible in line with the following drainage hierarchy:*

- *store rainwater for later use;*
- *use infiltration techniques, such as porous surfaces in non-clay areas;*
- *attenuate rainwater in ponds or open water features for gradual release;*
- *attenuate rainwater by storing in tanks or sealed water features for gradual release;*
- *discharge rainwater direct to a watercourse;*
- *discharge rainwater to a surface water sewer/drain; and*

- *discharge rainwater to the combined sewer.*

Drainage should be designed and implemented in ways that deliver other policy objectives of the Plan, including water use efficiency and quality, biodiversity, amenity and recreation.'

2.3 The London Plan is supported by Supplementary Planning Guidance: Sustainable Design and Construction, May 2006. In relation to Water Pollution and Flooding, the guidance states that the Essential Standard is to use Sustainable Drainage Systems measures, wherever practical and to achieve 50% attenuation of the undeveloped site's surface water run off at peak times. The Mayor's preferred standard is to achieve 100% attenuation of the undeveloped site's surface water run off at peak times.

Local Planning Policy

2.4 The Local Development Framework (LDF) has replaced the Unitary Development Plan (UDP) with Development Plan Documents (DPDs). The Core Strategy, which is part of the LDF, is the strategic policy document and was adopted in April 2009.

2.5 The Development Management Plan (DMP) builds on the Core Strategy and includes more detailed policies for the management of development. The DMP was adopted on 1 November 2011.

2.6 *Policy DM SD 6 (Flood Risk)* of the DMP states:

- In addition to the Environment Agency's normal floodplain compensation requirement, developers must consider attenuation areas to alleviate fluvial and / or surface water flooding. For sites over 10 properties or 1000 sqm of non-residential development, evidence or justification must be provided if this cannot be achieved.
- for sites over 10 properties or 1000 sqm of non-residential development in areas at risk of flooding, a Flood Warning and Evacuation Plan must be submitted.
- for sites in Flood Zone 3a, self-contained residential units and bedrooms at basement level are not permitted. Basements must have internal access to a higher floor and flood resistant and resilient design techniques must be adopted.

2.7 *Policy DM SD 7 – Sustainable Drainage* of the DMP requires the use of SuDS wherever practical. Discharge should be reduced to Greenfield runoff rates wherever feasible. When discharging to the public sewer, developers are required to provide evidence that capacity exists in the public sewerage network to serve their development.

2.8 *Policy DM SD 8 Flood Defences* of the DMP encourages developments to be set back from river banks and existing flood defence infrastructure. The Environment Agency must be consulted for any works that could affect a flood defence infrastructure.

2.9 The London Borough of Richmond upon Thames Strategic Flood Risk Assessment (SFRA), August 2010, identifies and maps flood risk from all sources at a Borough-wide scale as well as providing guidance on producing site specific FRAs. Relevant information from the SFRA has been referenced throughout this Flood Risk Assessment report.

2.10 The London Borough of Richmond upon Thames Surface Water Management Plan (SWMP) assesses the risk of surface water flooding within the Borough and identifies options to manage risk to acceptable level. Relevant information from the SWMP has been reproduced throughout this Flood Risk Assessment report.

3 CONSULTATION

3.1 The Flood Risk Assessment has been produced in consultation with the Partnership and Strategic Overview Team at the Environment Agency. The Environment Agency has advised that commercial uses would be considered appropriate at ground floor level, and that there is no requirement to raise ground floor levels within the building. Where there is an increase in the building footprint within the 1 in 100 year plus climate change fluvial flood extent, this should be compensated for, preferably on a level for level basis. A safe route of access and egress will need to be shown from all new units to an area wholly outside the 1 in 100 year plus 20% allowance for climate change floodplain. This route should be on publicly accessible land and should have a hazard rating no higher than 'very low'.

3.2 Modelled flood level data has been requested from the Environment Agency, as well as details of historic flooding and flood defences within the vicinity of the site. The information provided by the Environment Agency is included as Appendix A and is summarised in Section 6 of this report.

3.3 The site is not located within an Internal Drainage Board (IDB) District.

3.4 The London Borough of Richmond upon Thames planning department has provided pre-application advice regarding the development. The following key issues were raised in relation to flood risk:

- The Sequential Test must be applied in accordance with the NPPF.
- If it can be demonstrated that the Sequential Test is passed, the Exception Test must be applied.
- The Flood Risk Assessment to support the development should particularly address the issues of increase in flood vulnerability, safe access / egress (particularly for the residential units) and number of people at potential risk. It must demonstrate that the development and its users / residents will be safe for the lifetime of the development in the case of a flood event, and that the proposal does not increase flood risk elsewhere, taking climate change into account.
- A sequential approach should be applied by locating the most vulnerable uses on the upper floors.
- Surface water runoff rates should be reduced 'as much as is feasible' by utilising SuDS.
- If feasible, safe access / egress should be provided above the predicted 1 in 100 fluvial or 1 in 200 tidal event (whichever is greater), including an allowance for climate change, and assuming breach of flood defences. If safe access / egress is not feasible or achievable, a flood

emergency plan should be submitted with the planning application demonstrating that procedures will be in place for residents / users to evacuate and / or retreat to a safe place of refuge via a safe route should a flood event occur.

3.5 The public sewer network within the vicinity of the site is operated by Thames Water. A pre-development enquiry has not been undertaken as part of the preparation of the Flood Risk Assessment (this would be undertaken at the detailed design stage). The conceptual surface water attenuation scheme presented in the FRA (see section 10) is intended to demonstrate that a feasible surface water attenuation solution can be achieved on the site to meet the requirements of the NPPF. The detailed drainage design for the proposed development will be finalised in consultation with Thames Water at the detailed design stage.

4 SITE DESCRIPTION

Site Description

4.1 The site is located at National Grid Reference TQ 16519 75415. It is irregular in shape, occupying an area of approximately 0.21 hectares. A site location plan is provided in Figure 1.

4.2 The site is currently occupied by a group of commercial buildings in mixed office / light industrial use.

4.3 Vehicular and pedestrian access to the site is from Railshead Road, which runs along the site's southern boundary.

4.4 Currently the entire site is either beneath the footprint of a building or laid to hardstanding.

Surrounding Land Uses

4.5 The site located within a predominantly residential setting where properties generally comprise flats.

Topography

4.6 A topographic survey has been completed for the site (Twickenham Surveys, September 2012). Reference to this survey indicates that the site generally slopes down from west to east, with levels ranging from approximately 5.3m AOD in the west to 4.5m AOD in the northeast of the site.

4.7 The A3004 (Richmond Road) along the western site boundary is elevated above the subject site, with levels of between 5.7m AOD and 5.9m AOD on the stretch of road adjacent to the site. Railshead Road to the south of the site is at a similar level to the subject site, sloping down towards the east, with levels ranging from approximately 5.4m AOD to the southwest of the site, to 4.8m AOD to the southeast of the site.

4.8 The topographic survey is located in Appendix B.

5 PROPOSED DEVELOPMENT

5.1 Development plans are shown in Appendix C. The proposed development would comprise:

- a car park, cycle storage area, refuse storage area and plant rooms at basement level;
- workshops / business uses at ground floor level;
- workshop offices and five apartments at first floor level;
- a further 16 apartments arranged over the second and third floors;

5.2 External areas at ground level would comprise a child's play space in the west of the site, a car park in the southeast of the site (with peripheral soft landscaping) and a pedestrian walkway around the base of the building.

5.3 Private terraces are proposed on the first, second and third floors, and areas of green roof are proposed at first floor and third floor level. Green roofs are proposed at roof level, together with PV panels.

5.4 The basement car park would be accessed via a double car lift from the car park in the south of the site, with internal lifts and staircases connecting the basement level to the ground floor and upper levels.

5.5 Users of the commercial workshops at ground floor level would have internal access to the first floor offices via the commercial core (stairs and lift).

5.6 It is proposed to set the finished floor level of the ground floor level at 5.1m AOD.

5.7 Vehicular access to the site would be via separate access and egress points onto Railshead Road to the south of the site. An additional pedestrian entrance would be provided in the southwest of the site, also onto Railshead Road.

5.8 The primary entrances to the building would be along the southern elevation of the property. Access to the residential areas on the first, second and third floors would be via two lifts / staircases from the ground floor level.

5.9 The proposed use of the site is classified as 'more vulnerable' within the NPPF.

5.10 At this stage, it is anticipated that surface water runoff will continue to pass to the existing public surface water sewer. The acceptable discharge rate to the existing mains sewer will need to be agreed with Thames Water in consultation with the Environment Agency at the detailed design stage.

5.11 The potential to provide surface water attenuation, including the use of SuDS, has been considered as part of the preliminary design process (see Section 10 – Surface Water Management).

6 HYDROLOGICAL SETTING

Nearby Watercourses

6.1 Reference to Ordnance Survey Mapping indicates that the nearest surface water feature is the River Crane which flows west to east along the northern boundary of the site. The River Thames, which is tidally influenced, lies approximately 10m east of the site.

6.2 No artificial watercourses / features (e.g. canals, reservoirs) have been identified within 1km of the site.

Flood Risk Classification

6.3 The Environment Agency flood map (provided in Figure 2) shows that the site is located within Flood Zone 3 (high probability of flooding), not taking account of flood defences. The flood map indicates that flood defences are present in the vicinity, although it is not clear what standard of defences is afforded to the subject site. The London Borough of Richmond upon Thames SFRA confirms the site's location within Flood Zone 3a.

6.4 The Environment Agency has been consulted to obtain further information regarding the fluvial and tidal flood risk to the site. The information provided by the Environment Agency is provided in full in Appendix A. A summary of the information provided is given below:

Tidal Flooding

6.5 In-channel tidal flood levels have been provided for various node points along the River Thames, taken from the Thames Estuary 2100 study completed by HR Wallingford in 2008. The closest node point to the subject site is node reference 2.9u. TE2100 takes into account operation of the Thames Barrier when considering future levels. Levels upstream of the Thames Barrier are the highest levels permitted by the operation of the Thames Barrier. The present day levels include extreme flows from upstream fluvial events but the climate change levels do not include consideration of fluvial flows. For node reference 2.9u, the maximum present day in-channel level is reported as 5.54m AOD. The maximum in-channel level taking into account climate change is reported as 5.83m AOD up to 2100 and 6.28m AOD beyond 2100.

6.6 There are no records of tidal flooding affecting the site or surrounding area historically.

6.7 Flood defences along the tidal River Thames are raised, man-made and privately owned. The defences provide a standard of protection of 1 in 1000. They are inspected twice a year to ensure they remain fit for purpose. They must be maintained by their owners to a crest level of 5.94m AOD (this crest level is noted to be in excess of the reported maximum in-channel tidal

flood level up to the year 2100, confirming the standard of protection of 1 in 1000 years). The overall condition of the defences in this area is given as 2 (good).

6.8 Modelled breach extents have been provided for the tidal River Thames, taken from the Thames Tidal Breach Modelling Study, 2013. Based on a modelled breach location at the eastern end of Railshead Road (i.e. approximately 10m to the east of the site), a 1 in 200 year breach event is shown to affect the subject site, the land / buildings between the subject site and the River Thames, and a narrow strip of land either side of the River Crane to the west of the site. St Margaret's Road and Richmond Road (to the west of the site) and land immediately to the north and south of the site would not be affected. The maximum velocity of floodwater is reported as between 0m/s and 0.3m/s, and the maximum depth is given as 0.25m – 1m in the eastern half of the site and 0 – 0.25m in the western half of the site. The resulting flood hazard is reported as 'danger for most' along the eastern site boundary and in the northeast corner of the site (comprising approximately 25% of the site); 'danger for some' in the central portion of the site (comprising approximately 25% of the site); and 'low hazard' in the western half of the site (comprising approximately 50% of the site).

6.9 Modelled breach levels have been provided for numerous points across the site. These levels generally increase from north to south, and west to east, ranging from 5.08m AOD in the north of the site to 5.41m AOD in the southeast of the site.

Fluvial Flooding

6.10 Modelled fluvial flood outlines have been provided for the River Crane, taken from the River Crane Mapping Study (Halcrow, 2008). The flood outlines take into account the presence of flood defences. The mapping indicates that the River Crane remains within the river channel for various return period events up to and including the 1 in 1000 year event.

6.11 Modelled fluvial flood levels have been provided for the River Crane, for various node points. Node points C0002, C006, C008 and C010 are located along the site's northern boundary. The maximum 1 in 100 year plus climate change fluvial flood level for these node points is given as 4.200m AOD, and the worse-case 1 in 1000 year fluvial flood level is given as 4.238m AOD.

6.12 Fluvial defences along the southern bank of the River Crane (along the northern site boundary) comprise concrete capped sheet steel piling bank protection with a brick wall above. The defences are raised 0.5m above surrounding land and are 4m in height in total. The defences afford a 1 in 1000 year standard of protection. The crest level is reported as 5.49m AOD upstream of the site and 5.91m AOD downstream of the site. These crest levels are noted to be significantly higher than 1 in 1000 year fluvial flood level, confirming the standard of protection of at least 1 in 1000.

6.13 A fluvial flood event was recorded in 1965 affecting the land on the north bank of the River Crane to the north of the site, and land on both banks of the River Crane to the west of the site. The subject site does not appear to have been affected during this flood event.

7 HYDROGEOLOGICAL SETTING

7.1 Reference to the British Geological Survey online mapping (1:50,000 scale) indicates that the site is underlain by the Kempton Park Gravels Formation. This generally comprises sand and gravel, locally with lenses of silt, clay or peat. This is further underlain by the London Clay Formation which is a firm to stiff, brown and blue/grey clay with variable silty and sandy parts.

7.2 According to the Environment Agency's online Groundwater Vulnerability Mapping, the Kempton Park Gravel Formation at the surface is classified as a Principal Aquifer. These formations provide a high level of water storage and may support water supply and / or river base flow on a strategic scale.

7.3 *Soilscapes* data indicates that soils within the area are underlain by 'freely draining soils'.

7.4 A nearby BGS borehole of 6m depth at Kilmorey Road (ref. TQ17NE23) approximately 250m south of the site did not reportedly encounter groundwater.

7.5 Reference to the Environment Agency's online groundwater Source Protection Zone maps indicates that the site is not located within a groundwater Source Protection Zone.

8 EXISTING DRAINAGE / WATER MAINS

8.1 Reference to Thames Water plans of public sewers (shown in Appendix D) identifies two 'effluent conduits' (conveying effluent from a sewage treatment works) passing beneath the centre of the site. A surface water drain (750mm diameter) also passes beneath the southeast of the site. Data for manhole reference 6350 on Railshead Road to the south of the site indicates a cover level of 5.01m AOD and an invert level of 2.06m AOD.

8.2 A 150mm foul sewer is recorded beneath Railshead Road to the south of the site, running east to west. A manhole on this sewer adjacent to the south of the site (reference 6301) has a cover level of 5.14m AOD and an invert level of 3.61m AOD.

9 FLOOD RISK AND MITIGATION

9.1 The key sources of flooding that could potentially impact the site are discussed below:

Fluvial / Tidal Flooding

9.2 The Environment Agency Flood Map (see Figure 2) indicates that the site is located within Flood Zone 3a. The annual probability of flooding is classified as greater than 1 in 100 from fluvial sources or greater than 1 in 200 from tidal sources in the absence of any defences. The site is within the fluvial floodplain of the River Crane and the combined fluvial and tidal floodplain of the River Thames. Flood defences for the River Crane and the River Thames afford a 1 in 1000 year standard of protection. Therefore, the fluvial and tidal flood risk are residual only, associated with a breach or overtopping of the flood defences. There are no records of the site having been affected by fluvial or tidal flooding historically.

9.3 The 1 in 100 year plus climate change and 1 in 1000 year fluvial flood levels for the River Crane (4.200m AOD and 4.238m AOD respectively) are both below the level of the subject site (minimum site levels are approximately AOD 4.5m). Therefore, there is no residual risk associated with fluvial flooding from the River Crane.

9.4 The River Thames is dominated by tidal influences. The Environment Agency has provided information regarding the potential extent and depth of flooding, and associated hazard, in the event of a breach of the River Thames flood defences immediately to the east of the site (the Environment Agency has confirmed that the breach flood levels provided are the most appropriate levels on which to base this risk assessment). During such a breach, an event with a 1 in 200 year return period would result in flooding of the subject site, the development immediately to the east and Railshead Road to the south of the site. Comparison of breach flood levels with site levels indicates that the western half of the site would be subject to a shallow depth of flooding (less than 0.1m depth). Potential depths for the eastern half of the site increase towards the southeast of the site with a maximum depth of approximately 0.6m in the southeast corner of the site.

9.5 These depths are generally in line with modelled depth ranges provided by the Environment Agency. The Environment Agency data suggests a floodwater velocity of less than 0.3m/s for the whole site in the event of a breach, and a hazard rating of ‘low’ for the western half of the site, increasing to ‘danger for some’ and ‘danger for most’ in the central and eastern parts of the site respectively.

9.6 Given the standard of protection (1 in 1000 year) provided against tidal flooding, the likelihood of a breach of the flood defences occurring is considered to be low. In the event of such a breach, there is the potential for flooding of the external areas and the ground floor and basement of the

property. It is proposed to set the ground floor level of the building at 5.1m AOD. Modelled breach levels for the area of proposed building footprint range from 5.08m AOD to 5.30m AOD. Therefore, there is the potential for up to 0.2m depth of water within the ground floor of the property during a 1 in 200 year breach flood event.

9.7 The commercial uses on the ground floor of the property are considered to remain safe in the unlikely event of a breach of the defences given the relatively shallow depth (<0.2m) and slow speed (<0.3m/s) of any floodwaters within the building. The Flood Risk to People Technical Report FD2321/TR1 indicates that flood depths below 0.25m and velocities below 0.5m/s are generally considered low hazard. Commercial occupants will be able to access the commercial first floor area in the event that dry refuge needs to be sought.

9.8 The residential uses have been sequentially allocated to the upper floors of the building, well above the breach flood level and would therefore be unaffected during a breach of the defences. The basement car park would be susceptible to flooding during a breach flood event. However, it is unlikely that anyone will be within the basement at the time of a breach, and internal access to the ground and upper floors of the building will be available via a number of stairways.

9.9 The part of the site potentially subject to the greatest depth of flooding during a breach event (i.e. southeast corner) is proposed for use as a car park. This use is considered appropriate within Flood Zone 3. The depth of water in the far southeast of the site could reach 0.6m. However, closer to the building the breach level data indicates that depths would decrease to approximately 0.1 - 0.15m. The depth across external areas in the western half of the site would be less than 0.1m. Given that flood depths between the entrances to the building and the proposed pedestrian entrance towards the western end of Railshead Road would generally be below 0.15m, and that velocities are reportedly less than 0.3m/s, the flood hazard for the pedestrian egress route is considered to be low (in accordance with Technical Report FD2321/TR1). Land surrounding the site is almost entirely outside the modelled breach extent, meaning that occupants would have a very short distance to travel to reach an area unaffected during a breach flood event.

9.10 Given that the residual risk to the site is tidal only, there is no requirement to provide floodplain compensation as part of the development scheme.

Proposed Mitigation

9.11 The assessment has shown that the site is provided with a high standard of protection (at least 1 in 1000) against fluvial and tidal flooding. In the unlikely event of a breach of the River Thames flood defences, site users would remain safe, with the pedestrian egress route shown to be at a low hazard.

9.12 Flood resilient construction techniques will be used where appropriate within the ground floor of the property (at least the lower 300mm) to ensure that the commercial units can return quickly to use in the unlikely event of a breach of the flood defences.

Flooding from sewers

9.13 Sewer flooding can occur during periods of heavy rainfall when a sewer becomes blocked or is of inadequate capacity. The site is currently served by separate foul and surface water sewers (detailed in Section 8).

9.14 The SWMP states that the site is not located within a critical drainage area. The SFRA indicates that the nearest recorded localised drainage issue occurred approximately 250m southwest of the site on Haliburton Road and Thames Water has reported that there have been no incidences of sewer flooding in close proximity to the subject site. RPS has been advised of anecdotal reports of minor sewer flooding in the vicinity of the residential development immediately to the east, although this has not been confirmed.

9.15 Adjacent roads are at a similar or higher level than the site. Therefore, in the event of surcharging of sewers on adjacent roads, there is the potential for surcharged water to be directed onto the subject site. However, there have been no previous reported incidences of significant sewer surcharging or drainage issues in the immediate vicinity of the site.

9.16 The discharge rate to the existing sewer will be agreed with Thames Water to ensure that there is capacity to receive discharge from the site without significantly increasing flood risk.

Proposed Mitigation

9.17 Appropriate site grading will be used to direct any surcharged water away from the building and basement openings.

Surface water flooding (overland flow)

9.18 This can occur during intense rainfall events, when water cannot soak into the ground or enter drainage systems. The SFRA includes mapping of areas potentially susceptible to surface water flooding (using a simplified assessment, excluding the effect of buildings and underground drainage systems). Neither the subject site nor the roads leading to the site are identified as particularly susceptible to surface water flooding. The SWMP includes further modelling of surface water flood depth and associated hazard. The flood depth at the site is shown to be less than 0.1m and the hazard is very low.

9.19 Overall, no significant issues have been identified in relation to surface water flooding.

9.20 Surface water flooding from on-site sources is considered in Section 10 of this report.

Proposed Mitigation

9.21 Appropriate site grading will be used to direct surface water away from the building and basement openings.

Groundwater flooding

9.22 This can occur in low-lying areas when groundwater levels rise above surface levels, or within underground structures. BGS mapping indicates that the site is underlain by the variably permeable Kempton Park Gravels. Although a nearby BGS borehole log did not encounter any shallow groundwater, given the proximity of both the River Crane and the River Thames, there is the potential for shallow groundwater to exist beneath the site.

9.23 According to the SFRA, there have been no recorded groundwater flooding incidents within close proximity to the site. However, given the underlying geology and the proposed basement level, there is considered to be the potential for groundwater ingress to impact the proposed basement car park.

Proposed Mitigation

9.24 Appropriate construction techniques (e.g. tanking) will be used to ensure there is no ingress of shallow groundwater into the proposed basement car park.

Other Sources

9.25 There is a limited risk of flooding occurring as a result of a break in a water main. The locations of the water mains in the immediate vicinity of the site are described in Section 8. In the event of a burst water main, it is possible that water would flow onto the subject site.

9.26 Environment Agency mapping indicates that the site could be at risk in the event of a failure of one of a number of water storage reservoirs. However, it is noted that the mapping depicts a worse-case scenario, and that the Environment Agency states that reservoir flooding is 'extremely unlikely'.

Proposed Mitigation

9.27 Site grading will be designed to ensure that any water entering the site from man-made sources is directed away from the building and basement openings.

Event Exceedence and Residual Risk

9.28 The mitigation measures proposed as part of the development scheme are considered appropriate to mitigate against any residual risks or event exceedence scenarios.

10 SURFACE WATER MANAGEMENT

Introduction

10.1 The London Plan and local planning policy promote the use of Sustainable Drainage Systems (SuDS) and require a reduction in surface water runoff rates to greenfield rates, where feasible. In pre-application discussions, the London Borough of Richmond upon Thames has indicated that runoff rates should be reduced as much as feasible.

10.2 The site is currently entirely surfaced with hardstanding and building cover. Following redevelopment, it is proposed to create soft landscaping areas comprising a child's play area and landscaping around the perimeter to the car park. These areas will comprise approximately 11% of the site area (totalling approximately 235m^2). These changes alone will provide a reduction in runoff rates by creating permeably surfaced areas.

10.3 The potential to provide additional surface water attenuation within the development scheme is discussed below.

Consideration of Sustainable Drainage Systems

10.4 The potential for the use of Sustainable Drainage Systems (SuDS) has been considered at this stage.

Swales, detention basins and ponds

10.5 Given the space restrictions on the site, it is not feasible to incorporate open SuDS features such as swales, detention basins or ponds within the development scheme.

Soakaways

10.6 Reference to BGS mapping indicates that the site is underlain by the Kempton Park Gravels, which are likely to be of a relatively high permeability. The soils are described as 'freely draining'. Given the reported geological conditions beneath the site, it is considered possible that soakaways could provide a feasible method for the disposal of surface water runoff from the site. Further assessment of ground conditions (including infiltration testing, assessment of depth to groundwater and contamination status) would be required to confirm this.

Rainwater Harvesting

10.7 The attenuation benefits provided through the use of rainwater harvesting are considered to be limited, and would only be realised when the tanks were not full. There is the potential for rainwater harvesting to be incorporated into the development scheme, however this is unlikely to contribute significantly to surface water attenuation.

Green Roofs

10.8 It is proposed to include green roofs, comprising 181m^2 at roof level, 65m^2 at first floor level and 115m^2 at third floor level. This will enable attenuation to be provided within the growing medium.

Porous / Permeable Paving

10.9 There is the potential to use permeable paving across external landscaped areas including the car park and paved walkways. These areas total approximately 800m^2. Storage would be provided within the sub-grade material prior to controlled discharge to the receiving stormwater sewer.

Modular Underground Attenuation Tanks

10.10 There is the potential to install a modular surface water attenuation tank beneath the car park in the south of the site. The surface water sewer beneath Railshead Road has an invert level approximately 3m below ground level. This would allow sufficient depth for the installation of a modular storage tank, with appropriate surface cover.

Conceptual Surface Water Attenuation Scheme

10.11 The development scheme will result in a reduction in the impermeably surfaced hardstanding, and therefore a reduction in surface water runoff rates. It is also proposed to include green roofs within the scheme, providing attenuation of surface water. Additional attenuation could be achieved through the use of permeable paving and the installation of a modular storage tank beneath the car park. Infiltration testing would be undertaken to establish whether soakaways could provide a feasible method for disposal of surface water.

10.12 The conceptual surface water strategy would be refined at the detailed design stage. However, on the basis of this assessment there is the potential to provide a significant reduction in surface water runoff rates compared to the pre-development scenario.

Event Exceedence

10.13 The detailed drainage design will identify mitigation measures to ensure that any above-ground flooding during event exceedence will be confined to temporary shallow flooding of the on-site car park and will not affect the building on site or significantly increase flood risk to off-site locations.

11 SEQUENTIAL TEST AND EXCEPTION TEST

Sequential test

11.1 The NPPF requires the Local Authority to apply the Sequential Test in consideration of new development. RPS has undertaken the Sequential Test in relation to the development, and the findings are detailed in the Sequential Test assessment report reference HLEF25703/002R, July 2013 (provided under a separate cover).

The Exception Test

11.2 The NPPF advises that 'more vulnerable' development can be considered appropriate in Flood Zone 3a, following satisfactory application of the Exception Test. The Exception Test aims to ensure that more vulnerable property types are not allocated to areas at high risk of flooding. For the Exception Test to be passed:

a) It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a Strategic Flood Risk Assessment where one has been prepared; and

b) a site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

11.3 With reference to point (a) above, the development will provide high specification housing and employment within a building designed to achieve BREEAM 'excellent' and Code for Sustainable Homes Level 4.

11.4 With reference to point (b) above, this Flood Risk Assessment demonstrates that the development will be safe, without increasing flood risk elsewhere, and will reduce flood risk overall given the reduction in surface water runoff following redevelopment.

11.5 On the basis of the information above, it is concluded that the development passes the Exception Test.

12 SUMMARY AND CONCLUSIONS

12.1 The aim of the Flood Risk Assessment is to outline the potential for the site to be impacted by flooding, the potential impacts of the development on flooding both onsite and in the vicinity, and the proposed measures which can be incorporated into the development to mitigate the identified risks. The report has been produced in accordance with the guidance detailed in the NPPF. Reference has also been made to the CIRIA SUDS manual (C697), the Strategic Flood Risk Assessment and the Surface Water Management Plan and following consultation with the Environment Agency's Partnership and Strategic Overview Team.

12.2 The potential flood risks to the site, and the measures proposed to mitigate the identified risks, are summarised in the table below:

Source of flooding	Identified Risk			Mitigation proposed	Residual risk		
	L	M	H		L	M	H
Fluvial	✓			None required.	✓		
Tidal		✓		Sequential approach to uses within building. Flood resilient construction methods for ground floor.	✓		
Sewers	✓			Water directed by gradients away from building.	✓		
Surface Water	✓			Runoff directed by gradients away from building.	✓		
Groundwater		✓		Appropriate tanking of basement	✓		
Other Sources (e.g. reservoirs, water mains)	✓			None required.	✓		

12.3 The site is within the defended floodplain of the fluvial River Crane and the tidal River Thames. A high standard of protection is provided by flood defences, and it has been shown that there is no residual risk of fluvial flooding from the River Crane. In the unlikely event of a breach of the tidal River Thames flood defences, the site could be inundated to a relatively shallow depth. The resulting hazard within the building and for access / egress routes would be low. Site uses follow a sequential approach, with the less vulnerable uses (commercial) on the ground floor and residential uses only on the upper floors.

12.4 No significant risks have been identified associated with other sources of flooding. As a standard design measure, external areas will be appropriately graded to direct surface water runoff away from the building, and the basement will be suitably tanked to prevent groundwater ingress.

12.5 The development will result in a significant reduction in surface water runoff rates, through a reduction in impermeable surfacing and the use of green roofs. There is also the potential to provide further attenuation through the use of permeable paving and underground storage.

12.6 It has been demonstrated that the development meets the Sequential and Exception Tests imposed under the NPPF. The Sequential Test assessment is provided under a separate cover.

12.7 Overall, it has been demonstrated that the development would be safe, without increasing flood risk elsewhere, and that a positive reduction in flood risk would be achieved through the implementation of SuDS techniques to attenuate surface water runoff.

FIGURES

Figure 1: Site Location Plan

Map Date: Current

Scale: Not to scale

RPS
14 Cornhill
London
EC3V 3ND

☎ 020-7280-3200
www.rpsgroup.com

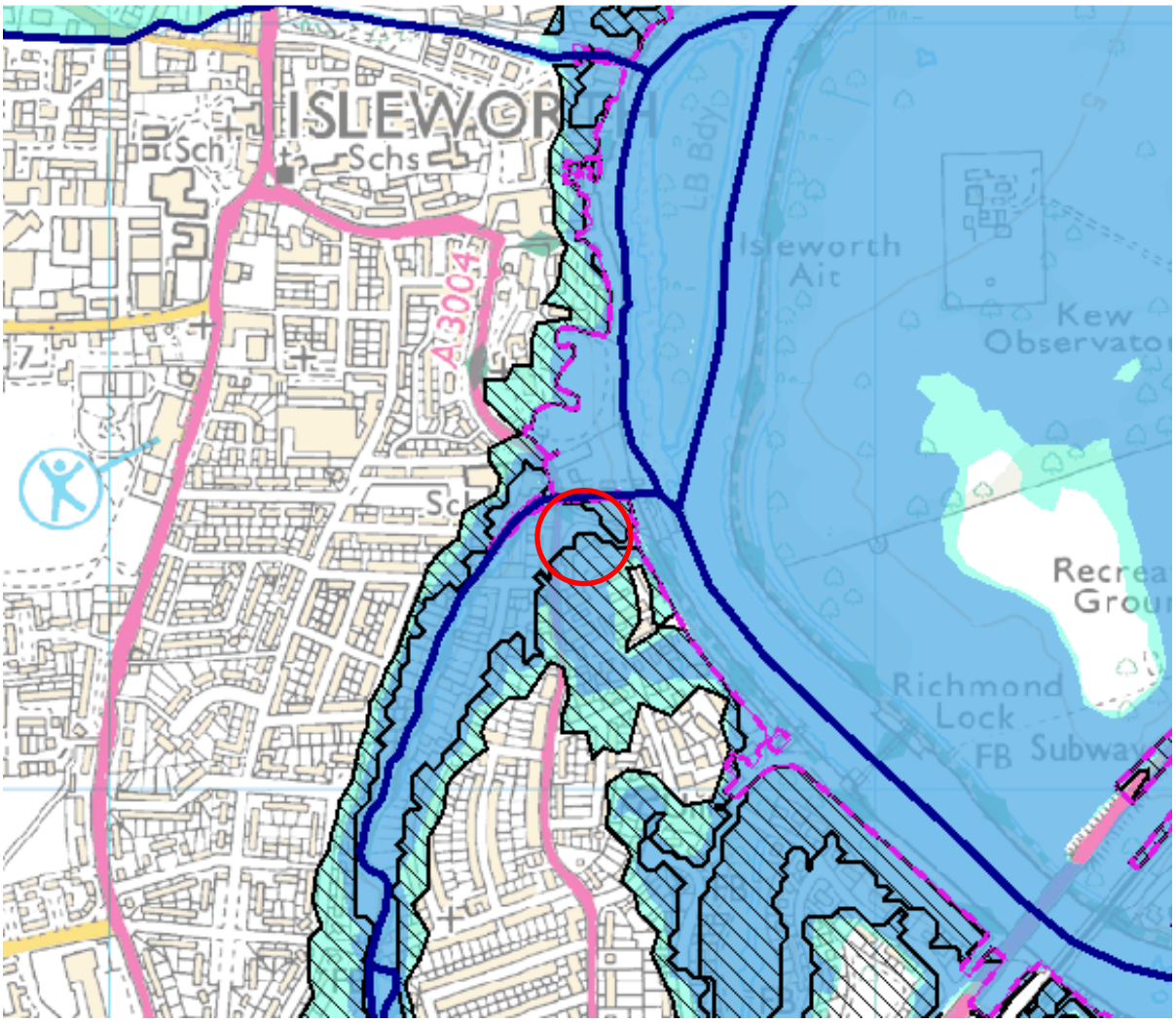


Figure 2: Environment Agency Flood Map

Map Date: Current

Scale: Not to scale

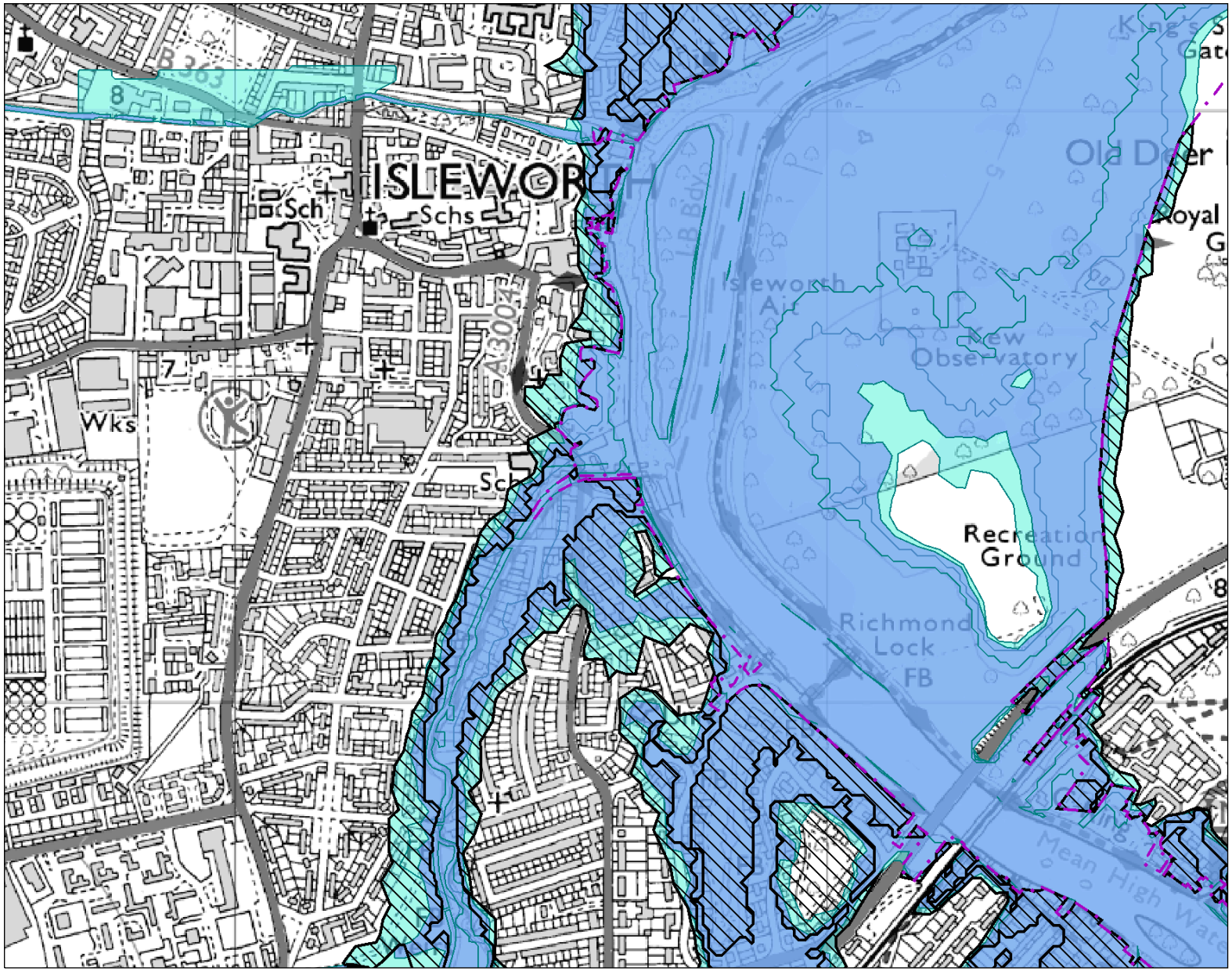
RPS
14 Cornhill
London
EC3V 3ND

☎ 020-7280-3200
www.rpsgroup.com

APPENDIX A

Environment Agency Consultation Response

Flood Map centred on Waterside Business Park, TW7 7DG created 27 June 2012 - NE31398BC.



Environment Agency

Scale 1:10,001

N
W E
S

- Flood Map - Defences
- Areas Benefiting from Flood Defences
- Flood Map - Flood Storage Areas
- Flood Map - Flood Zone 3
- Flood Map - Flood Zone 2

Flood Map Areas (assuming no defences)

Flood Zone 3 shows the area that could be affected by flooding:
- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Detailed FRA centred Waterside Business Park, Railshed Road, Richmond TW7 7DG - created 27 June 2012 - NE31398BC.

Environment Agency
2 Bishops Square Business Park
St Albans Road West
Hatfield
Hertfordshire
AL10 9EX

0 12.5 25 50
Metres

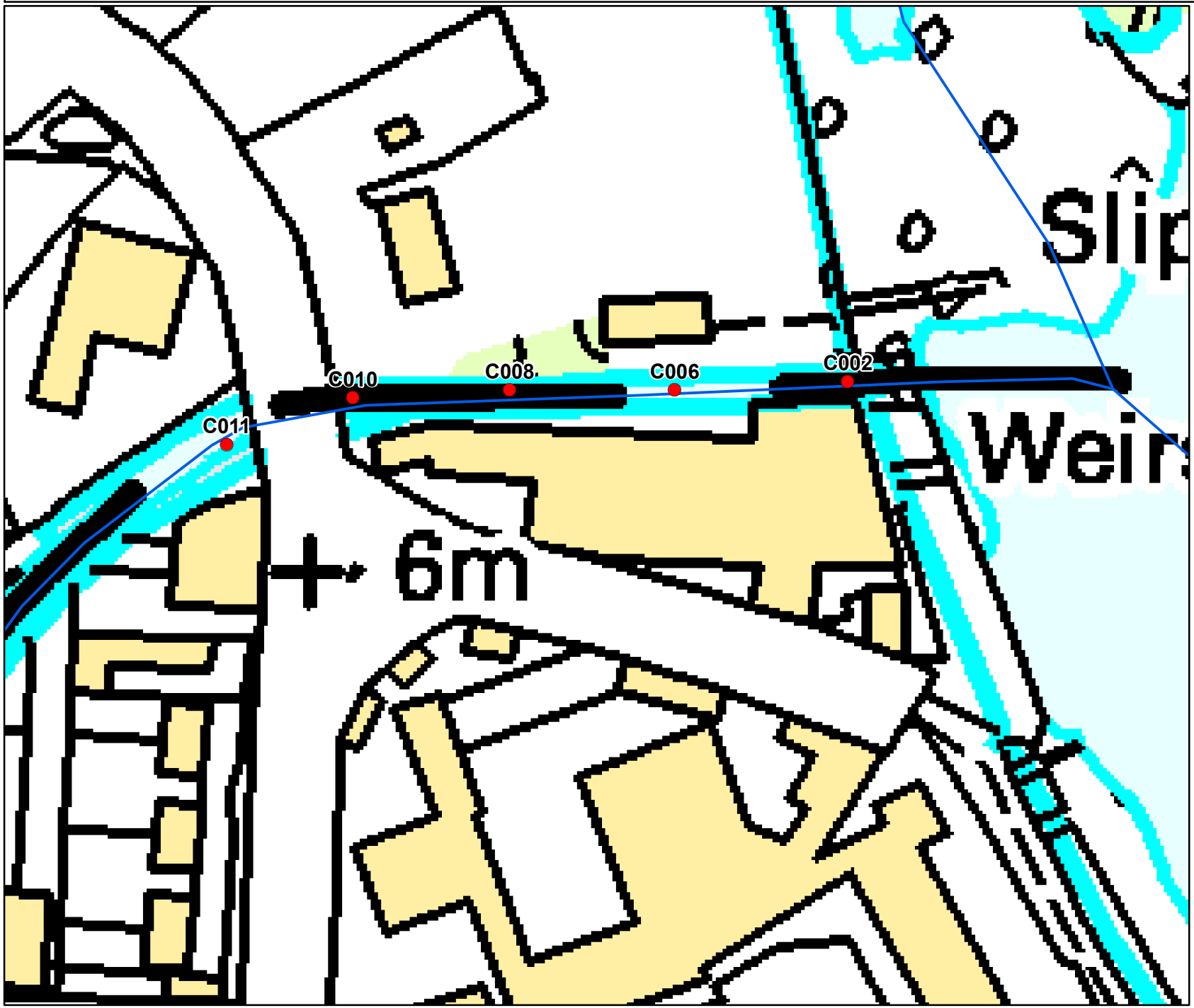
Legend

- Main river
- 1 in 1000 (0.1%) Defended
- 1 in 100+20% (*CC) Defended
- 1 in 100 (1%) Defended
- 1 in 50 (2%) Defended
- 1 in 20 (5%) Defended
- 1 in 5 (20%) Defended

The data in this map has been extracted from the River Crane Mapping Study (Halcrow 2008).
This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment.
Modelled outlines take into account catchment wide defences.

Produced by:
Flood Risk Mapping & Data Management
South East (North East Thames Area)

Detailed FRA centred Waterside Business Park, Railshed Road, Richmond TW7 7DG - created 27 June 2012 - NE31398BC.



Environment Agency
2 Bishops Square Business Park
St Albans Road West
Hatfield
Hertfordshire
AL10 9EX

0 10 20 40
Metres

Legend

- Main river
- Node locations

The data in this map has been extracted from the River Crane Mapping Study (Halcrow 2008).
This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment.
Modelled outlines take into account catchment wide defences.

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Flood Risk Mapping & Data Management
South East (North East Thames Area)

Environment Agency ref: NE31398BC

The following information has been extracted from the River Crane Mapping Study (Halcrow 2008)

Caution:
The modelled flood levels and extents are appropriate for catchment wide strategic flood risk mapping. However, for more detailed flood risk assessment it is recommended that each of the underlying flood mapping, hydraulic modelling and hydrological assumptions are re-evaluated to determine the appropriateness in a more detailed analysis.

All flood levels are given in metres Above Ordnance Datum (mAOD)
All flows are given in cubic metres per second (cumecs)

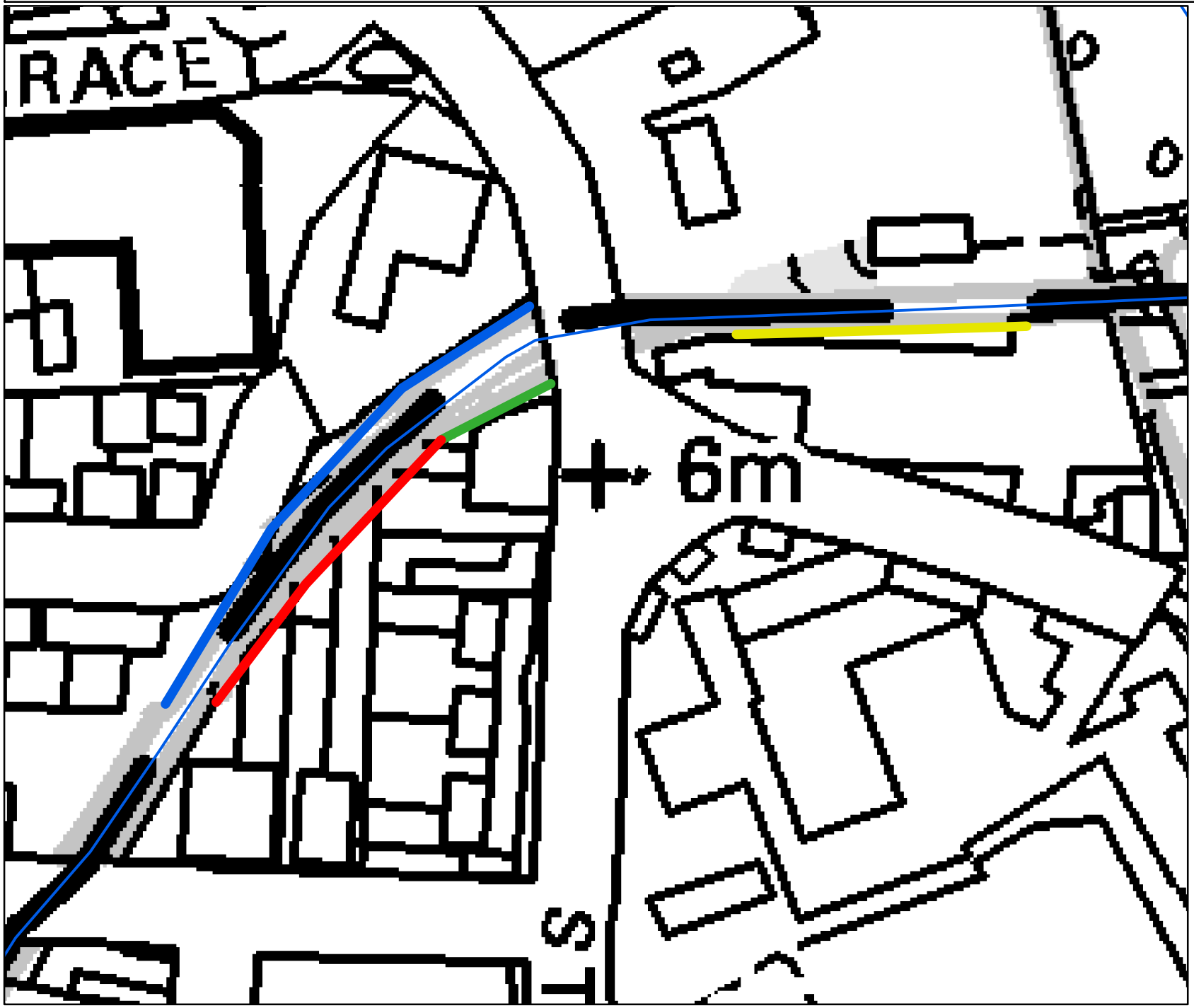
MODELLED FLOOD LEVEL

			Return Period					
Node Label	**Easting**	**Northing**	**5 yr**	**20 yr**	**50 yr**	**100 yr**	**100yr + 20%**	**1000yr**
C011	516563	175372	4.202	4.208	4.214	4.219	4.227	4.288
C010	516586	175381	4.183	4.187	4.191	4.194	4.200	4.238
C008	516614	175382	4.138	4.134	4.128	4.124	4.117	4.059
C006	516643	175382	4.109	4.100	4.088	4.079	4.063	4.034
C002	516674	175384	4.165	4.166	4.167	4.168	4.170	4.182

MODELLED FLOWS

			Return Period					
Node Label	**Easting**	**Northing**	**5 yr**	**20 yr**	**50 yr**	**100 yr**	**100yr + 20%**	**1000yr**
C011	516563	175372	24.319	26.149	26.872	27.384	28.396	39.061
C010	516586	175381	24.319	26.149	26.872	27.384	28.396	39.061
C008	516614	175382	24.319	26.149	26.872	27.384	28.396	39.087
C006	516643	175382	24.319	26.149	26.872	27.384	28.396	39.101
C002	516674	175384	24.319	26.149	26.872	27.384	28.396	39.258

Detailed FRA centred Waterside Business Park, Railshed Road, Richmond TW7 7DG - created 27 June 2012 - NE31398BC.



Environment Agency
2 Bishops Square Business Park
St Albans Road West
Hatfield
Hertfordshire
AL10 9EX

0 10 20 40
Metres

Legend

Main river

Flood defence

1

2

3

4

The data in this map has been extracted from the River Crane Mapping Study (Halcrow 2008).
This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment.
Modelled outlines take into account catchment wide defences.

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Flood Risk Mapping & Data Management
South East (North East Thames Area)

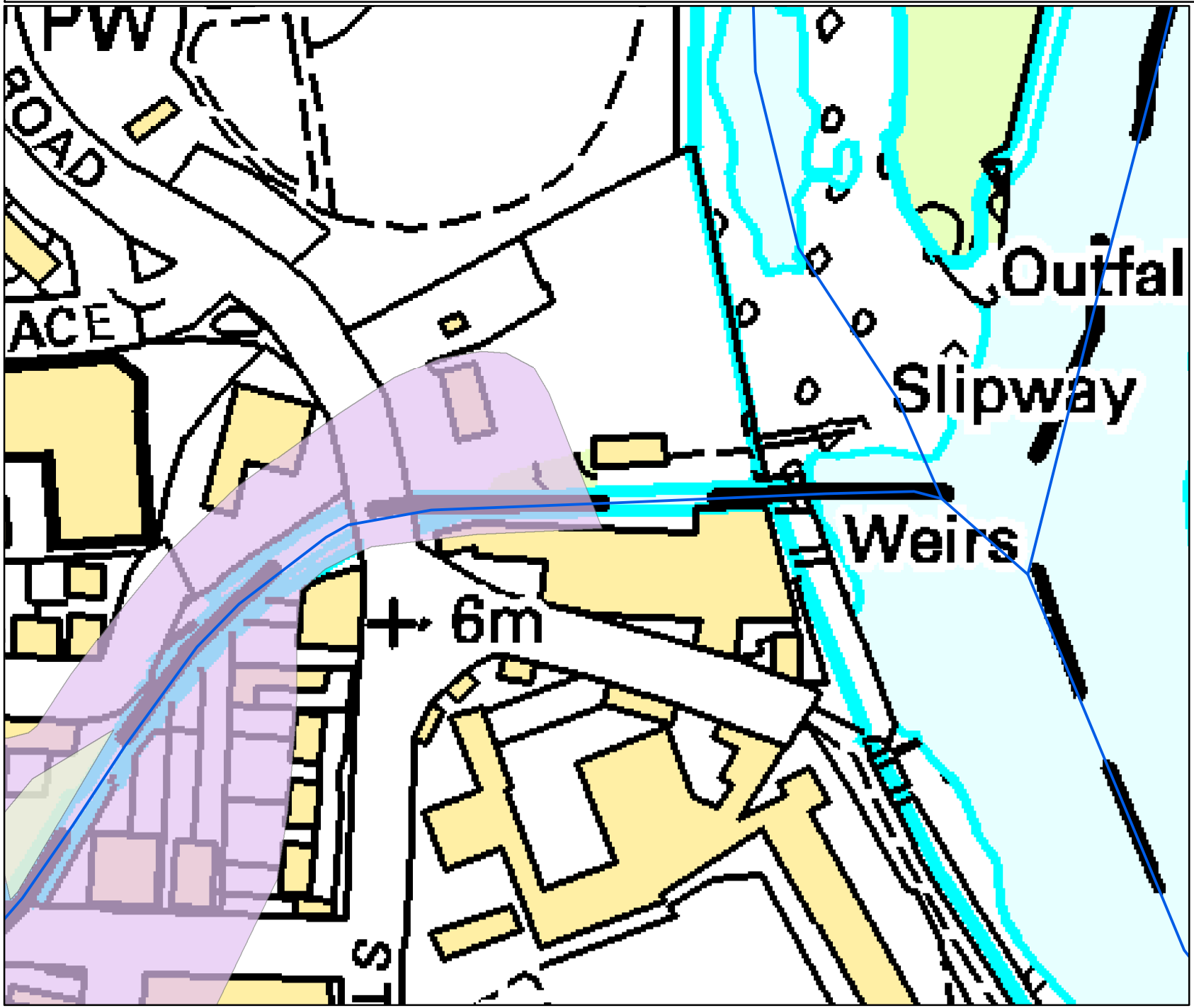
Environment Agency ref: NE31398BC

The following information on defences has been extracted from the National Flood and Coastal Defence Database (NFCDD)

Defences

Map ID	Asset Reference	Asset Type	Asset Protection	Asset Comment	Asset Description	Asset Location	Design Upstream Crest Level (mAOD)	Design Downstream Crest Level (mAOD)	Actual Upstream Crest Level (mAOD)	Actual Downstream Crest Level (mAOD)	Design Standard of protection (years)	Grid Reference
1	0623636CR0101L05	raised defence (man-made)	fluvial	Brick Lined channel sides - part of the Tidal Crane channel works. 1 in 100yr SoP O & M Manual 36/4.	Tidal Crane Channel Works	U/S of Crane Tidal Gates	Unknown	Unknown	5.6	5.3	1000	TQ1656575382
2	0623636CR0101R04	raised defence (man-made)	fluvial	Concrete capped sheet steel piling bank protection with brick wall above. Raised 0.5m above surrounding land, 4m height in total. 1 in 100yr SoP. O & M Manual 36/4.	Wall.	U/S of Confluence with Thames	Unknown	Unknown	5.49	5.91	1000	TQ1666075378
3	0623636CR0101R06	raised defence (man-made)	fluvial	Masonry channel sides - 0.3m above surrounding land. 1 in 100 year SoP. O & M MANUAL 36/4.	Wall.	U/S of Crane Tidal Gates	Unknown	Unknown	5.1	5.75	1000	TQ1656975367
4	0623636CR0101R07	raised defence (man-made)	fluvial	3m high brick wall with timber piling at regular intervals for boat mooring. 1 in 100yr SoP. O & M MANUAL 36/4.	Tidal Crane Channel Works	U/S of Confluence with Thames	Unknown	Unknown	5.48	5.1	1000	TQ1654875356

Detailed FRA centred Waterside Business Park, Railshed Road, Richmond TW7 7DG - created 27 June 2012 - NE31398BC.



Environment Agency
2 Bishops Square Business Park
St Albans Road West
Hatfield
Hertfordshire
AL10 9EX

0 15 30 60
Metres

Legend

- Main river
- 1965 flood event

The data in this map has been extracted from the River Crane Mapping Study (Halcrow 2008).
This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment.
Modelled outlines take into account catchment wide defences.

Produced by:
Flood Risk Mapping & Data Management
South East (North East Thames Area)

Product 4 (Detailed Flood Risk) for: Waterside Business Park, TW7 7DG
Reference: NE36468JH
Date: 13th September 2013

Contents

The information provided is based on the best data available as of the date of this letter.

You may feel it is appropriate to contact our office at regular intervals, to check whether any amendments/ improvements to the data for this location have been made. Should you re-contact us after a period of time, please quote the above reference in order to help us deal with your query.

This information is provided subject to the enclosed notice which you should read.

Apollo Court, 2 Bishop Square Business Park, St Albans Road West, Hatfield, Hertfordshire, AL10 9EX
Customer services line: 03708 506 506
Email: NETenquiries@environment-agency.gov.uk
Website: www.environment-agency.gov.uk

Flood Map Confirmation

The Flood Map:

Our Flood Map shows the natural floodplain for areas at risk from river and tidal flooding. The floodplain is specifically mapped ignoring the presence and effect of defences. Although flood defences reduce the risk of flooding they cannot completely remove that risk as they may be over topped or breached during a flood event.

The Flood Map indicates areas with a 1% (0.5% in tidal areas), Annual Exceedance Probability (AEP) - the probability of a flood of a particular magnitude, or greater, occurring in any given year, and a 0.1% AEP of flooding from rivers and/or the sea in any given year. In addition, the map also shows the location of some flood defences and the areas that benefit from them.

The Flood Map is intended to act as a guide to indicate the potential risk of flooding. When producing it we use the best data available to us at the time and also take into account historic flooding and local knowledge. The Flood Map is updated on a quarterly basis to account for any amendments required. These amendments are then displayed on the internet at www.environment-agency.gov.uk.

At this Site:

The Flood Map shows that this site lies within the outline of the 0.5% chance of tidal flooding in any given year from the sea.

is not within the current 'Extreme Flood Outline'. According to the Flood Map, which provides a general estimate of the likelihood of flooding across England & Wales, this site is shown to have less than 0.1% chance of flooding in any year from rivers and, or the sea.

Enclosed is an extract of our Flood Map which shows this information for your area.

Method of production

The Flood Map at this location has been derived using detailed modelling of the Thames Tidal Defences Study completed in March 2006 by Halcrow Ltd.

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Model Output Data – Thames Estuary 2100

You have requested in-channel flood levels for the tidal river Thames. These have been taken from the **Thames Estuary 2100 study completed by HR Wallingford in 2008**. The modelled node closest to your site is **2.9u**; the location of these nodes is also shown on the enclosed map.

Why have the levels changed?
The TE2100 plan is now live and within it are a set of levels on which the flood risk management strategy is based. The plan is the overarching flood management strategy for the Thames Estuary and therefore any development planning should be based on the same underlying data.

What is the difference between the TE2100 levels and the 2008 Joint Probability levels that have previously been provided?
The values of the two sets of levels are very similar for the present day scenario. However, the TE2100 takes into account operation of the Thames Barrier when considering future levels. The Thames Barrier requires regular maintenance and with additional closures the opportunity for maintenance will be reduced. When this happens, river levels for which we would normally shut the barrier, will have to be allowed through to ensure that the barrier is not shut too often. For this reason, levels upstream of the barrier will increase and the tidal walls will need to be heightened to match. The levels previously provided do not take this scenario into consideration.

Why is there no return period for levels upstream of the barrier?
The levels upstream of the barrier are the highest levels permitted by the operation of the Thames Barrier. If levels and flows are forecast to be any higher, the Thames Barrier would shut, ensuring that the tide is blocked and the river maintained to a low level. For this reason the probability of any given water level upstream of the Barrier is controlled and therefore any associated return period becomes irrelevant. The Thames Barrier and associated defence system has a 1 in 1000 year standard which means it ensures that flood risk is managed up to an event that has a 0.1% annual probability. The probability of water levels upriver is ultimately controlled by the staff at the Thames Barrier.

Why are the levels in west London higher than the defence crest levels?
In west London there is a heavy influence from upstream flows (fluvial flows). The flood defences are built to manage tidal flood risk only. With very high fluvial flows, the river levels in west London could be above the 0.1% annual probability tidal level.

Why are the climate change/future west London levels lower than the present day levels?
The climate change levels are assessed to determine the future tidal defence levels. For this reason they only account for extreme tidal events and not extreme fluvial flow events. The present day levels include extreme flows from upstream (fluvial events) as well as extreme tidal events.

For further information about the Thames Barrier please visit our website at:
http://www.environment-agency.gov.uk/homeandleisure/floods/38353.aspx

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Website: www.environment-agency.gov.uk

TE2100 present day levels:

Levels downstream of the Thames Barrier are 0.1% AEP (1 in1000) and levels upstream are the highest levels permitted by the Thames Barrier. The defence levels (left defence, right defence) are the minimum levels to which the defences should be built.

Note: The defence levels near Teddington are lower than the extreme water levels because they take into account high fluvial events. The defences are tidal only.

Location	Node	Easting	Northing	Extreme water level	Left Defence	Right defence	Allow for future defence raising to a level of...	
							Left Bank	Right Bank
Richmond	2.9d	516766	175416	5.54	5.94	5.94	6.70	6.70
	2.9u	516742	175353	5.54	5.94	5.94	6.70	6.70
Teddington	2.8	516863	175134	5.59	5.94	5.94	6.70	6.70
	2.81	516864	175180	5.59	5.94	5.94	6.70	6.70

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TE2100 climate change levels:

Note: The water levels in west London are lower than the current day extreme levels because they do not take into account extreme fluvial events; they are tidal only levels.

Location	Node	Easting	Northing	2065 to 2100		2100	
				Design water level	Defence level (both banks)	Design water level	Defence level (both banks)
Richmond	**2.9d**	**516766**	**175416**	**5.83**	**6.25**	**6.28**	**6.70**
	2.9u	**516742**	**175353**	**5.83**	**6.25**	**6.28**	**6.70**
Teddington	**2.8**	**516863**	**175134**	**5.84**	**6.25**	**6.29**	**6.70**
	2.81	**516864**	**175180**	**5.84**	**6.25**	**5.29**	**6.70**

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Breach Modelling

The table below displays site specific modelled flood levels at your site. These have been taken from **Tidal Thames Breach modelling study completed by Halcrow in March 2012.** The exact location of the given site specific levels and the extent of the breach is shown on the enclosed map.

This modelling simulates tidal breaches along the Thames from Teddington to the Mar Dyke and River Darent. A series of approximately 100 tidal models were developed for the Environment Agency at pre-determined breach locations. These were chosen using a risk-based approach by examining critical locations based on low floodplain topography. For hard defences breaches are set at 20 m wide; for soft defences, breaches are 50 m wide. In both cases, defences are assumed to breach down to the ground level behind the defence.

Based on the 2008 Extreme Water Level Modelling, the 0.5% probability of annual exceedance (1 in 200 year joint probability – Thames Barrier Operational) tidal event was modelled for all breach locations with a current year baseline of 2005. In addition, for breaches downstream of the Thames Barrier, the 1 in 200 year plus climate change event (2107 epoch) was also modelled.

	National Grid Reference		Modelled levels in m AODN for 0.5% AEP
Point	**Easting**	**Northing**	**2005**
1	516589	175373	5.19
2	516654	175377	5.16
3	516654	175349	5.40
4	516617	175351	5.41
5	516618	175368	5.20
6	516591	175367	5.26

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Defence Details

The design standard of protection of the flood defences in this area of the Thames is 0.1% AEP; they are designed to defend London up to a 1 in 1000 year flood event. The defences are all raised, man-made and privately owned. It is the riparian owners' responsibility to ensure they are maintained to a crest level of 5.94m AODN (the Flood Defence Level in this reach of the Thames). We inspect them twice a year to ensure that they remain fit for purpose. The current condition grade for defences in the area is 2 (Good), on a scale of 1 (very good) to 5 (very poor). For more information on your rights and responsibilities as a riparian owner, please see our document 'Living on the edge' found on our website at:

https://publications.environment-agency.gov.uk/skeleton/publications/default.aspx

Please see the 'Thames Estuary 2100' document on our website for the short, medium and long term Flood Risk Management strategy for London:

http://www.environment-agency.gov.uk/homeandleisure/floods/125045.aspx

Areas Benefiting from Flood Defences

This site is within an area benefiting from flood defences, as shown on the enclosed extract of our Flood Map. Areas benefiting from flood defences are defined as those areas which benefit from formal flood defences specifically in the event of flooding from rivers with a 1% (1 in 100) chance in any given year, or flooding from the sea with a 0.5% (1 in 200) chance in any given year.

If the defences were not there, these areas would be flooded. An area of land may benefit from the presence of a flood defence even if the defence has overtopped, if the presence of the defence means that the flood water does not extend as far as it would if the defence were not there.

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Historic Flood Data

We do not hold records of historic flood events from rivers and/or the sea affecting the area local to this property. However, please be aware that this does not necessarily mean that flooding has not occurred here in the past, as our records are not comprehensive.

Please note that our records are not comprehensive. We would therefore advise that you make further enquiries locally with specific reference to flooding at this location. You should consider contacting the relevant Local Planning Authority and/or water/sewerage undertaker for the area.

We map flooding to land, not individual properties. Our historic flood event record outlines are an indication of the geographical extent of an observed flood event. Our historic flood event outlines do not give any indication of flood levels for individual properties. They also do not imply that any property within the outline has flooded internally.

Please be aware that flooding can come from different sources. Examples of these are:

- from rivers or the sea;
- surface water (i.e. rainwater flowing over or accumulating on the ground before it is able to enter rivers or the drainage system);
- overflowing or backing up of sewer or drainage systems which have been overwhelmed,
- groundwater rising up from underground aquifers

Currently the Environment Agency can only supply flood risk data relating to the chance of flooding from rivers or the sea. However you should be aware that in recent years, there has been an increase in flood damage caused by surface water flooding or drainage systems that have been overwhelmed.

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Additional Information

Use of Environment Agency Information for Flood Risk / Flood Consequence Assessments

Important If you have requested this information to help inform a development proposal, then we recommend that you undertake a formal pre-application enquiry using the form available from our website:- http://www.environment-agency.gov.uk/research/planning/33580.aspx

Depending on the enquiry, we may also provide advice on other issues related to our responsibilities including flooding, waste, land contamination, water quality, biodiversity, navigation, pollution, water resources, foul drainage or Environmental Impact Assessment.

In **England**, you should refer to the Environment Agency's Flood Risk Standing Advice, the technical guidance to the National Planning Policy Framework and the existing PPS25 Practice Guide for information about what flood risk assessment is needed for new development in the different Flood Zones. These documents can be accessed via:

http://www.environment-agency.gov.uk/research/planning/82587.aspx
https://www.gov.uk/government/publications/national-planning-policy-framework-technical-guidance
https://www.gov.uk/government/publications/development-and-flood-risk-practice-guide-planning-policy-statement-25

You should also consult the Strategic Flood Risk Assessment produced by your local planning authority.

You should note that:

1. Information supplied by the Environment Agency may be used to assist in producing a Flood Risk / Consequence Assessment (FRA / FCA) where one is required, but does not constitute such an assessment on its own.

2. This information covers flood risk from main rivers and the sea, and you will need to consider other potential sources of flooding, such as groundwater or overland runoff. The information produced by the local planning authority referred to above may assist here.

3. Where a planning application requires a FRA / FCA and this is not submitted or deficient, the Environment Agency may well raise an objection.

4. For more significant proposals in higher flood risk areas, we would be pleased to discuss details with you ahead of making any planning application, and you should also discuss the matter with your local planning authority.

Apollo Court, 2 Bishop Square Business Park, St Albans Road West, Hatfield, Hertfordshire, AL10 9EX
Customer services line: 03708 506 506
Email: NETenquiries@environment-agency.gov.uk
Website: www.environment-agency.gov.uk

Development and Flood risk

Finished floor levels using TE2100 design levels

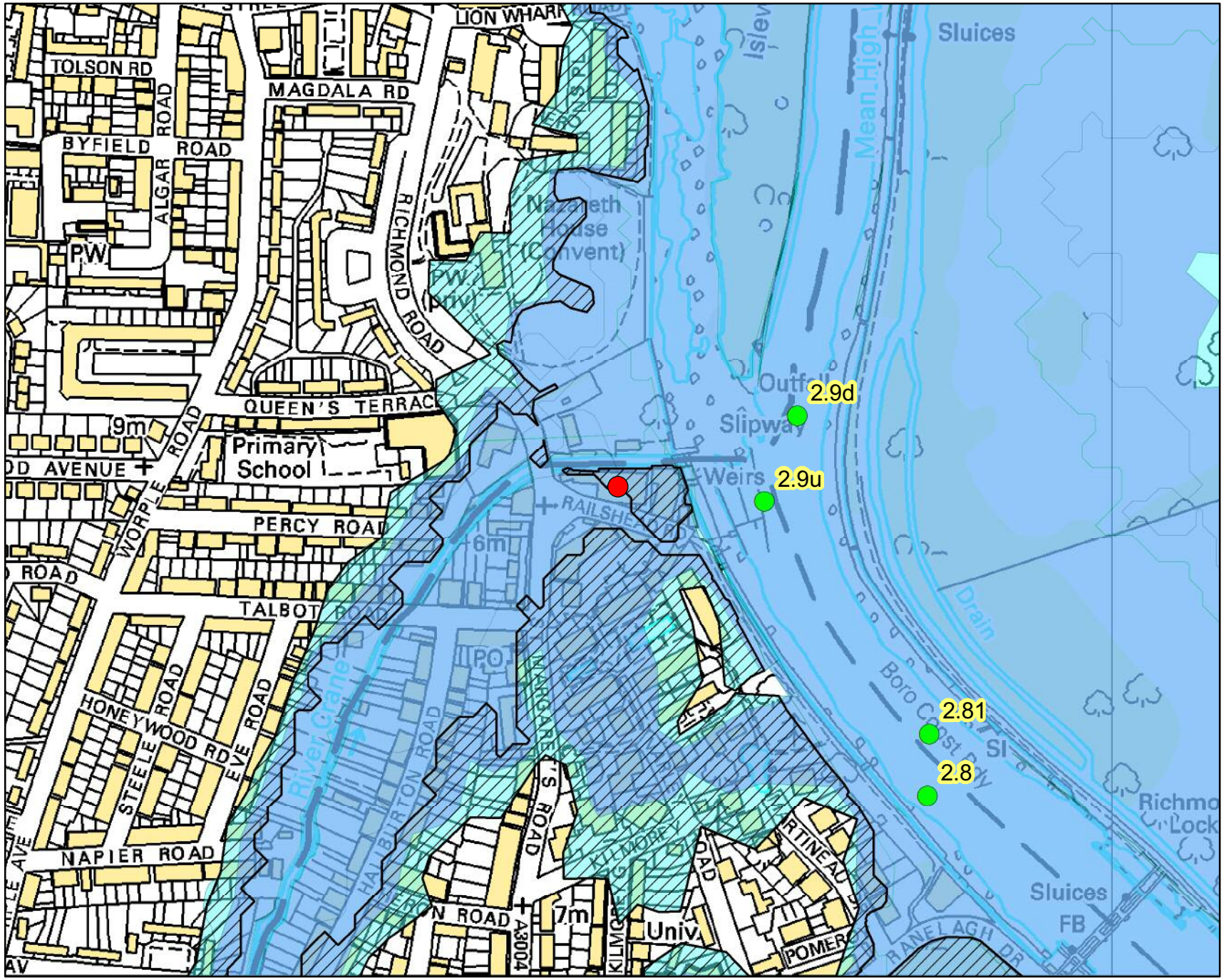
We have recently moved to issuing design water levels from the TE2100 project as part of data requests. Developers should use these levels as part of their flood risk assessments for elements impacted by in-river levels, for example defence crest heights etc. We are in the process of carrying out revised breach modelling for the floodplains based on these new in-river levels. Until this new breach modelling is available, developers may continue to use our existing (2008) breach modelling levels to inform their flood risk assessments and to set finished floor levels in developments at residual risk (where this data is available). Developers should be aware that these levels will be changing in the future and are likely to result in recommended finished floor levels being set at a higher level to that currently used. Developers may wish to undertake their own updated breach modelling using our TE2100 data, which we can supply on request where available.

Surface Water

You may also wish to consider contacting the appropriate relevant Local Planning Authority and/or water/sewerage undertaker for the area. They may be able to provide some knowledge on the risk of flooding from other sources. We are working with these organisations to improve knowledge and understanding of surface water flooding.

Apollo Court, 2 Bishop Square Business Park, St Albans Road West, Hatfield, Hertfordshire, AL10 9EX
Customer services line: 03708 506 506
Email: NETenquiries@environment-agency.gov.uk
Website: www.environment-agency.gov.uk

Detailed FRA/FCA for Waterside Business Park - created 13/09/2013 - NE36468JH



Environment Agency

0 40 80 160
Meters

N
W E
S

Legend

- Site Location
- Model Nodes
- Areas Benefiting from Flood Defences
- Flood Zone 3
- Flood Zone 2

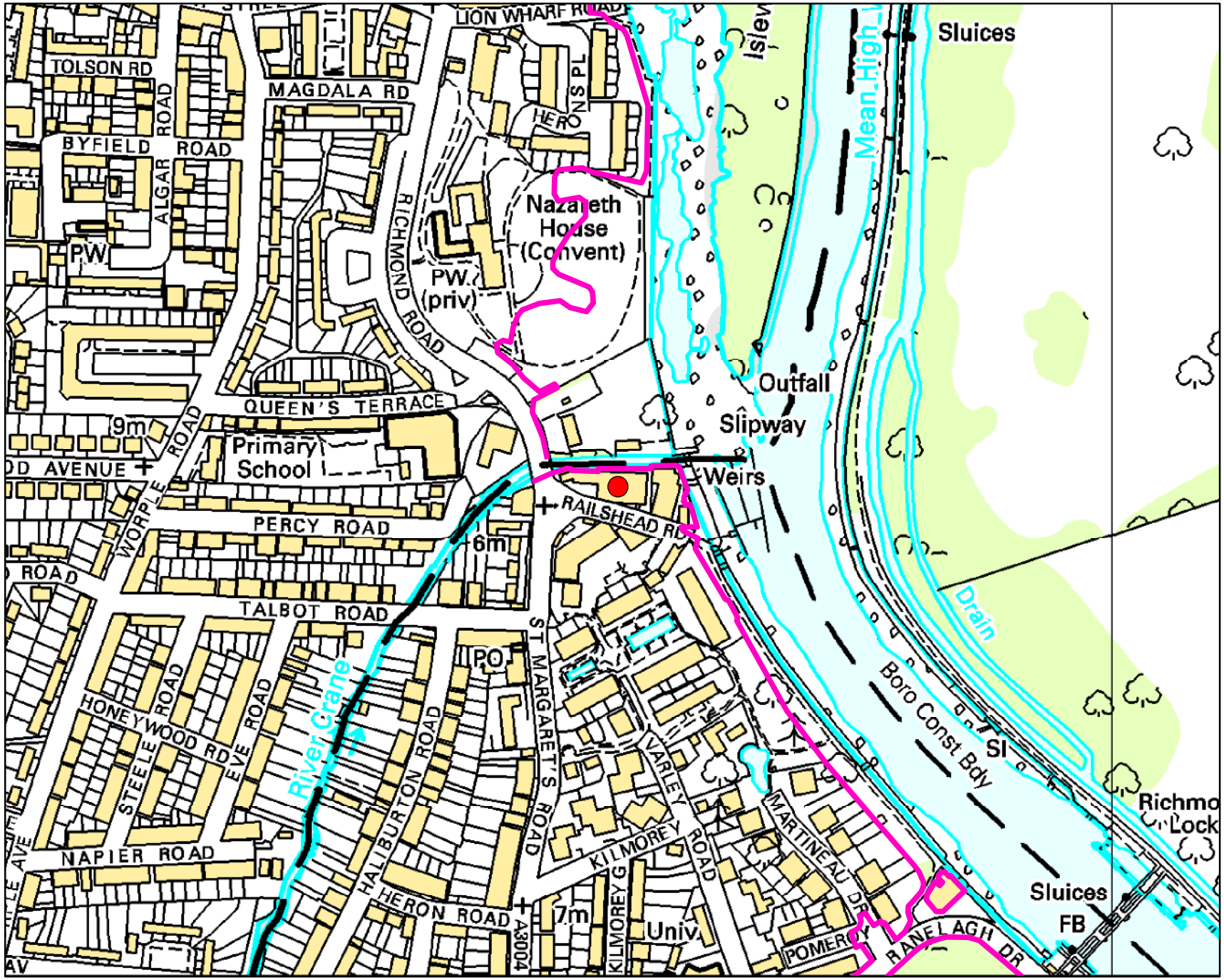
Flood Map Areas (assuming no defences)

Flood Zone 3 shows the area that could be affected by flooding:
- from the sea with a 0.5% or greater chance of occurring each year
- or from a river with a 1% or greater chance of occurring each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 0.1% chance of occurring each year.

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Detailed FRA/FCA for Waterside Business Park - created 13/09/2013 - NE36468JH



Environment Agency

0 40 80 160
Meters

N
W E
S

Legend

Site Location

TTD Defences SDL (mAODN)

5.94

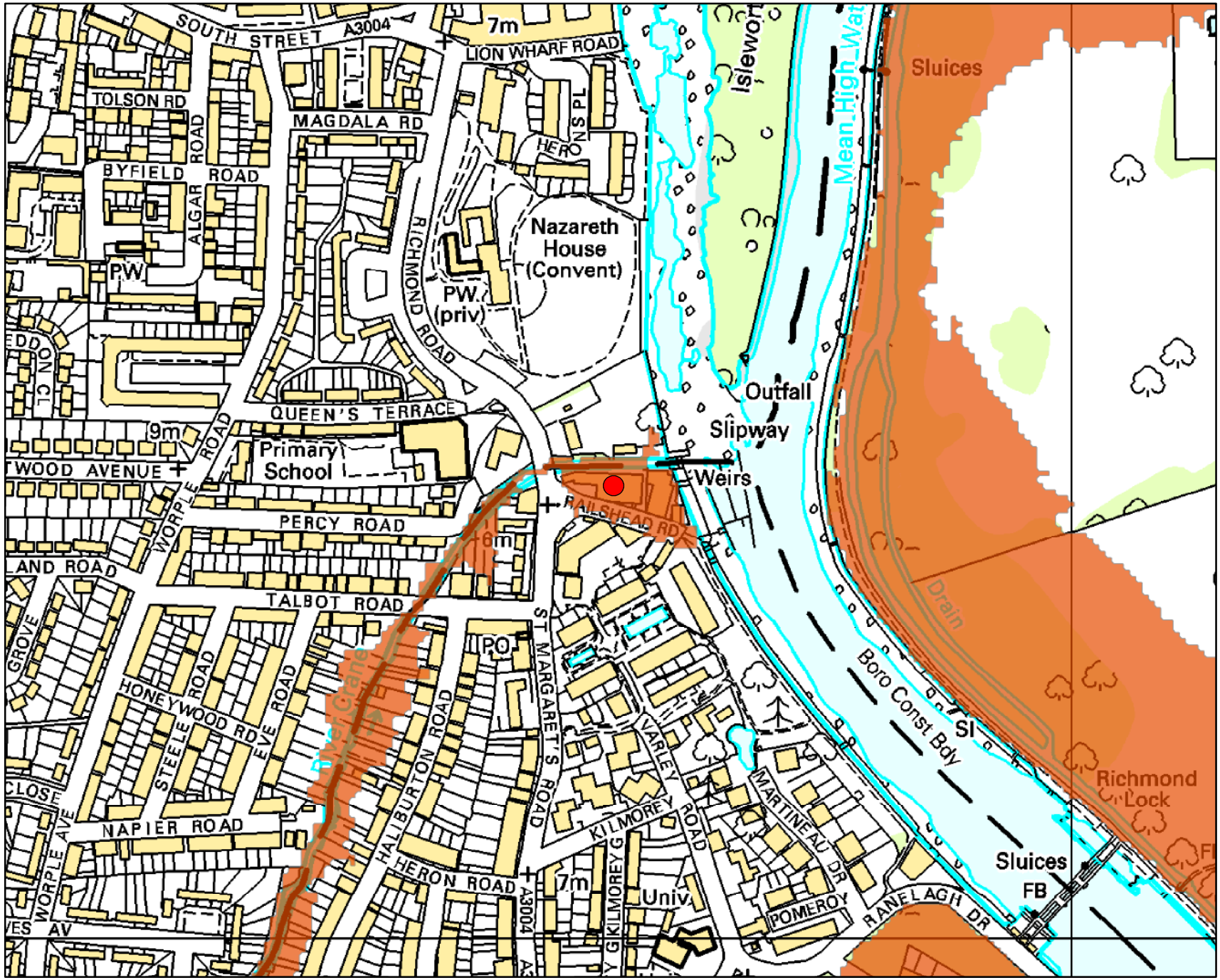
Flood Map Areas (assuming no defences)

Flood Zone 3 shows the area that could be affected by flooding:
- from the sea with a 0.5% or greater chance of occurring each year
- or from a river with a 1% or greater chance of occurring each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 0.1% chance of occurring each year.

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Breach Modelling Map for Waterside Business Park - created 13/09/2013 - NE36468JH



Environment Agency

0 40 80 160
Meters

N W E S

Legend

Site Location

Max Flood Extent

0.5% AEP (1 in 200 year) 2005

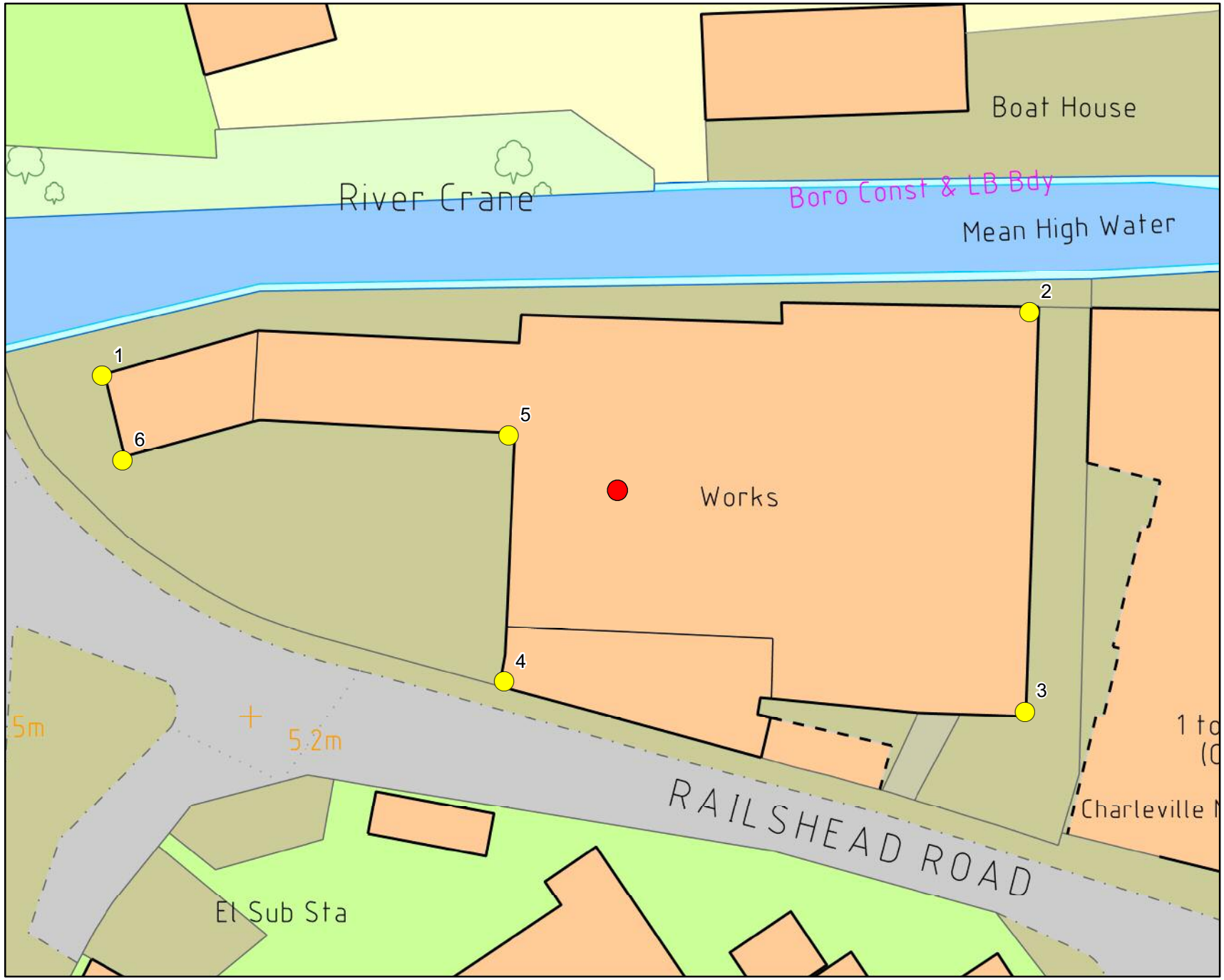
0.5% AEP (1 in 200 year) 2107

Thames Tidal Breach Modelling 2013

A modelled representation of tidal breaches along the Thames from Teddington to the Mar Dyke and River Darent, based on low floodplain topography. For hard defences breaches are set at 20 m wide; for soft defences, breaches are 50 m wide. In both cases, defences are assumed to breach down to the ground level behind the defence. The modelling is based on the Extreme Water Levels 2008 (current year 2005), and includes 0.5% (1 in 200) chance in any year. In the case of breaches downstream of the Thames Barrier, the 1 in 200 year plus climate change event (2107 epoch) was also modelled.

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Modelled Flood Levels for Waterside Business Park - created 13/09/2013 - NE36468JH



Environment Agency

0 2.5 5 10
Meters

N
W E
S

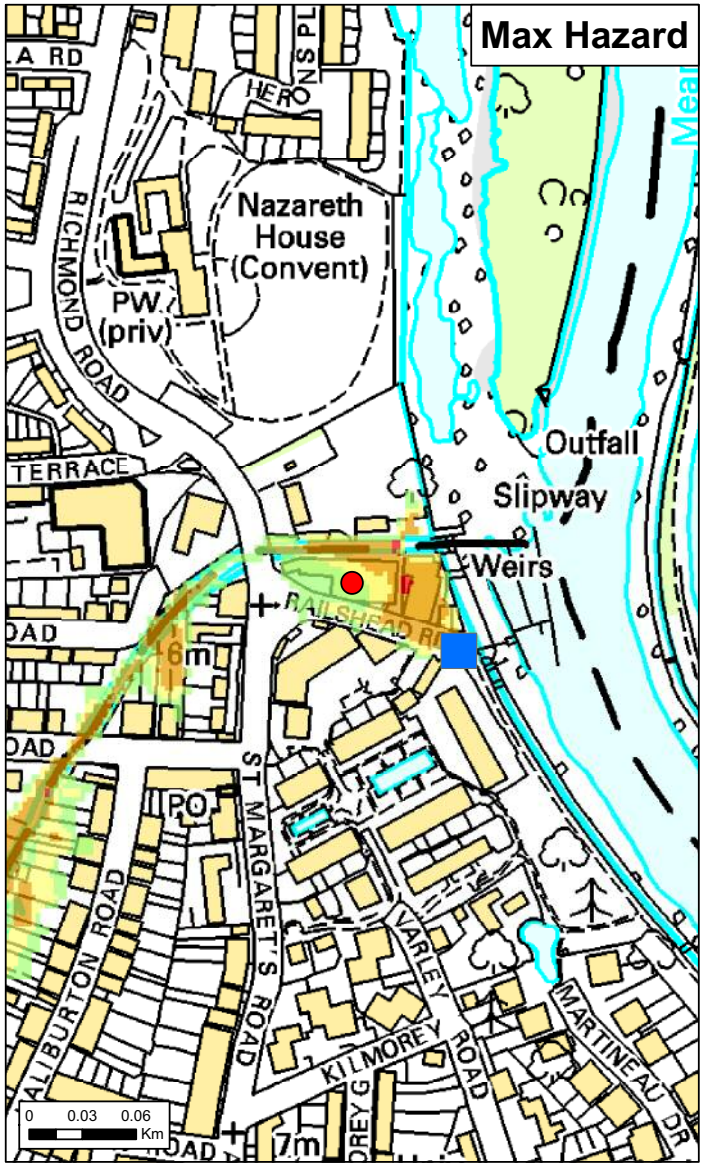
Legend

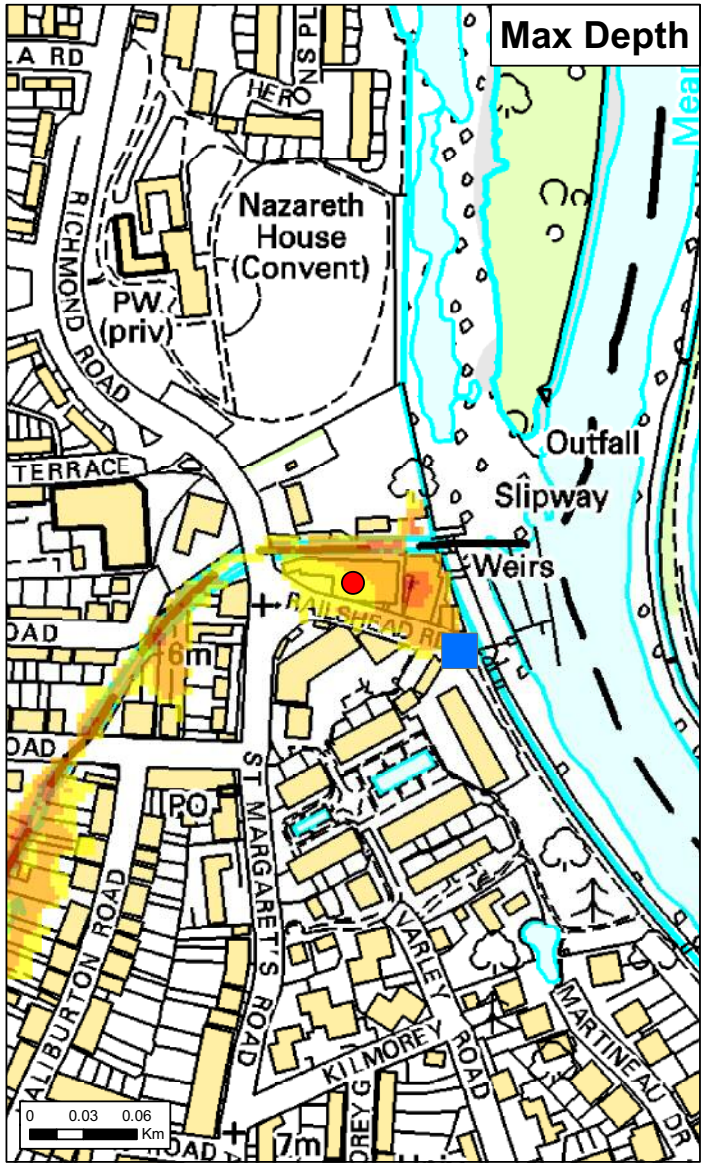
- Site Location
- Modelled Floor Levels

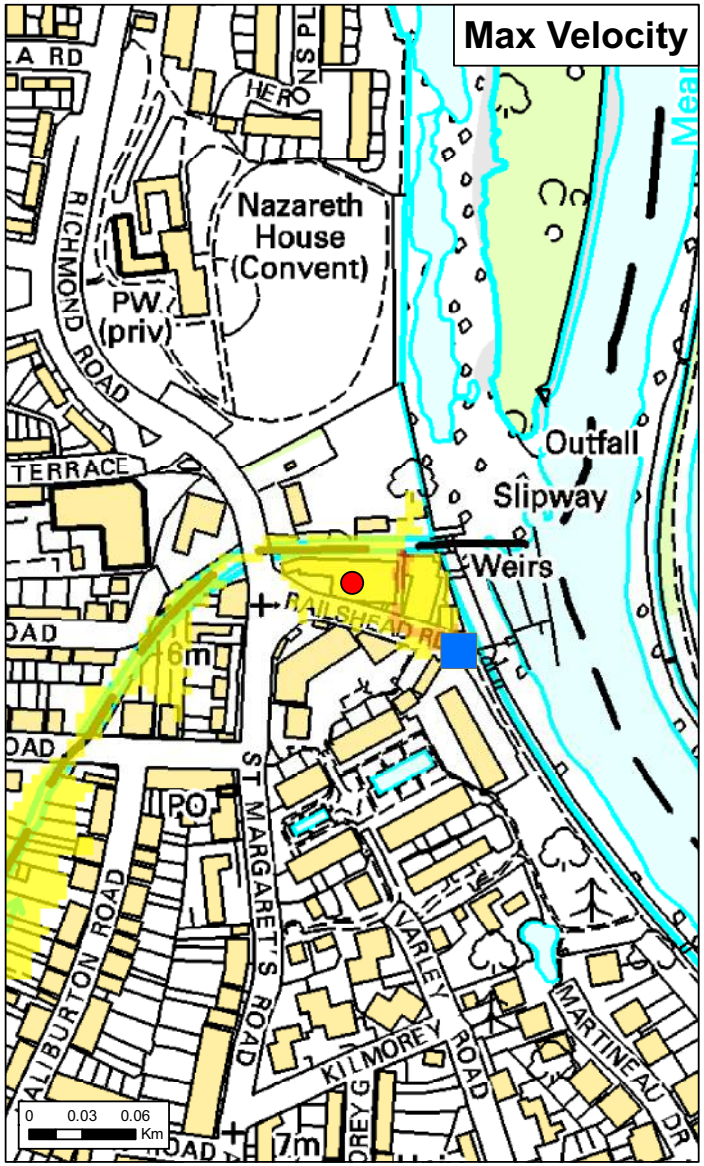
Thames Tidal Breach Modelling 2013

A modelled representation of tidal breaches along the Thames from Teddington to the Mar Dyke and River Darent, based on low floodplain topography. For hard defences breaches are set at 20 m wide; for soft defences, breaches are 50 m wide. In both cases, defences are assumed to breach down to the ground level behind the defence.
The modelling is based on the Extreme Water Levels 2008 (current year 2005), and includes 0.5% (1 in 200) chance in any year. In the case of breaches downstream of the Thames Barrier, the 1 in 200 year plus climate change event (2107 epoch) was also modelled.

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk







Site Location Modelled Breach Location

Max Hazard

- Less than 0.75 (Low Hazard)
- Between 0.75 and 1.25 (Danger for Some)
- Between 1.25 and 2.00 (Danger for Most)
- Greater than 2.00 (Danger for All)

Max Depth (m)

- 0 - 0.25
- 0.25 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- > 2.00

Max Velocity (m/s)

- 0 - 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.5
- > 2.5

Date Printed	April 2013	Scenario year	2005	Scenario Annual Chance	0.5% (1 in 200)

This map shows the level of flood hazard to people (called a hazard rating) if our flood defences are breached at certain locations, for a range of scenarios. The hazard rating depends on the depth and velocity of floodwater, and maximum values of these are also mapped.

The map is based on computer modelling of simulated breaches at specific locations. Each breach has been modelled individually and the results combined to create this map. Multiple breaches, other combinations of breaches, different sized tidal surges or flood flows may all give different results.

The map only considers the consequences of a breach, it does not make any assumption about the likelihood of a breach occurring. The likelihood of a breach occurring will depend on a number of different factors, including the construction and condition of the defences in the area. A breach is less likely where defences are of a good standard, but a risk of breaching remains.

Please contact the Environment Agency for further information on emergency planning associated with flood risk in this area.

General Enquiries No: 03708 506 506. Weekday Daytime calls cost 5p plus up to 6p per minute from BT Weekend Unlimited. Mobile and other providers' charges may vary

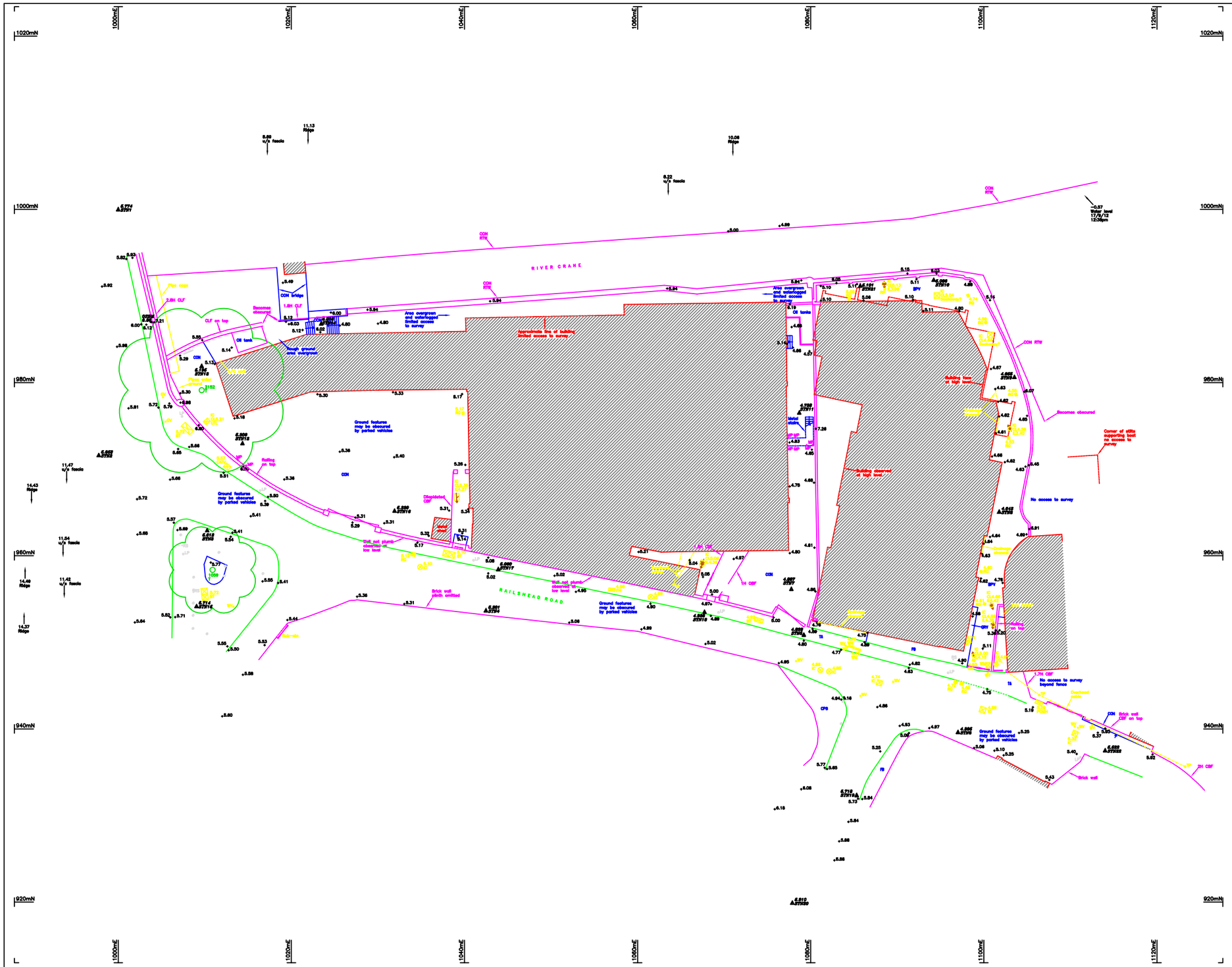
Environment Agency

Thames Tidal Breach Hazard Mapping

Map Centred on TQ1662975361

APPENDIX B

Topographic Survey



NOTES

All dimensions are to be checked on site by the contractor before any work is commenced.
In the case of apparent discrepancy refer immediately to surveyors.
The accuracy and completeness of this survey is dependent on the original survey brief including the scale intended.
The type and extent of information and the survey accuracy will have been matched to the client's original requirements.
Twickenham Surveys accepts no responsibility or liability to later users without prior consent.
The detail of this survey was established for a brief requiring a 1:200 plot. It is therefore suitable for plotting or planning/designing at scales of 1:200 or smaller.
The survey grid is not related to Ordnance Survey National Grid.
Level positions are indicated by a cross.
Levels relate to OSBM 6.36m, as shown on plan.
This survey did not include locating underground services and equipment.
Tree girths are representative only and reference should be made to the tree schedule if included in the survey brief.
Levels are taken on b/s kerb unless otherwise indicated.

LEGEND

AV Air valve
BB Ballina beacon
Bdy Boundary
BL Bed level
BPV Brass bollard
BS Bus stop
BT British Telecom Cover
BU Business unit
BWF Barbed wire fence
CATV Cable television cover
CBF Close boarded fence
CL Cover level
CLF Chain link fence
CO Crossover
CON Concrete
Corr Corrugated
CP Concrete post
CPF Chestnut paling fence
CPS Concrete paving slabs
Cul Culvert
ELPM Electricity manhole
EP Electricity pole
EPy Electricity pylon
ER Earth rail
FB Flowerbed
FH Fire hydrant
FHPM Fire hydrant marker
FL Floor level
FPM Foul water manhole
FS Flagstaff
G Gulley
GR Grass
GRV Gravel
GV Gas valve
H High

IC Inspection chamber
IL Invert level
IRF Iron railing fence
KPG Kerb pole gulley
LB Letter box
LM Lamp hole
LP Lamp post
MH Manhole
MP Metal post
OBF Open boarded fence
OF Outfall
OSBM Ordnance Survey bench mark
POPM Post Office manhole
PS Pub sign
PWF Post and wire fence
RG Road gulley
RS Road sign
RTW Retaining wall
SPM Surface water manhole
SP Signpost
STP Streetpipe
STN Survey station
SV Stoke valve
TA Tanker
TBM Temporary bench mark
TCB Telephone callbox
TP Telegraph pole
T Tree
VP Vent pipe
WL Water level
WM Water meter
WMF Wire mesh fence
WP Wooden post
WV Water valve
YG Yard gulley

N
INDICATIVE

TOPOGRAPHICAL SURVEY

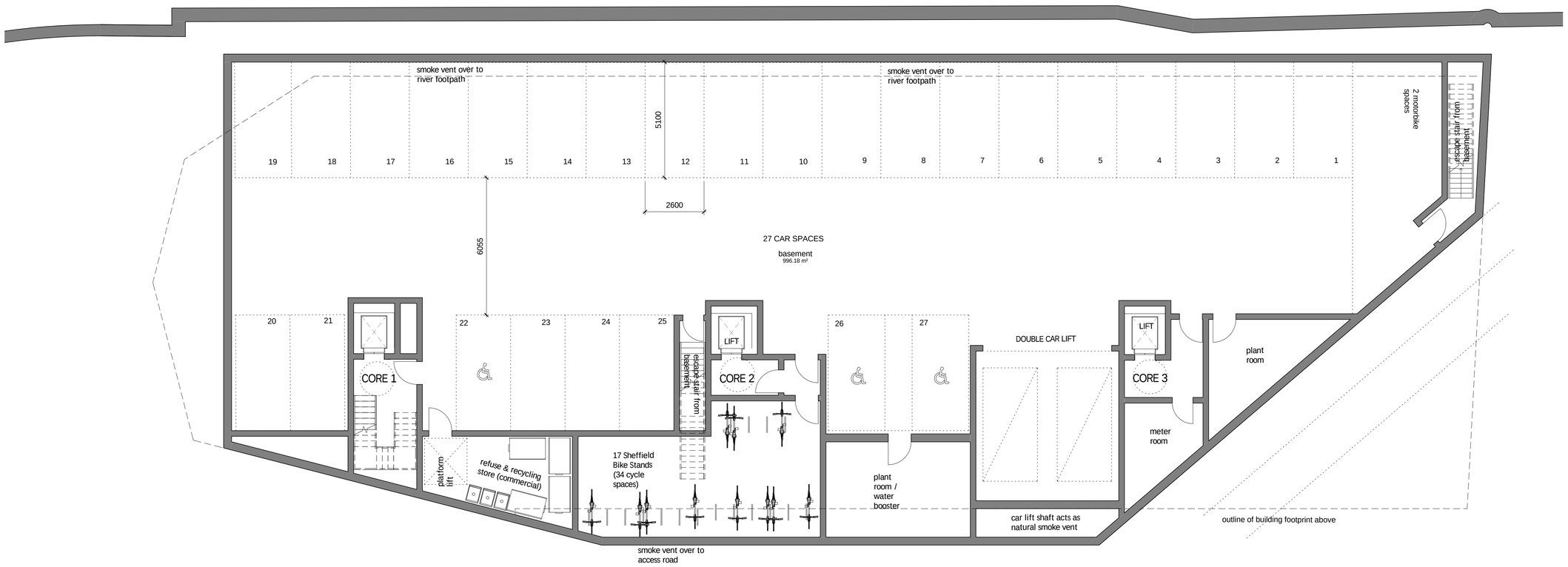
RAILSHEAD ROAD
ISLEWORTH

Drawing No. : 12111LS
Scale : refer grid
Date : September 2012
Drawn by : JWHD
Checked by : NHS

TWICKENHAM SURVEYS
LAND AND BUILDING SURVEYORS
CENTRAL HOUSE
124 HIGH STREET
HAMPTON HILL
MIDDLESEX TW12 1NS
T-020 8614 4480 F-020 8977 6579
mail@twickenhamsurveys.co.uk
www.twickenhamsurveys.co.uk

APPENDIX C

Development Plans



BASEMENT LEVEL PLAN - scale 1:100

This line measures 100mm when this drawing is printed @ A1

19/08/2013 18:01:16

rev	date	description

Project
Railshead Rd Richmond
TW7 7DG

Status
PLANNING 01

Drawing Title
BASEMENT LEVEL

Date: 07/17/13
Scale: 1:100

Drawing #
5346 P1_02

GOLDCREST architects

3 Hurlingham Business Park
Sullivan Road SW6 3DU
T 0207 731 7111
F 0207 371 7782
E architects@goldcrestland.com

sea scouts
boat house

new trees

smoke vent

existing flood gate defences
to river crane

river crane

listed
bridge

new railings

hedge planting along boundary wall

new river access walkway

2.5m

smoke vent

new river access walkway

new river access walkway

stair from basement

charleville
mews

Child's Play Space
area = 190 m2

replacement of horse
chestnut tree with 5No
new trees

new railings

hedge planting

along boundary wall

new railings

General B1
Workshop / Start Up
836.43 m²
9003.3 SF

B

D

child's play
space

new river access walkway

new railings

LIFT

commercial
CORE 1

platform
from
basement

riser

riser

CORE 2

LIFT

stair from
basement

Residential Refuse
Store

riser

riser

CORE 3

LIFT

6300

6600

DOUBLE CAR LIFT

roller shutter

Residential Refuse
Store

B

D

s t . m a r g a r e t s r o a d

new pedestrian
access gate

10 Sheffield Stands for
commercial & public use
(20 cycle spaces)

C

5.0 m

refuse bins temp.
pickup zone

Residential
entrance

Residential
entrance

3.5 m

4.8 m

E

F

A

existing crossover
re-positioned

note: existing pedestrian
access to be widened to
vehicle access

5.2 m

OUT - re-positioned
vehicle access

r a i l s h e a d r o a d

new trees

1

2

3

4

5

6

11

10

9

8

7

6.0 m

6.0 m

5.2 m

IN - re-positioned
vehicle access

existing crossover

riverside
house

N

0m 5m 10m

scale bar

bowyers
court

bowyers
court

GROUND FLOOR PLAN - scale 1:100

This line measures 100mm when this drawing is printed @ A1

19/08/2013 18:02:19

rev	date	description
A	03/04/13	Revised parking layout

Project
Railshead Rd Richmond
TW7 7DG

Status
PLANNING 01

Drawing Title
GROUND FLOOR PLAN

Date:
20/03/13

Scale:
1:100

Drawing #:
5346 P1_03 A

GOLDCREST architects
3 Hurlingham Business Park
Sullivan Road SW6 3DU
T 0207 731 7111
F 0207 371 7782
E architects@goldcrestland.com

sea scouts
boat house

new trees

new trees

FIRST FLOOR PLAN - scale 1:100

N

This line measures 100mm when this drawing is printed @ A1

19/08/2013 18:03:06

rev	date	description

Project
Railshead Rd Richmond
TW7 7DG

Status
PLANNING 01
Drawing Title
FIRST FLOOR PLAN

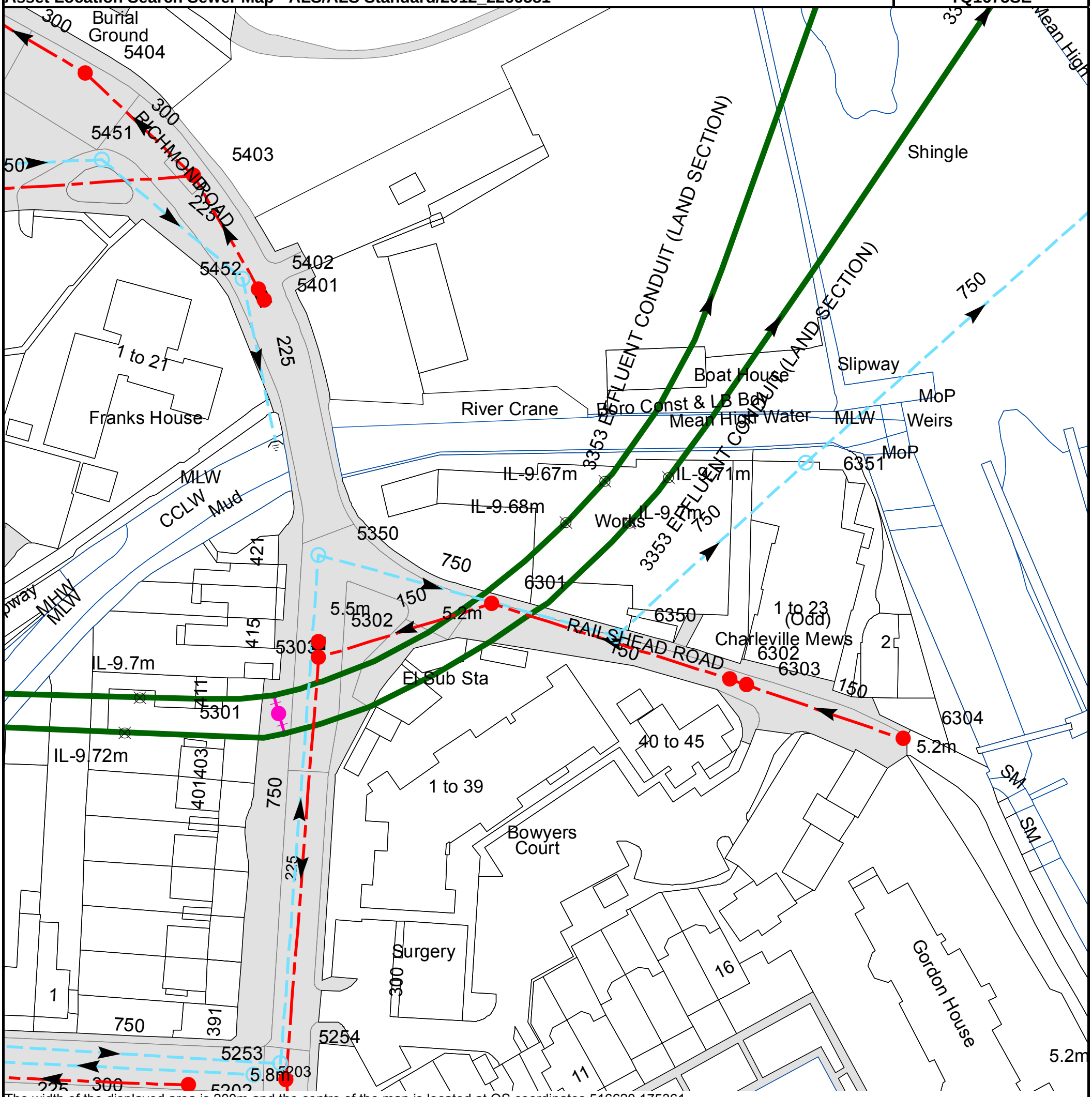
Date:
20/03/13
Scale:
1:100
Drawing #:
5346 P1_04 A

GOLDCREST architects
3 Hurlingham Business Park
Sullivan Road SW6 3DU
T 0207 371 7111
F 0207 371 7782
E architects@goldcrestland.com

APPENDIX D

Thames Water Sewer Plans

Asset Location Search Sewer Map - ALS/ALS Standard/2012_2266581 | **TQ1675SE**



The width of the displayed area is 200m and the centre of the map is located at OS coordinates 516620,175361

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
6304	5.09	4.33
6303	4.9	4.1
6302	4.9	4.06
6350	5.01	2.06
6351	n/a	n/a
5202	5.67	3.37
5203	5.81	3.06
5253	5.7	3.83
5254	5.77	2.62
5301	5.57	-9.71
5303	5.59	3.25
5302	5.61	n/a
5350	5.69	2.49
5401	5.63	n/a
5402	5.63	3.9
5452	5.57	3.6
5403	5.86	3.86
5451	6.14	4.29
5404	6.12	3.8
-	-	-
6301	5.14	3.61

ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

Trunk Surface Water

Trunk Foul

Storm Relief

Trunk Combined

Vent Pipe

Bio-solids (Sludge)

Proposed Thames Surface Water Sewer

Proposed Thames Water Foul Sewer

Gallery

Foul Rising Main

Surface Water Rising Main

Combined Rising Main

Sludge Rising Main

Proposed Thames Water Rising Main

Vacuum

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

Air Valve

Dam Chase

Fitting

Meter

Vent Column

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

Control Valve

Drop Pipe

Ancillary

Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

Outfall

Undefined End

Inlet

Other Symbols

Symbols used on maps which do not fall under other general categories

Public/Private Pumping Station

Change of characteristic indicator (C.O.C.I.)

Invert Level

Summit

Areas

Lines denoting areas of underground surveys, etc.

Agreement

Operational Site

Chamber

Tunnel

Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

Foul Sewer

Surface Water Sewer

Combined Sewer

Gulley

Culverted Watercourse

Proposed

Abandoned Sewer

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.

2) All measurements on the plans are metric.

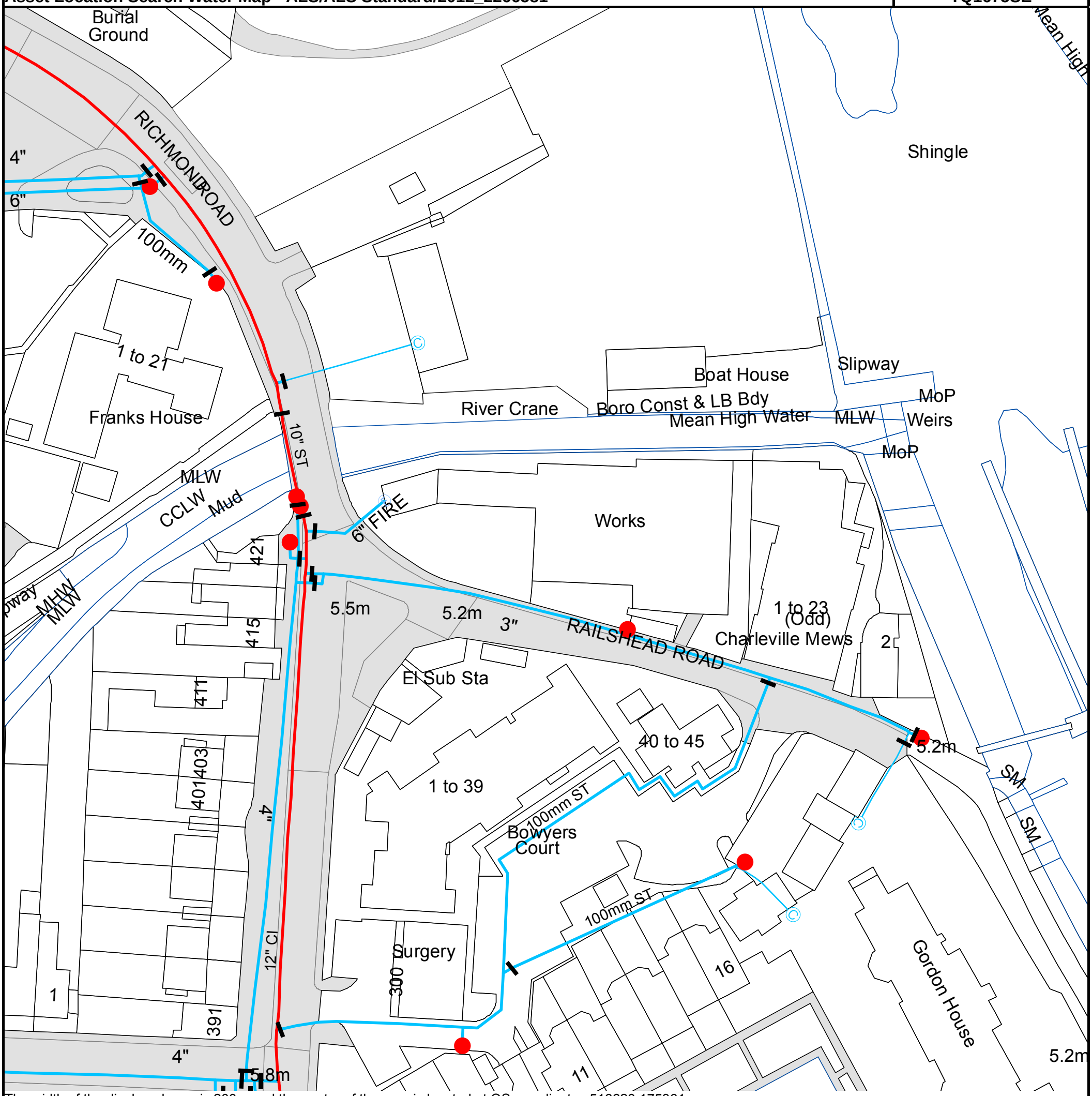
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.

4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.

5) 'na' or '0' on a manhole level indicates that data is unavailable.

6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0118 925 1504.

Asset Location Search Water Map - ALS/ALS Standard/2012_2266581 | **TQ1675SE**



The width of the displayed area is 200m and the centre of the map is located at OS coordinates 516620,175361

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

4"

Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.

16"

Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.

3" SUPPLY

Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.

3" FIRE

Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.

3" METERED

Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.

Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.

Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 8")
600mm and bigger (24" plus)	1200mm (4')

Valves

- General Purpose Valve
- Air Valve
- Pressure Control Valve
- Customer Valve

Hydrants

- Single Hydrant

Meters

- Meter

End Items

Symbol indicating what happens at the end of a water main.

- Blank Flange
- Capped End
- Emptying Pit
- Undefined End
- Manifold
- Customer Supply
- Fire Supply

Operational Sites

- Booster Station
- Other
- Other (Proposed)
- Pumping Station
- Service Reservoir
- Shaft Inspection
- Treatment Works
- Unknown
- Water Tower

Other Symbols

- Data Logger

Other Water Pipes (Not Operated or Maintained by Thames Water)

Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.

Private Main: Indiates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Sewer Flooding

History Enquiry

Thames Water Property Searches
12
Vastern Road
Reading
RG1 8DB

Search address supplied Waterside Business Centre
Railshead Road
Isleworth
TW7 7DG

Your reference HLEF22340

Our reference SFH_SFH_Standard_2012_2266578

Search date **3 July 2012**

Thames Water Utilities Ltd

Property Searches
PO Box 3189
Slough SL1 4WW

DX 151280 Slough 13

T 0118 925 1504
F 0118 923 6655/57
E searches@thameswater.co.uk
I www.thameswater-propertysearches.co.uk

Registered in England and Wales
No. 2366661, Registered office
Clearwater Court, Vastern Road
Reading RG1 8DB

Sewer Flooding

History Enquiry

Search address supplied: Waterside Business Centre, Railshead Road, Isleworth, TW7 7DG

This search is recommended to check for any sewer flooding in a specific address or area

TWUL, trading as Property Searches, are responsible in respect of the following:-

(i) any negligent or incorrect entry in the records searched;

(ii) any negligent or incorrect interpretation of the records searched;

(iii) and any negligent or incorrect recording of that interpretation in the search report

(iv) compensation payments

Thames Water Utilities Ltd

Property Searches
PO Box 3189
Slough SL1 4WW

DX 151280 Slough 13

T 0118 925 1504
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Registered in England and Wales
No. 2366661, Registered office
Clearwater Court, Vastern Road
Reading RG1 8DB

Sewer Flooding

History Enquiry

History of Sewer Flooding

Is the requested address or area at risk of flooding due to overloaded public sewers?

The flooding records held by Thames Water indicate that there have been no incidents of flooding in the requested area as a result of surcharging public sewers.

Although Thames Water does not have records of public sewer flooding within the vicinity, please be aware that property owners are not legally obliged to report this flooding to Thames Water. In addition flooding from private sewers, watercourses and highways drains are not the responsibility of Thames Water, and such incidents may not be noted in our records. We therefore strongly advise you to contact the current owners and occupiers of the premises and inquire about sewer flooding.

For your guidance:

- A sewer is “overloaded” when the flow from a storm is unable to pass through it due to a permanent problem (e.g. flat gradient, small diameter). Flooding as a result of temporary problems such as blockages, siltation, collapses and equipment or operational failures are excluded.
- “Internal flooding” from public sewers is defined as flooding, which enters a building or passes below a suspended floor. For reporting purposes, buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes.
- “At Risk” properties are those that the water company is required to include in the Regulatory Register that is presented annually to the Director General of Water Services. These are defined as properties that have suffered, or are likely to suffer, internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system more frequently than the relevant reference period (either once or twice in ten years) as determined by the Company’s reporting procedure.
- Flooding as a result of storm events proven to be exceptional and beyond the reference period of one in ten years are not included on the At Risk Register.
- Properties may be at risk of flooding but not included on the Register where flooding incidents have not been reported to the Company.
- Public Sewers are defined as those for which the Company holds statutory responsibility under the Water Industry Act 1991.
- It should be noted that flooding can occur from private sewers and drains which are not the responsibility of the Company. This report excludes flooding from private sewers and drains and the Company makes no comment upon this matter.
- For further information please contact Thames Water on Tel: 0845 9200 800 or website www.thameswater.co.uk

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