Kensington Forum

QUEENSGATE INVESTMENTS Rockwell

TRIUM

Kensington Forum Hotel – London

ENVIRONMENTAL STATEMENT ADDENDUM | JULY 2020

TECHNICAL APPENDICES | VOLUME 3

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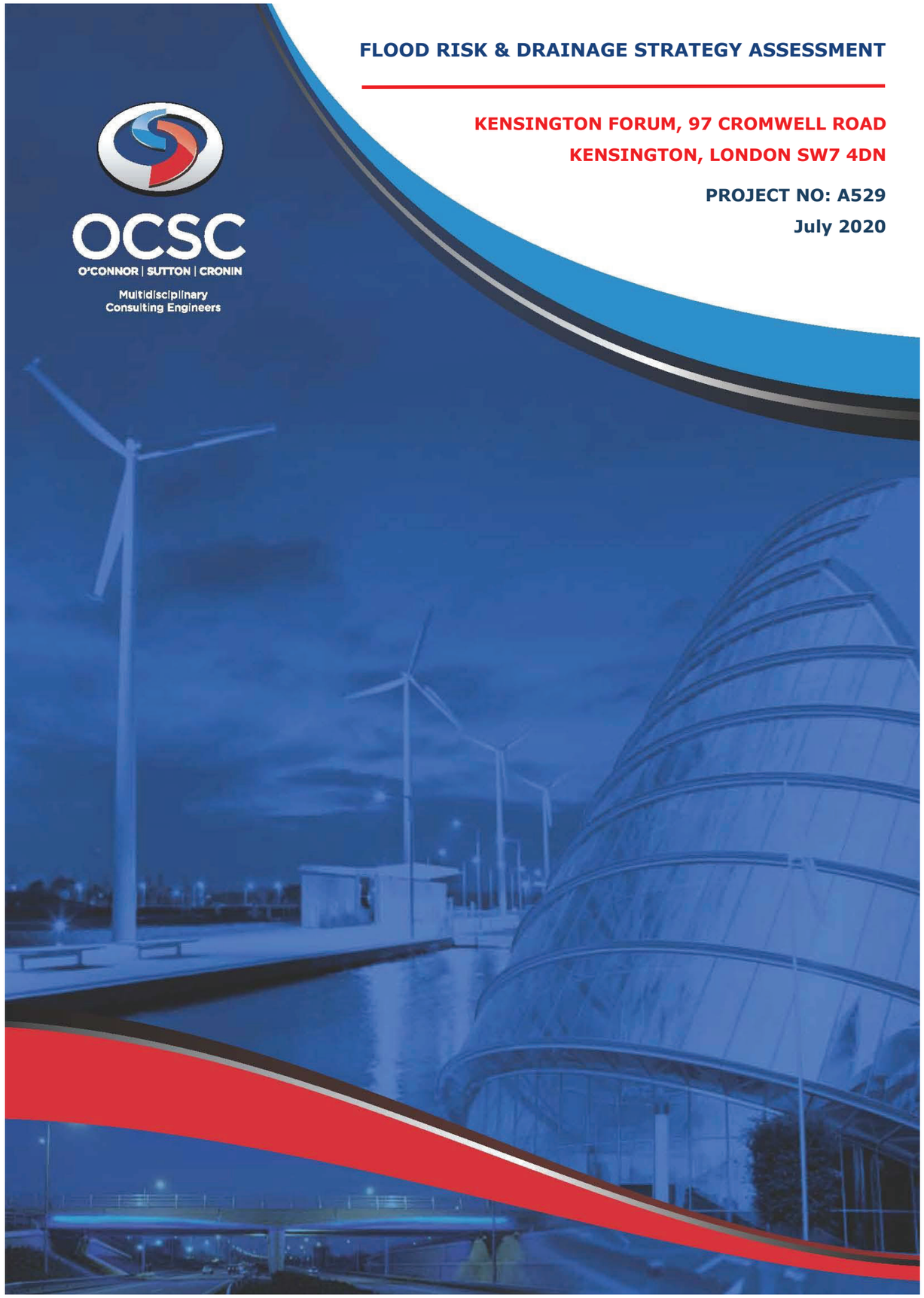
FLOOD RISK & DRAINAGE STRATEGY ASSESSMENT

KENSINGTON FORUM, 97 CROMWELL ROAD
KENSINGTON, LONDON SW7 4DN

PROJECT NO: A529

July 2020



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for

ACUMEN PORTFOLIO SOLUTIONS

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FLOOD RISK & DRAINAGE STRATEGY ASSESSMENT

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FLOOD RISK & DRAINAGE STRATEGY ASSESSMENT

1 INTRODUCTION

1.1 Purpose of Assessment

Acting on behalf of our Client, Acumen Portfolio Solutions (APS), O'Connor Sutton Cronin Multi-Disciplinary Consulting Engineers (OCSC) have carried out a Flood Risk and Drainage Strategy Assessment with respect to the Kensington Forum development at 97 Cromwell Road, Kensington, London, SW7 4DN. Figure 1 below shows the location of the site in question.

The proposed development consists of 749 Hotel rooms, 340 serviced residential apartments along with 46 private residential apartments, comprised of a mixture of 1, 2 and 3 bed units. In addition to this, there will be approximately 1,783m^2 of bar & restaurants, 4,163m^2 of conference facilities and an 829m^2 gym.

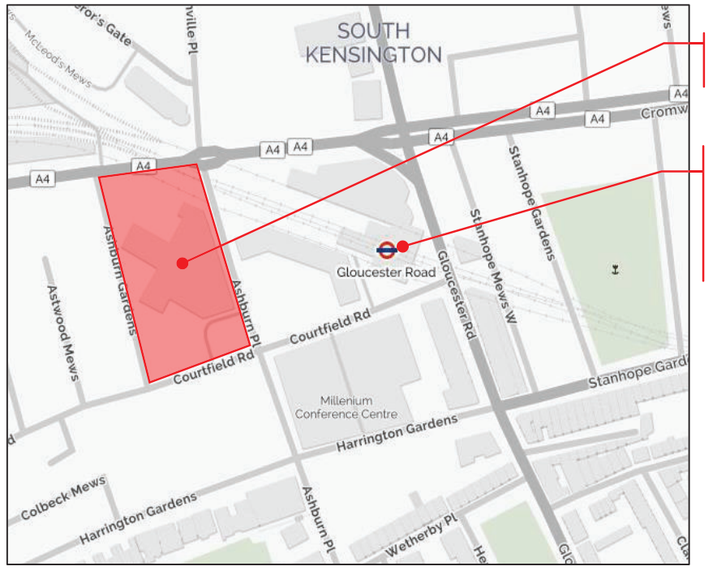

Figure 1: Site Location Plan

1.2 Project Brief and Objectives

This Flood Risk Assessment (FRA) & drainage strategy was commissioned to ascertain the potential likelihood of the Kensington Forum development on Cromwell Road flooding during various extreme storm events, and the impacts that developing the site would have on other land owners within the catchment.

This FRA has been undertaken in accordance with the relevant planning policy documents and is therefore compliant with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Policy Statement 25 (PPS25) and other local policy documents which are referred to in Section 3 of this report.

In addition to the relevant Planning Policy documents, the development has been analysed against information provided by the Environment Agency, Thames Water and the Royal Borough of Kensington and Chelsea. Any assumptions made in this report must be verified during the detailed design and verified by the relevant regulatory authorities during this stage.

1.3 Limitations

This study is concerned with the risk to people and property from fluvial and tidal flooding of associated watercourses adjacent to the proposed development site in addition to groundwater, surface water and sewer flooding.

The most common way of assessing the likelihood of extreme flood events is to look at the probability of the event happening on an annual basis. For example a 1% annual flood probability can be viewed as having a return period of 100 years or a 1-in-100 year event.

It is important to acknowledge that a 1% annual probability has a 26% chance of being equalled or exceeded at least once in 30 years, and a 49% probability of being equalled or exceeded at least once in 70 years. The 1% annual probability flood also has a 15% chance of occurring twice in 70 years.

2 SITE DETAILS

2.1 Site Location and Description

The site is located at the Holiday Inn, 97 Cromwell Road, Kensington, London SW7 and is centred at National Grid Reference TQ 2609 7882. The site contains a 28 storey hotel over a double basement with mezzanine. The hotel site is bounded by Cromwell Road to the north; Ashburn Place to the east; Courtfield Road to the south; and Ashburn Gardens to the west. The hotel basement car park is accessed from Courtfield Road to the south-east, with the exit onto Ashburn Gardens to the north-west. The development site lies within an area of mixed use development and within close proximity to two local shopping areas.

The site benefits from excellent transport connections. Cromwell Road to the north comprises two lanes in both directions and forms part of the A4 highway which terminates to the east at Piccadilly Circus and to the west where it joins the M4 motorway which in turn provides links to Heathrow, Reading and Western UK and Wales.

Gloucester Road tube station is less that a 5 minute walk away and provides access to the Piccadilly, Circle and District lines of the London Underground, giving connections to Heathrow Airport (Approx. 45 mins), King's Cross St Pancras (Approx. 18 mins) and London Victoria (Approx. 6 mins).

There are numerous bus routes serving the locality with the closest bus stop located directly outside the site on Cromwell Road.

The topographical survey drawings prepared by Plowman Craven (See Appendix A) illustrate that the site slopes from a highpoint of 8.65mAOD at the junction of Courtfield Road and Ashburn Gardens to 7.5mAOD at the junction of Cromwell Road and Ashburn Place. Courtfield Road falls from 8.65mAOD at the junction with Ashburn Gardens to 8.38mAOD at the junction with Ashfield Place. Ashfield Gardens falls from 8.65mAOD at the junction with Courtfield Road to 7.89mAOD at the junction with Cromwell Road. Ashburn Place falls from 8.38mAOD to 7.5mAOD at the junction with Cromwell Road while Cromwell Road falls from 7.89mAOD at junction with Ashburn Gardens

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to 7.5mAOD at the junction with Ashburn Place. Road levels continue to fall in an eastwardly direction towards Gloucester Road with Cromwell Road falling along Cromwell Road, to a level of 7.39mAOD at the Crown Plaza Hotel and Courtfield Road to 7.74mAOD at its junction with Gloucester Road. Ref Fig 2.

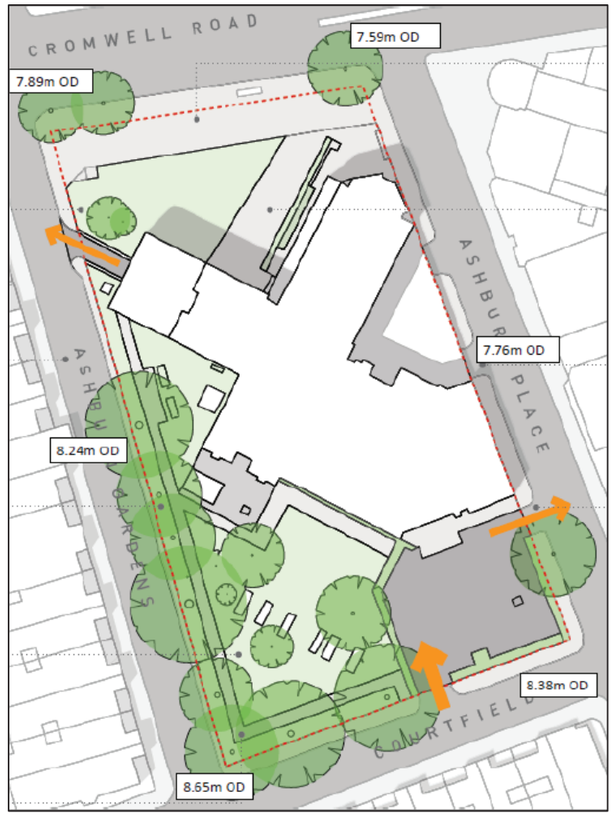

Figure 2: Topographical Levels of Adjacent Road

2.2 Existing Conditions

Research into the site history involved reference to historical Ordnance Survey (OS) maps, aerial photographs, plans and information obtained from the internet.

The site was part of market gardens in the 1800s, before being developed with housing by the 1890s. Houses in the south-eastern corner of the site suffered

general blast damage due to bombing during the Second World War and were cleared. The Holiday Inn Hotel was built in the early 1970s. The hotel has remained to the present day.

By 1865, a tunnel for the London Underground had been built adjacent to the north- eastern boundary of the site, accessing Gloucester Road station to the east. In the 1860s, a gasometer was shown on the northern side of railway, which had been removed by 1916. Electricity sub-stations, control room and running shed associated with the railway were present to the north-west of the site. The railway land to the north-west was partly redeveloped as the 'West London Air Terminal' (opened in 1952), providing a hub for passengers to be transferred to Heathrow Airport in buses. The Air Terminal building was extended in the 1960s. This site is now 'Point West' a block of flats.

Table 1 gives a brief summary of some of the key features noted on the proposed development site

Table 1: Site Description Summary

Feature	Description
Area of Site	Approximately 0.76 Ha
Ground Levels	The site rises from 7.59m AOD in the north east up to approximately 8.65m AOD in the south west
Current use/buildings	The site contains a 28 storey hotel over a double basement with mezzanine
Basement	A basement of approximately 0.59ha is located below the existing hotel
External Surfacing/Vegetation	There is a landscaped area surrounding the hotel protected under the London Squares Preservation Act of 1931
Surface Water & Flooding	There are no streams or ditches on the site or within 250m of the site. The closest watercourse is the River Thames which is located circa 1.5km to the South of the site.
Waterlogged or Marshy Ground	None observed
Wastewater & Site Drainage	There is a main Thames Water drainage sewer at the corner of Ashburn Place and Cromwell Road

2.3 Geology and Hydrogeology

The site stands at an elevation of circa 8mAOD on generally level ground, 1.5km north of the River Thames.

The 1935 geological map for the area shows the site covered by superficial Flood Plain Gravel, and underlain by the solid geology of the London Clay. The more recent geological map, sheet 270 (1998) at 1:50,000 scale, shows the site covered by the renamed Kempton Park Gravel, on the solid geology of the London Clay Formation. Immediately north of the site is an area of worked ground, where the tunnel for a railway line had been constructed.

A previous investigation on the site, for the current hotel development, found up to 3.80m of made ground, including a cellar, near surface clay River Terrace Deposits to a maximum 4.00m depth, underlain by Kempton Park Gravel to between 8.00m and 11.00m depth, and in turn the solid geology London Clay to at least 45.00m depth. Groundwater was recorded at 9.50m below ground level.

3 FLOOD RISK PLANNING POLICY

3.1 National Planning Policy

PLANNING POLICY STATEMENT 25 (PPS25, MARCH 2010) – Planning Policy Statements (PPS) set out the Government's national policies on different aspects of land use planning in England. PPS25 specifically sets out Government policy on development and flood risk. Its aims are to ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas of highest risk. Where new development is proposed, this policy aims to make it safe without increasing flood risk elsewhere, and, where possible, reducing flood risk overall. This sets a baseline for how FRAs should be conducted and although it has now been superseded by the National Planning Policy Framework, it still remains a valid

reference in relation to conducting FRAs and has been considered for the purpose of this report.

Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences. They are shown on the Environment Agency's Flood Map for Planning (Rivers and Sea), available on the Environment Agency's web site, as indicated below.

- Zone 1: low probability. This zone comprises land assessed as having less than 1 in 1000 annual probability of flooding in any year (<0.1% Annual Exceedance Probability (AEP). The percentage coverage of this flood zone within RBKC Borough is 92%.
- Zone 2: Medium Probability. This zone comprises land assessed as having between a 1 in 200 and 1 in 1000 annual probability of flooding (0.5% - 0.1% AEP) in any year. The percentage coverage of this flood zone within RBKC is 2%.
- Zone 3a: High probability. This zone comprises land assessed as having a 1 in 200 or greater annual probability of flooding (<0.5% AEP) in any year. The percentage coverage of this flood zone within RBKC is approximately 6%.
- Zone 3b: The Functional Floodplain. This zone comprises land where water has to flow or be stored in times of flood. From a review of flood maps the development site is located in flood zone 1.

National Planning Policy Framework (NPPF, February 2019) – National planning policy sets out the strategy for future development across the UK. It states that:

- Developments in areas at risk of flooding should be avoided, but where development is necessary, making it safe without increasing flood risk elsewhere. Local Plans should be supported by Strategic Flood Risk Assessment and develop policies to manage flood risk from all sources.
- Local Plans should apply a sequential, risk-based approach to the location of development to avoid where possible flood risk to people and property, taking account of the impacts of climate change, by: Safeguarding land

from development that is required for current and future flood management; using opportunities offered by new development to reduce the cause and impact of flooding

The latest version of the NPPF, reiterates the importance Local Plans being supported by a SFRA and ensuring that land selected for development follows the sequential and exception test approach previously discussed under the NPPF review. The 2019 NPPF differs slightly from previous iterations by putting more onerous on the application of sustainable drainage systems when it comes to planning for flood risk and states that these systems are to be provided where appropriate and where inappropriate, clear evidence is to be provided to demonstrate why.

3.1.1 The Sequential Test

As stated in the NPPF, a sequential risk-based approach to determining the suitability of land for development should be applied at all stages of the planning process giving precedence to low flood risk areas wherever possible.

With regards to directing potential development sites within The Royal Borough of Kensington and Chelsea, the Strategic Flood Risk Assessment (SFRA) states that when allocating or approving land for development in flood risk areas, those responsible for making development decision are expected to demonstrate that there are no suitable alternative development sites located in lower flood risk areas.

The methodology introduces a Sequential Test that is core to the SFRA process. The Sequential Test is the key driver for the SFRA. The EA Flood Zone Map provides the basis of the test, which will be undertaken a number of times, considering a greater resolution and understanding of flood risk at each stage taking into account flooding from other sources. At each step, sites of lower flood risk are identified and prioritised in order of vulnerability to flood risk and their safety in terms of allocation for development.

RBKC will be required to prioritise the allocation of land for development in ascending order from Flood Risk Zone 1 to 3, including the subdivisions of Flood Risk Zone 3, if necessary. The EA has statutory responsibility and must be consulted on all development application allocated with medium and high risk zones, including those in areas with critical drainage problems and for any development on land exceeding 1 hectare outside flood risk areas. In these circumstance, the EA will require the RBKC to demonstrate that there are no reasonable alternatives, in lower risk categories, available for development. Where appropriate, the Exception Test is to be applied. As the Kensington Forum development lie within EA flood zone 1 (see Section 4.1), the sequential test is satisfied and therefore no exception test is required.

3.1.2 The Exception Test

The NPPF describes the Exception Test as a method for managing flood risk, while still allowing necessary development to occur within Flood Zone 2 and 3. The Exception Test will be satisfied where:

- The FRA demonstrates that the development will be safe, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

3.2 Regional Planning Policy

The London Plan (LP, 2016) - The London Plan 2016 is the overall strategic plan for London, setting out an integrated economic, environmental, transport and social framework for the development of London over the next 20-25 years. The overarching policy setting out the principles of flood risk associated with construction are incorporated in Policies 5.12 and 5.13;

- Policy 5.12 Flood risk management: Development proposals must comply with the flood risk assessment and management requirements set out in the NPPF and the associated technical Guidance on flood risk over the lifetime of the development and have

regard to measures proposed in Thames Estuary 2100 (TE2100 – see paragraph 5.55) and Catchment Flood Management Plans;

- Policy 5.13 Sustainable Drainage: Development should utilise Sustainable 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 surface in non-clay areas
  - Attenuate rainwater by storing in tanks or sealed features for gradual release
  - Discharge rainwater direct into a watercourse
  - Discharge rainwater to a surface water sewer / drain
  - Discharge rainwater to a combined sewer

The Draft London Plan (DLP, 2019) - The Draft London Plan (DLP) 2019 is the latest iteration of the Mayor of London's spatial development strategy for the Greater London area that is undergoing consultation. When compared with the current LP 2016, the DLP 2019 follows the same policy objectives in relation to flood risk management and the provision of sustainable drainage discussed above (Policy S12 and S13 respectively in the DLP). However, the new DLP differs by providing a far more focused approach to these policies. Additional emphasis is placed on flood resilient infrastructure and future proofing existing flood defences in terms of managing the risk of flooding, and a more focused sustainable drainage hierarchy, with rainwater harvesting at the top and direct discharge into a combined sewer at the bottom, is suggested for all new developments to aim towards. The DLP identifies that the sustainable drainage policy is complemented by the London Sustainable Drainage Action Plan where it is suggested that all new developments should aim to reduce surface water runoff rates by at least 50% and where possible, reduce further to achieve greenfield runoff rates.

3.3 Local Planning Policy

The Royal Borough of Kensington and Chelsea Local Plan (Sept 2019) – Within the RBKC Consolidated Local Plan, provision was set out for policy in relation to Flooding within the Royal Borough. With the SFRA assessing that the risk of fluvial flooding is negligible, there is still a tidal flood risk, which is categorised into 3 Flood Zones Policy CE 2 states;

- The Council will require development to adapt to fluvial flooding and mitigate the effects of, and adapt to, surface water and sewer flooding. To deliver this the Council will:
  - a) resist vulnerable development, including self-contained basement dwellings, in Flood Risk Zone 3 and Critical Drainage Areas as defined in the Strategic Flood Risk Assessment and the Surface Water Management Plan;
  - b) require a site-specific Flood Risk Assessment, including an 'Exception Test' for all development in Flood Risk Zone 2 and 3 as defined in the Strategic Flood Risk Assessment, for sites in Critical Drainage Areas and for all sites greater than one hectare;
  - c) where required undertake the 'Sequential Test' for planning applications within Flood Risk Zones 2 and 3, and for sites in Critical Drainage Areas;
  - d) require development at risk from flooding in Flood Risk Zones 2 and 3, in Critical Drainage Areas, or sites greater than 1ha to incorporate suitable flood risk measures to account for site conditions in accordance with Building Regulations, existing guidance and the recommendations of the site-specific Flood Risk Assessment, the Strategic Flood Risk Assessment and the Local Flood Risk Management Strategy
    - i. address all flood depths for the 1 in 100 year storm event plus climate change to ensure the development will remain safe during a flood event throughout its lifetime;
    - ii. take into account access, egress and emergency exit routes;
    - iii. ensure buildings remain safe for occupants in case of flooding, and are protected from sewer flooding through the installation of a suitable pumped device when the new development includes floors below the level of the sewer;
    - iv. apply where required the measures and actions included in the Local Flood Risk Management Strategy Action Plan;
  - e) require that flood risk measures and flood risk assets are protected and maintained to remain operational and provide adequate protection for the lifetime of development; require development adjacent to the Thames to be set back from the Thames flood defence to enable the sustainable and cost-effective upgrade of flood defences over the next 50 to 100 years;
  - f) Require development adjacent to the Thames to be set back from the Thames flood defence to enable the sustainable and cost effective upgrade of flood defences and to implement any other recommendations of the Thames Estuary 2100 plan (TE2100).
  - g) require major development to achieve greenfield run-off rates and minor development to achieve a reduction of 50% of existing rates, ensuring that surface water run-off is managed as close to its source as possible, through:
    - a. the increase of permeable surfaces;
    - b. recognising opportunities for SuDS to provide other environmental benefits;
    - c. factoring all flows into the sewer system (including swimming pools discharges, groundwater or other flows) in the calculations of greenfield run-off rates;
  - h) require SuDS to have regard to DEFRA non-statutory SuDS standards and local guidance to ensure SuDS are adequately designed, built and maintained for the lifetime of development;
  - i) resist impermeable surfaces in gardens and landscaped areas
  - j) Encourage the retrofitting of SuDS in buildings even if the development will not have drainage implications.

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The Royal Borough of Kensington and Chelsea Strategic Flood Risk Assessment (SFRA, March 2014) – A Strategic Flood Risk Assessment (SFRA) on behalf of RBKC was undertaken by URS Ltd in March 2014. This SFRA was prepared in accordance with current beat practice, National Planning Policy Framework (NPPF) and its accompanying Technical Guidance. The SFRA Identified that the significant sources of flood risk within Royal Borough of Kensington and Chelsea (RBKC) are surface water and sewer flooding, and the risk which arises from a failure in the Thames tidal defences.

Tidal flood risk is limited to the southern portion of the Borough and does not affect the development site, however at present the borough Kensington and Chelsea is fully defended against the 0.1% annual probability extreme tide level. Nevertheless, the areas benefiting from these tidal defences have the potential to experience high hazard should a breach in defences occur.

Sewer and surface water flooding is particularly problematic in the RBKC catchment, with the Borough experiencing significant problems historically and during heavy rainfall events. It is recognised that this is a larger scale issue and is recommended that RBKC Council continues in an active role in future strategic surface water management plans for London such as the reduction of surface water flows with the inclusion of Sustainable Drainage Systems (SuDS) from new developments.

The Royal Borough of Kensington and Chelsea Surface Water Management Plan (SWMP, February 2014) – A Surface Water Management Plan (SWMP) was produced for the RBKC to outline the predicted risk and preferred surface water management strategy for the Royal Borough. Four Critical Drainage Areas (CDAs) were identified in the study, with dominant mechanisms for flooding being broadly divided into, topographical low lying areas and low points, sewer flood risk, fluvial/tidal flood risk. The SWMP recommends the following in short and medium term cases;

- Basement properties include suitable pumping services to protect them from sewer flooding

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- Promote the use of SuDS features within council assets (roads, parks, footpaths) and private property (car parking areas, private parks, etc.)
- Improve maintenance regimes to target those areas identified to flood regularly or known to have blocked gullies or are prone to damage

The SWMP Action Plan recommends that the following policies are implemented within the boundaries of the catchment to reduce the flood risk therein;

- Policy 1: Proposed 'brownfield' redevelopments of more than one property or area greater than 0.1 hectare are required to reduce post-development runoff rates for events up to and including the 1 in 100-year return period event with an allowance for climate change (in line with NPPF and UKCIP guidance) to that of a Greenfield condition (calculated in accordance with IoH124[10])
- Policy 2: Developments located in Critical Drainage Areas (CDAs) and for redevelopments of more than one property or area greater than 0.1 hectare should seek betterment to a Greenfield runoff rate (calculated in accordance with IoH124). It is recommended that a SuDS treatment train is utilised to assist in this reduction.
- Policy 3: Best Management Practices (BMP) are required for development applications greater than 0.1 hectare within the catchment. The following load-reduction targets must be achieved when assessing the post-developed sites SuDS treatment train (comparison of unmitigated developed scenario versus developed mitigated scenario):
  - 80% reduction in Total Suspended Sediment (TSS);
  - 45% reduction in Total Nitrogen (TN);
  - 60% reduction in Total Phosphorus (TP); and
  - 90% reduction in litter (sized 5mm or greater)

PRELIMINARY FLOOD RISK ASSESSMENT (PFRA, JULY 2011) – A Preliminary Flood Risk Assessment (PFRA) was completed in July 2011 as part of the wider Drain London project which involved the delivery of a SWMP – modelled at an intermediate level – and PFRA for each of the 32 London Boroughs and the Corporation of the City of London. The PFRA has been undertaken to assist RBKC to meet its duties as the Lead Local Flood Authority, with the delivery of the first stage of the Flood Risk Regulations (2009). The PFRA is a high level screening exercise that compiles information on significant local flood risk from the past and future floods, based on readily available and derivable information. The study has not identified any past floods that are considered to have any significant harmful consequences. Future flood risk from extreme events is estimated to be high in RBKC.

4 CATCHMENT CHARACTERISTICS AND HISTORY OF FLOODING

4.1 Assessing the Risk of Flooding

The requirements for a Flood Risk Assessment are provided within the NPPF (see section 3.1) and associated planning policy guidance. Paragraph 103 of the NPPF requires that a site-specific FRA should be submitted with planning applications for all sites greater than 1 hectare in Flood Zone 1; for sites of any size within Flood Zones 2 or 3; or in an area within Flood Zone 1 which has critical drainage problems.

Flood Zone 1 is defined as land with little or no flood risk (an annual exceedance probability [AEP] of flooding of less than 0.1%); Flood Zone 2 is defined as having a medium flood risk (an AEP of between 0.1% and 0.5% for tidal areas and 0.1% and 1.0% for rivers); and Flood Zone 3 is defined as high risk (with an AEP of flooding of greater than 0.5% for tidal areas and greater than 1.0% for rivers).

FRAs should describe and assess all flood risks (from rivers, the sea, sewers and groundwater) to and from the development and demonstrate how they will be managed, including an evaluation of climate change effects. Guidance

on the content of FRAs is contained in the NPPF (covering flood risk and coastal change) together with the relevant Environment Agency (EA) Guidance. These documents have been consulted with regard to the acceptability of the development proposals described in this report.

The Environment Agency's (EA's) flood map for the area confirms that the Kensington Forum site lies within Flood Zone 1 (low risk) as illustrated in Figure 3.

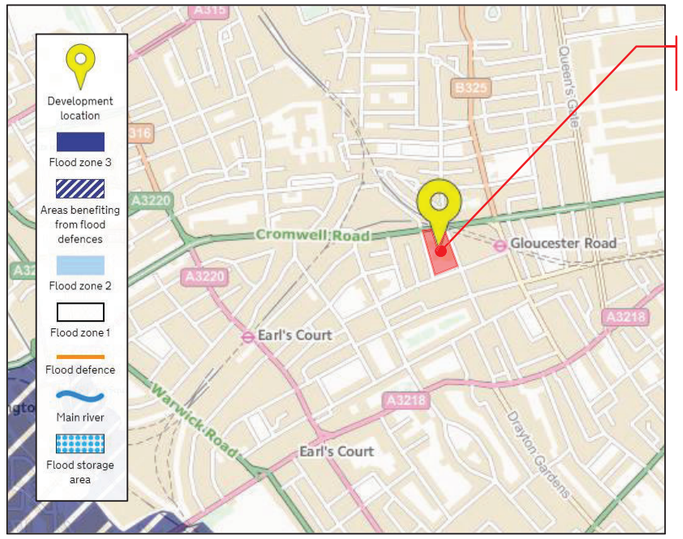

Figure 3: The Environment Agency's Online Flood Map with Site Location

The Kensington Forum Development site is situated in a Critical Drainage Area (CDA) within the RBKC, a CDA being a discrete geographic area, usually a hydrological catchment, where multiple and interlinked sources of flood risk (surface water, groundwater, sewer, main river and/or tidal) cause flooding in one or more Local Flood Risk Zones during severe weather thereby affecting people, property or local infrastructure. CDA 03, see Figure 4, is located around the Kensington area of the Royal Borough, with surface water predicted to flow generally from North to South. The potential flooding mechanism associated with CDA 03 which is included within the Counters Creek catchment are examined in the next section for 97 Cromwell Road.

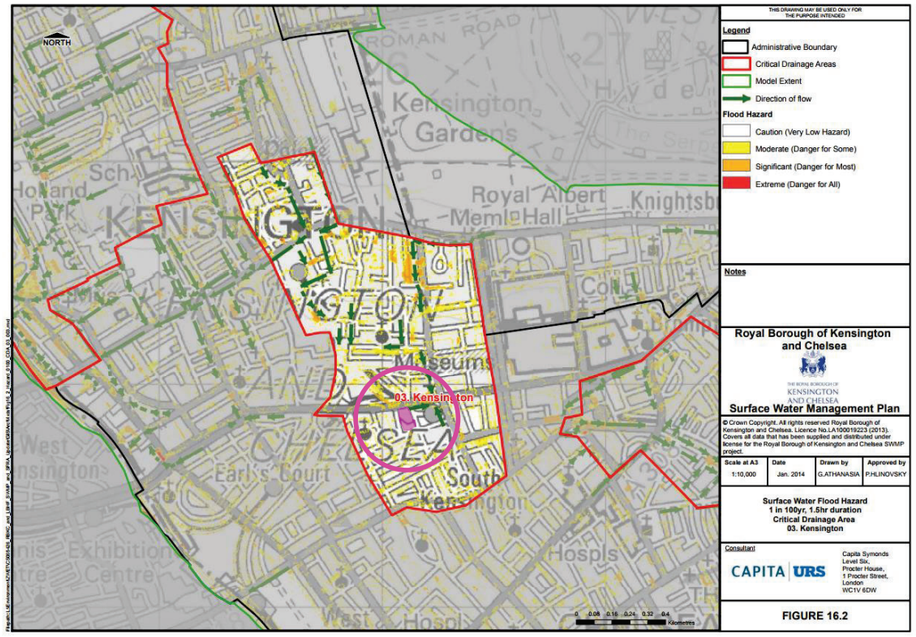

Figure 4: Critical Drainage Area 03: Kensington. Kensington Forum Site Highlighted in Magenta (SWMP, 2014)

The pluvial modelling has indicated predicted surface water flooding across various locations of the CDA. As shown in the above Figure 4, the direction of flow is past the site in question, flowing down to the Gloucester Road Tube Station. The majority of areas predicted to be at risk are basement properties.

4.2 History of Flooding within Royal Borough of Kensington and Chelsea

According to the SFRA, the SWMP, the EA and following discussions with the owners of the Holiday Inn London – Kensington Forum, which has occupied the site since the 1970s, there is no historical evidence of Pluvial, Tidal, Groundwater or Sewer Flooding on the Kensington Forum Development Site. (Ref Figure 7)

4.2.3 History of Surface Water Flooding

RBKC has historically suffered basement flooding and surface water ponding following heavy rainfall events. Water ponding in roads is mainly due to blocked or collapsed highways drains that are regularly checked, maintained and replaces as necessary and blocked drainage cullies.

In October 2006 the Notting Hill and Sloane Square London Underground stations were affected by surface water flooding due to heavy rainfall and sewer surcharge. During the heavy rainfall on 20 July 2007, 511 properties across three areas were flooded as a result of a combination of surface water and sewer flooding. This was caused by the following;

- The insufficient capacity of the drainage network leading to exceedance flows bypassing gulley inlets which results in ponding within topographic low areas; and
- Surcharging of the sewer drainage network, leading to the flooding or basements property which have a direct connection to the combined sewer network.

The areas affected were the Holland Road and Elsham Road areas along the boundary with the London Borough of Hammersmith and Fulham (LBHF), Sloane Street and Sloane Square area as well as the Gloucester Road and South Kensington area where both London Underground stations were flooded.

4.3 Potential Flooding Mechanisms

From a review of the available information relating to the site, the following Table conveys a summary of the different mechanisms and possible sources of flooding which may impact the development of the site at Cromwell Road:

Table 2: Possible Flooding Mechanisms

Flood Source	Mechanism	Affecting	
		Typical impact	On site
The River Thames	Extreme flood water leading to out of bank river flow	Up to regional scale impacts	Flood waters entering through services, basements, doors and landscape areas.
Surface run-off from storm water	Excessive run-off from site and from surroundings. Overland flow resulting from surcharging of local sewers, noted as Critical Drainage Area	Up to neighbourhood scale impacts, including transport	Probably entering site via surrounding land could flood services, landscaped areas and basement
Drainage services	Blockages and/or insufficient capacity of drainage & foul sewers	Up to neighbourhood scale impacts, including transport	Surcharging of public sewer systems, increasing possibility of flooding entering buildings, basements
Water supply services	Leaks in the public water main system	Generally site specific only	In isolation typically leaks have limited impact.
Rising groundwater	Groundwater levels in a shallow aquifer during recharge from high river levels	Generally site specific only	Should the groundwater exceed the level of services or basement, flooding could occur.

4.3.4 Fluvial and Tidal Flooding

Fluvial flooding is caused from adjacent rivers and streams. Tidal flooding is caused in areas adjacent to the sea or to rivers at tidal estuaries. From a review of the EA flood maps (See Figure 3) there is a low risk of either fluvial or tidal flooding occurring on this site which is located in Flood Zone 1.

4.3.5 Pluvial Flooding

Pluvial flooding occurs due to extreme rainfall events where the capacity of the local surface water drainage cannot cater for the excess volumes of water.

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Multidisciplinary Consulting Engineers

Flood Risk & Drainage Strategy Assessment
Kensington Forum, 97 Cromwell Road

The Environment Agency's (EA's) surface water flood mapping identifies the Kensington Forum as located within the medium and high risk areas (Figure 4), however due to the site and surrounding area topography it would suggest that the risk of flooding from surface run-off would in fact be minimal. The topography survey notes a depression on the site due to basement access which is the likely reason that the surface water flood mapping in Figure 5 identifies a high risk area. This depression however will be graded out and re-profiled to further direct any overland flow towards the proposed SuDS features.

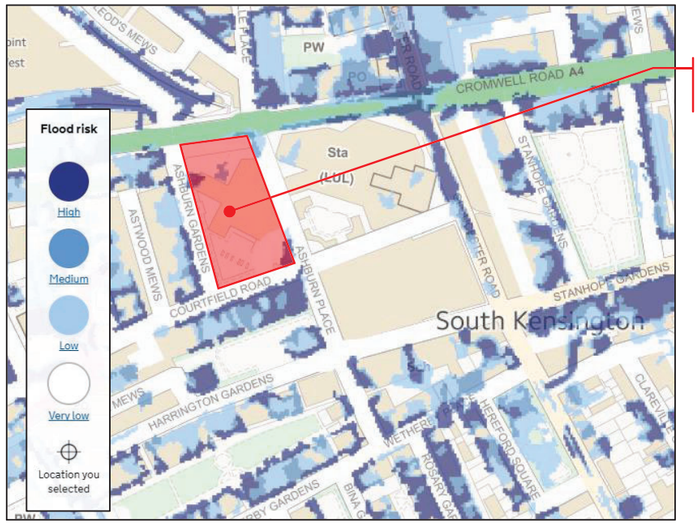

Figure 5: Environment Agency Surface Water Flood Risk Map

The existing development site is unaffected by pluvial flooding due to the buildings being super elevated above the existing external road network. Any excess floodwater generated on Courtfield Road, Ashburn Gardens or Ashburn Place will traverse along the existing highway to Cromwell Road where it will flow eastwards towards central London and avoid interaction with the development site.

4.3.6 Groundwater Flooding

Groundwater flooding is defined as the emergence of groundwater at surface level away from perennial river channels or the rising of groundwater into

man-made ground, under conditions where the 'normal' ranges of groundwater level and groundwater flow are exceeded. From a review of the EA flood maps for groundwater flooding, the nearest record of flooding occurring is approximately 1.1 kilometres to the north east of the development, see Figure 7.

A previous investigation on the site, for the current hotel development, found up to 3.80m of made ground, including a cellar, near surface clay River Terrace Deposits to a maximum 4.00m depth, underlain by Kempton Park Gravel to between 8.00m and 11.00m depth, and in turn the solid geology London Clay to at least 45.00m depth. Groundwater was recorded at 9.50m below ground level.

4.3.7 Sewer and Watermain Flooding

Sewer and watermain flooding occurs due to the failure of local infrastructure. In sewer networks, this is usually due to blockages and in watermain networks, due to burst or damaged mains. The development is located under the jurisdiction of Thames Water Ltd. From an asset location search, there are existing combined sewers and potable watermain networks on Cromwell Road, Ashburn Place, Ashburn Gardens and Courtfield Road (See Appendix B).

Similarly to pluvial flooding the site would be unaffected by any sewer and watermain flooding due to the local topography surrounding the development guiding excess floodwater towards Cromwell Road where it would flow eastwards to central London.

However, the surcharging of sewers due to blockages may affect any new development due to backing up within the network and entering private sewer systems. It is recommended in areas where this occurs that non return valves are installed on the last private manholes or inspection chamber to prevent the surcharged floodwater from entering private drainage networks.

As part of the SFRA, Thames Water were able to provide information regarding sewer flooding events over the past ten years on a broad scale. The

information was provided on a postal area basis, no specific information was provided. Figure 6 shows the number of properties flooded by overloaded sewers, within RBKC and nearby Boroughs over the past ten years.

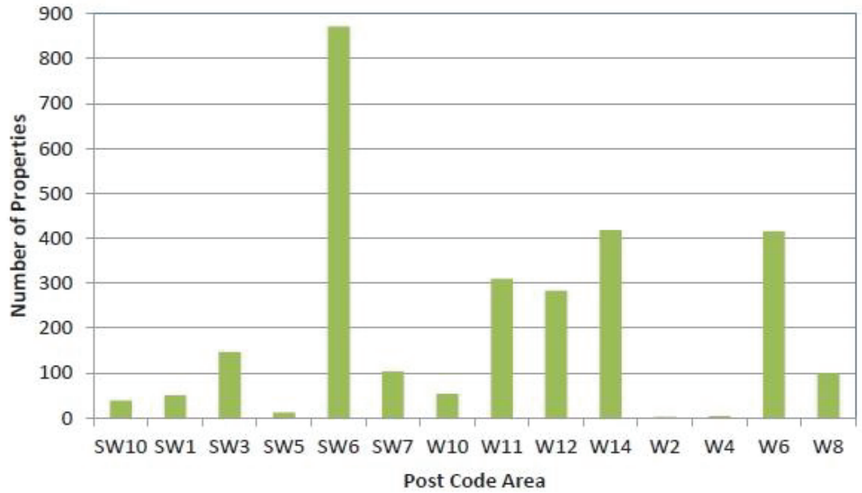

Figure 6: Number of properties flooded by overloaded sewers over the last 10 years (SFRA, 2014)

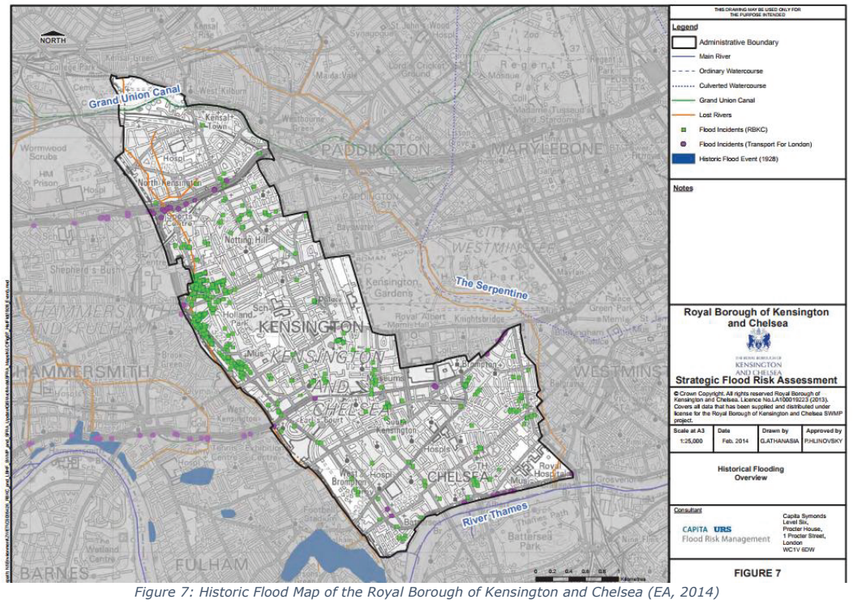

Figure 7: Historic Flood Map of the Royal Borough of Kensington and Chelsea (EA, 2014)

5 FLOOD RISK MITIGATION

In Section 4 of this FRA, we have identified the potential flooding mechanisms and their associated risk with respect to the proposed development of the Kensington Forum. This section will now suggest and recommend possible mitigating measures to further incorporate within the development to address and reduce the risk of flooding to within acceptable levels.

5.1 Finished Floor Levels

It is recommended that the access for residential units on the site be set to a minimum of 8mAOD to match existing topographical site levels. The external site around the Hotel is recommended to set to a minimum level of 7.5mAOD to minimise risk of flooding.

The external levels around the entrance to the proposed basement are also proposed to be set to a minimum of 7.5mAOD to prevent the risk of water ingress due to flooding and all openings and ventilation grills to the basement will be set above this level for added flood protection. The basement structure will be designed in accordance with the relevant design standards and codes of practice to ensure it is watertight and satisfies the requirements of Building Control and the Warranty providers.

5.2 Site Specific Drainage Design

The RBKC SFRA (see Section 3.2) outlines that all new developments should seek to incorporate Sustainable Drainage Systems (SuDS) or demonstrate alternative sustainable approaches to the management of surface water.

The onsite surface water would be managed in a sustainable manner to mimic the surface water flow arising from the site prior to the proposed development. This management strategy should aim to reduce flood risk to the site itself as well as elsewhere in the catchment while taking the influence of climate change into account.

SuDS work through utilising the principle of ecosystem services. They are designed to drain developed areas in a more natural way, using the infiltration and storage capacities of semi-natural devices such as infiltration trenches, swales and ponds. Typically the term/acronym, SuDS covers a wide range of sustainable approaches to surface water drainage management including:

- Source control measures including rainwater recycling and drainage
- Infiltration devices to allow water to soak into the ground, that can include individual soakaways and communal facilities
- Filter strips and swales, which are vegetated features that hold and drain water downhill mimicking natural drainage patterns
- Filter drains and porous pavements to allow rainwater and run-off to infiltrate into permeable material below ground and provide storage if needed; and
- Basins and ponds to hold excess water after rain and allow controlled discharge that avoids flooding.

The incorporation of SuDS components and how they are applied to further reduce the risk of flooding are considered and review in the next section in more detail.

6 DRAINAGE STRATEGY ASSESSMENT

The development is located under the jurisdiction of Thames Water Ltd (TWL). From an asset location search there are no surface water drains in the immediate area of the development site. All surface water generated from the site outfalls to the existing combined drainage sewers on Cromwell Road (900x750mm and 300mm sewers), Ashburn Place (1150x750mm sewer), Ashburn Gardens (900x600mm sewer) and on Courtfield Road (1150x750mm sewer).

6.1 Surface Water Drainage

The development site is approximately 0.76 hectares in size and is approximately 60% hardstanding based on the topographical survey. It is proposed to demolish the existing Holiday Inn Hotel and construct a new 749 room hotel compromising restaurants, bars and function rooms etc. with 340 number serviced apartments and 46 number private residential apartments. The proposed new basement will match the footprint of the existing basement.

It is unclear from the topographic survey carried out by Plowman Craven which manholes and inspection chambers are catering for surface water. OCSC recommends a full CCTV survey and dye test be undertaken to ascertain the status of the existing internal drainage and confirm if the existing connections to the TWL network can be reused for the future development.

The existing hotel was built in the early 1970s and we understand from site surveys that no attenuation of surface water runoff presently occurs on site. We have calculated the existing runoff from the development site from the topographical survey which can be found in Appendix D and are summarised below:

Table 3: Existing Surface Water Run-off Rates

Return Period (Yrs)	Average Storm Intensity (mm/hr)	Existing Run-off Rate (l/s)
1	31.98	63.1
5	53.47	105.5
30	78.49	154.8
100	101.44	200.5

The London Plan and the London Sustainable Drainage Action Plan suggest that new developments reduce their surface water runoff by at least 50% of its original discharge flow. By applying Greenfield Runoff rates, the surface water discharge has been calculated as 3.7l/s for a 100 year event (See Appendix E) However, as best practice and in line with RBKC's recommendations we propose

a reduced discharge rate of 5l/s to avoid potential blockages from vegetation etc. at the outfall flow control device Applying a rate of 5l/s results in approximately a 92% reduction in existing surface water runoff..

The submission of a Pre-development enquiry and further correspondence with Thames Water, will confirm the exact requirements for the discharge rates and impact on the existing sewer network. However, as we are proposing to decrease the discharge rate by 92%, this will reduce the load on the existing sewer network during storm events from the site at Cromwell Road.

The local storm water attenuation will be designed to accommodate up to the 100 year storm event plus a 40% allowance for climate change in line with current planning policy. Based on the 5l/s greenfield runoff rate, we have estimated the attenuation storage requirement using the Modified Rational Method which is summarised in Table 4 below (see Appendix E for calculations):

Table 4: Proposed Attenuation Storage Estimate (Based on 50% reduction in Existing Run-off)

Return Period (Yrs)	Attenuation Storage Estimate (m^3)
100 + cc (40%)	310

The attenuation estimate in Table 4 is based on an impermeable site area of 0.54 Ha which includes the proposed building roofs and hard landscaped areas at ground floor level. It is proposed that the attenuation storage consists of a sectional or concrete tank within the basement (location to be confirmed and coordinated with the Architect) that will outfall via gravity to an external flow control manhole before discharging into an adjacent Thames Water surface water sewer network (existing sewers to be confirmed by CCTV survey).

As part of this drainage strategy assessment, the SuDS hierarchy identified within the London Plan and other national and local planning policy reviewed in Section 3, has been considered as and integral part of our drainage design philosophy. A summary of the drainage hierarchy has been provided in Table 5

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Multidisciplinary Consulting Engineers
Flood Risk & Drainage Strategy Assessment
Kensington Forum, 97 Cromwell Road

Rainwater harvesting is consistently at the top of this hierarchy, and it is therefore proposed that an active attenuation system, such as the "StormHarvester" system by "Stormsaver", could be implemented as part of the attenuation strategy. Active attenuation would allow the rainwater from the building roofs to be recycled and reused for either irrigation of greywater use while at the same time providing the attenuation required for the development. Active Attenuation systems can also help to reduce the reticulated water ("clean/drinking water") demand of new buildings by approximately 50% while also reducing the overall storm water runoff from the building to the adjacent sewer by approximately 90%.

The "StormHarvester" technology is linked directly to a highly accurate, short to medium term Met Office Rain Prediction system. When rainfall is predicted, Stormsaver's telemetry recognises the anticipated rainfall event. A control system lowers the water in the Rainwater Harvesting tank to a safe level, so when the rain arrives all the necessary attenuation capacity is available within the tank. The system has a built-in failsafe so that the total attenuation capacity is available for all events that the system is designed for.

To incorporate this system, the attenuation would need to be split into two tanks. The active attenuation tank is proposed to be located within the basement and provide attenuation for the building roofs while doubling up as a rainwater harvesting tank. This tank would require a storage volume of approximately $220m^3$. The remaining $90m^3$ of attenuation for the hardstanding areas would be provided through a modular crate system (such as Permavoid or similar approved) and would be located below the landscape build-up at ground level over the podium slab. Further investigation during the detailed design stage would be required to identify the suitability and extent that an active attenuation system could be implemented.

Any surface water runoff generated at basement level that cannot flow under gravity to the external TWL network shall be collected in a pumping station that shall pump storm via duty, assist and standby pumps to ground floor level where it will connect to the development site's gravity system and outfall to the TWL network.

Table 5: Surface Water Drainage Hierarchy Assessment Summary

Feature	Description
Store rainwater for reuse	Active attenuation has been proposed which will form of a sectional or concrete tank that will collect any rainwater from the building roof and store it for reuse
Infiltration Techniques	Due to the building footprint, basement and foundations, infiltration techniques such as soakaways would not be suitable for the proposed development
Attenuation storage for gradual release	In addition the proposed active attenuation for rainwater reuse, additional storage in the form of geocelluar crates is proposed to attenuate the external hard landscaping at ground level.
Discharge direct to a watercourse	No watercourse available in the vicinity of the development
Discharge to a surface water sewer	No surface water sewers are located within the vicinity of the development.
Discharge to a combined sewer	The proposed development will discharge into the combined sewers that surround it. It is proposed to use any existing connections where possible which will be confirmed and assessed for suitability following detailed survey during the detailed design stage.
Source Control Measures	The application of green/brown roofs have been included at the podium level of the proposed development

6.2 Foul Drainage

The development is located under the jurisdiction of Thames Water Ltd (TWL). From the asset location search there are no dedicated foul sewers in the immediate area of the development site Combined drainage sewers are present on Cromwell Road (900x750mm sewer), Ashburn Place (1150x750mm), Ashburn Gardens (900x600mm) and on Courtfield Road (1150x750mm) (see Fig 6.3 for TWL sewer information). There is a 300mm combined sewer at the corner of Ashburn Place and Cromwell Road that traverses across the footpath adjacent to the entrance to the Taverns Pub. The reason the sewer traverses the junction at this angle is due to the proximity of the adjacent LU tube tunnel

from Gloucester Road Station. The 300mm sewer runs parrallel with the tube line from the top of Ashburn Place until it meets the 1150x750mm sewer on Cromwell Road with flows continuing to head westwards. Please refer to Figure 8 for an extract from the TWL sewer records. For full record information please refer to Appendix B.

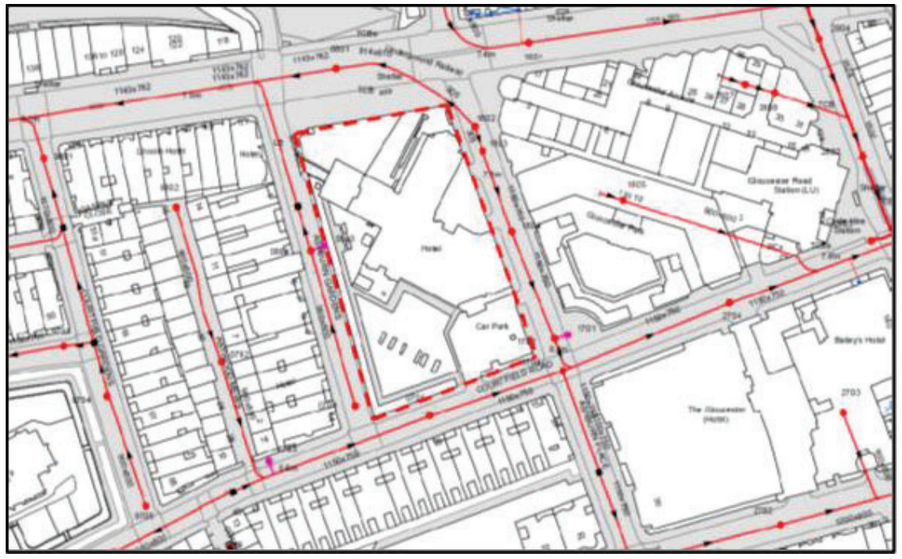


Figure 8: Extract from Thames Water Utilities Asset Location Records.

TWL will have a wayleave over their existing 300mm diameter sewer and any future development at the north east corner of the site which will encroach onto this wayleave will require agreements with TWL in the form of build over licenses etc.

We envisage foul sewage that shall be generated from the new development shall be collected in pipes of 100mm, 150mm and 225mm in diameter and flow under gravity to the existing combined sewers surrounding the development site. A Section 106 application (Consent to Connect) shall be made to TWL at detailed design stage once a drainage layout and design flows have been confirmed.

It is proposed to develop the site into a 756 room hotel (including restaurants and lesiure facilites etc and 176 residiential units (subject to planning) and preliminary foul flows have been estimated and are summarised below and compared with the assumed existing flows in Table 6 with more detaild calculations available in Appendix F. A swimming pool is also proposed but discharge flows, chlorination levels etc need to be agreed directly with TWL as they may limit the discharge flow to a certain rate and agree that the pool will only be emptied at off peak times. The loadings for the estimates in Table 6 have been taken from the British Water *"Flows and Loads"* Code of Practice.

Table 6: Existing vs Proposed Foul Discharge Estimates

Usage Type	Existing Peak Foul Discharge (l/s)	Proposed Peak Foul Discharge (l/s)
Private Apartments	N/A	2.13
Serviced Apartments	N/A	15.74
Hotel Rooms	37.92	31.20
Conference Rooms	5.00	8.34
Bars / Restaurants	0.73	3.71
Gym	N/A	0.29
Total	***43.65***	***61.41***

Based on the foul estimates in Table 6, it has been determined that there is approximately a 41% increase in the foul discharge rate when compared with the estimates for the existing. This can be largley put down to the addition of dwellings within the new proposed development (both private and serviced) and the additional amennitiy provisions. The submission of a Pre-Development Enquiry, as discussed in Section 6.1, will be necessary to confirm the above foul flows with Thames Water and to confirm that the existing sewer network can take the required capacity.

Any foul drainage generated at basement level that cannot flow under gravity to the external TWL network will need to be collected in a pumping station with storage for 24 hours and then pumped via duty, assist and standby pumps to ground floor level where it will connect to the development site's gravity system and outfall to the TWL network.

6.3 Offsite Impact of Proposed Development

The impermeable area of the proposed development is not being increased from that of the existing site and the surface water discharge is proposed to be reduced from that of the existing. This will consequently provide the opportunity to significantly decrease the surface water run-off from the site in line with local and national planning policy and thus downstream surface water flood risk as a result of a reduced load on the existing Thames Water sewer from the proposed redevelopment at Cromwell Road.

6.4 Residual Risk

The scheme has been designed to ensure the safety of the occupants up to and over a 1 in 100 year storm event (including a climate change allowance of 40%). Notwithstanding this and despite the low risk of flooding on the site, provision will be made for residents, employees and visitors of the buildings to be able to reach a higher place of refuge within the building. A FWEP (Flood warning and evacuation plan) will be prepared upon occupation of the development detailing procedures to manage a flood emergency. This, together with the availability of Flood Warning will help the managers and residents of the development in taking action to mitigate the potential impact of flooding (e.g. evacuation before flooding, escaping to the safe refuge etc).

It is proposed that the surface water drainage discharge via gravity where possible. In the unlikely event of a blockage occurring in the proposed attenuation tank for example a maintenance strategy has been proposed and available in Appendix F. The maintenance of any SuDS components is to be in accordance with guidance set out in The SuDS Manual (C763) by CIRIA and best practices.

7 CONCLUSIONS AND RECOMMENDATIONS

- A Flood Risk and Drainage Strategy Assessment has been prepared in accordance with planning policy for the redevelopment of the Kensington Forum site at 97 Cromwell Road.

- The requirements for a Flood Risk Assessment (FRA) are provided in the National Planning Policy Framework and its associated Planning Practice Guidance together with Environment Agency's Guidance Notes. This policy and guidance, including that provided in the Regional and Local Policy Framework, have been followed in the preparation of this Flood Risk and Drainage Strategy Assessment.

- From a review of the EA's flood maps for planning, the Kensington Forum Development site is found to lie within Flood Zone 1 and therefore at low risk of tidal or fluvial flooding.

- The site is located within Critical Drainage Area (CDA) 03 of the Royal Borough of Kensington and Chelsea (RBKC) where a high to medium risk from surface water or pluvial flooding exists on the adjacent streets. From the EA's surface water flood mapping, it has been determined that the extent of flooding in this vicinity is contained within the public highway with less effect on 97 Cromwell Road due to the super elevation of the carriageway and site topography. The flood risk from surface water is therefore deemed to be low.

- According to the RBKC Strategic Flood Risk Assessment (SFRA), the Surface Water Management Plan (SWMP), the EA and following discussions with the owners of the Holiday Inn London – Kensington Forum, which has occupied the site since the 1970s, there is no historical evidence of Pluvial, Tidal, Groundwater or Sewer Flooding on the Kensington Forum Development Site.

- It is proposed that the finished floor levels at the entrances to residential dwellings be maintained to that of the existing development at a minimum

of 8.0mAOD. The entrance levels into the Hotel are proposed to be set to a minimum of 7.5mAOD to minimise the risk of flooding.

- The design intent for the surface water drainage is to reduce the discharge rate to 5.0l/s which equates to 92% of the existing development run-off for a 1 year event in line with The RBKC recommendations. Doing so will require onsite attenuation storage which has been estimated as approximately 310m³ for the 1 in 100 year event plus 40% for climate change.

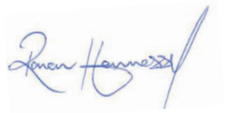
- It is proposed to implement an active attenuation system that would allow the rainwater from the building roofs to be recycled and reused for either irrigation of greywater use while at the same time providing the attenuation required for the development.

- Any surface water runoff generated at basement level that cannot flow under gravity to the external TWL network shall be collected in a pumping station and pumped to the necessary level. To incorporate this system, the proposed attenuation volume would be divided between two tanks. The active attenuation / rainwater harvesting tank would be located within the basement taking runoff from the building roofs with a volume of 220m^3. The remaining 90m^3 of attenuation for the hardstanding areas would be provided through a modular crate system (such as Permavoid or similar approved) and would be located below the landscape build-up at ground level over the podium slab.

- Any surface water runoff generated at basement level that cannot flow under gravity to the external TWL network shall be collected in a pumping station that shall pump storm via duty, assist and standby pumps to ground floor level where it will connect to the development site's gravity system and outfall to the TWL network.

- The design intent for the foul water drainage will be to discharge directly into the existing Thames Water sewers within the vicinity of the site. A survey of the existing drainage connections onsite is recommended in order to

determine if these are fit for purpose and can be reused for the new development connection. It has been estimated by OCSC that the foul discharge rate for the new proposed development will increase by approximately 41% which can be largely put down to the addition of residential units and increased amenity facilities proposed in the new development. Further consultation with Thames Water including a Pre-development enquiry are required to provide further information and clarification on this.



Ronan Hennessy
BEng (Hons), MEng, MIEI

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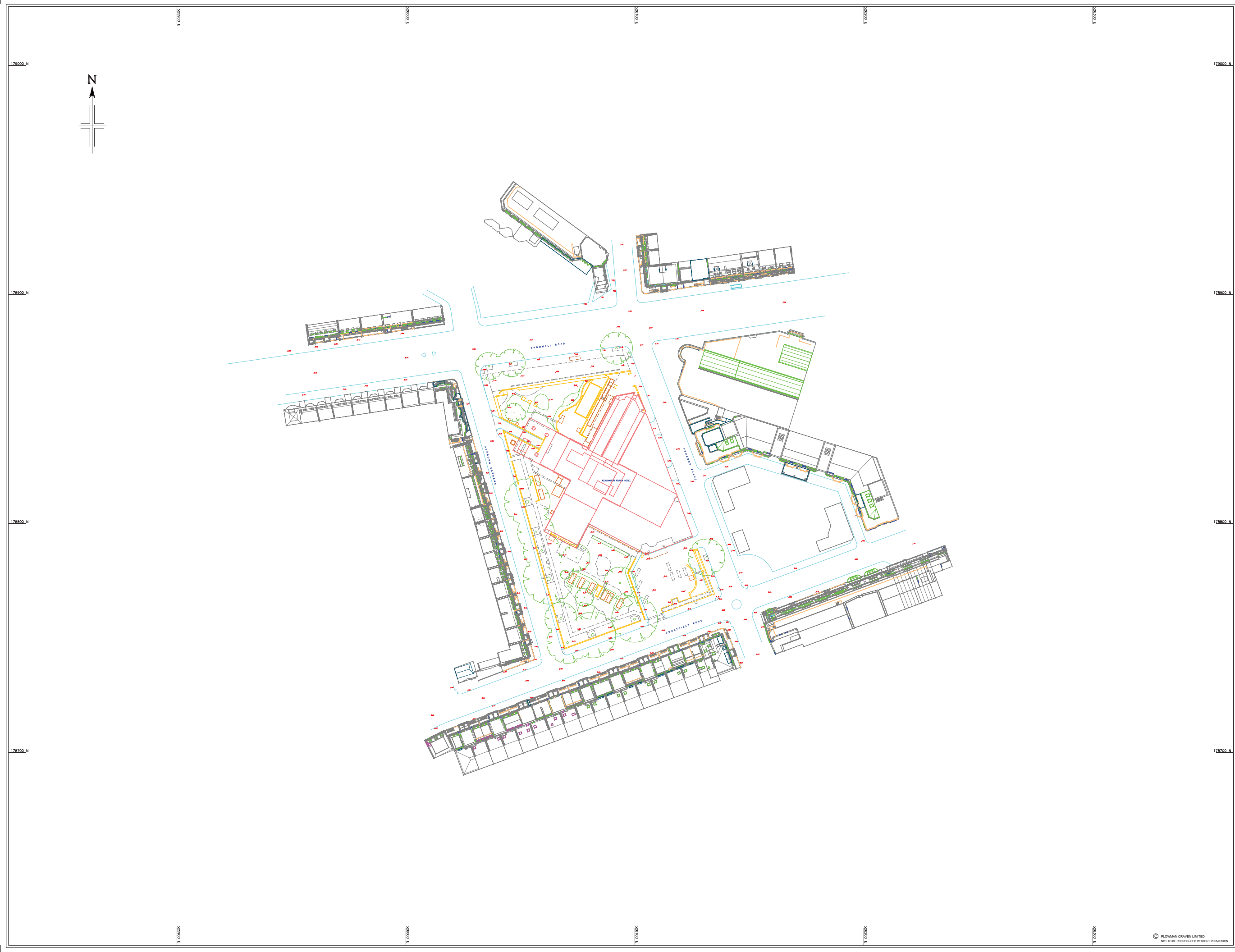
APPENDIX A. TOPOGRAPHICAL SURVEY

Appendix A

Topographical Survey



THIS SURVEY HAS BEEN CARRIED OUT TO AN ACCURACY CONSISTENT WITH A PRESENTATION SCALE OF 1:100. INTERROGATED DIMENSIONS WILL BE WITHIN THE TOLERANCE ASSOCIATED WITH THIS AND SMALLER SCALES ONLY.

ALL LEVELS ARE IN METRES AND ARE ABOVE ORDNANCE SURVEY NEWLYN DATUM DERIVED BY MULTIPLE NETWORK RTK GPS OBSERVATIONS.

THE SURVEY GRID SHOWN ON THIS DRAWING IS POSITIONED ON ORDNANCE SURVEY (OS) NATIONAL GRID, OBTAINED BY MULTIPLE NETWORK RTK GPS OBSERVATIONS.

ALL QUOTED DIMENSIONS ARE IN METRES

DRAWING UNITS ARE METRES

CLIENT

QUEENSGATE INVESTMENTS LLP
8 HILL STREET
LONDON
W1J 5NG

PROJECT TITLE

KENSINGTON FORUM HOTEL

Survey for Rights of Light
3D Model (AutoCAD Solids)

SURVEYED AND DRAWN BY

Plowman Craven
141 Lower Luton Road
Harpenden
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AL5 5EQ
+44(0)1582 765566 info@plowmancraven.co.uk
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PRESENTATION SCALE	1:500 @ A0
DATE OF ORIGINAL SURVEY	January 2016
PC PROJECT No. 34177-001	CHECKED STG
DRAWING No.	34177-001RoLm-01
ISSUE	A

THIS SURVEY HAS BEEN CARRIED OUT TO AN ACCURACY CONSISTENT WITH A PRESENTATION SCALE OF 1:200. INTERROGATED DIMENSIONS WILL BE WITHIN THE TOLERANCE ASSOCIATED WITH THIS AND SMALLER SCALES ONLY.

ALL LEVELS ARE IN METRES AND ARE ABOVE ORDNANCE SURVEY NEWLYN DATUM DERIVED BY MULTIPLE NETWORK RTK GPS OBSERVATIONS.

THE SURVEY GRID SHOWN ON THIS DRAWING IS POSITIONED ON ORDNANCE SURVEY (OS) NATIONAL GRID, OBTAINED BY MULTIPLE NETWORK RTK GPS OBSERVATIONS.

ALL QUOTED DIMENSIONS ARE IN METRES

DRAWING UNITS ARE METRES

CLIENT

GVA Second London Wall
65 Gresham Street
London
EC2V 7NQ

PROJECT TITLE

KENSINGTON FORUM HOTEL

3D Topographic Survey

SURVEYED AND DRAWN BY

Plowman Craven
141 Lower Luton Road
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AL5 5EQ
+44(0)1582 765566 info@plowmancraven.co.uk
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PRESENTATION SCALE	1:200 @ A1+
DATE OF ORIGINAL SURVEY	November 2015
PC PROJECT No. 34177	CHECKED STG
DRAWING No.	34177-001T-01
ISSUE	A

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Multidisciplinary
Consulting Engineers

APPENDIX B. THAMES WATER ASSET LOCATION RECORDS

Appendix B

Thames Water Asset Location Records

Asset Location Search

Thames Water

Andrew Peeke
O Connor Sutton Cronin
40Bowling Green Lane
LONDON
EC1R 0NE

Search address supplied
97
Cromwell Road
Kensington
London
SW7 4DN

Your reference N/A

Our reference ALS/ALS Standard/2016_3376728

Search date 21 July 2016

You are now able to order your Asset Location Search requests online by visiting
www.thameswater-propertysearches.co.uk

searchcode

Asset Location Search

Search address supplied: 97, Cromwell Road, Kensington, London, SW7 4DN

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This searchprovides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0845 070 9148, or use the address below:

Thames Water Utilities Ltd
Property Searches
PO Box 3189
Slough
SL1 4WW

Email: searches@thameswater.co.uk
Web: www.thameswater-propertysearches.co.uk

Asset Location Search

Waste Water Services

Please provide a copy extract from the public sewer map.

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an ‘as constructed’ record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies.

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and

pressure test to be carried out for a fee.

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

An invoice is enclosed. Please send remittance to Thames Water Utilities Ltd., PO Box 3189, Slough, SL1 4WW.

Asset Location Search

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0845 850 2777
Email: developer.services@thameswater.co.uk

Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0845 850 2777
Email: developer.services@thameswater.co.uk

Asset Location Search Sewer Map - ALS/ALS Standard/2016_3376728

The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 526097,178818

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.

Based on the Ordnance Survey Map with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

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
0902	7.99	4.58
0901	7.74	4.59
201B	n/a	.73
201A	n/a	.34
201C	n/a	n/a
10ZV	n/a	n/a
1003	n/a	n/a
1004	n/a	n/a
1005	n/a	n/a
2001	7.54	4.29
10ZY	n/a	n/a
3001	8.27	4.37
10ZX	n/a	n/a
0004	7.92	4.89
1001B	7.55	5.26
1805	n/a	n/a
3802	6.91	5.39
2802	7.56	3.65
1803	7.65	4.6
3807	n/a	n/a
1802	7.58	6.18
3806	n/a	n/a
3804	7.43	4.33
3805	n/a	n/a
2808	n/a	n/a
2807	n/a	n/a
0801	7.75	4.65
1801	7.44	4.21
2804	7.08	3.99
191C	n/a	n/a
191D	n/a	n/a
191E	n/a	n/a
191B	n/a	n/a
2908	7.45	4.05
191A	n/a	n/a
3904	7.7	4.14
291A	n/a	n/a
0903	7.83	4.44
2905	6.4	4.53
2901	7.28	n/a
3605	7.65	4.09
2602	8.56	4.18
2605	8.06	4.31
261A	n/a	n/a
1604	9.05	4.13
3604	7.52	3.88
0601	8.99	3.1
3602	7.57	n/a
061A	n/a	n/a
0603	7.48	4.35
361A	n/a	n/a
1603	8.85	3.57
361B	n/a	n/a
361D	n/a	n/a
061B	n/a	n/a
3609	n/a	n/a
371A	2.48	.98
2702	8.26	3.89
371B	n/a	n/a
2706	7.77	3.71
0703	8.63	4.76
3701	7.38	3.68
0706	8.5	4.62
2703	n/a	n/a
271B	n/a	.42
0701	8.46	4.96
271C	2.15	.65
1704	8.46	4.37
1702	n/a	n/a
1701	8.35	4.38
3707	7.22	5.55
2704	7.98	4.1
271A	n/a	n/a
0804	n/a	n/a
0803	8.04	4.59
2803	7.28	n/a
1804	7.92	4.02
801A	n/a	n/a
9001	8.69	6.39
901A	n/a	n/a
90ZY	n/a	n/a
9801	n/a	n/a
9002	8.87	4.97
991A	n/a	n/a
9802	n/a	n/a
9006	8.77	4.64
9901	n/a	n/a
9007	8.51	4.91
0904	8.24	4.64
0002	8.22	4.79
0003	8.27	4.87

Manhole Reference	Manhole Cover Level	Manhole Invert Level
9605	n/a	n/a
0602	8.92	2.72
8601	n/a	n/a
9604	n/a	n/a
9603	n/a	n/a
9602	n/a	n/a
9601	n/a	n/a
9705	n/a	n/a
8703	n/a	n/a
9704	n/a	n/a
9702	n/a	n/a
0702	7.85	5.39
9701	n/a	n/a
9703	n/a	n/a
8801	n/a	n/a
9501	n/a	n/a

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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 0845 070 9148.