Appendix 11.2: Drainage Strategy

NEW CITY COURT

Drainage Strategy - Addendum

AKT II

3948 New City Court

Drainage Strategy

July 2021

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Contents

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E	09/07/2021	Issued for Information
D	07/07/2021	Draft Issue
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1 Introduction

AKT II have been commissioned to undertake a sustainable drainage strategy in support of the proposed redevelopment of New City Court, 4-26 St Thomas Street, London, SE1 9RS ('the Site'). This report is intended to cover only drainage design and to provide the guidelines and parameters for the detailed design.

This report has been prepared in accordance with the guidance contained in the National Planning Policy Framework (NPPF) and the accompanying Planning Practice Guidance.

This report was updated and re-submitted in July 2021 to reflect revisions to the detailed design of the proposals since the planning and listed building application submission in April 2021. This latest revision updates the figures and sketches to reflect the revised architectural drawings, but the analysis remains unaffected.

2 The Site

2.1 Site location

The Site is located between St Thomas Street (North); King's Head Yard (South); and occupied retail buildings running along Borough High Street and Guy's hospital Buildings (East). It is located in close proximity to London Bridge station, the Shard and Borough Market. (Fig 2.2)

The Site is currently occupied by o□ce blocks with pedestrian access from St Thomas Street and vehicular access to the building from the carpark located in the south west.

The wider contextual location (Fig 2.3) shows the Site located approximately 180m south of the River Thames and within walking distance to London Bridge station.

The south east corner of the development is bounded by the adjacent nurses' accommodation.

2.2 Site description

The Site is currently occupied by o□ce blocks with pedestrian access from St. Thomas Street and vehicular access to the building from the carpark located on the SW corner, plus a loading bay on St. Thomas Street.

The levels adjacent to the Site boundary range from approximately 4.25m Above Ordnance Datum (AOD), at the north east corner of the Site, to 3.50m AOD at the south east corner of the Site on King's Head Yard / White Hart Yard. The elevation of Borough High Street parallel to the Site on the western side ranges from 5.34m AOD to 4.96m AOD with a slope towards the south. St. Thomas Street to the north ranges from 4.97m AOD to 4.25m AOD with a slope in westerly direction, towards Borough High Street.

For topographical survey information refer to Appendix A.

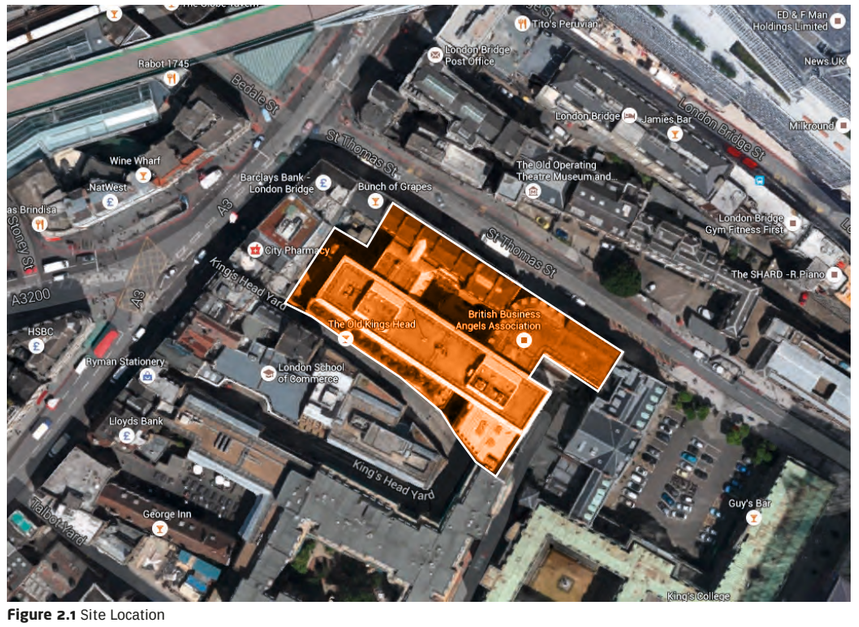


Figure 2.1 Site Location

Figure 2.2 Aerial image Site Location, London Bridge

Figure 2.3 Wider contextual location of the Site

3 Proposed Development

The Site to be redeveloped is located in the London borough of Southwark in the London Bridge area. The Site boundary lies directly along the south side of St. Thomas Street, between the cross roads of London Bridge Street, to the east; and Borough High Street, to the west. It is located adjacent to the Guy's Hospital accommodation and King's College Guy's Campus buildings. The Site is bordered by Kings Head Yard, to the south.

The project comprises the construction of a 26-storey building (with mezzanine and two basement levels), adjacent to King's Head Yard, after demolishing the existing New City Court o□ce building.

Keats House, a smaller building located in the northeast corner, will be reconstructed with a new internal structure intended to reflect the Venetian style of its facade. The existing Keats House front facade is to be relocated by approximately 6m to the West to allow for space for a servicing access.

The whole expansion of the existing level of basement and the construction of a second level across the Site is proposed, to accommodate extensive cycle parking in addition to servicing and plantrooms.

Additionally the proposed development will provide o□ce floorspace, flexible o□ce/retail floorspace, restaurant/café floorspace and a public rooftop garden, associated public realm and highways improvements, provision for a new access to the Borough High Street entrance to the Underground Station, cycling parking, car parking, service, refuse and plant areas, and all ancillary or associated works.

Finally, the project proposes to retain and refurbish the existing terrace houses located along St. Thomas Street (no. 4 to 16), following special requirements for listed buildings (Grade II.

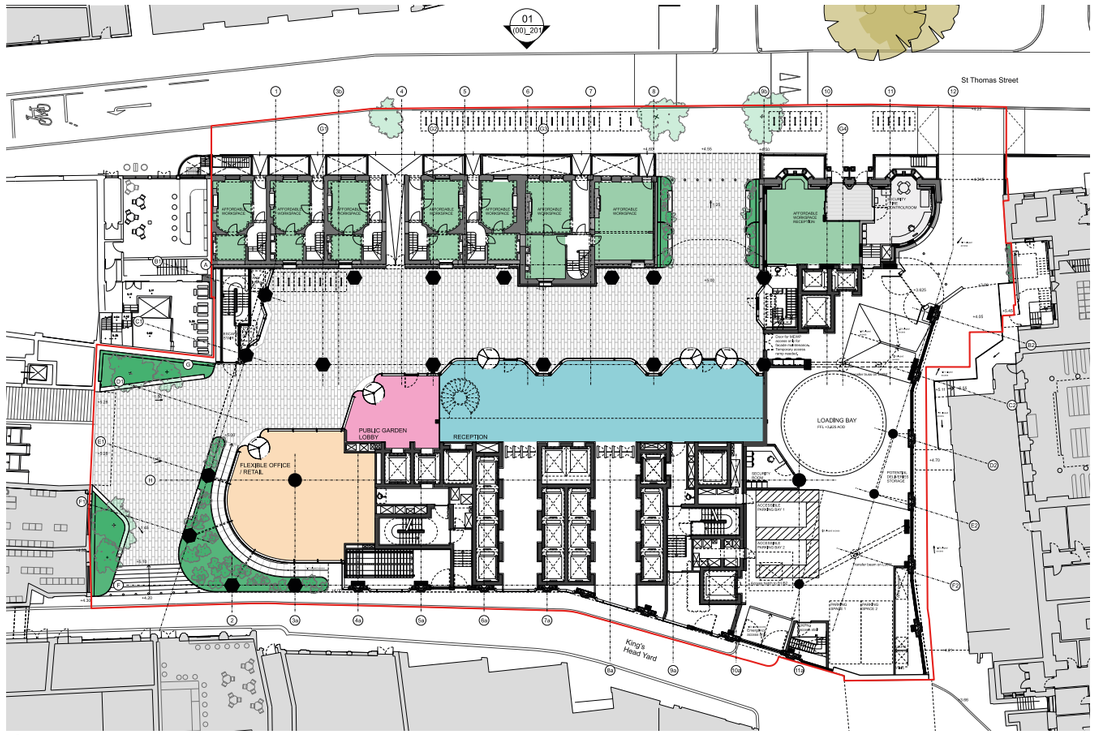


Figure 3.1 New City Court, Proposed Ground Floor Layout

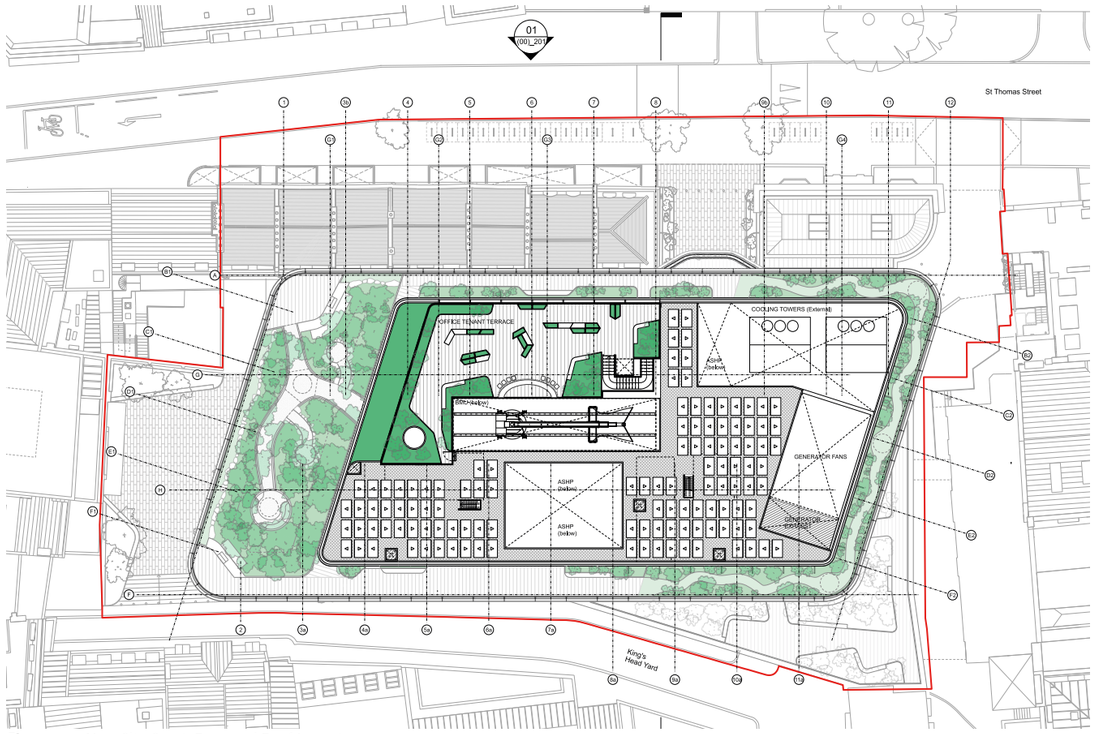


Figure 3.2 New City Court, Proposed Roof Layout

4 Surface water drainage

4.1 Existing scheme

The available Thames Water record plans indicate that the closest combined public sewers to the Site are:

- A 1143 × 762 mm combined sewer running under St Thomas Street to the north of the Site.
- A 375 mm combined water sewer running under Keats House to the east of the Site. However, it should be noted that the actual pipe size as recorded by CCTV survey is 300 mm.
- A 305mm dia. combined water sewer in King's Head Yard to the south of the Site. However, it should be noted that the actual pipe size as recorded by CCTV survey is 300 mm.

An extract from the record plans is shown in Figure 4.2 for reference.

It is believed that all surface water from the building currently discharges directly to one or more of these public sewers without any form of attenuation, but it is not clear which one, and it is therefore recommended that a CCTV survey of the existing Site drainage network is undertaken to confirm the location, size and condition of all existing outfalls from the Site and to rule out any third-part connections from adjoining properties.

The total Site area excluding the existing listed Georgian terrace buildings (Grade II) which will be restored (nos. 4-16 St Thomas Street) is approximately 2,980 m2. In accordance with the Modified Rational Method, the peak existing run-o from the Site is calculated from the formula:

$Q = 3.61 \times C_v \times A \times i$

where C_v is the volumetric runo coe cient, A is the catchment area in hectares and i is the peak rainfall intensity in mm / hr.

For the peak 1-in-1-year return period storm event this gives an existing discharge rate from the Site of:

$\mathbf{Q_1} = 3.61 \times 0.75 \times 0.298 \times 38.3 =$ **30.9 litres / sec**

and for the peak 1-in-100-year return period storm event this gives an existing discharge rate from the Site of:

$\mathbf{Q_{100}} = 3.61 \times 0.75 \times 0.298 \times 104.7 =$ **84.4 litres / sec**

Manhole reference	Manhole cover level	Manhole invert level
7111	5.11 m	0.34 m
7101	4.8 m	n/a
8101	3.82 m	-0.19 m

Figure 4.1 Thames Water Sewer Record

4.2 Proposed scheme

The proposed impermeable area will remain as existing. Again using the Modified Rational Method, the proposed (unattenuated) peak run-o from the new extension for the 1-in-1-year return period storm would be:

$\mathbf{Q_1} = 3.61 \times 0.75 \times 0.298 \times 38.3 =$ **30.9 litres / sec**

and for the peak 1-in-100-year return period storm event:

$\mathbf{Q_{100}} = 3.61 \times 0.75 \times 0.298 \times 104.7 =$ **84.4 litres / sec**

The Environment Agency (EA) updated their guidance on climate change allowance in February 2016 to include an upper and lower allowance to be considered depending on the specific Site characteristics. Figure 1.3 shows the revised figures based on various building life spans. Therefore, making an allowance for climate change of 40 % this would give an unattenuated design discharge of:

$\mathbf{Q_{1\,(+40\%)}}$ **= 43.3 litres / sec** and $\mathbf{Q_{100\,(+40\%)}}$ **= 118.2 litres / sec**

In accordance with the EA's guidelines, the Building Regulations and the Water Authority's advice, the preferred means of surface water drainage for any new development is into a suitable soakaway or infiltration drainage system. Sustainable Urban Drainage Systems (SuDS) can reduce the impact of urbanisation on watercourse flows, ensure the protection and enhancement of water quality and encourage recharging of groundwater in a manner which mimics nature.

In addition to this, the NPPF requires that surface water arising from a developed Site should, as far as is practicable, be managed in a sustainable manner to mimic surface water flows arising from the Site prior to the proposed development, whilst reducing flood risk to the Site itself and elsewhere, taking climate change into account.

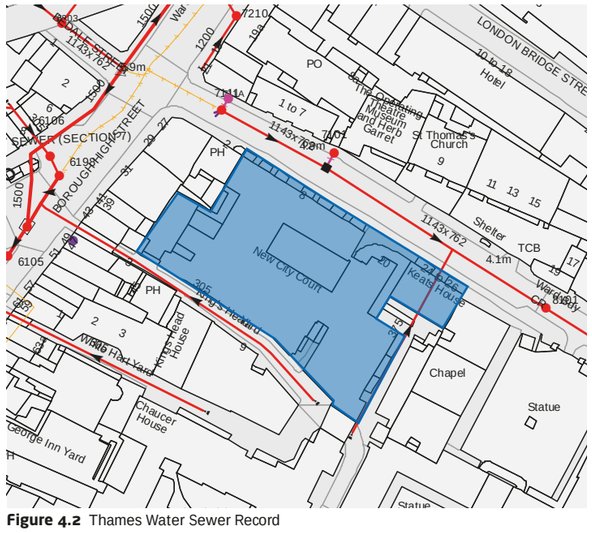


Figure 4.2 Thames Water Sewer Record

Therefore, as an absolute minimum, the proposed Site discharge under the 1-in-100-year storm plus climate change should be no greater than the existing 1-in-100-year storm discharge (i. e. it should mitigate the impact of climate change and any increase in the area of hardstanding). In this case, this would mean that, rather than discharging 118.2 litres / sec, the maximum permissible discharge from the Site would be 84.4 litres / sec.

Further to the above, Policy SI 13 of The London Plan 2021 states that "Development proposals should aim to achieve greenfield run-o rates and ensure that surface water tun-o is managed as close to its source as possible". The EA also suggests that Developers should aim to achieve greenfield run o from their Site. In accordance with the method outlined in the Institute of Hydrology Report 124, the Greenfield runo for the Site is calculated from the formula:

$Q_{BAR} = 0.00108 \times AREA^{0.89} \times SAAR^{1.17} \times SOIL^{2.17}$

where AREA is the Site area in km2 (pro rata of 50 ha if the Site is less than 50 ha), SAAR is the Standard Average Annual Rainfall in mm and SOIL is the Soil Index, both read from The Wallingford Procedure maps. This gives a greenfield runo for the Site of:

$\mathbf{Q_{BAR}} = 0.00108 \times 0.50^{0.89} \times 600^{1.17} \times 0.45^{2.17} =$ **183.4 litres / sec (for 50 ha)**

Scaling this for the actual Site area gives:

$\mathbf{Q_{BAR}} = (183.4 \times 0.298) \div 50 =$ **1.09 litres / sec**

Using the Hydrological Growth Curve for south east England, the growth factor from Q_{BAR} to Q_{100} is 3.190 which gives a value for $\mathbf{Q_{100}} =$ **3.49 litres / sec.**

As the project is new build we would expect that based on our recent experience in the borough. The Local Authority, Thames Water, and the EA would require the storm water discharge to be limited to the greenfield run-o rate.

Potential approaches that can be taken are discussed in the next section.

Range	Total potential change anticipated for 2010-2039	Total potential change anticipated for 2040-2059	Total potential change anticipated for 2060-2115
Upper end	10%	20%	40%
Central	5%	10%	20%

Figure 4.3 Peak rainfall intensity allowance

4.3 Disposal methods

SuDS management train

A useful concept used in the development of sustainable drainage systems is the SuDS management train (sometimes referred to as the treatment train). Just as in a natural catchment, drainage techniques can be used in series to change flow and quality characteristics of the runo in stages. There are a variety of measures that can be implemented to achieve these goals:

Site management / Prevention

Site management procedures are used to limit or prevent runo and pollution and include:

- Minimising the hardened areas within the Site.
- Frequent maintenance of impermeable surfaces.
- Minimising the use of de-icing products.

Source control

Source control techniques will be used where possible as they control runo at source in smaller catchments. They can also provide e ective pollution control and treatment, thereby improving the quality of the e uent discharged to the receiving waters.

Site control

Where source control techniques do not provide adequate protection to the receiving watercourses in terms of flood protection and pollution control, Site control may be required.

Regional control

Where large areas of public space are available regional control can be incorporated to provide additional 'communal' storage and treatment to runo from a number of Sites. However, in this case, all storage and treatment will be implemented on Site.

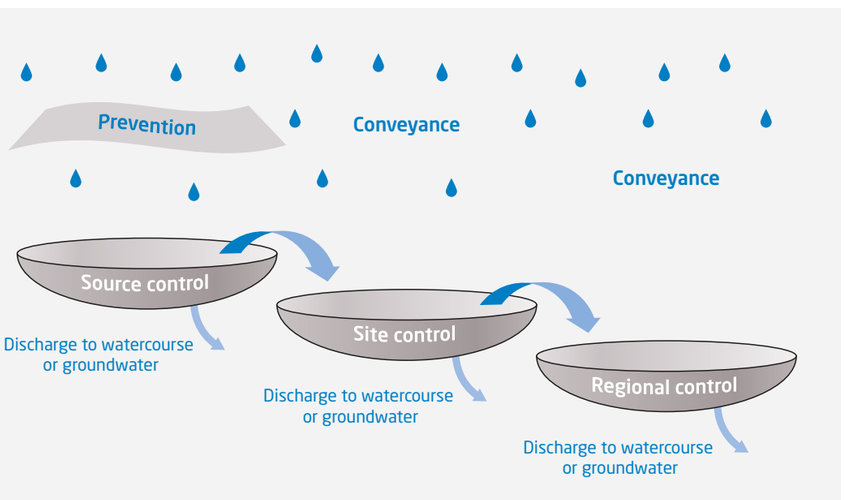


Figure 4.4 SuDS management train

Drainage hierarchy

Based on the above and in line with The London Plan 2021, the following drainage hierarchy has been considered when preparing the surface water disposal strategy:

1. Rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation).
2. Rainwater infiltration to ground at or close to source.
3. Rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens).
4. Rainwater discharge direct to a watercourse (unless not appropriate).
5. Controlled rainwater discharge to a surface water sewer or drain.
6. Controlled rainwater discharge to a combined sewer.

Assessment of SuDS techniques

Rainwater harvesting

This involves the capture of rainwater into a tank for re-use (usually non-potable) such as irrigation, toilet flushing or vehicle cleaning. Systems are now available which combine rain water harvesting with tanked attenuation. This means that water is stored during dry periods for re-use but released ahead of predicted storms in order to ensure that the full attenuation capacity remains available when it is needed.

As the project is a new build, it should be possible to install a rainwater harvesting system where roof water could be collected for re-use to flush toilets or irrigate planted areas. Its use should therefore be investigated further at the next design stages to determine its suitability in terms of the plant space requirements, the need for a secondary water distribution network, the available yield and demands.

Green / brown / blue roofs

These are used on flat or shallow pitched roofs to provide a durable roof covering which also provides thermal insulation, amenity space and biodiversity habitat as well as attenuation of rainwater. Depending on the design, these roofs can attenuate di ering volumes of rainwater. The term 'blue roof' is reserved for those roofs designed to maximise water retention. This is a relatively recent area of increased focus and can involve an attenuation tank at roof level which reduces (or avoids) the need for pumping of basement tanks.

It is proposed that blue roofs are incorporated into the scheme.

Raingardens

Raingardens are planted areas (usually close to buildings but not immediately adjacent) that allow the diversion of a portion of rainwater from either downpipes or the surrounding paved surfaces. These techniques can be incorporated into the landscaping plans for a Site and are most e ective where the landscaping regime is designed with the aim of capturing as much rainfall as possible. They can either allow infiltration into the ground or have tanked systems for water retention, depending on the Site and soil conditions. There are also a number of vertical raingardens attached to building walls with rainwater downpipes diverted through a stacked series of planters.

As the proposed structure takes up the full Site area it is not possible to incorporate raingardens into the scheme.

Bio-retention

This refers to a chain of landscaped features, potentially including reed beds, filter drains, etc. designed to hold and treat surface water. They are often used where there is a high risk of low-level pollution, for example from road run-o . However, it does require areas of open space. The design of a bio-retention system can vary widely depending on Site conditions and available space. At a small scale this could include flow through planters or tree pits.

As the proposed structure takes up the full Site area it is not possible to incorporate bio-retention into the scheme.

Permeable surfacing

Permeable hard surfaces which work in much the same way as traditional impermeable surfaces apart from the ability to allow rainwater to pass through. Permeable blocks are traditionally used but there are now a range of permeable asphalt and resin bound gravel pavings being used increasingly commonly. Permeable surfaces can either allow infiltration into the ground or have tanked systems for water retention, depending on the Site and soil conditions. They are suitable in even the most densely built-up development. However, they're not well suited to roads carrying heavy or fast motor tra c.

It is proposed to incorporate tanked permeable surfacing for water retention above the podium deck.

Swales

These are dry ditches used as landscape features to allow the storage, carriage and infiltration of rainwater and are often used as linear features alongside roads, footpaths or rail lines. They can also be integrated into the design of many open spaces.

As the proposed structure takes up the full Site area it is not possible to incorporate swales into the scheme.

Detention basin / ponds

These are landscape features designed to store and in some cases infiltrate rainwater. Detentions basins are usually dry, whereas a pond should retain water. These features need areas of open space but can often be combined with other sustainable drainage techniques.

As the proposed structure takes up the full Site area it is not possible to incorporate ponds into the scheme.

Discharge to tidal river / dock / canals

Discharging clean rainwater directly to tidal rivers, canals or docks isn't normally a sustainable drainage technique. Other more productive techniques should be used first. However, it is generally more sustainable than discharging to the combined or surface drainage systems. Residual surface water can be discharged to tidal / large waterbodies, in some cases with no limitation on volumes. Some storage may be required to allow for outfalls becoming tide locked. Care is needed to prevent scour (sediment removal) in the receiving waterbody and potentially to prevent pollution. Consent from the EA, the asset owner and (where applicable) the Canal and River Trust is required.

There are no adjacent rivers or ponds and so discharge to a watercourse will not be a viable disposal method.

Storage tanks

Storage tanks are single GRP (glass reinforced plastic) units usually but not necessarily located below ground level which attenuate rainwater for later slow release back into the drainage system but do not provide the wider benefits of green infrastructure sustainable drainage. They can also have the disadvantage that pumping may be required to empty the tank into the drainage system - especially if the tank is located at or below basement level. Where tanks are designed for large storm events, care is needed to ensure that they still perform a useful sustainable drainage function for low order storms.

It is believed that the most viable solution for the Site is to connect to existing public sewers. **The total attenuation volume based upon the greenfield run-of rate of 3.49 litres/ sec for a range of discharge rates plus 40% climate change is approximately 190 m³.**

The proposed attenuation features will comprise mainly blue roof systems at various levels with a small area being drained into an attenuation tank inside the basement. The attenuation tank should be located high enough to achieve a gravity discharge into the public sewers. This will need to be investigated during the next design stage.

It is also recommended that, if possible, the existing sewer connection(s) from the Site are reused to prevent the need for constructing a new sewer connection. This would minimise both the cost of the work and the disruption to St. Thomas Street and Borough High Street which is a busy thoroughfare and would consequently require significant pedestrian and tra□c management to be provided during the work. This is all subject to a CCTV survey which is yet to be undertaken to confirm the capacity and condition of existing outfall points.

Oversized piping

Using larger than necessary pipework creates more room to store rainwater. This would be potentially more sustainable than storage tanks / geocellular storage (modular attenuation tank) if the pipes drain by gravity and do not require pumping. However, this option lacks the wider benefits of the green infrastructure based techniques.

Due to the restricted nature of the Site the pipework would become impractically large to provide the volume of storage required to achieve the required run-o□ rate.

Design for exceedance

This involves designing areas within a Site such that they will flood and hold water during rare storm events (typically a frequency of once in ten years or longer).

As the attenuation volume has been sized to accommodate the 1-in-100-year plus climate change event and with a well maintained system, the risk of exceedance will be very low.

Summary of the proposed SuDS strategy

It is proposed to provide the blue roof systems at various levels alongside an attenuation tank located inside the basement box which will drain a small area of the development. In addition, there will be an area of tanked permeable paving which will o□er treatment and storage of the rainwater run-o□. **The total attenuation volume based upon the greenfield run-of rate of 3.49 litres/sec for a range of discharge rates plus 40% climate change is approximately 190 m³.**

A schematic drainage strategy is included in Appendix 1 for reference.

The final drainage details will be developed at the next design stage.

Element	Management stage	Water quantity	Water quality	Amenity & biodiversity	Possible in scheme
Rainwater harvesting	Prevention	✓	×	×	×
Green / brown / blue roof	Source control	✓	✓	✓	✓
Raingardens	Source control	✓	✓	✓	×
Bio-retention	Source control	✓	✓	✓	×
Permeable surfacing	Source control	✓	✓	×	✓
Swales	Source control	✓	✓	✓	×
Detention basin / ponds	Source control	✓	✓	✓	×
Discharge to tidal river / dock / canals	Site control	✓	×	×	×
Storage tanks / Geocellular storage	Site control	✓	×	×	✓
Oversized piping	Site control	✓	×	×	×
Design for exceedance	Site control	✓	×	×	×

Figure 4.5 Summary of proposed SuDS devices

5 Flood risk assessment requirements

The EA's Indicative Floodplain Map (see Figure 5.1) shows that the Site lies in Flood Zone 3a. – an area with a high probability of flooding from rivers and sea without the local flood defences.

A Flood Risk Assessment (FRA) has been undertaken by AKT II which concluded that the Site will not increase the flood risk to other properties and the proposed development has an acceptable flood risk within the terms and requirements of the NPPF. Refer to AKT II FRA report dated March 2021.

The main findings of this report can be summarised as:

- In accordance with the NPPF, the Site would be categorised as lying within Flood Zone 3a - an area assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%). However, the Site benefits from the presence of flood defences along the River Thames. According to the EA Product 4 data (see Appendix E of the AKT II FRA), 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 0.1% annual probability. This is also confirmed by the Thames Estuary 2100 (2012) report.
- In accordance with the NPPF, the proposed retail and o□ce uses are acceptable within Flood Zone 3a.
- The development does not require the Exception Test to be applied and therefore, the development is considered appropriate to the location.
- The Site has been assessed as being at very low risk of flooding from rivers or tidal sources.
- In the event of breach, the occupants can evacuate to higher levels and safely remain inside or can leave the Site early having been alerted by the Flood Warning Service.
- The Site has been assessed as being at low risk from surcharging sewers.
- The Site has been assessed as being at low risk from groundwater sources.
- The Site has been assessed as being at low risk from artificial sources.
- The Site has been assessed as being at flood risk from surface water flooding from King's Head Yard. It is recommended that mitigation measures specified in the AKT II FRA are implemented during the next design stage.
- The proposed redevelopment has an acceptable flood risk within the terms and requirements of the NPPF, subject to implementation of the mitigation measures outlined in the AKT II FRA.

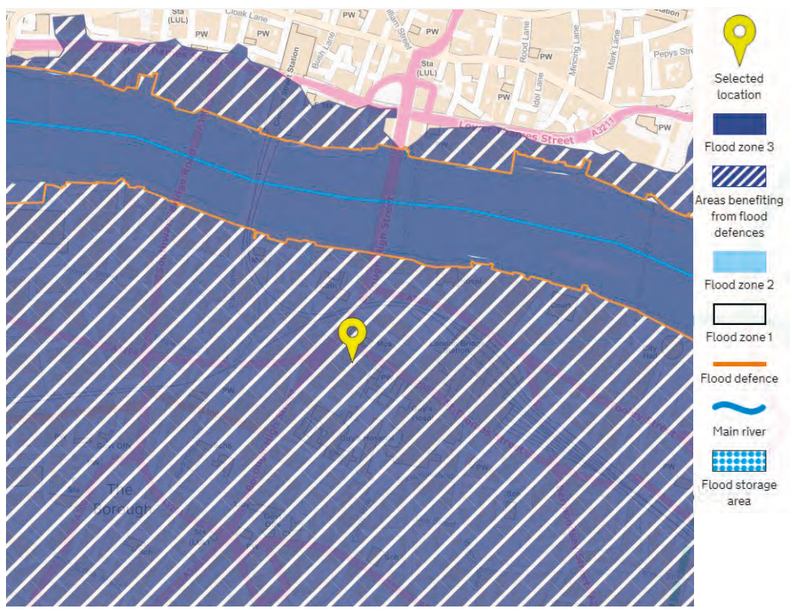


Figure 5.1 Environment Agency indicative flood map

6 Foul water drainage

6.1 Existing scheme

The available Thames Water record plans indicate that the closest combined public sewers to the Site are:

- A 1143 × 762 mm combined sewer running under St Thomas Street to the north of the Site.
- A 375 mm combined water sewer running under Keats House to the east of the Site. However, it should be noted that the actual pipe size as recorded by CCTV survey is 300 mm.
- A 305mm dia. combined water sewer in King's Head Yard to the south of the Site. However, it should be noted that the actual pipe size as recorded by CCTV survey is 300 mm.

An extract from the record plans is shown in Figure 1.2 for reference.

It is believed that all surface water from the building currently discharges directly to one of these public sewers without any form of attenuation, but it is not clear which one, and it is therefore recommended that a CCTV survey of the existing Site drainage network is undertaken to confirm the location and size of all existing connections from the Site and to rule out a third-party connections from adjoining properties.

Existing foul water discharge has been calculated using existing plans of the Main building, Keats House and nos. 4-16 St Thomas Street.

The existing foul flows from the development are as follows:

Appliance	No.	Discharge Units per Appliance	Total Units
Washbasins	52	0.5	26
Urinal	13	0.5	6.5
Kitchen Sink	5	0.8	4
WCs	42	2	84
Floor Drains	20	2	40
Total			**160.5**

Therefore, the total foul flow from the development is **8.5 l/s**.

6.2 Proposed scheme

The proposed foul water discharge has been based on the peak daily discharge of 4,950 and 2,640 litres per day per 100m2 of floor area of o□ce and retail space, respectively.

The proposed foul flow from the development including the refurbished buildings are as follows:

Use	Area GIA (sqm)	Daily Discharge (litres/day)	Peak Flow Rate (litres/sec)
O□ce	44,312	2,193,444	25.4
Retail	340	8,976	0.1
Food and Drink	421	assumed 11,111	0.13
Roof top garden	208	assumed 5,491	0.07
A□ordable workspace	5,017	248342	2.9
Total			**≥8.6**

There will be an increase in flow rate of approximately **20 l/s** into the public sewer which would need to be agreed with Thames Water by a way of submitting a pre-development enquiry and secured under Section 106 of the Water Industry Act 1991.

It is assumed that any foul water drainage from ground floor level and above will be drained by gravity in order to minimise the amount of pumping required. It is recommended that an allowance is made at this stage for pumping foul water from below the basement level slab up to high level in the basement to allow it to discharge by gravity to the public sewer.

As with the surface water drainage, due to the depth of the public sewers it is recommended that, if possible, the existing drainage connection(s) should be reused, subject to the findings of the CCTV survey.

7 BREEAM

BREEAM (Building Research Establishment's Environmental Assessment Method) is a sustainability rating scheme for the built environment and through its application and use it helps measure and reduce the environmental impacts of buildings and in doing so create higher value, lower risk assets.

The section below sets out the assessment criteria relevant to the Flood and Surface Water Management (Pol 03) NEW CONSTRUCTION and the following page assess against these criteria.

Pol 03: Flood and surface water management (New Construction)

Prerequisite

1. An appropriate consultant is appointed to carry out and demonstrate the development's compliance with all criteria.

Up to two credits – Flood resilience

Two credits - Low flood risk

2. A site specific flood risk assessment (FRA) confirms the development is in a flood zone that is defined as having a low annual probability of flooding. The FRA takes all current and future sources of flooding into consideration.

One credit - Medium or high flood risk

3. A site specific FRA confirms the development is in a flood zone that is defined as having a medium or high annual probability of flooding and is not in a functional floodplain. The FRA must take all current and future sources of flooding into consideration.
4. To increase the resilience and resistance of the development to flooding, one of the following must be achieved:
   - **a.** The ground level of the building and access to both the building and the Site, are designed (or zoned) so they are at least 600 mm above the design flood level of the Site's flood zone; **OR**
   - **b.** The final design of the building and the wider site reflects the recommendations made by an appropriate consultant in accordance with the hierarchy approach outlined in Section 5 of BS 8533:2017.

Two credits – Surface water run-off

Prerequisite for surface water run-o credits

5. Surface water run-o design solutions must be bespoke, i.e. they must take account of the specific Site requirements and natural or man-made environment of and surrounding the Site. The priority levels detailed in the Methodology must be followed, with justification given by the appropriate consultant where water is allowed to leave the Site.

One credit - Surface Water Run-O - Rate

6. Drainage measures are specified so that the peak rate of run-o from the Site to the watercourses (natural or municipal) shows a 30% improvement for the developed Site compared with the pre-developed Site. This should comply at the 1-year and 100-year return period events.
7. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified Sustainable Drainage Systems (SuDS) are in place.
8. Calculations include an allowance for climate change. This should be made in accordance with current best practice planning guidance.

One Credit - Surface Water Run-O - Volume

9. Flooding of property will not occur in the event of local drainage system failure (caused either by extreme rainfall or a lack of maintenance); **AND EITHER**
10. Drainage design measures are specified so that the post-development run-o volume, over the development lifetime, is no greater than it would have been prior to the assessed Site's development. This must be for the 100-year 6-hour event, including an allowance for climate change.
11. Any additional predicted volume of run-o for this event is prevented from leaving the Site by using infiltration or other SuDS techniques.

OR (only where Criteria 10 & 11 cannot be achieved)

12. Justification from the appropriate consultant indicating why the above criteria cannot be achieved, i.e. where infiltration or other SuDS techniques are not technically viable options.
13. Drainage design measures are specified so that the post-development peak rate of run-o is reduced to the limiting discharge. The limiting discharge is defined as the highest flow rate from the following options:
    - **a.** The pre-development one-year peak flow rate **OR**
    - **b.** The mean annual flow rate Q_{BAR} **OR**
    - **c.** 2 litres/sec/ha

    For the one-year peak flow rate, the one year return period event criterion applies.
14. Relevant maintenance agreements for the ownership, long-term operation and maintenance of all specified SuDS are in place.
15. For either option, above calculations must include an allowance for climate change; this should be made in accordance with current best practice planning guidance.

One credit – Minimising watercourse pollution

One credit

16. There is no discharge from the developed Site for rainfall up to 5 mm (confirmed by the appropriate consultant).
17. Areas with a low risk source of watercourse pollution, an appropriate level of pollution prevention treatment is provided, using appropriate SuDS techniques.
18. Areas with a high risk of contamination or spillage of substances, such as petrol and oil, have separators (or an equivalent system) installed in surface water drainage systems.
19. Chemical or liquid gas storage areas have a means of containment fitted to the Site drainage system (i.e. shuto valves). This is to prevent the escape of chemicals to natural watercourses in the event of a spillage or bunding failure.
20. All water pollution prevention systems have been designed and installed in accordance with the recommendations of documents such as the SuDS Manual and other relevant industry best practice. They must be bespoke solutions taking account of the specific Site requirements and natural or man-made environment of and surrounding the Site.
21. A comprehensive and up-to-date drainage plan of the Site will be made available for the building or Site occupiers.
22. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS must be in place.
23. All external storage and delivery areas designed and detailed in accordance with the current best practice planning guidance.

Assessment of available credits (New Construction)

PrerequiSite

Criterion	AKT II assessment	
1.	AKT II are appropriate consultants with the relevant qualifications and experience to design SuDS and flood prevention measures and completing peak rate of run-o calculations.	✓

Flood resilience

Criterion	AKT II assessment	
2.	Not applicable as the development ins in Flood Zone 3a.	N/A
3.	The Site is located in Flood Zone 3a and a detailed flood risk assessment has been prepared.	✓
4a.	It is not possible to locate the building access 600mm above the flood levels as entrances need to tie with the existing ground levels.	✗
4b.	The design of the building and the wider Site is in accordance with the flood risk assessment and the hierarchical approach outlined in the relevant standards.	✓

Based on this we believe that potentially one credit out of a possible two can be awarded under these criteria.

However, based upon the BREEAM Knowledge Base which states that 'In an area protected by existing flood defences, (designed to withstand a certain magnitude of flooding), the appropriate number of flood risk credits can be awarded where the defences reduce the risk to 'low' or 'medium' and the following conditions are met:

1. The development is not located in an area where new flood defences have to be, or have been, constructed to minimise the risk of flooding to the Site and its locality purely for the purpose of the development or its wider master plan.

2. The development is located on previously occupied land (as defined by the criteria in BREEAM issue LE 01 Site selection).

3. The relevant agency confirm that, as a result of such defences, the risk of a flood event occurring is reduced to low or medium risk. If firm confimation is not provided then the credit cannot be awarded.'

It is considered that the proposed development complies with the three conditions stated above. Condition 3 is confirmed by the EA Product 4 data (contained in the FRA) which states that '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' and '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 tidal flood event', which is a low risk.

Based on the above evidence we believe that two credits out of a possible two may be awarded under these criteria

Surface water run-off

Run-off criteria	AKT II assessment	
5.	The drainage strategy has been prepared in line with the London Plan drainage hierarchy and the priority levels detailed in the BREEAM Methodology.	✓
6.	The proposed peak run-o rate has been reduced to greenfield rate from the proposed development.	✓
7.	The ownership, operation and maintenance requirements for each SuDS device will be written into the O&M Manual for the Site.	✓
8.	An allowance of 40% has been made for climate change in all calculations in line with the Environment Agency's guidance.	✓
9.	The Site-specific FRA has been carried out by AKT II which confirms that the Site is at low risk of flooding from local drainage system failure.	✓
10.	As the pre and post development hard standing areas are the same then there cannot be any more run-o volume over the lifetime of the building.	✓
11.	As the existing and proposed buildings cover the entire Site area it is not possible to utilise infiltration.	✗
12.	As the existing and proposed buildings cover the entire Site area it is not possible to utilise infiltration.	✓
13.	Pre-development 1-year peak flow rate = 30.9 litres/sec Mean annual flow rate Q_{bar} = 1.09 litres/sec 2 litres/sec/ha = 0.6 litres/sec It is proposed to reduce the proposed peak discharge rate to the greenfield run-o rate.	✓
14.	The ownership, operation and maintenance requirements for each SuDS device will be written into the O&M Manual for the Site.	✓
15.	An allowance of 40% has been made for climate change.	✓

Based on this we believe that potentially two credits out of a possible two can be awarded under these criteria.

Minimising watercourse pollution

Pollution criteria	AKT II assessment	
16.	As confirmed in Section 1.3, no infiltration is possible and there is insu cient green roof coverage therefore this criterion cannot be achieved.	✗
17.	SuDS devices will be specified where possible within the limitations of the development.	✓
18.	As there are no high risk areas being provided as part of the scheme and therefore no separators require to be provided.	N/A
19.	There are no chemical/liquid gas storage areas proposed as part of the scheme.	N/A
20.	All water pollution prevention and SuDS devices will be designed in accordance with the SuDS Manual.	✓
21.	An up-to-date drainage plan will be made available to the Site occupiers upon completion.	✓
22.	The ownership, operation and maintenance requirements for each SuDS device will be written into the O&M Manual for the Site.	✓
23.	There are no external storage or delivery areas proposed as part of the scheme.	N/A

Based on this we believe that no credit out of a possible one can be awarded under these criteria.

Overall, we believe that potentially four credits out of a possible five can be awarded under the Pol03 criteria outlined above.

Pol 03: Flood and surface water management (Refurbishment and Fit-Out)

This section sets out the assessment criteria relevant to the Flood and Surface Water Management (Pol 03) - REFURBISHMENT AND FIT-OUT and the following page assess against these criteria.

Up to two credits – Flood risk management

Low flood risk

1. Where flood maps from the appropriate statutory body (see Relevant definitions) confirm the refurbishment or fit-out is situated in a flood zone that is defined as having a low annual probability of flooding;

OR

2. The project meets the requirements for avoidance of flooding in accordance with Checklist 1, e.g. where the refurbishment or fit-out zone is of a floor level that is 0.3m higher than the obtained/estimated flood level and safe access/escape routes are available/present

OR

Medium/high flood risk

3. Where criterion 4 and either criterion 5 or 6 have been met
4. Where flood maps from the appropriate statutory body (see Relevant definitions) confirm the site has a medium or high flood risk and a site specific Flood Risk Assessment (FRA) has been undertaken (as relevant to size of project in accordance with CN7). The FRA must take all current and future sources of flooding into consideration in accordance with compliance note.
5. Where the refurbishment or fit-out zone achieves avoidance from flooding through either:

   - The refurbishment and fit-out zone is located entirely on the first floor or above and a flood emergency plan has been developed in accordance with 'Would your business stay afloat? A Guide to preparing your business for flooding', Environment Agency, 2011

OR

   - As a result of the building's floor level or measures to keep water away, the building is defined as achieving avoidance from flooding by following Checklist 1, Checklists and tables.

6. Where avoidance is not possible, two credits are achieved where a full flood resilience/resistance strategy is implemented for the building's scope of works in accordance with recommendations made by a Suitably Qualified Building Professional (see Relevant definitions). The following aspects of the design should be addressed for the relevant parts, in accordance with best practice guidance (see compliance note CN9):

   - Part 1: Fabric – using flood resilient materials and flood protection measures for the building fabric, e.g. waterproof materials, impermeable membranes, flood barriers, safe access/exit points in the event of a flood etc.
   - Part 2: Core services – core services and associated infrastructure (including equipment and vulnerable pipes/ducts/cables etc.) should be located/specified so as to protect services from flooding damage, e.g. location/routing/height, protection of building apertures (such as intakes/extracts/ventilation), non-return valves etc.
   - Part 3: Local services – the location/height of local services such as sockets, vents etc. and the location of the wiring/pipework/ductwork in relation to the flood level and other measures to protect local services.
   - Part 4: Interior – the proposed function of spaces that are below the flood level (e.g. sacrificial spaces) should be limited to those which are not susceptible to flood damage, and the resilience of materials used for partitions, walls, floors, ceiling finishes, furniture and fittings and the location of equipment in relation to the flood level, e.g. avoid storing flood sensitive materials and functions in spaces that are below the flood level.>One credit – Medium or high flood risk

Two credits - Surface water run-off

One credit - neutral impact on surface water

7. There is no increase in the impermeable surfaces as a result of the refurbishment works; OR
8. If there is an increase in the impermeable surface as a result of the refurbishment works then the following must be met:

   - Hard standing areas - where there is an extension or increase in the hardstanding areas and hence an increase in the total impermeable area as a result of the refurbishment works, the hardstanding area must be permeable or be provided with on-site SuDS to allow full infiltration of the additional volume, to achieve the same end result. The permeable hardstanding must include all pavements and public rights of way, car parks, driveways and non-adoptable roads, but exclude footpaths that cross soft landscaped areas which will drain onto a naturally permeable surface.
   - Building extension - where there is an increase in building footprint, extending onto any previously permeable surfaces, the additional run-o caused by the area of the new extension must be managed on-site using an appropriate SuDS technique for rainfall depths up to 5mm.

OR

Two credits - reducing run-o

9. An Appropriate Consultant (see Relevant definitions) has been used to design an appropriate drainage strategy for the site.
10. Either of the following criteria are met:

   - There is a decrease in the impermeable area by 50% or more, from the pre-existing impermeable hard surfaces; OR
   - Where run-o as a result of the refurbishment is managed on-site using source control achieving the following requirements:

     i.) The peak rate of run-o as a result of the refurbishment for the 1 in 100 year event has been reduced by 50% from the existing site.

     ii.) The total volume of run-o discharged into the watercourses and sewers as a result of the refurbishment, for a 1 in 100 year event of 6 hour duration has been reduced by 50%.

     iii.) An allowance for climate change must be included for all of the above calculations; this should be made in accordance with current best practice planning guidance.

Minimising water course pollution

One credit

11. There is no discharge from the developed site (includes new and existing hard landscaping and buildings) for rainfall up to 5mm (confirmed by the Appropriate Consultant).
12. Where suitable pollution prevention measures are put in place (or already exist) for the di erent sources of pollution present on the assessed site, in accordance with compliance note CN20.
13. A comprehensive and up to date drainage plan of the site will be made available for the building/site occupiers.
14. Relevant agreements for the ownership, long term operation and maintenance of all installed Sustainable Drainage Systems (SuDS) are in place, or for speculative projects, made available for the future occupier.

Assessment of available credits (Refurbishment and Fit-Out)

Flood risk management

Criterion	AKT II assessment	
1.	Not applicable as the development is in Flood Zone 3a.	N/A
2.	0.3m freeboard is not achievable for all of the existing townhouses.	✗
3.	Criterion 4 is met.	✓
4.	The Site is located in Flood Zone 3a and a detailed flood risk assessment has been prepared by AKT II.	✓
5.	This criterion is not achievable as the refurbishment covers ground floor and below.	✗
6.	This criterion is not achievable	✗

Based on this we believe that potentially two credits out of a possible two can be awarded under these criteria.

Surface water run-off

Run-off criteria	AKT II assessment	
7.	There is no increase in the impermeable area as a result of the refurbishment.	✓
8.	Not applicable as there is no increase in impermeable areas.	✗
9.	AKT II are appropriate consultants with the relevant qualifications.	✓
10.	It is not proposed to reduce the rainwater run-o□ from the existing buildings with the exception of Keats House.	✗

Based on this we believe that potentially one credit out of a possible two can be awarded under these criteria.

Minimising watercourse pollution

Pollution criteria	AKT II assessment	
11.	This criterion cannot be achieved as the existing drainage in the refurbished buildings will remain as free discharging.	✗
12.	Not achievable as noted above.	✗
13.	An up-to-date drainage plan will be made available to the Site occupiers upon completion.	✓
14.	Not achievable as there is no SuDS devices proposed for the existing buildings.	✗

Based on this we believe that no credit out of a possible one can be awarded under these criteria.

Overall, we believe that potentially three credits out of a possible five can be awarded under the Pol03 criteria outlined above.

8 Maintenance and operation

Before cleaning, final testing and immediately before handover the Contractor will:

- Lift covers to manholes, inspection chambers and access points. Remove mortar droppings, debris and loose wrappings.
- Thoroughly flush pipelines with water to remove silt and check for blockages. Rod pipelines between access points if there is any indication that they may be obstructed.
- Carry out a CCTV of the pipework to ensure that it is free of silt and blockages.

The End User shall then follow the "Waste Management, The Duty of Care - A Code of Practice (Revised 1996)" and shall ensure that their waste does not escape from their control and is transferred only to a registered waste carrier to be sent for recycling or disposal at a suitably licensed facility.

All waste arising from the maintenance of the drains and sewers shall be handled, stored and disposed of correctly to avoid pollution. Waste may be designated as hazardous / special waste and, as such, the End User shall ensure that they comply with the Hazardous Waste (England and Wales) Regulations 2005.

Reference shall be made to CIRIA publication C753 - The SuDS Manual by the Contractor and the End User. A suitable maintenance schedule must be developed, maintained, followed and updated as required to reflect observed performance. The following items are highlighted for guidance.

8.1 General drainage

The below ground drainage network will be designed in accordance with the requirements of the Building Regulations whilst acknowledging the need to limit the number of inspection chambers within "front of house" areas. To this end, all main runs will have rodding eyes, manholes or inspection chambers at the head of the run and at all changes of direction to provide access to rod or jet the main pipework.

Where possible, connections from stacks or gullies will be made directly to these manholes or inspection chambers to allow the connection to be rodded or jetted from the downstream end. Where this is not possible, each stack will be detailed to have an access hatch provided just above floor level (see Figure 8.1) to allow the connection to be rodded or jetted from the upstream end. Similarly, the gullies will have a rodding access provided within their body allowing the pipework to be rodded or jetted from the gully downstream.

Gullies and channels will be specified with silt buckets and silt trap manholes will be provided upstream of all tanks and infiltration structures to prevent the ingress of silts into the drainage network and impairing the performance of the system.

Maintenance schedule	Required action	Recorded frequency
Regular maintenance	Inspect and identify areas that are not operating correctly. If required, take remedial action.	Monthly for the first three months then six-monthly
	Remove sediment from pre-treatment structures (e.g. gullies, channels, silt traps).	Six-monthly or as required
Occasional maintenance	Debris removal from catchment surface where this may cause risks to performance.	Monthly
Remedial actions	Repair / rehabilitation of inlets, outlets, overflows and vents.	As required
Monitoring	Inspect all manholes, inspection chambers, inlets, outlets, overflows and vents to ensure they are in good condition and operating as designed.	Annually and after large storms

8.2 Pumped systems

Pumps will be designed as duplex units operating on a duty/standby run based on hours, pump failure and high/high water level. A suitable BMS interface shall be provided monitoring each pump system for the following status points:

- Pump 1 running / Pump 2 running - These statuses shall be provided to the BMS in the form of a volt free contact that is closed when the pump is running.
- Pump 1 failed / Pump 2 failed - These statuses shall be provided to the BMS in the form of a volt free contact that is closed when the pump has deemed to have failed, i.e. failed to run when requested. This shall cause a latched general alarm on the BMS.
- High water level - This status shall be provided to the BMS in the form of a volt free contact that is closed when a high water level is breached. The level shall be set at a level that is higher than the normal pump control level switch. This shall cause a latched general alarm on the BMS.
- High/High water level - This status shall be provided to the BMS in the form of a volt free contact that is closed when a high/high water level is breached. The level shall set at a level that is higher than the high water level switch. This shall cause a critical latched alarm on the BMS.
- System not in automatic/not available - This status shall be provided to the BMS in the form of a volt free contact that is open (failsafe) when the system is not available to operate. This shall operate should any event occur that could prevent the system from operating, such as power loss to the control panel, hand/off/auto switches not in Auto, or isolators opened. This shall cause a critical latched alarm on the BMS.

The BMS shall be capable of raising the following alarms:

- Excessive Pump Running Alarm - The BMS shall monitor the running status of each pump. Should any pump run for longer than 20 minutes, a general alarm shall be raised on the BMS.
- Excessive Pump Starts Alarm - The BMS shall calculate from the running status the number of starts per hour. Should the number of starts per hour exceed 4, a general alarm shall be raised on the BMS.

A control panel local to each pump station shall be provided to monitor the same status points and alarms as defined for the BMS Interface above.

8.3 Petrol separators

A petrol separator will be provided for the service yard area. The separator shall be provided with a robust device to provide visual and audible warning to an appropriate location when the level of oil reaches 90% of the oil storage volume under static liquid level conditions. Appropriate maintenance shall then be carried out.

Maintenance schedule	Required action	Recorded frequency
Regular maintenance	Follow the manufacturer's recommended guidelines.	As manufacturer's recommendations
	Remove sediment / oil from separator.	Six-monthly or as manufacturer's recommendations
	Service all electrical equipment.	As manufacturer's recommendations
	Inspect integrity of separator and all mechanical parts.	Six-monthly or as manufacturer's recommendations

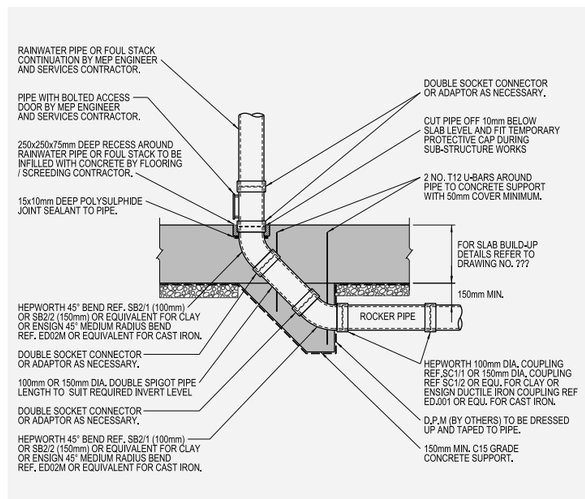


Figure 8.1 Rodding/Jetting access details

9 Drainage design standards

The following guides and current British Standards will be used for the design of the drainage elements on this project:

- BS EN 752:2017 Drain and Sewer Systems Outside Buildings. Sewer System Management
- BS EN 12056 Gravity Drainage Systems Inside Buildings: Part 2
- Building Regulations 2010 Part H1 – Foul Water Drainage (2015 Edition)
- Building Regulations 2010 Part H2 – Wastewater Treatment Systems and Cesspools (2015 Edition)
- Building Regulations 2010 Part H3 – Rainwater Drainage (2015 Edition)
- Building Regulations 2010 Part H4 – Building Over Sewers (2015 Edition)
- Building Regulations 2010 Part H5 – Separate Systems of Drainage (2015 Edition)
- Building Regulations 2010 Part H6 – Solid Waste Storage (2015 Edition)
- Environment Agency "Control of Runoff from New Developments Interim Regional Guidance"
- The London Plan 2021
- National Planning Policy Framework
- Planning Practice Guidance
- Southwark's Sustainable Design Supplementary Planning Document

10 Materials

	Item	Material	British standard
a)	Drainage pipe work	Vitrified clayware	BS EN 295-1
		Cast iron	BS EN 877
		Concrete	BS 5911-1 and BS EN 1916
		uPVC	BS EN 1401-1
		Stainless steel (if requested by Thames Water for sewer diversion)	BS EN 10296-2 (Thames Water to confirm)
b)	Precast inspection chambers	Precast concrete	BS 5911 Part 200
c)	Drainage gullies and gratings	Vitrified clayware	BS EN 295-1
		Ductile iron	BS EN 124 D 400
d)	Drainage channels and gratings	Polymer concrete	
		Ductile iron	BS EN 124 D 400
e)	Access covers	Grey iron	BS EN 124
		Galvanised steel	Facta Class A, B & D
f)	Cellular units	Polypropylene	
g)	Geotextiles		

11 Sewer diversion

There is an existing 300 mm dia. sewer running from South to North under the existing basement of Keats House, see Figure 1.2. The existing sewer was found to be live and will require a diversion under Section 185 of the Water Industry Act 1991.

For the diversion proposal refer to the AKT II Basement Impact Assessment, Appendix 7.

Appendix 1

Schematic Attenuation Layouts

TOTAL CATCHMENT AREA (EXCLUDING EXISTING GEORGIAN TOWNHOUSES AND PUBLIC HIGHWAY = 2,980 m2)

MAX. DISCHARGE RATE = **3.49 l/sec**

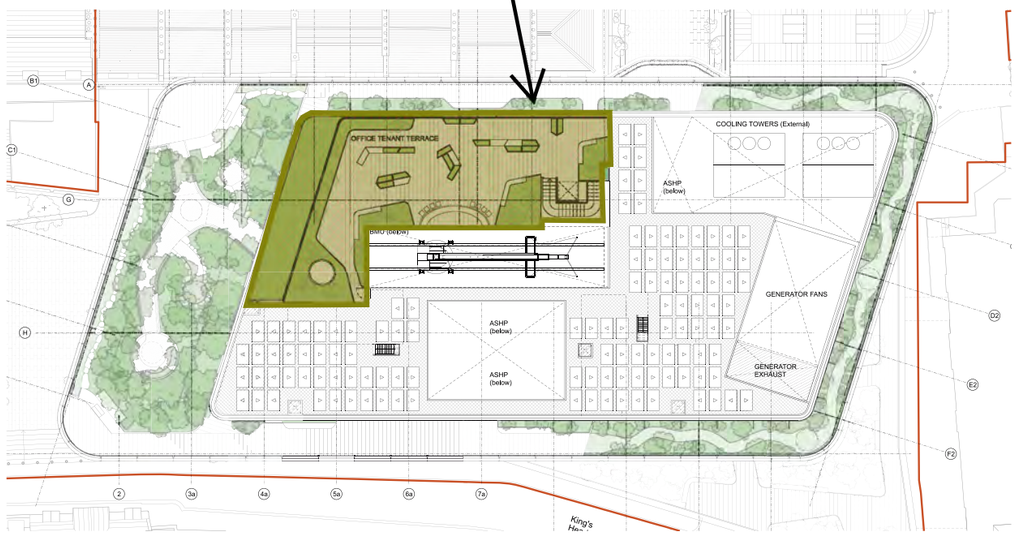
APPROX. ATTENUATION VOLUME REQUIRED = **190 m3**

BLUE ROOF LEVEL 26:

MAX. DISCHARGE RATE = 0.37 l/sec

APPROX. CATCHMENT AREA = 300 m2

APPROX. ATTENUATION VOLUME REQUIRED = 19 m3



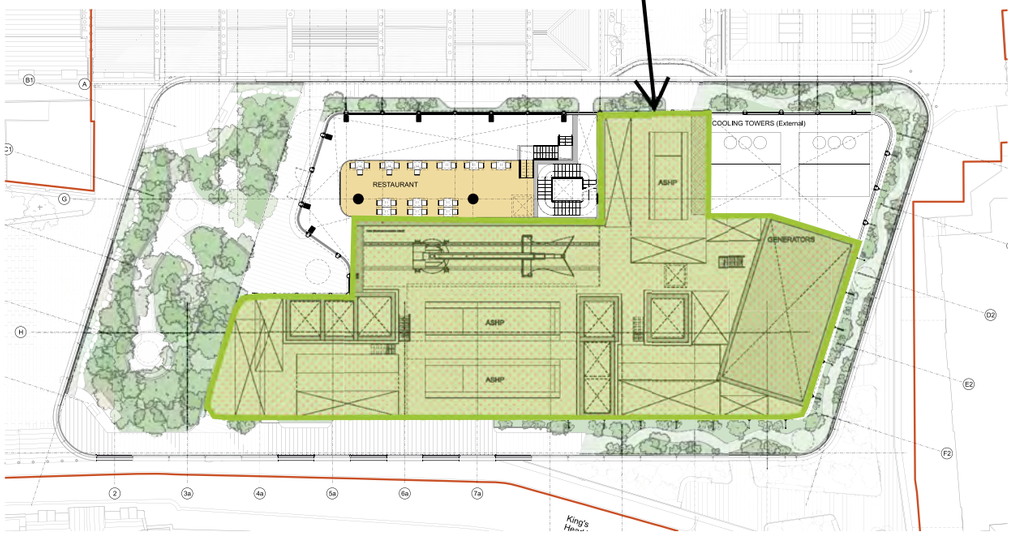
LEVEL 26

BLUE ROOF LEVEL 25:

MAX. DISCHARGE RATE = 0.94 l/sec

APPROX. CATCHMENT AREA = 835 m2

APPROX. ATTENUATION VOLUME REQUIRED = 53 m3



LEVEL 25

PROJECT **NEW CITY COURT**		TITLE **SURFACE WATER ATTENUATION STRATEGY - SHEET 1**	
DATE JUL 2021	SCALE N.T.S.	CAD FILENAME -	STATUS PRELIMINARY
DRAWN DN / CHECKED DP	PROJECT No. 3948	DRAWING No. 3948-CSK001	REV P6

TOTAL CATCHMENT AREA (EXCLUDING EXISTING GEORGIAN TOWNHOUSES AND PUBLIC HIGHWAY= 2,980 m2)

MAX. DISCHARGE RATE = **3.49 l/sec**

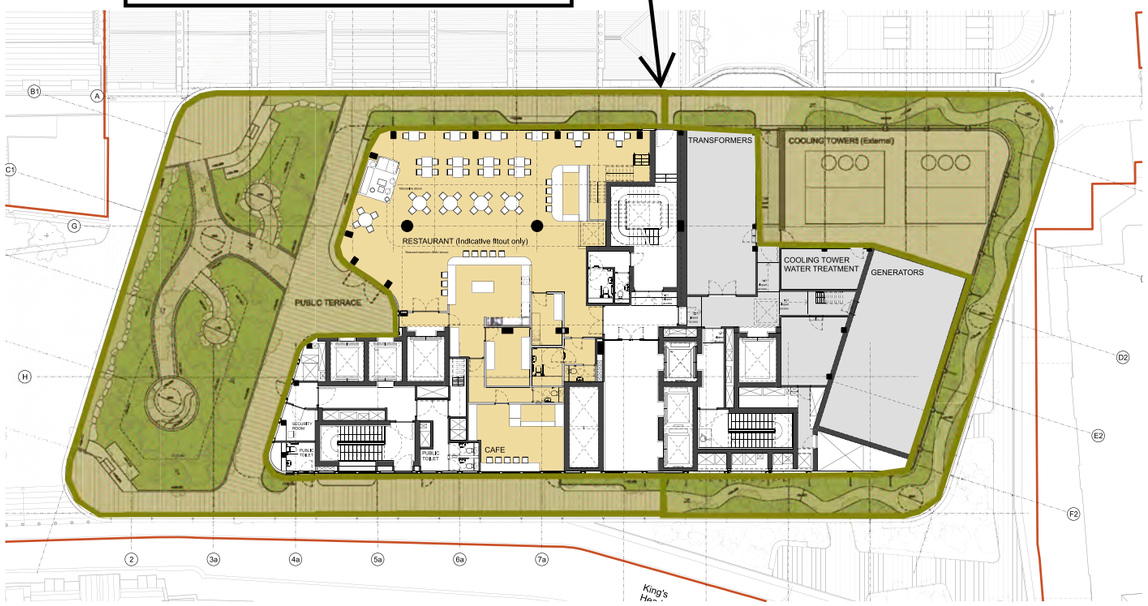
APPROX. ATTENUATION VOLUME REQUIRED = **190 m3**

BLUE ROOF LEVEL 24:

MAX. DISCHARGE RATE = 1.07 l/sec

APPROX. CATCHMENT AREA = 960 m2

APPROX. ATTENUATION VOLUME REQUIRED = 63 m3



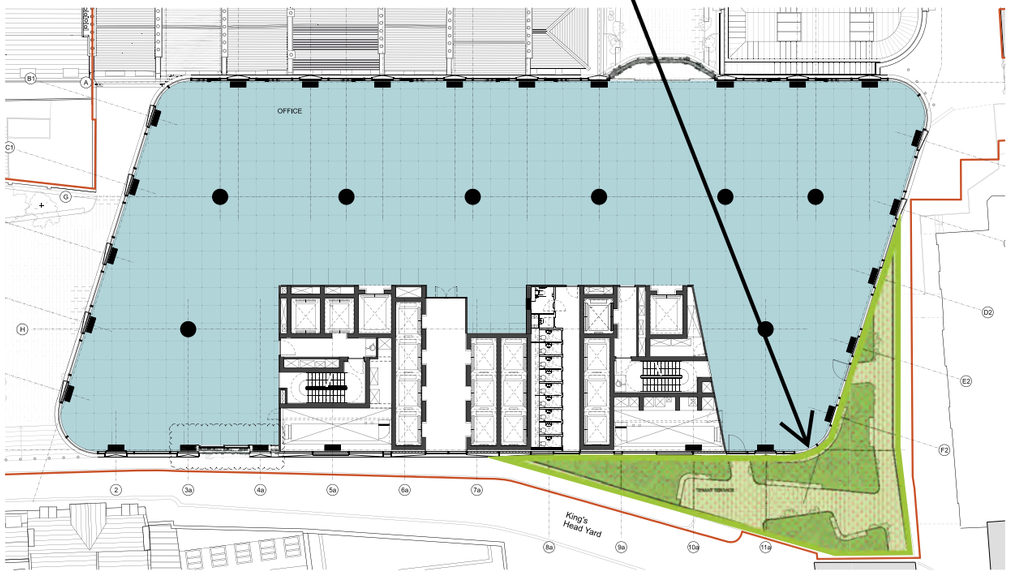
LEVEL 24

BLUE ROOF LEVEL 3:

MAX. DISCHARGE RATE = 0.24 l/sec

APPROX. CATCHMENT AREA = 190 m2

APPROX. ATTENUATION VOLUME REQUIRED = 12 m3



LEVEL 3

PROJECT NEW CITY COURT		TITLE SURFACE WATER ATTENUATION STRATEGY - SHEET 2	
DATE JUL 2021	SCALE N.T.S.	CAD FILENAME -	STATUS PRELIMINARY
DRAWN DN	CHECKED DP	PROJECT No. 3948	DRAWING No. 3948-CSK002	REV P6

SYSTEM 2 (GRANULAR SUBBASE):

MAX. DISCHARGE RATE = 0.13 l/sec

APPROX. CATCHMENT AREA = 95 m2

APPROX. ATTENUATION VOLUME REQUIRED = 6 m3

FREE DISCHARGE FROM THE EXISTING GRADE II LISTED BUILDINGS TO REMAIN (EXISTING SURFACE WATER DRAINAGE IS TO REMAIN)

TOTAL CATCHMENT AREA (EXCLUDING EXISTING GEORGIAN TOWNHOUSES AND PUBLIC HIGHWAY = 2,980 m2)

MAX. DISCHARGE RATE = **3.49 l/sec**

APPROX. ATTENUATION VOLUME REQUIRED = **190 m3**

SYSTEM 3 (ATTENUATION TANK INSIDE BASMENT):

MAX. DISCHARGE RATE = 0.40 l/sec

APPROX. CATCHMENT AREA = 325 m2

APPROX. ATTENUATION VOLUME REQUIRED = 20 m3

SYSTEM 1 (GRANULAR SUB-BASE) :

MAX. DISCHARGE RATE = 0.34 l/sec

APPROX. CATCHMENT AREA = 270 m2

APPROX. ATTENUATION VOLUME REQUIRED = 17 m3

GROUND FLOOR

akt II

PROJECT	NEW CITY COURT			TITLE	SURFACE WATER ATTENUATION STRATEGY - SHEET 3		
DATE	JUL 2021	SCALE	N.T.S.	CAD FILENAME	-	STATUS	PRELIMINARY
DRAWN	DN	CHECKED	DP	PROJECT No.	3948	DRAWING No.	3948-CSK003	REV	P6

Appendix 2

Potential Drainage Outfalls

KEY:

SITE BOUNDARY

EXISTING FOUL WATER SEWER

EXISTING FOUL WATER MANHOLE

POTENTIAL CONNECTION POINT FOR NEW FOUL / SURFACE WATER DRAINAGE CONNECTIONS SUBJECT TO DETAILED DESIGN

BOROUGH HIGH STREET

GEORGIAN TOWNHOUSES (4-16 ST THOMAS STREET)

ST THOMAS STREET

1143x762mmØ

EXISTING KEATS HOUSE

300mmØ

300mmØ

300mmØ

MH 100
IL: -0.19m

MH 49
IL: 1.65m

375mmØ

KINGS HEAD YARD

PROPOSED NEW CITY COURT DEVELOPMENT

MH 33
IL: 0.62m

MH 54
IL: 0.97m

MH 39
IL: 0.36m

EXISTING SEWER UNDER KEATS HOUSE IS TO BE DIVERTED UNDER SECTION 185 OF THE WATER INDUSTRY ACT 1991.

FOR DIVERSION DETAILS REFER TO AKT II BASEMENT IMPACT ASSESSMENT, APPENDIX 7

PROJECT NEW CITY COURT		TITLE POTENTIAL DRINAGE OUTFALLS	
DATE Feb 2021	SCALE N.T.S.	CAD FILENAME -	STATUS PRELIMINARY
DRAWN DN	CHECKED DP	PROJECT No. 3948	DRAWING No. 3948-CSK006	REV P1