

Kings Meadow View, Reading

Drainage Strategy 10982-CNM-XX-XX-RP-C-101

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1.0 Introduction

This Drainage Strategy report has been undertaken by Clarke Nicholls Marcel on behalf of the client, Abrdn Property Income Trust (“abrdn”), to advise in the drainage strategy for the proposed development, known as Kings Meadow View.

This document is to support the outline application for a comprehensive redevelopment, including demolition of existing structures, comprising a residential-led mixed use scheme of up to 820 units (Class C3) and up to 5,500 sqm (GEA) of commercial uses (Class E) together with ancillary and associated development including new and enhanced pedestrian routes and vehicle access routes, open spaces, hard and soft landscaping, basement, and basement car parking providing up to 200 car parking spaces, and up to 53 car parking spaces serving the commercial uses, up to 860 cycle parking spaces and servicing facilities, sewer diversion and associated works, with details of layout, scale, external appearance and landscaping reserved.

A list of references used in its production are appended as Appendix A and are references within the report thus – ⁽¹⁾.

2.0 Existing Site

The site falls in postcode RG1 3JD and is bounded to the north by a Network Rail railway, to the south by Forbury Road and Kenavon Drive, to the east by the remaining part of Forbury Retail Park and to the west by the commercial office development (One Forbury Place). The Ordnance Survey grid reference for the site is 472128E, 173728N and the National Grid reference is SU721737/SU7212873728.

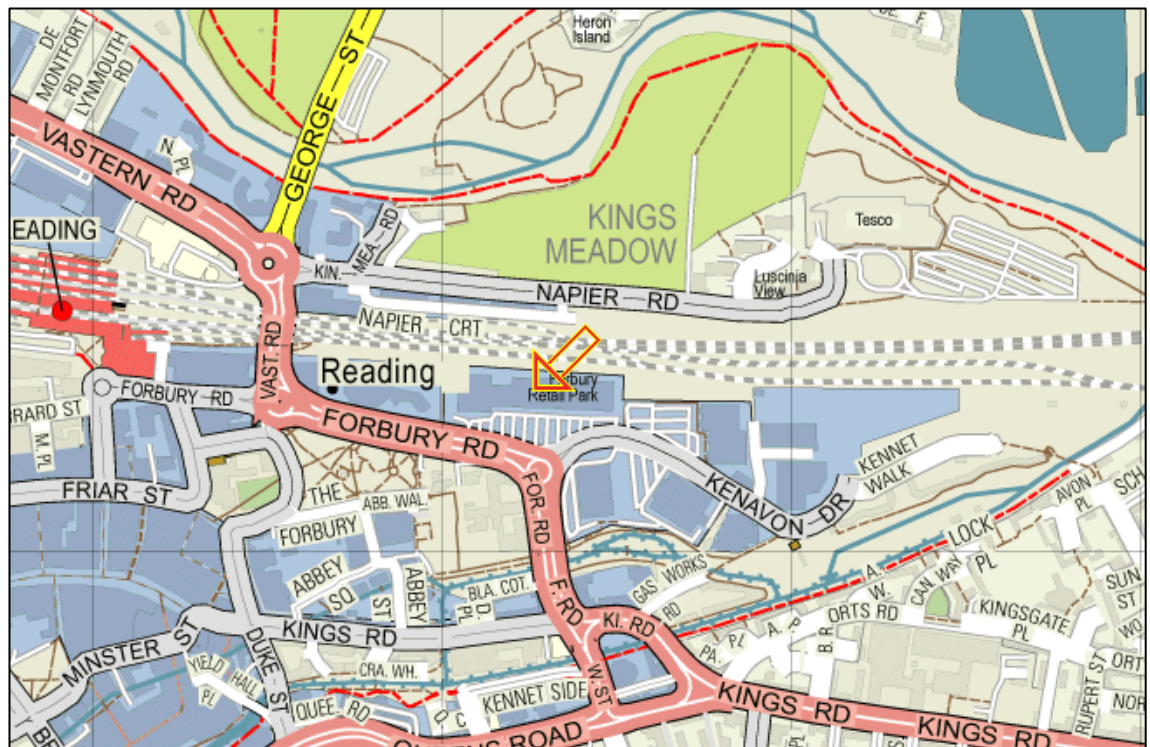


Figure 1 – Site Location

The 'red line' site boundary given in Figure 2 is approximately 2.65 hectares (26,473m²/284,953 ft²) in plan area and has approximate dimensions of 250m x 105m.

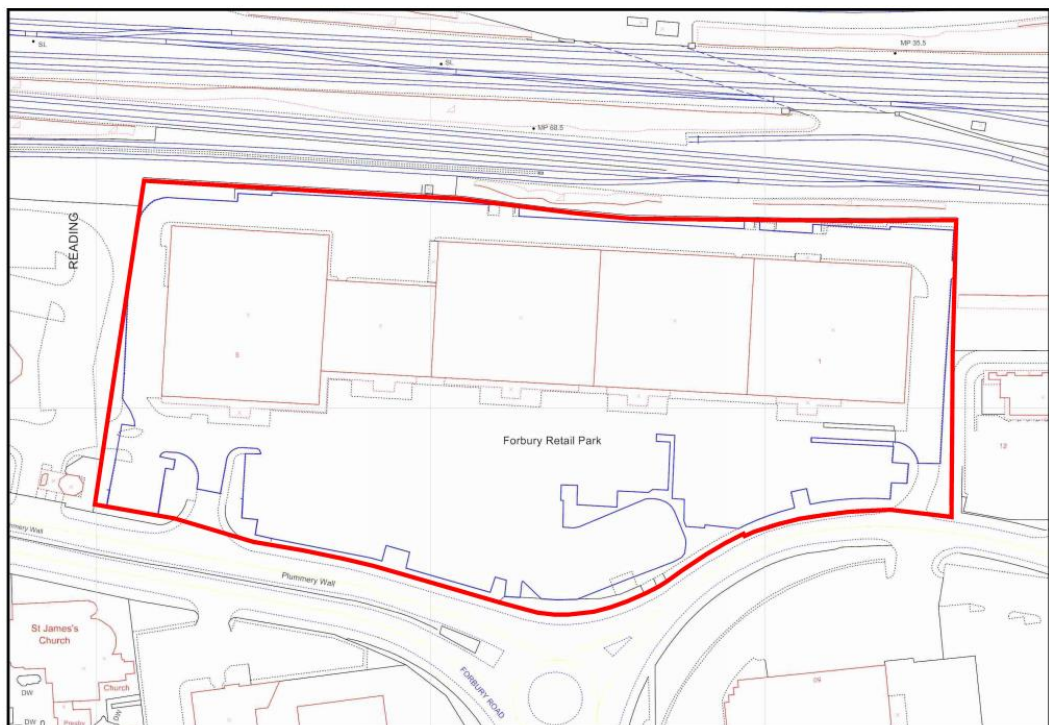


Figure 2 – Site Area

The topography shows that the site falls from north to south and west to east (Appendix B).

3.0 Existing Drainage

3.1. Existing Surface Water Drainage

The existing site is covered by retail units, a KFC drive through restaurant and at grade car parking. The existing retail terrace footprint is 9,114m², the existing restaurant building footprint is approximately 333m², the car parking area is approximately 17,026m². The landscaping that exists on site is minimal. Both buildings (retail and restaurant) and car parking are currently positively drained with outfall to the Thames Water sewer system in Kenavon Drive (Appendix F).

The existing structure is understood to have been constructed in the mid-late 1990s, before the need to provide restriction on surface water discharge was commonplace and, therefore, the need to provide surface water attenuation. It is likely that the drainage system was designed to accord with the requirements of Building Regulations. As such, the peak surface water discharge rate, from the existing drainage regime into the receiving watercourse, has been determined using the rainfall design intensity of 50mm/hr, cited in Building Regulations, Part H and relates to the existing runoff rate from the development for the 1-year return rainfall event. It should be noted that this does not include any allowance for the currently predicted effects of climate change or the higher rate that would be generated by the 100-year rainfall event. As such, should the site remain unchanged, the effects of climate change on increased rainfall intensities will lead to an increase in the surface water discharge rate.

The existing runoff rate has been calculated by the modified rational method as:

$$Q = 2,78 C i A$$

Q - peak runoff (l/s)

C - runoff coefficient

i - rainfall intensity (mm/hr)

A - catchment area (ha)

3.1.1 Retail Buildings & KFC Restaurant

The retail buildings and KFC restaurant existing runoff rate has been calculated to be 118 l/s, as shown below:

$$Q = 2.78 \times 0.9 \times 50 \times 0.9447 = 118 \text{ l/s}$$

3.1.2 Car Parking

The car parking existing runoff rate has been calculated to be 215l/s, as shown below:

$$Q = 2.78 \times 0.9 \times 50 \times 1.7026 = 215 \text{ l/s}$$

3.1.3 Total Existing Surface Water Runoff Rate:

From the above it can be determined that the estimated total existing surface water flow is 333 l/s, which is given by the sum of the following flow rates:

- Retail Buildings & KFC Restaurant – 118 l/s
- Car Parking – 215 l/s

The underground utility survey indicates that the site's surface water outfalls to the public sewer via a 300mm and 450mm diameter sewer, located at the South of the site. Whilst the gradients are currently unknown we could assume the 300 diameter has a gradient of 1:300 and the 450 diameter a gradient of 1:450. The pipe full flow rates are approximately 63.7 l/s and 151.1 l/s, respectively. Therefore, the site's surface water is potentially being discharged at a maximum discharge rate of 214.8 l/s to a public sewer that at its best has been designed to accommodate the 1 in 30 year return period. As such the existing site flows are believed to exceed the capacity of the public sewer.

3.2. Existing Foul Water Drainage

An existing Thames Water foul sewer is known to exist crossing the site. This will be diverted, in agreement with Thames Water, under Section 185 of Water Industry Act, to allow the proposed development (Appendix E). The proposed schematic foul water sewer diversion, shown in Appendix E, has been accomplished via various pre-planning meetings and discussions held with TWUL to determine the best sewer diversion strategy.

3.2.1 Retail Units

The retail warehouse units existing foul drainage system is unknown; however, to estimate the retail units existing foul flow, Table 10.2 of the 'Urban Drainage (3rd edition) David Butler & John W Davies' document has been used.

Table 10.2 Daily volume and pollutant load of wastewater produced from various commercial sources

Category	Volume (l/day)	BOD ₅ load (g/day)	Per
Hotels, boarding houses	150–300	50–80	Bed
Restaurants	30–40	20–30	Customer
Pubs, clubs	10–20	10–20	Customer
Cinema, theatre	10	10	Seat
Offices	750	250	100 m ²
Shopping centre	400	150	100 m ²
Commercial premises	300	100	100 m ²

Table 1 – Daily volume and pollutant load of wastewater produced from various commercial sources

Considering the retail unit as a 'shopping centre', the foul flow generated could be expected to be in the region of 36456 l/day. Considering 8-hour day flow, the peak flow calculated for the retail units is:

- Retail units $36456/8/3600 = 1.26$ l/s

Based on BS EN 752:2008, a multiplier of 6 should be used to calculate the peak flow rate. Using a multiplier of 6, the peak flow rate is 7.56 l/s.

3.2.2 KFC Restaurant

To estimate the KFC Restaurant existing foul flow, Table 10.2 of the 'Urban Drainage (3rd edition) David Butler & John W Davies' document has also been used.

According to Table 1, 30 – 40 l/day of wastewater is estimated to be produced per customer. Based on KFC drawing records, the Proposed Plan (drawing no. 0000/2016/G100) refers to 69 covers; however, it is not indicated the frequency these occur. As such, it has been assumed that 69 covers occur every 1.5hrs (8 times a day) which gives a total of 552 covers. As such, the foul flow generated could be expected to be in the region of 22080 l/day. Considering 12-hour day flow, the peak flow calculated for the retail units is:

- KFC Restaurant $22080/12/3600 = 0.51$ l/s

Based on BS EN 752:2008, a multiplier of 6 should be used to calculate the peak flow rate. Using a multiplier of 6, the peak flow rate is 3.07 l/s.

3.2.3 Total Existing Foul Rates:

From the above it can be determined that the estimated total existing peak flow is 10.63 l/s, which is given by the sum of the following peak flow rates:

- Retail warehouse units – 7.56 l/s
- KFC Restaurant – 3.07 l/s

The utility and topography plan, produced by Michael Gallie dated December 2020, shows the KFC Restaurant to drain to the existing 150mm diameter foul water public sewer in Kenavon Drive and the Retail units to drain to the existing foul water public sewer within the site (Appendix F).

4.0 Proposed Site

The proposals are for a residential-led mixed use scheme of up to 820 units (Class C3) and up to 5,500 sqm (GEA) of commercial uses (Class E) together with ancillary and associated development including new and enhanced pedestrian routes and vehicle access routes, open spaces, hard and soft landscaping, basement, and basement car parking providing up to 200 car parking spaces, up to 860 cycle parking spaces and servicing facilities, sewer diversion and associated works.

5.0 Proposed Drainage

5.1. Proposed Surface Water Drainage

On brownfield developments the guidance is to ensure that the proposed discharge rate does not exceed the existing rate whilst considering the currently predicted effects of climate change. It is also preferable to offer a reduction over the existing rate to ensure the development makes additional contributions to the reduction of flood risk within the area. The targeting of attaining a value as close as possible to 'greenfield' rate is the ideal, however this is not always practical or viable.

This document is prepared to support an outline Planning application so a large level of detail is not available and as such all options have been explored with the intention of setting a realistically viable discharge rate that will not be exceeded and could potentially be improved upon during a later detailed design phase.

Hence, all rates have been reviewed below to assess if it is a practical option.

5.1.1 Greenfield Rates

The greenfield runoff rate is the rate at which water runs off an area of vegetated land as it would prior to any development. The actual runoff rate is dependent upon many factors including soil type, ground slope, vegetation type and the rainfall intensity. Once a site has been heavily developed and changed by multiple developments it is difficult to know what the exact conditions

would have been to attain an “accurate” greenfield rate. As such all methods of assessing Greenfield runoff rates have been considered.

The ‘broad brush’ approach is to assume a runoff rate of 5 l/s/ha. This does not take many factors into account but would give a discharge rate of 13.25 l/s for the site area.

The greenfield runoff rate correspondent to the site's area has been calculated using the “Greenfield Runoff Estimation Tool” on the HR Wallingford UK SuDS website and is in Appendix G. The Q_{bar} rate calculated for the site is 0.4 l/s. This method can take into account longer rainfall return periods when the runoff rate naturally increases.

Also, the SuDS Manual Section 24.5 allows for the peak discharge rate of a previously developed site, where the existing system is largely unknown to be calculated by applying the greenfield calculation method using the high soil runoff type (lowest infiltration potential).

It is also recognised that discharge rates below 5 l/s are not necessarily practical as they can require additional maintenance due to the increased risks of debris blocking the reduced opening in any flow control device leading to an increased risk of flooding.

The greenfield run-off rates have been shown on table 3 for comparison.

	Greenfield	3 x Greenfield	SuDS Manual High SOIL	3 x Greenfield (High SOIL)
Q_{bar} (l/s)	0.4 (<5l/s)	1.2 (<5l/s)	15.03 (>5l/s)	45.09 (>5l/s)
1 in 1 year (l/s)	0.34 (<5l/s)	1.02 (<5l/s)	12.78 (>5l/s)	38.34 (>5l/s)
1 in 30 years (l/s)	0.93 (<5l/s)	2.79 (<5l/s)	34.58 (>5l/s)	103.74 (> 5l/s)
1 in 100 years (l/s)	1.29 (<5l/s)	3.87 (<5l/s)	47.96 (>5l/s)	143.88 (>5 l/s)

Table 2 – Greenfield Runoff Rates for Site Area of 2.65ha

5.2. Discharge Location

Development proposals should aim to discharge surface water in line with the following drainage hierarchy:

- i) Rainwater use as a resource (for example rainwater harvesting, blue roofs as irrigation)
- ii) Rainwater infiltration to ground at or close to source
- iii) Rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)

- iv) Rainwater discharge direct to a watercourse (unless not appropriate)
- v) Controlled rainwater discharge to a surface water sewer or drain
- vi) Controlled rainwater discharge to a combined sewer.

These methods are assessed below to reach a conclusion appropriate to the development.

5.2.1 Collection for Reuse

The collection of rainwater for reuse or rainwater harvesting (RWH) cannot be considered as the sole means of dealing with surface water runoff generated by a development for numerous reasons:

- i) Water collection from living roofs can be intermittent and discoloured. They can also contain fertilisers and other elements that promote algae growth in storage tanks
- ii) Insufficient useable water can be generated to make an RWH system viable
- iii) There is insufficient space within the development to provide the required tank and plant
- iv) Reduced catchment available for water reuse – use of living roofs and paved areas to be discounted due to water quality issues

Current guidance requires a surface water drainage system incorporating RWH to be designed to accommodate the design rainfall events assuming that the harvesting tank is full or out of service. This would entail an increased carbon footprint due to additional materials and works required to provide this.

There is also the option of providing a smart attenuation and harvesting system which releases the harvested water prior to a forecast storm event. The provision of this type of system is governed by the source and quality of the harvested water along with the layout of the development. This consists in an underground rainwater storage tank comprised with a self-cleaning filter and a controlled discharge valve, which with the addition of a submersible pump and management system turns into a full domestic rainwater harvesting system. The space constraints imposed by the development and the proposed basement occupying the entire site area does not make this a feasible option and, as such, it has been ruled out.

5.2.2 Discharge into the Ground by Infiltration

The provision of any form of infiltration is subject to the suitability of the ground conditions that are found on the site. The following needs to be considered.

- i) Building Regulations prohibits the use of soakaways within 5m of buildings.

- ii) Soakaways should not be greater than 3m deep.
- iii) Soakaways should not be in made ground.
- iv) Infiltration should not be used in contaminated ground.
- v) A minimum 1m should be provided between base of soakaway and ground water level.

The map extracts from the BGS website (Figure 3 and 4) confirm that the ground conditions could be conducive to ground water and infiltration albeit unlikely given the high groundwater level. There is also a 'high' potential for contaminated ground. As such, it is not possible to allow for infiltration.

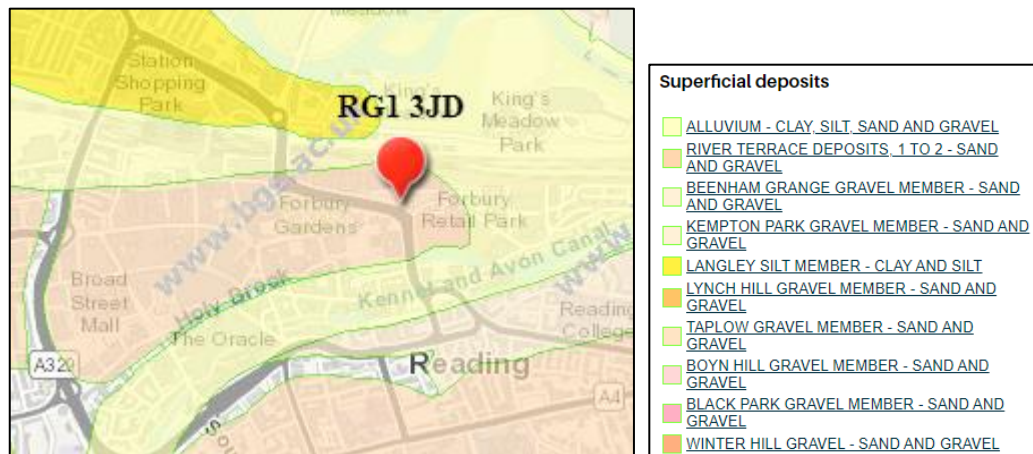


Figure 3 – Geology of Britain Viewer - Surface geology

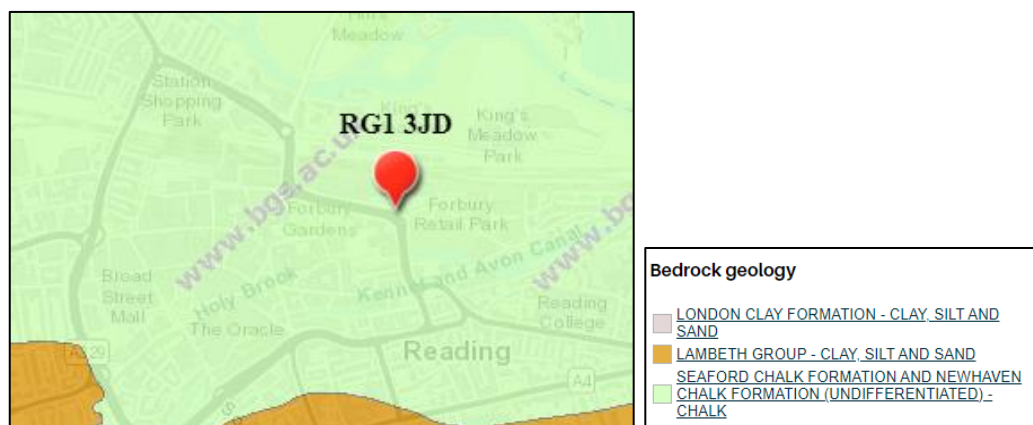


Figure 4 - Geology of Britain Viewer - Bedrock geology

5.2.3 Attenuate in green infrastructure features for gradual release (green roofs, rain gardens)

Green infrastructure comprises a variety of water management practices, such as rain gardens, brown/green roofs, trees, swales, and other measures that capture, filter, and reduce the volume

of runoff entering a watercourse or a sewer.

Blue roofs, although not technically green infrastructure, collect and store rainfall until it can be gradually released (controlled rate) to a watercourse or sewer.

The development should look to include both blue and biodiverse roofs, and other ground level SUDS techniques where practically feasible.

5.2.4 Controlled discharge to a Watercourse or Other Surface Water Body or Sea

The nearest watercourse to the development is the River Thames which is approximately 300m to the north of the site and River Kennet which is approximately 150m to the South of the site. Although the proximity to a watercourse, it is not deemed feasible to connect the developments surface water to it, due to the need to traverse other private and public land to connect this to the watercourse as well as having the outfall in other land.

5.2.5 Controlled discharge to a surface water sewer, highway drain or other drainage system

There is a public surface water sewer in the near proximity of the site that forms the current surface water outfall and it is envisaged that it will continue to be used to outfall the surface water for the development site.

5.2.6 Controlled discharge to a combined sewer

There is no need to discharge to combined public sewer as there is an alternative for surface water discharge.

5.3. Providing Interception

Where rainfall takes place on a greenfield site, during the majority of the annual rainfall events there is no discernible surface water runoff. The rainfall is lost by means of evapotranspiration from the upper soil layers and vegetation. In most urban locations in the UK more than 50% of all rainfall events are less than 5mm in depth. However, impermeable surfaces generate runoff from virtually all rainfall events, and this can have a negative impact on the morphology and ecology of receiving water bodies. Therefore, preventing runoff from these events is significant in terms of both hydrological and pollution impact reduction on receiving waterbodies.

Achieving this in an urban environment for the whole development site is exceedingly difficult and generally cannot be accomplished. It should however be targeted as far as practically possible with the inclusion of appropriate SuDS.

5.4. SuDS Techniques

The use of SuDS is intended to provide benefits to the development in four areas.

- i) Water Quantity
- ii) Water Quality
- iii) Amenity
- iv) Biodiversity

The design criteria for each are given in the table below of the SuDS Manual ⁽⁴⁾.

TABLE 2.1 Design criteria for SuDS		
	Design criteria	Further information
Water quantity	1 Use surface water runoff as a resource 2 Support the management of flood risk in the receiving catchment 3 Protect morphology and ecology in receiving surface waters 4 Preserve and protect natural hydrological systems on the site 5 Drain the site effectively 6 Manage on-site flood risk 7 Design system flexibility/adaptability to cope with future change	Chapter 3
Water quality	1 Support the management of water quality in the receiving surface waters and groundwaters 2 Design system resilience to cope with future change	Chapter 4
Amenity	1 Maximise multi-functionality 2 Enhance visual character 3 Deliver safe surface water management systems 4 Support development resilience/adaptability to future change 5 Maximise legibility 6 Support community environmental learning	Chapter 5
Biodiversity	1 Support and protect natural local habitats and species 2 Contribute to the delivery of local biodiversity objectives 3 Contribute to habitat connectivity 4 Create diverse, self-sustaining and resilient ecosystems	Chapter 6

Figure 5 - Design Criteria of SuDS

Each of these criteria needs to be considered to verify the suitability of the SuDS with respect to the constraints set by the development and the generic criteria set out in Table 8, extracted from the SuDS Manual ⁽⁴⁾.

TABLE 2.2 Generic criteria of a good design		
	The design of a SuDS scheme should ensure that...	Further information
Constructability	It can be easily and safely constructed.	Chapter 31
Maintainability	It can be easily and safely maintained.	Chapter 32
Cost-effectiveness	The site is drained to meet the required standards of service, while maximising the potential benefits from delivery of the criteria, at an affordable cost both initially to the developer and for those responsible for the long-term operation and maintenance of the system.	Chapter 35
Health and safety	It is safe for those living near or visiting the system, and for those involved in its operation and maintenance.	Chapter 36

Figure 6 – Generic Criteria for Good SuDS Design

The Environment Agency's SuDS Hierarchy lists the techniques in the order they are being most sustainable in line with the intent of their SuDS benefits and aims.

A hierarchical approach to the drainage strategy has been considered for this development in accordance with the following table. Each method is assessed to reach a conclusion appropriate to the development.

Most Sustainable ↑ ↓ Least Sustainable	SUDS technique	Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit
	Living roofs	✓	✓	✓
	Basins and ponds - Constructed wetlands - Balancing ponds - Detention basins - Retention ponds	✓	✓	✓
	Filter strips and swales	✓	✓	✓
	Infiltration devices - soakaways - infiltration trenches and basins	✓	✓	✓
	Permeable surfaces and filter drains - gravelled areas - solid paving blocks - porous paviers	✓	✓	
	Tanked systems - over-sized pipes/tanks - storms cells	✓		

Figure 7 – SuDS Hierarchy

These requirements and the constraints imposed by the specific development have been considered and reviewed to determine their suitability for this development. These represent the options given within the SuDS Manual.

5.4.2 Rainwater Harvesting Systems

It should be noted that the use of rainwater harvesting is not listed as a SuDS technique in the Environment Agency's hierarchy, this is in part due to the reasons outlined earlier in Section 5.3.1.

A designed and implemented rainwater harvesting system, where the water is used internally i.e.: flushing WCs etc can be classed as a form of SuDS as it will reduce the runoff from the development in many rainfall events. It can also be classed as providing the interception of the 5mm rainfall events from the catchment that is its supply.

A well designed RWH system will contribute to the SuDS under certain circumstances:

- Reducing runoff quantity (only when space in the tank)
- Reducing peak flows (only while tank is filling)
- Improve quality by reducing runoff (only when space in tank)

They do not offer any amenity or biodiversity benefits.

They may also not be wholly compatible with other SuDS (i.e.: green roofs) so could offer a lower

benefit.

As previously said, these need to take in to account catchment and usage and are often not practical for high-rise and high-density development.

As such, it is not considered appropriate for this development.

5.4.3 Living Roofs

These include bio-diverse and green roofs and can be extensive or intensive. Extensive green roofs have deeper grown medium.

Whilst these can be incorporated on some sloping roofs they are more commonly used on flat roofs where greater benefits can be gained.

The growing medium will hold water which will be taken up by plants and evaporation. It is recognised that a living roof with 100mm of growing medium will supply interception of 5mm of rainfall.

The rainfall on living roofs also takes longer to make its way into the drainage network and supplies some attenuation. This increased time of concentration and reduced flow rate reduces the requirement for attenuation in any downstream secondary SuDS system.

A living roof will contribute to the SuDS regime by:

- Reducing runoff quantity
- Reducing peak flows
- Improve water quality
- Provide amenity where accessible
- Provide biodiversity

Living roofs can offer other benefits outside the normal SuDS requirements, such as:

- Improved thermal performance
- Help combat urban heat islands
- Improve air quality
- Extend life of roof waterproofing by shielding from UV damage, temperature extremes and mechanical damage

The use of some types of living roofs may not be compatible with other required usages of the roof space, i.e.: plant.

The use of living roofs will be considered across the development, where feasible.

5.4.4 Ponds and Wetlands

These are landscaped features that are designed to be permanently wet with additional capacity for the water generated by storm events.

Due to the tight constraints of the site and its urban environs it is not practically possible to incorporate ponds or wetlands within the design.

5.4.5 Detention Basins

These are landscaped depressions, either hard or soft, that are normally dry except during and after storm events. The frequency that they contain water will be subject to the specific site design.

Due to the tight constraints of the site, its urban environs it is not practically possible to incorporate a detention basin within the design.

5.4.6 Filter Strips

These are uniformly graded and gently sloping strips of grass or other vegetation prior to collection in filter drains or swales.

Due to the tight constraints of the site and its urban environs it is not practically possible to incorporate filter strips within the design.

5.4.7 Filter Drains

These are shallow trenches filled with stone and gravel for collection of runoff and conveyance below ground via a perforated pipe. These are generally used to receive lateral flows from impermeable surfacing.

Due to the tight constraints of the site and its urban environs it is not practically possible to incorporate filter drains within the design.

5.4.8 Swales

These are shallow flat bottomed vegetated open channels designed to convey, treat, and attenuate surface water runoff.

Due to the tight constraints of the site and its urban environs it is not practically possible to

incorporate swales within the design.

5.4.9 Bioretention Systems

These are shallow landscaped depressions which are typically under drained and rely on engineered soils and enhanced vegetation and filtration to remove pollution and reduce runoff downstream.

They provide interception and deal with frequent and smaller rainfall events. Their design needs to take in to account overflow and velocities for the longer return storms.

These will contribute to the SuDS regime by:

- Reducing runoff quantity
- Reducing peak flows
- Improve water quality
- Provide amenity where accessible
- Provide biodiversity

These systems will be accommodated on the site during detail design, wherever feasible.

5.4.10 Trees

On their own trees might not immediately be recognised as a form of SuDS. However, when incorporated in a range of other components they can contribute to the drainage solution. To grow, tree pits are needed, and these can be designed as a bio retention system with runoff collected via the tree pit or filtered through it and excess water removed via a perforated outfall. The tree canopy also provides interception which will increase as the tree grows.

Correctly incorporated trees can contribute to SuDS by:

- Reducing runoff quantity.
- Reducing peak flows
- Improve water quality
- Provide amenity where accessible
- Provide biodiversity

Trees will be accommodated on the site during detail design, wherever feasible.

5.4.11 Infiltration Systems

The use of infiltration systems is not practically possible due to the probable high groundwater level and contaminated ground.

5.4.12 Pervious Pavements

Pervious or permeable pavements allow water to infiltrate through into the sub-base and attenuated there until it infiltrates into the ground or discharges to a piped system. The use of this type of paving can also contribute towards interception as some water will be retained within the construction build up and lost via evaporation.

Pervious paving contributes to SuDS by:

- Reducing runoff quantity
- Reducing peak flows
- Improve water quality
- Provide amenity

The use of permeable paving also needs to consider the following which will offer limitations upon where it can be used.

- a) Permeable asphalt is unsuitable for use in HGV areas as the loads imposed by slow moving and turning HGVs will lead to a significant shortening of the design life of the pavements. I.e.: 20 years could become 5.
- b) Whilst permeable block paving is suitable for HGV areas, even with turning, due to the need to provide an asphalt road base with drainage holes, they are significantly less effective on areas with relatively steep gradients.
- c) Utility routes need to be in traditional construction zones to allow for any future excavation whilst keeping the integrity of the permeable paving. The utilities also need to be installed at depths greater than that needed for permeable paving in most cases so would provide areas of permanent water in a tanked system. Utilities are prone to being excavated and, in this case, it is unlikely the pavement would be reinstated to keep the original design as permeable paving, increasing flood risk due to a reduction in the drainage capability.

The use of permeable paving will likely be utilised at the podiums, with water draining to a blue roof system prior being discharge to the public sewer.

5.4.13 Below Ground Attenuation Tanks

These are large water storage structures contained below ground and one of the mainstays of a SuDS storing water until it can be released at a controlled rate. These take many forms although the use of geocellular units is one of the most common options due to their light weight, ease of construction and high storage capacity. Most urban SuDS will incorporate some form of attenuation.

Attenuation tanks contribute to SuDS by:

- Reducing peak flows (in conjunction with a flow control)
- Provide amenity (by use of space above)

It may be possible the use of below ground attenuation tanks in landscaping areas that are not within the basement footprint.

5.4.14 Proprietary Treatment Systems

These are devices installed within the drainage network to remove specific pollutants to improve water quality. These include the likes of oil separators and silt traps. There is no need to use these systems within this development.

5.4.15 Blue Roof Systems

The use of blue roof attenuation is becoming a more recognised form of SuDS attenuation technique as these provide a major form of source control. Given the proposed architectural plans, blue roofs systems are proposed, at roofs and ground floor areas, to manage surface water run-off volumes and peak flows to the required magnitudes.

Typical blue roof are summarised below:

- 1) **Roofs:** 108mm blue roof system that provides attenuation and can be used in conjunction with PV solar systems. If used in conjunction with a living/biodiverse roof, a 129mm blue roof system would be needed (attenuation + reservoir board). Importantly, all roofs would need to be flat and of robust construction, otherwise the system will not work effectively or efficiently.
- 2) **Ground floor Pedestrian & Vehicle Trafficked Areas:** maximum 108mm blue roof system (attenuation).

The use of blue roofs will likely be present at all/ most roofs and podiums to attenuate surface water and restrict the site's discharge rate. Detailed design will need to be undertaken to ensure

optimum depth and discharge rates are provided.

5.4.16 SuDS Summary

Based upon the above the use of certain SuDS techniques can be ruled out as inappropriate for the development. There are however others that may be able to be incorporated which can ensure the surface water drainage network will achieve the requirements. These have been summed up with their benefits and shown in the table below:

SuDS Technique	Suitable		Benefits					
			Interception	Reduced Flow	Quantity	Quality	Amenity	Biodiversity
	Yes	No						
Rainwater Harvesting		X	✓	✓	✓	✓	□	□
Green Roofs	X		✓✓	✓✓	✓✓	✓✓	✓	✓✓
Blue Roofs	X		✓	✓✓	✓✓	✓✓	✓	✓
Detention Basins		X	✓	✓	✓	✓	✓✓	✓
Ponds & Wetlands		X	□	✓	✓	✓✓	✓✓	✓✓
Filter Strips		X	✓	□	□	✓	✓✓	✓
Filter Drains		X	✓	✓✓	✓	✓	✓	✓✓
Swales		X	✓	✓	✓	✓✓	✓✓	✓✓
Infiltration Systems		X	✓✓	✓✓	✓✓	✓	✓	✓
Bioretention Systems	X		✓✓	✓✓	✓	✓✓	✓✓	✓✓
Trees	X		✓	✓	✓	✓	✓✓	✓✓
Pervious Pavements	X		✓	✓	✓	✓✓	✓✓	□
Attenuation Tanks	X		□	✓	✓	□	✓	□
Proprietary Treatment System		X	□	□	□	✓✓	□	□

✓✓	Provides benefit as standalone
✓	Can provide under specific circumstances or in conjunction with a flow control or secondary system or specific design

Table 3 – SuDS Summary

The following SuDS features are considered feasible for inclusion in the site's surface water drainage system:

- Blue roof systems at roofs and podiums.
- Living roofs
- Below ground attenuation tanks and oversized pipes.

- Permeable paving systems (system C- no infiltration)
- Bioretention areas (tree pits, rain gardens etc)

5.5. Climate Change

The surface water drainage regime also needs to consider the predicted effects of climate change which is expected to bring wetter and more intense rainfall events. A 40% increase in peak rainfall intensity will be applied to the 100-year return storm design which is the largest requirement in accordance with current guidance.

5.6. Proposed Surface Water Discharge Rate

The existing surface water discharge rate of the site has been estimated, as mentioned above, to be 214.8 l/s.

For the new development it is proposed that the surface water discharge rate is reduced to target the Q_{bar} for the High Soil 3x Greenfield rate, i.e., 45 l/s. This would represent a significant reduction in surface water discharge rate of approximately 79%, which returns capacity to the public sewer.

To restrict the surface water runoff of the proposed development, blue roofs and a below ground attenuation/ oversized pipes and flow control is proposed. These will be designed to manage surface water runoff volumes and peak flows to the required rate.

It has been assumed that blue roofs will have a discharge rate of 26 l/s while the ground floor hardstanding areas a discharge rate of 19 l/s. These discharge rates are subject to detail design.

The blue roof will collect and store rainfall until it can be gradually released (controlled rate) to a sewer within the site. The remaining ground floor hardstanding areas discharge rate will be managed using a below ground attenuation/oversized pipes. Using the HR Wallingford 'Surface water storage volume estimation tool', it has been calculated that a below ground storage of 371cbm is required to store the water generated at ground floor areas before it is released at a controlled rate.

A full detailed design will still need to be undertaken and co-ordinated with all other aspects of the development prior to any construction.

5.7. Proposed Surface Water Drainage Regime

Using the discussions above a schematic design for the drainage networks has been undertaken to demonstrate that it is possible to provide a workable and sustainable drainage system for the

proposed development (Appendix D).

The surface water drainage system will be designed to accommodate the 1 in 100-year storm event, with an increase in peak rainfall intensity of 40% to allow for the currently predicted effects of climate change and final discharge rate is subject to detailed design. The maximum discharge rate should not exceed 45 l/s.

This will ensure that the development does not increase the flood risk both on and off site and it is also expected that this will offer a significant improvement over the existing site and its drainage regime, as the proposals will provide enough attenuation to cater for all the design rainfall events

It is proposed to outfall the new developments surface water drainage network to the public surface water sewer in Kenavon Drive, which will be subject to Thames Water approval.

5.8. Exceedance design

The new development design levels will be considered at detail design and designed so no ponding occurs that will affect buildings or cause a hazard to people.

5.9. Proposed Foul Water Drainage

All buildings within the site, which incorporate residential and commercial units, are above the proposed basement. As such, it is proposed that all foul water generated at ground level and above will drain by gravity to the suspended foul sewer within the basement and to the below ground sewer proposed. Foul water generated at basement level (refuse stores, plant rooms, etc) will be pumped to the suspended gravity sewer proposed within the basement, prior to discharging to the below ground foul water network proposed.

A feasible schematic foul water drainage strategy diagram for the proposed development site can be found in Appendix D.

5.10. Foul Water Peak Discharge Rate

The site proposals consist of accommodation together with supermarket, car, and bicycle parking.

To estimate dry weather foul flow from commercial units, the 'Urban Drainage (3rd edition) David Butler & John W Davies' document has been used, applying table 10.2 of the document (Figure 2 above), and for dwellings this can be based upon the requirements of Ofwat – Code for adoption agreements for water and sewerage companies operating wholly or mainly in England (7).

Table 5 below shows the estimated foul water design flows for the East, Central and West blocks including the supermarket store located at the West of the site.

	Volume (l/day)	Units	m ²	l/day
Dwellings	4000 l/day/dwelling	820	-	3,280.000
Commercial	300 l/day/100m ²	-	4343.2	13,031

Table 5 –Estimated design foul flows

Considering an 8-hour day flow, the peak flow calculated for the supermarket is:

- Commercial: $13031/8/3600 = 0.45$ l/s

BS EN 752:2008 recommends that the above peak design flow is multiplied by 6 to determine the peak design flow rate. Using a multiplier of 6, the design peak flow rate has been estimated to be 0.45 l/s.

From the above it can be determined that the estimated proposed peak flow is as follows:

- Residential blocks – 38 l/s
- Commercial – 0.45 l/s

The above is as estimate of the peak flows that could be generated on site. The exact provision is to be finalised and as such additional calculations will need to be undertaken as a matter of course during the detailed design to ensure the adequacy of the drainage design.

The foul water originated by the entire development (38.45 l/s) will increase the foul flow in the public sewerage network by approximately 29.33 l/s.

Thames Water have confirmed capacity exists within the local network for these flows (Appendix H).

6.0 Maintenance Schedule

Whilst this document outlines a potential drainage strategy for the development it is important that a maintenance regime is developed and put into place. This will need to be compiled when a detailed drainage design is undertaken.

A detailed operation and maintenance manual and schedule should be compiled that is appropriate for the development parameters and the final drainage design and mechanisms that form the working system to ensure its ongoing reliable performance. This should be compiled using the recommendations within The SuDS Manual and other good practice guidance alongside

any specific requirements from a product manufacturer. This will need to include timescales for regular inspection, sweeping of surfaces, cleansing and other maintenance to ensure all systems continue to operate as the design intends.

It is also important to ensure that the details of the system are available to all relevant parties to ensure that any future maintenance works do not remove the functionality of the drainage regime, for example replacing permeable finishes with impermeable, which can often be the case.

7.0 Conclusions

This document has set out to look at the potential drainage strategy for the development to demonstrate that a drainage solution can be provided for the proposed redevelopment.

- A foul and surface water drainage gravity network can be achieved for the entire development site.
- The surface water system will accommodate the 100-year return storm with an increase in peak rainfall intensity of 40% to allow for the predicted effects of climate change.
- The surface water system will include SuDS techniques. The exact type and extents will be determined during the detail design phase based upon those determined as practical in this document.
- The surface water strategy will reduce the risk of flooding to property on site.
- The significant reduction in discharge rate to the public sewer network will contribute to an overall reduction to flood risk within its catchment, particularly downstream, by returning capacity to a likely over-burdened network.

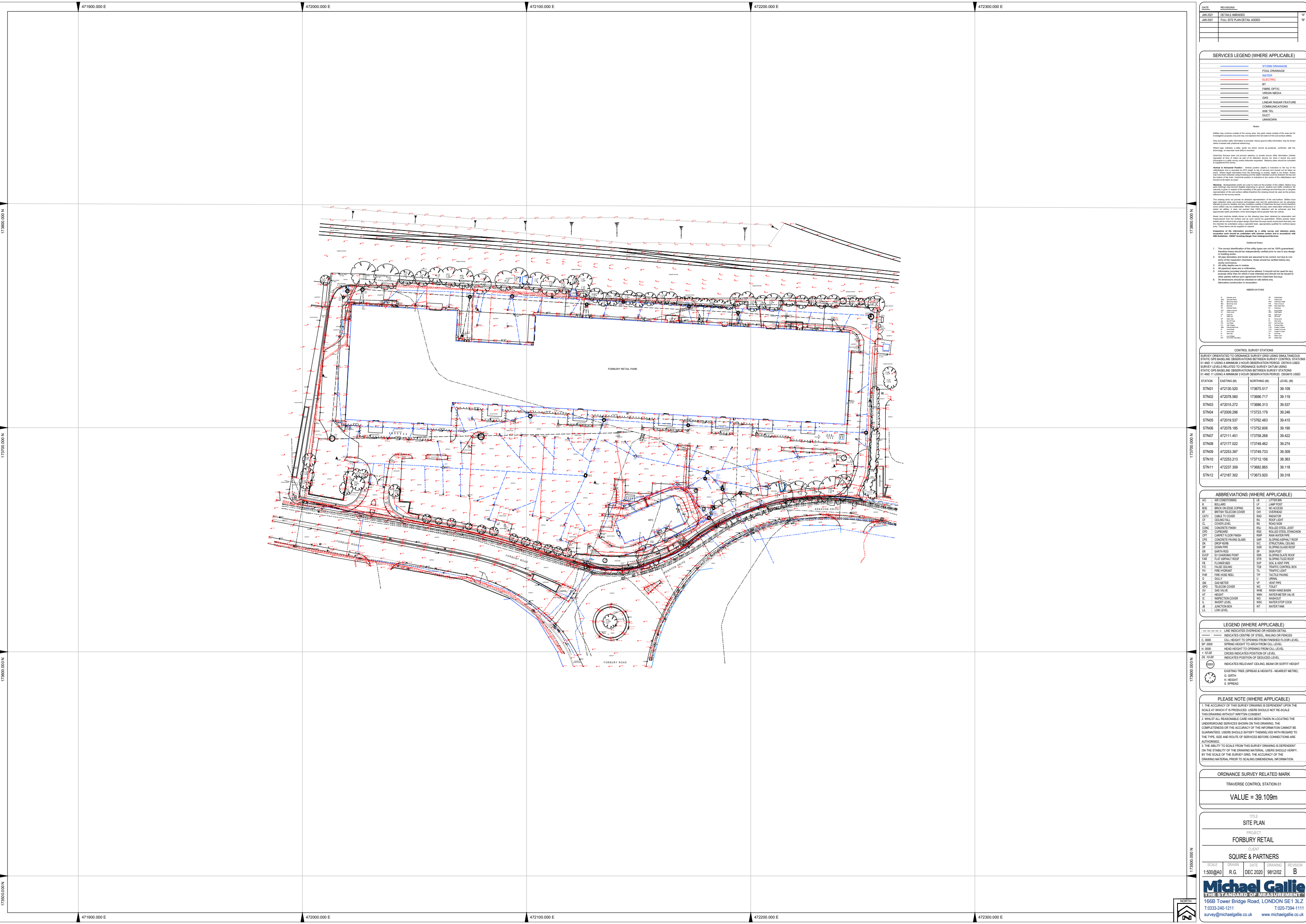
As such, we believe that when fully detailed and designed drainage regime for the development will meet the requirements of the NPPF and the requirements of the LLFA and Reading's Planning policy.

APPENDIX A

List of References

- 1 Urban Drainage (3rd edition) David Butler & John W Davies, E & FN Spon 2000.
- 2 The Building Regulations 202 disposal – Part H: Drainage and waste disposal
- 3 BS EN 12056-2 Gravity drainage systems inside buildings – Part 2: Sanitary pipework, layout and calculations
- 4 CIRIA SuDS manual (2015) – CIRIA C697
- 5 The London Plan 2021
- 6 Supplementary Planning Guidance ‘Sustainable Design and Construction’ April 2014, Implementation Framework London Plan 2011
- 7 Ofwat – Code for adoption agreements for water and sewerage companies operating wholly or mainly in England.
- 8 CNM Flood Risk Assessment, May 2022

APPENDIX B
Existing Site Topographical Survey

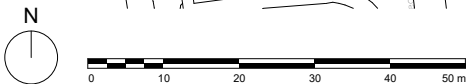


APPENDIX C

Proposed Site Parameter Plans

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Extent of Application Site



Description	Date	Chk	Rev															
SQUIRE & PARTNERS Squire and Partners LLP The Department Store 248 Ferndale Road, London SW9 8FR T: 020 7278 5555 info@squireandpartners.com www.squireandpartners.com Project Kings Meadow View Title Parameter Plan 01 Site Location Status Planning <table><tr><th>Drawn</th><th>Date</th><th>Scale @</th><th>ISO A1</th><th>Job Number</th></tr><tr><td>SQP</td><td>22/05/23</td><td>1:500</td><td></td><td>18111</td></tr><tr><td colspan="4">Drawing Number</td><td>Revision</td></tr></table> 18111-SQP-ZZ-GF-DR-A-PL00001				Drawn	Date	Scale @	ISO A1	Job Number	SQP	22/05/23	1:500		18111	Drawing Number				Revision
Drawn	Date	Scale @	ISO A1	Job Number														
SQP	22/05/23	1:500		18111														
Drawing Number				Revision														



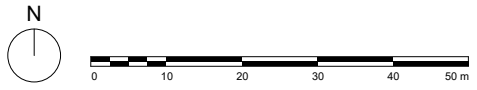
Do not scale from this drawing. All dimensions to be checked on site. All omissions and discrepancies to be reported to the Architect immediately

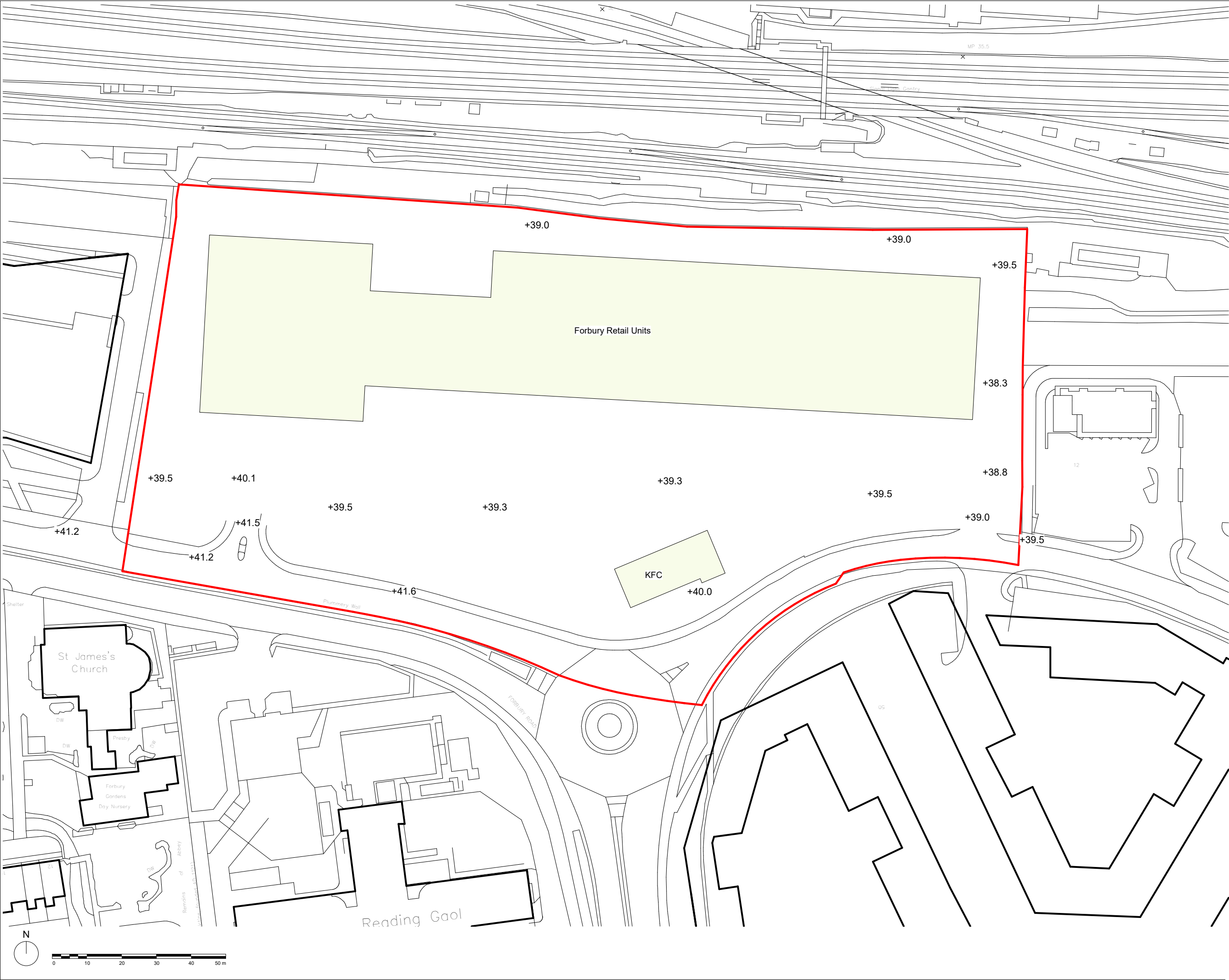
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Key

- Extent of Application Site
- Existing Structures, To be demolished

Description	Date	Chk	Rev
SQUIRE & PARTNERS			
Squire and Partners LLP The Department Store 248 Ferndale Road, London SW9 8FR T: 020 7278 5555 info@squireandpartners.com www.squireandpartners.com			
Project Kings Meadow View			
Title Parameter Plan 02 Demolition Plan			
Status Planning			
Drawn	Date	Scale @ ISO A1	Job Number
SQP	22/05/23	1:500	18111
Drawing Number			Revision
18111-SQP-ZZ-GF-DR-A-PL00002			





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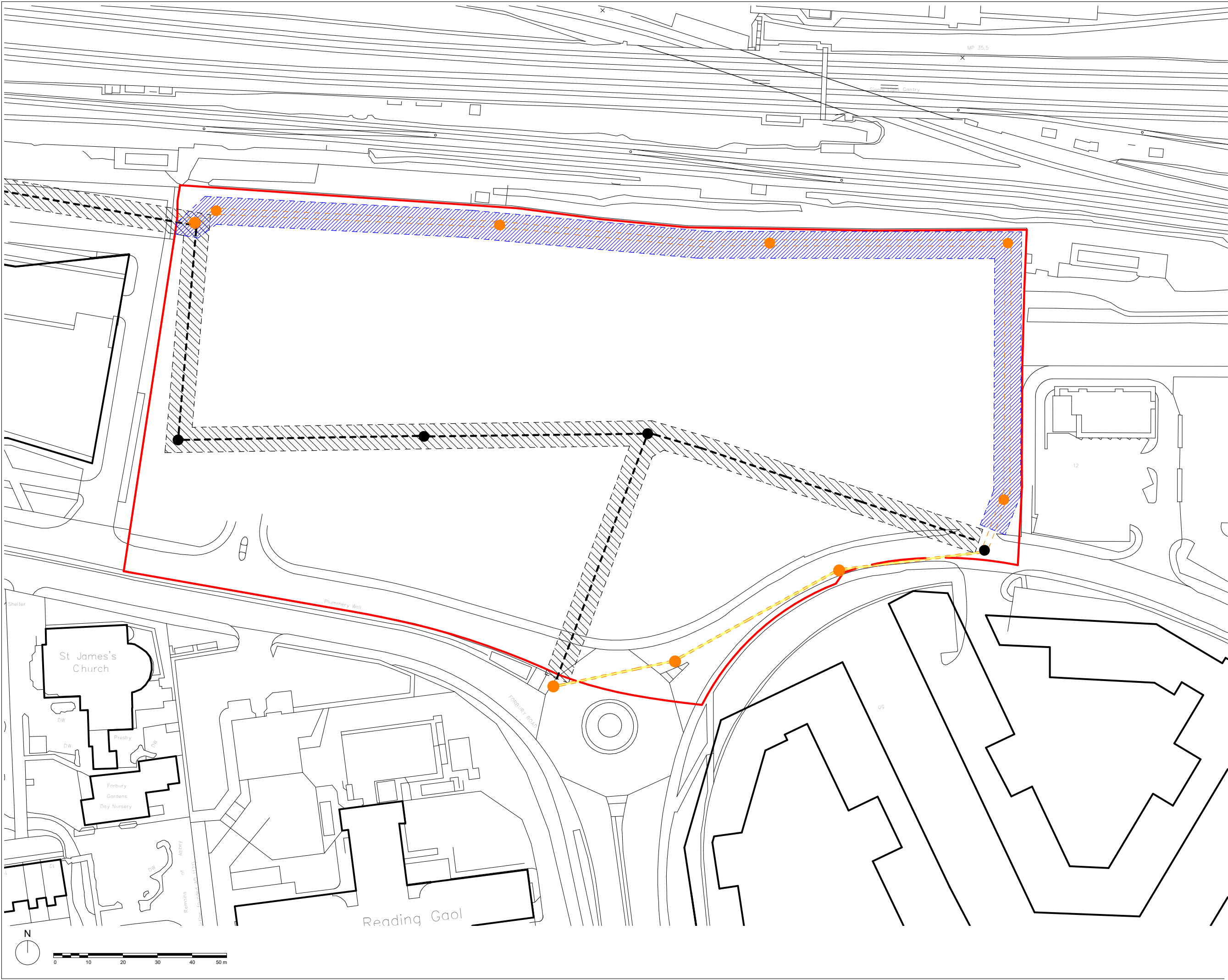
Key

- Extent of Application Site
- Existing Retail Units

Notes

- All levels should be interpreted as AOD.

Description	Date	Chk	Rev
SQUIRE & PARTNERS			
Squire and Partners LLP The Department Store 248 Ferndale Road, London SW9 8FR T: 020 7278 5555 info@squireandpartners.com www.squireandpartners.com			
Project Kings Meadow View			
Title Parameter Plan 03 Existing Site Levels Plan			
Status Planning			
Drawn	Date	Scale @ ISO A1	Job Number
SQP	22/05/23	1:500	18111
Drawing Number			Revision
18111-SQP-ZZ-GF-DR-A-PL00003			



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Key

- Extent of Application Site
- Indicative Location of the Existing Sewer
- Proposed Sewer Easement. No build zone.
- Proposed New Foul Water Sewer
- Proposed Kenavon Drive Diversion
- Proposed Location of Manholes
- Existing Manholes will require reconstruction

Notes

- This drawing should be read in conjunction with the Design Code submitted as part of the Planning Application.

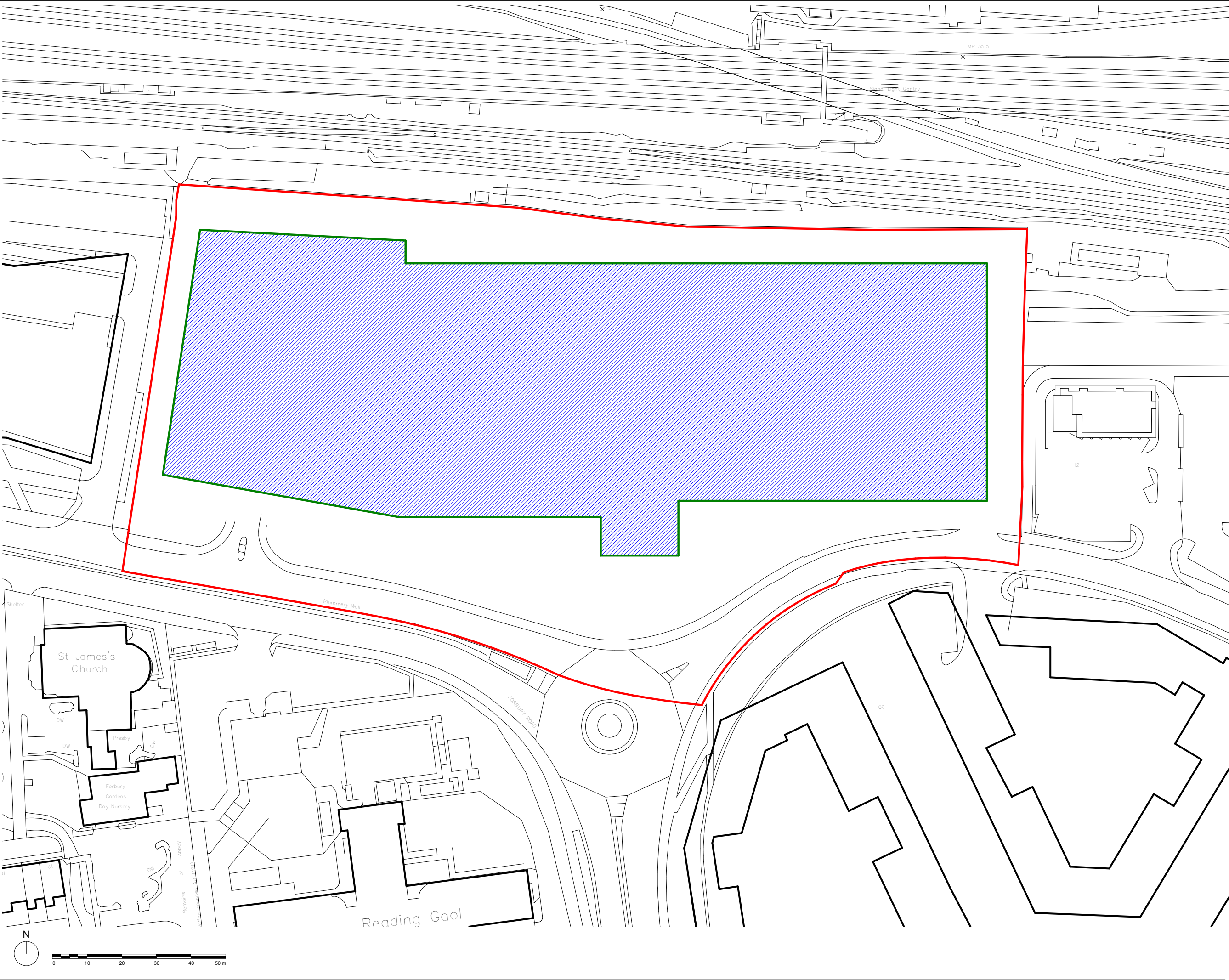
Sewer Diversion

- Foul water sewer that crosses the site is to be diverted along the North and East boundary.
- Sewer diversion details (easement width, manhole locations & sizes and pipe size) are subject to detailed design and Thames Water approvals.

Sewer Diversion in Kenavon Drive

- Foul water sewer that enters the site from the South is to be diverted along Kenavon Drive and reconnected to an existing manhole at the South-East corner of the development site.
- Sewer diversion details (manhole locations & sizes and pipe size) are subject to detailed design and Thames Water approvals.

Description	Date	Chk	Rev
SQUIRE & PARTNERS			
Squire and Partners LLP The Department Store 248 Ferndale Road, London SW9 8FR T: 020 7278 5555 info@squireandpartners.com www.squireandpartners.com			
Project Kings Meadow View			
Title Parameter Plan 04 Proposed Sewer Location No Build Zone			
Status Planning			
Drawn	Date	Scale @ ISO A1	Job Number
SQP	22/05/23	1:500	18111
Drawing Number			Revision
18111-SQP-ZZ-GF-DR-A-PL00004			



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Key

- Application Site Boundary
- Development Plots
- Car Parking and Servicing to Class C3/E

Description	Date	Chk	Rev
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Project Kings Meadow View			
Title Parameter Plan 05 Proposed Land Use Basement			
Status Planning			
Drawn	Date	Scale @ ISO A1	Job Number
SQP	22/05/23	1:500	18111
Drawing Number			Revision
18111-SQP-ZZ-B1-DR-A-PL00005			



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Key

- Application Site Boundary
- Maximum Development
- Maximum Deviation Line - Building Overhead
- Mixed-Use (Class C3/E)
- Use Class C3
- Car Parking and Servicing to Class C3/E
- Open Space/Amenity Area
- Servicing for Class C3 / Refuse collection
- Development Plot Reference

Notes

- This drawing has been prepared to identify the different building plots with the development and for no other approval purposes.
- This plan shows the maximum size of building plots.
- This drawing should be read in conjunction with the Design Code submitted as part of the Planning Application.
- All plots should be equal to or less than the maximum permissible GEA.

Description	Date	Chk	Rev
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info@squireandpartners.com
www.squireandpartners.com

Project
Kings Meadow View

Title
Parameter Plan 06
Proposed Land Use
Ground Level

Status
Planning

Drawn	Date	Scale @ ISO A1	Job Number
SQP	22/05/23	1:500	18111

Drawing Number	Revision
18111-SQP-ZZ-GF-DR-A-PL00006	



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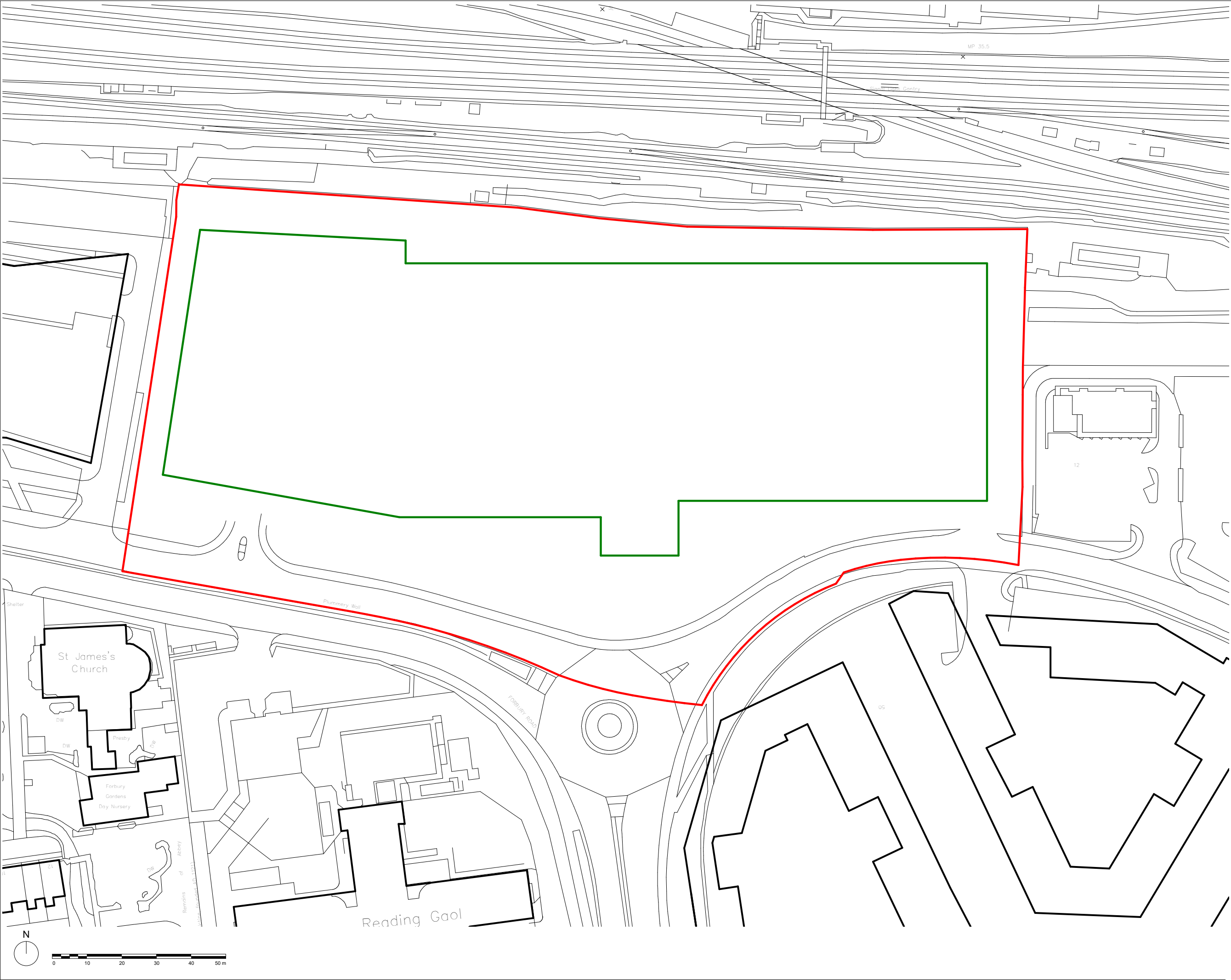
Key

- Application Site Boundary
- Development Plots
- Class C3/E
- Use Class C3
- XX Block X Development Plot Reference

Notes

- This drawing has been prepared to identify the different building plots with the development and for no other approval purposes.
- This plan shows the maximum size of building plots.
- This drawing should be read in conjunction with the Design Code submitted as part of the Planning Application.
- All plots should be equal to or less than the maximum permissible GEA.

Description	Date	Chk	Rev
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Squire and Partners LLP The Department Store 248 Ferndale Road, London SW9 8FR T: 020 7278 5555 info@squireandpartners.com www.squireandpartners.com			
Project Kings Meadow View			
Title Parameter Plan 07 Proposed Land Use Typical Floor of Upper Levels			
Status Planning			
Drawn	Date	Scale @ ISO A1	Job Number
SQP	22/05/23	1:500	18111
Drawing Number			Revision
18111-SQP-ZZ-05-DR-A-PL00007			



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Key

- Application Site Boundary
- Maximum Development Limit

Notes

- The plan defines the horizontal limits of deviation for the proposed buildings.

Description	Date	Chk	Rev
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Project Kings Meadow View			
Title Parameter Plan 08 Proposed - Maximum Deviation Plan Basement			
Status Planning			
Drawn	Date	Scale @ ISO A1	Job Number
SQP	22/05/23	1:500	18111
Drawing Number			Revision
18111-SQP-ZZ-B1-DR-A-PL00008			



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Key

- Application Site Boundary
- Maximum Development Limit
- Balcony / Bay zone
- Servicing / Car Park
- Servicing for residential / refuse collection
- Maximum Deviation Line - Building Overhead
- XX Block X Development Plot Reference

Notes

- The plan defines the horizontal limits of deviation for the proposed buildings.

Description	Date	Chk	Rev
SQUIRE & PARTNERS			
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info@squireandpartners.com www.squireandpartners.com			
Project			
Kings Meadow View			
Title			
Parameter Plan 09 Proposed - Maximum Deviation Plan Ground Level			
Status			
Planning			
Drawn	Date	Scale @ ISO A1	Job Number
SQP	22/05/23	1:500	18111
Drawing Number			Revision
18111-SQP-ZZ-GF-DR-A-PL00009			



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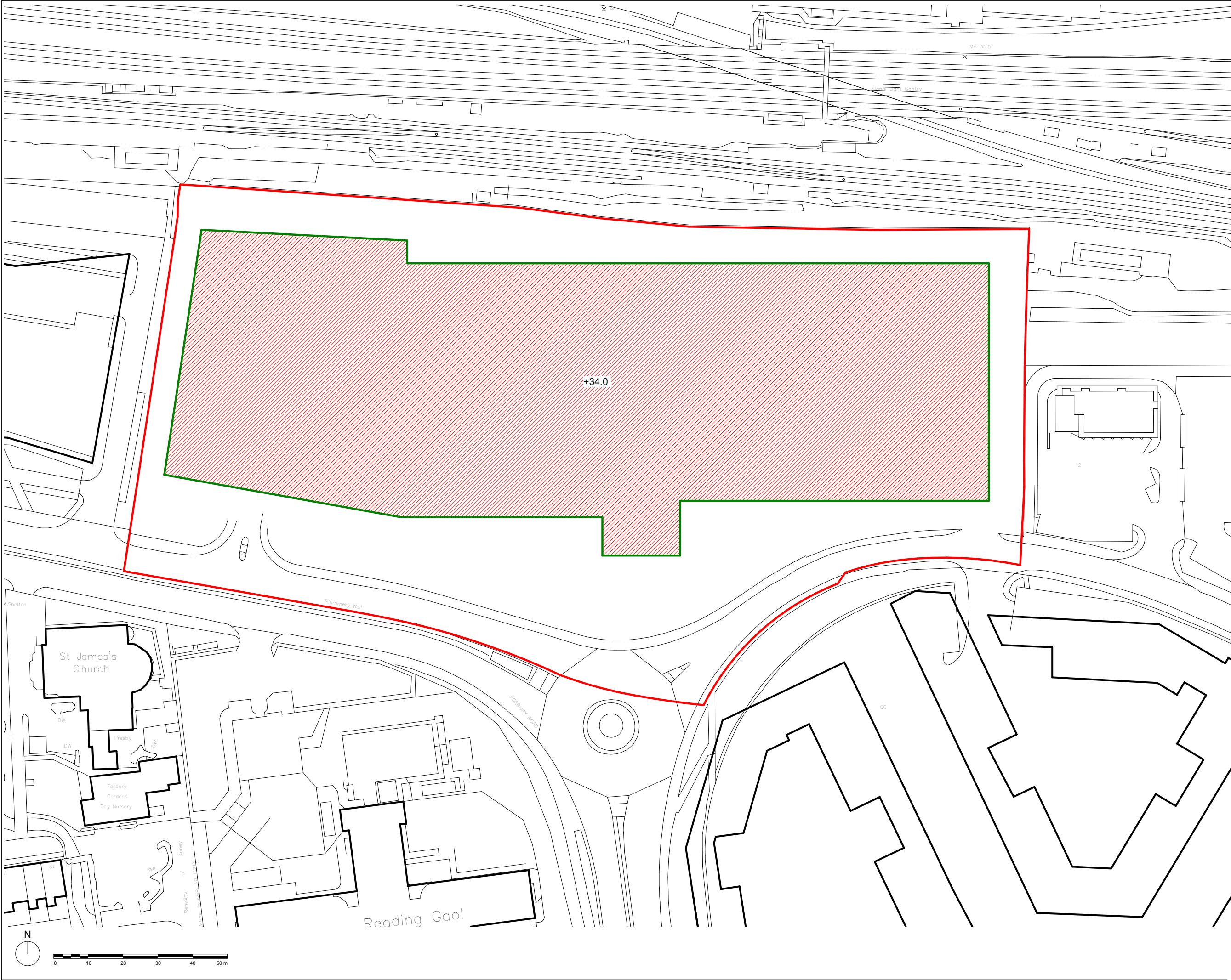
Key

- Application Site Boundary
- Maximum Development Limit
- Balcony / Bay zone
- XX Block X Development Plot Reference

Notes

- The plan defines the horizontal limits of deviation for the proposed buildings.

Description	Date	Chk	Rev
SQUIRE & PARTNERS			
Squire and Partners LLP The Department Store 248 Ferndale Road, London SW9 8FR T: 020 7278 5555 info@squireandpartners.com www.squireandpartners.com			
Project Kings Meadow View			
Title Parameter Plan 10 Proposed - Maximum Deviation Plan Typical Floor of Upper Levels			
Status Planning			
Drawn	Date	Scale @ ISO A1	Job Number
SQP	22/05/23	1:500	18111
Drawing Number			Revision
18111-SQP-ZZ-05-DR-A-PL00010			



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- Key**
- Application Site Boundary
 - Development Zone
 - Enclosed Car Park / Servicing

- Notes**
- All heights should be interpreted as AOD.
 - Level shown on development plot on basement plan is to the minimum of top of SSL (excluding finishes).
 - This drawing should be read in conjunction with the Design Code submitted as part of the Planning Application.
 - All levels are SSL levels within built elements

Description	Date	Chk	Rev
SQUIRE & PARTNERS			
Squire and Partners LLP The Department Store 248 Ferndale Road, London SW9 8FR T: 020 7278 5555 info@squireandpartners.com www.squireandpartners.com			
Project Kings Meadow View			
Title Parameter Plan 11 Proposed - Site Levels Basement			
Status Planning			
Drawn	Date	Scale @ ISO A1	Job Number
SQP	22/05/23	1:500	18111
Drawing Number			Revision
18111-SQP-ZZ-B1-DR-A-PL00011			



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Key

- Application Site Boundary
- Development Zone
- Servicing for residential / refuse collection
- Enclosed Car Park
- Building Overhead

Notes

- All heights should be interpreted as AOD.
- This drawing should be read in conjunction with the Design Code submitted as part of the Planning Application.

Table 1: Revision History

Description	Date	Chk	Rev
SQUIRE & PARTNERS			
Squire and Partners LLP The Department Store 248 Ferndale Road, London SW9 8FR T: 020 7278 5555 info@squireandpartners.com www.squireandpartners.com			
Project Kings Meadow View			
Title Parameter Plan 12 Proposed - Site Levels Ground Level			
Status Planning			
Drawn	Date	Scale @ ISO A1	Job Number
SQP	22/05/23	1:500	18111
Drawing Number		Revision	
18111-SQP-ZZ-GF-DR-A-PL00012			



Do not scale from this drawing. All dimensions to be checked on site. All omissions and discrepancies to be reported to the Architect immediately

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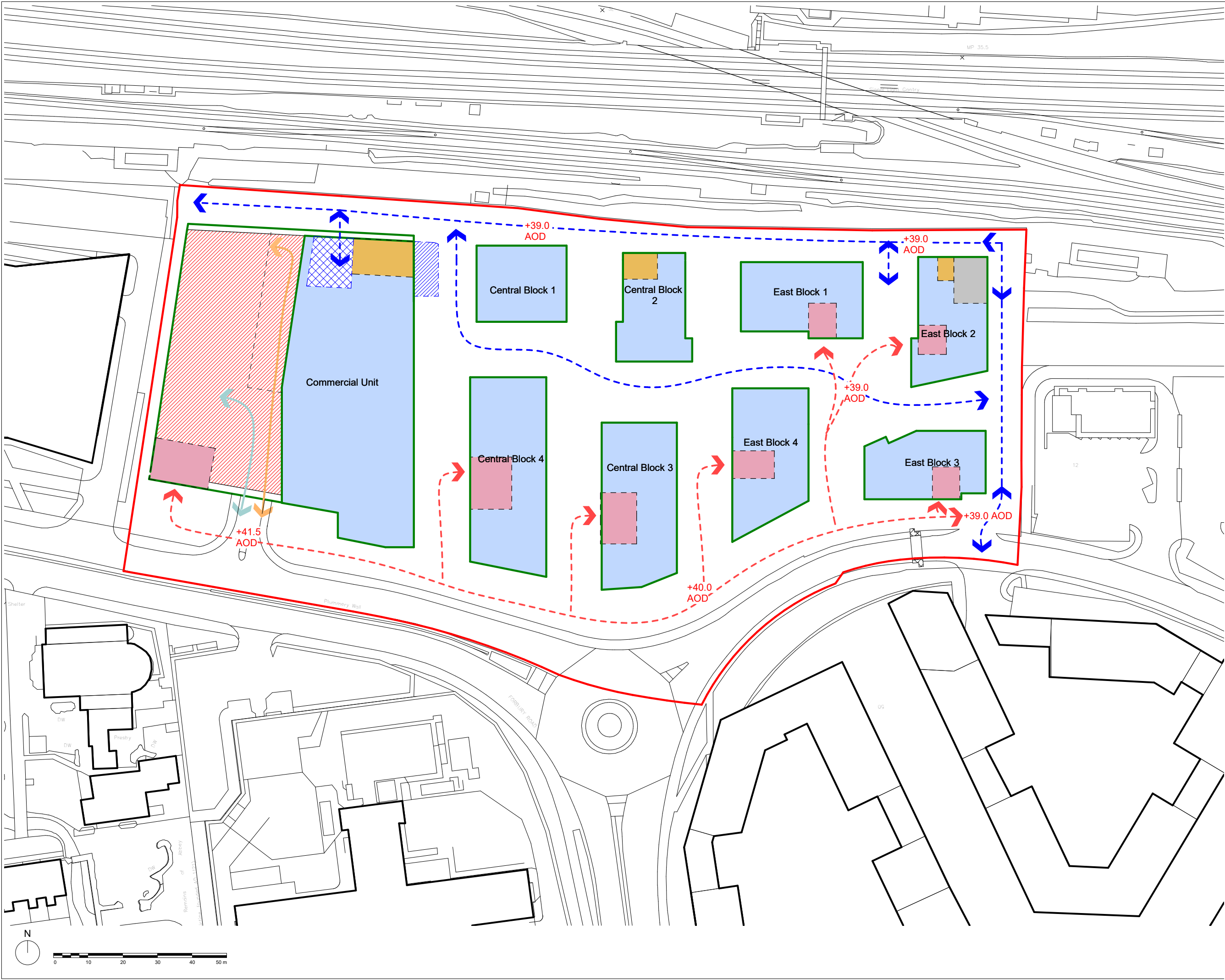
Key

- Application Site Boundary
- Development Zone
- +XX.X All roof heights are excluding rooftop plant.

Notes

- All heights should be interpreted as AOD.
- This drawing should be read in conjunction with the Design Code submitted as part of the Planning Application.

Description	Date	Chk	Rev
SQUIRE & PARTNERS			
Squire and Partners LLP The Department Store 248 Ferndale Road, London SW9 8FR T: 020 7278 5555 info@squireandpartners.com www.squireandpartners.com			
Project Kings Meadow View			
Title Parameter Plan 13 Proposed Site Levels Maximum Building Heights			
Status Planning			
Drawn	Date	Scale @ ISO A1	Job Number
SQP	22/05/23	1:500	18111
Drawing Number			Revision
18111-SQP-ZZ-05-DR-A-PL00013			



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Key

- Application Site Boundary
- Development Zone
- Enclosed Car Park
- Car Parking Ramp
- Substation
- Servicing Parking
- Cycle Store
- Servicing
- Servicing for residential / refuse collection
- Servicing Access
- Cyclist Access
- Residential Car Parking Access
- Commercial Car Parking Access
- +XX.X Maximum Parameter AOD

Notes

- All levels to be confirmed by Landscape Architect.
- All heights should be interpreted as AOD.
- This drawing should be read in conjunction with the Design Code submitted as part of the Planning Application.
- Extent of Highway works to be agreed

Description	Date	Chk	Rev
SQUIRE & PARTNERS			
Squire and Partners LLP The Department Store 248 Ferndale Road, London SW9 8FR T: 020 7278 5555 info@squireandpartners.com www.squireandpartners.com			
Project Kings Meadow View			
Title Parameter Plan 14 Proposed - Servicing & Access Ground Level			
Status Planning			
Drawn	Date	Scale @ ISO A1	Job Number
SQP	22/05/23	1:500	18111
Drawing Number		Revision	
18111-SQP-ZZ-GF-DR-A-PL00014			

APPENDIX D
Proposed Schematic Site Foul and
Surface Water Drainage

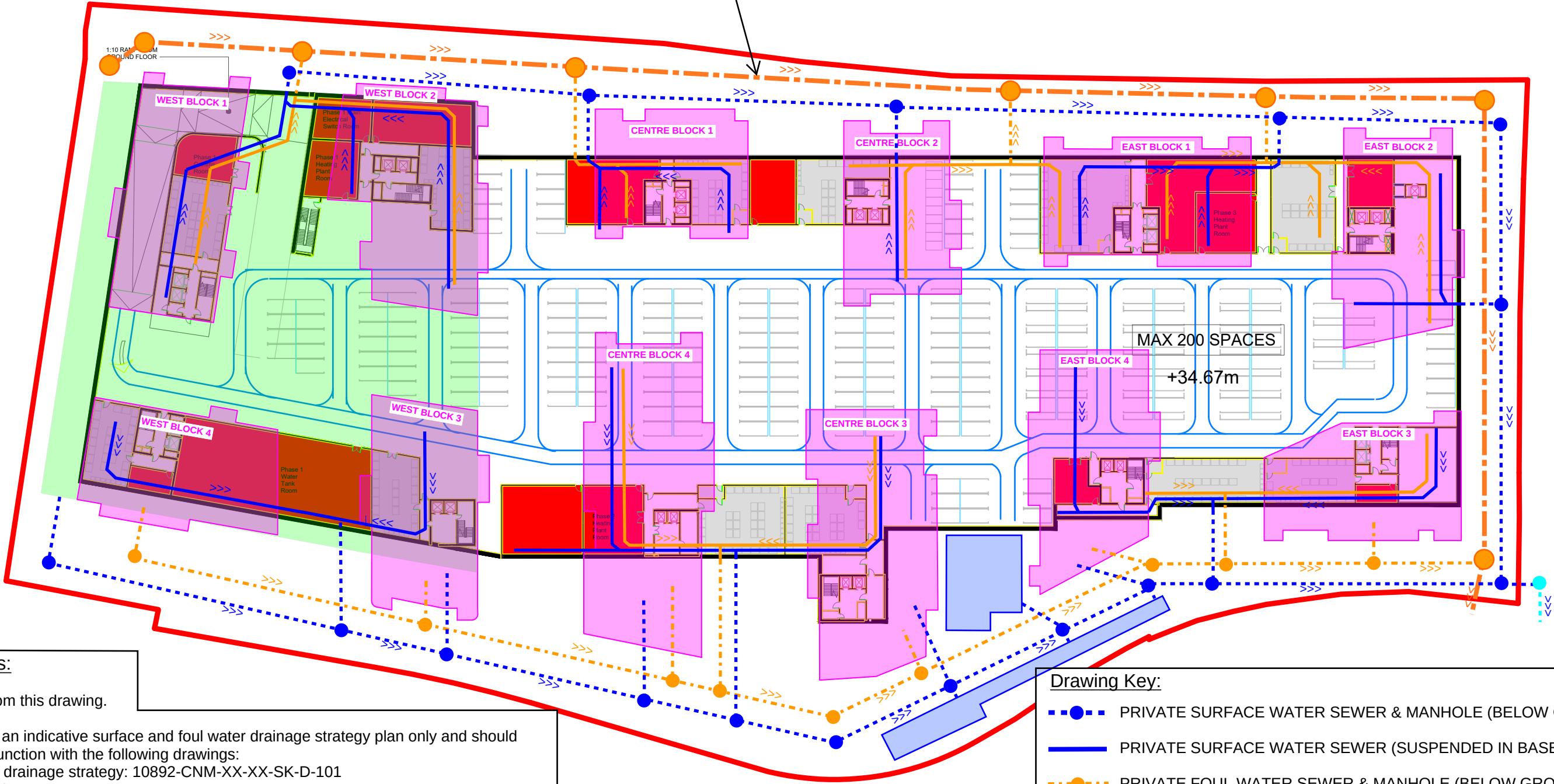
10982 - KINGS MEADOW VIEW, READING

Schematic Surface and Foul Water Drainage Strategy Plan



Project Title:		KINGS MEADOW VIEW, READING	
Project No:		10982	
Sketch No:		10892-CNM-XX-XX-SK-D-100	
Title		SURFACE AND FOUL WATER DRAINAGE STRATEGY PLAN	
Scale		NTS	
Eng:	Rev:	Date:	Checked:
CVG		MARCH 2023	

TWU FOUL WATER SEWER PROPOSED DIVERSION INDICATIVELY SHOWN.REFER TO DRAWING NO. 10982-CNM-XX-XX-SK-D-103 FOR TWU FOUL WATER SEWER DIVERSION



Drainage Notes:

- Do not scale from this drawing.
- This drawing is an indicative surface and foul water drainage strategy plan only and should be read in conjunction with the following drawings:
 - Surface water drainage strategy: 10892-CNM-XX-XX-SK-D-101
 - Foul water drainage strategy: 10892-CNM-XX-XX-SK-D-102
 - TWU Foul Water Diversion: 10982-CNM-XX-XX-SK-D-103
- Refer to Thames Water Asset Maps for location and size of existing sewers at and near the development Site.
- All foul and surface water from buildings above the basement footprint is to be suspended within the basement. All refuse stores and plant rooms within the basement are to be pumped to the foul water suspended system in the basement.
- This drawing shows the required below ground storage for the ground floor areas, based on a 1.2m deep tank. Storage can also be provided via oversized pipes. All subject to detail design.

General Notes:

- Sketches are schematic only and not to scale
- Sketches should be read in conjunction with relevant design philosophy reports and architectural information

THIS SKETCH SHOULD BE READ IN COLOUR

Drawing Key:

- PRIVATE SURFACE WATER SEWER & MANHOLE (BELOW GROUND)
- PRIVATE SURFACE WATER SEWER (SUSPENDED IN BASEMENT)
- PRIVATE FOUL WATER SEWER & MANHOLE (BELOW GROUND)
- PRIVATE FOUL WATER SEWER (SUSPENDED IN BASEMENT)
- PROPOSED PUBLIC FOUL WATER SEWER DIVERSION (NORTH & EAST SITE)
- EXISTING SURFACE WATER OUTFALL (450mm DIAMETER)
- BELOW GROUND ATTENUATION TANK
- BLOCKS ABOVE BASEMENT
- HIGHER PODIUM LEVEL

10982 - KINGS MEADOW VIEW, READING

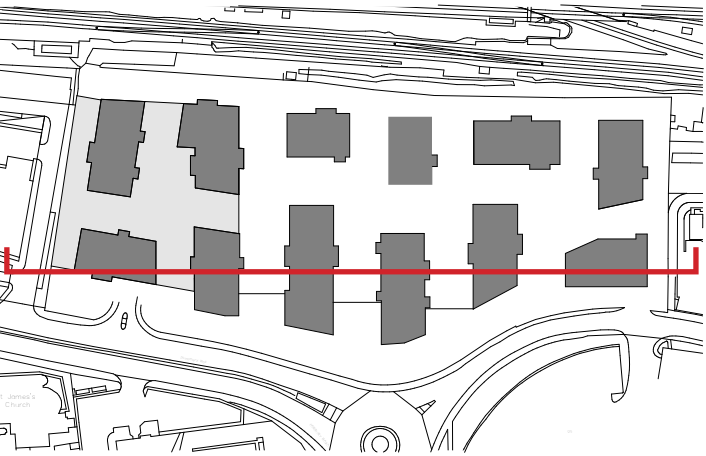
Schematic Surface Water Drainage Strategy Section

Proposed Scheme
Sections

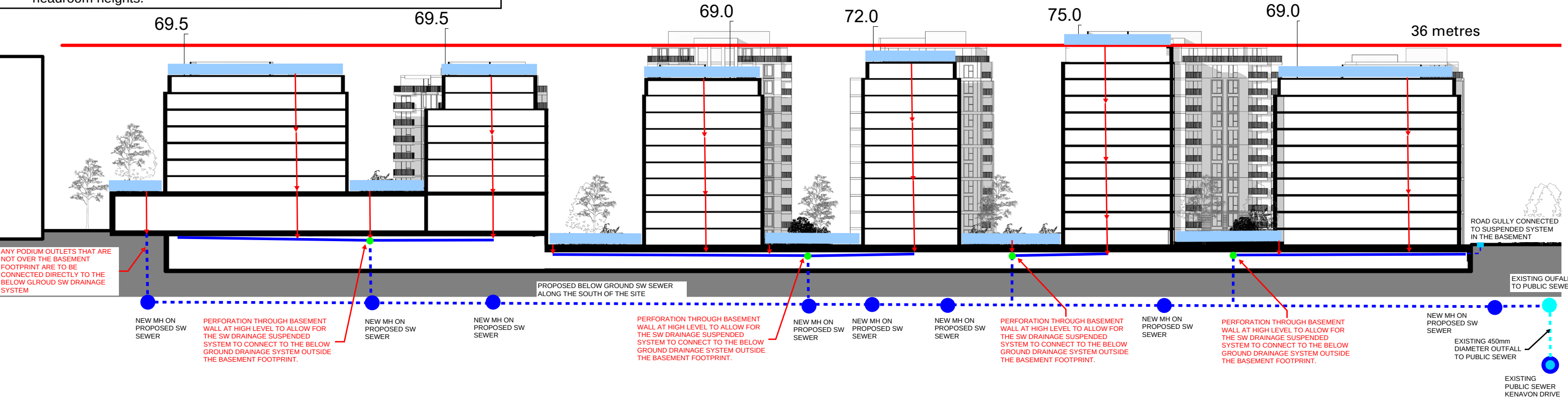
- Drainage Notes:**
1. Do not scale from this drawing.
 2. This drawing is an indicative surface water drainage strategy section only and should be read in conjunction with the following drawings:
 - Surface and foul water drainage strategy plan: 10892-CNM-XX-XX-SK-D-100
 - Foul water drainage strategy: 10892-CNM-XX-XX-SK-D-102
 - TWU Foul Water Diversion: 10892-CNM-XX-XX-SK-D-103
 3. Refer to Thames Water Asset Maps for location and size of existing sewers at and near the development Site
 4. The Site's maximum discharge rate is subject to LLFA approval
 5. Flow rates from blue roofs systems on roofs and podiums are to be restricted and are subject to detailed design
 6. It has been assumed that all terraces drain to the blue roof system in the podium below.
 7. It has been assumed that no residential drainage can be within the retail unit;
 8. All surface water drainage generated above the retail unit level is to be drained by a gravity system suspended in the basement (TBC).
 9. Main surface water pipes suspended in the basement are to run north-south to avoid issues with headroom heights.
 10. Surface water pipes suspended in the basement running east-west or west-east are to be along the south basement wall to avoid issues with headroom heights.

- Drawing Key:**
- BLUE ROOF SYSTEM -108/129mm
 - SW FROM ROOFS & PODIUM (GRAVITY)
 - SW GRAVITY SUSPENDED IN BASEMENT
 - SW GRAVITY BELOW GROUND
 - EXISTING 450mm DIAMETER OUTFALL
 - BASEMENT WALL PERFORATION FOR DRAINAGE PIPES TO CONNECT TO BELOW GROUND SW DRAINAGE SYSTEM
 - PUBLIC MANHOLE - KENAVON DR.

- General Notes:**
1. Sketches are schematic only and not to scale
 2. Sketches should be read in conjunction with relevant design philosophy reports and architectural information
- THIS SKETCH SHOULD BE READ IN COLOUR**



Project Title:		KINGS MEADOW VIEW, READING	
Project No:		10982	
Sketch No:		10892-CNM-XX-XX-SK-D-101	
Title		SURFCE WATER DRAINAGE STRATEGY SECTION	
Scale		NTS	
Eng:	Rev:	Date:	Checked:
CVG		MARCH 2023	



10982 - KINGS MEADOW VIEW, READING

Schematic FOul Water Drainage Strategy Section

Proposed Scheme
Sections

Drainage Notes:

1. Do not scale from this drawing.
2. This drawing is an indicative surface water drainage strategy section only and should be read in conjunction with the following drawings:

- Surface and foul water drainage strategy plan: 10892-CNM-XX-XX-SK-D-100

- Surface water drainage strategy: 10892-CNM-XX-XX-SK-D-101

- TWU Foul Water Diversion: 10982-CNM-XX-XX-SK-D-103
3. Refer to Thames Water Asset Maps for location and size of existing sewers at and near the development Site
4. It has been assumed that no residential drainage can be within the retain unit
5. It has been assumed that no separate foul water drainage system is required for the retail unit.
- 6.All foul water drainage generated above the basement footprint is to be drained by a below ground gravity system in the basement and connected to the proposed TWU diversion foul water sewer at the north of the Site.
7. All foul water generated beyond the basement footprint at the south of the Site is to drain by gravity to a below ground drainage system at the south of the Site.
8. All foul water generated at basement is to be pumped to the foul water suspended system in the basement.
9. Main foul water pipes suspended in the basement are to run south-north to avoid issues with headroom heights and connect to the proposed public diverted sewer.
10. Foul water pipes suspended in the basement from east-west or west-east are to be along the north basement wall to avoid issues with headroom heights

Drawing Key:

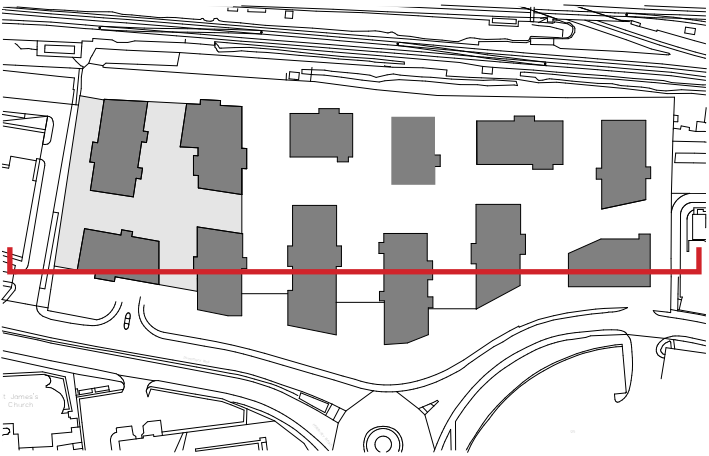
- FW FROM RESIDENTIAL BLOCKS (GRAVITY)
- FW FROM RETAIL (GRAVITY)
- PUMPED FW FROM BASEMENT LEVEL
- P

PUMP CHAMBER IN BASEMENT
- BASEMENT WALL PERFORATION FOR DRAINAGE PIPES TO CONNECT TO BELOW GROUND FW DRAINAGE SYSTEM
- PUBLIC SEWER DIVERSION BELOW GROUND (NORTH & EAST)

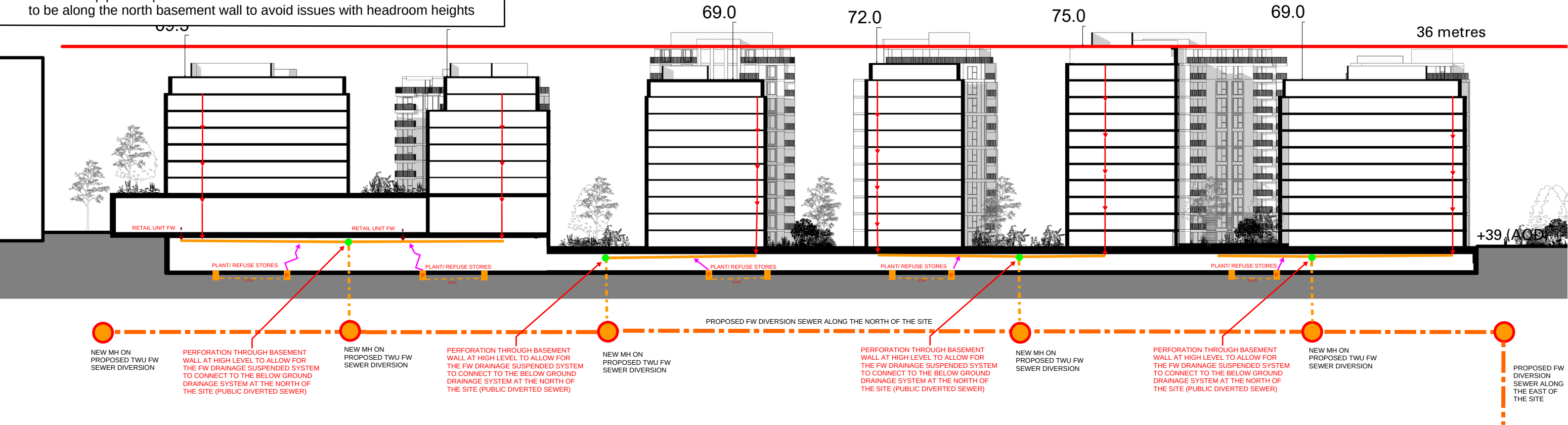
General Notes:

1. Sketches are schematic only and not to scale
2. Sketches should be read in conjunction with relevant design philosophy reports and architectural information

THIS SKETCH SHOULD BE READ IN COLOUR



Project Title:		KINGS MEADOW VIEW, READING	
Project No:		10982	
Sketch No:		10892-CNM-XX-XX-SK-D-102	
Title		FOUL WATER DRAINAGE STRATEGY SECTION	
Scale		NTS	
Eng:	Rev:	Date:	Checked:
CVG		MARCH 2023	



APPENDIX E
Proposed Schematic TWU Foul Sewer Diversion

10982 - KINGS MEADOW VIEW, READING

Schematic Thames Water Foul Water Sewer Diversion

cnm

Clarke Nicholls Marcel

CIVIL & STRUCTURAL ENGINEERS

Project Title:		KINGS MEADOW VIEW, READING	
Project No:		10982	
Sketch No:		10892-CNM-XX-XX-SK-D-103	
Title		TWU FOUL WATER SEWER DIVERSION PLAN	
Scale		NTS	
Eng:	Rev:	Date:	Checked:
CVG		MARCH 2023	

New 1200mm diameter diverted FW sewer to connect to existing TWU MH 0708
CL 39.600
IL 33.840

New 1400mm diameter diverted FW sewer to be installed along the North and East of the site

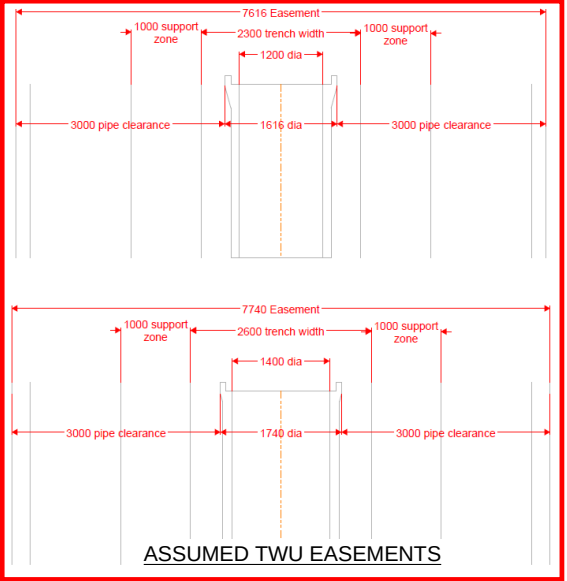
Existing TWUL existing FW sewer and manholes to be decommissioned

Existing 900x600mm dia sewer to be decommissioned

New manhole to be installed on existing TWU sewer.

New 900x600mm concrete ovoid diverted FW sewer

New 1400mm diameter diverted FW sewer to connect to existing TWU MH 2601
CL 39.270
IL 32.900



NOTES:
1) Pipe sizes for the diversion are based upon maintaining existing flow capacity and volume. They are subject to agreement with Thames Water.
2) Easement widths have been based upon preliminary discussions with Thames Water and are subject to a full design and approval process with Thames Water.

Drainage Notes:

- Do not scale from this drawing.
- This drawing is an indicative Thames Water foul sewer diversion plan and should be read in conjunction with the following drawings:
- Surface water drainage strategy: 10892-CNM-XX-XX-SK-D-101
- Foul water drainage strategy: 10892-CNM-XX-XX-SK-D-102
- Refer to Thames Water Asset Maps for location and size of existing sewers at and near the development Site.
- The foul sewer diversion shown has been produced on Squire and Partners latest ground floor plan and is indicative only.
- The current foul sewer location and manhole location shown on this sketch are based on Michael Gallie's below ground services drawing.
- All easements to sewer diversions identified in this sketch are for the proposed works and are to be discussed and agreed with TWUL.
- Developed diversion is subject to a S185 Agreement and Thames Water approvals.

General Notes:

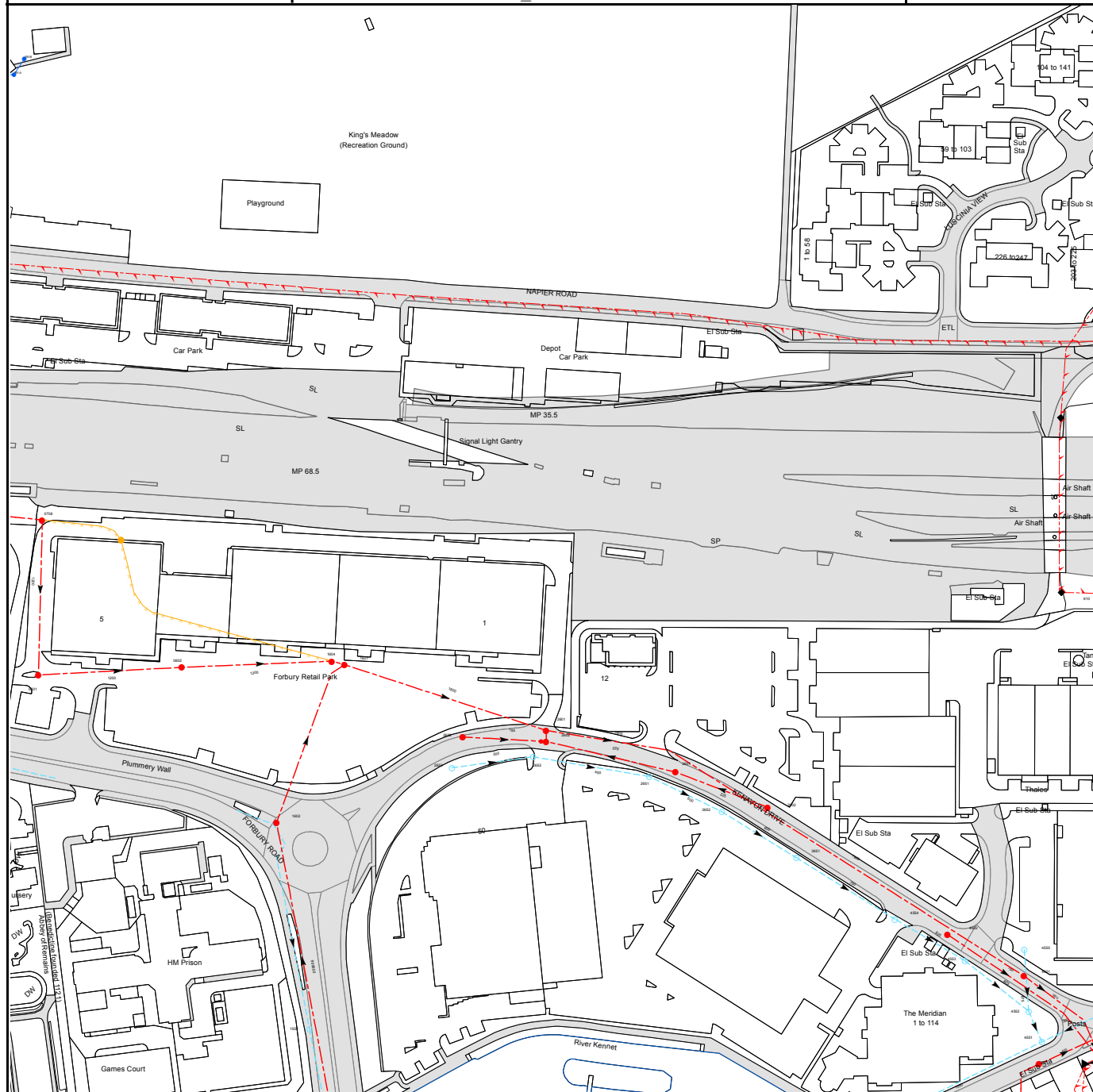
- Sketches are schematic only and not to scale
- Sketches should be read in conjunction with relevant design philosophy reports and architectural information

THIS SKETCH SHOULD BE READ IN COLOUR

Drawing Key:

- EXISTING TWU FOUL WATER SEWER TO BE RETAINED
- EXISTING TWU FOUL WATER SEWER TO BE ABANDONED
- PROPOSED PUBLIC FOUL WATER SEWER DIVERSION
- ASSUMED TWU SEWER EASEMENT
- PROPOSED BUILDING FOOTPRINT
- PROPOSED EAST PODIUM
- PROPOSED WEST PODIUM
- PROPOSED BASEMENT FOOTPRINT

APPENDIX F
Thames Water Public Sewer Records



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 472250,173750

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
451A	n/a	n/a
4503	n/a	n/a
4551	38.28	35.37
1552	n/a	n/a
4552	38.12	35.42
4501	37.97	n/a
4553	37.92	35.39
4555	37.9	35.8
4502	38.14	35.08
4554	38.3	35.65
3651	38.43	35.88
091A	n/a	n/a
091B	n/a	n/a
1602	41.68	n/a
3652	38.5	36.13
3602	n/a	n/a
2651	38.53	n/a
3601	38.87	35.12
2653	40.36	n/a
2652	39.34	36.51
2602	39.12	34.69
2603	39.47	36.27
2601	39.27	32.9
0601	n/a	33.72
0602	n/a	33.6
1601	38.06	33.47
1604	n/a	33.48
0708	39.6	33.84
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.		



ALS 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		

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.

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

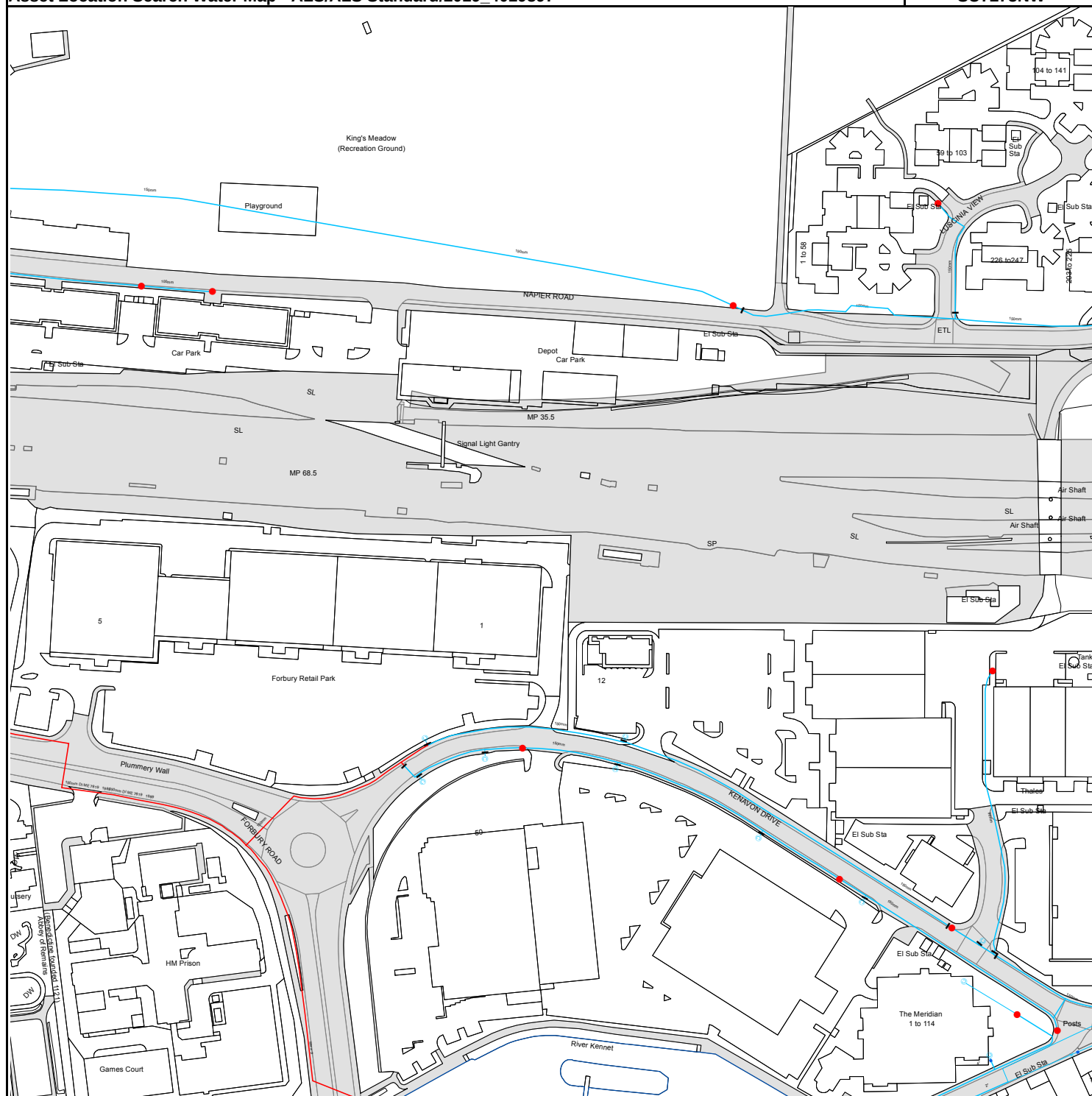
Lines denoting areas of underground surveys, etc.

	Agreement
	Operational Site
	Chamber
	Tunnel
	Conduit Bridge

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

	Foul Sewer		Surface Water Sewer
	Combined Sewer		Gully
	Culverted Watercourse		Proposed
			Abandoned Sewer

- 6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimetres. 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.



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 472250.173750

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.



ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

4"	Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.
16"	Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.
3" SUPPLY	Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.
3" FIRE	Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.
3" METERED	Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.
	Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.
	Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

PIPE DIAMETER

Up to 300mm (12")

300mm - 600mm (12" - 24")

600mm and bigger (24" plus)

DEPTH BELOW GROUND

900mm (3')

1100mm (3' 8")

1200mm (4')

Valves

	General Purpose Valve
	Air Valve
	Pressure Control Valve
	Customer Valve

Hydrants

	Single Hydrant
--	----------------

Meters

	Meter
--	-------

End Items

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

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

Operational Sites

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

Other Symbols

	Data Logger
--	-------------

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

	Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.
	Private Main: Indicates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

APPENDIX G

Greenfield Runoff Estimation Tool

[Print](#)[Close Report](#)

Greenfield runoff rate estimation for sites

www.uksubs.com | Greenfield runoff tool

Calculated by: chantelle Goncalves

Site name: Forbury Retail Park

Site location: Forbury Road

Site Details

Latitude: 51.45783° N

Longitude: 0.96308° W

Reference: 1889012066

Date: Feb 07 2023 11:11

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Runoff estimation approach **IH124**

Site characteristics

Total site area (ha): 2.65

Methodology

Q_{BAR} estimation method: Calculate from SPR and SAAR

SPR estimation method: Calculate from SOIL type

Soil characteristics

Default

Edited

SOIL type: 1 5

HOST class: N/A N/A

SPR/SPRHOST: 0.1 0.53

Hydrological characteristics

Default

Edited

SAAR (mm): 643 643

Hydrological region: 6 6

Growth curve factor 1 year: 0.85 0.85

Growth curve factor 30 years: 2.3 2.3

Growth curve factor 100 years: 3.19 3.19

Growth curve factor 200 years: 3.74 3.74

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

Default

Edited

Q_{BAR} (l/s): 0.4 15.03

1 in 1 year (l/s): 0.34 12.78

1 in 30 years (l/s): 0.93 34.58

1 in 100 year (l/s): 1.29 47.96

1 in 200 years (l/s): 1.51 56.23

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

APPENDIX H

Thames Water Pre-planning Enquiry (Capacity)

Chantelle Gonçalves - CNM

From: DEVELOPER.SERVICES@THAMESWATER.CO.UK
<DEVELOPER.SERVICES@THAMESWATER.CO.UK>
Sent: 23 October 2020 18:25
To: Chantelle Gonçalves - CNM
Subject: DS6078088 - Forbury Retail Park, Reading RG1 3HS
Attachments: Capacity Report Forbury Retail Park, Reading RG1 3HS.pdf; Forbury Retail Park Capacity L3.pdf; IPS_1B-#1351256-v1-TWUL_Underwriting_Agreement_Template_-_Water_only (2).doc

Dear Miss Goncalves,

Thank you for your recent enquiry. Please find attached a capacity report and clean water network capacity letter for your site. Should you wish to apply for a formal quotation, please use the link below:

<https://developers.thameswater.co.uk>

Many Thanks

Claire Gould

Developer Services - Network Co-Ordinator

Mobile: 07747 640 806

claire.gould@thameswater.co.uk

Visit us online www.thameswater.co.uk, follow us on twitter [www.twitter.com/thameswater](https://twitter.com/thameswater) or find us on www.facebook.com/thameswater. We're happy to help you 24/7.

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Clean water capacity concerns – DS6078088

Your reference: DS6078088

Your site address: Forbury Retail Park, Reading RG1 3HS

Miss Chantelle Goncalves
Clarke Nicholls Marcel
Space One
1 Beadon Road
London
W6 0EA

23rd October 2020

We need to do further investigation

Dear Miss Goncalves,

Unfortunately, our capacity check shows our clean water network can only partially supply your development.

Our assessment concludes that we have sufficient capacity to supply the first 49 properties. However, we're currently unable to meet the needs of your full development consisting of 1,000 residential flats and 3,500m² of commercial premises.

We'll need to carry out modelling to confirm whether reinforcement of our network is necessary to deliver the capacity you require, which we'll undertake at our cost.

What do I need to do?

We've attached your **capacity report**, which you should include when making your local authority (LA) planning application to show we've assessed the site and are in the process of addressing your requirements.

We'll start modelling once you let us know that you own the land and either have outline or full planning permission. Just email me your land registry documents and planning application reference number.

What if I don't have this?

If you have a rapid build programme, we understand that you may need us to start modelling before you own the land or have planning permission. In this case we ask you to share the risk with us by underwriting the cost of modelling. This means if you haven't achieved first occupancy on the site within five years, you agree to pay the cost of the modelling work. We don't ask you to pay anything upfront.

Please call me if you would like to discuss this. You'll find a sample underwriting agreement attached.

What happens next?

We may be able to confirm capacity as soon as we've finished our investigative modelling work. If we need to upgrade our network, we'll design a solution and build the necessary improvements.

We estimate this would take:

Modelling: 6 months

Design (if required): 6 months

Reinforcement (if required): 6 months

Total: 18 months

Can I speak to someone?

As your dedicated contact for your clean water pre-planning enquiry, I'm here if you need a hand. Just call me on the number below.

Yours sincerely,

Claire Gould

Developer Services – Network Co-Ordinator

07747 640 806

Claire.gould@thameswater.co.uk



Your reference: DS6078088

Your site address: Forbury Retail Park, Reading RG1 3HS

Miss Chantelle Goncalves
Clarke Nicholls Marcel
Space One
1 Beadon Road
London
W6 0EA

Clean water capacity report

Status: Capacity concerns

Date: 23rd October 2020

Validity: Valid until 22nd October 2021 or for the duration of your Local Authority planning permission when this report is used to support your application.

We confirm that there will be sufficient capacity on our clean water network to serve the following properties on your development: 49 residential flats.

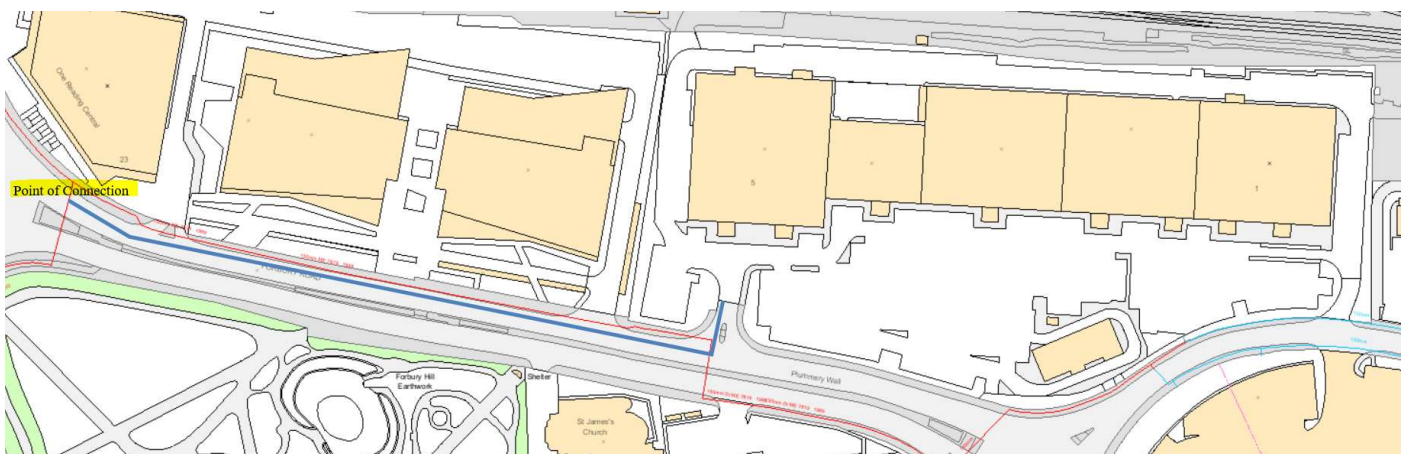
However, we're unable to confirm capacity for your whole development consisting of 1,000 residential flats and 3,500m² of commercial premises without further investigation. How to make a request for us to progress with network modelling activity is listed in the accompanying email.

Please be aware that this report is based upon the details and drawings provided. If there are any subsequent changes to these, then the contents of this report will become invalid and a new assessment will be needed.

Please note that the below POC is based on desktop study and it might change after capacity check study or site-specific survey.

Nearest point of connection

250mm main on Forbury Road.





Contaminated land

If your site is on contaminated land, any new water pipes laid should be barrier pipe which is more expensive. If you think this is not the case you will need to provide a soil report when applying for new mains and services.

Diversions

From our records we don't anticipate that any clean water assets need to be diverted to accommodate your proposals.

Building water

It's important that you apply for a building water supply before you start using water on site even if you believe your supply is already metered. We need to ensure your account is properly set up and you have the correct meter for your supply or fines maybe imposed. Apply [here](#).

Fire hydrant and sprinkler demand

Please note that we cannot confirm whether a fire hydrant or sprinkler demand can be accommodated on a new connection. You'll need to contact an independent consultant or specialist company for hydrant testing for fire-fighting purposes. Valve operations must be carried out by our Network Service Technician which can be booked on 0800 316 9800.

Asset location search

If you need help in identifying the location of existing water mains and sewers, you can get this information from any property search provider. We have a Property Searches team who will carry out an asset location search, which provides information on the location of known Thames Water clean and/or wastewater assets, including details of pipe sizes, direction of flow and depth (for which a fee is payable). You can find out more [online](#) or by calling us on 0845 070 9148.

Chantelle Gonçalves - CNM

From: DEVELOPER.SERVICES@THAMESWATER.CO.U
<DEVELOPER.SERVICES@THAMESWATER.CO.UK>
Sent: 28 October 2020 16:46
To: Chantelle Gonçalves - CNM
Subject: RE: RE: RE: 10982 - Forbury Retail Park Reading Redevelopment - Network capacity - DS6078087
Attachments: DS6078087 L2 28.10.20.pdf; Wastewater FAQs for pre-planning enquiries.pdf

Hi Chantelle

Please see attached our formal response.

Regards
Dan

Dan Rees BSc

MIWater

Developer Services – Adoptions Engineer

Mobile: 07747642033

developer.services@thameswater.co.uk

Clearwater Court, Vastern Road, Reading, RG1 8DB

Find us online at developers.thameswater.co.uk

Get advice on making your sewer connection correctly at connectright.org.uk

Original Text

From: Chantelle Gonçalves - CNM <CVG@cnmlondon.com>
To: DEVELOPER.SERVICES@THAMESWATER.CO.U <DEVELOPER.SERVICES@THAMESWATER.CO.UK>
CC:
Sent: 21.10.20 13:08:03
Subject: RE: RE: 10982 - Forbury Retail Park Reading Redevelopment - Network capacity - DS6078087

Hi Dan,

Many thanks for this information.

We are planning a TEAMS meeting with your colleague Alex Birgauan. Can you please contact him and check if it would be good to have you at this TEAM meeting too?

Regards,

Chantelle Goncalves | Senior Civil Engineer

Space One, 1 Beadon Road, London W6 0EA

t +44 (0)20 8748 8611

www.clarkenichollsmarcel.com

Clarke Nicholls Marcel (Civil & Structural Engineers) Limited.

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From: DEVELOPER.SERVICES@THAMESWATER.CO.U <DEVELOPER.SERVICES@THAMESWATER.CO.UK>
Sent: 21 October 2020 12:46
To: Chantelle Gonçalves - CNM <CVG@cnmlondon.com>
Subject: RE: RE: 10982 - Forbury Retail Park Reading Redevelopment - Network capacity - DS6078087

Hi Chantelle

Thank you for confirming. The sewer, despite being large and critical to our operations, are not classified as trunk sewers. Please confirm who you are in correspondence with regarding the diversion, it may be useful for us to have a joint meeting at some point.

In the meantime, we will check the capacity d/s of manhole 0601 and provide our formal response by w/e 30th October 2020.

Regards
Dan

Dan Rees BSc
MIWater
Developer Services – Adoptions Engineer
Mobile: 07747642033
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Clearwater Court, Vastern Road, Reading, RG1 8DB
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Original Text

From: Chantelle Gonçalves - CNM <CVG@cnmlondon.com>
To: DEVELOPER.SERVICES@THAMESWATER.CO.U <DEVELOPER.SERVICES@THAMESWATER.CO.UK>
CC:
Sent: 14.10.20 08:25:53
Subject: RE: 10982 - Forbury Retail Park Reading Redevelopment - Network capacity - DS6078087

Hi Dan,

Thanks for getting back to us.

I have attached an extract of the sewer records and have highlighted, in pink, the manhole (MH 0601) where we would envisage a new connection. As we haven't yet developed any drainage for the site the connection could also be at any location downstream of this manhole, if allowable.

We have also sent an enquiry to TWUL to confirm whether the foul sewers crossing the site are classified as Trunk Sewers or not. However, we haven't received any response on this and would be much appreciated if you could

advise. If the sewers are classed as Trunk Sewers and if no new connection is allowed to these, we would alternatively connect to the manhole highlighted blue (MH2603).

Concurrently to the enquiry sent for waste and water capacity, we have also sent a separate email to TWUL to arrange a meeting to discuss the proposed development, with the aim to focus on the foul sewers crossing the site and the potential for a build over/diversion agreements or even a combination of both options.

I hope the attached is suitable. However, please contact me if you require any further information.

Regards,

Chantelle Goncalves | Senior Civil Engineer

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From: [DEVELOPER.SERVICES@THAMESWATER.CO.U](mailto:DEVELOPER.SERVICES@THAMESWATER.CO.UK) <DEVELOPER.SERVICES@THAMESWATER.CO.UK>

Sent: 13 October 2020 11:53

To: Chantelle Gonçalves - CNM <CVG@cnmlondon.com>

Subject: RE: 10982 - Forbury Retail Park Reading Redevelopment - Network capacity - DS6078087

Hi Chantelle

Thank you for your enquiry, in order for us to confirm that there is sewage capacity in the sewer network, we need to understand which part of the network has the most suitable point of connection for you. The area is served by separate systems.

Our records indicate that there are large diameter sewers crossing the site which will require diverting in order to accommodate your development. I have attached our scheme of charges in order that you can get an understanding of the costs involved. The works may need to be undertaken in house due to the size of the assets and the volume of flow expected within them which will have to be managed during construction.

If you require a copy of the records, please contact our Searches (searches@thameswater.co.uk) team to purchase a copy.

Regards

Dan Rees BSc

MIWater

Developer Services – Adoptions Engineer

Mobile: 07747642033

developer.services@thameswater.co.uk

Clearwater Court, Vastern Road, Reading, RG1 8DB

Find us online at developers.thameswater.co.uk

Get advice on making your sewer connection correctly at connectright.org.uk

Original Text

From: Chantelle Gonçalves - CNM <CVG@cnmlondon.com>
To: [DEVELOPER.SERVICES@THAMESWATER.CO.U](mailto:DEVELOPER.SERVICES@THAMESWATER.CO.UK) <DEVELOPER.SERVICES@THAMESWATER.CO.UK>
CC:
Sent: 09.10.20 10:58:57
Subject: 10982 - Forbury Retail Park Reading Redevelopment - Network capacity

Dear Sir/Madam,

We are in the early stages of looking at the redevelopment proposal at the above. With reference this please see attached the following documents:

- Application for a pre-planning enquiry to confirm if sufficient capacity already exists in the network to serve the redevelopment site
- Site location plan
- Proposed development plans

The proposals are for the demolition of the existing commercial units and restaurant on the site. The exact details of this are not fully known. At present the commercial building covers approximately 9371m² and the restaurant 341m².

The redevelopment would provide approx. 3500m² of commercial premises and possibly ancillary areas at ground level (cycle stores, refuse stores and plant) with approx. 1000 residential units in high rise towers over. The team is currently looking at options for this and determining constraints that may impact the development and possibly lead the development. As such, the attached proposed redevelopment plans are very preliminary.

With this, we would like to appeal for confidentiality when treating this subject.

Your earliest response would be greatly appreciated, should you wish to discuss any aspect of this further please contact our office.

Kind Regards

Chantelle Gonçalves | Senior Civil Engineer

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Chantelle Gonçalves
CNM

CVG@cnmlondon.com



28 October 2020

Pre-planning enquiry: Confirmation of sufficient capacity

Dear Chantelle

Thank you for providing information on your development at Forbury Retail Park, Reading which includes 341sqm restaurant and 9371sqm commercial to be replaced with 1000 flats and 3500sqm of new commercial premises. You have proposed to connect your foul sewerage to existing manhole 0601. We have not yet received your surface water strategy.

We have completed the assessment of the foul water flows and surface water run-off based on the information submitted in your application with the purpose of assessing sewerage capacity within the existing Thames Water sewer network.

As discussed, the site is also crossed by large diameter public sewers which may require diverting under S185 of the Water Industry Act 1991.

Foul Water

If your proposals progress in line with the details you've provided, we're pleased to confirm that there will be sufficient sewerage capacity in the adjacent foul sewer network to serve your development.

This confirmation is valid for 12 months or for the life of any planning approval that this information is used to support, to a maximum of three years.

You'll need to keep us informed of any changes to your design – for example, an increase in the number or density of homes. Such changes could mean there is no longer sufficient capacity.

Surface Water

In accordance with the Building Act 2000 Clause H3.3, positive connection of surface water to a public sewer will only be consented when it can be demonstrated that the hierarchy of disposal methods have been examined and proven to be impracticable.

Before we can consider your surface water needs, you'll need written approval from the lead local flood authority that you have followed the sequential approach to the disposal of surface water and considered all practical means.

The disposal hierarchy being:

1. store rainwater for later use.
2. use infiltration techniques where possible.
3. attenuate rainwater in ponds or open water features for gradual release.
4. attenuate rainwater by storing in tanks or sealed water features for gradual release.
5. discharge rainwater direct to a watercourse.
6. discharge rainwater to a surface water sewer/drain.
7. discharge rainwater to the combined sewer.
8. discharge rainwater to the foul sewer

we would support a direct discharge to the river if possible. Where connection to the public sewerage network is still required to manage surface water flows we will accept these flows at a discharge rate in line with CIRIA's best practice guide on SuDS or that stated within the sites planning approval.

Please see the attached 'Planning your wastewater' leaflet for additional information.

What happens next?

Please make sure you submit your connection application, giving us at least 21 days' notice of the date you wish to make your new connection/s.

Yours sincerely

Dan Rees

Developer Services