

Hyro Energy Ltd

Kimberly Clark Industrial Estate – Northfleet Pulp Store

Flood Risk Assessment

681689-R1(01)-FRA
February 2025

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RSK GENERAL NOTES

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Title: Flood Risk Assessment

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK LDE Ltd.

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1 INTRODUCTION

RSK Land and Development Engineering Ltd were commissioned by Hyro Energy Ltd (the client) to provide a Flood Risk Assessment (FRA) to support the planning application at Kimberly Clark Industrial Estate – Northfleet Green (the site). Development proposals include the potential development of a concrete slab, to provide an area for pulp storage for the existing paper mill.

The purpose of the FRA is to establish the risk associated with the proposed development and to propose suitable mitigation, if required, to reduce the flood risk to a more acceptable level. The FRA must demonstrate that the development will be safe for its lifetime (in this case taken to be 75 years as a conservative approach) taking account of the vulnerability of its users, without increasing flood risk elsewhere.

This document has been produced to assess the flood risk from tidal, fluvial, surface water, groundwater, sewers, reservoirs and artificial sources in line with the National Planning Policy Framework (NPPF)[1] and its corresponding Planning Practice Guidance (PPG)[2].

This assessment has been undertaken in consultation with the relevant authorities, and with reference to data, documents and guidance published by the Environment Agency (EA), the Lead Local Flood Authority (LLFA) (Kent County Council), the Local Planning Authority (LPA) (Gravesham Borough Council), and the Water Authority (Southern Water).

The comments given in this report and opinions expressed are subject to RSK Group Service Constraints provided in **Appendix A**.

[1] Communities and Local Government, 'National Planning Policy Framework', published March 2012 and last updated December 2024.

[2] Communities and Local Government, 'Planning Practice Guidance - Flood Risk and Coastal Change, ID 7', published March 2014 and last updated August 2022.

2 SITE DESCRIPTION & PROPOSALS

2.1 Existing site

2.1.1 Site description

The site is located to the north of Crete Hall Road, Northfleet, Kent, within the existing Kimberly Clark industrial area. The site can be located at National Grid Reference 562727 E, 174515 N and postcode DA11 9AA. A site location plan is included as **Figure 2.1**.

The site covers an area of approximately 0.51Ha and currently comprises a grassed area surrounded by areas of hardstanding. The surrounding area consists of a paper mill to the south and west, a scrap processing area to the west and the River Thames to the north.



Figure 2.1: Site location plan

2.1.2 Topography

A site-specific topographic survey has been carried out by Premier Surveys. The survey shows the existing site levels vary from approximately 5.70 meters Above Ordnance Datum (mAOD) in the centre of the site, down to approximately 4.80mAOD at the centre of the southern boundary. The land is generally at a level of 5.50mAOD, with a slight slope southward.

The topographic survey is included in **Appendix B**.

2.1.3 Existing drainage

2.1.3.1 Public

Southern Water sewer plans have been obtained for the site and are included in **Appendix C**. These plans indicate the following network of sewers in the vicinity of the site:

- A 225mm diameter foul sewer located to the west of the site. This sewer runs from northwest to southeast toward the southwest corner of the site, where it is discharged into by a 150mm diameter foul sewer located to the west of the site and is upsized to a 300mm diameter pipe. The sewer then runs southward from the southwest corner of the site and discharges into a 150mm diameter rising main that runs eastward along Crete Hall Road.
- A 225mm diameter surface water sewer that runs westward along Crete Hall Road to the south of the site. This sewer is upsized to a 300mm diameter pipe to the south of the site. The pipe continues to follow Crete Hall Road and wraps around the southwest of the site and flows northward, where it is upsized to a 900mm diameter pipe, before eventually discharging to the River Thames.
- A 375mm diameter surface water sewer located the east of the site. This sewer runs northward and discharges into the River Thames.

2.1.3.2 Private

Surface water runoff from the wider Kimberly Clark paper mill site is currently believed to be collected via a private surface water drainage system and discharged to the River Thames. A private drainage survey has been overlain on the topographic survey in **Appendix B.**

This survey indicates that surface water from the majority of the wider site is collected by gullies (GY062, GY061, GY058, GY057 & GY053) located on Kimberley Clark Road to the east of the site. These gullies discharge to a 225mm diameter pipe which runs southward along Kimberley Clark Road and discharges to a 825mm diameter surface water sewer at Manhole MH07 to the southeast of the site. There is a 100mm diameter surface water pipe located in the centre of southern half of grassed area. This pipe runs southwest to Manhole MH073, before turning to run southward to Manhole MH045 where the survey ends. It is assumed this pipe connects to a 150mm diameter pipe that discharges to the 825mm diameter surface water sewer running westward. The 850mm diameter surface water pipe is upsized to a 900mm diameter pipe at Manhole MH026 and subsequently discharges into the River Thames.

2.2 Development proposals

The development proposals for the site include the construction of a concrete slab for a pulp storage area, which will serve the existing paper mill.

The relevant proposed site plans are included as **Appendix D**.

3 ENVIRONMENTAL SETTING

3.1 Hydrology

Reference to Ordnance Survey (OS) mapping and the EA's web-based mapping indicates that the nearest EA Main River is River Thames, which is located approximately 50m north from the site. The River Thames flows west to east, though at this location will be strongly tidally influenced. There are no other notable surface water features in the vicinity of the site.

3.2 Geology

Based on published geological records for the area (British Geological Survey online mapping), the site exhibits the following geology:

- Superficial Geology: None present.
- Bedrock Geology: Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation - Chalk.

BGS Borehole data shows several borehole records to the east of the site. The closest record is located to the east of the site on Crete Hall Road, BGS Reference TQ67SW438. The borehole was taken from a starting ground level of 5.37mAOD, the borehole records ash, brick, rubble and chalk fragments to a level of 3.0m below ground level (mBGL). Chalk flints and silty clay is recorded to 4.10mBGL. White chalk and flints are recorded to borehole completion at 10.0mBGL. A water level is recorded at approximately 5.0mBGL.

3.3 Hydrogeology

Hydrogeological information was obtained from the online Magic Maps service. These maps indicate that:

- The site is not underlain by a superficial aquifer.
- The site is underlain by a Principal bedrock aquifer.
- The majority of the site is located within Zone II – Outer Protection Zone groundwater Source Protection Zone (SPZs).

The close proximity of the site to a major watercourse and underlying geology suggest that shallow groundwater may be present beneath the site, however a nearby borehole log suggests groundwater levels to be at approximately 5.0mBGL. The River Thames to the north of the site is a major tidal waterbody and hence groundwater levels are likely to vary with tide levels.

4 SOURCES OF FLOOD RISK

4.1 Criteria

In accordance with the NPPF and advice from the EA, an assessment of the risk associated with various flooding sources is required along with consideration of the effects of climate change over the design life of the development (in this case assumed to be 75 years).

The EA's most recent climate change guidance, published in May 2022[3], should be referenced in order to identify the appropriate peak river flow and rainfall intensity allowances for the scheme. The appropriate allowance for peak river flow is based on the location of the site in the country, the lifetime of development, the relevant flood zone and the vulnerability of the proposed end use.

The flood risk elements that need to be considered for any site are defined in BS 8533 'Assessing and managing flood risk in development Code of practice'[4] as the "Forms of Flooding" and are listed as:

- Flooding from rivers (fluvial flood risk);
- Flooding from the sea (tidal flood risk);
- Flooding from the land;
- Flooding from groundwater;
- Flooding from sewers (sewer and drain exceedance, pumping station failure etc); and
- Flooding from reservoirs, canals and other artificial structures.

The following section reviews each of these in respect of the subject site.

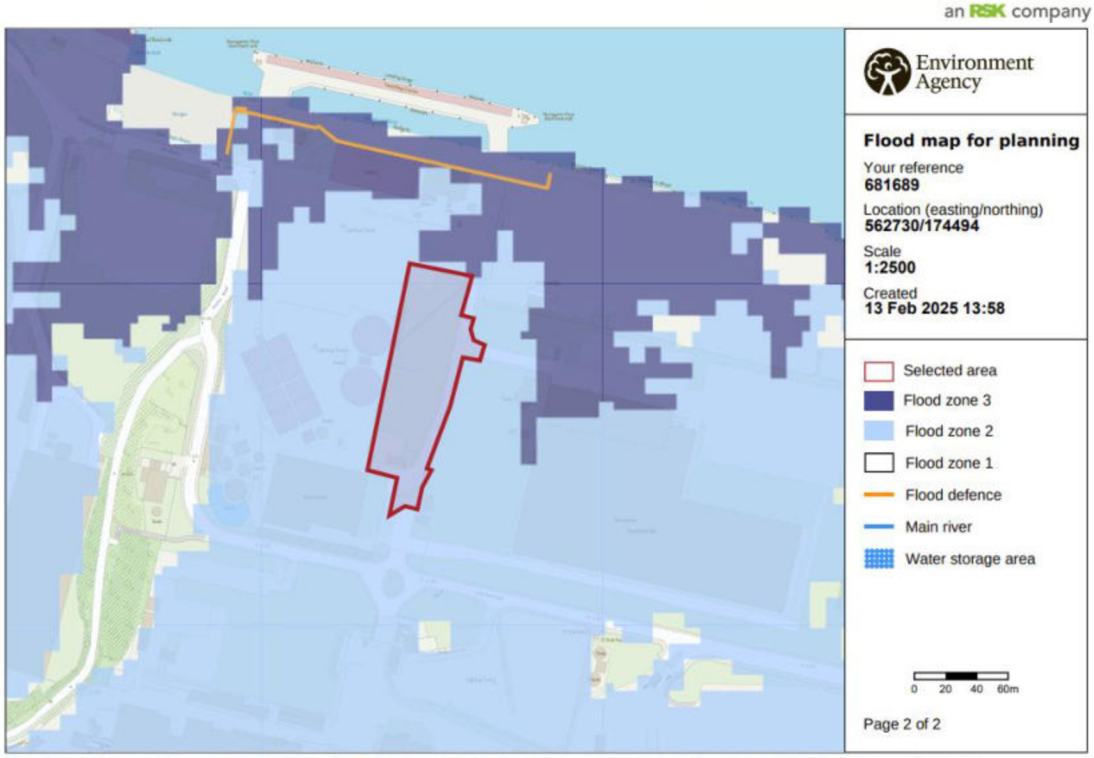
4.2 Flooding from the River Thames (fluvial and tidal flood risk)

The EA Flood Zone mapping study for England is available on their website at: https://flood-map-for-planning.service.gov.uk.

The latest EA published flood zone map **(Figure 4.1)** shows that the majority of the site lies within Flood Zone 2, representing a between 1 in 100 year and 1 in 1000 year annual probability of flooding from fluvial sources and/or a between 1 in 200 year and 1 in 1000 year annual probability of flooding from tidal sources. There is a negligible area of Flood Zone 3 i.e. a 1 in 100 year or greater annual probability of flooding from fluvial sources or a 1 in 200 year or greater annual probability of flooding from tidal sources, located in the northeast corner of the site.

[3] Environment Agency, 'Guidance: Flood Risk Assessments: Climate Change Allowances'. https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances, last updated May 2022

[4] BSI, 'BS 8533-2017 Assessing and managing flood risk in development Code of practice', December 2017.



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Figure 4.1: Environment Agency 'Flood map for planning'

Due to the site's location within Flood Zone 2 and Flood Zone 3, the EA was formally consulted as part of this assessment, with request for flood related information (including flood levels) included in the consultation. Their full response to the flood data request can be found in **Appendix E**. Within this consultation the EA confirmed that the flooding associated with this site is a tidal flooding from the River Thames. It is noted that the site boundary shown on the EA dataset comprises a wider extent of the Kimberly Clark industrial estate.

4.2.1 Flood Defences

As can be seen within **Figure 4.1** there is a flood defence located along the river wall to the north of the site. Within the data provided by the EA this flood wall has a current crest level of 6.73mAOD and a standard of protection of 1000 years.

It is required by 2040 that these defences are increased to a crest level of 6.90mAOD, and by 2070 are increased to 7.40mAOD. The future statutory defence level is 7.40mAOD and will ensure the site is protected from the extreme flood level of 6.49mAOD, however the onus of delivering these flood defence improvements will be on the private landowner in which the flood defences lie. If flood defences are not maintained to their current condition and standard of protection then the flood risk to the site will increase as tidal flooding will not be prevented as effectively, the risk of a breach of the defences also increases. If the flood defences are not improved in line with future statutory defence level requirements, then the site will be at increased risk of more frequent flooding as sea level rises with climate change.

4.2.2 Breach Analysis

As noted above, the site is afforded protection from tidal inundation by the presence of raised linear flood defences to the north of the site. Whilst the failure of the defences during an extreme tidal event is considered unlikely, the consequence of a breach or overtopping failure in terms of the rate, depth and extent of inundation will be dictated largely by the landward ground levels within the area behind the defences. The residual risk, in the event of defence failure, should therefore be assessed for the site.

The EA have supplied a Product 4 data package which includes the breach analysis data, the modelling is based on the Downriver Breach Inundation Modelling Study 2018, with an allowance for climate change for epoch 2115. Although this data was originally obtained in May 2023, the EA confirmed in November 2024 that it remains valid for the site. Nodes 3 and 13 are considered most relevant to the above ground compound proposed within the site boundary. The modelled levels for a breach for the 0.5% AEP and 0.1% AEP scenarios are shown in **Table 4.1.** The EA mapping of the Node location points, and modelled levels is contained in **Appendix E.**

The lowest existing ground levels in the area of the proposed pulp slab are approximately 4.80mAOD. For the present day scenario this could mean flood depths of 0.48m and 0.68m for the 0.5% AEP and 0.1% AEP scenarios respectively. For the future scenario this could mean flood depths of 1.19m and 1.60m for the 0.5% AEP and 0.1% AEP scenarios respectively.

Table 4.1: Breach Inundation modelled node data

Node	0.5% AEP Modelled levels (mAOD)		0.1% AEP Modelled Levels (mAOD)	
	2014	2115	2014	2115
3	5.24	5.99	5.53	6.40
6	5.28	5.99	5.48	6.40

The breach mapping outputs in the Product 8 data show the breach hazard mapping which has been calculated from the maximum flood depths multiplied by the maximum flood velocity and then categorised. Maximum flood depths in the proposed development area are expected to be between 0.25m and 1.0m for a 0.5% AEP flood in the 2115 scenario. The site is within the hazard rating category of 1.25 - 2.0, indicating a 'danger for most'.

A 0.1% AEP flood in the 2115 scenario shows a greater depth of flooding on site, predominantly within the 1.0m - 1.5m category. This results in the hazard rating for the site being partially 'danger for most' and partially within the greater than 2.0 category indicating a 'danger for all' during this scenario.

4.2.3 Historical Flooding

In the Product 4 data provided by the EA they note that they have recorded one historical flood event within the vicinity of the site. This is the January 1953 event, which was a result of a storm surge in the North Sea. The EA state: *"the approximate level in the Thames at the time was 4.90mAOD"* with the extent *"within approximately 700m"* of the site. **Figure 4.2** is the EA's historic flood map.



Figure 4.2: Environment Agency Historic Flood Map

4.2.4 Climate Change

On the assumption that the Thames Barrier will be closed more frequently due to increased sea levels anticipated during climate change scenarios, fewer high tides will be allowed to flow upstream into central London each year therefore the estimated extreme water levels within the study area do not increase with climate change. Tidal flood levels therefore do not change as a result of climate change.

4.2.5 Flood Risk

Overall, the site is currently defended against a 1 in 1000 year fluvial / tidal flood event and will continue to be afforded this standard of protection on the basis that the relevant riparian owners continue to maintain and raise the existing flood defences in line with their responsibilities as riparian landowners. There is a residual risk of tidal flooding to the site in the event of a defence failure.

The resultant flood risk is considered to be **medium.**

4.3 Flooding from the land (surface water flood risk)

If intense rain is unable to soak into the ground or be carried through manmade drainage systems, for a variety of reasons, it can run off over the surface causing localised floods before reaching a river or other watercourse.

Generally, where there is impermeable surfacing or where the ground infiltration capacity is exceeded, surface water runoff can occur. Excess surface water runoff from the site will either drain via infiltration or will run off onto the surrounding hardstanding and be discharged to the River Thames via the existing drainage system for the wider Kimberly Clark estate.

The EA's surface water flood map **(Figure 4.3)** indicates that the majority of the site is located within an area of 'very low' surface water flood risk i.e. a less than 0.1% annual probability of flooding. There is a small area of 'low' (between 0.1% and 1.0% annual probability) surface water flooding risk located in the southern area of the site.



Figure 4.3: Environment Agency 'Flood risk from surface water' map

Surface water flooding is likely to increase as a result of climate change in a similar ratio to fluvial flooding. Increased intensity and frequency of precipitation is likely to lead to reduced infiltration and increased overland flow. Climate change guidance was updated

by the EA in May 2022. Revised allowances for climate change have been included in the indicative drainage strategy.

The overall risk of surface water flooding at the site is considered to be **very low.**

4.4 Flooding from groundwater

Groundwater flooding tends to occur after long periods of sustained high rainfall. Higher rainfall means more water will infiltrate into the ground and cause the water table to rise above normal levels. In low-lying areas, the water table is usually at shallower depths anyway, but during very wet periods, with all the additional groundwater flowing towards these areas, the water table can rise up to the surface causing groundwater flooding.

Available geological mapping indicates that the site is underlain by a Chalk bedrock, with nearby borehole logs indicating groundwater to be at approximately 5.0mBGL. The site is located next to a major tidal waterbody and hence groundwater levels are likely to change with tide levels.

The Kent County Council Preliminary Flood Risk Assessment (2011)[5] Groundwater Flood Risk Areas Mapping[6] places the site within an area of negligible to low groundwater flood risk.

Climate change could increase the risk of groundwater flooding as a result of increased precipitation filtering into the groundwater body. This is less likely to cause a significant change to flood risk than from other sources, since groundwater flow is not as confined. It is probable that any locally perched aquifers may be more affected, but these are likely to be isolated. The change in flood risk as a result of climate change is likely to be low.

The overall groundwater flood risk is considered to be **low.**

4.5 Flooding from sewers

Flooding from artificial drainage systems occurs when flow entering a system, such as an urban storm water drainage system, exceeds its conveyance capacity, the system becomes blocked, or it cannot discharge due to a high water level in the receiving watercourse. When exceeded, the surcharged pipe work could lead to flooding from backed up manholes and gully connections.

Sewer details have been referenced from sewer record plans obtained from Southern Water. The plans indicate a public surface water and foul sewer to the south and west of the site. The private utilities survey **(Appendix B)** indicates a large private network of surface water and foul sewers across the wider Kimberly Clark site. The plans show that runoff from the Kimberly Clark estate drains to the River Thames via a 900mm diameter public surface water sewer, the invert level of the outfall of the 900mm pipe to the River

[5] Kent County Council Preliminary Flood Risk Assessment (2011), accessible at: https://www.kent.gov.uk/__data/assets/pdf_file/0013/12091/Preliminary-flood-risk-assessment.pdf

[6] Kent County Council PFRA Groundwater Flood Risk Areas Mapping, accessible at: https://www.kent.gov.uk/__data/assets/pdf_file/0018/12087/fig6-groundwater.pdf

Thames is thought to be -3.05mAOD, and there is no evidence of tidal flaps to prevent backflow.

No information on historic flooding has been provided by Southern Water and the Kent County Council PFRA does not make mention of site specific sewer flooding.

Based on advice provided by Kent County Council in their predevelopment response as part of the application for the hydrogen facility to the northwest of the site (RSK ref: 681688-R1(01)-FRA), the existing drainage network for the wider Kimberly Clark estate has been modelled using an approximation of the hardstanding catchment draining into the private drainage system, and pipe sizes and lengths recorded from the utility survey in **Appendix B.** The system was modelled for a 1 in 30 year storm event plus climate change with the outfall surcharged for the 1 in 200 year event tidal event. The surcharged outfall levels for the tidal event were calculated using the 'rule of twelfths' method to simulate the tidal curve between 6.080mAOD (Extreme Sea Level) and -2.340mAOD (the estimated low tide level). The model simulation shows the existing Kimberly Clark site would flood in the 30 year + 35% climate change scenario with a surcharged outfall due to tidal storm event. The critical results maximum levels are shown in **Appendix H.**

Climate change is likely to result in an increase in flooding from sewers. Increased rainfall and more frequent flooding put existing sewer and drainage systems under additional pressure resulting in the potential for more frequent surcharging and potential flooding. This would increase the frequency of local sewer flooding but would not be significant in terms of the proposed development.

The overall sewer flood risk to the site is considered to be **medium.**

4.6 Flooding from reservoirs

Flood events can occur from a sudden release of large volumes of water from reservoirs. The EA reservoir flood map **(Figure 4.4)** shows the largest area that might be flooded if a reservoir were to fail and release the water it holds. Since this is a prediction of a worst-case scenario, it is unlikely that any actual flood would be this large.



Figure 4.4: Environment Agency 'Flood risk from reservoirs' map

The EA mapping was updated in 2021 to demonstrate the potential maximum extent of flooding for two scenarios - a "dry day scenario" in which river levels are "normal", and a "wet day scenario" where the flooding from the reservoir coincides with flooding from rivers.

The mapping shows that the majority of the site is not in a location at risk of reservoir flooding when river levels are normal and should the peak fluvial event and reservoir failure occur at the same time. However, there are some areas considered to be at residual risk should the peak fluvial event and reservoir failure occur at the same time. The reality is a reservoir failure is more likely to occur sometime after the peak of the event. Reservoir flooding is also extremely unlikely and there has been no loss of life in the UK from reservoir flooding since 1925. Since then, reservoir safety legislation has been introduced

Reservoirs can be managed over time, controlling inflow/outflow of water and therefore there is the capacity to control the effects of climate change. Increased rainfall has the potential to increase base flow, but this should be minimal. It is unlikely that there will be a substantial change to the risk of flooding for this site as a result of climate change.

The resultant flood risk is considered to be **low.**

4.7 Other sources of flooding

4.7.1 Canals

There are no Canal & River Trust owned canals within the vicinity of the site.

The resultant flood risk from canals is considered to be **very low.**

4.7.2 Other artificial features

No other artificial features with the potential to result in a flood risk to the site have been identified.

The resultant flood risk from 'other' sources is considered to be **very low.**

4.7.3 Tide locking

Tide locking occurs when a high rainfall event coincides with a high tide rather than a fluvial flood. Tide locking can be a regular occurrence. However, the period of tide lock is confined to the peak of the tide and therefore its duration is generally limited.

Runoff from the proposed development area discharges via infiltration or runoff to the wider Kimblery Clark drainage network, which ultimately discharges to the River Thames via a public sewer at Manhole MH030. There has been no evidence to suggest that the site floods frequently as a result of rainfall coinciding with high tide, though water levels at Tilbury monitoring station[7] do suggest frequent surcharging of the 900mm diameter public sewer outfall, this may impede drainage.

The potential flood risk impact of tide locking at this site has been assessed within the sewer flood risk section above **(Section 4.5).**

The risk from tide locking causing flooding to the site is greatest when a high intensity rainfall event would coincide with hightide. Tide locking would impede drainage and will result in backlogging of the drainage into the site, therefore resulting in a heightened risk of ponding on site until tidal levels recede. The effect of tide locking could be exacerbated by climate change as a result of more frequent higher tides and increased surface runoff.

The resultant flood risk from tide locking is considered to be **medium.**

[7] Tilbury Monitoring Station, accessible at: https://check-for-flooding.service.gov.uk/station/7394

5 MITIGATION MEASURES AND RESIDUAL RISK

5.1 Sequential approach within application boundary

The site is considered at low risk from flooding when defences are considered, and the breach mapping shows a relatively equal level of breach hazard flood risk through the site owing to the level ground levels on site.

From the information described above and the breach mapping extents as provided in the EA Product 4 data, there is relatively little difference in flood risk within the application boundary. Therefore, it is not possible to direct the proposed infrastructure to a lower risk area within the red line boundary.

5.2 Overland flood flow

Tidal flooding caused by a breach of the flood defences could impact the proposed development. It is not proposed to bund the site, and flooding will be permitted to occur in the unlikely event of a breach, ensuring no disruption to existing flow routes.

There is uncertainty regarding the likelihood of exceedance flows from the surface water manholes during a tidal event. The topography of the site would suggest exceedance flows from surcharged manholes within the wider industrial estate will flow southwards towards areas of lower ground.

No surface water overland flow routes have been identified across the site.

5.3 Finished floor levels

Whilst it is acknowledged the site is at risk from flooding during the unlikely scenario of a breach of the defences, it is not proposed to raise the pulp storage area above the flood levels.

The proposed use is of a low vulnerability, and the operator acknowledges the residual risk of flooding and accepts that any flood damage would need to be repaired prior to the facility being brought back into use following a flood.

In terms of the construction of the development, reference should be made to “Preparing for Floods” a DEFRA publication[8], CIRIA guidance C624 “Development and flood risk”[9] and the CLG document “Improving the flood performance of new buildings”[10].

[8] DTLR, ‘Preparing for Floods Interim guidance for improving the flood resistance of domestic and small business properties’, October 2003.

[9] CIRIA, ‘Development and Flood Risk guidance for the construction industry’ C624, 2004.

[10] Communities and Local Government, ‘Improving the flood performance of new buildings – flood resilient construction', May 2007.

5.4 Easements and consents

The proposed developed is approximately 50m south from the River Thames flood defences. The distance between the flood defences and proposed development is not considered to impede flood defence works in the future including the potential for new defences to be built 16m inland from the existing defences (as outlined by the EA in **Appendix E**). The current layout is greater than 16m south from the flood defences, as shown in **Appendix D.**

Any consent works usually take place post planning, prior to construction, however, the principals of any development within the appropriate easements should be agreed at the planning stage.

5.5 Flood compensation

The site is shown to be at risk from tidal flooding, rather than fluvial flooding, so fluvial floodplain compensatory measures are not deemed necessary.

5.6 Safe access/egress

The site is shown to be within flood extents in a tidal breach scenario during which inundation mapping shows flooding across the site. This is a residual risk, which can be managed through a Flood Management Plan as described below.

5.7 Flood management plan

The site is partially located within Flood Zone 3. Given that the site could be impacted in the event of a breach of the Thames Tidal defences during a 1 in 200 year event, a Flood Management Plan should be prepared to support the development.

Forecasting of tidal flooding on the River Thames is well developed through 24 hour monitored telemetry and flood forecasting models allowing around 36 hours' notice of an impending storm surge.

The site is located within the EA Flood warning area classified as 'Gravesend and Northfleet'. The EA charter is to provide a minimum 2 hour advance warning, which would provide sufficient time for site users to be evacuated to an area of safe refuge.

It is recommended that future users of the site ensure they are registered with the EA's Flood Warning system (Floodline Warning Direct) to provide adequate forewarning in the event of a predicted flood in the neighbourhood.

6 PLANNING POLICY CONTEXT

6.1 National planning policy

Section 14 of the NPPF details the overarching requirements relating to flood risk for any development. The key message is that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.

In areas at risk of flooding, the NPPF requires that the following criteria are met:

a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;

b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;

c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;

d) any residual risk can be safely managed; and

e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.

The PPG supports the NPPF and provides further advice regarding the assessment of flood risk and the application of the Sequential and Exception Tests.

6.1.1 Land use vulnerability

Table 2 of the PPG indicates the compatibility of various land uses in each flood zone, dependent on their vulnerability to flooding. **Table 6.1** below is reproduced from Table 2 of PPG.

Table 6.1: Flood risk vulnerability and flood zone 'compatibility'

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate
	Zone 2	Appropriate	Appropriate	Exception Test Required	Appropriate	Appropriate
	Zone 3a	Exception Test Required	Appropriate	Should not be permitted	Exception Test Required	Appropriate
	Zone 3b functional floodplain	Exception Test Required	Appropriate	Should not be permitted	Should not be permitted	Should not be permitted

With reference to Annex 3 of the NPPF, the proposed development is classed as 'less vulnerable'. This classification of development is appropriate for areas within Flood Zone 2 and Flood Zone 3 and therefore appropriate for the subject site.

6.1.2 Sequential Test

The Sequential Test aims to direct new development to areas with the lowest probability of flooding. The site has been identified as located within Flood Zone 2 and Flood Zone 3 and has been assessed as having no other significant flooding issues from all other sources. Based on the use of the proposed development it needs to be located with close proximity to of the existing paper mill and hence cannot intrinsically be placed elsewhere.

Detailed sequential testing is outside the scope of this report.

6.1.3 Exception Test

In accordance with **Table 6.1**, there is no requirement to apply the Exception Test for a 'less vulnerable' development within Flood Zone 2 and Flood Zone 3.

7 SURFACE AND FOUL WATER DRAINAGE ASSESSMENT

7.1 Scope

This section discusses the potential quantitative effects of the development on both the risk of surface water flooding on-site and elsewhere within the catchment, as well as the type of potential SuDS features that could be incorporated as part of the masterplan.

The NPPF states that SuDS should be considered wherever practical. The use of SuDS is also encouraged by regional and local policy. In accordance with the Defra Non-Statutory Technical Standards[11], the surface water drainage strategy should seek to implement a SuDS hierarchy that aspires to achieve reductions in surface water runoff rates to greenfield rates. Where a reduction to the greenfield rate is not practicable, the proposed surface water drainage strategy should not exceed the existing runoff rate, unless the proposed drainage system will discharge to a tidally influenced waterbody.

In addition, Building Regulations Part H[12] requires that the first choice of surface water disposal should be to discharge to an adequate soakaway or infiltration system, where practicable. If this is not reasonably practicable then discharge should be to a watercourse, the least favourable option being to a sewer (surface water before combined). Infiltration techniques should therefore be applied wherever they are appropriate.

This assessment includes an overview and comparison of the existing and proposed development scenario. The approximate existing and proposed areas are provided in the Table below:

Table 7.1: Approximate existing and proposed site areas

Land use	Existing area (m^2)	Proposed area (m^2)
Impermeable	1,500m^2 (30%)	5,100m^2 (100%)
Permeable	3,600m^2 (70%)	0m^2 (0%)
Total	5,100m^2	5,100m^2

7.2 Pre-development situation

The existing site area is approximately 0.51Ha and 30% impermeable.

[11] DEFRA, 'Sustainable Drainage Systems - Non-statutory technical standards for sustainable drainage systems', March 2015.

[12] HM Government (2010 with 2013 amendments), 'The Building Regulations 2010: Approved Document H - Drainage and Waste Disposal (2002 Edition incorporating 2010 amendments)'.

The pro-rata IoH 124[13] method has been used to estimate the Greenfield surface water runoff for the proposed development area of the site (0.36Ha), using the HR Wallingford Greenfield runoff rate estimation tool. Calculations are contained in **Appendix G**.

Table 7.2: IOH 124 surface water runoff (greenfield) for 0.36Ha

Return period	Peak flow (l/s)
QBar	0.78
1 in 1 year	0.67
1 in 30 year	1.80
1 in 100 year	2.50

The existing drainage network for the wider industrial estate has been modelled using an approximation of the hardstanding catchment draining into the private drainage system, and pipe sizes and lengths recorded from the utility survey in **Appendix B.**

Kent County Council (KCC) provided a predevelopment response and subsequent guidance in relation to the linked planning application for a new hydrogen facility to the west of the site. This advice is considered relevant to the subject application so has been included in **Appendix F**. In accordance with this LLFA advice, the wider drainage system was modelled for a 1 in 30 year storm event, plus climate change with the outfall surcharged for the 1 in 200 year event tidal event. The surcharged outfall levels for the tidal event were calculated using the 'rule of twelfths' method to simulate the tidal curve between 6.080mAOD (Extreme Sea Level) and -2.340mAOD (the estimated low tide level). The model simulation shows the existing site would flood in the 30 year + 35% climate change scenario with a surcharged outfall due to tidal storm event. The critical results maximum levels are shown in **Appendix H.**

7.3 Post-development situation

The proposed development will result in an increase in impermeable area and surface water runoff across the site. It will therefore be necessary to manage surface water on-site through conveyance towards the proposed point of discharge, whilst providing sufficient attenuation for all events up to the 1 in 100 year event inclusive of 35% climate change based on latest climate change guidance, unless discharging to a tidally influenced watercourse.

7.3.1 Point of discharge

Discharge options from the site have been considered in line with the SuDS hierarchy, as follows.

[13] Institute of Hydrology (IoH), 'Flood Estimation for small catchments - Report 124', 1994.

Infiltration

Infiltration should be considered as the primary option to discharge surface water from the developed study area. The effectiveness of infiltration is completely dependent on the physical conditions at the study area. Potential obstacles include:

- Local variations in permeability preventing infiltration - It is understood that the site is underlain by Chalk bedrock, which is typically considered suitable for the use of soakaways due to its high permeability. This will limit the depth at which infiltration can be used.
- Shallow groundwater table - For infiltration drainage devices, Building Regulation approved document H2 states that these *"should not be built in ground where the water table reaches the bottom of the device at any time of the year"*. Groundwater was observed at a nearby borehole at approximately 5mbgl and is likely to fluctuate with the tide.
- Source Protection Zones - The study area is located within a Zone II Groundwater Source Protection Zone. Therefore, extra precautions to the ensure the quality of water discharged to the ground must be provided.

From the information available infiltration based SuDS are not considered feasible due to potential variable underlying groundwater levels and potential contamination of an SPZ.

Discharge to watercourse

The site will be able to discharge to the River Thames via the existing drainage system which connects to a 900mm diameter public surface water sewer which subsequently outfalls into the tidal River Thames.

The correspondence from KCC has confirmed that as the River Thames is a tidal body at this location, the proposed development will be able to discharge at an unlimited rate with no restriction on the rate of discharge.

Discharge to surface water sewer

The site currently discharges to a 900mm diameter public surface water sewer which enables an outfall to the River Thames. The proposed developed will utilise the existing private drainage system to connect to the public sewer system and subsequently discharge into the River Thames as described above.

7.3.2 Proposed drainage strategy

Whilst there is no requirement to attenuate and discharge surface water at a controlled rate when discharging to a tidally influenced water body, initial discussions with Southern Water have identified that a discharge rate of 2.5l/s will be acceptable to their sewer. On this basis, a modular storage tank has provisionally been proposed beneath the concrete slab; the proposed drainage system that will provide onsite attenuation and will discharge to Manhole MH069 at a rate of 2.5l/s. This rate is between the Q30 and Q100 greenfield rate for the existing site and will ensure that the capacity of the existing private drainage system is not exceeded during the critical storm events. This rate has been agreed by Southern Water in consultation with the client. It should be noted that this consultation between the client and Southern Water is still ongoing, and a higher or uncontrolled discharge rate may be agreed to by Southern Water, subject to pipe capacity checks. In

this situation, the attenuation proposals may change. However, for the purposes of this assessment it is reiterated that an uncontrolled discharge is allowable when discharging to tidal watercourses.

A plan of the provisional proposed drainage strategy has been included in **Appendix D.**

The correspondence from KCC has confirmed that discharge from the site may be at unlimited rates to the River Thames but surface water attenuation is subject to the requirements to attenuate for the 30 year storm event plus 35% climate change with a surcharged outfall at the 1 in 200 year tidal storm event level. The existing network calculations provided in **Appendix H** show the area where the concrete pulp slab will be located is already subject to flooding during a tide locking event.

Any flood risk to the site from the tidal and sewer sources in the tide-locking scenario is considered to only impact on the private users of the Kimberly Clark Industrial Estate with a low risk to the wider public. Flooding is likely to be retained within the site and would follow the topography of the site to the low point west of the proposed site. Any flooding during the tide-locking scenario would be temporary, lasting only until the tide recedes at the next natural tidal cycle. It is noted that although there is a theoretical risk of tide-locking resulting in flooding due to a surcharged outfall, there is no evidence of this having occurred at the site to date.

As the proposed development will continue to use the existing sewer network on site, it is not considered proportionate to the scale of the development to provide attenuation for the tide-locking scenario, although the proposed attenuation tank (subject to Southern Water discussions) will provide some benefit during a tide locking scenario. Even if storage was provided for runoff from the development area, the site remains theoretically at risk of flooding during the tide locking scenario as the existing outfall serves a much larger industrial area that does not include any surface water attenuation. Any additional storage provided would have a negligible impact on the overall flood risk during the tide-locking scenario.

If required, the dimensions, volumes and location of the SuDS features will need to be revised as the masterplan develops and during the detailed planning stage. Detailed design of individual features is not part of the scope of this report. Preliminary design criteria have been based upon guidance given in the CIRIA publication 'The SUDS Manual'[14]

Temporary drainage should be established for the construction phase of development to prevent silt mobilisation, potentially impacting on flow regimes and silt pollution downstream. The construction of SuDS should be considered in the early stages of site design.

[14] The CIRIA SuDS Manual (C753)

7.3.3 Adoption and maintenance

The Design and Construction Guidance for Foul and Surface Water Sewers (DCG)[15] states that as of April 1st 2020, sewerage authorities are required to adopt some SuDS features, including basins and swales. However, SuDS features that are classified as forming part of a building or yard (i.e. permeable paving and green roofs) will not be adoptable under the DCG and will require a second adopting authority or maintenance company. Therefore, if an attenuation tank is used at this site, the long-term maintenance will most likely be undertaken by a management company.

Maintenance of SuDS features should be undertaken in line with maintenance schedules outlined in the SuDS Manual and if adopted, any Southern Water maintenance guidance. An example of a typical maintenance regime for a storage tank can be found in **Appendix I.** Similar regimes would be applicable for all other SuDS features on site. Full maintenance schedules should be confirmed at the detailed design stage in consultation with appropriate product suppliers.

7.4 Foul drainage provision

A foul drainage connection is not required for this development.

[15] Water UK, 'Sewerage Sector Guidance Appendix C – Design and Construction Guidance for foul and surface water sewers offered for adoption under the Code for adoption agreements for water and sewerage companies operating wholly or mainly in England', March 2020.

8 CONCLUSIONS AND RECOMMENDATIONS

This FRA complies with the NPPF and Planning Practice Guidance and demonstrates that flood risk from all sources has been considered in the proposed development. It is also consistent with the Local Planning Authority requirements with regard to flood risk.

The proposed development site lies in an area designated by the EA as Flood Zone 2 and Flood Zone 3; however, the site is protected by flood defences to a 1 in 1000 year standard of protection. The risk of fluvial or tidal flooding is residual only, associated with a breach of the existing flood defences.

The proposed development is classified as 'less vulnerable' and therefore considered appropriate within Flood Zone 2 and Flood Zone 3 without application of the Exception Test.

This FRA has considered multiple sources of flooding and concluded the following:

Table 8.1: Flood risk summary

Source	Level of risk	Mitigation
River Thames (Tidal)	**Medium** Flood Zone 2 & 3	-The site is protected by a flood defence wall to the north of the site, with a 1000 year standard of protection. -During a flood event, the wider facility will close, and the site will be evacuated.
Surface water	**Very Low**	-No Mitigation Required. -Subject to Southern Water discussions, the development may incorporate a surface water drainage strategy to accommodate surface water generated on site. Surface water will be discharged directly to the River Thames via the existing private drainage system, then 900mm Thames Water sewer.
Groundwater	**Low**	-No Mitigation Required.
Sewers	**Medium**	-The design of 900mm diameter sewer is unknown and based on tidal flood levels, exceedance flows may be possible. -Non return valves should be considered.
Reservoir	**Low**	-No Mitigation Required.
Canals	**Very Low**	-No Mitigation Required.

Source	Level of risk	Mitigation
Other sources	**Very Low**	-No Mitigation Required.
Tide Locking	**Medium**	-Any associated flooding is likely to be short-duration given the influence of the tides. -No such flooding has been reported from the current outfall.

Overall, taking into account the above points, the development of the site should not be precluded on flood risk grounds.

APPENDIX A
RSK GROUP SERVICE CONSTRAINTS

1. This report and the drainage design carried out in connection with the report (together the "Services") were compiled and carried out by RSK LDE Ltd (RSK) for RES Group Ltd. (the "client") in accordance with the terms of a contract between RSK and the "client" dated January 2025. The Services were performed by RSK with the skill and care ordinarily exercised by a reasonable civil engineer at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the client.

2. Other than that, expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.

3. Unless otherwise agreed in writing, the Services were performed by RSK exclusively for the purposes of the client. RSK is not aware of any interest of or reliance by any party other than the client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.

4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date of this report, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.

5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate, or such other terms as may be agreed between RSK and the client.

6. The observations and conclusions described in this report are based solely upon the Services, which were provided pursuant to the agreement between the client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off the site of asbestos, electromagnetic fields, lead paint, heavy metals, radon gas or other radioactive or hazardous materials.

7. The Services are based upon RSK's observations of existing physical conditions at the site gained from a walk-over survey of the site together with RSK's interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The Services are also based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely. The Services clearly are limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the walk-over survey. Further RSK was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services. RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the client and RSK.

8. The phase II or intrusive environmental site investigation aspects of the Services is a limited sampling of the site at pre-determined borehole and soil vapour locations based on the operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition, chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and RSK] [based on an understanding of the available operational and historical information,] and it should not be inferred that other chemical species are not present.

9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (boreholes, trial pits etc) annotated on site plans are not drawn to scale but are centred over the appropriate location. Such features should not be used for setting out and should be considered indicative only.

APPENDIX B
TOPOGRAPHIC SURVEY & UTILITIES SURVEY



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PSL REF 8856

CLIENT

RES

JOB TITLE

KIMBERLY CLARK
NORTHFLEET
GRAVESEND DA11 9AD

DRAWING TITLE

SITE SURVEY

SURVEYOR: YI & IA	DRAWN: YI	CHECKED: OH
SCALE 1/200	SHEET No: SHEET 1 OF 5	
DATE MAY 23	SHEET SIZE A0	DRAWING No: 8856_SITE_2D_R0

This survey has been orientated to the Ordnance Survey (O.S) National Grid OSGB36 via Global Navigational Satellite System and the O.S. Active Network using OSTN15 transformation.

Vertical datum – levels are related to GPS Orthometric height, converted to MSL (Newlyn) by OSGM15 transformation parametes.

No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates.

A true OSGB36 coordinates can be calculated by scaling the survey by the centre point as follows:

SCALE FACTOR: 0.99992612
CENTRE POINT: 562641.722,174436.439

Every effort is made to identify and survey all relevant, visible features. However, it should be borne in mind, some features may have been obscured by vegetation, debris, parked vehicles etc. As such, some items may have been omitted.

REVISIONS

No.	REVISION	DATE	BY

LEGEND

Building Line
Overhead Building
Drainage Channel
Kerb (Bottom)
Kerb (Top)
Shop Kerb
Embankment
Vegetation Line
Concrete Line
Slabs Line
Tarmac Line
Tactile Paving
Sette Line
Wall Line
Fence(line with type: BWF-BARBED WIRE FENCE, CLF-CHAIN LINK FENCE, CBF-CLOSED BOARDED FENCE, CPF-CONCRETE PANEL FENCE, IRF-IRON RAILING FENCE, OBF-OPEN BOARD FENCE, PBF-POST & RAIL FENCE, PWF-POST & WIRE FENCE)

Survey Station
+10.00 Level Position
+ tha, 15.00 Threshold Level
+ EVL 95.45 Eaves Level
+ RWL 95.45 Ridge Level
+ WEL 95.45 Roof Level
Service Cover
12.34
Building
Building Canopy
Sapling
Bush
Tree (Diameter@1.5m=400, Spread=4.00, Height=6.00)
Vegetated Area
Bank Fall
Gate
Registration Mark

Note: Linetypes are visible on 2D drawings only

ABBREVIATIONS

A/C	AIR CONDITIONING UNIT	IRF	IRON RAILING FENCE
BB	BELISHA BEACON	MH	MANHOLE
BBL	BELL BOLLARD	MKR	MARKER
BL	BASEMENT LIGHTS	NBB	NOTICE BOARD
BN	BOLLARD	NP	STREET NAME PLATE
BPS	BUS STOP	OBF	OPEN BOARD FENCE
BS	BUS STOP POST	O/H	OVERHEAD
BSH	BUS STOP SHELTER	P	POST
BT	BT MANHOLE	PB	PARKING BOX
BWF	BARBED WIRE FENCE	PM	PARKING METER
CAM	CAMERA	PR	PIPE RISER
CBF	CLOSED BOARDED FENCE	PSF	POST & RAIL FENCE
CBR	CRASH BARRIER	PWF	POST & WIRE FENCE
CE	CABLE END	RFL	ROOF LEVEL
CL	CABLE LINK	RG	ROAD GULLY
CLH	CELLAR HATCH	RGL	RIDGE LEVEL
CLF	CHAIN LINK FENCE	RL	ROOF LIGHT
CONC	CONCRETE	RSI	ROAD SIGN ILLUMINATED
CPF	CONCRETE PANEL FENCE	RW	RETAINING WALL
CPS	CONCRETE PAVING SLABS	RWP	RAIN WATER PIPE
CR	CABLE RISER	SAP	SAPLING
CTV	CABLE TELEVISION	SC	SECURITY COCK
C/W	CONCRETE WALL	SL	SUMP LEVEL
DP	DOWN PIPE	SV	SLUICE VALVE
DS	DOMESTIC SVTS	SW	SURFACE WATER
ELB	ELECTRICITY JUNCTION BOX	SWP	STONE WALL
EP	ELECTRICITY POLE	TCB	TELEPHONE CALL BOX
ER	EARTHING ROD	THL	THRESHOLD LEVEL
EVL	EAVES LEVEL	TIC	TELECOMMUNICATIONS IC
FCP	FIRE CONTROL PANEL	TL	TRAFFIC LIGHTS
FLD	FLOODLIGHT	TP	TRAFFIC SIGNAL
G	GULLY	TSCU	TS CONTROL UNIT
GRB	GRIT BOX	TSIC	TRAFFIC SIGNAL IC
GSV	GAS SVTS, GAL	UTL	UNABLE TO LIFT
GV	GAS VALVE	VP	VENT PIPE
H	HEIGHT	WL	WATER LEVEL
IBOL	ILLUMINATED BOLLARD	WM	WATER METER
IC	INSPECTION COVER	WO	WASHOUT
LP	LAMP POST	WT	WALL TOP LEVEL

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Survey Stations

Name	Easting	Northing	Height
A3A	562550.773	174418.239	3.704
Y12	562518.765	174540.839	5.528
Y15	562514.482	174484.424	5.084
Y24	562668.693	174512.288	5.383
Y32	562597.396	174367.491	5.111
Y33	562595.398	174367.480	5.111
Y35	562636.185	174290.107	5.199
Y5	562733.949	174504.060	5.360
Y8	562762.346	174593.823	5.146
A1	562571.351	174138.284	3.645
A2	562571.350	174138.284	3.645
A3	562585.054	174188.723	3.723
A4	562674.258	174200.403	3.694
A5	562676.098	174305.448	3.744
A6	562541.798	174303.329	4.764
A7	562811.259	174277.204	3.704
Y1	562721.111	174404.838	5.145
Y2	562730.364	174438.324	5.224
Y3	562730.364	174438.324	5.224
Y4	562697.270	174441.548	4.979
Y7	562718.601	174506.457	5.495
Y9	562749.902	174603.592	5.241
Y10	562644.401	174622.346	5.365
Y11	562644.401	174622.346	5.365
Y13	562607.068	174545.508	5.353
Y14	562557.407	174550.318	8.184
Y16	562553.839	174548.839	8.350
Y17	562553.839	174548.839	8.350
Y20	562621.475	174430.779	5.098
Y21	562603.303	174438.079	5.113
Y22	562603.303	174438.079	5.113
Y23	562686.709	174475.850	5.292
Y25	562670.297	174475.810	5.251
Y27	562593.730	174531.196	10.021
Y28	562593.283	174488.750	8.780
Y29	562593.283	174488.750	8.780
Y31	562637.051	174388.037	5.163
Y32	562691.273	174319.114	3.687
Y34	562664.528	174284.384	3.370
Y35	562685.340	174334.401	4.387
Y38	562686.233	174307.555	5.173
Y39	562586.233	174307.555	5.173
Y6	562750.066	174410.831	5.368
Y17	562598.912	174474.245	5.085
Y18	562615.213	174474.245	5.093
Y25	562618.082	174627.082	5.739
Y38	562670.192	174355.424	5.331
Y40	562591.846	174373.002	5.090
Y41	562602.817	174425.270	5.346

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PSL REF 8856

CLIENT

RES

JOB TITLE

KIMBERLY CLARK
NORTHFLEET
GRAVESEND DA11 9AD

DRAWING TITLE

SITE SURVEY

SURVEYOR: YI & IA	DRAWN: YI	CHECKED: OH
SCALE 1/200	SHEET No: SHEET 2 OF 5	
DATE: MAY 23	SHEET SIZE: A0	DRAWING No: 8856_SITE_2D_R0

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REVISIONS

No.	REVISION	DATE	BY

LEGEND

- Building Line
- Overhead Building
- Drainage Channel
- Kerb (Bottom)
- Kerb (Top)
- Drop Kerb
- Embankment
- Vegetation Line
- Concrete Line
- Slate Line
- Tarmac Line
- Tactile Paving
- Setts Line
- Rail Line
- Fenceline-with type: PW-RAILED WIRE FENCE, CLF-CHAIN LINK FENCE, CBF-CLOSED BOARDED FENCE, CPF-CONCRETE PANEL FENCE, OBF-OPEN BOARD FENCE, BRF-BRICK WALL FENCE, PRF-POST & RAIL FENCE, PWF-POST & WIRE FENCE

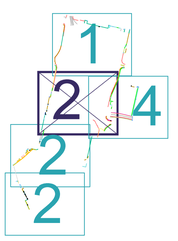
- Survey Station
- +10.00 Level Position
- THL 15.00 Threshold Level
- EVL 95.45 Eaves Level
- +RSL 95.45 Ridge Level
- +RFL 95.45 Roof Level
- Service Cover
- 12.34
- Building
- Building Canopy
- Sapling
- Bush
- Trees: MH-Tough, (Semi-ref)Ch/Spread/Ch and Height by Measured Survey
- Vegetated Area
- Bank Fall
- Gate
- Registration Mark

Note: Linetypes are visible on 2D drawings only

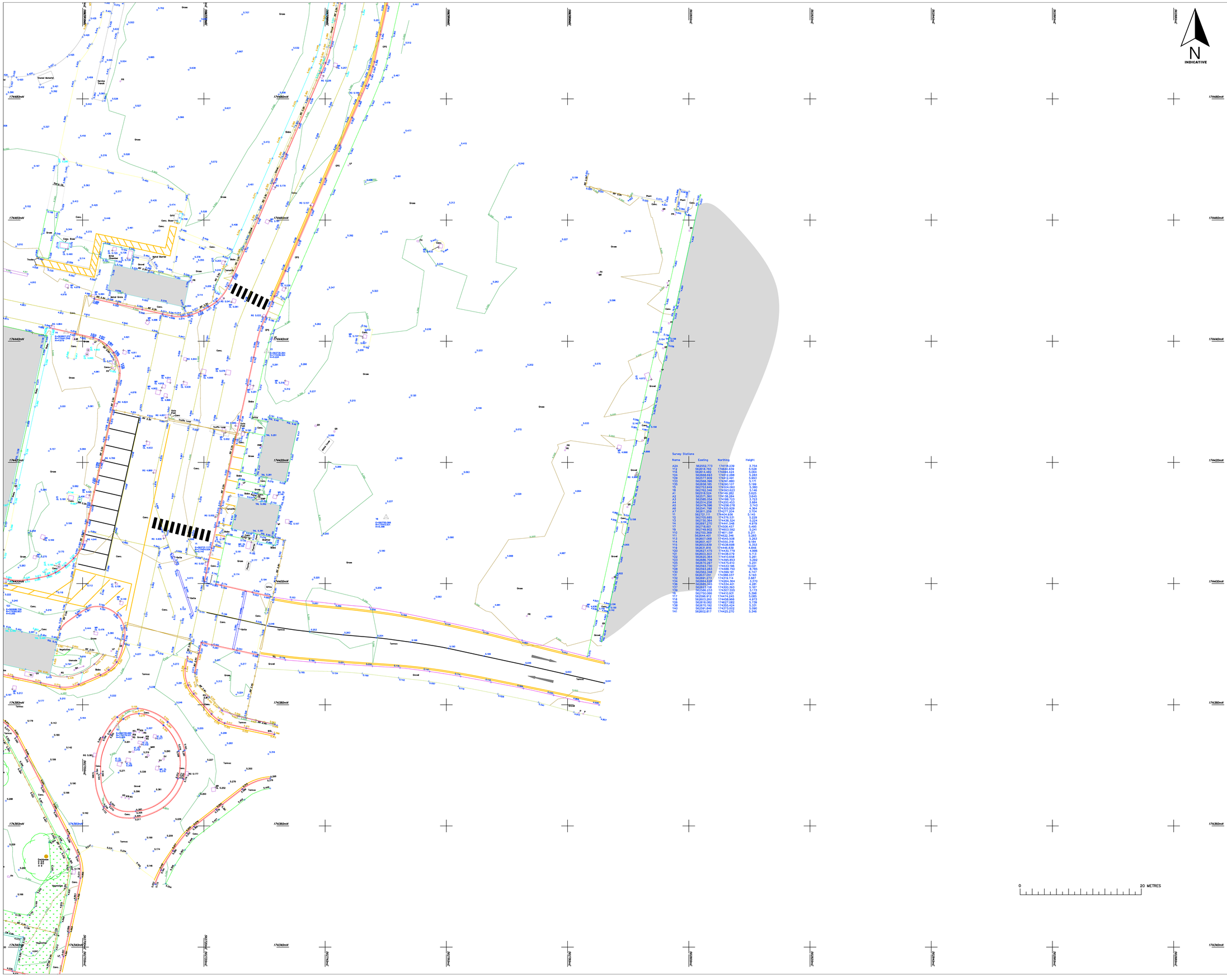
ABBREVIATIONS

A/C	AIR CONDITIONING UNIT	IRF	IRON RAILING FENCE
BB	BELISHA BEACON	MH	MANHOLE
BBL	BELL BOLLARD	MKR	MARKER
BL	BASEMENT LIGHTS	NB	NOTICE BOARD
BH	BORE HOLE	NP	NUMBER PLATE
BR	BRICK PIER	OBF	OPEN BOARD FENCE
BS	BUS STOP POST	O/H	OVERHEAD
BSH	BUS STOP SHELTER	PC	PC VALUE
BW	BRICK WALL	PI	POST BOX
CBF	CLOSED BOARDED FENCE	PM	PARKING METER
CBF	CLOSED BOARDED FENCE	PR	PIPE RISER
CE	CLEANING EYE	PRF	POST & RAIL FENCE
CH	CATCH PIT	PWF	POST & WIRE FENCE
CLH	CELLAR HATCH	RF	ROOF LEVEL
CLF	CHAIN LINK FENCE	RG	ROAD GULLY
COND	CONDUIT	RSL	RIDGE LEVEL
CPF	CONCRETE PANEL FENCE	RS	ROAD SIGN
CS	CONCRETE PAVING SLABS	RSI	ROAD SIGN ILLUMINATED
CR	CABLE RISER	RW	RETAINING WALL
CTV	CABLE TELEVISION	RWP	RAIN WATER PIPE
CW	CONCRETE WALL	SB	SOIL BOX
DP	DOWN PIPE	SC	STOP COCK
EB	ELECTRICITY BOX	SL	SUMP LEVEL
EJB	ELECTRICITY JUNCTION BOX	SV	SLUICE VALVE
EP	ELECTRICITY POLE	SVP	SOIL VENT PIPE
ER	EARTHING BOX	TC	TELECOM COVER
EVL	EAVES LEVEL	TCB	TELEPHONE CALL BOX
FB	FLOWER BED	TH	THRESHOLD LEVEL
FLD	FLOODLIGHT	TIC	TELECOMMUNICATIONS IC
G	GULLY	TP	TELEPHONE POLE
GB	GRID BOX	TR	TELEPHONE RISER
GRD	GUARD RAIL	TSU	TS CONTROL UNIT
GV	GAS VALVE	TSC	TRAFFIC SIGNAL IC
H	HEIGHT	UTL	UNABLE TO LIFT
IBOL	ILLUMINATED BOLLARD	UTS	UNABLE TO SURVEY
IC	INSPECTION CHAMBER	VC	VENT PIPE
IL	INVERT LEVEL	WL	WATER LEVEL
LP	LAMP POST	WM	WATER METER
		WO	WASHOUT
		WT	WALL TOP LEVEL

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CLIENT

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JOB TITLE

KIMBERLY CLARK
NORTHFLEET
GRAVESEND DA11 9AD

DRAWING TITLE

SITE SURVEY

SURVEYOR: YI & IA	DRAWN: YI	CHECKED: OH
SCALE 1/200	SHEET No: SHEET 3 OF 5	
DATE MAY 23	SHEET SIZE A0	DRAWING No: 8856_SITE_2D_R0

This survey has been orientated to the Ordnance Survey (O.S) National Grid OSGB36 via Global Navigational Satellite System and the O.S. Active Network using OSTN15 transformation.

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A true OSGB36 coordinates can be calculated by scaling the survey by the centre point as follows:

SCALE FACTOR: 0.99992612
CENTRE POINT: 562641.722;174436.439

Every effort is made to identify and survey all relevant, visible features. However, it should be borne in mind, some features may have been obscured by vegetation, debris, parked vehicles etc. As such, some items may have been omitted.

REVISIONS

No.	REVISION	DATE	BY

LEGEND

Building Line
Overhead Building
Drainage Channel
Kerb (Bottom)
Kerb (Top)
Drop Kerb
Embankment
Vegetation Line
Concrete Line
Slate Line
Tarmac Line
Tactile Paving
Setts Line
Rail Line
Fence/line-with type:
BW=BARBED WIRE FENCE
CLF=CHAIN LINK FENCE
CBF=CLOSED BOARDED FENCE
CPF=CONCRETE PANEL FENCE
HF=HEDGE FENCE
RBF=RAIL BOARD FENCE
PWF=POST & RAIL FENCE
PWF=POST & WIRE FENCE

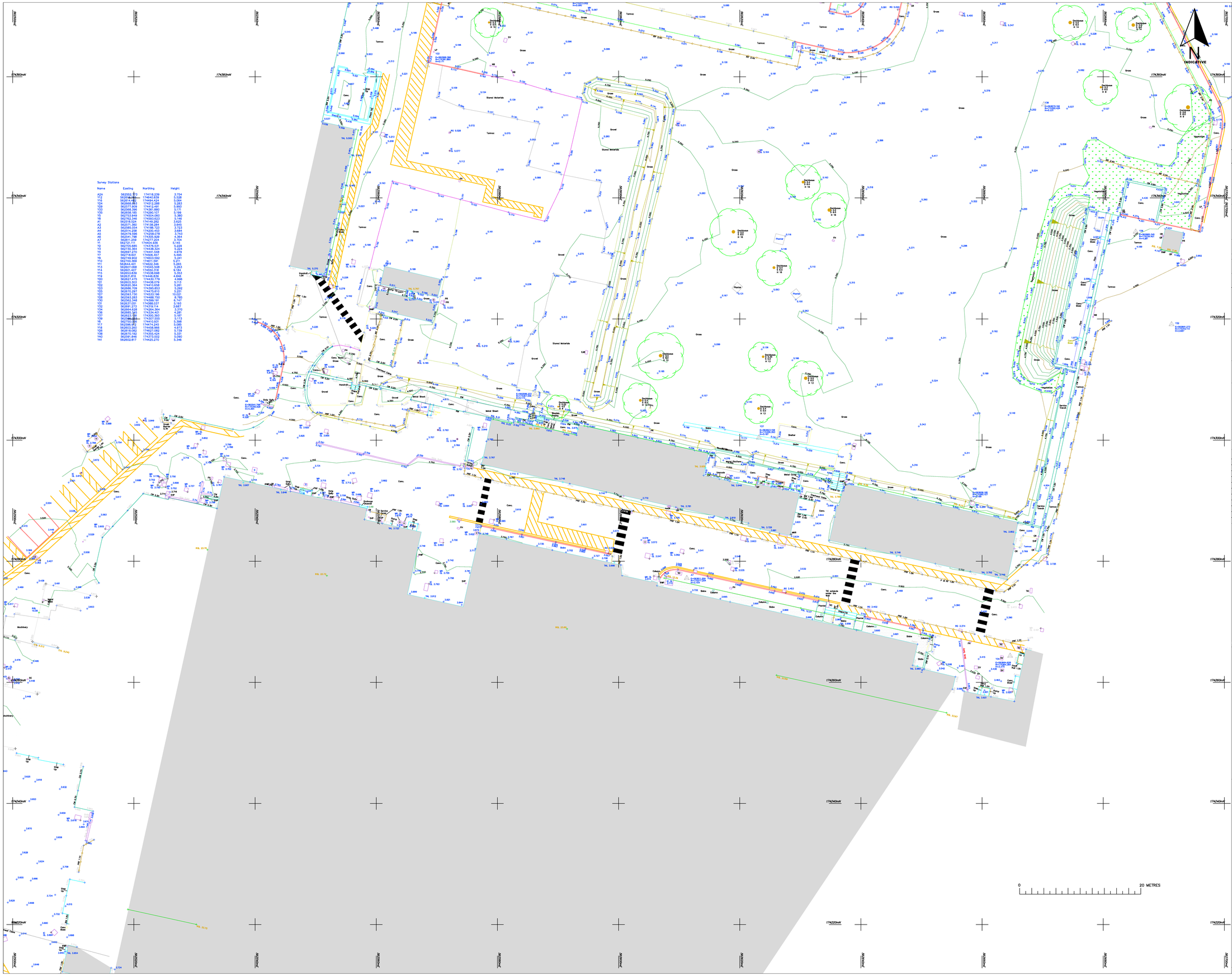
Survey Station
+10.00 Level Position
+ THL 15.00 Threshold Level
+ EVL 95.45 Eaves Level
+ RDL 95.65 Ridge Level
+ RFL 95.45 Roof Level
Service Cover
12.34
Building
Overhang Canopy
Sapling
Bush
Tree
Vegetated Area
Bank Fall
Gate
Registration Mark

Note: Linetypes are visible on 2D drawings only

ABBREVIATIONS

A/C	AIR CONDITIONING UNIT	IRF	IRON RAILING FENCE
BB	BELISHA BEACON	MH	MANHOLE
BBL	BELL BOLLARD	MKR	MARKER
BL	BASEMENT LIGHTS	NB	NOTICE BOARD
BO	BOLLARD	NP	NAME PLATE/ NAME PLATE
BR	BRICK RAIL	OBF	OPEN BOARD FENCE
BS	BUS STOP POST	O/H	OVERHEAD
BSH	BUS STOP SHELTER	PC	PC VALUE
BW	BRICK WALL	PI	POST BOX
CCTV	CAMERA	PM	PARKING METER
CAM	CAMERA	PR	PIPE RISER
CBF	CLOSED BOARDED FENCE	PWF	POST & RAIL FENCE
CBR	CRASH BARRIER	RAF	RAILING FENCE
CE	CLEANING EYE	RFL	ROOF LEVEL
CL	CONIFER TREE	RG	ROAD GULLY
CLH	CELLAR HATCH	RGL	RIDGE LEVEL
CLF	CHAIN LINK FENCE	RS	ROAD SIGN
CONC	CONCRETE	RSI	ROAD SIGN ILLUMINATED
CPF	CONCRETE PANEL FENCE	RW	RETAINING WALL
CPS	CONCRETE PAVING SLABS	RWP	RAIN WATER PIPE
CR	CABLE RISER	SC	STOP COCK
CTV	CABLE TELEVISION	SCP	STOP COCK
CW	CONCRETE WALL	SL	SUMP LEVEL
DP	DOWN PIPE	SV	SLUICE VALVE
DR	DRAIN INSPECTION	SVP	SOIL VENT PIPE
EJB	ELECTRICITY JUNCTION BOX	TC	TELEPHONE KIOSK
EP	ELECTRICITY POLE	TCB	TELEPHONE CALL BOX
ER	EARTHING BOX	THL	THRESHOLD LEVEL
EVL	EAVES LEVEL	TIC	TELECOMMUNICATIONS IC
FB	FLOWER BED	TP	TELEPHONE POLE
FLD	FLOODLIGHT	TR	TELEPHONE RISER
G	GULLY	TSCU	TS CONTROL UNIT
GB	GRID BOX	TSIC	TRAFFIC SIGNAL IC
GBB	GUARD RAIL	UTL	UNABLE TO LIFT
GV	GAS VALVE	VDT	VIDEO DUCT SURVEY
H	HEIGHT	VP	VENT PIPE
IBOL	ILLUMINATED BOLLARD	WL	WATER LEVEL
IC	INSPECTION CHAMBER	WM	WATER METER
IL	INVERT LEVEL	WO	WASHOUT
LP	LAMP POST	WT	WALL TOP LEVEL

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PSL REF 8856

CLIENT

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JOB TITLE

KIMBERLY CLARK
NORTHFLEET
GRAVESEND DA11 9AD

DRAWING TITLE: SITE SURVEY

SURVEYOR: YI & IA	DRAWN: YI	CHECKED: OH
SCALE: 1/200	SHEET No: SHEET 4 OF 5	
DATE: MAY 23	SHEET SIZE: A0	DRAWING No: 8856_SITE_2D_R0

This survey has been orientated to the Ordnance Survey (O.S) National Grid OSGB36 via Global Navigational Satellite System and the O.S. Active Network using OSTN15 transformation.

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CENTRE POINT: 562641.722,174436.439

Every effort is made to identify and survey all relevant, visible features. However, it should be borne in mind, some features may have been obscured by vegetation, debris, parked vehicles etc. As such, some items may have been omitted.

REVISIONS

No.	REVISION	DATE	BY

LEGEND

- Building Line
- Overhead Building
- Drainage Channel
- Kerb (bottom)
- Kerb (top)
- Drop Kerb
- Embankment
- Vegetation Line
- Concrete Line
- Slabs Line
- Tarmac Line
- Textile Paving
- Setts Line
- Wall Line
- Fenceline-with type: BWF=BARBED WIRE FENCE CLF=CHAIN LINK FENCE CBF=CLOSED BOARDED FENCE IRF=IRON RAILING FENCE OBF=OPEN BOARDED FENCE PWF=POST & WIRE FENCE PMF=POST & MESH FENCE

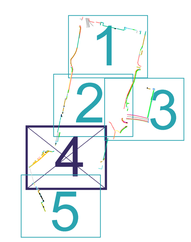
- Survey Station
- +10.00 Level Position
- +TH. 15.00 Threshold Level
- +EVE. 95.45 Eaves Level
- +RDL 95.45 Ridge Level
- +WFL 95.45 Roof Level
- Service Cover
- 12.34
- Building
- Building Canopy
- Sapling
- Bush
- Trees (Diameter(D)=Spread(S) and Height(H) Meters Where Known)
- Vegetated Area
- Bank Fall
- Gate
- Registration Mark

Note: Linetypes are visible on 2D drawings only

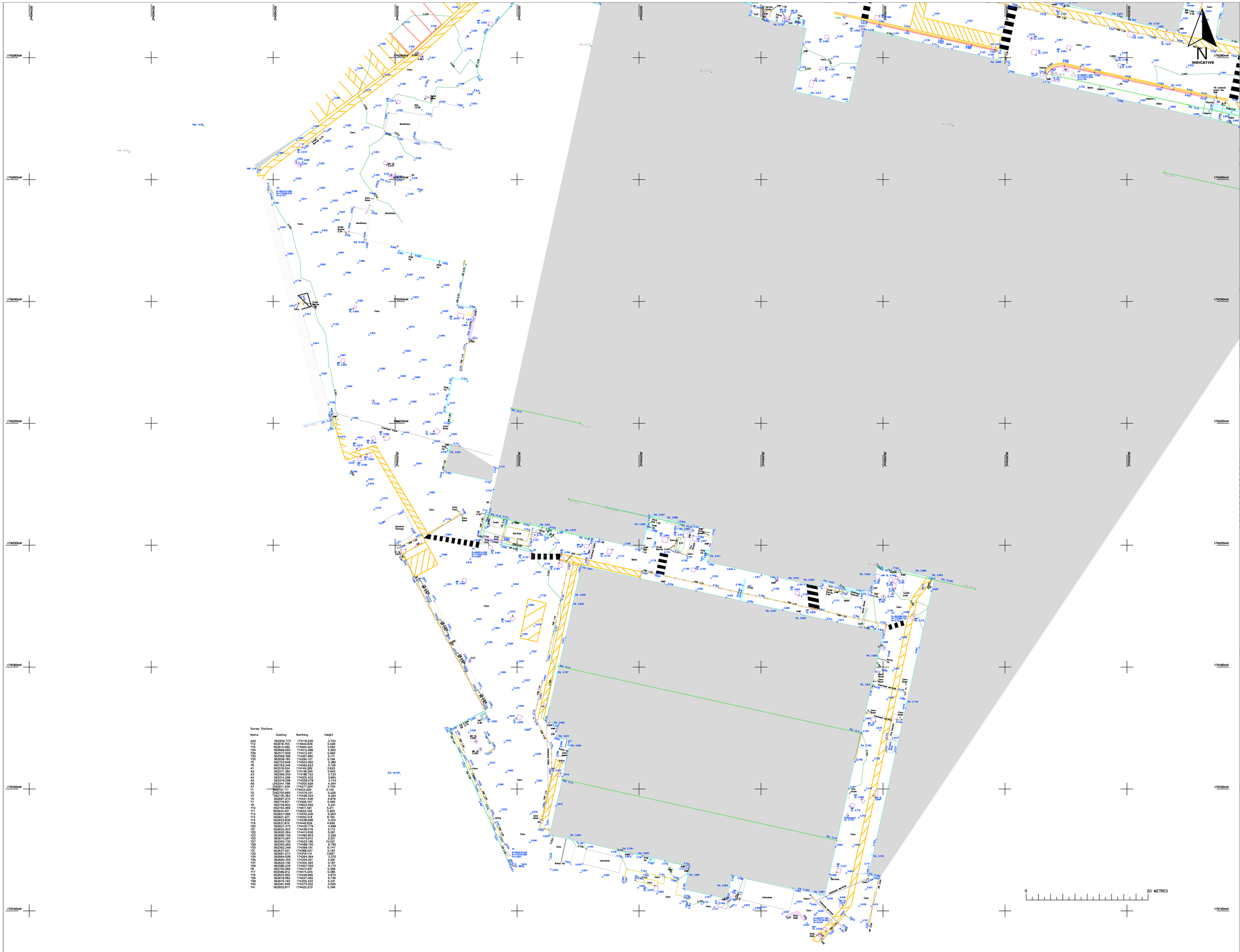
ABBREVIATIONS

A/C	AIR CONDITIONING UNIT	IRF	IRON RAILING FENCE
BB	BELISHA BEACON	MH	MANHOLE
BBL	BELL BOLLARD	MKR	MARKER
BC	BROADCAST UNITS	MBF	METAL BOARD
BOL	BOLLARD	NP	STREET NAME PLATE
BRR	BRKE RAIL	OBF	OPEN BOARD FENCE
BS	BUS STOP POST	O/H	OVERHEAD
BSH	BUS STOP SHELTER	PB	POST
BT	BT MANHOLE	PB	POST BOX
BWF	BARBED WIRE FENCE	PM	PARKING METER
CAM	CAMERA	PPI	PIPE INVERT
CBF	CLOSED BOARDED FENCE	PWF	POST & WIRE FENCE
CBR	CRASH BARRIER	RFL	ROOF LEVEL
CH	CHIMNEY POT	RG	ROAD GULLY
CL	COVER LEVEL	RGL	RIDGE LEVEL
CLH	CELLAR HATCH	RS	ROAD SIGN
CLF	CHAIN LINK FENCE	RSI	ROAD SIGN ILLUMINATED
CONC	CONCRETE	RW	RETAINING WALL
CPF	CONCRETE PANEL FENCE	RWP	RAIN WATER PIPE
CPS	CONCRETE PAVING SLABS	SAP	SAPLING
CR	CABLE RISER	SC	STOP COCK
CTV	CABLE TELEVISION	SL	SUMP LEVEL
CW	CONCRETE WALL	SV	SLUICE VALVE
DC	DRAIN COVER	SVP	SOIL VENT PIPE
EC	ELECTRICITY IC	SW	STONE WALL
EJB	ELECTRICITY JUNCTION BOX	TCB	TELEPHONE CALL BOX
EP	ELECTRICITY POLE	THL	THRESHOLD LEVEL
EX	EARTHING ROD	TIC	TELECOMMUNICATIONS IC
FH	FIRE HYDRANT	TL	TRAFFIC LIGHTS
FH	FIRE HYDRANT	TS	TRAFFIC SIGNAL
FLD	FLOODLIGHT	TSCU	TS CONTROL UNIT
G	GULLY	TSC	TRAFFIC SIGNAL IC
GAB	GRIT BOX	UTL	UNABLE TO LIFT
GB	GRAVE SLAB	UTS	UNABLE TO SURVEY
GV	GAS VALVE	VP	VENT PIPE
H	HEIGHT	WL	WATER LEVEL
IBOL	ILLUMINATED BOLLARD	WM	WATER METER
IC	INSPECTION COVER	WO	WASHOUT
IL	INVERT LEVEL	WT	WALL TOP LEVEL
LP	LAMP POST		

Sheet Layout
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Survey Stations

Name	Easting	Northing	Height
A2A	562552.773	174118.239	3.754
Y12	562615.397	174640.839	5.328
Y16	562614.482	174494.424	5.084
Y24	562617.909	174412.491	5.093
Y23	562617.909	174412.491	5.093
Y33	562568.396	174361.880	5.171
Y35	562658.581	174260.107	5.199
Y5	562753.949	174304.060	5.380
Y6	562753.949	174304.060	5.380
A1	562315.564	174146.282	3.625
A2	562371.360	174138.284	3.645
A3	562680.004	174186.723	3.723
A4	562914.258	174200.453	3.684
A5	562941.798	174200.453	3.764
A6	562941.798	174305.928	4.364
A7	562691.259	174277.204	3.704
Y1	562720.151	174434.831	5.429
Y2	562720.151	174434.831	5.429
Y3	562730.364	174438.324	5.224
Y4	562697.270	174441.348	4.979
Y7	562718.601	174506.457	5.495
Y8	562718.601	174506.457	5.495
Y10	562700.369	174611.590	5.371
Y11	562644.401	174622.346	5.265
Y13	562607.068	174543.008	5.263
Y14	562601.407	174550.318	9.184
Y17	562601.407	174550.318	9.184
Y19	562631.816	174446.838	4.846
Y20	562627.475	174430.779	4.996
Y21	562633.302	174418.078	5.113
Y22	562633.709	174416.853	5.092
Y25	562670.397	174415.810	5.251
Y27	562563.730	174533.196	10.021
Y29	562562.348	174389.191	6.747
Y30	562562.348	174389.191	6.747
Y31	562637.051	174388.037	5.193
Y32	562691.273	174319.114	3.687
Y34	562664.828	174354.364	5.370
Y36	562653.158	174330.393	5.187
Y37	562653.158	174330.393	5.187
Y39	562586.233	174307.205	5.173
Y6	562750.066	174410.831	5.388
Y17	562395.912	174474.245	5.085
Y27	562818.082	174627.092	5.739
Y28	562818.082	174627.092	5.739
Y38	562670.192	174355.424	5.331
Y40	562591.846	174373.002	5.090
Y41	562602.817	174425.270	5.346

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GRAVESEND DA11 9AD

DRAWING TITLE

SITE SURVEY

SURVEYOR: YI & IA	DRAWN: YI	CHECKED: OH
SCALE 1/200	SHEET No: SHEET 5 OF 5	
DATE: MAY 23	SHEET SIZE: A0	DRAWING No: 8856_SITE_2D_R0

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REVISIONS

No.	REVISION	DATE	BY

LEGEND

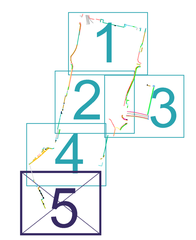
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- Overhead Building
- Drainage Channel
- Kerb (Bottom)
- Kerb (Top)
- Drop Kerb
- Embankment
- Vegetation Line
- Concrete Line
- Slabs Line
- Tarmac Line
- Tactile Paving
- Setts Line
- Wall Line
- Fenceline-with type: PWF=BOARDED WIRE FENCE CVF=Chain Link FENCE CBF=CLOSED BOARDED FENCE CPF=CONCRETE PANEL FENCE IRF=IRON RAILING FENCE OBF=OPEN BOARDED FENCE PRF=POST & RAIL FENCE PWF=POST & WIRE FENCE
- Survey Station
- +10.00 Level Position
- THL 10.00 Threshold Level
- EVL 95.45 Eaves Level
- +RL 95.45 Ridge Level
- +RFL 95.45 Roof Level
- Service Cover (C 12.34)
- Building
- Building Canopy
- Sapling
- Bush
- Tree (Diameter@1.5m=400 Height=10 Radius=6)
- Vegetated Area
- Bank Fall
- Gate
- Registration Mark

Note: Linetypes are visible on 2D drawings only

ABBREVIATIONS

A/C	AIR CONDITIONING UNIT	IRF	IRON RAILING FENCE
ASP	ASPHALT	LP	LAMP POST
BBL	BELL BOLLARD	MKR	MARKER
BL	BASEMENT LIGHTS	NB	NOTICE BOARD
BOL	BOLLARD	OBP	OPEN BOARD PLATE
BS	BUS STOP	OBF	OPEN BOARD FENCE
BSP	BUS STOP POST	O/H	OVERHEAD
BSH	BUS STOP SHELTER	P	POST
BW	BRICK WALL	PB	POST BOX
BWF	BARBED WIRE FENCE	PBF	PERIMETER BUTTER
CHT	CHIMNEY	PR	PIPE RISER
CBF	CLOSED BOARDED FENCE	PRF	POST & RAIL FENCE
CBR	CRASH BARRIER	PWF	POST & WIRE FENCE
CE	CLEANING EYE	RG	ROAD GRATE
CL	CLOSE LEVEL	RGL	ROAD GULLY
CLL	COLLAR LEVEL	RGL	RIDGE LEVEL
CLF	CHAIN LINK FENCE	RS	ROAD SIGN
COL	COLUMN	RSI	ROAD SIGN ILLUMINATED
CONC	CONCRETE	RW	RETAINING WALL
CPF	CONCRETE PANEL FENCE	RWP	RAIN WATER PIPE
CPS	CONCRETE PAVING SLABS	SAP	SAPLING
CTV	CABLE TELEVISION	SC	STOP COCK
CTVB	CABLE TELEVISION	SCR	SCREW DOWN
CW	CONCRETE WALL	SV	SLUICE VALVE
DP	DOWN PIPE	SVP	SOIL VENT PIPE
EC	ELECTRICITY C	SW	STONE WALL
EJB	ELECTRICITY JUNCTION BOX	TCB	TELECOMMUNICATIONS BOX
ELP	ELECTRICITY POLE	TH	THRESHOLD LEVEL
ER	EARTHING ROD	TO	TELECOMMUNICATIONS IC
EVL	EAVES LEVEL	TP	TELEPHONE POLE
FH	FIRE HYDRANT	TRL	TRAFFIC SIGNAL
FL	FLOODLIGHT	TSO	TRAFFIC SIGNAL IC
G	GULLY	TSO	TRAFFIC SIGNAL IC
GRB	GRIT BOX	UTL	UNABLE TO LIFT
GSR	GUARD RAIL	UTS	UNABLE TO SURVEY
GV	GAS VALVE	VP	VENT PIPE
H	HEIGHT	WL	WATER LEVEL
IBOL	ILLUMINATED BOLLARD	WM	WATER METER
IC	INSPECTION COVER	WO	WASHOUT
IL	INVERT LEVEL	WT	WALL TOP LEVEL

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** Note **
A range of detection methods are used to obtain the underground information produced in this drawing. Variations in the ground conditions can affect the quality of the data and therefore an absolute affirmation cannot be guaranteed.

The identification of any located service should not be treated as infallible. The originating source may not have been traced.

The location and/or identification of a service will not necessarily indicate whether it is live or dead or identify whether it is a single or multiple service where one or more services may be situated above, below or in close proximity of the indicated line. Where possible, this will be annotated as 'multiple'.

All depths of metallic features are to centre of the service, depths on drainage runs are to the pipe invert at the manhole and should be treated as an approximate indication.

Underground drainage has been proven for position using traceable sonde methods, unless otherwise stated. No allowance has been made for sub surface entry into manholes or other chambers or voids below ground level, therefore any details relating to depths, sizes etc, are taken from above ground and as such will be approximate only.

Features not traceable by electromagnetic or sonde techniques, such as polyethylene water/gas pipes have been located using Ground Probing Radar (GPR). Successful GPR detection is based on a number of factors, clear access, ground/geophysical conditions and size/type of physical target. All GPR work, unless verified (QL-A) is interpretive. Trial holes should be carried out to confirm service identification, position and particularly depths, where these are critical, in accordance with HSG47 - "Avoiding Danger from Underground Services".

Premier Surveys use skilled professional surveyors and modern, calibrated location equipment. However, the completeness of any underground utility survey should not be 100% guaranteed. We cannot be held liable for inaccuracies beyond those that could be reasonably expected of a professionally skilled company. Any information taken from these drawings, pipe sizes/positions etc cannot be 100% guaranteed.

These results are not infallible and trial holes should be carried out to confirm service identification, position and particularly depths, where these are critical, in accordance with HSG47 - "Avoiding Danger from Underground Services".

This drawing must be read in conjunction with all available statutory undertakers record information. Record information is often incomplete and should be used for reference only and combined with detailed survey works/verification.

ELEC — Power Carrying Feature
WATER — Water Main
GAS — Gas Main
SFW — Sewer Foul Water
SCO — Sewer Combined
SRM/SRMO — Sewer Rising Main
SSW — Sewer Surface Water
SSW3 — Sewer Surface Water 300dI and above
SSW5 — Sewer Surface Water 500dI and above
SGW — Sewer Grey Water
TELE — Telecom
Tel-Fib — Telecom (Fibre Optic Cable)
MULT — Multiuser Ducts
COMMS — Communications
CATV — Cable Television
CCTV — Closed Circuit Television
UNKNOWN — Unidentified
? — Unidentified EML
GPR — Unidentified GPR

Heating Pipe
Road Traffic Sensor
Traffic Signals
PIPE — Pipe (use unknown)
Extents of Chamber
Earthing Strap
Survey Boundary
End of Trench /car
End of Trace
Characteristic Change
Eo5e — Depth to service (applicable to all types)
Eo7 — Extent of survey (service continues)
1.20d — Assumed Route
Eo3 — Taken Records
AR
TFR
MH FW** — Manhole Text
UG Text — UG Text remark, text box layer indicates relevant service
Inaccessible areas, cloths/covers
Inaccessible areas due to vegetation
Service Duct extents

WHILST PREMIER SURVEYS APPROACH ALL PROJECTS WITH THE INTENTION OF PROVIDING FULL UNDERGROUND UTILITY MAPPING INFORMATION, 100% SUCCESSFUL DETECTION IS NOT/CANNOT BE GUARANTEED. ITEMS MAY BE OMITTED DESPITE THE BEST ENDEAVOURS OF THE SURVEYOR(S).

UNDERGROUND ABBREVIATIONS

AR	ASSUMED ROUTE	NFI	NO FURTHER INFO
BL	BASE LEVEL	PE	POLYETHYLENE
CL	COVER LEVEL	OH	OVERHEAD
CR	CABLE RISER	PR	PIPE RISER
DI	DUCTILE IRON WATER (SEWER)	PC	PRE CAST CONCRETE
DI	DUCTILE IRON	ST	STEEL
FW	FOUL WATER (SEWER)	SW	STORM WATER (SEWER)
GLY	GULLY	TFR	TRACED FROM RECORDS
HV	HIGH VOLTAGE	UG	UNDERGROUND
IC	INSPECTION CHAMBER	UTL	UNABLE TO LIFT
IL	INVERT LEVEL	UTS	UNABLE TO SURVEY
LV	LOW VOLTAGE	UTT	UNABLE TO TRACE
MH	MANHOLE		

Survey Stations

Name	Easting	Northing	Height
A24	560552.779	174118.239	3.754
Y25	560552.779	174118.239	3.754
Y16	560564.882	174064.434	5.004
Y24	560568.669	174012.298	5.269
Y29	560577.809	173953.481	5.063
Y33	560568.386	173901.592	5.171
Y34	560571.111	173851.111	5.107
Y6	560769.946	174004.662	5.180
Y8	560782.346	174065.823	5.146
A1	560818.524	174126.053	5.025
A2	560575.360	174138.264	3.645
A3	560575.360	174138.264	3.645
A4	560418.356	174200.453	3.054
A5	560479.596	174254.578	3.745
A6	560479.596	174254.578	3.745
A7	560411.266	174270.504	3.708
Y1	560725.319	174404.936	5.145
Y2	560705.899	174439.501	5.239
Y3	560759.594	174438.324	5.224
Y4	560759.594	174438.324	5.224
Y7	560719.663	174505.607	5.495
Y9	560749.902	174600.595	5.241
Y10	560700.369	174651.595	5.311
Y11	560644.401	174522.546	5.395
Y12	560644.401	174522.546	5.395
Y14	560607.467	174504.514	5.164
Y15	560853.836	174539.686	5.352
Y18	560921.816	174446.578	4.845
Y20	560921.816	174400.578	4.996
Y21	560923.803	174400.079	4.991
Y22	560923.804	174400.858	5.351
Y23	560998.709	174390.933	5.292
Y26	560593.283	174468.730	5.785
Y27	560593.592	174503.196	10.727
Y28	560593.283	174468.730	8.785
Y30	560593.592	174503.196	8.747
Y31	560557.061	174368.037	5.163
Y32	560557.061	174368.037	5.163
Y35	560964.635	174264.564	5.370
Y36	560895.545	174034.401	4.291
Y37	560923.156	174300.065	5.167
Y39	560596.769	174307.559	5.175
Y40	560596.769	174307.559	5.175
Y17	560598.912	174474.249	5.095
Y13	560603.280	174459.986	4.873
Y38	560603.280	174459.986	4.873
Y5	560510.182	174355.424	5.791
Y19	560510.182	174355.424	5.791
Y42	560561.545	174426.370	5.346
Y41	560562.817	174426.370	5.346

Note: Linetypes are visible on 2D drawings only

LEGEND

Survey Station
10.00 — Level Position
THL 15.00 — Threshold Level
EVL 95.45 — Eaves Level
RDL 95.45 — Ridge Level
RFL 95.45 — Roof Level
Service Cover
10.34
Building
Building Canopy
Sapling
Bush
Tree — Trunk Diameter(DL)/Spread(S) and Height(H) Measurements
Vegetated Area
Bank Fail
Gate
Registration Mark

ABBREVIATIONS

A/C	AIR CONDITIONING UNIT	IRF	IRON RAILING FENCE
BB	BELLBAA BEACON	MH	MANHOLE
BBL	BELL BOLLARD	MKR	MARKER
BCN	BEACON POST / LIGHTS	NB	NOTICE BOARD
BOL	BOLLARD	NP	STREET NAME PLATE
BR	BIKE RAIL	OBF	OPEN BOARD FENCE
BS	BUS STOP POST	OH	OVERHEAD
BSH	BUS STOP SHELTER	PAL	PALISADE
BT	BT MANHOLE	PB	POST BOX
BWF	BARBED WIRE FENCE	PM	PARKING METER
CAM	CAMERA	PIF	PIPE RAIL
CBF	CLOSED BOARDED FENCE	PWF	POST & WIRE FENCE
CBR	CRASH BARRIER	RFL	ROOF LEVEL
CH	CHIMNEY POT	RG	ROAD GULLY
CL	COVER LEVEL	RGL	RIDGE LEVEL
CLH	CELLAR HATCH	RL	ROOF LEVEL
CLF	CHAIN LINK FENCE	RS	ROAD SIGN ILLUMINATED
CONC	CONCRETE	RW	RETAINING WALL
CPF	CONCRETE PANEL FENCE	RWP	RAIN WATER PIPE
CPS	CONCRETE PAVING SLABS	SAT	SATELLITE
CR	CABLE RISER	SH	SPRUNG HOOK
CTV	CABLE TELEVISION	SL	SUMP LEVEL
CW	CONCRETE WALL	SV	SLUICE VALVE
DF	DRAIN FLUSH	TBF	TIMBER BOARD
EC	ELECTRICITY C	SW	STONE WALL
EJB	ELECTRICITY JUNCTION BOX	TCB	TELEPHONE CALL BOX
EP	ELECTRICITY POLE	THC	THRESHOLD LEVEL
ER	EARTHING ROD	TIC	TELECOMMUNICATIONS IC
EW	EARTH WIRE	TL	TRAFFIC LIGHTS
FH	FIRE HYDRANT	TS	TRAFFIC SIGNAL
FLD	FLOODLIGHT	TSCU	TS CONTROL UNIT
G	GULLY	TSIC	TRAFFIC SIGNAL IC
GPB	GRIT BOX	UTL	UNABLE TO LIFT
GR	GUARD RAIL	UTS	UNABLE TO SURVEY
GV	GAS VALVE	VP	VENT PIPE
H	HEIGHT	WL	WATER LEVEL
IBOL	ILLUMINATED BOLLARD	WM	WATER METER
IC	INSPECTION COVER	WO	WASHOUT
LC	LIGHTING COLUMN	WT	WALL TOP LEVEL
LP	LAMP POST		

Sheet Layout
Not to scale

1 2 3 4 5

N
INDICATIVE

0 20 METERS

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JOB TITLE
KIMBERLY CLARK
NORTHFLEET
GRAVESEND
DA11 9AD

DRAWING TITLE
UNDERGROUND UTILITY SURVEY

SURVEYOR:	WT/VD	DRAWN:	WT/VD	CHECKED:	DS
SCALE: 1/200			SHEET No: SHEET 1 OF 5		
DATE: MAY 23	SHEET SIZE: A0		DRAWING No: 8856_UNDERGROUND_R1		

This survey has been orientated to the Ordnance Survey (O.S) National Grid OSGB36 via Global Navigational Satellite System and the O.S. Active Network using OSTN15 transformation.

Vertical datum - levels are related to GPS Orthometric height, converted to MSL (Newlyn) by OSGM15 transformation parameters.

No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates.

A true OSGB36 coordinates can be calculated by scaling the survey by the centre point as follows:

SCALE FACTOR: 0.99992612
CENTRE POINT: 562641.722,174436.439

Every effort is made to identify and survey all relevant, visible features. However, it should be borne in mind, some features may have been obscured by vegetation, debris, parked vehicles etc. As such, some items may have been omitted.

REVISIONS

No.	REVISION	DATE	BY
1	UPDATED DRAWING	26.05.23	DS

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** Note **
A range of detection methods are used to obtain the underground information produced in this drawing. Variations in the ground conditions can affect the quality of the data and therefore an absolute affirmation cannot be guaranteed.

The identification of any located service should not be treated as infallible. The originating source may not have been traced.

The location and/or identification of a service will not necessarily indicate whether it is live or dead or identify whether it is a single or multiple service where one or more services may be situated above, below or in close proximity of the indicated line. Where possible, this will be annotated as 'multiple'.

All depths of metallic features are to centre of the service, depths on drainage runs are to the pipe invert at the manhole and should be treated as an approximate indication.

Underground drainage has been proven for position using traceable sonde methods, unless otherwise stated. No allowance has been made for sub surface entry into manholes or other chambers or voids below ground level, therefore any details relating to depths, sizes etc, are taken from above ground and as such will be approximate only.

Features not traceable by electromagnetic or sonde techniques, such as polyethylene water/gas pipes have been located using Ground Probing Radar (GPR). Successful GPR detection is based on a number of factors, clear access, ground/geophysical conditions and size/type of physical target. All GPR work, unless verified (QL-A) is interpretive. Trial holes should be carried out to confirm service identification, position and particularly depths, where these are critical, in accordance with HSG47 - "Avoiding Danger from Underground Services".

Premier Surveys use skilled professional surveyors and modern, calibrated location equipment. However, the completeness of any underground utility survey should not be 100% guaranteed. We cannot be held liable for inaccuracies beyond those that could be reasonably expected of a professionally skilled company. Any information taken from these drawings, pipe sizes/positions etc cannot be 100% guaranteed.

These results are not infallible and trial holes should be carried out to confirm service identification, position and particularly depths, where these are critical, in accordance with HSG47 - "Avoiding Danger from Underground Services".

This drawing must be read in conjunction with all available statutory undertakers record information. Record information is often incomplete and should be used for reference only and combined with detailed survey works/verification.

ELEC — Power Carrying Feature
WATER (WM) — Water Mains
GAS — Gas Mains
FOUL — Sewer Foul Water
COMB — Sewer Combined
STORM — Sewer Rising Main
SW — Sewer Surface Water
SW — Sewer Surface Water 300Ø and above
SW — Sewer Surface Water 2000 and above
SGW — Sewer Grey Water
TELCM — Telecom
— Telecom (Fibre Optic Cable)
MCU — Multi-user Ducts
COMMS — Communications
CATV — Cable Television
CCTV — Closed Circuit Television
— Control Cables
? — Unidentified EML
GPR — Unidentified GPR
— Heating Pipe
— Road Traffic Sensor
TLIGHT — Traffic Signals
PIPE — Pipe (use unknown)
— Extents of Chamber
— Earthing Strap
— Survey Boundary
EoSC — End of Trench scar
EoT — End of Trace
— Characteristic Change
1.20d — Depth to service (applicable to all types)
EoS — Extent of survey (service continues)
AR — Assumed Route
TFR — Taken from Records
MH FW — Manhole Text
UG Text — UG Text remark, text box layer indicates relevant service
Inaccessible areas, construction
Inaccessible areas due to vegetation
Service Duct extents

WHILST PREMIER SURVEYS APPROACH ALL PROJECTS WITH THE INTENTION OF PROVIDING FULL UNDERGROUND UTILITY MAPPING INFORMATION, 100% SUCCESSFUL DETECTION IS NOT CANNOT BE GUARANTEED. ITEMS MAY BE OMITTED DESPITE THE BEST ENDEAVOURS OF THE SURVEYOR(S).

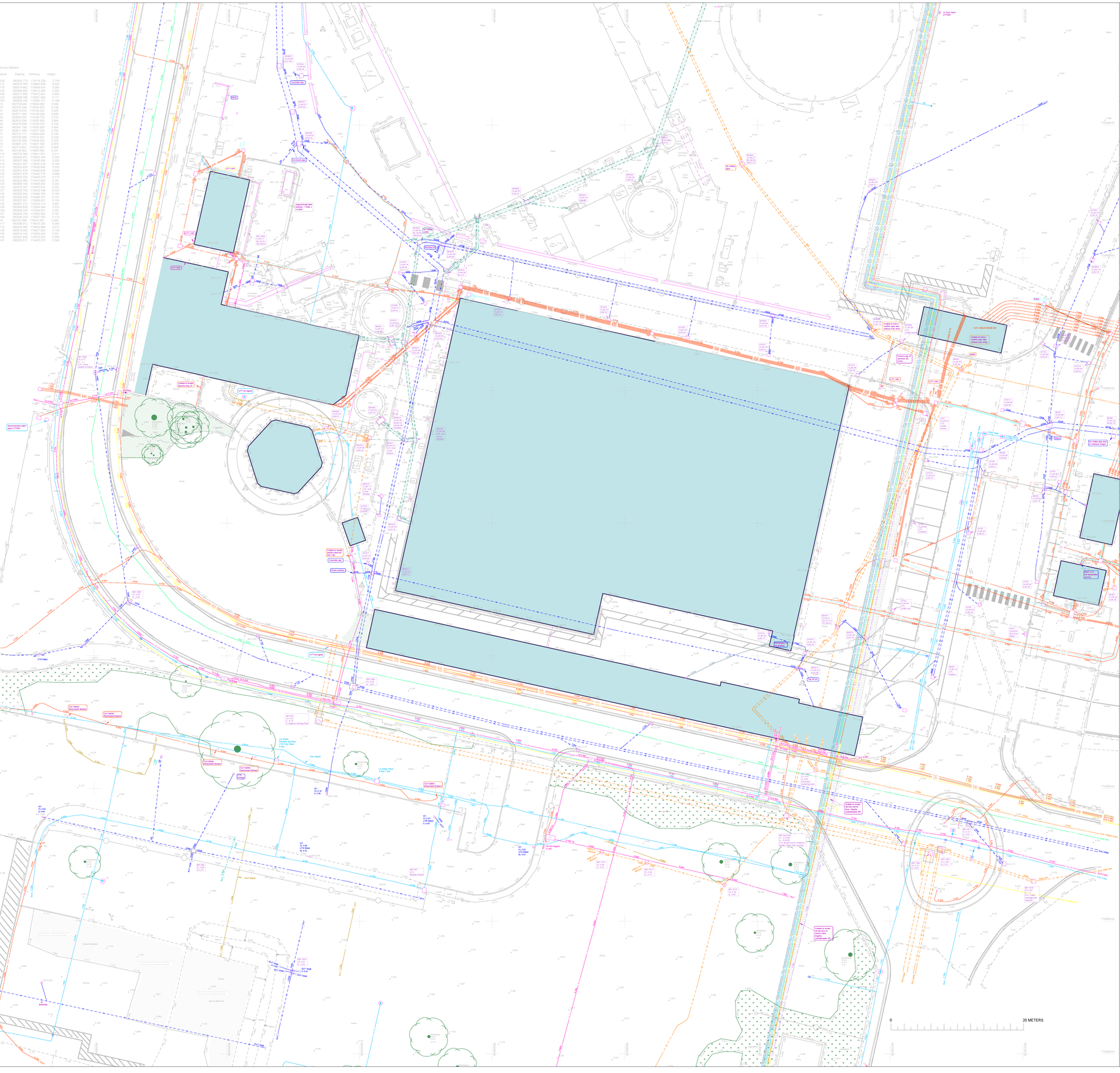
UNDERGROUND ABBREVIATIONS

AR	ASSUMED ROUTE	NFI	NO FURTHER INFO
BL	BASE LEVEL	PE	POLYETHYLENE
CL	COVER LEVEL	OH	OVERHEAD
CO	CONCRETE OVER	OR	OVERRIDING
CR	CABLE RISER	PR	PIPE RISER
CW	COMBINED WATER (SEWER)	SI	SPUN IRON
DI	DUCTILE IRON	ST	STEEL
FW	FOUL WATER (SEWER)	SW	STORM WATER (SEWER)
GLY	GULLY	TFR	TAKEN FROM RECORDS
HV	HIGH VOLTAGE	UG	UNDERGROUND
IC	INSPECTION CHAMBER	UTL	UNABLE TO LIFT
IL	INVERT LEVEL	UTS	UNABLE TO SURVEY
LV	LOW VOLTAGE	UTT	UNABLE TO TRACE
MH	MANHOLE		

N
INDICATIVE

Survey Stations

Name	Easting	Northing	Height
A24	563552.770	174116.239	5.754
Y17	563552.770	174116.239	5.754
Y16	563514.483	174064.424	5.054
Y24	563666.691	174512.286	5.265
Y20	563707.008	174412.401	5.993
Y30	563586.384	174361.660	5.171
Y29	563586.384	174361.660	5.171
Y5	562703.946	174049.962	5.380
Y6	562762.348	174093.823	5.146
A1	562810.284	174136.222	5.145
A2	562810.284	174136.222	5.145
A3	562585.056	174149.705	5.910
A4	562614.256	174200.463	5.994
A5	562479.599	174258.079	5.743
A6	562479.599	174258.079	5.743
Y1	562411.256	174277.354	5.704
Y1	562721.511	174404.906	5.145
Y2	562703.369	174361.591	5.229
Y3	562735.364	174439.324	5.234
Y4	562735.364	174439.324	5.234
Y7	562749.903	174403.902	5.466
Y9	562749.903	174403.902	5.241
Y10	562702.369	174361.591	5.211
Y11	562644.402	174522.348	5.265
Y12	562644.402	174522.348	5.265
Y14	562467.587	174450.018	5.184
Y15	562853.839	174538.898	5.353
Y18	562853.839	174538.898	5.353
Y22	562857.675	174460.578	4.998
Y21	562803.303	174458.078	5.113
Y23	562930.364	174470.955	5.291
Y25	563088.730	174566.853	5.262
Y26	563088.730	174566.853	5.262
Y27	562991.350	174468.750	5.029
Y28	562991.350	174468.750	5.795
Y31	562993.348	174360.551	5.147
Y32	562857.591	174358.057	5.193
Y33	562857.591	174358.057	5.193
Y34	562664.835	174264.994	5.370
Y36	562885.545	174304.401	4.291
Y37	562823.158	174300.585	5.187
Y38	562795.096	174407.997	5.005
Y39	562795.096	174407.997	5.005
Y17	562696.914	174479.245	5.005
Y18	562803.303	174458.996	4.973
Y35	562857.591	174358.057	5.193
Y36	562857.591	174358.057	5.320
Y40	562597.647	174373.002	5.090
Y41	562602.617	174429.270	5.348



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NORTHFLEET
GRAVESEND
DA11 9AD

DRAWING TITLE
UNDERGROUND UTILITY SURVEY

SURVEYOR:	WT/VD	DRAWN:	WT/VD	CHECKED:	DS
SCALE: 1/200		SHEET No: SHEET 2 OF 5			
DATE: MAY 23	SHEET SIZE: A0	DRAWING No: 8856_UNDERGROUND_R1			

This survey has been orientated to the Ordnance Survey (O.S) National Grid OSGB36 via Global Navigational Satellite System and the O.S. Active Network using OSTN15 transformation.

Vertical datum - levels are related to GPS Orthometric height, converted to MSL (Newlyn) by OSGM15 transformation parameters.

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SCALE FACTOR: 0.99992612
CENTRE POINT: 562641.722,174436.439

Every effort is made to identify and survey all relevant, visible features. However, it should be borne in mind, some features may have been obscured by vegetation, debris, parked vehicles etc. As such, some items may have been omitted.

REVISIONS

No	REVISION	DATE	BY
	UPDATED DRAWING	19.05.23	WT

LEGEND

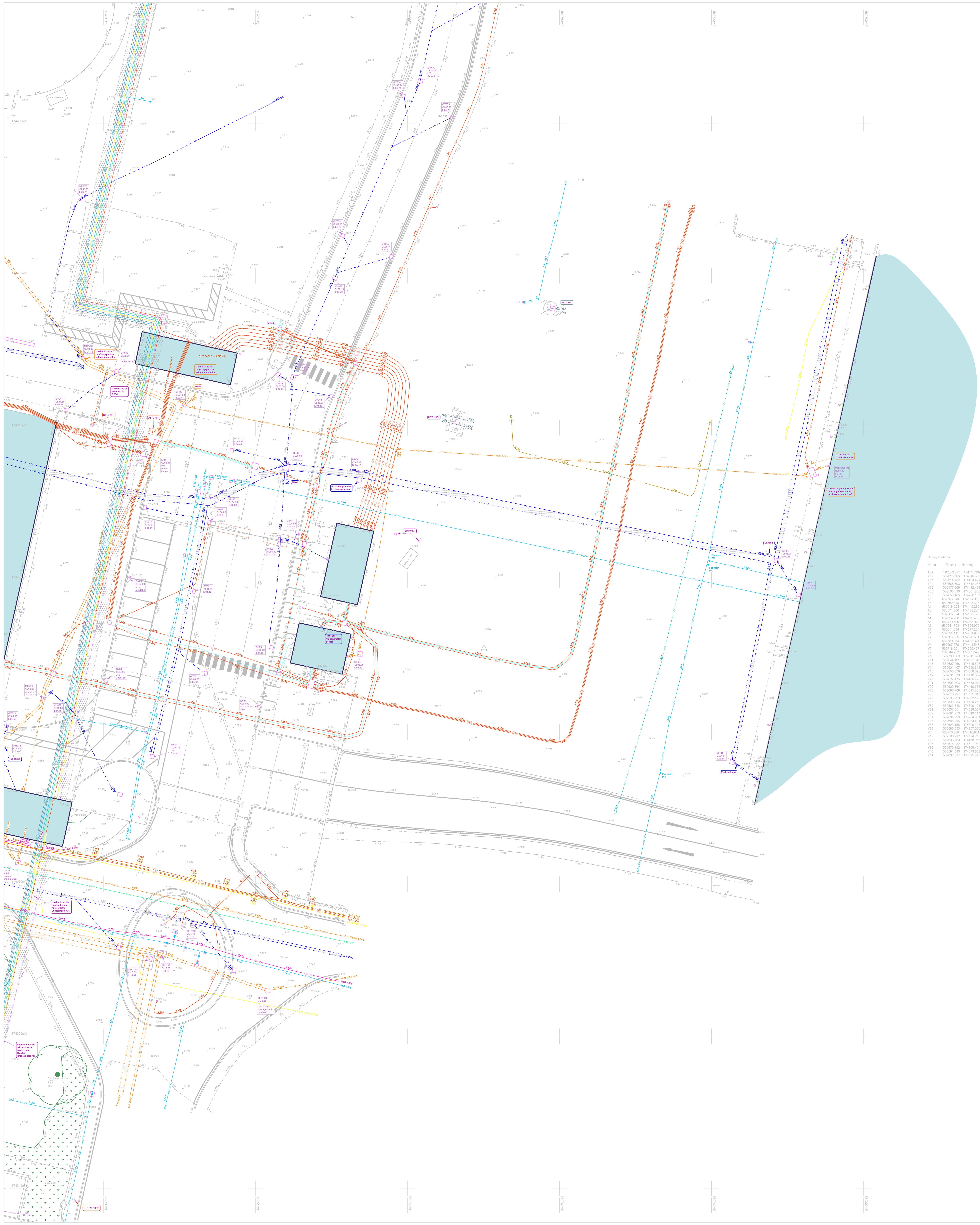
- Survey Station
- Building Line
- Boundary Details
- Fence Line
- Kerb Line
- Hedge Line
- Wall Line
- Service Line
- Survey Points
- Contours
- Level Position
- Threshold Level
- Eaves Level
- Ridge Level
- Roof Level
- Service Cover
- Building
- Building Canopy
- Sapling
- Bush
- Tree (Width Symbol=(0.2)xpread)+ and Height(1.5)xcrown/cone
- Vegetated Area
- Bank Fall
- Gate
- Registration Mark

Note: Linetypes are visible on 2D drawings only

ABBREVIATIONS

AC	AIR CONDITIONING UNIT	IRF	IRON RAILING FENCE
BB	BELISHA BEACON	MH	MANHOLE
BG	BOLLARD LIGHT	NB	NOTICE BOARD
BL	BASEMENT LIGHTS	NB	NOTICE BOARD
BOL	BOLLARD	NP	STREET NAME PLATE
BR	BIKE RAIL	OBF	OPEN BOARD FENCE
BS	BUS STOP POST	OH	OVERHEAD
BT	BT OPENREACH	PB	POST BOX
BW	BRICK WALL	PB	POST BOX
BWF	BARBED WIRE FENCE	PM	PARKING METER
CAM	CAMERA	PO	POST OFFICE
CBF	CLOSED BOARDED FENCE	PPF	POST & RAIL FENCE
CE	CLEANING EYE	PWF	POST & WIRE FENCE
CE	CLEANING EYE	RFL	ROOF LEVEL
CL	COVER LEVEL	RG	ROAD GULLY
CLH	CELLAR HATCH	RG	ROAD GULLY
CLF	CHAIN LINK FENCE	RS	ROAD SIGN
CO	CONCRETE OVER	RSI	ROAD SIGN ILLUMINATED
CPF	CONCRETE PANEL FENCE	RW	RETAINING WALL
CPS	CONCRETE PAVING SLABS	RWP	RAIN WATER PIPE
CR	CABLE RISER	SC	STOP COCK
CTV	CABLE TELEVISION	SC	STOP COCK
DP	DOWN PIPE	SL	SUMP LEVEL
DP	DOWN PIPE	SL	SUMP LEVEL
EC	ELECTRICITY IC	SVP	SOIL VENT PIPE
EJB	ELECTRICITY JUNCTION BOX	SW	STONE WALL
EP	ELECTRICITY POLE	TCB	TELEPHONE CALL BOX
EVL	EAVES LEVEL	THL	THRESHOLD LEVEL
EVL	EAVES LEVEL	TIC	TELEPHONE EXCHANGE IC
FH	FIRE HYDRANT	TP	TELEPHONE POLE
FLD	FLOOD LIGHT	TS	TRAFFIC SIGNAL
G	GULLY	TSCU	TS CONTROL UNIT
GAT	GATE POST	TSIC	TRAFFIC SIGNAL IC
GDR	GUARD RAIL	UP	UTILITY POLE
GV	GAS VALVE	UTS	UNABLE TO SURVEY
H	HEIGHT	VP	VENT PIPE
IBOL	ILLUMINATED BOLLARD	WL	WATER LEVEL
IC	INSPECTION COVER	WM	WATER METER
IL	INVERT LEVEL	WP	WALL POST
LP	LAMP POST	WT	WALL TOP LEVEL

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Survey Stations

Name	Easting	Northing	Height
A2A	562552.773	174118.239	3.754
Y12	562618.765	174640.839	5.528
Y16	562614.482	174494.424	5.064
Y24	562668.693	174512.288	5.283
Y29	562577.909	174412.491	5.993
Y33	562568.396	174361.880	5.171
Y35	562658.185	174290.107	5.199
Y5	562753.949	174504.060	5.380
Y8	562782.346	174593.623	5.146
A1	562518.524	174149.282	3.625
A2	562571.360	174138.284	3.645
A3	562585.054	174188.723	3.723
A4	562514.258	174200.453	3.684
A5	562479.596	174258.078	3.743
A6	562541.798	174305.929	4.364
A7	562611.259	174277.204	3.704
Y1	562721.111	174404.936	5.145
Y2	562705.685	174378.531	5.229
Y3	562730.384	174438.324	5.224
Y4	562697.270	174441.548	4.979
Y7	562718.601	174506.457	5.495
Y9	562749.902	174603.592	5.241
Y10	562700.369	174611.591	5.211
Y11	562644.401	174622.346	5.265
Y13	562607.068	174545.508	5.263
Y14	562601.407	174550.318	9.184
Y15	562653.839	174538.698	5.353
Y19	562631.816	174446.839	4.846
Y20	562627.475	174430.779	4.896
Y21	562603.303	174438.079	5.113
Y22	562620.384	174410.658	5.261
Y23	562686.709	174395.853	5.292
Y25	562670.297	174475.610	5.251
Y27	562593.730	174533.196	10.021
Y28	562593.283	174488.750	8.785
Y30	562582.348	174399.191	6.747
Y31	562637.051	174388.037	5.193
Y32	562691.273	174319.114	3.687
Y34	562664.828	174264.364	3.370
Y36	562685.345	174334.401	4.281
Y37	562623.158	174300.393	5.187
Y39	562586.233	174307.555	5.173
Y6	562750.066	174410.931	5.398
Y17	562596.912	174474.245	5.085
Y18	562603.280	174458.966	4.973
Y26	562618.082	174627.082	5.739
Y38	562670.192	174355.424	5.331
Y40	562591.846	174373.002	5.090
Y41	562602.817	174425.270	5.346

N
INDICATIVE

** Note **
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- WATER — Water Main
- GAS — Gas Main
- Sewer Foul Water
- Sewer Combined
- RISINGMAIN — Sewer Rising Main
- Sewer Surface Water
- Sewer Surface Water 300Ø and above
- Sewer Foul Water 300Ø and above
- Sewer Grey Water
- TELCM — Telecom
- TEL FO — Telecom (Fibre Optic Cable)
- MU — Multi-user Ducts
- COMMS — Communications
- CATV — Cable Television
- CCTV — Closed Circuit Television
- DUCT EMPTY — Duct (Empty)
- ? — Unidentified EML
- GPR — Unidentified GPR
- H — Heating Pipe
- Road Traffic Sensor
- TLIGHT — Traffic Signals
- PIPE — Pipe (use unknown)
- Extents of Chamber
- E — Earthing Strap
- Survey Boundary
- EoSc — End of Trench scar
- EoT — End of Trace
- Characteristic Change
- 1.20d — Depth to service (applicable to all types)
- EoS — Extent of survey (service continues)
- AR — Assumed Route
- TFR — Taken from Records
- MH FW** CL**.** — Manhole Text
- UG Text — UG Text remark, text box layer indicates relevant service
- Inaccessible areas, obstruction(s)
- Inaccessible areas due to vegetation
- Service Duct extents

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UNDERGROUND ABBREVIATIONS

AR	ASSUMED ROUTE	NFI	NO FURTHER INFO
BL	BASE LEVEL	PE	POLYETHYLENE
CL	COVER LEVEL	O/H	OVERHEAD
CR	CABLE RISER	PR	PIPE RISER
CW	COMBINED WATER (SEWER)	SI	SPUN IRON
DI	DUCTILE IRON	ST	STEEL
FW	FOUL WATER (SEWER)	SW	STORM WATER (SEWER)
GLY	GULLY	TFR	TAKEN FROM RECORDS
HV	HIGH VOLTAGE	UG	UNDERGROUND
IC	INSPECTION CHAMBER	UTL	UNABLE TO LIFT
IL	INVERT LEVEL	UTS	UNABLE TO SURVEY
LV	LOW VOLTAGE	UTT	UNABLE TO TRACE
MH	MANHOLE		

0 — 20 METERS

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JOB TITLE
KIMBERLY CLARK
NORTHFLEET
GRAVESEND
DA11 9AD

DRAWING TITLE
UNDERGROUND UTILITY SURVEY

SURVEYOR: WT/VD	DRAWN: WT/VD	CHECKED: DS
SCALE 1/200	SHEET No: SHEET 3 OF 5	
DATE MAY 23	SHEET SIZE A0	DRAWING No: 8856_UNDERGROUND_R1

This survey has been orientated to the Ordnance Survey (O.S) National Grid OSGB36 via Global Navigational Satellite System and the O.S. Active Network using OSTN15 transformation.

Vertical datum - levels are related to GPS Orthometric height, converted to MSL (Newlyn) by OSGM15 transformation parameters.

No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates.

A true OSGB36 coordinates can be calculated by scaling the survey by the centre point as follows:

SCALE FACTOR: 0.99992612
CENTRE POINT: 562641.722;174436.439

Every effort is made to identify and survey all relevant, visible features. However, it should be borne in mind, some features may have been obscured by vegetation, debris, parked vehicles etc. As such, some items may have been omitted.

REVISIONS

No.	REVISION	DATE	BY
1	UPDATED DRAWING	26.05.23	DS

LEGEND

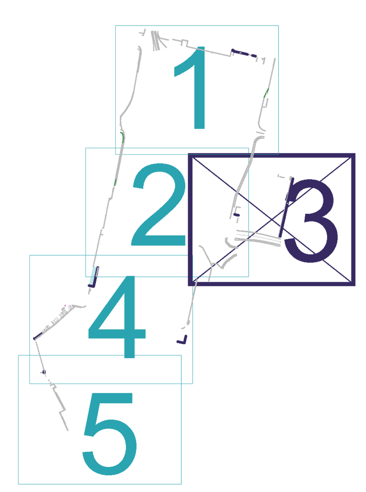
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- Overhead Building
- Drainage Channel
- Kerb (Bottom)
- Kerb (Top)
- Drop Kerb
- Embankment
- Vegetation Line
- Concrete Line
- Slabs Line
- Tarmac Line
- Tactile Paving
- Setts Line
- Wall Line
- Fenceline-with type: BWF-BARBED WIRE FENCE, CLF-CHAIN LINK FENCE, CBF-CLOSED BOARDED FENCE, CPF-CONCRETE PANEL FENCE, IRF-IRON RAILING FENCE, OBF-OPEN BOARDED FENCE, PRF-POST & RAIL FENCE, PWF-POST & WIRE FENCE
- Survey Station
- + 10.00 Level Position
- + THL 15.00 Threshold Level
- + EVL 95.45 Eaves Level
- + RGL 95.45 Ridge Level
- + RFL 95.45 Roof Level
- IC CL 12.34 / CTV Service Cover
- Building
- Building Canopy
- Sapling
- Bush
- Tree With Trunk Diameter(D),Spread(S) and Height(H) Measurements
- Vegetated Area
- Bank Fall
- Gate
- Registration Mark

Note: Linetypes are visible on 2D drawings only

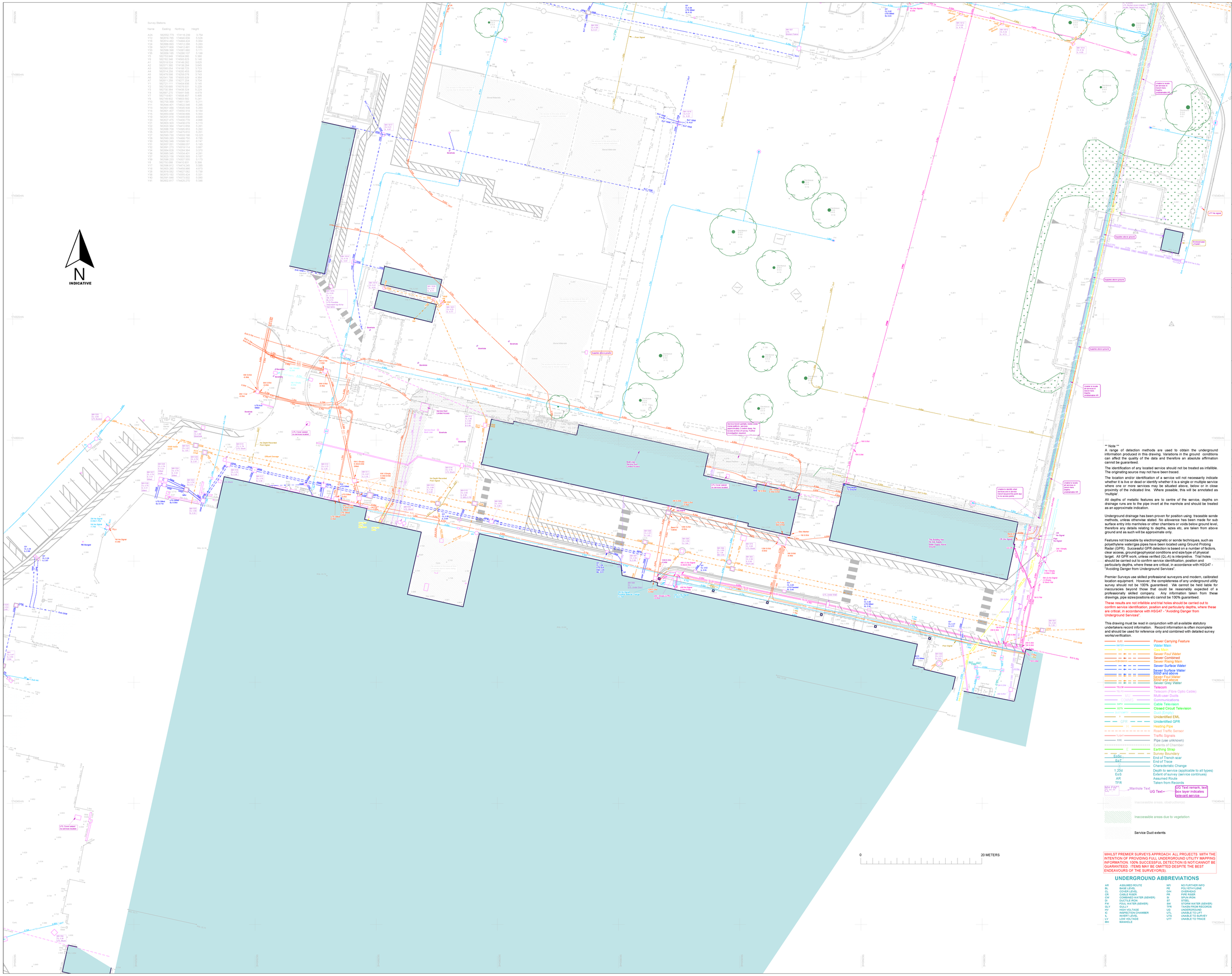
ABBREVIATIONS

A/C	AIR CONDITIONING UNIT	IRF	IRON RAILING FENCE
BB	BELISHA BEACON	MH	MANHOLE
BBL	BELL BOLLARD	MKR	MARKER
BL	BASEMENT LIGHTS	NB	NOTICE BOARD
BOL	BOLLARD	NP	STREET NAME PLATE
BR	BIKE RAIL	OBF	OPEN BOARD FENCE
BS	BUS STOP POST	O/H	OVERHEAD
BSH	BUS STOP SHELTER	P	POST
BW	BRICK WALL	PB	POST BOX
BWF	BARBED WIRE FENCE	PM	PARKING METER
CAM	CAMERA	PR	PIPE RISER
CBF	CLOSED BOARDED FENCE	PRF	POST & RAIL FENCE
CBR	CRASH BARRIER	PWF	POST & WIRE FENCE
CE	CLEANING EYE	RFL	ROOF LEVEL
CL	COVER LEVEL	RG	ROAD GULLY
CLH	CELLAR HATCH	RGL	RIDGE LEVEL
CLF	CHAIN LINK FENCE	RS	ROAD SIGN
CONC.	CONCRETE	RSI	ROAD SIGN ILLUMINATED
CPF	CONCRETE PANEL FENCE	RW	RETAINING WALL
CPS	CONCRETE PAVING SLABS	RWP	RAIN WATER PIPE
CR	CABLE RISER	SAP	SAPLING
CTV	CABLE TELEVISION	SC	STOP COCK
CW	CONCRETE WALL	SL	SUMP LEVEL
DP	DOWN PIPE	SV	SLUICE VALVE
EIC	ELECTRICITY IC	SVP	SOIL VENT PIPE
EJB	ELECTRICITY JUNCTION BOX	SW	STONE WALL
EP	ELECTRICITY POLE	TCB	TELEPHONE CALL BOX
ER	EARTHING ROD	THL	THRESHOLD LEVEL
EVL	EAVES LEVEL	TIC	TELECOMMUNICATIONS IC
FH	FIRE HYDRANT	TP	TELEPHONE POLE
FLD	FLOODLIGHT	TS	TRAFFIC SIGNAL
G	GULLY	TSCU	TS CONTROL UNIT
GRB	GRIT BOX	TSIC	TRAFFIC SIGNAL IC
GDR	GUARD RAIL	UTL	UNABLE TO LIFT
GV	GAS VALVE	UTS	UNABLE TO SURVEY
H	HEIGHT	VP	VENT PIPE
IBOL	ILLUMINATED BOLLARD	WL	WATER LEVEL
IC	INSPECTION COVER	WM	WATER METER
IL	INVERT LEVEL	WO	WASHOUT
LP	LAMP POST	WT	WALL TOP LEVEL

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DRAWING TITLE
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SURVEYOR:	WT/VD	DRAWN:	WT/VD	CHECKED:	DS
SCALE: 1/200				SHEET No: SHEET 4 OF 5	
DATE: MAY 23		SHEET SIZE: A0		DRAWING No: 8856_UNDERGROUND_R1	

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** Note **
A range of detection methods are used to obtain the underground information produced in this drawing. Variations in the ground conditions can affect the quality of the data and therefore an absolute affirmation cannot be guaranteed.

The identification of any located service should not be treated as infallible. The originating source may not have been traced.

The location and/or identification of a service will not necessarily indicate whether it is live or dead or identify whether it is a single or multiple service where one or more services may be situated above, below or in close proximity of the indicated line. Where possible, this will be annotated as "multiple".

All depths of metallic features are to centre of the service, depths on drainage runs are to the pipe invert at the manhole and should be treated as an approximate indication.

Underground drainage has been proven for position using traceable sonde methods, unless otherwise stated. No allowance has been made for sub surface entry into manholes or other chambers or voids below ground level, therefore any details relating to depths, sizes etc. are taken from above ground and as such will be approximate only.

Features not traceable by electromagnetic or sonde techniques, such as polyethylene water/gas pipes have been located using Ground Probing Radar (GPR). Successful GPR detection is based on a number of factors, clear access, ground/geophysical conditions and size/type of physical target. All GPR work, unless verified (QL-A) is interpretive. Trial holes should be carried out to confirm service identification, position and particularly depths, where these are critical, in accordance with HSG47 - "Avoiding Danger from Underground Services".

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BJEE — Power Carrying Feature
WATER — Water Main
GAS — Gas Main
FOUL — Sewer Foul Water
COMBINED — Sewer Combined
STORM — Sewer Flood Main
SURFACE WATER — Sewer Surface Water
SURFACE WATER — Sewer Surface Water
SURFACE WATER — Sewer Flood Mains - D302 and above
GREY WATER — Sewer Grey Water
TELECOM — Telecom
TELECOM — Telecom (Fibre Optic Cable)
TELECOM — Multi-user Ducts
TELECOM — Communications
CATV — Cable Television
CCTV — Closed Circuit Television
TELECOM — Communications
UNKNOWN — Unidentified EML
UNKNOWN — Unidentified GPR
HEATING — Heating Pipe
TRAFFIC — Road Traffic Sensor
TRAFFIC — Traffic Signals
PIPE — Pipe (use unknown)
Extents of Chamber
Earthing Strap
Survey Boundary
EoSC — End of Trench scar
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Characteristic Change
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AR	ASSUMED ROUTE	NFI	NO FURTHER INFO
BL	BASE LEVEL	PE	POLYETHYLENE
CL	COVER LEVEL	OH	OVERHEAD
CR	CABLE RISER	PR	PIPE RISER
CW	COMBINED WATER (SEWER)	SI	SPUN IRON
DW	DRAIN WATER	SW	SEWER
FW	FOUL WATER (SEWER)	SW	STORM WATER (SEWER)
GLY	GULLY	TFR	TAKEN FROM RECORDS
HV	HIGH VOLTAGE	UG	UNDERGROUND
IC	INSPECTION CHAMBER	UTL	UNABLE TO LIFT
LC	LAMP COLUMN	UTS	UNABLE TO SURVEY
LV	LOW VOLTAGE	UTT	UNABLE TO TRACE
MH	MANHOLE		

LEGEND

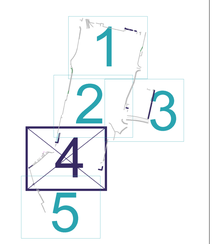
Survey Station
Level Position
Threshold Level
Eaves Level
Ridge Level
Roof Level
Service Cover
Bulding
Building Canopy
Sapling
Bush
Tree
Vegetated Area
Bank Fall
Gate
Registration Mark

Note: Linetypes are visible on 2D drawings only

ABBREVIATIONS

A/C	AIR CONDITIONING UNIT	IRF	IRON RAILING FENCE
BAR	BARRIER BOLLARD	LP	LAMP POST
BBL	BELL BOLLARD	MKR	MARKER
BL	BASEMENT LIGHTS	NB	NOTICE BOARD
BOL	BOLLARD	NP	STREET NAME PLATE
BR	BIKE RAIL	OBF	OPEN BOARD FENCE
BSP	BUS STOP POST	OG	OPEN GRID
BSH	BUS STOP SHELTER	P	POST
BW	BRICK WALL	PB	POST BOX
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CBF	CLOSE BOARDED FENCE	PRF	POST & RAIL FENCE
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CPS	CONCRETE PAVING SLABS	SCP	SCAFFOLD TYPE
CR	CABLE RISER	SAF	SAFLING
CW	COMBINED WATER	SC	STOP COCK
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GPB	GPO BOX	UTC	UNABLE TO TRACE C
GDR	GUARD RAIL	UTL	UNABLE TO LIFT
GV	GAS VALVE	UTS	UNABLE TO SURVEY
HT	HEIGHT	VC	VENT COLUMN
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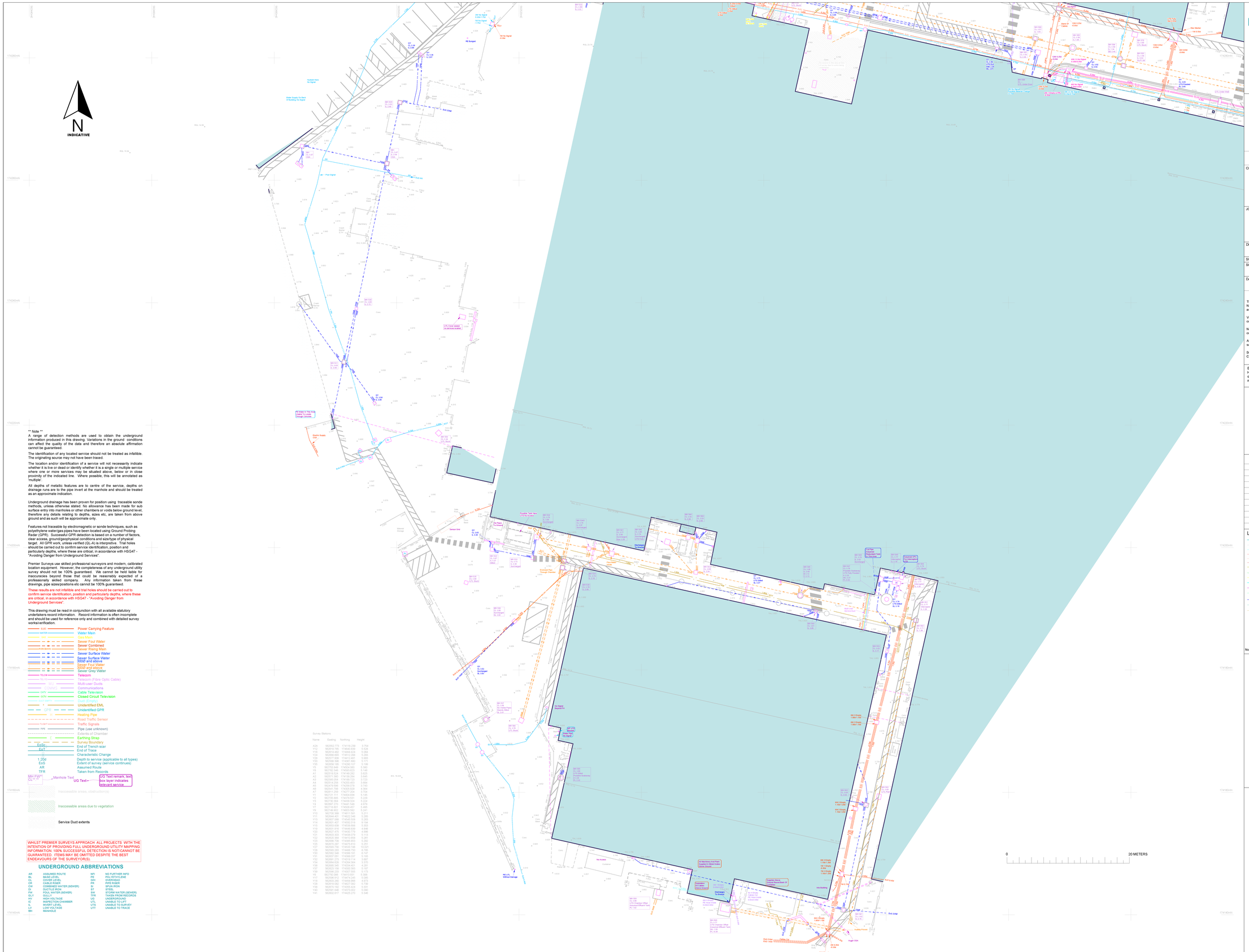
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- COMB — Sewer Combined
- RISING MAIN — Sewer Rising Main
- SURFACE WATER — Sewer Surface Water
- SURFACE WATER — Sewer Surface Water 300dI and above
- FOUL — Sewer Foul Water 300dI and above
- GREY WATER — Sewer Grey Water
- TELECOM — Telecom
- TELECOM (FIBRE OPTIC CABLE) — Telecom (Fibre Optic Cable)
- MULTI — Multi-user Ducts
- COMMS — Communications
- CATV — Cable Television
- CCTV — Closed Circuit Television
- UNKNOWN ELEC — Unidentified EML
- ? — Unidentified EML
- GPR — Unidentified GPR
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SURVEYOR:	WT/VD	DRAWN:	WT/VD	CHECKED:	DS

SCALE	SHEET No:
1/200	SHEET 5 OF 5

DATE:	SHEET SIZE:	DRAWING No:
MAY 23	A0	8856_UNDERGROUND_R1

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LEGEND

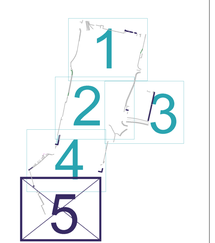
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- RFL 95.45 — Roof Level
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- Tree (Trunk Diameter(DL)/Spread(S) and Height(H) Measurements)
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ABBREVIATIONS

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BS	BUS STOP POST	OH	OVERHEAD
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FLD	FLOODLIGHT	TSCU	TS CONTROL UNIT
G	GULLY	TSIC	TRAFFIC SIGNAL IC
GPB	GRIT BOX	UTL	UNABLE TO LIFT
GPO	GAS PROVAL	UTS	UNABLE TO SURVEY
GV	GAS VALVE	VP	VENT PIPE
H	HEIGHT	WL	WATER LEVEL
IBOL	ILLUMINATED BOLLARD	WM	WATER METER
IC	INSPECTION CHAMBER	WO	WASHOUT
LC	LIGHTING CONTROL	WT	WALL TOP LEVEL
LP	LAMP POST		

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APPENDIX C
SOUTHERN WATER SEWER RECORDS



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WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.

Foul Gravity Sewer | Combined Gravity Sewer | Culverted Water Course or Treated Effluent | Surface Water Gravity Sewer | Rising Main, Vacuum or Syphon | Water Treatment Works | Section 104 Area | Building Over Agreement Area

Combined Pumping Station | Surface Water Pumping Station | Foul Pumping Station | Combined Outfall | Foul Outfall | Surface Water Outfall | Surface Water Inlet

Foul Manhole | Combined Manhole | Surface Water Manhole | Side Entry Manhole, Desanderbin Chamber, Dummy Manhole or Surface Water Soakaway

daniel.cole@res-group.com
Northfleet

WATER for LIFE from Southern Water.

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
0301	F	5.33	3.22	
0302	F	5.06	3.36	
1201	F	5.34	4.88	
1301	F	6.27	2.82	
1302	F	6.53	2.78	
1303	F	5.23	3.02	
1304	F	6.02	3.27	
2201	F	0.00	0.00	
2301	F	4.58	1.68	
2302	F	6.29	2.24	
2303	F	7.54	2.74	
2304	F	5.61	2.10	
2401	F	5.76	1.26	
3201	F	29.20	26.79	
3202	F	29.43	26.96	
3203	F	29.71	27.46	
3204	F	29.79	27.67	
3205	F	28.84	27.16	
3206	F	27.17	10.17	
3207	F	26.85	10.00	
3208	F	28.67	27.16	
3209	F	28.54	27.39	
3210	F	28.08	27.44	
3211	F	28.12	27.64	
3212	F	28.06	27.72	
3213	F	28.57	26.53	
3214	F	28.86	26.66	
3215	F	28.86	28.56	
3216	F	28.86	28.28	
3217	F	28.32	28.00	
3218	F	0.00	0.00	
3219	F	29.46	27.11	
3601	F	0.00	0.00	
3701	F	5.19	3.23	
3703	F	5.51	2.13	
3704	F	5.25	3.25	
4104	F	28.87	28.21	
4105	F	28.76	27.82	
4106	F	28.35	24.60	
4107	F	28.46	24.37	
4201	F	27.20	26.05	
4202	F	27.30	25.63	
4204	F	29.44	26.64	
4602	F	5.39	0.00	
4700	F	5.30	1.46	
5601	F	4.82	0.22	
5602	F	4.92	0.32	
6302	F	5.47	-0.03	
6402	F	5.26	-0.42	
6403	F	4.95	-1.25	
6404	F	5.24	0.00	
6501	F	3.97	-0.55	
6502	F	7.39	-0.13	
6601	F	5.54	-0.13	
7301	F	5.22	1.02	
7303	F	5.30	0.15	
7304	F	5.26	0.00	
7401	F	5.07	-0.93	
7402	F	5.07	-1.33	
8301	F	5.32	3.55	
9301	F	5.00	3.55	
9302	F	5.03	3.55	
9303	F	0.00	0.00	
0351	S	5.28	4.34	
0352	S	5.03	4.33	
1250	S	6.68	4.80	
1251	S	5.99	3.83	
1351	S	5.22	4.57	
1352	S	6.38	3.50	
2350	S	6.92	3.19	
2351	S	5.39	2.88	
2352	S	5.27	2.38	
2450	S	5.28	2.29	
2451	S	5.40	2.15	
5350	S	0.00	0.00	
5450	S	0.00	0.00	
7250	S	0.00	0.00	
7351	S	5.12	0.00	
8351	S	5.28	3.65	
9351	S	5.05	4.12	
9352	S	5.29	3.87	

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Northfleet Lower Lighthouse
(flashing red and white)

3" CI
4" CI
THE SHORE
Path
3" CI
GRANBY ROAD
Tanks
Tank
Tanks
Warehouse
Tank
Warehouse
4" SI
6" SI
6" SI
6" SI
CRETE HALL ROAD
PORTLAND ROAD
EI Sub Sta
Tank
Tank
6" SI
6" SI
6" SI
6" CI
6" CI
6" CI
6" CI
7" CI
SOUTH PR
VICARAGE DRIVE
Surgery
Granby Place
Mill
Tanks
Tk
Mill
0m
100m
200m
300m

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WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.

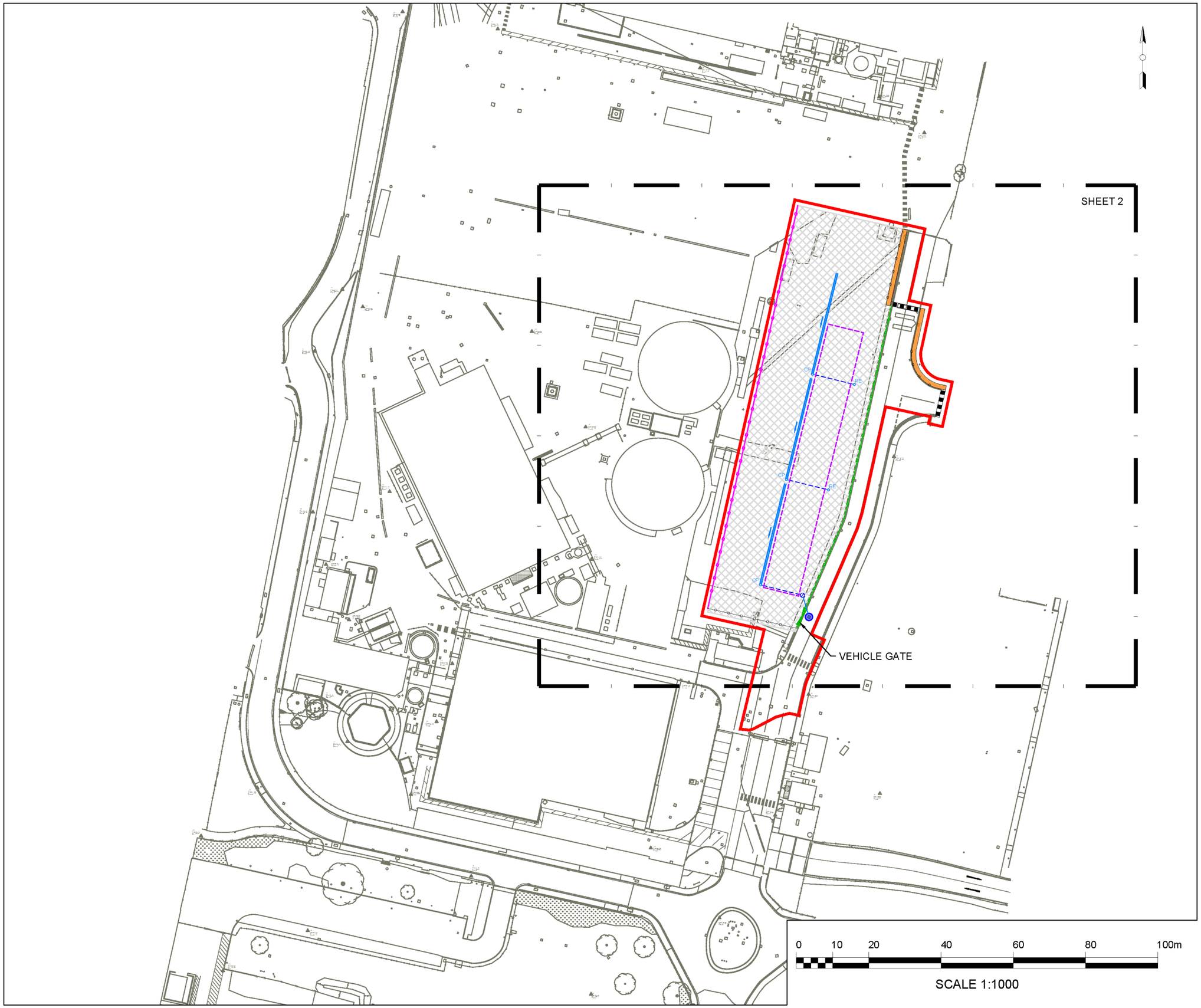
Water Main | Proposed Main | Trunk Main | Non-potable Main | Abandoned Main | Water Hydrant | Water Meter | Water Valve

daniel.cole@res-group.com

Northfleet

WATER for LIFE from Southern Water.

APPENDIX D
PROPOSED DEVELOPMENT PLANS



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2025 LICENCE NUMBER 0100031673.

KEY:

- DEVELOPMENT BOUNDARY (0.51 HECTARES) (INSIDE EDGE OF LINE DENOTES BOUNDARY)

HARDSTANDING KEY

- PULP STORAGE HARDSTANDING (CONCRETE SLAB)
- VEHICLE BARRIER (A-SAFE BARRIER)
- VEHICLE BARRIER (ARMCO BARRIER)
- PALISADE FENCE
- GATE
- LINEAR CHANNEL DRAIN
- PERFORATED PIPE
- DRAINAGE PIPE
- CP CATCHPIT
- RE RODDING EYE
- MANHOLE WITH FLOW CONTROL
- MODULAR ATTENUATION CRATES
- SURFACE WATER DRAINAGE CONNECTION POINT
- FOOTPATH
- WALKWAY MARKING

SHEET 1 OF 3

ISSUE	DRAWN	CHKD	APPD	DATE	REVISION NOTES
2	BM	DC	IB	2025-02-06	UPDATED PROJECT TITLE AND UPDATED VEHICLE BARRIER
1	BM	DC	IB	2025-01-23	FIRST ISSUE

PURPOSE: PLANNING	COORDINATES: OSGB 1936
SCALE: 1:1,000 @A3	DATUM: N/A
LAYOUT DRAWING: N/A	T-LAYOUT NO: N/A

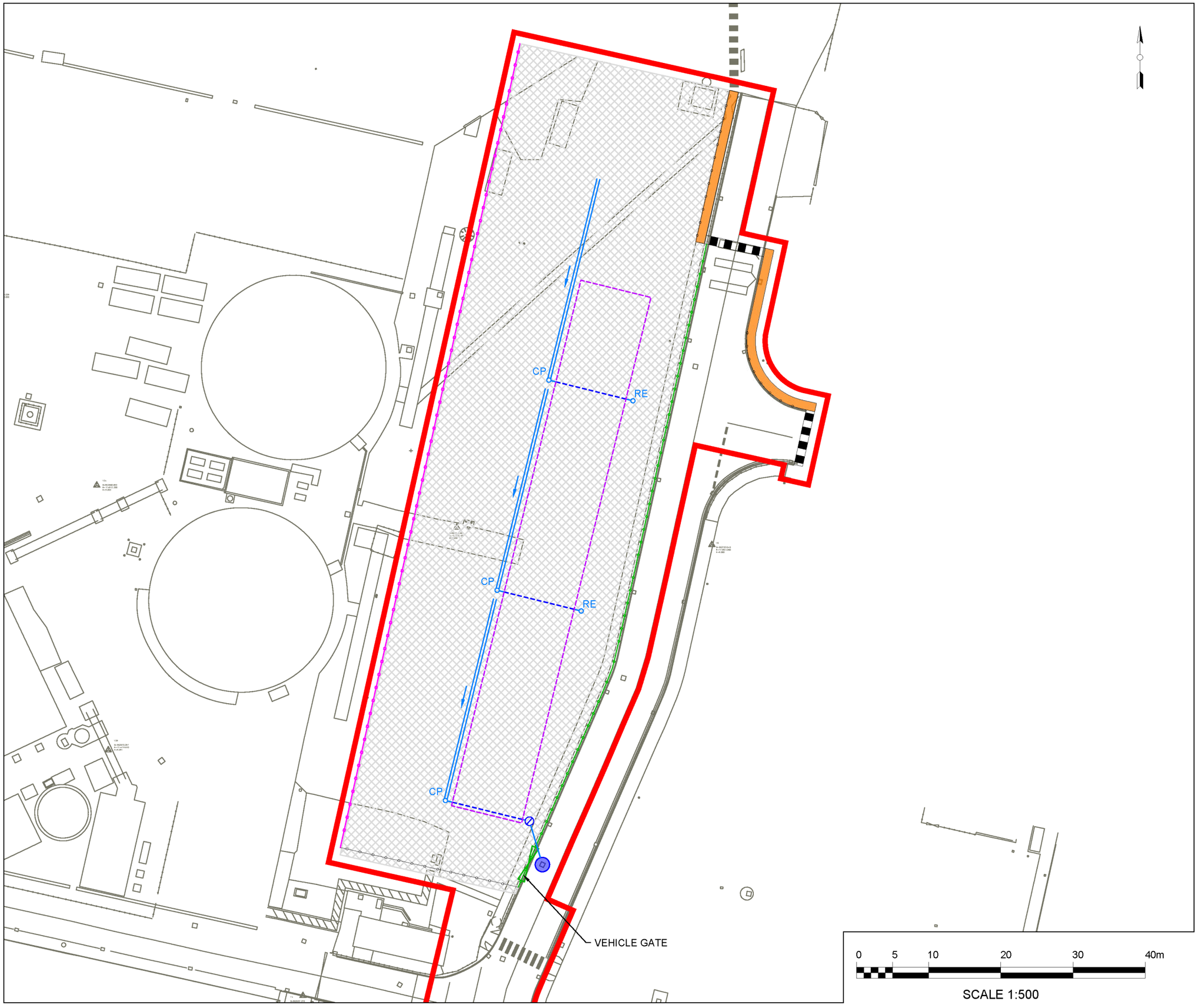
PROJECT TITLE
NORTHFLEET PULP LAYDOWN AREA

DRAWING TITLE
PULP STORAGE HARDSTANDING INFRASTRUCTURE LAYOUT

RES DRAWING NUMBER	REV
05135-RES-PRO-DR-PT-010	2

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BEAUFORT COURT,
EGG FARM LANE,
KINGS LANGLEY,
HERTS WD4 8LR. UK
TEL +44 (0) 1923 299200
WWW.RES-GROUP.COM



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2025 LICENCE NUMBER 0100031673.

KEY:

- DEVELOPMENT BOUNDARY (0.51 HECTARES) (INSIDE EDGE OF LINE DENOTES BOUNDARY)

HARDSTANDING KEY

- PULP STORAGE HARDSTANDING (CONCRETE SLAB)
- VEHICLE BARRIER (A-SAFE BARRIER)
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- PERFORATED PIPE
- DRAINAGE PIPE
- CP CATCHPIT
- RE RODDING EYE
- MANHOLE WITH FLOW CONTROL
- MODULAR ATTENUATION CRATES
- SURFACE WATER DRAINAGE CONNECTION POINT
- FOOTPATH
- WALKWAY MARKING

SHEET 2 OF 3

ISSUE	DRAWN	CHKD	APPD	DATE	REVISION NOTES
2	BM	DC	IB	2025-02-06	UPDATED PROJECT TITLE AND UPDATED VEHICLE BARRIER
1	BM	DC	IB	2025-01-23	FIRST ISSUE

PURPOSE: PLANNING	COORDINATES: OSGB 1936
SCALE: 1:500 @A3	DATUM: N/A
LAYOUT DRAWING: N/A	T-LAYOUT NO: N/A

PROJECT TITLE
NORTHFLEET PULP LAYDOWN AREA

DRAWING TITLE
PULP STORAGE HARDSTANDING INFRASTRUCTURE LAYOUT

RES DRAWING NUMBER	REV
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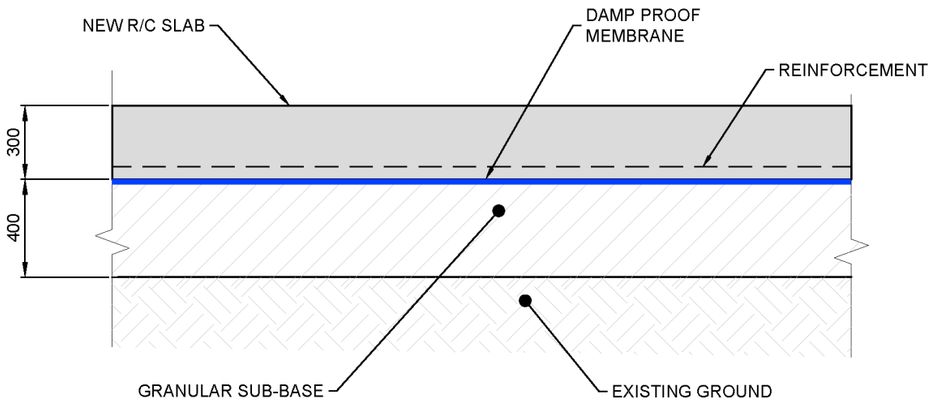
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SCALE 1:500

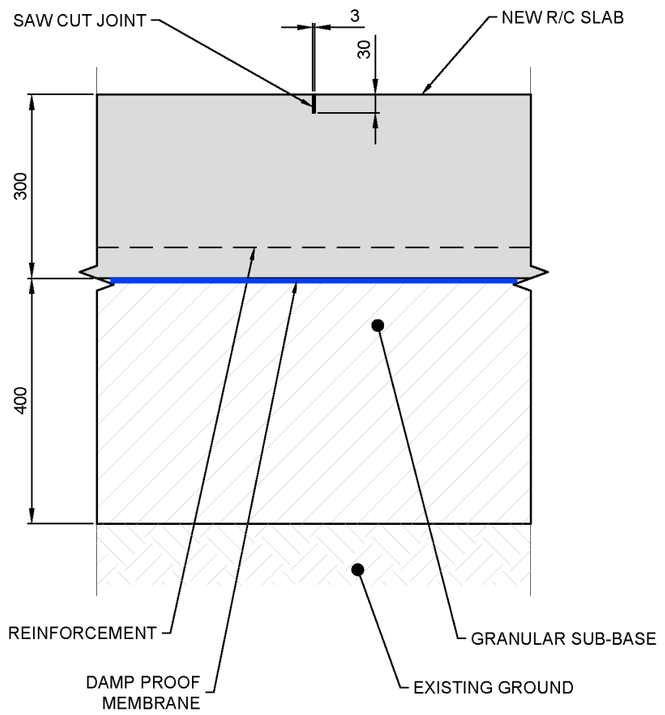
© CROWN COPYRIGHT, ALL RIGHTS RESERVED.
2025 LICENCE NUMBER 0100031673.

NOTES:

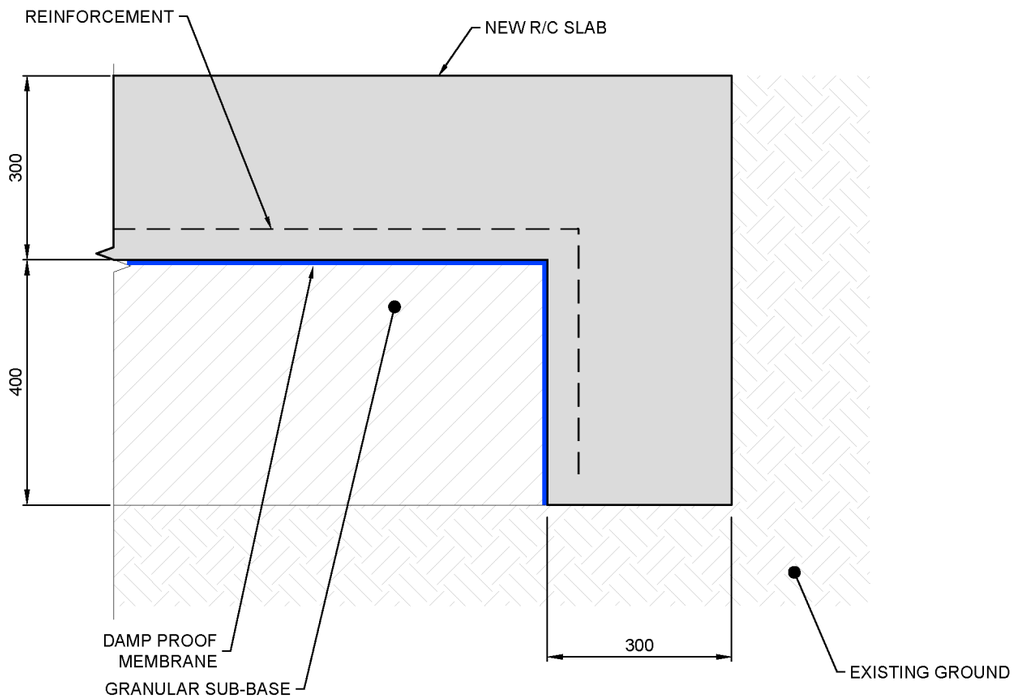
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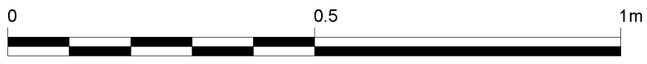
DETAIL A - SECTION/ BUILDUP DETAIL
SCALE 1:25



DETAIL B - SAW JOINT
SCALE 1:10



DETAIL C - PERIMETER DOWNSTAND
SCALE 1:10



SCALE 1:10



SCALE 1:25

SHEET 3 OF 3

ISSUE	DRAWN	CHKD	APPD	DATE	REVISION NOTES
2	BM	DC	IB	2025-02-06	UPDATED PROJECT TITLE AND UPDATED VEHICLE BARRIER
1	BM	DC	IB	2025-01-23	FIRST ISSUE

PURPOSE: PLANNING	COORDINATES: OSGB 1936
SCALE: AS SHOWN @A3	DATUM: N/A
LAYOUT DRAWING: N/A	T-LAYOUT NO: N/A

PROJECT TITLE
NORTHFLEET PULP LAYDOWN AREA

DRAWING TITLE
PULP STORAGE HARDSTANDING INFRASTRUCTURE LAYOUT

RES DRAWING NUMBER	REV
05135-RES-PRO-DR-PT-010	2

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EGG FARM LANE,
KINGS LANGLEY,
HERTS WD4 8LR. UK
TEL +44 (0) 1923 299200
WWW.RES-GROUP.COM

APPENDIX E
ENVIRONMENT AGENCY CORRESPONDENCE

Jacob Winfield

From: Alison Cadge
Sent: 16 January 2025 16:51
To: Jacob Winfield
Subject: FW: KSL 305544 RL: Kimberly-Clark Industrial Estate, Crete Hall Road, Northfleet, Gravesend, DA11 9AD

Alison Cadge
Principal Hydrologist

LDE
CIVILS | STRUCTURES | HYDROLOGY
an RSK company

www.rsklde.com
18 Frogmore Road, Hemel Hempstead, Hertfordshire, HP3 9RT, UK
Switchboard: +44 (0)1442 437500
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Before printing think about your responsibility and commitment to the **ENVIRONMENT!**

From: KSL PSO SE London & North Kent <PSO.SELondonandNKent@environment-agency.gov.uk>
Sent: 14 November 2024 15:29
To: Alison Cadge <ACadge@rsk.co.uk>
Cc: KSL Enquiries <KSLE@environment-agency.gov.uk>
Subject: RE: KSL 305544 RL: Kimberly-Clark Industrial Estate, Crete Hall Road, Northfleet, Gravesend, DA11 9AD

CAUTION: This email originated from outside the Organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Good afternoon Alison,

The model data provided within the Product 4 and 8 in May 2023 is still the most up-to-date modelling we have for the Thames Tidal Downriver extents. Therefore, the Product 4 and 8 should still be suitable for input into a Flood Risk Assessment.

Kind regards,

Aidan Anderson
Flood & Coastal Risk Management Officer
Partnership & Strategic Overview | South East London & North Kent
Environment Agency | Orchard House, London Road, Addington, West Malling, ME19 5SH
E: PSO.SELondonandNKent@environment-agency.gov.uk

Creating a better place for people and wildlife

From: Alison Cadge <ACadge@rsk.co.uk>
Sent: 12 November 2024 15:20
To: KSL Enquiries <KSLE@environment-agency.gov.uk>
Subject: FW: KSL 305544 RL: Kimberly-Clark Industrial Estate, Crete Hall Road, Northfleet, Gravesend, DA11 9AD

Dear Sir / Madam,

You provided the attached Product 4 and Product 8 datasets in May 2023, please can you advise whether these are still valid or whether you have updated the flood modelling in this location since provision of this data?

Many thanks,

Alison

Alison Cadge
Principal Hydrologist

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an RSK company

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18 Frogmore Road, Hemel Hempstead, Hertfordshire, HP3 9RT, UK
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From: KSL Enquiries <KSLE@environment-agency.gov.uk>
Sent: 15 May 2023 08:50
To: Alison Cadge <ACadge@rsk.co.uk>
Subject: KSL 305544 RL: Kimberly-Clark Industrial Estate, Crete Hall Road, Northfleet, Gravesend, DA11 9AD

Dear Alison,

RE: KSL 305544 RL - Kimberly-Clark Industrial Estate, Crete Hall Road, Northfleet, Gravesend, DA11 9AD

Thank you for your enquiry which was received on 31 March 2023.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004.

Please note that we have changed our process for responding to flood product data requests, in that where appropriate we supply the data in its raw form as opposed to in the Product 4 and 8 PDF formats. This is to improve efficiency within our area of the Environment Agency and to provide customers with a more rapid and flexible response. Where customers are unable to use the Model Output Data (Product 6), or if the

data is particularly complex, we will continue to produce Product 4 and 8 formats, until an alternative process is confirmed.

Please find attached the Product 4 and 8.

Please refer to the Open Government Licence which explains the permitted use of this information.

Please be aware that the Environment Agency supply data, but we do not interpret it for use in a Flood Risk Assessment. Flood Risk Assessment's should be completed by a suitably competent and qualified person.

Surface water flooding maps can be downloaded from our Partner Data Catalogue (http://environment.data.gov.uk/ds/partners/#/partners/login). The Lead Local Flood Authority is responsible for surface water flooding issues. Please contact them for further information or for details on groundwater flood risk.

You may be interested in the following guidance / information publically available:

- **'Planning Practice Guidance'** - provides information about planning considerations in areas at risk of flooding. http://planningguidance.planningportal.gov.uk/
- **'Planning applications: assessing flood risk'** - information about completing Flood Risk Assessments. https://www.gov.uk/planning-applications-assessing-flood-risk
- **'Site specific flood risk assessment: Checklist'** – a checklist to help ensure you have considered all the relevant factors in your flood risk assessment. http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/site-specific-flood-risk-assessment-checklist/

Please refer to https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances for Climate Change allowance guidance.

We recommend that you discuss your proposals with the Local Planning Council at the earliest opportunity. They will be able to advise you on a wide range of planning matters in addition to flood risk.

Environment Agency pre application service

We are able to supply a preliminary opinion outlining the key environmental issues and opportunities which is free. For more detailed advice, guidance, review of draft report, meetings etc we can organise a cost recovery agreement which is chargeable.

We encourage early discussions to ensure environmental issues and opportunities are considered early in the planning process. If you would like a free preliminary opinion or our cost recovery service please complete the form and email back to kslplanning@environment-agency.gov.uk.

If you have any further queries or if you'd like us to review the information we have provided under the Freedom of Information Act 2000 and Environmental Information Regulations 2004 please contact us within two months.

Kind regards,

Robyn

Robyn Latter
Customer & Engagement Officer
Customer and Engagement Team – Kent, South London and East Sussex Area
Environment Agency | Orchard House, London Road, Addington, West Malling, ME19 5SH | KSLE@environment-agency.gov.uk | 0208 474 6848

From: Alison Cadge <ACadge@rsk.co.uk>
Sent: 25 April 2023 11:21
To: KSL PSO SE London & North Kent <PSO.SELondonandNKent@environment-agency.gov.uk>
Cc: KSL Enquiries <KSLE@environment-agency.gov.uk>
Subject: RE: KSL 305544 RL: Kimberly-Clark Industrial Estate, Crete Hall Road, Northfleet, Gravesend, DA11 9AD

Dear Layo,

Thank you for providing the Product 5 and 6 data. Unfortunately we don't have the capability or resource to extract the required information ourselves. Would it be possible to provide the information in a Product 4/8 format please?

Many thanks,

Alison

Alison Cadge
Principal Hydrologist

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From: KSL PSO SE London & North Kent <PSO.SELondonandNKent@environment-agency.gov.uk>
Sent: 06 April 2023 13:59
To: Alison Cadge <ACadge@rsk.co.uk>
Cc: KSL Enquiries <KSLE@environment-agency.gov.uk>
Subject: RE: KSL 305544 RL: Kimberly-Clark Industrial Estate, Crete Hall Road, Northfleet, Gravesend, DA11 9AD

Dear Alison,

Re: KSL 305544 RL: Kimberly-Clark Industrial Estate, Crete Hall Road, Northfleet, Gravesend, DA11 9AD

Thank you for your enquiry which was received on 31 March 2023.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004.

You have requested a Product 4, please see Appendix 1 below detailing each product.

Your request for a Product 4 falls under the exemption in provision 6(1)(a) and (b) of the Environmental Information Regulations 2004 (EIR), and on this occasion we are not providing the information in the requested format, but in an alternative format. Further detail of the provisions under the EIR can be found in Appendix 2.

Please find below the link containing the Product 5 and 6

Thames Tidal Downriver Breach Inundation Modelling 2018 https://defra.sharefile.com/d-s7fa7e1d01734d5a9

We have also enclosed Thames Estuary 2100 information.

We are licensing the supplied data to you under the Environment Agency Conditional Licence, details of which are included in the ShareFile link. You must first check this supporting information, to determine if the conditions of use are suitable for your purposes. If the conditions for use are not suitable for your purposes, this information is not provided with a licence for use, and the data is provided for the right to read only.

The information provided in the ShareFile link is based on the best data available as of the date of this letter. You may feel it is appropriate to contact us at regular intervals, to check whether any amendments/ improvements have been made to the data for this location. Should you re-contact us after a period of time, please quote the above reference in order to help us deal with your query.

Requests for flood products in Kent, South London and East Sussex

Please note that we changed our process in December 2019 for responding to flood product data requests. Where appropriate, we supply the data in its raw form (Product 6), as opposed to in the Product 4 and/or 8 PDF format. This is to improve efficiency within our area of the Environment Agency, and to provide customers with a more rapid and flexible response. Where customers are unable to use the Model Output Data (Product 6), or if the data is particularly complex, we will continue to produce Product 4 and 8 formats.

The Product 4 itself is not a direct requirement in the planning process, but the data that goes into the Product 4 is required to inform your Flood Risk Assessment. This data can be extracted from the Product 6 data provided in the ShareFile link and in open data sources listed below. Instructions on how to use the appropriate data are provided on the ShareFile link.

Other flood data sources

The Flood Map for Planning is available to view and export maps for your site at: https://flood-map-for-planning.service.gov.uk/

Flood Zone 3 https://data.gov.uk/dataset/flood-map-for-planning-rivers-and-sea-flood-zone-3
Flood Zone 2 https://data.gov.uk/dataset/flood-map-for-planning-rivers-and-sea-flood-zone-2
Historic Flood Map https://data.gov.uk/dataset/historic-flood-map1

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

Please be aware that flooding can come from different sources. Examples of these are:
- from rivers or the sea
- surface water (i.e. rainwater flowing over or accumulating on the ground before it is able to enter rivers or the drainage system)
- overflowing or backing up of sewer or drainage systems which have been overwhelmed
- groundwater rising up from underground aquifers

Currently the Environment Agency can only supply flood risk data relating to the chance of flooding from rivers or the sea. The Lead Local Flood Authority is responsible for surface water flooding issues. Please contact them for further information or for details on groundwater flood risk.

Defence Information

Asset type / Description – Wall

Location – Kimberly-Clark Industrial Estate, Crete Hall Road, Northfleet,

Maintainer – Environment Agency

Standard of protection – 1000

Asset protection type – Tidal

Condition – 3

Build date – 11/10/2012

Date of next inspection – 20/07/2023

Plans for improvement / future schemes – Unknown

Environment Agency planning guidance and pre application service.

- Planning practice guidance - provides information about planning considerations in areas at risk of flooding https://www.gov.uk/guidance/flood-risk-and-coastal-change
- Planning applications: assessing flood risk - information about completing flood risk assessments https://www.gov.uk/planning-applications-assessing-flood-risk
- Site specific flood risk assessment checklist - a checklist to help ensure you have considered all the relevant factors in your flood risk assessment http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/site-specific-flood-risk-assessment-checklist/
- Climate change allowance guidance - https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

We recommend that you discuss your proposals with the Local Planning Authority at the earliest opportunity. They will be able to advise you on a wide range of planning matters in addition to flood risk.

Please see our website for details on how to get planning advice from the Environment Agency, including charged-for discretionary advice https://www.gov.uk/guidance/developers-get-environmental-advice-on-your-planning-proposals#when-to-consult. Our planning team can be contacted at kslplanning@environment-agency.gov.uk

If you have a new enquiry or would like us to review the information we have provided under the Freedom of Information Act 2000 and Environmental Information Regulations 2004 please contact us within two months by email at KSLE@environment-agency.gov.uk

Regards,

Layo Oluwole
Flood & Coastal Risk Management Officer
Partnership & Strategic Overview - South East London & North Kent
Kent, South London and East Sussex Area
Environment Agency | Orchard House, London Road, Addington, West Malling, ME19 5SH

PSO.SELondonandNKent@environment-agency.gov.uk





Appendix 1

Product 4	Detailed Flood Risk Assessment Map, including flood zones, defences and storage areas, areas benefiting from defences, statutory main river designations, historic flood event outlines and more detailed information from hydraulic models (including model extents and 2D flood level data for specific points)
Product 5	Reports, including flood modelling reports, model user logs and guides, hydrology reports, etc
Product 6	Model Output Data, including product 5. • flood outlines usually provided in shapefile format • 2D grids (level (h), depth (d) velocity (v) and hazard ZKU0) usually provided in ASCII or GeoTIFF format • 1D flow and level data Requires GIS software such as ArcGIS, MapInfo, QGIS or similar.
Product 7	Calibrated and Verified Model Input Data (CaVMID), including product 5. Enables customer to re-run and/or make changes to a hydraulic model. Requires specific hydraulic modelling software such as Flood Modeller, TUFLOW, or ICM InfoWorks.
Product 8	Breach Hazard Map Provides a hazard map of breaches in PDF format including, maximum flood depth, maximum flood velocity and maximum flood hazard. Please note product 8 is not available for fluvial models.

Appendix 2

The exemption in provision 6(1)(a) and (b) of the Environmental Information Regulations 2004 (EIR) states that

'……6.—(1) Where an applicant requests that the information be made available in a particular form or format, a public authority shall make it so available, unless—
(a) it is reasonable for it to make the information available in another form or format; or
(b) the information is already publicly available and easily accessible to the applicant in another form or format……'

On this occasion we are not providing the information in the requested format, for the following reasons:

- Complying with the preference would incur a significant cost, which the public authority [The Environment Agency] cannot pass on to the requester;
- Using a Product 5/6/7 allows us to make the information available at a lower cost; and
- The impact on the available resources of the public authority [The Environment Agency], of supplying a Product 5/6/7, is therefore much less.

From: Alison Cadge <ACadge@rsk.co.uk>
Sent: 31 March 2023 16:36
To: KSL Enquiries <KSLE@environment-agency.gov.uk>
Subject: Product 4 flood data request - Kimberley-Clark Industrial Estate, Gravesend

Dear Sir / Madam,

Please could I request a Product 4 flood risk dataset for the site shown on the attached plan? The address is Kimberly-Clark Industrial Estate, Crete Hall Road, Northfleet, Gravesend DA11 9AD, NGR TQ 62643 74342.

Specifically we would like to request:

- Floodplain modelled flood levels and extents for a range of return period events including a climate change allowance
- Modelled in-channel flood levels and flows for a range of return period events
- Details of any flood defences benefitting the site
- Any breach modelled flood levels / extents where applicable
- Details of any historical flooding affecting the site

Many thanks,

Alison

Alison Cadge
Principal Hydrologist

LDE
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an RSK company

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Company Number: 4723837
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Product 4 (Detailed Flood Risk) for: Kimberly-Clark Industrial Estate, Crete Hall Road, Northfleet, Gravesend, DA11 9AD
Requested by: Alison Cadge
Reference: KSL 305544 RL
Date: 12th May 2023

Contents

- Flood Map for Planning (Rivers and Sea)
- Flood Map Extract
- Thames Estuary 2100 (TE2100)
- Thames Tidal Downriver Breach Inundation Modelling 2018
- Thames Tidal Downriver Breach Inundation Modelling Map
- Site Node Locations Map
- Defence Details
- Recorded Flood Events Data
- Recorded Flood Events Outlines Map
- Additional Information

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

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

Please refer to the Open Government Licence which explains the permitted use of this information.

Environment Agency, Orchard House, Endeavour Park, London Road, West Malling, ME19 5SH
Customer services line: 020 8474 6848
Email: kslenquiries@environment-agency.gov.uk
Website: https://www.gov.uk/government/organisations/environment-agency

Flood Map for Planning (Rivers and Sea)

The Flood Map:

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

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

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

At this Site:

The Flood Map shows that this site lies within the outline of Flood Zone 3. This zone comprises land assessed as having a 0.5% (1 in 200) or greater annual probability of tidal flooding.

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

Method of production

The Flood Map at this location has been derived using detailed modelling of the tidal River Thames through the North Kent Coastal Modelling study completed in 2018 by JBA Consulting.

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Website: https://www.gov.uk/government/organisations/environment-agency

Flood Map for Planning centred on DA11 9AD created 12th May 2023 [Ref: KSL 305544 RL]



Environment Agency

Scale 1: 10,000

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Legend

- Site Location
- TE2100 Model Nodes
- Main Rivers
- Flood Zone 3
- Flood Zone 2
- Flood Defences

Flood Map for Planning (assuming no defences)

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

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

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Thames Estuary 2100 (TE2100)

You have requested in-channel flood levels for the tidal river Thames. These have been taken from the Thames Estuary 2100 study completed by HR Wallingford in 2008. The modelled node closest to your site is **3.24**; the locations of nearby nodes are also shown on the enclosed map.

Details about the TE2100 plan

The Plan sets out how the Environment Agency and our partners can work together to manage tidal flood risk, from now until the end of the century. The Plan covers the Thames Estuary from Teddington in the west to the mouth of the estuary at Shoeburyness (north bank) and Sheerness (south bank) in the east. It is an adaptive plan for managing the estuary, including the tidal defence system, until 2100 so that current standards of flood protection are maintained or improved taking into account climate change effects e.g. sea level rise. The Plan has 3 phases of activity:

- Until 2035 – maintain and improve current defences, safeguard areas required for future improvements, and monitor climate change indicators.
- 2035-2050 – raise existing walls, defences & smaller barriers whilst reshaping the riverside environment.
- 2050-2100 – determine and implement an option for the future of the Thames Barrier, and adapt other defences as required to work alongside this to protect the estuary.

The Thames Estuary 2100 Plan can be found at: https://www.gov.uk/government/publications/thamesestuary-2100-te2100

Details about the TE2100 in-channel levels

The TE2100 in-channel levels take into account operation of the Thames Barrier when considering future levels. The Thames Barrier requires regular maintenance and with additional closures the opportunity for maintenance will be reduced. When this happens, river levels – for which the Barrier would normally shut for the 2008 epoch – will have to be allowed through to ensure that the barrier is not shut too often. For this reason, levels upriver of the barrier will increase and the tidal walls will need to be raised to match.

Where to find the in-channel levels and defence crest level data from the 2008 TE2100 study

The TE2100 in-channel levels and defence crest levels documents can be downloaded from ShareFile at the following link:
https://ea.sharefile.com/d-s5e56401472448219331e780c91c4ac2

- Downriver of the Thames Barrier is detailed within Table 7.1 (page 56) of the document titled '*Thames Estuary 2100, Improvements to Flood Risk Management System, Design Water Levels and Future Defence Crest Levels, May 2015*'. Defence raising for other barrier options can also ben found the document titled '*Thames Estuary 2100, Phase 3 Studies, Topic 1.5, Phase 3 Set 2 Estuary Wide Options Hydraulic modelling, December 2008*'

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Thames Tidal Downriver Breach Inundation Modelling - 2018

The table below displays site-specific modelled flood levels at your site. These have been taken from the Downriver Breach Inundation Modelling Study 2018 completed by Atkins Ltd. in May 2018.

We have developed a modelling approach where all downriver breach locations along the Thames are equitably modelled, to ensure a consistent approach across London. This modelling simulates continuous tidal breaches along the entire extent of the Thames between the Thames Barrier and east of Gravesend on the south bank and east of Tilbury on the north bank. For hard and composite defences breaches are set at 20 m wide; for soft defences, breaches are 50 m wide. In both cases, the defence breach scour distance was assumed to extend into the floodplain by the same distance as the breach width.

Based on the 2008 TE2100 in-channel levels, the 0.5% (1 in 200 year) and 0.1% (1 in 1000 year) annual probability of exceedance tidal events were modelled for all breach locations downriver of the Thames Barrier. These were modelled for the 2014 year epoch (current year), as well as 2115 epoch which include allowances for climate change.

This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within London.

	National Grid Reference		Modelled levels in mAODN for 0.5% AEP		Modelled levels in mAODN for 0.1% AEP	
Node	Easting	Northing	2014	2115	2014	2115
1	562638	174658	5.71	6.08	5.78	6.37
2	562773	174622	5.40	5.99	5.58	6.40
3	562748	174516	5.24	5.99	5.53	6.40
4	562792	174503	5.21	5.99	5.53	6.40
5	562771	174375	5.21	5.99	5.46	6.40
6	562715	174381	5.28	5.99	5.48	6.40
7	562688	174273	3.59	5.99	4.32	6.40
8	562635	174113	Nil return	5.98	4.32	6.40
9	562550	174119	Nil return	5.99	4.32	6.40
10	562494	174248	Nil return	5.99	4.32	6.40
11	562547	174302	Nil return	5.99	4.32	6.40

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12	562593	174476	Nil return	Nil return	Nil return	Nil return
13	562674	174549	5.47	6.02	5.65	6.40
14	562631	174345	Nil return	5.99	5.30	6.40

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Downriver Breach Modelling Map centred on DA11 9AD created 12th May 2023 [Ref: KSL 305544 RL]



Environment Agency

Scale 1: 10,000

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Legend

- Site Location
- TE2100 Model Nodes
- Main Rivers

Downriver 0.5% AEP Outlines

Epoch

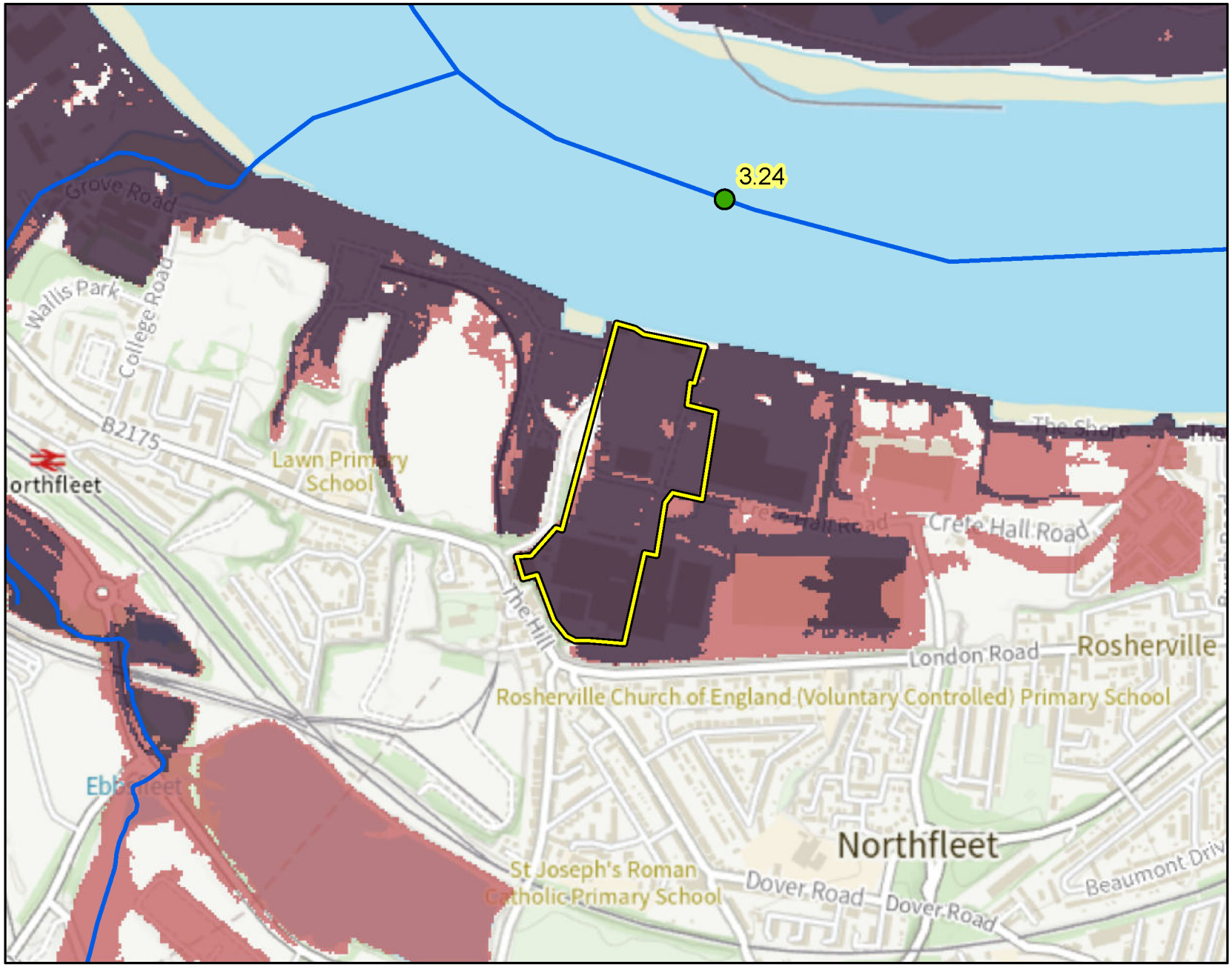
- 2014 (Current year)
- 2115

Thames Tidal Downriver Breach Inundation Modelling 2018

A modelled representation of all tidal breach locations along the Thames from the Thames Barrier to Gravesend, based on low floodplain topography. For hard and composite defences breaches are set at 20 m wide; for soft defences, breaches are 50 m wide. In both cases, the defence breach scour distance was assumed to extend into the floodplain by the same distance as the breach width.
The modelling is based on the 2008 TE2100 in-channel levels, with an allowance for climate change for epoch 2115.

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Downriver Breach Modelling Map centred on DA11 9AD created 12th May 2023 [Ref: KSL 305544 RL]



Environment Agency

Scale 1: 10,000

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Legend

- Site Location
- TE2100 Model Nodes
- Main Rivers

Downriver 0.1% AEP Outlines

Epoch

- 2014 (Current year)
- 2115

Thames Tidal Downriver Breach Inundation Modelling 2018

A modelled representation of all tidal breach locations along the Thames from the Thames Barrier to Gravesend, based on low floodplain topography. For hard and composite defences breaches are set at 20 m wide; for soft defences, breaches are 50 m wide. In both cases, the defence breach scour distance was assumed to extend into the floodplain by the same distance as the breach width.
The modelling is based on the 2008 TE2100 in-channel levels, with an allowance for climate change for epoch 2115.

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Node Location Map centred on DA11 9AD created 12th May 2023 [Ref: KSL 305544 RL]



Environment Agency

Scale 1: 5,000

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Legend

- Node Point Locations
- Site Location
- Main Rivers

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Defence Details

Asset type / Description – Wall

Location – Kimberly-Clark Industrial Estate, Crete Hall Road, Northfleet,

Maintainer – Environment Agency

Standard of protection – 1000

Asset protection type – Tidal

Condition – 3

Build date – 11/10/2012

Date of next inspection – 20/07/2023

Plans for improvement / future schemes – Unknown

For more information on your rights and responsibilities as a riparian owner, please see our document 'Living on the edge' found on our website at:

https://www.gov.uk/government/publications/riverside-ownership-rights-and-responsibilities

Areas Benefiting from Flood Defences

The Environment Agency has taken the decision to retire this dataset and remove it from the Flood Map for Planning portal. This is because we have determined that it no longer meets the customer needs and creates a false sense of security for users.

To understand the long-term risk of flooding to an area, you can use the Check Your Long Term Flood Risk portal: this will provide an understanding of flood risk from rivers and sea, taking into account the presence and condition of defences, and other sources of flood risk such as from surface water and reservoirs.

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Recorded Flood Events Data

We hold records of historic flood events from rivers and the sea. Information on the floods that may have affected the area local to your site is provided below and in the enclosed map (if relevant).

Flood Event Data

1953 – The site was within approximately 700m of the tidal flooding, due to a storm surge in the North Sea, on the night of the 31st January into the morning of 1st February. An approximate level in the Thames at the time was 4.90 m AODN.

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

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

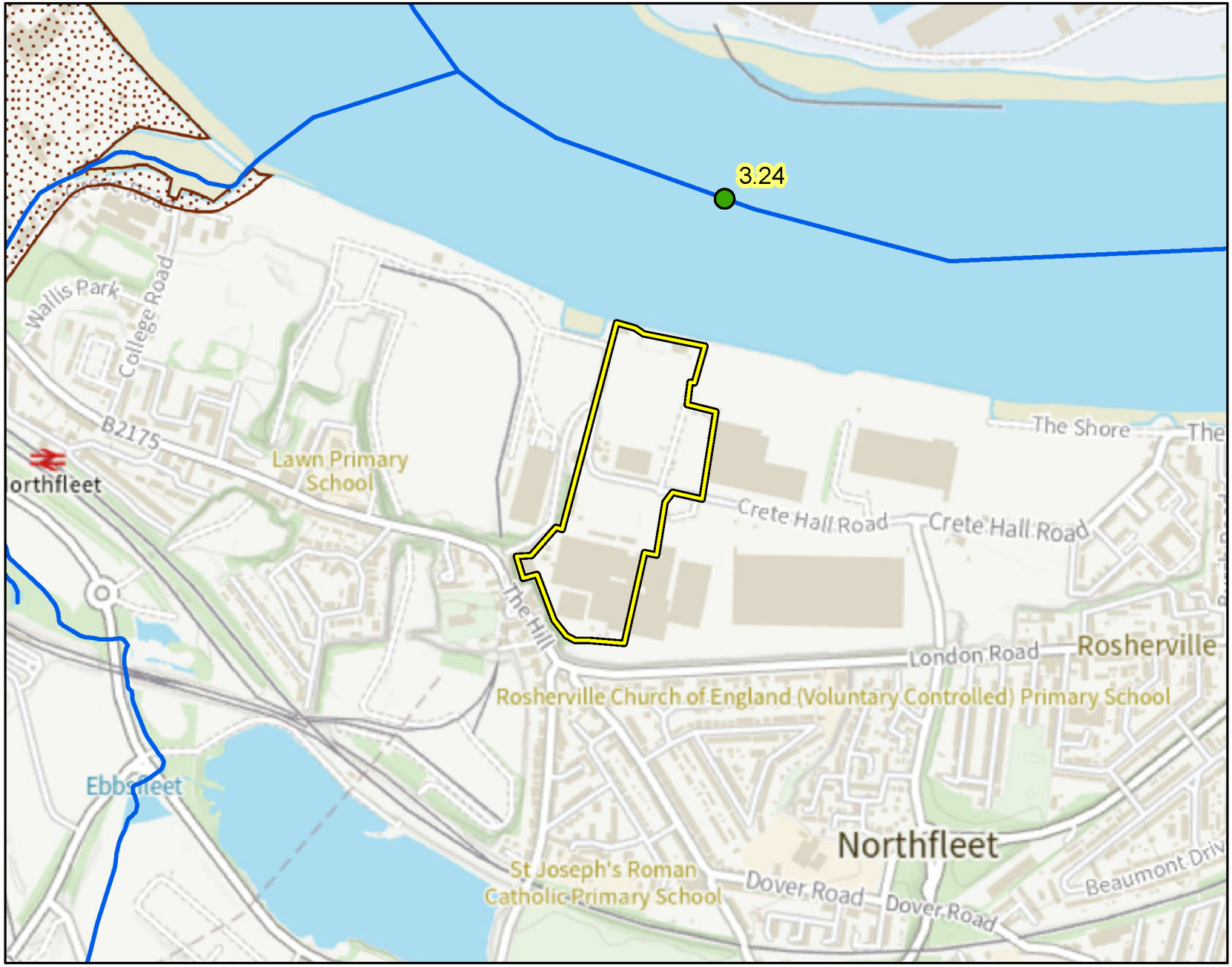
Please be aware that flooding can come from different sources. Examples of these are:

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

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

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Historic Flood Map centred on DA11 9AD created 12th May 2023 [Ref: KSL 305544 RL]



Environment Agency

Scale 1: 10,000

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Legend

- Site Location
- TE2100 Model Nodes
- Main Rivers
- Jan 1953 Flood Outline

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Additional Information

Information Warning - OS background mapping

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Environment Agency planning guidance and pre application service

- Planning Practice Guidance_- provides information about planning considerations in areas at risk of flooding. https://www.gov.uk/guidance/flood-risk-and-coastal-change
- Planning applications: assessing flood risk - information about completing Flood Risk Assessments. https://www.gov.uk/planning-applications-assessing-flood-risk
- Site specific flood risk assessment: Checklist_– a checklist to help ensure you have considered all the relevant factors in your flood risk assessment. http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/site-specific-flood-risk-assessment-checklist/
- Climate change allowance guidance https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

We recommend that you discuss your proposals with the Local Planning Authority at the earliest opportunity. They will be able to advise you on a wide range of planning matters in addition to flood risk.

Please see our website for details on how to get planning advice, including charged-for discretionary advice, from the Environment Agency https://www.gov.uk/guidance/developers-get-environmental-advice-on-your-planning-proposals#when-to-consult. Our planning team can be contacted at kslplanning@environment-agency.gov.uk

You should also consult the Strategic Flood Risk Assessment and flood risk local plan policies produced by your local planning authority.

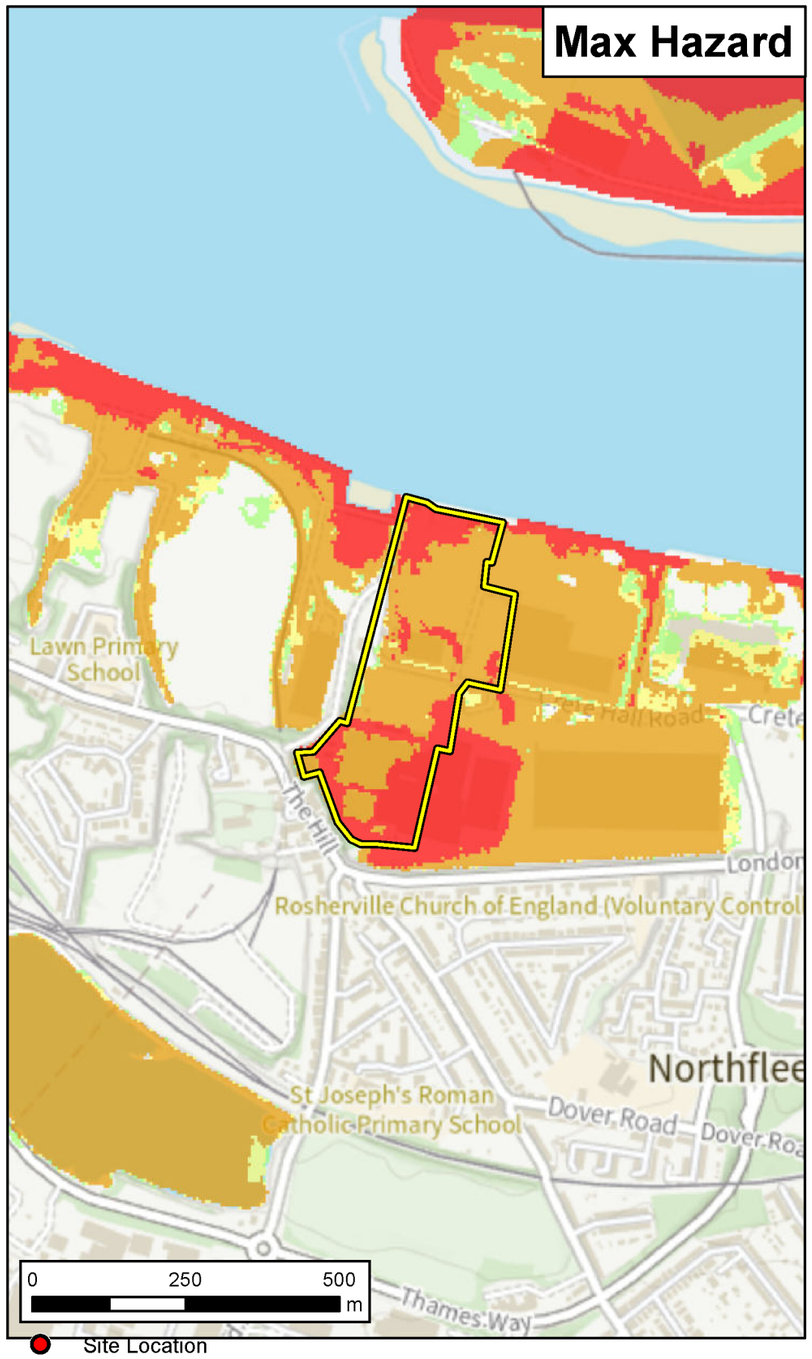
You should note that:

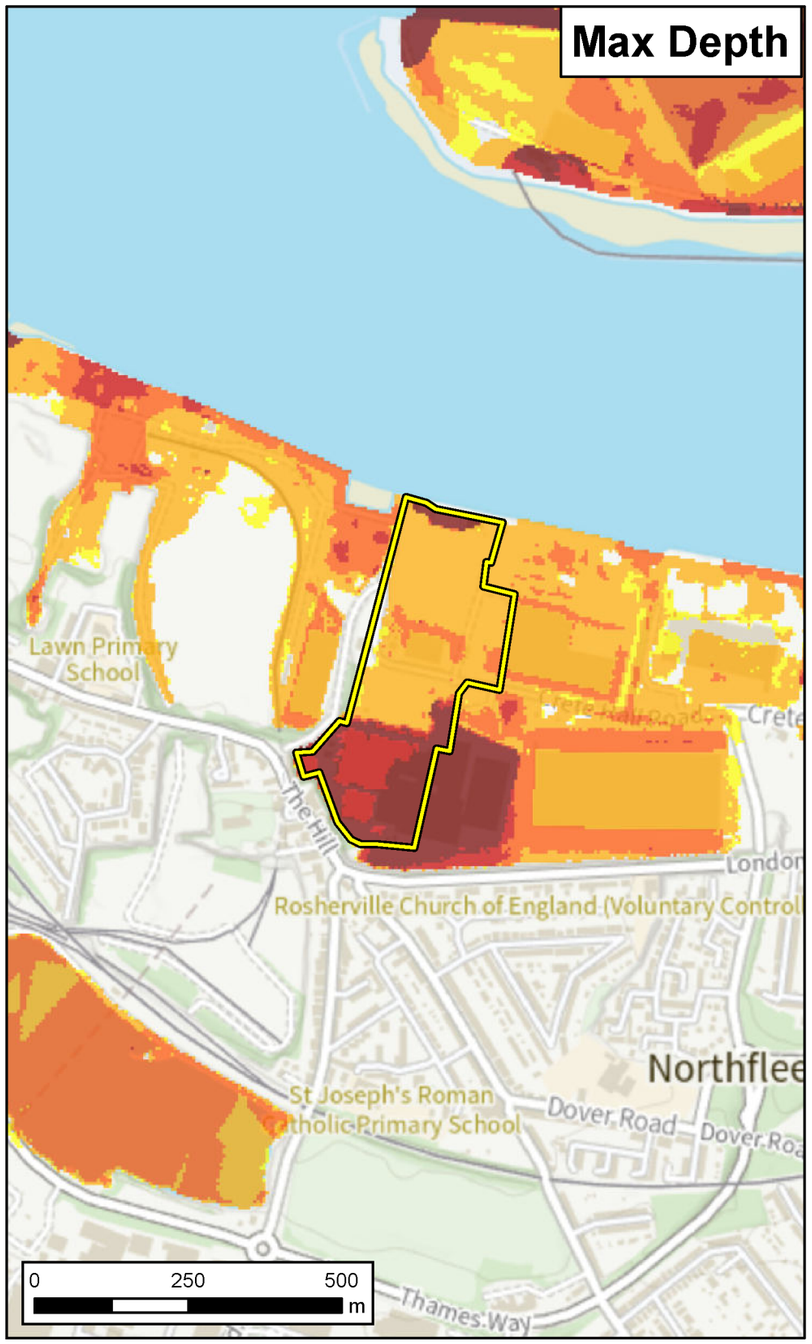
1. Information supplied by the Environment Agency may be used to assist in producing a Flood Risk Assessment where one is required, but does not constitute such an assessment on its own.

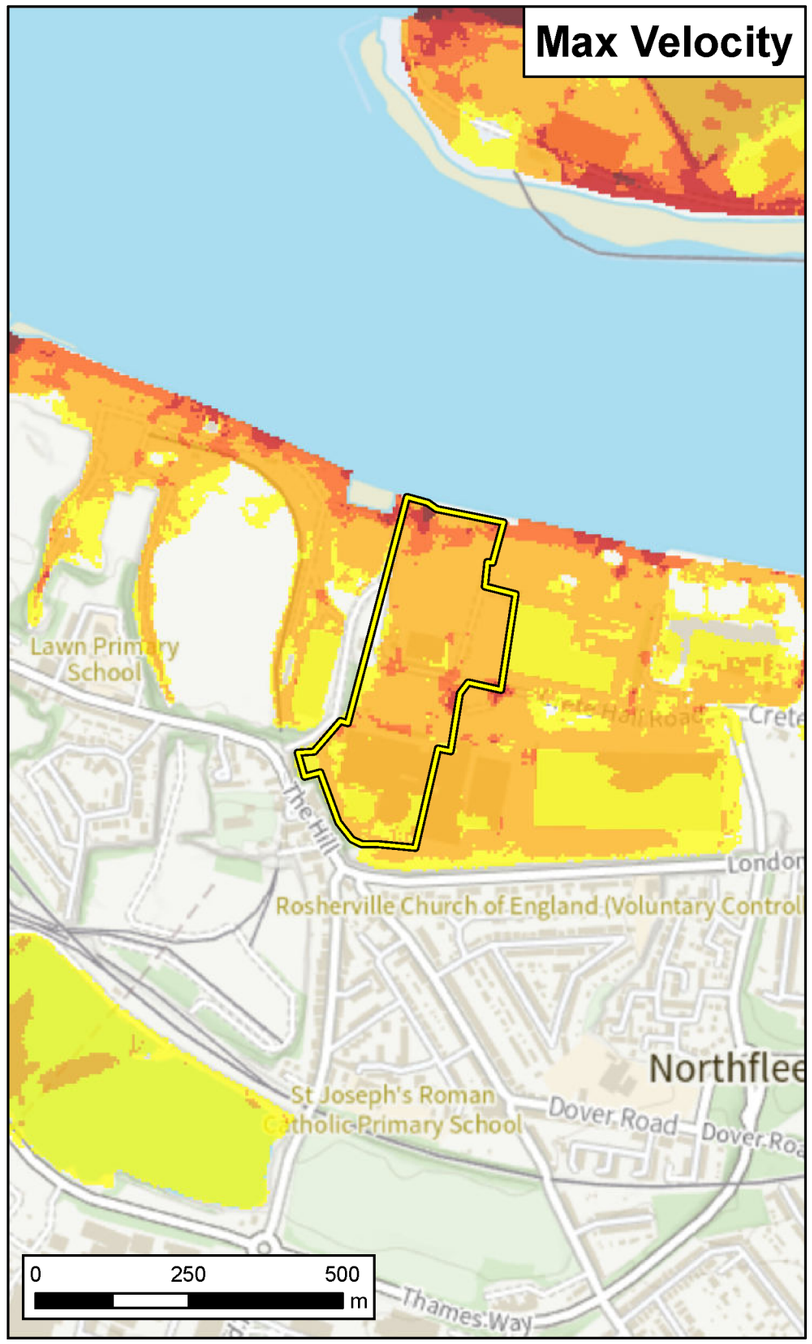
2. This information covers flood risk from main rivers and the sea, and you will need to consider other potential sources of flooding, such as groundwater or overland runoff. You should discuss surface water management with your Lead Local Flood Authority.

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

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Site Location

Site Location

Max Hazard

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

Max Depth (m)

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

Max Velocity (m/s)

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

Date Printed	12/05/2023	Scenario year	2115	Scenario Annual Chance	0.5% (1 in 200)

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

The map is based on computer modelling of simulated breaches covering the entire extent between the Thames Barrier and Gravesend. Each breach has been modelled individually and the results combined to create this map. Multiple breaches, other combinations of breaches, different sized tidal surges or flood flows may all give different results.

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

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

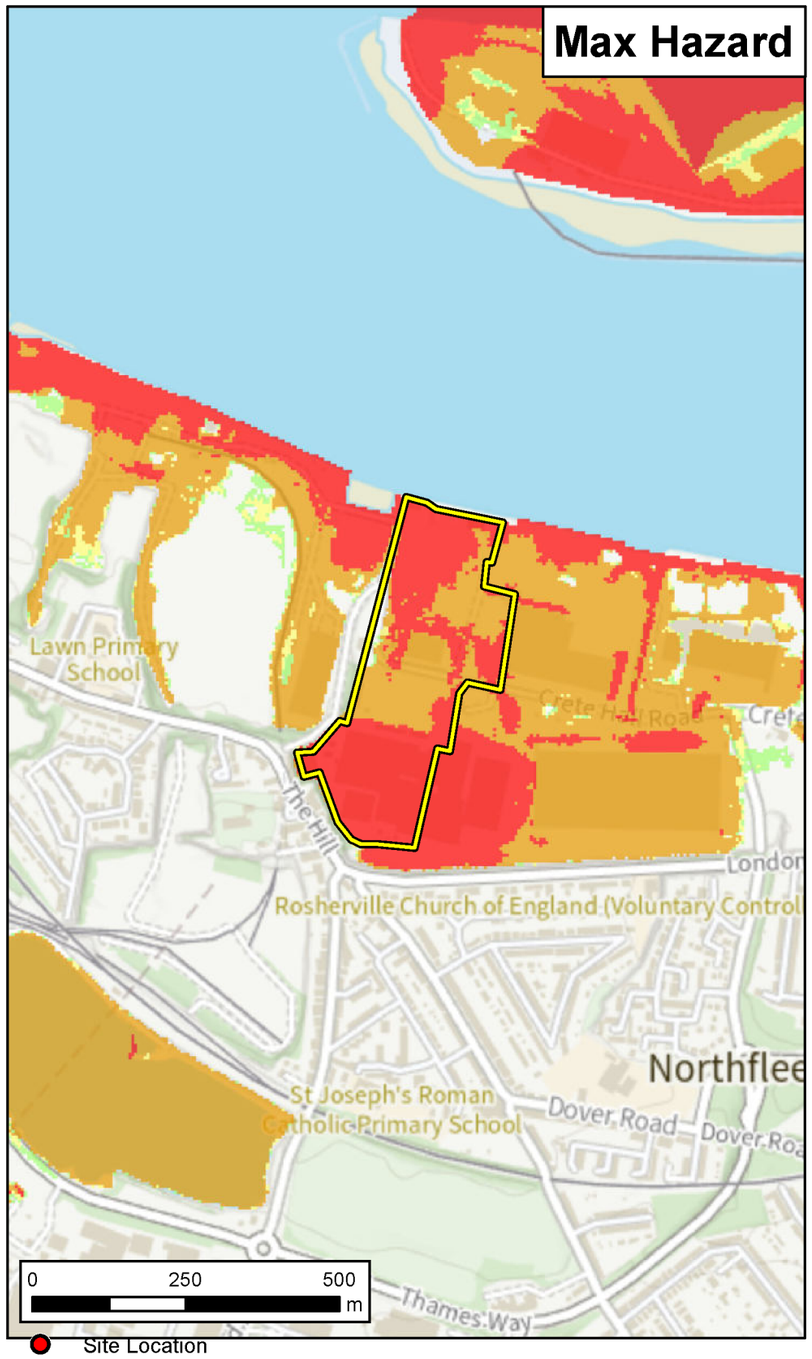
General Enquiries No: 03708 506 506. Weekday Daytime calls cost 5p plus up to 6p per minute from BT Weekend Unlimited. Mobile and other providers' charges may vary

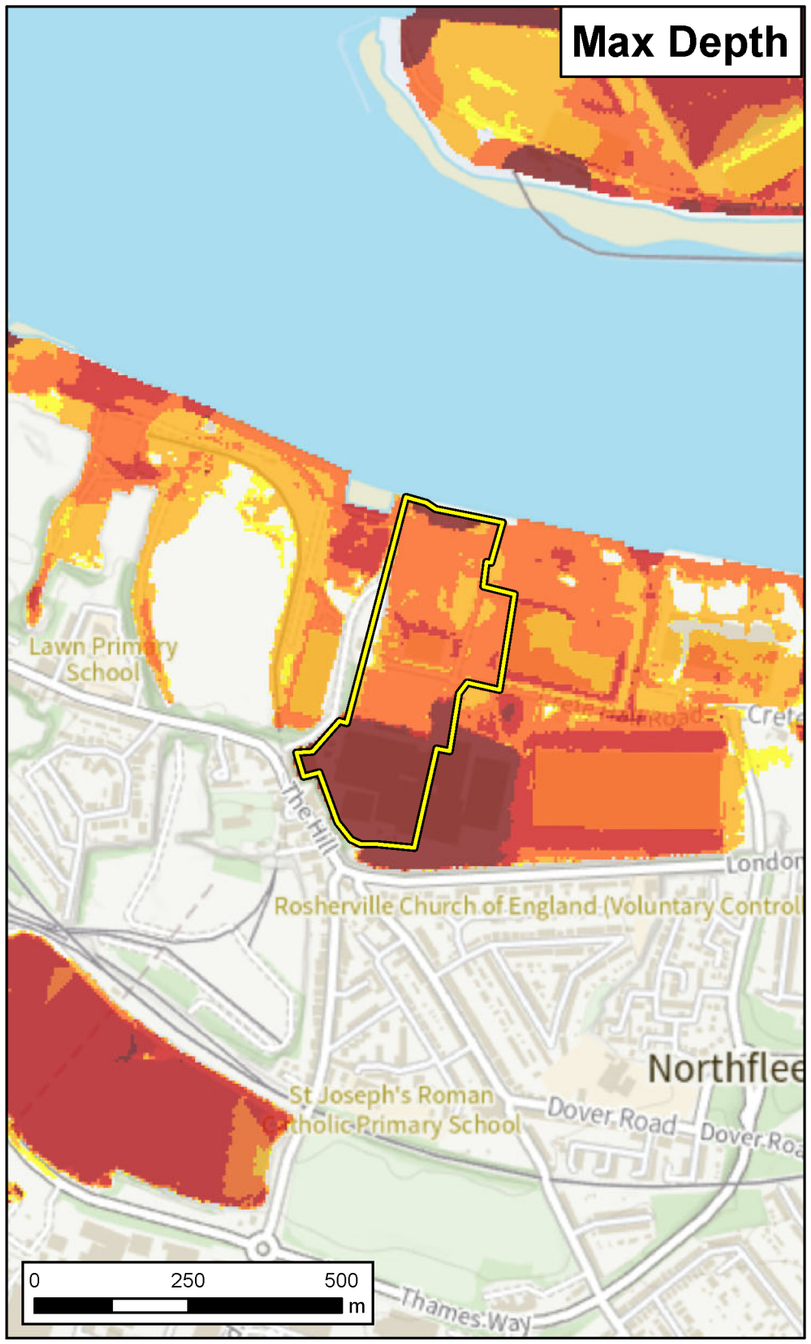
Environment Agency

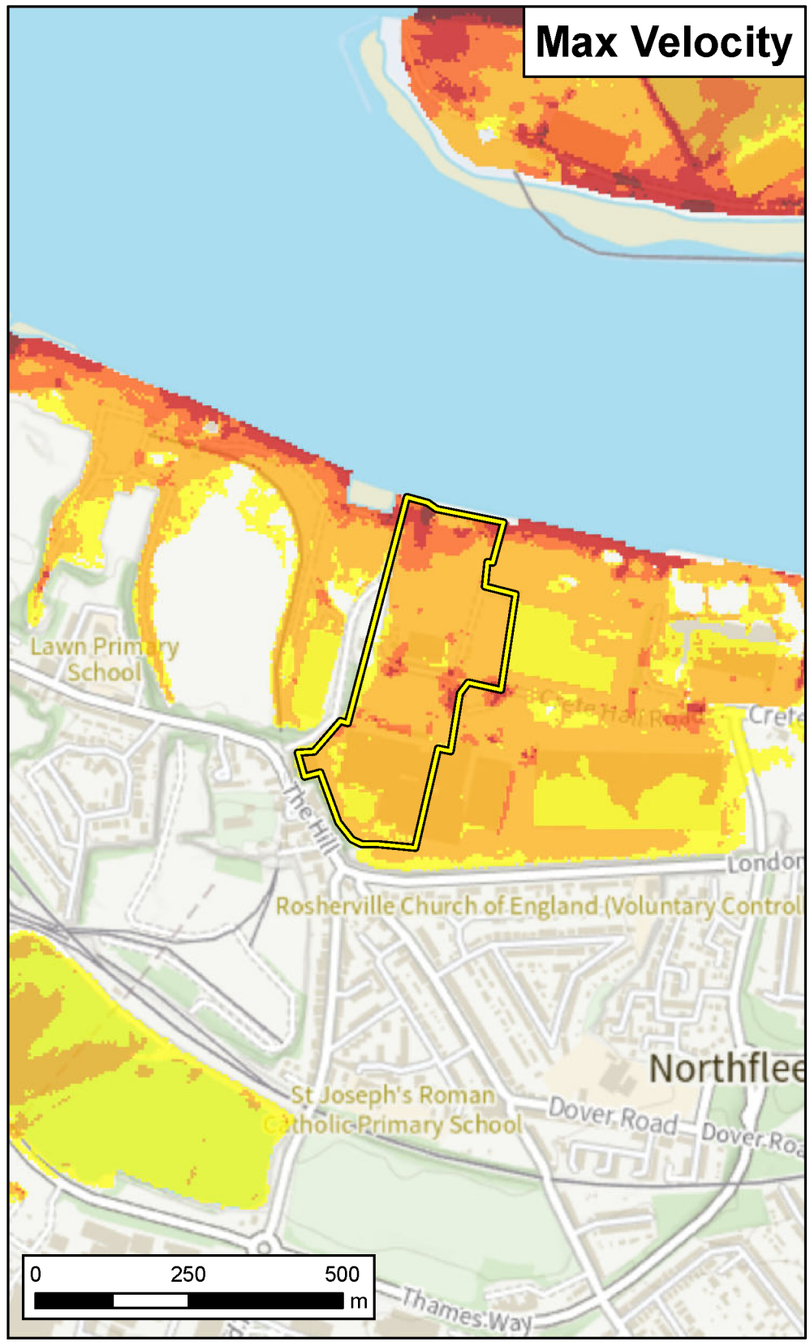
Thames Tidal Downriver Breach Hazard Mapping

Map Centred on DA11 9AD
KSL 305544 RL

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Site Location

Site Location

Max Hazard

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

Max Depth (m)

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

Max Velocity (m/s)

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

Date Printed	12/05/2023	Scenario year	2115	Scenario Annual Chance	0.1% (1 in 1000)

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

The map is based on computer modelling of simulated breaches covering the entire extent between the Thames Barrier and Gravesend. Each breach has been modelled individually and the results combined to create this map. Multiple breaches, other combinations of breaches, different sized tidal surges or flood flows may all give different results.

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

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

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

Environment Agency

Thames Tidal Downriver Breach Hazard Mapping

Map Centred on DA11 9AD
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Table 7.1 Defence levels downriver of the Thames Barrier

DEFENCE LEVELS downriver of Barrier		Existing defence levels (2009)		OPTIONS 1.4 & 3.2 Defence levels required in 2040 (for period 2040 to 2070)		OPTION 1.4 Defence levels required in 2070 (for period 2070 to 2120)		OPTION 1.4 Defence levels required in 2120 (for period 2120 to 2170)		OPTION 3.2 Defence levels required in 2070 (for period 2070 to 2170)	
Location	Node	LB	RB	LB	RB	LB	RB	LB	RB	LB	RB
Barrier	a3.1	7.20	7.20	7.20	7.20	8.30	8.30	8.80	8.80	6.20	6.20
	3.2	7.20	7.20	7.20	7.20	8.30	8.30	8.80	8.80	6.20	6.20
	3.3	7.20	7.20	7.20	7.20	8.30	8.30	8.80	8.80	6.20	6.20
	3.4	7.20	7.20	7.20	7.20	8.30	7.70	8.80	8.20	6.20	6.20
Roding	a3.5u	7.20	7.10	7.20	7.20	8.30	7.70	8.80	8.20	6.20	6.20
	a3.5d	7.20	7.10	7.20	7.20	7.70	7.70	8.20	8.20	6.20	6.20
	River Roding	R5.80	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3.6	7.30	7.10	7.20	7.20	7.70	7.70	8.20	8.20	6.10	6.10
	3.7	7.30	7.10	7.20	7.20	7.70	7.70	8.20	8.20	6.10	6.10
	3.8	7.30	7.10	7.20	7.20	7.70	7.70	8.20	8.20	6.10	6.10
Beam	3.9	7.20	7.10	7.10	7.10	7.70	7.70	8.20	8.20	6.10	6.10
	3.10	7.10	7.10	7.10	7.10	7.60	7.60	8.10	8.10	6.10	6.10
	3.11	7.05	7.10	7.10	7.10	7.60	7.60	8.10	8.10	6.10	6.10
	3.12	6.90	7.00	7.10	7.10	7.60	7.60	8.10	8.10	6.10	6.10
	3.13	7.00	7.00	7.10	7.10	7.60	7.60	8.10	8.10	6.10	6.10
	3.14	7.00	6.90	7.10	7.10	7.60	7.60	8.10	8.10	6.10	6.10
Darent	3.15u	7.05	6.90	7.10	7.10	7.60	7.60	8.10	8.10	6.10	6.10
	3.15d	7.05	6.90	7.10	7.10	7.60	7.60	8.10	8.10	6.10	6.10
	River Darent	N/A	R5.30	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3.16	7.15	6.70	7.10	7.10	7.60	7.60	8.10	8.10	6.10	6.10
	3.17	6.85	6.74	7.00	7.00	7.60	7.60	8.00	8.00	8.50	8.50
	3.18	6.90	6.35	7.00	7.00	7.50	7.50	8.00	8.00	8.50	8.50
	3.19	6.85	6.75	7.00	7.00	7.50	7.50	8.00	8.00	8.50	8.50
	3.20	6.85	6.28	7.00	7.00	7.50	7.50	8.00	8.00	8.50	8.00
	3.21	6.90	7.05	7.00	7.00	7.50	7.50	8.00	8.00	8.50	8.00
	3.22	6.85	7.05	7.00	7.00	7.50	7.50	7.90	7.90	8.00	8.00
	3.23	6.85	6.75	7.00	7.00	7.50	7.50	7.90	7.90	8.00	8.00
	3.24	6.50	6.73	6.90	6.90	7.40	7.40	7.90	7.90	8.00	8.00
Tilbury	3.25	6.95	6.87	6.90	6.90	7.40	7.40	7.90	7.90	8.00	8.00
	3.26	6.65	6.75	6.90	6.90	7.40	7.40	7.90	7.90	8.00	8.00
	3.27	7.00	6.35	6.90	6.35	7.40	6.35	7.90	6.35	8.00	6.35
	3.28	7.00	6.57	7.00	6.57	7.00	6.57	7.00	6.57	7.00	6.57
	3.29	6.48	6.12	6.48	6.12	6.48	6.12	6.48	6.12	6.48	6.12
	3.30	6.75	5.91	6.75	5.91	6.75	5.91	6.75	5.91	6.75	5.91
Mucking	3.31	6.90	6.10	6.90	6.10	7.50	6.10	8.10	6.10	8.10	6.10
	3.32	6.50	5.90	6.90	5.90	7.50	5.90	8.10	5.90	8.10	5.90
	3.33	6.60	5.80	6.80	5.80	7.50	5.80	8.10	5.80	8.10	5.80
	Vange Creek	R4.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3.34	6.80	5.75	6.70	5.75	7.40	5.75	8.10	5.75	8.10	5.75
Canvey	3.35	6.75	5.82	6.70	5.82	7.40	5.82	8.10	5.82	8.10	5.82
	3.36	6.65	Cliff	6.70		7.40		8.10		8.10	
	EH Creek	R4.20	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Hadleigh Marsh	R6.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3.37	4.75	5.30	6.00	5.30	6.70	5.30	7.40	5.30	7.40	5.30
Southend	3.38	5.70	5.50	6.00	5.50	6.70	5.50	7.40	5.50	7.40	5.50
	Grain east	N/A	5.70	N/A	6.30	N/A	7.00	N/A	7.70	N/A	7.70

Key	Notes
P5 (1:10,000)	Defence levels are shown at ISIS model nodes. Policy Units are not indicated.
P4 (1:1,000)	Representative levels are shown using the prefix 'R' for defences
P4 (1:200)	not represented by ISIS nodes.
P3	

If staff are requested to provide data to developers in P3 areas downriver of the Barrier, including at Hadleigh Marshes, North Kent Marshes and Isle of Grain, they must contact the TE2100 implementation team as early as possible, to ensure they use the best available data on design levels. The TE2100 Plan assumed that the existing defence crest levels would be maintained in P3 areas downriver of the Barrier but did not calculate the specific design levels required for such sites. These may need to be calculated to support such a data request.

Source: Reference 29 (*Phase 3 Set 2 Estuary Wide Options – Hydraulic Modelling*). Some minor adjustments were subsequently made to simplify the level information.

Table 7.2 Defence levels for Policy Units downriver of the Thames Barrier

Recommendations are given in the right hand column for the allowances for future raising that should be included in new defence designs when defences are replaced.

Policy Unit	Bank	Defence levels (m AOD)				Comment and Recommendations
		Existing (2009 data)	2070 Implement in 2040	2170 See Table 7.1 for implementation dates	2170	
				Option 1.4	Option 3.2	
Greenwich, Royal Docks	R L	7.2	7.2	8.8	6.2	Downriver Thames Barrier. Allow future raising to 8.8m AOD
Barking & Dagenham	L	7.2	7.2	8.2	6.1	Allow future raising to 8.2m AOD
Rainham	L	6.9 – 7.1	7.1	8.1	6.1	Allow future raising to 8.1m AOD
Thamesmead	R	7.0 – 7.1	7.1 – 7.2	8.1 – 8.2	6.1	Allow future raising to 8.2m AOD
Dartford & Erith:						
- U/R new barrier	R	6.7 – 7.0	7.1	8.1	6.1	Allow future raising to 8.1m AOD
- D/R new barrier	R	6.7	7.0	8.0	8.5	Allow future raising to 8.5m AOD
Swanscombe & Northfleet	R	6.3 – 7.1	6.9 – 7.0	7.9 – 8.0	8.0	Allow future raising to 8.0m AOD
Purfleet, Grays & Tilbury:						
- U/R new barrier	L	7.1	7.0 - 7.1	8.0 - 8.1	6.1	Allow future raising to 8.1m AOD
- D/R new barrier to Grays	L	6.8 – 6.9	7.0	8.0	8.5	Allow future raising to 8.5m AOD
- D/R Grays	L	6.5 – 6.9	6.9 – 7.0	7.9	8.0	Allow future raising to 8.0m AOD
East Tilbury	L	6.4 – 6.9	6.4 – 6.9	6.4 – 6.9	6.4 – 6.9	APF will be 5% by 2100. Consider secondary defence for East Tilbury.
Shellhaven & Fobbing	L	6.5	6.8 – 6.9	8.1	8.1	Allow for future raising of existing tidal defences to 8.1m AOD in the southern half of the policy unit (i.e. from Mucking Sluice to Fobbing Barrier) to protect critical infrastructure, including London Gateway Port.
Bowers	L	6.5	6.7	8.1	8.1	Allow future raising to 8.1m AOD for primary defence on Holehaven Creek.
Canvey	L	6.6 – 6.8	6.7	8.1	8.1	Allow future raising to 8.1m AOD
Hadleigh	L	6.0	6.0	6.0	6.0	
Southend	L	4.7 – 5.7	6.0	7.4	7.4	Allow future raising to 7.4m AOD
North Kent west	R	6.1 - 6.5	6.1 - 6.5	6.1 - 6.5	6.1 - 6.5	
North Kent east	R	5.8 – 6.1	5.8 – 6.1	5.8 – 6.1	5.8 – 6.1	
Grain west	R	5.5	5.5	5.5	5.5	No defence raising proposed for Allhallows and Grain Marshes. Protection needed for access routes to Grain east.
Grain east	R	5.7	6.0 – 6.3	7.4 – 7.7	7.4 – 7.7	Industrial areas. Allow future raising to 7.4m or 7.7m AOD depending on location.

Notes:
Green shading: Policy P3 - No change in levels
Orange shading: Increase in defence levels
D/R: Downriver U/R: Upriver

If staff are requested to provide data to developers in P3 areas downriver of the Barrier, including at Hadleigh Marshes, North Kent Marshes and Isle of Grain, they must contact the TE2100 implementation team as early as possible, to ensure they use the best available data on design levels. The TE2100 Plan assumed that the existing defence crest levels would be maintained in P3 areas downriver of the Barrier but did not calculate the specific design levels required for such sites. These may need to be calculated to support such a data request.

creating a better place

Environment Agency

Daniel Cole
HYRO Energy Ltd
Beaufort Court Egg Farm Lane
Kings Langley
Hertfordshire
WD4 8LR

Our ref: KT/2023/130807/01-L01
Your ref: 680775

Date: 19 July 2023

Dear Daniel,

Development of hydrogen electrolysis facility within the grounds of the existing Kimberly-Clark Industrial Estate.

Kimberly-Clark Industrial Estate, Crete Hall Road, Northfleet, Gravesend, DA11 9AD

Thank you for consulting us on the above planning application.

Flood Risk:
We have reviewed the submitted information and, we would be unlikely to object to the proposal in principle. However, we are not able to determine if the development would meet the requirements of the National Planning Policy Framework (NPPF, 2021). In particular, it is not clear if the proposal would be made safe for its lifetime without increasing flood risk elsewhere.

As noted, the site is mostly within Flood Zone 2 with a small section in Flood Zone 3. However, the site would be flooded were the neighbouring tidal Thames flood defence to breach. This would result in significant site flooding in the 0.5% Annual Exceedance Probability (AEP) current day breach scenario. The resulting flood depths would worsen with the impacts of climate change.

The client has stated that the proposal's design life would be 25 years. It should be noted that the Planning Practice Guidance (PPG), paragraph 006, states that non-residential development should be considered to have a design life of at least 75 years. We understand elements of the hydrogen electrolysis facility may have a lesser design life, but we would consider 75 years as the baseline for the proposal in its entirety. The tidal Thames downstream model does not include 2050 flood outputs which would rarely be appropriate for development when considering the PPG.

The site benefits from the Tidal Thames flood defences, which should provide a

minimum protection up to the 1 in 1000 year event. However, the condition of the neighbouring flood defences varies and it is likely that significant works would need to be undertaken to maintain this standard of protection and enable such development.

From the submitted documents, it is not clear what the blue line boundary is for the development. Please can this be provided.

The PPG also states that, where flood risk management infrastructure such as flood defences form part of the strategy for addressing flood risk, Flood Risk Assessments (FRAs) should identify how this infrastructure will be operated, funded and maintained in addition to ensuring that there is space for future maintenance or new flood risk management infrastructure.

The proposal should consider how the site will be protected from tidal flood risk. This will likely require flood defence raising and/or land raising. Raising options should be considered in line with the Thames Estuary 2100 (TE2100) plan.

Land raising may be required to protect the site from inundation during a tidal flood defence breach event. This may be of particular importance if the site is considered to be essential infrastructure.

Groundwater and Contaminated Land:
We note that no new buildings are proposed and that the equipment would be housed within portacabin style containers on existing or new hardstanding.

A preliminary risk assessment would be required for any breaking of ground and this may necessitate further investigations should suspected or identified contamination be discovered.

Environmental permits may be required for any effluent with detailed designs submitted for associated infrastructure relating to drainage.

Any facilities for the storage of oils, fuels or chemicals shall be provided with secondary containment that is impermeable to both the oil, fuel or chemical and water, for example a bund, details of which shall be submitted to the local planning authority for approval. The minimum volume of the secondary containment should be at least equivalent to the capacity of the tank plus 10%. If there is more than one tank in the secondary containment the capacity of the containment should be at least the capacity of the largest tank plus 10% or 25% of the total tank capacity, whichever is greatest.

Environmental Permitting Regulations Installations
The papermill is a permitted activity and a change to the boiler arrangement will require a permit variation, however this will depend on specifics of the changes/additions etc, a stand-alone permit could be required in some circumstances, without further information it's difficult to say.

Should you require any additional information, or wish to discuss these matters further, please do not hesitate to contact us via the email below.

Yours sincerely,

pp. Kimberley Wadsworth

George Goodby
Planning Specialist

KSLPLANNING@environment-agency.gov.uk

creating a better place
for people and wildlife

Environment Agency

Alison Cadge
RSK Land and Development Engineering

Our ref: KT/2023/130807/02-L01
Charged Agreement ref: ENVPAC/1/KSL/00653
Your ref: 680775

Date: 16 August 2023

Dear Alison,

02- Review of further flood risk queries

Kimberly-Clark Industrial Estate, Crete Hall Road, Northfleet, Gravesend, DA11 9AD

Following our initial response dated 19 July 2023 (KT/2023/130807/01-L01), we received further flood risk queries from yourself via email on 25 July 2023. Please see our response to these queries below.

Flood risk vulnerability classification
Thank you for confirming the purpose of the proposed hydrogen facility and that this will not be 'essential infrastructure' but form a part of the wider, less vulnerable site.

Defence raising and setback
Assuming the red line boundary does not include any tidal flood defence, then we accept that defence raising could not be delivered as part of this development. We would require any submitted site specific Flood Risk Assessment (FRA) to consider the spatial requirements for a future tidal flood defence were it to be retreated inland e.g. away from the river wall. It should be clearly demonstrated that the proposed development would not restrict options for future defence raising in line with the Thames Estuary 2100 (TE2100) Plan.

It may be that the current river wall would not form the raised tidal flood defence due to space limitations along the quayside. The revised FRA should show minimum offsets between the riverward boundary of the site and the sunken tanks which border the river frontage. It should be demonstrated that there would be sufficient space to construct a retreated tidal flood defence. Ideally this would be at least 16 metres.

Lifetime of development
As previously stated, the development should be assumed to have a minimum design life of 75 years in line with the Paragraph 6 of the "Flood Risk and Coastal Change" section of the Planning Practice Guidance (PPG).

At the formal planning consultation stage, we would assume a design life of 75 years, unless the Local Planning Authority advised us to consider a different value

design life.

Safe refuge
Where people are expected to work from the proposed development, we would expect the facility to include safe refuge which must be raised to at least the site breach level for the 0.5% Annual Exceedance Probability (AEP) breech event plus 0.6 metres freeboard.

Closing comments
Please note that the view expressed in this letter is a response to a pre application enquiry and does not represent our final view in relation to any future planning application made in relation to this site. We reserve the right to change our position in relation to any such application. You should seek your own expert advice in relation to technical matters relevant to any planning application before submission.

Should you have any queries regarding this response, please contact me.

Yours sincerely,

George Goodby
Sustainable Places Planning Specialist

Mobile +447879802840
E-mail kslplanning@environment-agency.gov.uk

APPENDIX F
LLFA CORRESPONDENCE

RYAN WHITFIELD

Flood and Water Management
Invicta House
Maidstone
Kent
ME14 1XX
Website: www.kent.gov.uk/flooding
Email: suds@kent.gov.uk
Tel: 03000 41 41 41
Our Ref: NON/2023/095761
Date: 22 June 2023

Application No: pre app

Location: Kimberley Clark Industrial Estate, Gravesham, DA11 9AA

Proposal: Hydrogen electrolysis facility

Thank you for your enquiry in relation to the above site.

I will address your queries as presented in your original email:

- *Whether we would have any requirements in relation to the restriction of runoff from the area of the proposed works or in relation to the use of SuDS?*

- *Or whether it would be acceptable to allow surface water discharge as per the existing scenario.*

It is understood from the information provided that the existing scenario discharges to the existing private surface water network that serves the industrial estate. This is thought to discharge to mains sewer and then the tidal Thames.

The LLFA applies the Non-Statutory Technical Standards guidance, of which Paragraph S1 states:

"Where the drainage system discharges to a surface water body that can accommodate uncontrolled surface water discharges without any impact on flood risk from that surface water body (e.g. the sea or a large estuary) the peak flow control standards (S2 and S3 below) and volume control technical standards (S4 and S6 below) need not apply"

In this instance, the LLFA would view that applying discharge rates and volume do not apply to this development due to the nature of the receiving watercourse (River Thames).

Consideration would however need to be given to the tide locking scenario. Appropriate storage would need to be provided to accommodate for tide locking against varying rainfall events (30- 100 year).

We note from BGS data available to us that groundwater in this area may be high, coupled with the proximity to an Source Protection zone 1 making infiltration not feasible. Therefore we would accept for the reuse of the existing connection.

Existing connection to mains sewer and river Thames:

- A CCTV survey should ideally be undertaken to confirm the condition of this existing network for reuse.
- With the River Thames being a Main River, and parts of the site being within Flood Zones 2 and 3 and we would expect for the Environment Agency to be consulted with regards to the appropriateness for development.
- Further to this, any work in, under, over or within 8 metres of the banks of a designated main river or the toe of a flood defence requires a Flood Risk Activity Permit (FRAP). As of 6th April 2016, the Water Resources Act 1991 and associated land drainage byelaws have been amended and flood defence consents will now fall under the Environmental Permitting (England and Wales) Regulations 2010. Further details and guidance are available on the GOV.UK website: https://www.gov.uk/guidance/flood-risk-activities-environmental-permits.

Further items for consideration:

Pollution Controls:

Prior to offsite discharge to the Thames, the LLFA requests for all developments to adhere to the guidance stipulated within the CIRIA SuDS Manual (2015) Part E Section 26. This section within the manual contains details of treatment levels and anticipated pollution from different land uses.

Given the sites existing and proposed use, the incorporation of above ground SuDS features is not considered feasible. We would therefore accept for proprietary treatment devices such as vortex separators, downstream defenders or interceptors .These must still demonstrate they meet the required total SuDS mitigation index within the Ciria SuDs manual.

Supporting Drainage Modelling:

As part of a future drainage strategy report for all major planning applications, we would seek for the proposed scheme to be modelled, using appropriate software. The following items should be considered when undertaking the modelling:

- Simulations against the varying storm events that include the 1/2, 30 and the 100 year events.
- Appropriate application of climate change percentages for both the 30 and 100 year events. The climate change rates to be applied can be found at: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

- The utilisation of the FEH 2013 rainfall dataset where possible. Should FEH not be used, the LLFA would request the M5-60 value is uplifted from the default 20.00mm value to 26.25mm.
- If full network analysis is provided for outline or full, the outputs as presented should also contain the pipe/ manhole schedule to illustrate the design modelled through the simulations (the identification of pipes and manholes in the calculations should be reflected on the accompanying drainage layout drawings).
- Inclusion of the critical summary events within the outputs.
- No surcharging of the network should be experienced for the 1/2 year events, unless where unavoidable at features such as flow controls.

Climate Change Guidance:

As of the 10th of May 2022, the Environment Agency's climate change allowances have been updated. As part of this update, revisions have been made to the 'Peak Rainfall Intensity Allowances' that are used in applying climate change percentages to new drainage schemes. The LLFA would now seek the 'upper end' allowance is designed for both the 30 (3.3%) and 100 (1%) year storm scenarios. The latest information on the allowances and map can be found at the following link:
https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

I trust this information assists with your enquiries.

Yours faithfully,

Emily Neale
Graduate Flood Risk Officer
Flood and Water Management

Ryan Whitfield

From: Emily.Neale@kent.gov.uk
Sent: 18 July 2023 13:23
To: Ryan Whitfield
Subject: RE: Response To pre app at Kimberley Clark Industrial Estate, Gravesham, DA11 9AA

Follow Up Flag: Follow up
Flag Status: Flagged

CAUTION: This email originated from outside the Organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Good afternoon Ryan,

Thank you for your email.

As noted in your email the 200-year (tidal) climate change event coinciding with a 30 year (including climate change 35%) rainfall event is viewed as an acceptable joint probability.

Where there is any exceedance of the drainage network, an exceedance plan should be provided illustrating where exceedance occurs and the extent and depth of flooding.

Kind regards,

Emily Neale | **Graduate Flood Risk Officer** | **Flood & Water Management**
Kent County Council | Invicta House, County Hall, Maidstone ME14 1XX |
As Lead Local Flood Authority (LLFA) for the County, we have become a statutory consultee in planning to promote the provision of Sustainable Drainage Systems. You can find out more by visiting: http://www.kent.gov.uk/waste-planning-and-land/flooding-and-drainage/sustainable-drainage-systems

Please don't take offence if I don't reply to say 'thank you'. If every UK adult sent 1 less courtesy email a day, we'd save over 16,400 tonnes of carbon a year – so please, think before you thank.

From: Ryan Whitfield <rwhitfield@rsk.co.uk>
Sent: Tuesday, July 11, 2023 10:38 AM
To: SUDS - GT <SUDS@kent.gov.uk>
Cc: Alison Cadge <ACadge@rsk.co.uk>
Subject: RE: Response To pre app at Kimberley Clark Industrial Estate, Gravesham, DA11 9AA

Good morning,

Thank you for your response.

Would you be able to advise which coinciding events I should be using to provide the maximum attenuation volumes for the tidal locking scenario?

For example, a Q200 tidal height coinciding with a Q30 rainfall event?

Kind regards,

Ryan Whitfield
Hydrologist BSc(Hons) MSc MCIWEM

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an RSK company
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Switchboard: +44 (0)1942 493255

From: SUDS@kent.gov.uk <SUDS@kent.gov.uk>
Sent: Thursday, June 22, 2023 2:13 PM
To: Ryan Whitfield <rwhitfield@rsk.co.uk>
Subject: Response To pre app at Kimberley Clark Industrial Estate, Gravesham, DA11 9AA

Good afternoon,

Please find attached my representation in relation to the above pre app.

Kind regards,

Emily Neale

Kent County Council

[WARNING: This email originated outside of RSK. DO NOT CLICK links, attachments or respond unless you recognise the sender and are certain that the content is safe]

APPENDIX G
GREENFIELD RUNOFF CALCULATIONS

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Jacob Winfield
Site name:	681689
Site location:	Northfleet Pulp Storage

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.

Site Details

Latitude:	51.44642° N
Longitude:	0.34035° E
Reference:	873466813
Date:	Feb 26 2025 10:34

Runoff estimation approach

IH124

Site characteristics

Total site area (ha):	0.36

Methodology

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

Soil characteristics

	Default	Edited
SOIL type:	3	3
HOST class:	N/A	N/A
SPR/SPRHOST:	0.37	0.37

Hydrological characteristics

	Default	Edited
SAAR (mm):	552	552
Hydrological region:	7	7
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):	0.78	0.78
1 in 1 year (l/s):	0.67	0.67
1 in 30 years (l/s):	1.8	1.8
1 in 100 year (l/s):	2.5	2.5
1 in 200 years (l/s):	2.93	2.93

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
EXISTING DRAINAGE NETWORK MODEL

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
1.000	77.666	0.640	121.4	0.155	5.00	0.0	0.600	o	225
1.001	38.639	0.330	117.1	0.084	0.00	0.0	0.600	o	225
1.002	9.200	0.090	102.2	0.310	0.00	0.0	0.600	o	300
1.003	20.396	0.200	102.0	0.000	0.00	0.0	0.600	o	300
1.004	5.099	0.010	509.9	0.208	0.00	0.0	0.600	o	300
1.005	9.055	0.240	37.7	0.000	0.00	0.0	0.600	o	375
1.006	2.236	0.100	22.4	0.000	0.00	0.0	0.600	o	375
1.007	3.000	1.110	2.7	0.000	0.00	0.0	0.600	o	375
1.008	103.078	4.740	21.7	0.000	0.00	0.0	0.600	o	900

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Vel (m/s)	Cap (l/s)
1.000	4.410	0.155	0.0	1.19	47.1
1.001	3.770	0.239	0.0	1.21	48.0
1.002	3.440	0.549	0.0	1.55	109.9
1.003	3.350	0.549	0.0	1.56	110.0
1.004	3.000	0.757	0.0	0.69	48.7
1.005	2.990	0.757	0.0	2.96	326.7
1.006	2.750	0.757	0.0	3.85	424.8
1.007	2.650	0.757	0.0	11.09	1224.6
1.008	1.015	0.757	0.0	6.73	4284.4

Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.008		5.320	-3.725	-2.340	0	0

Datum (m) 0.000 Offset (mins) 60

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
60	6.080	420	-2.340	780	6.080	1140	-2.340	1500	6.080
120	5.380	480	-1.640	840	5.380	1200	-1.640	1560	5.380
180	3.980	540	-0.230	900	3.980	1260	-0.230	1620	3.980
240	1.870	600	1.870	960	1.870	1320	1.870		
300	-0.230	660	3.980	1020	-0.230	1380	3.980		
360	-1.640	720	5.380	1080	-1.640	1440	5.380		

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30
Climate Change (%) 0, 35

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	240 Winter	30	+35%	1/180 Summer	1/240 Winter			22
1.001	240 Winter	30	+35%	1/180 Summer	1/180 Summer			31
1.002	15 Winter	30	+35%	1/120 Winter	1/1440 Summer			9
1.003	1440 Summer	30	+35%	1/120 Winter	1/1440 Summer			1
1.004	240 Summer	30	+35%	1/15 Summer	1/1440 Summer			3
1.005	240 Summer	30	+35%	1/120 Summer	1/1440 Summer			
1.006	240 Summer	30	+35%	1/120 Summer	1/1440 Summer			17
1.007	240 Summer	30	+35%	1/120 Summer	1/1440 Summer			19
1.008	1440 Summer	1	0%	1/120 Summer	1/1440 Summer			19

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH061	5.285	0.650	45.265	1.04	0.0	47.7	FLOOD
1.001	MH064	5.298	1.303	88.120	1.36	0.0	62.1	FLOOD
1.002	MH065	5.342	1.602	22.215	2.23	0.0	167.8	FLOOD
1.003	MH066	5.360	1.710	1.761	0.45	0.0	42.8	FLOOD
1.004	MH034	5.333	2.033	3.313	1.54	0.0	71.2	FLOOD
1.005	MH033	5.332	1.967	0.000	0.37	0.0	71.9	FLOOD RISK
1.006	MH032	5.331	2.206	30.609	0.64	0.0	79.1	FLOOD
1.007	MH031	5.330	2.305	30.744	0.30	0.0	123.1	FLOOD
1.008	MH030	5.348	3.433	32.800	0.02	0.0	59.2	FLOOD

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APPENDIX I
SUDS MAINTENANCE STRATEGY



Hyro Energy Ltd

Kimberly Clark Industrial Estate – Northfleet Pulp Store

Sustainable Drainage System (SuDS) Management Strategy

681689-R2(01)
February 2025

DNV ISO 9001 · ISO 14001 · ISO 45001
INVESTORS IN PEOPLE We invest in people Standard

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an RSK company

RSK GENERAL NOTES

Project No.: 681689-R1(01)-FRA

Site: Kimberly Clark Industrial Estate – Northfleet Pulp Store

Title: Sustainable Drainage System (SuDS) Management Strategy

Client: Hyro Energy Ltd

Date: February 2025

Office: Hemel Hempstead

Status: Final

Author	[redacted]	**nical reviewer**	C Whittingham
Signature		ture	
Date:			27.02.2025
Project Manager			
Signature			
Date:	27.02.2025		

Issue No	Version/Details	Date issued	Author	Reviewed by	Approved by
R2(0)	Draft	19.02.25	JW	AC	AC
R2(01)	Final	27.02.25	JW	AC	CW

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Where any data supplied by the client or from other sources have been used, it has been assumed that the information is correct. No responsibility can be accepted by RSK for inaccuracies in the data supplied by any other party. The conclusions and recommendations in this report are based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK LDE Ltd.

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3 MAINTENANCE REGIME 4

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APPENDICES

APPENDIX A INSPECTION CHECKLIST

1 INTRODUCTION

This management strategy has been prepared by RSK Land and Development Engineering Ltd on behalf of Hyro Energy Ltd to support the planning application at Kimberly Clark Industrial Estate – Northfleet Pulp Store (The Development).

The SuDS considered for the purposes of this statement, include drainage features that will be employed to reduce and manage surface water runoff from the development. This is required so that The Development will not increase the risk of flooding to the site and its environs. All drainage on site is taken to the River Thames to the north of the site. Such features include the following:

- Geocellular Storage Tank
- Filter Drains

This document outlines the long-term maintenance of the proposed surface water system and will refer to the following documents, some of which provide further detail on the maintenance operations required:

- CIRIA Report C753, 'The SUDS Manual', 2015
- CIRIA Report C625, 'Model Agreements for Sustainable Water Management Systems', 2004; and
- Interpave, 'Permeable pavements: Guide to the Design, Construction and Maintenance of Concrete Block Permeable Pavements', ed. 4, 2006.

2 MAINTENANCE RESPONSIBILITIES

Responsibility for drainage within England and Wales rests with various bodies. For the Development, the drainage responsibilities will be divided between the following:

- **Communal Areas** - A Management company will be set up for the Development to maintain all stormwater attenuation tanks, outfalls and any associated flow controls within communal areas. However, it should be noted that if, the Flood and Water Management Act 2010 is ever fully implemented this allows a surface water drainage system to be vested to the SUDS approving body (SAB) in this case Surrey County Council. This would be reviewed at the time of any implementation of the act.

3 MAINTENANCE REGIME

As the maintenance of the communal SUDS features will be carried out via a Management Company, the form of agreement should include the required maintenance listed below. Should the maintenance be transferred at a later date to a public body, then the model agreement SUDS MA1 should be used, details of which can be found in the CIRIA guidance C625.

The following section describes the required maintenance for each feature in turn. The SUDS maintenance requirements listed below should be reviewed after the first 5 years, with a view to agreeing a new regime for the ongoing maintenance.

Notwithstanding the routine inspections and maintenance requirements, after severe storm events all features shall be inspected to clear debris and repair damaged structures or features. Records of the maintenance carried out shall be prepared by the Management Company.

3.1 Attenuation Tanks

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, the annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

3.2 Filter Drains

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter (including leaf litter) and debris from filter drain surface, access chambers and pre-treatment devices	Monthly or as required
	Inspect filter drain surface, inlet/outlet pipework and control systems for blockages, clogging, standing water and structural damage	Monthly
	Inspect pre-treatment systems, inlets and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies	Six monthly
	Remove sediment from pre-treatment devices	Six monthly or as required
Occasional maintenance	Remove or control tree roots where they are encroaching the sides of the filter drain, using recommended methods (e.g. NJUG, 2007 or BS 398:2010	As required
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace overlying filter medium	Five yearly or as required
	Clear, perforated pipework of blockages	As required

3.3 An example of Operation and Maintenance Requirements for Proprietary Treatment Systems

Maintenance schedule	Required action	Typical frequency
Routine maintenance	Remove litter and debris and inspect for sediment, oil and grease accumulation	Six monthly
	Change the filter media	As recommended by manufacturer
	Remove sediment, oil, grease and floatables	As necessary – indicated by system inspections or immediately following significant spill
Remedial actions	Replace malfunctioning parts or structures	As required
Monitoring	Inspect for evidence of poor operation	Six monthly
	Inspect filter media and establish appropriate replacement frequencies	Six monthly
	Inspect sediment accumulation rates and establish appropriate removal frequencies	Monthly during first half year of operation, then every six months

APPENDIX A
INSPECTION CHECKLIST

General information			
Site ID	Kimberly Clark Industrial Estate – Northfleet Pulp Store		
Site location and co-ordinates (GIS if appropriate)	Land west of Kimberly Clark, Northfleet, Gravesend, DA11 9AA NGR: 562727 E, 174515 N		
Elements forming the SuDS scheme	Geocellular Storage Tank	Approved drawing reference	05135-RES-PRO-DR-PT-010 (REV 2)
Inspection frequency	As required	Approved specification reference	
Type of development	Concrete slab for pulp storage	Specific purpose of any parts of the scheme (e.g. biodiversity, wildlife and visual aspects)	

Inspection Date	Details	Y/N	Action required	Date completed	Details	Y/N	Action required	Date completed
General inspection items								
Is there any evidence of erosion, channelling, ponding (where not desirable) or other poor hydraulic performance?								
Is there any evidence of accidental spillages, oils, poor water quality, odours or nuisance insects?								
Have any health and safety risks been identified to either the public or maintenance operatives?								
Silt/Sediment accumulation								
Is there any sediment accumulation at inlets (or other defined accumulation zones such as the surface of filter drains or infiltration basins and within proprietary devices)? If yes, state depth (mm) and extent. Is removal required? If yes, state waste disposal requirements and confirm that all waste management requirements have been complied with (consult environmental regulator)								
Is surface clogging visible potentially problematic where water has to soak into the underlying								

Inspection Date	Details	Y/N	Action required	Date completed	Details	Y/N	Action required	Date completed
construction or ground (e.g. underdrained swale or infiltration basin)?								
Does permeable or porous surfacing require sweeping to remove silt?								
Is there evidence of litter accumulation in the system? If yes, is this a blockage risk?								
Is there any evidence of any other clogging or blockage of outlets or drainage paths?								
Is the vegetation condition satisfactory (density, weed growth, coverage etc)? (check against approved planting regime)								
Does any part of the system require weeding, pruning or mowing? (check against maintenance frequency state in approved design).								
Is there any evidence of invasive species becoming established? If yes, state action required								
Are any check dams or weirs in good condition?								
Is there any evidence of any accidental damage to the system (e.g. wheel ruts?)								

Inspection Date	Details	Y/N	Action required	Date completed	Details	Y/N	Action required	Date completed
Is there any evidence of cross connections or other unauthorised inflows?								
Is there any evidence of tampering with the flow control?								
Are there any other matters that could affect the performance of the system in relation to the design objectives for hydraulic, water quality, biodiversity and visual aspects?								
Other observations								
Information appended (e.g. photos)								
Continue as current Increase maintenance Decrease maintenance								
Proposed date for next inspection								