WE ARE SYMMETRYS

FLOOD RISK ASSESSMENT AND SUDS REPORT

139 CRANLEY GARDENS
LONDON
N10 3AH

21066-SYM-XX-XX-RP-C-0001

SYMMETRYS
STRUCTURAL / CIVIL ENGINEERS

TABLE OF CONTENTS

TABLE OF CONTENTS

1.0 Executive Summary

2.0 Introduction

3.0 Scope of Flood Risk Assessment

4.0 Existing Development

5.0 Flood Risk Vulnerability and Flood Zone 'Compatibility'

6.0 Climate Change

7.0 Site Specific Flood Risk

8.0 Flood Risk Management

9.0 Conclusions

APPENDICES

Appendix A Sewer Records

Appendix B topographical survey

Appendix C Outline Drainage Strategy

Appendix D Calculations

Appendix E SUDS Proforma

REVISION HISTORY

Revision	Description	Date	By	Checked
A	Issue for Planning Submission	03/05/23	YP	RF

1.0 Executive Summary

1.1 The site is located in 139 Cranley Gardens, Haringey, London, N10 3AH.

1.2 The proposed development consists of basement extension to implement a new gym, swimming pool, sauna room, plant room and bathroom.

1.3 The site is classified as 'More Vulnerable', in accordance with the National Planning Policy Framework.

1.4 The site is located in Flood Zone 1 and is in an existing residential area. The development should fulfil the requirements of the Sequential Test.

1.5 An Exception Test is not required as the 'More Vulnerable' development lies within Flood Zone 1.

1.6 The site lies within a Critical Drainage Area as identified by The LB of Haringey SWMP (Surface Water Management Plan)

1.7 The overall flood risk to the site is assessed as 'Medium', associated with surface water and sewer failure flooding mechanisms.

1.8 The proposed drainage strategy for the development would provide adequate water management for the site.

1.9 An assessment of the feasibility of the sustainable urban drainages (SuDS) has been conducted in accordance with the London Plan's drainage hierarchy. For new basement areas, a maximum runoff discharge is limited to 1 l/s for the 1in100 +40% storm event.

1.10 The inclusion of flood resistant, resilience and mitigation techniques stated in this Flood Risk Assessment reduce the impact of flooding to low from all sources.

1.11 To be read in conjunction with BIA Report 21066-SYM-XX-XX-RP-S-0001.

2.0 Introduction

2.1 This site-specific Flood Risk Assessment (FRA) has been prepared for the proposed works, which consists of a basement extension to implement a new gym, swimming pool, sauna room, plant room and bathroom.

2.2 The proposed development is within a Critical Drainage Area (CDA) hence the purpose of this FRA is to provide information regarding the potential flood risk hazards affecting the site and demonstrate that the development is safe for its intended use.

2.3 This FRA has been prepared with reference to the National Planning Policy Framework (NPPF, 2021) and the National Planning Practice Guidance (NPPG, 2022), Haringey Council Strategic Flood Risk Assessment (SFRA) and Surface Water Management Plan (SWMP)

3.0 Scope of Flood Risk Assessment

3.1 National Planning Policy Framework (NPPF)

3.1.1 The National Planning Policy Framework (NPPF) was published in March 2012 and sets out the government's planning policies for England and how they are expected to be applied. Chapter 14 'Meeting the challenge of climate change, flooding and coastal change' deals with planning for a low carbon future, taking full account of flood risk and coastal change.

3.1.2 Paragraph 161-163 of the NPPF states that all plans should apply a sequential, risk-based approach to the location of the development and manage any residual risk by considering a sequential test, and if necessary, an exception test. The sequential test aims to steer new development to areas with the lowest risk of flooding from any source. If this is not possible, the exception test may have to be applied.

3.1.3 Paragraph 167 of the NPPF states that when determining any planning application, the Local Authority should ensure flood risk is not increased elsewhere and, where appropriate, be supported by a site-specific flood risk assessment. In areas at risk of flooding, development should only be allowed if it can be demonstrated that (and in light of the sequential and exception tests, as applicable):

(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.

3.1.4 Footnote 55 in the NPPF states that a site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

3.1.5 The national planning practice guidance to the NPPF was launched as a web-based resource in March 2014 The category dealing with flooding is contained in Flood Risk and Coastal Change, updated in August 2022.

3.1.6 Paragraph 30 in the Flood Risk and Coastal Change Planning Practice Guidance (Reference ID: 7-030-20140306) advises that a site-specific flood risk assessment is carried out to assess the flood risk to and from a development site. The assessment should demonstrate how flood risk will be managed now and over the development's lifetime, taking climate change into account, and with regard to the vulnerability of its users.

3.1.7 Paragraph 2 in the Flood Risk and Coastal Change Planning Practice Guidance (Reference ID: 7-002-20140306) advises that "flood risk" is a combination of the probability and the potential consequences of flooding from all sources - including from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers, and drainage systems, and from reservoirs, canals and lakes and other artificial sources.

3.1.8 Paragraph 020 (Reference ID: 7-020-20220825) of the Flood Risk and Coastal Change Planning Practice Guidance gives a checklist for site-specific flood risk assessments and provides the basis of the scope of this FRA.

3.2 Department for Environment, Food & Rural Affairs (DEFRA) and Environment Agency (EA) Guidance

3.2.1 Paragraph 32 of the NPPF states that applicants for planning permission (or prior approval in the case of certain permitted development rights) will find the Environment Agency's advice on assessing flood risk for planning applications helpful when preparing a site-specific flood risk assessment for, and before designing, a development that raises lower risk concerns.

3.2.2 Guidance from the Department for Environment, Food & Rural Affairs (DEFRA) and Environment Agency (EA), published on the Government's GOV.UK website, includes guidance on how to carry out a flood risk assessment entitled: 'Flood risk assessment in flood zones 2 and 3', 'Flood risk assessment in flood zone 1 and critical drainage areas', and 'Preparing a flood risk assessment: standing advice'. The guidance provides information on the range of factors that need to be considered when assessing flood risk.

3.2.3 For Flood Zone 1, the Environment Agency is to be consulted if the development is:

(a) within 20m of a main river on the Environment Agency flood map.

(b) in an area with critical drainage problems, other than minor development, as classed in the legislation.gov.uk website.

3.2.4 Based on the guidance detailed above, the EA has not been consulted for the purposes of this Flood Risk Assessment.

3.3 Level 1 Strategic Flood Risk Assessment (SFRA)

3.3.1 Paragraph 160 of the NPPF states:

"Strategic policies should be informed by a strategic flood risk assessment and should manage flood risk from all sources. They should consider cumulative impacts in, or affecting, local areas susceptible to flooding, and take account of advice from the Environment Agency and other relevant flood risk management authorities, such as lead local flood authorities and internal drainage boards."

3.3.2 A SFRA was prepared by JBA Consulting on behalf of the London Boroughs of Haringey, dated February 2015. The SFRA provides an overview of flood risk from all sources including from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers, and drainage systems, and from reservoirs, canals and lakes and other artificial sources.

3.3.3 The SFRA states the following requirements for development proposals:

- show development is not at risk of flooding or is compatible with the residual risk.
- not increase flood risk elsewhere, taking into account the impacts of climate change.
- not increase surface water peak flow rates or runoff volumes above green field levels including an allowance for climate change, as this would result in an increased flood risk to the receiving catchments.
- not increase the risk of groundwater flooding elsewhere or change the hydrogeological regime of the area.
- the location of basement development should be carefully considered within the LB of Haringey and attention should be paid to all sources of flood risk early within the planning process for new development (including the impact of potential future subterranean works that fall under permitted development).
- wherever possible use the opportunities offered by new development to reduce flood risk within the site and elsewhere.
- ensure that where new development is necessary in areas of flood risk (in exceptional circumstances); it is made safe from flooding for the lifetime of the development, taking into account the impacts of climate change. This includes consideration of the potential effect of residual risks.

3.3.4 The following requirements should be included in the FRA.

- There shall be no self-contained basement developments located in areas of fluvial pluvial or groundwater flood risk. Any self-contained developments located in an area shown on the National Reservoir Inundation Maps should include within their FRA, an emergency evacuation plan and should be designed to withstand the forces that might be encountered during breach event of reservoir or flood defences.
- Any development including, basement extensions, shall include within their FRA evidence that flood risk from fluvial, pluvial and groundwater sources are not increased to the development site itself and to third parties.
- Surface water discharge from proposed development sites should mimic that of a present-day green field site, up to and including a 1:100 AEP critical storm event including an allowance for climate change. Green field runoff rates should be maintained irrespective of whether the site falls within an area designated as being affected by flood risk from any source.
- It is critical that the onsite drainage models should demonstrate that there is no increased flood risk to third parties. Use SuDS measures wherever practical and achieve 50% attenuation of undeveloped site's surface water runoff at peak times. Exemplar SuDS schemes, should consult.

4.0 Proposed Site and Location

4.1 The site is located in Cranley Gardens, Haringey. The postcode is N10 3AG and an approximate Ordnance Survey grid reference is 529257, 189072.

4.2 The current site is occupied by a 2 -storey house, an outbuilding for gym use at the rear, a football pitch and grass and paved areas. The total site area is circa 595 sqm, location is shown on Figure 1, below.

Figure 1. Site Location

5.0 Existing Development

5.1 Existing Drainage

5.1.1 An asset map has been obtained from Thames Water. it shows two 300 dia and 1143X763 foul and surface water sewers and a 305 dia surface water sewer running along Cranley Gardens. The smaller foul network is circa 2.5m deep and connects into the bigger sewer, which depth his unknown. The surface water sewer is circa 4m deep. Extract is shown in Figure 2 below, and maps are included in Appendix A.

Figure 2. Thames Water Asset Map

5.1.2 Connections from the property into the sewers shall be identified at detailed design stage by the completion of a CCTV Survey works.

5.2 Existing Levels

5.2.1 A topographical survey was completed in March 2021 by Metro Plans. Drawing can be found in Appendix B

5.2.2 Internal floor level is circa 12.06m. External levels are slightly higher along the footpath, 12,18-12.26m and they ramp down towards the rear of the building, where levels are circa 11.24m. There are steps down to the garden area, circa at 10.50m, sloping down toward the football pitch, where the lowest level is 9.85m.

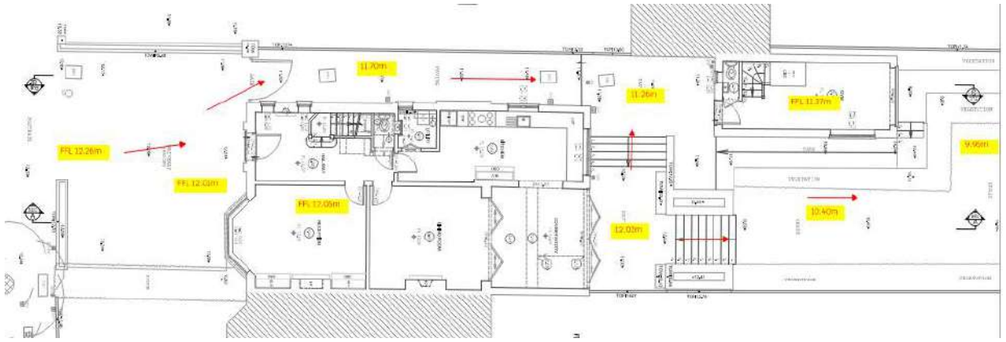


Figure 3. Topographical Survey drawing

5.2.3 Lidar data available from environmentdata.co.uk shows local topography drops from west to east.

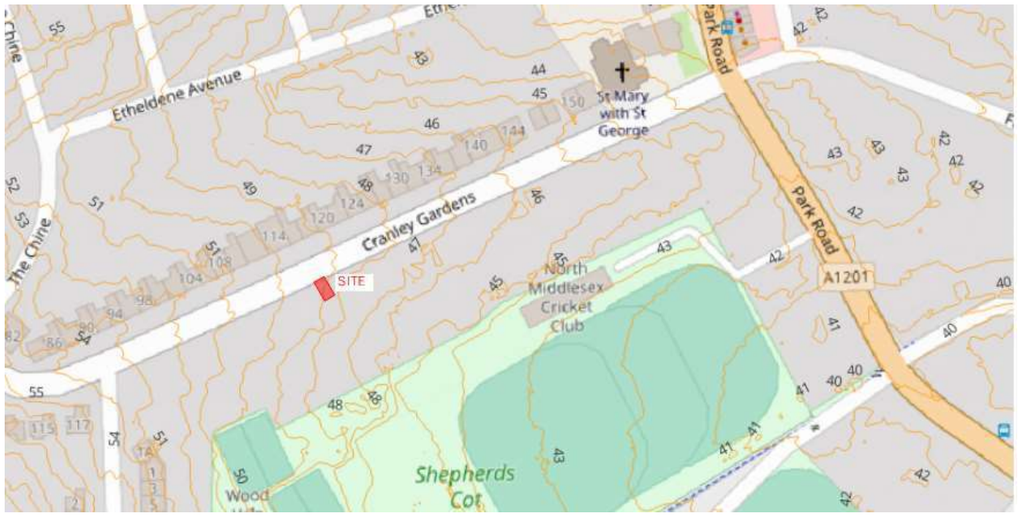


Figure 4. Contours maps extracted from environmentdata.co.uk.

5.3 Geology, Hydrology and Hydro-geology

5.3.1 The British Geological Survey© online geological mapping indicates that the site is underlain by bedrock only; London Clay Formation – Clay, Sand and Gravel. There are no superficial deposits recorded for the site.

5.3.2 A Ground Investigation & Assessment was conducted by Site Analytical Services Ltd in August MAY 2021. The full report can be found in BIA Appendix C. A summary of the ground conditions is as follows:

'The borehole revealed ground conditions that were generally consistent with the geological records and known history of the area and comprised Made Ground up to 0.60m in thickness resting on the London Clay Formation at depth.

Groundwater was encountered at a depth of 0.85m below ground level in Borehole 1 after a period of approximately two weeks. However, as the London Clay Formation is a non-aquifer, the water encountered is not groundwater, but instead, is surface water which has become trapped within the monitoring pipe.

5.3.3 According to the SWMP Overland flow follows the path of the Moselle Brook catchment where the natural outfall has been culverted beneath the railway line and the New River.'

5.3.4 The Cranfield Soil and AgriFood Institute (CSAI), incorporating the National Soil Resources Institute (NSRI,) at Cranfield University maintains soil reports and maps for England and Wales. The Soilscapes dataset map, shown in Figure 5 indicates that soils in the area are 'slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils' with a 'loamy and clayey' texture. These soils are identified as having 'impeded drainage'.

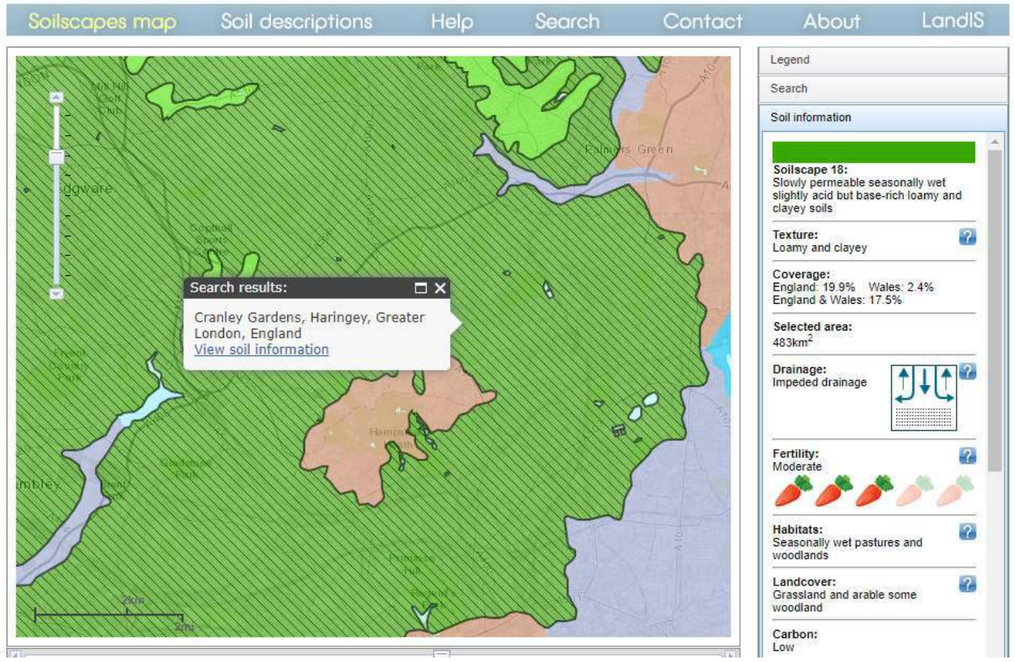


Figure 5. Soilscapes Map

5.3.5 Source Protection Zones (SPZs) are used to provide additional protection to safeguard drinking water quality through constraining the proximity of an activity that may impact upon a drinking water abstraction. From the Environment Agency's Source Protection Zones dataset on the MAGIC website, the site is not located within A SPZ1. This zone is defined by a travel time of 50-days or less from any point within the zone at, or below, the water table. Additionally, the zone has as a minimum a 50-metre radius. It is based principally on biological decay criteria and is designed to protect against the transmission of toxic chemicals and water-borne disease.

5.3.6 Aquifer designation maps dataset identifies different types of aquifers - underground layers of water-bearing permeable rock or drift deposits from which groundwater can be extracted. These designations reflect the importance of aquifers in

terms of groundwater as a resource (drinking water supply) but also their role in supporting surface water flows and wetland ecosystems. The site is at an unproductive area.

5.3.7 The Groundwater Vulnerability Maps show the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a single square kilometre. The site is not in area of vulnerability.

6.0 Proposed Development

6.1 The proposal consists of a basement extension to implement a new gym, swimming pool, sauna room, plant room and bathroom.

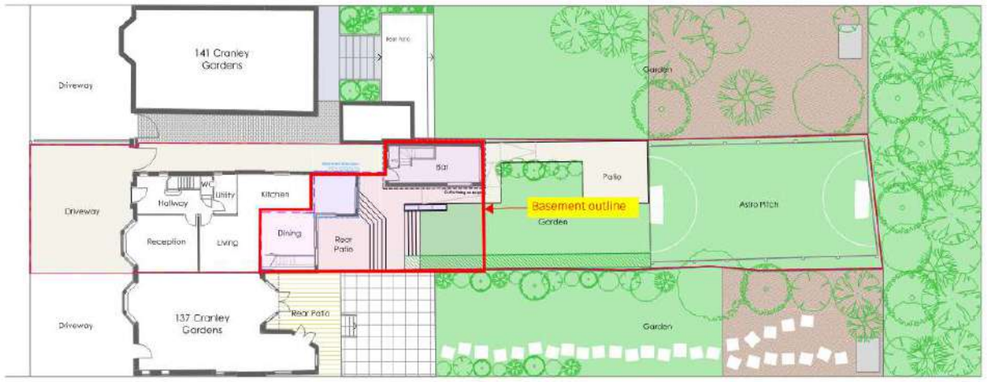


Figure 6. Site plan

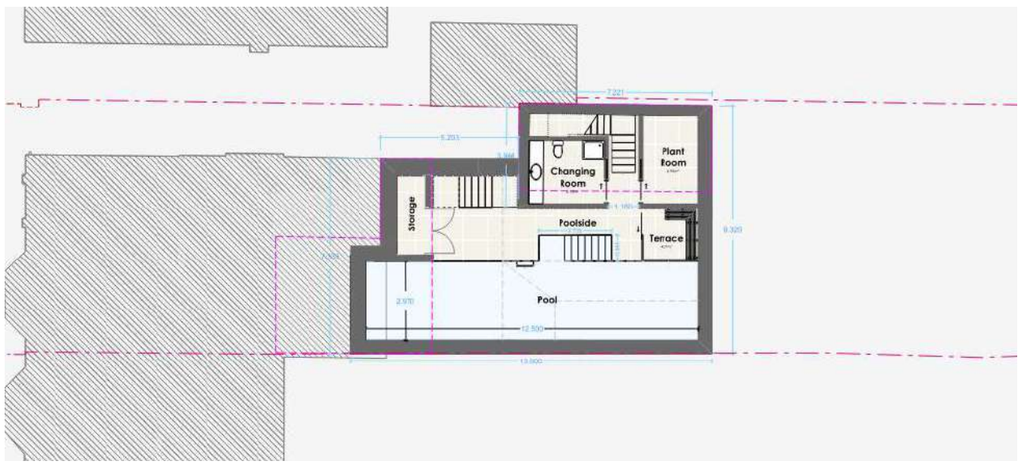


Figure 7. Basement Plan

6.2 The footprint of the basement works has a total area of circa 120sqm.

6.3 Architectural layouts can be found in BIA Appendix A – Stage 2 Drawings

7.0 Flood Risk Vulnerability and Flood Zone 'Compatibility'

7.1 Paragraph 077 (Reference ID: 7-077-20220825) of the Flood Risk and Coastal Change Planning Practice Guidance contains in Annex 3: Flood risk vulnerability classification. With reference to Table 2, the proposed development falls into the 'More vulnerable'. A copy of the More Vulnerable classification from the Table is reproduced below:

NPPG Annex 3: Flood Risk Vulnerability Classification - More Vulnerable
Hospitals
Residential institutions such as residential care homes, children's homes, social services homes, prisons, and hostels
Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs, and hotels
Non-residential uses for health services, nurseries, and educational establishments
Landfill* and sites used for waste management facilities for hazardous waste
Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan

Figure 8. NPPG Annex 3

7.2 With reference to Paragraph 079 (Reference ID: 7-079-20220825) Table 2: Flood risk vulnerability and flood zone 'compatibility', 'More Vulnerable' developments in Flood Zone 1 is appropriate. A screenshot of Table 3 is given below:

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	✗	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	✗	✗	✗	✓*

Key:

✓ Development is appropriate

✗ Development should not be permitted.

Figure 9. NPPG Table 2

7.3 The Sequential Test and Exception Test

7.4 For developments in areas identified as being at risk of any source of flooding now or in the future a sequential is required, Paragraph: 033 (Reference ID: 7-033-20220825) states that if the exception test is not required and the development is made safe through its lifetime, without increasing flood risk elsewhere, the development is appropriate.

7.5 SFRA Basement Development Guidance

7.5.1 Table 6-2 included in the SFRA and shown in Figure 6 describes the basement property type and recommends whether a type is suitable depending on its location in the Environment Agency Flood Zones, the LB of Haringey SWMP surface water maps and the iPEG maps.

Table 6-2 Basement Property Types and Flood Risk

		Fluvial				LB of Haringey SWMP Surface Water Maps				Reservoir	Groundwater
Property Type	Type of Development	FZ3a	FZ3b	FZ2	FZ1	30yr > 0.1m	30yr > 0.3m	200yr > 0.1m	200yr > 0.3m	NRIM	Permeable Superficial Deposits
	Self Contained Basement Dwelling	×	×	×	✓	×	×	×	×	✓ (ii) (iii)	×
Type 1	Permitted Development Basement is less than 3 metres depth and does not extend beyond the footprint of the original building.	✓ (i)	×	✓ (i)	✓ (i)	✓ (i)	✓ (i)	✓ (i)	✓ (i)	✓ (i) (iii)	✓ (i)
Type 2	Householder Application Larger than the dimensions of permitted development; greater than 3 metres in depth and extends beyond 3-4 metres outside of the footprint of the original building.	×	×	✓	✓	✓	✓	✓	✓	✓ (iii)	✓
Type 3	New Building (Usually a new house) One level basement below footprint of the new house and less than 4 metres beyond the rear main wall of the building.	×	×	✓	✓	✓	✓	✓	✓	✓ (iii)	✓
Type 4	New Building with basement excavation Boundary to boundary excavation and/or more than one level and projecting beyond the building footprint of the original building.	×	×	✓	✓	✓	✓	✓	✓	✓ (iii)	✓
×	**Development should not be permitted**										
✓	The LB of Haringey should, as a minimum maintain a register in conjunction with Building Control of subterranean development that falls under permitted development rights, existing and proposed, to monitor the potential cumulative impact of subterranean development on the drainage regime. **Prior to commencement of construction on basement development, assessments shall be submitted and approved by the London Borough of Haringey to demonstrate:** • There are suitable assessments to demonstrate there is no risk from surface water, groundwater and/ or fluvial flooding. • Basement extensions in flood risk areas do not contain sleeping accommodation. • There is an internal access to upper levels from the basement extension.										
(i)	It is recommended that regulation of basement development be applied through the building control process.										
(ii)	If the proposal lies within a RIM outline a reservoir breach analysis should be included in a FRA. RIM outlines can be found at http://www.environment-agency.gov.uk/homeandleisure/floods/default.aspx										
	The LB of Haringey should, as a minimum maintain a register in conjunction with Building Control of subterranean development that falls under permitted development rights, existing and proposed, to monitor the potential cumulative impact of subterranean development on the drainage regime.										
✓	A FRA appropriate to the size and scale of the basement extension will be required to support the planning application.										
✓	A FRA appropriate to the size and scale of the basement extension will be required to support the application, the FRA should be able to demonstrate that there will be no increase in surface water run off as a minimum, with an aim to reduce the overall surface water run off from the proposed development.										
✓	There should be **no sleeping accommodation in the basement extension** and **internal access can be provided to upper levels.** A FRA must be submitted for approval In addition, it should be shown that there is egress from the development to an area outside of National Reservoir Inundation mapped flood outline.										
✓	The FRA will need to demonstrate that the basement extension does not impact upon the existing hydro geological regime and that flood risk from groundwater is not increases to the development or to third parties.										

Figure 10. Basement and Flood risk

7.6 Figure 6 that in FZ1 basement development is appropriate subject to findings of the FRA. In case of risk from flooding from reservoirs no sleeping accommodation is allowed, but this risk is not relevant to the site.

8.0 Climate Change

8.1 The NPPF requires development to take account of the impacts of climate change. The allowances to be made for climate change effects when assessing flood risk are related to the lifetime of the development.

8.2 Guidance from the Environment Agency titled 'Flood risk assessments: climate change allowances' was published in February 2016. Climate change allowances are predictions of anticipated change for peak river flow, peak rainfall intensity, sea level rise, offshore wind speed and extreme wave height. There may be circumstances where local evidence supports using other data or allowances. Climate change allowances are set out below.

8.3 Peak River Flow Allowances

8.3.1 Peak river flow allowances show the anticipated changes to peak flow based on the site's management catchment. The site lies in the London Management Catchment (Department for Environment Food and Rural Affairs, 2022). However, the site is in Flood Zone 1, as shown in Figure 7 below, and has a 'low' probability of flooding from rivers and the sea and therefore peak river flow allowance are not relevant.

Figure 11: EA Flood Zone Map

8.4 Peak Rainfall Intensity Allowances

8.4.1 Drainage systems need to be designed to make sure there is no increase in the rate of runoff discharged from the site for the upper end allowance. As a minimum, there should be no significant flood hazard to people from on-site flooding for the central allowance. According to the Environment Agency guidance on climate changes allowances, for developments with a lifetime of beyond 2100, FRAs should consider the upper end allowance for both the 1.0% and 3.3% annual exceedance probability events for the 2070s epochs (2061-2125).

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

Figure 12. Peak rainfall intensity allowance in small catchments (less than 5km2) or urban drainage catchments (based on a 1961 to 1990 baseline) shows the total potential change anticipated for the 2080s (2070 to 2115) is 20% for the central category and 40% for the upper end category.

9.0 Site Specific Flood Risk

9.1 Flooding from Rivers and Sea

9.1.1 Fluvial flooding is caused by rivers, watercourses or ditches overflowing. It can also be caused by excessive snow melt or exacerbated by high tides and storm surges for rivers with tidal influences.

9.1.2 The Environment Agency's Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences, and show the extent of the natural floodplain and the additional extent of an extreme flood. In Flood Zone 1 ("Low Probability"), there is a less than 1 in 1000 chance of river and sea flooding occurring each year.

9.1.3 The Environment Agency's Flood Map for Planning, reproduced in Figure 9 and contained in Appendix #, indicates that the site is unaffected by any floodplain and falls entirely within Flood Zone 1 where flooding from rivers and the sea is very unlikely.

Figure 13: EA Flood Map for Planning

9.1.4 The probability of flooding from rivers and sea is assessed as 'Very Low'.

9.2 Flooding from Surface Water

9.2.1 Surface water flooding happens when rainwater does not drain away through the normal drainage systems or soak into the ground but lies on or flows over the ground instead, resulting in overland flow or ponding. Overland run-off follows the gradient of the land, whereas ponding occurs when overland flows reach low lying areas. These flood events tend to have a short duration and depend on factors such as geology, topography, rainfall, saturation, extent of urbanisation and vegetation.

9.2.2 The Environment Agency's Risk of Flooding from Surface Water map for the proposed development, taken from the GOV.UK website, is shown in Figure 9, below. It shows the site being in an area of 'Medium' risk of flooding from surface water.

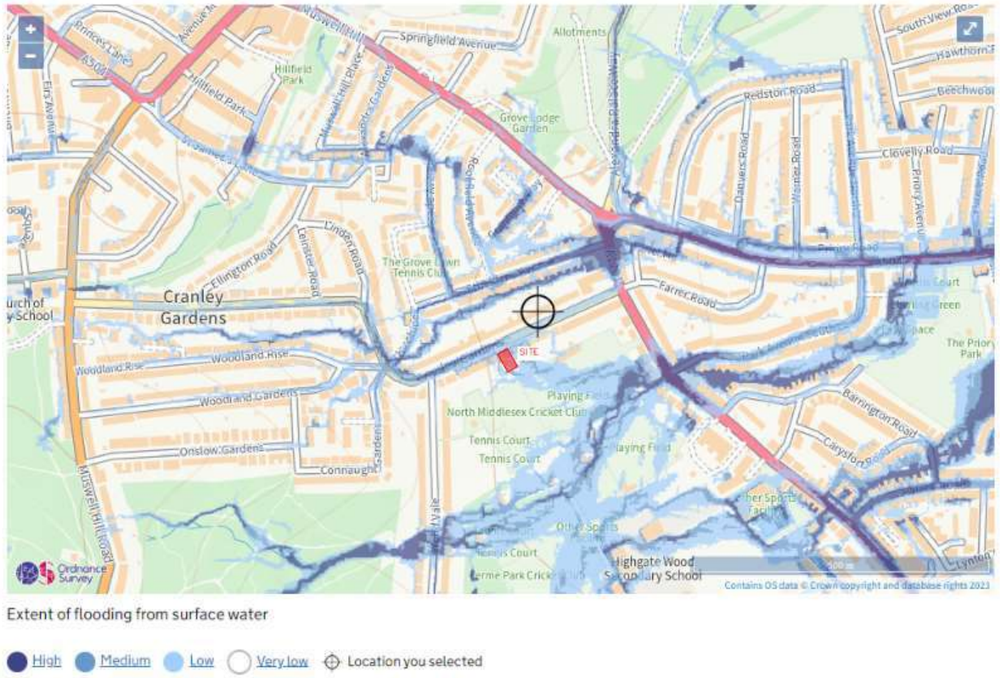
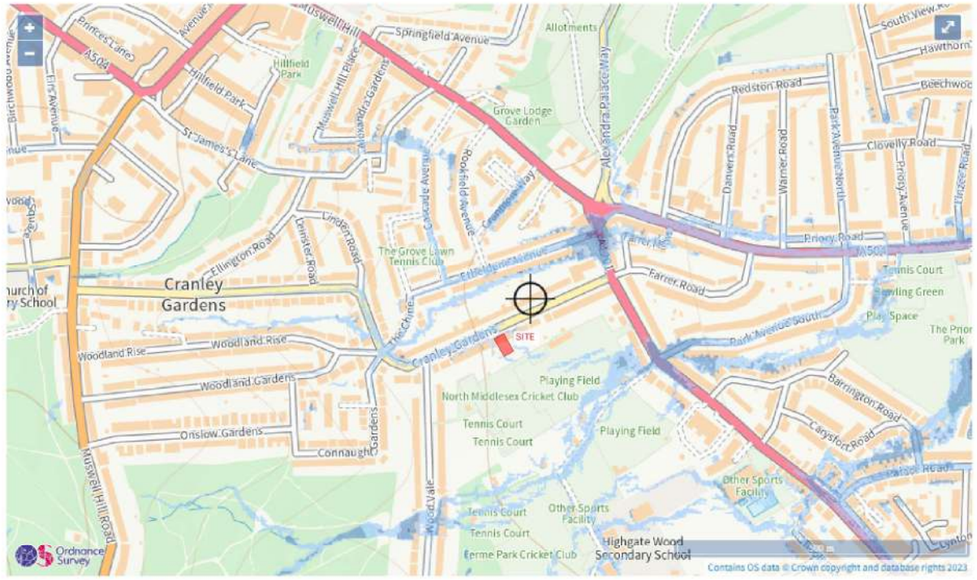


Figure 14: Surface Water Flooding – Extent

For this medium risk scenario, associated with storm events with a probability between 1 and 3.3% (1 1 1in 100 and 1 in 30) the estimated flood depth is maximum 300mm.

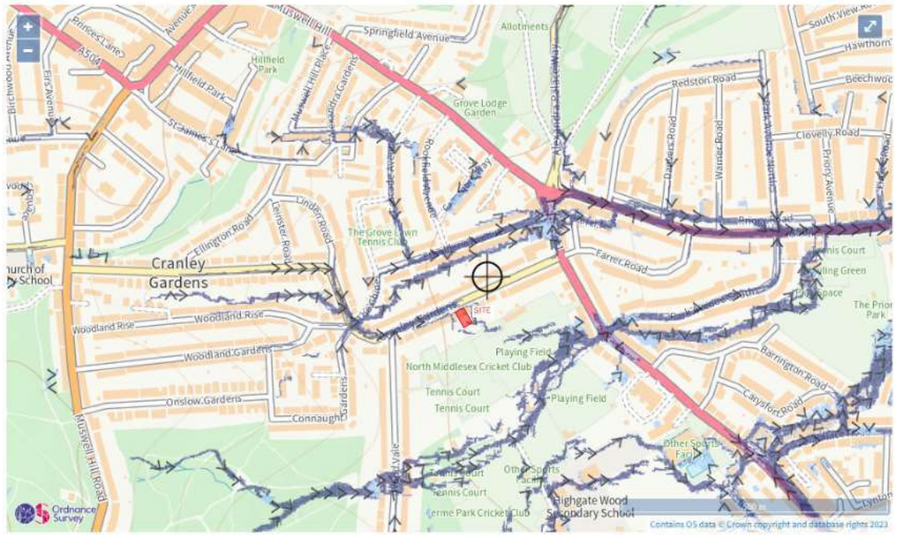


Surface water flood risk: water depth in a medium risk scenario
Flood depth (millimetres)

Over 900mm · 300 to 900mm · Below 300mm · Location you selected

Figure 15. Medium risk flood depth

Water velocity maps values of >0.25m/s, with flows west to east following the local topography.



Surface water flood risk: water velocity in a medium risk scenario
Flood velocity (metres/second)

Over 0.25 m/s · Less than 0.25 m/s · Direction of water flow · Location you selected

Figure 16. Medium risk flood velocities

9.2.3 The Department for Environment, Flood & Rural Affairs (Defra) and the Environment Agency (EA) published FD2321/TR2; a guidance document which provides a study on the combinations of flood depths and velocities that cause danger to people. The results are reproduced in Figure 17, below. It shows that at 300mm and velocities of 0.25 m/s, the category of flood hazard is less than Class 1 – *Danger for some*.

d * (v+0.5) + DF

Velocity \ Depth	0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50
0.00	0.13	0.25	0.38	0.50	0.63	0.75	0.88	1.00	1.13	1.25
0.50	0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50
1.00	0.38	0.75	1.13	1.50	1.88	2.25	2.63	3.00	3.38	3.75
1.50	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00
2.00	0.63	1.25	1.88	2.50	3.13	3.75	4.38	5.00	5.63	6.25
2.50	0.75	1.50	2.25	3.00	3.75	4.50	5.25	6.00	6.75	7.50
3.00	0.88	1.75	2.63	3.50	4.38	5.25	6.13	7.00	7.88	8.75
3.50	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00
4.00	1.13	2.25	3.38	4.50	5.63	6.75	7.88	9.00	10.13	11.25
4.50	1.25	2.50	3.75	5.00	6.25	7.50	8.75	10.00	11.25	12.50
5.00	1.38	2.75	4.13	5.50	6.88	8.25	9.63	11.00	12.38	13.75

Categories of flood hazard:

	From	To	
Class 1	0.75	1.50	Danger for some
Class 2	1.50	2.50	Danger for most
Class 3	2.50	20.00	Danger for all

Note: The table gives values of flood hazard (= d·(v+0.5) +DF)

Figure 17. FD2321/TR2 Figure 2.1 Combinations of flood depth and velocity that cause danger to people (Defra/EA, 2006)

9.2.4 The LB of Haringey SWMP completed an analysis of the number of properties at risk of flooding for the 1 in 100-year rainfall event and reviewed the potential number of properties with surface water flooding of a depth greater than 0.03m. A review of the numbers of properties affected coupled with local knowledge of the study area identified 9 Critical Drainage Areas.

9.2.5 As shown in Figure 18 below, the site is within CDA Group_055

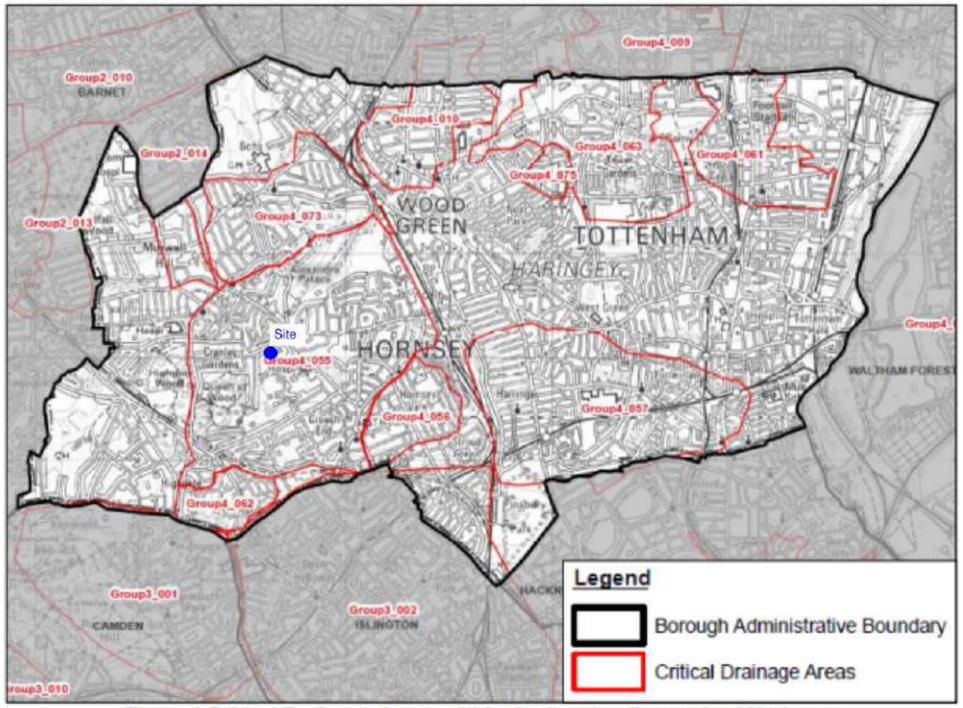


Figure i Critical Drainage Areas within the London Borough of Haringey

Figure 18. Critical Drainage Areas

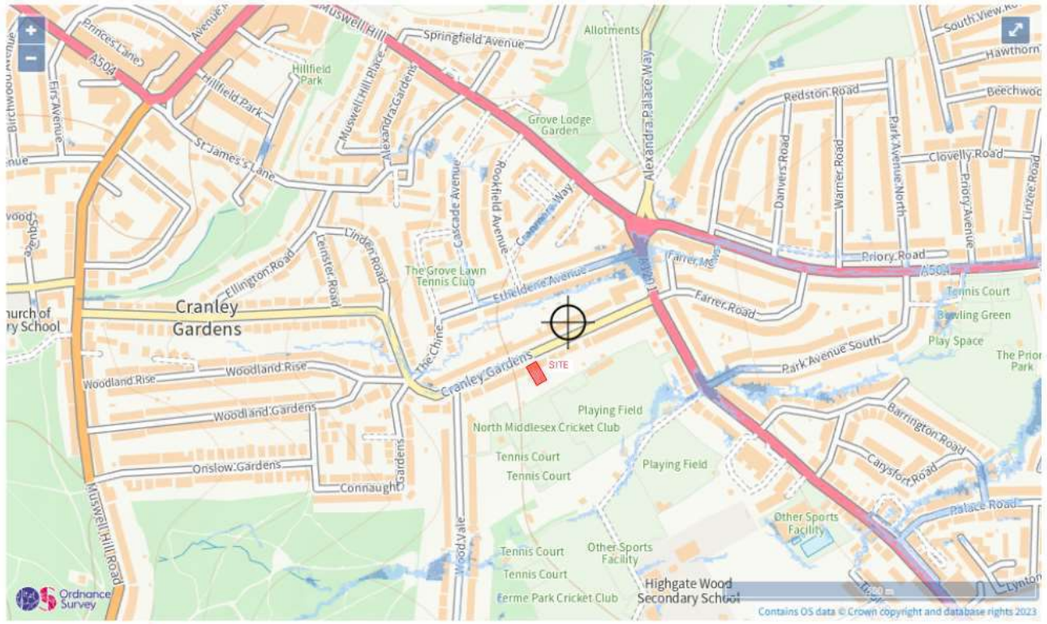
9.2.6 A review of the low-risk flood scenario, for rainfall events with a probability of less than 1% (1 in 100) concludes that in flow depths are mostly up to 300mm in the property.

Surface water flood risk: water depth in a low risk scenario
Flood depth (millimetres)

Over 900mm 300 to 900mm Below 300mm Location you selected

Figure 19. Low Risk Flood scenario

For the high-risk scenario, flood is contained to the road and has not impact on the property.



Surface water flood risk: water depth in a high risk scenario
Flood depth (millimetres)

Over 900mm 300 to 900mm Below 300mm Location you selected

Figure 20. High Risk flood scenario

9.2.7 The flood distribution is consistency among the EA Surface Water Maps and the SWMP.

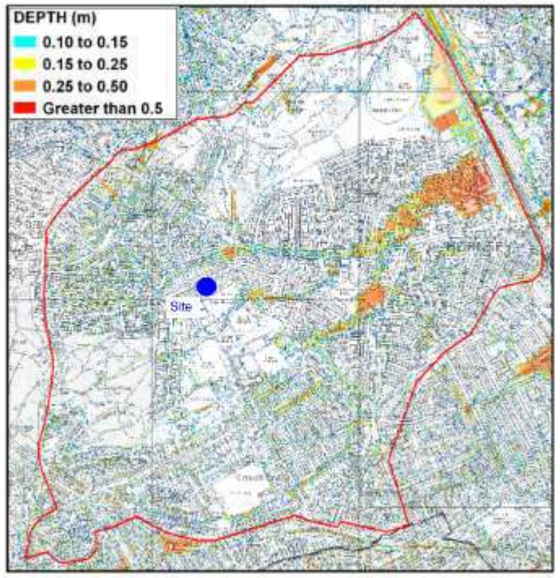


Figure 21. Surface Water flood depth form SWMP

9.2.8 As a result of further consideration of the mapping, the probability of flooding from surface water is considered to be 'Medium to Low'.

9.3 Flooding from Groundwater

9.3.1 Groundwater flooding occurs as a result of water rising from the underlying rocks or water flowing from abnormal springs. This 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, so during very wet periods, all the additional groundwater flowing towards these areas can cause the water table to rise to the surface causing groundwater flooding.

9.3.2 As shown in Haringey in Increased potential of elevated ground water map shown below, the site is not in an area at risk.

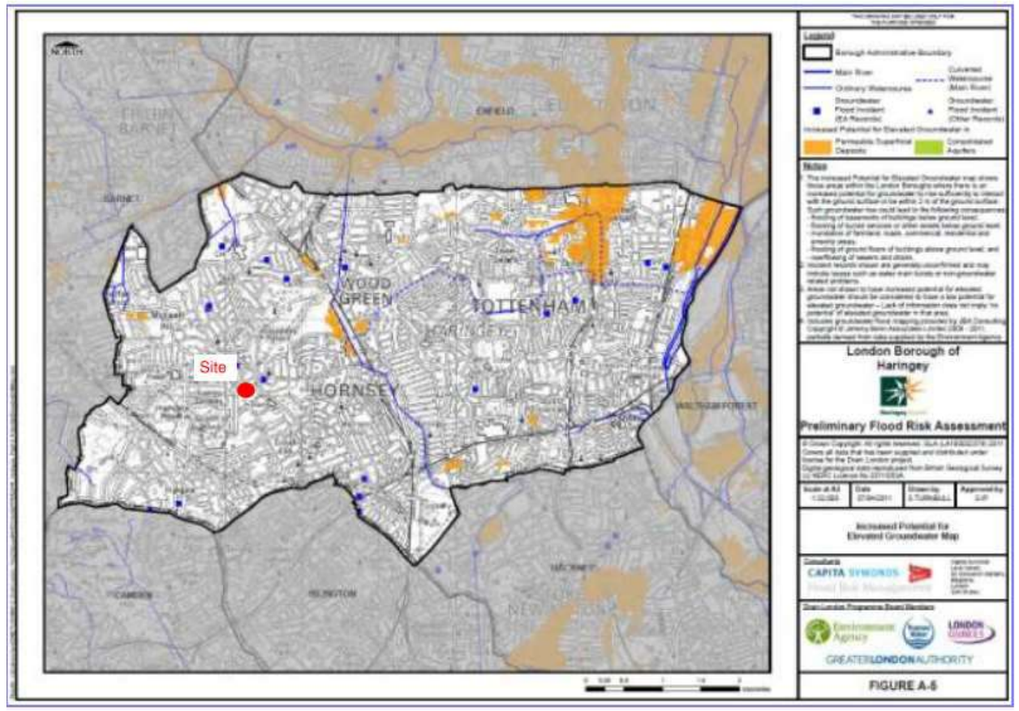


Figure 22. Risk of increase potential for elevated groundwater map

9.3.3 As stated in the Site Investigation report, no groundwater was recorded during the ground investigation works and that found during the return monitoring is associated with trapped surface water in the pipe.

9.3.4 The bedrock is a London Clay, classified as non-aquifer.

9.3.5 Based on the evidence above, the risk of groundwater flooding is assessed as 'Very Low'.

9.4 Flooding from Sewers and Drainage Systems

9.4.1 Flooding from sewers and drainage systems occurs when the sewer or drainage system is overwhelmed as a result of a blockage or excessive flow exceeding its capacity.

9.4.2 A Sewer Flooding History Enquiry of the Thames Water sewer flooding resulted in 'no incidents as a result of surcharging public sewers. The history enquiry is contained in Appendix #.

9.4.3 London Flood Review

9.4.4 The London Flood Review was set up to examine the flash flooding that affected many parts of the capital in July 2021. The review has sought to better understand the extent and causes of these floods, to assess how the drainage systems performed, and to recommend how the increasing risks of future flooding events can be managed.

9.4.5 The review, commissioned by Thames Water, will play an integral part in ensuring the company future proofs its infrastructure to protect its customers, their communities and the environment as such severe weather events look set to become the norm across the UK.

9.4.6 A Root Cause Analysis (RCA) has been undertaken to determine within each London Borough the key flooding areas (known from here as 'Hotspots') from both the 12 and 25 July events and to assess the likely associated flooding mechanisms. Any difference of flooding mechanisms between the two events will be detailed specifically where identified. All flooding Hotspots have been captured based on identifying clusters of reported incidents with the boundaries of the Hotspots following (where practicable) the sewer model sub catchments. The model subcatchments identify which houses drain to each manhole and as such are a useful boundary for grouping together houses that are likely to be impacted.

9.4.7 Figure 23 below shows the RCA map for Haringey.

Figure 4.6: London Borough of Haringey - Root Cause Analysis

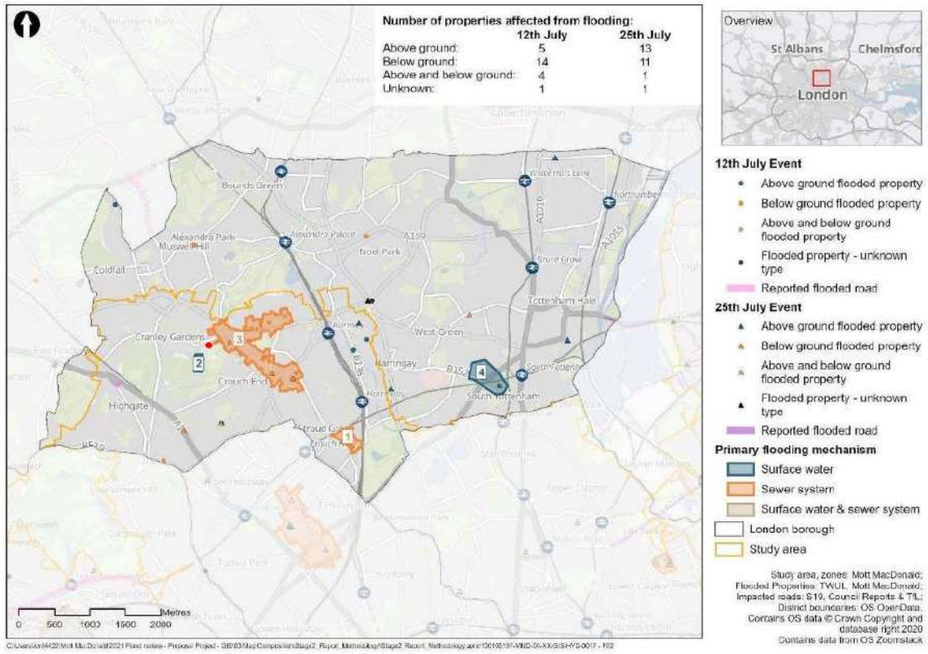


Figure 23. RCA Map

9.4.8 The site is next to hotspot 3, areas which experienced predominantly below ground flooding caused through direct sewer connections to basement and resulting in property flooding when the sewers surcharge.

9.4.9 On this basis, the risk of flooding from sewers and drainage systems is assessed as 'Medium'.

9.5 Flooding from Artificial Sources

9.5.1 Artificial sources of flood risk include waterbodies that have been amended by means of human intervention. Where infrastructure retains, transmits, or controls the flow of water, flooding may occur if there is a structural, hydraulic, geotechnical, or mechanical failure of the infrastructure.

9.5.2 The risk of inundation to the LB of Haringey as a result of reservoir breach or failure of a number of reservoirs within the area was assessed as part of the National Inundation Reservoir Maps (NRIM) 48 study. Extract can be found in Figure 14 below.

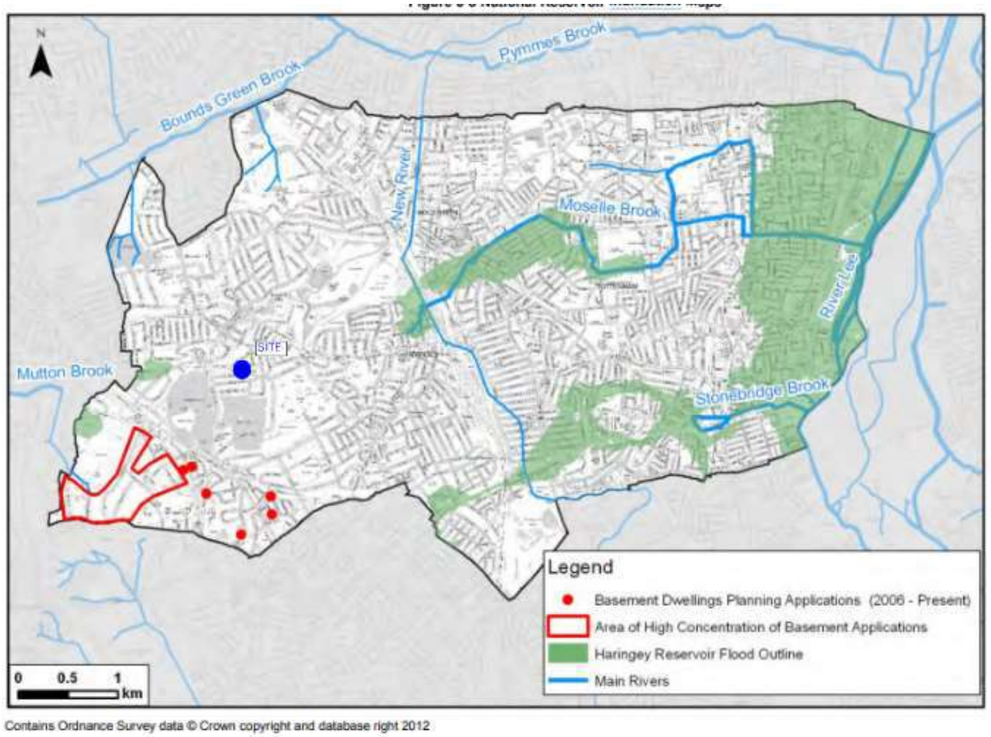


Figure 24. Reservoir Inundation Maps

9.5.3 Based on the information above, the risk of flooding from artificial sources is assessed as 'Very Low'.

9.6 Summary of Flood Risk

9.6.1 A summary of the potential flood risks associated with existing conditions (pre-development) is shown in Table 3, below.

Flood Source	Potential Risk			
	Very Low	Low	Medium	High
Fluvial (rivers and sea)	√			
Surface Water			√	
Ground Water	√			
Sewers and Drainage Systems	√		√	

Artificial Sources	√			
Overall	√			

Figure 25. Pre-development Potential Flood Risk from All Sources of Flooding

9.6.2 The pre-development potential flood risk from all sources of flooding is considered to be 'Low to Medium'.

10.0 Run-Off Assessment

10.1 The Environment Agency's 'Rainfall runoff management for developments – Report SC030219' sets out interim national procedure principles so that.

"Stormwater runoff rates and volumes discharged from urban developments should approximate to the site greenfield response over a range of storm frequencies of occurrence (return periods) and managed runoff on site for extreme events.

This requires:

- *the peak rate of stormwater run-off to be limited.*
- *the volume of run-off to be limited.*
- *the pollution load to receiving waters from stormwater runoff to be minimised.*
- *the assessment of overland flows and temporary flood storage across the site"*

10.1.1 The SFRAs also states that FRA should include a site drainage strategy including assessment of the local and cumulative impact of storing runoff with controlled release at greenfield rates to ensure no negative impact downstream.

10.1.2 The existing areas are summarised in the table below:

Area	Permeable, m2	Impermeable, m2
House		113
Outbuilding		25
Front driveway		60
External paving areas		120
Grass areas	120	
Small football pitch	160	
Total	**280**	**310**

Figure 26. Existing Areas Summary

10.1.1 The proposed areas are summarised in the table below:

Area	Permeable, m2	Impermeable, m2
House		113
Outbuilding		25
Front driveway		60
External paving areas	8	112
Grass areas	112	
Basement below grass	35	
Small football pitch	160	
Total	**280**	**310**

Figure 27. Proposed Areas Summary

10.1.2 The proposed development does not increase the total impermeable areas.

10.1.3 Existing brownfield rates were calculated following The Modified Rational Method as developed by The Wallingford Procedure, using the formula below:

$$Q = 2.78\ C \times i \times A$$

Q – Design event peak rate of runoff (l/s); A – Total catchment area being drained (ha); i – peak rainfall intensity in mm/hr

C – *Non-dimensional runoff coefficient which is dependent on the catchment characteristics*

10.1.4 Intensities have been calculated in accordance with the Wallingford Procedure based on the following site-specific values:

M5-60: 20mm

10.2 R=0.421

10.3 Intensities for different return periods and storm durations are shown in the Table below:

Rainfall intensity, mm			
Storm duration	**1 in 1**	**1 in 30**	**1 in 100**
15 min	35.1	76.4	101.2

Figure 28. Rainfall intensities

10.4 For the total impermeable site area of 0.0310Ha the following flowrates have been calculated:

Runoff rates, l /s			
Storm duration	**1 in 1**	**1 in 30**	**1 in 100**
15 min	2.97	6.47	8.70

Figure 29. Existing runoff rates

10.5 Greenfield rates have been obtained from HR Wallingford Greenfield runoff estimation tool.

Runoff rates, l /s			
Qbar	**1 in 1**	**1 in 30**	**1 in 100**
0.26	0.22	0.60	0.82

Figure 30. Greenfield rates

Haringey Development Management requires Sustainable Drainage Systems (SuDS) to be sensitively incorporated into new development by way of site layout and design, having regard to the following requirements:

All major development proposals will be required to reduce surface water flows to a greenfield run-off rate for a 1 in 100-year critical storm event.

- All minor development proposals should aim to achieve a greenfield run-off rate and, at a minimum, achieve a 50 per cent reduction on existing site run-off rates.

- All other development should seek to achieve a greenfield run-off rate and include at least one 'at source' SuDS measure resulting in an improvement in water quantity or quality discharging to a sewer; and
- For all development where a greenfield runoff rate cannot be achieved justification must be provided to demonstrate that the run-off rate has been reduced as much as possible.

10.5.1 Given site constraints, it is concluded a 50% reduction of runoff rates up to the 1 in 100+40% storm is acceptable. A volume of 8m3 is estimated to be required in order to achieve such reduction from all impermeable areas.

10.5.2 According to Table 26.2 *Pollution hazard indices for different land use classifications* of The SUDS Manual (CIRIA, 2015) the pollution hazard level is 'Very low' for residential roofs and 'low' for property driveways.

10.5.3 Overland flows are to be collected within the proposed drainage system. Flood storage will not be displaced as the site does not lie within a flood storage area.

10.6 Sustainable Urban Drainage Systems

10.6.1 The introduction of Sustainable Drainage Systems (SuDS) contributes to mitigate the risk of flood risk by reducing the impact of large rainfall events. By reducing runoff rates, SuDS help to decrease of risk of surface water and sewer flooding.

10.6.2 A SuDS Assessment has been carried out using the guidance set out in The London Plan published by Greater London Authority and The SuDS Manual published by CIRIA. SuDS techniques were assessed as possible surface water disposal methods and priority was given to SuDS which provide multi-functional benefits in line with the drainage hierarchy. Table 5, below, presents the drainage hierarchy taken from Policy SI 13 Sustainable drainage of The London Plan. The feasibility of incorporating different SuDS into the development proposals is outlined.

Method	Feasibility	Explanation
Rainwater harvesting (including a blue roofs)	×	Site constraints and reduced size make unpracticable the installation of rainwater harvesting devices
Infiltration to ground techniques	×	Ground conditions and site constraints are not compatible with infiltration due to the presence of London Clay
Rainwater attenuation in open water features and gradual release	×	There is not space on site for the construction of open water features
Rainwater discharge direct to a watercourse	×	There is no watercourse in the close enough vicinity to the site to make discharge to a watercourse a feasibility option.
Rainwater attenuation above ground (including blue roofs)	×	Site constraints and reduced size make unpracticable the installation of blueroofs
Rainwater attenuation below ground	✓	Below ground attenuation at the front garden along with orifice flow control is feasible
Discharge surface water to a surface water drain or drain.	✓	A new connection public surface water sewer in the vicinity of the site is possible
Discharge rainwater to the combined sewer	×	It is proposed to re-use existing surface water sewer connections into the public surface water sewer.

Figure 31. SUDS Hierarchy

10.7 Resistance, Resilience and Mitigation Measures

The guidance document 'Improving the Flood Performance of New Buildings: Flood Resilient Construction' was produced as part of the Department for Communities and Local Government Buildings Regulations (Sanitation) Research Framework, and the joint Defra/Environment Agency Flood Risk Management Research and Development programme. It defines flood resistance as:

Constructing a building in such a way to prevent floodwater entering the building and damaging its fabric.

10.7.1 Given the medium overall risk from all sources with a maximum water depth of 300mm it's considered water resilience (water inclusion) measures are not required. Proposed measures are considered to provide further mitigation and ensure the flood resistance of the building.

10.7.2 Slot channels at threshold will prevent runoff from entering the property.

10.7.3 Attenuation in the form of below ground tank or chamber will reduce runoff rates and limit the risk of surface and sewer flooding.

10.7.4 Non-return valves to be installed at the connection to the foul sewer will prevent basement flooding due to sewer surcharge.

10.7.5 Consideration should be made to the installation Flood resistance doors and gates for depth of up to 300mm.

10.7.6 The site is not within an area of flood warnings or alerts.

10.7.7 As a precaution, it is recommended that the owners obtain adequate flood insurance to manage risk and minimise potential economic losses.

10.7.8 Subject to the implementation of the proposed measures, the summary of the flood risk associated with the proposed development is considered to be the following:

Flood Source	Potential Risk			
	Very Low	Low	Medium	High
Fluvial (rivers and sea)	√			
Surface Water		√		
Ground Water	√			
Sewers and Drainage Systems	√	√		
Artificial Sources	√			
Overall	√			

Figure 32. Proposed development flood risk

10.8 Drainage Strategy

10.8.1 An outline drainage strategy has been developed. It is proposed runoff rates are reduced by 50% for all rainfall events up to the 1 in 100 +40% climate changes storm.

10.8.2 Attenuation is provided by 8m3 attenuation tank and flow control chamber.

10.8.3 Proposed runoffrates and reductions are shown in table below.

Runoff rates, l/s			
Storm event	**Existing**	**Proposed**	**Reduction**
1 in 1	2.97	3.7	n/a*
1 in 30	6.47	4.5	30%
1 in 100	8.70	4.5	48%
1 in 100 + 40%	n/a	4.5	n/a

Figure 33. Proposed runoff rates

10.8.4 * a reduction for the 1 in 1 is not applicable. Volumetric run-off coefficient applied for the Rational Method (0.75) used for the existing rates will typically result in runoff values than in Microdrainage, where a coefficient of 0.9 has been used.

10.8.5 Outline drainage strategy can be found in Appendix C

10.8.6 Microdrainage calculations can be found in Appendix D

10.8.7 SuDS Proforma can be found in Appendix E

10.9 Operation and Maintenance

10.9.1 The drainage strategy has been designed such that the foul and surface water pipes conform with Building Regulations Part H. This ensures operation of the drainage system is fit for purpose.

10.9.2 Gullies and channels will be specified with silt buckets to prevent the ingress of silts into the drainage network and impairing the performance of the system.

10.9.3 A maintenance regime to ensure efficient functioning of the drainage system is recommended.

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

11.0 Conclusions

11.1 In accordance with the National Planning Policy Framework, the site would be categorised as lying within Flood Zone 1 – an area assessed as having 1 in 1000 or less annual probability of river of sea flooding (<0.1%).

11.2 In accordance with the NPPF, the proposed development is classified as 'more vulnerable' land use.

11.3 Land use in the proposed development is acceptable under the terms of Sequential Test and there is no requirement for an Exception Test to be carried out.

11.4 The site is at 'Very Low' risk for fluvial flooding.

11.5 The site has been assessed as being at 'Medium' risk from surface water flooding.

11.6 The site has been assessed as being at 'Very Low' risk from groundwater sources.

11.7 The site has been assessed as being at 'Medium' risk from surcharging sewers.

11.8 The site has been assessed as being at 'Very Low' risk from artificial sources.

11.9 The overall pre=development flood risk to the site is assessed as 'Medium'

11.10 The provision of the SuDS and the inclusion of the proposed flood resistance measures will reduce the surface water flood risk.

11.11 The proposed overall reduction of runoff rates by 48% for all events up the 1 in 100 +40% storm will also mitigate the risk of flooding downstream,

11.12 The comments stated above are based on information received from other consultees. The flood risk classification of this site has been based on the above observations, and the recommendations stated.

APPENDIX A
SEWER RECORDS

Asset location search

Property Searches

Symmetrys Limited
Unit 6 The Courtyard Unit 6 The Courtyard

LONDON
N8 8SL

Search address supplied 139
Cranley Gardens
London
N10 3AH

Your reference Cranfield Gardens

Our reference ALS/ALS/24/2021_4492129

Search date 23 August 2021

Knowledge of features below the surface is essential for every development

The benefits of this knowledge not only include ensuring due diligence and avoiding risk, but also being able to ascertain the feasibility of any development.

Did you know that Thames Water Property Searches can also provide a variety of utility searches including a more comprehensive view of utility providers' assets (across up to 35-45 different providers), as well as more focused searches relating to specific major utility companies such as National Grid (gas and electric).

Contact us to find out more.

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0800 009 4540

Asset location search

Property Searches

Search address supplied: 139, Cranley Gardens, London, N10 3AH

Dear Sir / Madam

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

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

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

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

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

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

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0800 009 4540, or use the address below:

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

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

Waste Water Services

Please provide a copy extract from the public sewer map.

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

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

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

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

For your guidance:

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

Clean Water Services

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

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

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

For your guidance:

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

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

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

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

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

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Clean Water queries

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

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

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Asset Location Search Sewer Map - ALS/ALS/24/2021_4492129

The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 529191,189043

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

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

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

Manhole Reference	Manhole Cover Level	Manhole Invert Level
1004	49.48	n/a
2001	48.05	44.07
2002	47.01	n/a
2101	46.83	43.22
101A	n/a	n/a
1001	52.24	49.77
1002	52.15	n/a
1003	51.28	47.08
101B	n/a	n/a
101C	n/a	n/a
10YP	n/a	n/a
10XY	n/a	n/a
111A	n/a	n/a
11WQ	n/a	n/a

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

ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

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

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

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

Trunk Surface Water

Trunk Foul

Storm Relief

Trunk Combined

Vent Pipe

Bio-solids (Sludge)

Proposed Thames Surface Water Sewer

Proposed Thames Water Foul Sewer

Gallery

Foul Rising Main

Surface Water Rising Main

Combined Rising Main

Sludge Rising Main

Proposed Thames Water Rising Main

Vacuum

Sewer Fittings

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

Air Valve

Dam Chase

Fitting

Meter

Vent Column

Operational Controls

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

Control Valve

Drop Pipe

Ancillary

Weir

End Items

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

Outfall

Undefined End

Inlet

Other Symbols

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

Public/Private Pumping Station

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

Invert Level

Summit

Areas

Lines denoting areas of underground surveys, etc.

Agreement

Operational Site

Chamber

Tunnel

Conduit Bridge

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

Foul Sewer

Surface Water Sewer

Combined Sewer

Gulley

Culverted Watercourse

Proposed

Abandoned Sewer

Notes:

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

2) All measurements on the plans are metric.

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

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

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

6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Searches on 0800 009 4540.

Asset Location Search Water Map - ALS/ALS/24/2021_4492129

The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 529191, 189043.

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

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

ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

4"

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

16"

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

3" SUPPLY

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

3" FIRE

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

3" METERED

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

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

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

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

Valves

General Purpose Valve

Air Valve

Pressure Control Valve

Customer Valve

Hydrants

Single Hydrant

Meters

Meter

End Items

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

Blank Flange

Capped End

Emptying Pit

Undefined End

Manifold

Customer Supply

Fire Supply

Operational Sites

Booster Station

Other

Other (Proposed)

Pumping Station

Service Reservoir

Shaft Inspection

Treatment Works

Unknown

Water Tower

Other Symbols

Data Logger

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

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

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

Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment 14 days from due date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service, or will be held to be invalid.
4. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
5. In case of dispute TWUL`s terms and conditions shall apply.
6. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
8. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800

If you are unhappy with our service you can speak to your original goods or customer service provider. If you are not satisfied with the response, your complaint will be reviewed by the Customer Services Director. You can write to her at: Thames Water Utilities Ltd. PO Box 492, Swindon, SN38 8TU.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0121 345 1000 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

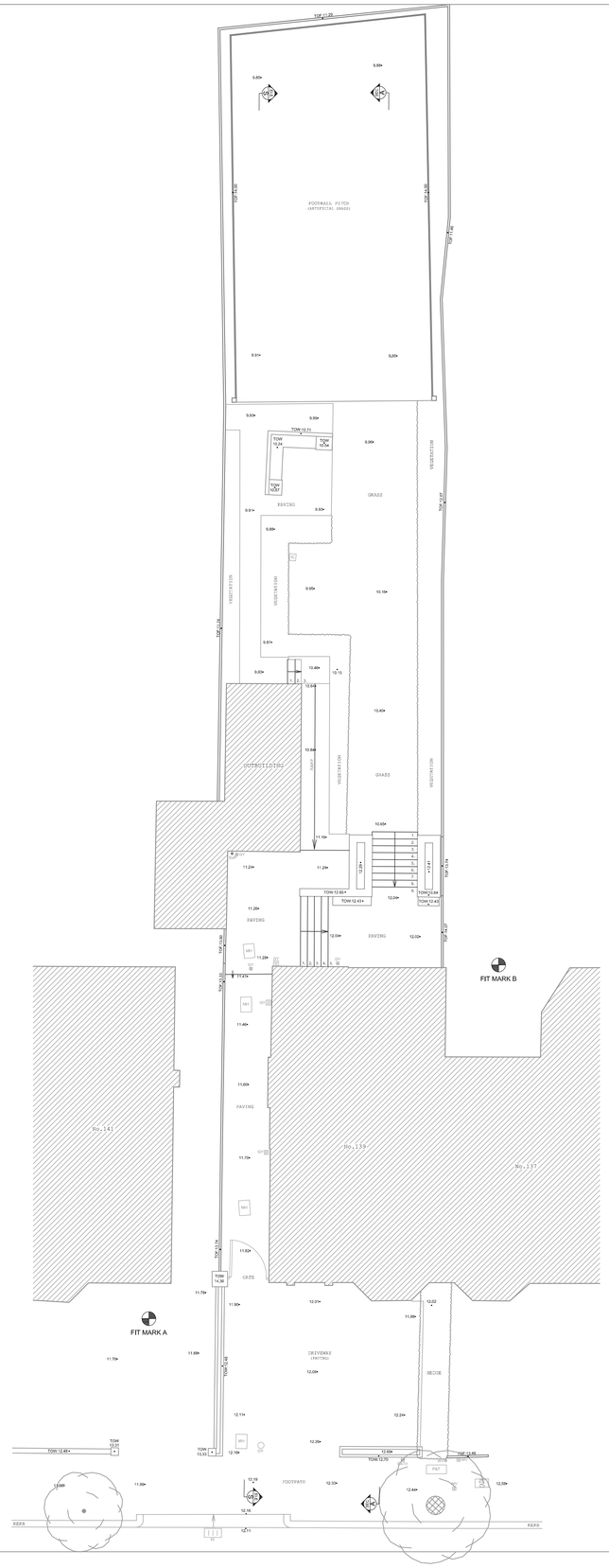
Ways to pay your bill

Credit Card	**BACS Payment**	**Telephone Banking**	**Cheque**
Call **0800 009 4540** quoting your invoice number starting CBA or ADS / OSS	Account number **90478703** Sort code **60-00-01** A remittance advice must be sent to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW.** or email **ps.billing@thameswater.co.uk**	By calling your bank and quoting: Account number **90478703** Sort code **60-00-01** and your invoice number	Made payable to '**Thames Water Utilities Ltd**' Write your Thames Water account number on the back. Send to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW** or by DX to **151280 Slough 13**

Thames Water Utilities Ltd Registered in England & Wales No. 2366661 Registered Office Clearwater Court, Vastern Rd, Reading, Berks, RG1 8DB.

APPENDIX B
TOPOGRAPHICAL SURVEY

0 2500 5000 7500 10000
Milimeters (mm)
Scale Bar



No.139 CRANLEY GARDENS, LONDON, N10 3AG
SITE PLAN

DO NOT SCALE FROM DRAWING
DO NOT RE-SCALE DRAWING
ALL DIMENSIONS TO BE CHECKED ON SITE

METRO PLANS SURVEYS

MEASURED BUILDING SURVEY

LEGEND

F—C 0.00	FLOOR TO CILL HEIGHT
C—H 0.00	CILL TO HEAD HEIGHT
⊕9	FLOOR TO CEILING HEIGHT
FL 21.80 ⊕	FLOOR LEVEL
0.00sp	SPRING HEIGHT
⊕	SINGLE STEP HEIGHT
AH	ACCESS HATCH
AHL	ARCH HEAD LEVEL
BLR	BOILER
BOL	BOLLARD
BM	BENCHMARK
BSL	BEAM SOFFIT LEVEL
BSH	BEAM SOFFIT HEIGHT
CAB	CABINET
CATV	CABLE TV
CBD	CUPBOARD
CCTV	CCTV CAMERA
CL	CEILING LEVEL
CNT	COUNTER
CH	CEILING HATCH
CL	CEILING LIGHT
CV	CEILING VENT
DH	DOOR HEIGHT
EAVE:00.00	EAVE LEVEL
EM	ELECTRIC METER
EP	ELECTRICAL POLE
FC	FALSE CEILING
FP	FIRE PLACE
FB	FUSE BOARD
FA	FIRE ALARM
FI	FIRE INDICATOR
FE	FIRE EXTINGUISHER
GM	GAS METER
GP	GATE POST
GV	GAS VALVE
GY	GULLY
IC	INSPECTION CHAMBER
KI	STORM WATER INLET
LP	LAMP POST
MH	MANHOLE
—CL:	COVER LEVEL
—IL:	INVERT LEVEL
OHC	OVER HEAD CABLE
OHG	OVERHANG
P	POLE
PAR:00.00	PARAPET LEVEL
P&T	POST & TELECOM
PS	POWER SUPPLY
RAD	RADIATOR
RE	RODDING EYE
RS	ROAD SIGN
RWP	RAIN WATER PIPE
RIDGE:00.00	RIDGE LEVEL
SLV	SHELVING
SL	SKYLIGHT
SV	STOP VALVE
SVP	SOIL VENT PIPE
SUS	SUSPENDED CEILING
SW	SWITCH
ToF:00.00	TOP OF FENCE
ToW:00.00	TOP OF WALL
TP	TELEPHONE POLE
WH	WATER HEATER
WM	WATER MAIN
WT	WATER TANK
WV	WATER VALVE
WL	WALL LAMP
WS	WORK SURFACE
B6 10.45	SURVEY STATION
	TREE DECIDUOUS— trunk (T): spread (S): height (H):
	TREE CONIFEROUS— trunk (T): spread (S): height (H):
	BUSH
ELECTRICAL LAYOUT	
	SINGLE SOCKET
	DOUBLE SOCKET
	TELECOM
	TV
	ALARM
	LIGHTING
UPL	UPLIGHT
	SINGLE SWITCH
	DOUBLE SWITCH

NOTES

All levels to arbitrary datum

-

-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	FULL ISSUE	19/03/2021	DC

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33 GOLDSMITH ROAD
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LONDON W3 6PX
TEL NO. + 44 (0) 20 8354 9331

EMAIL: info@metroplans.com
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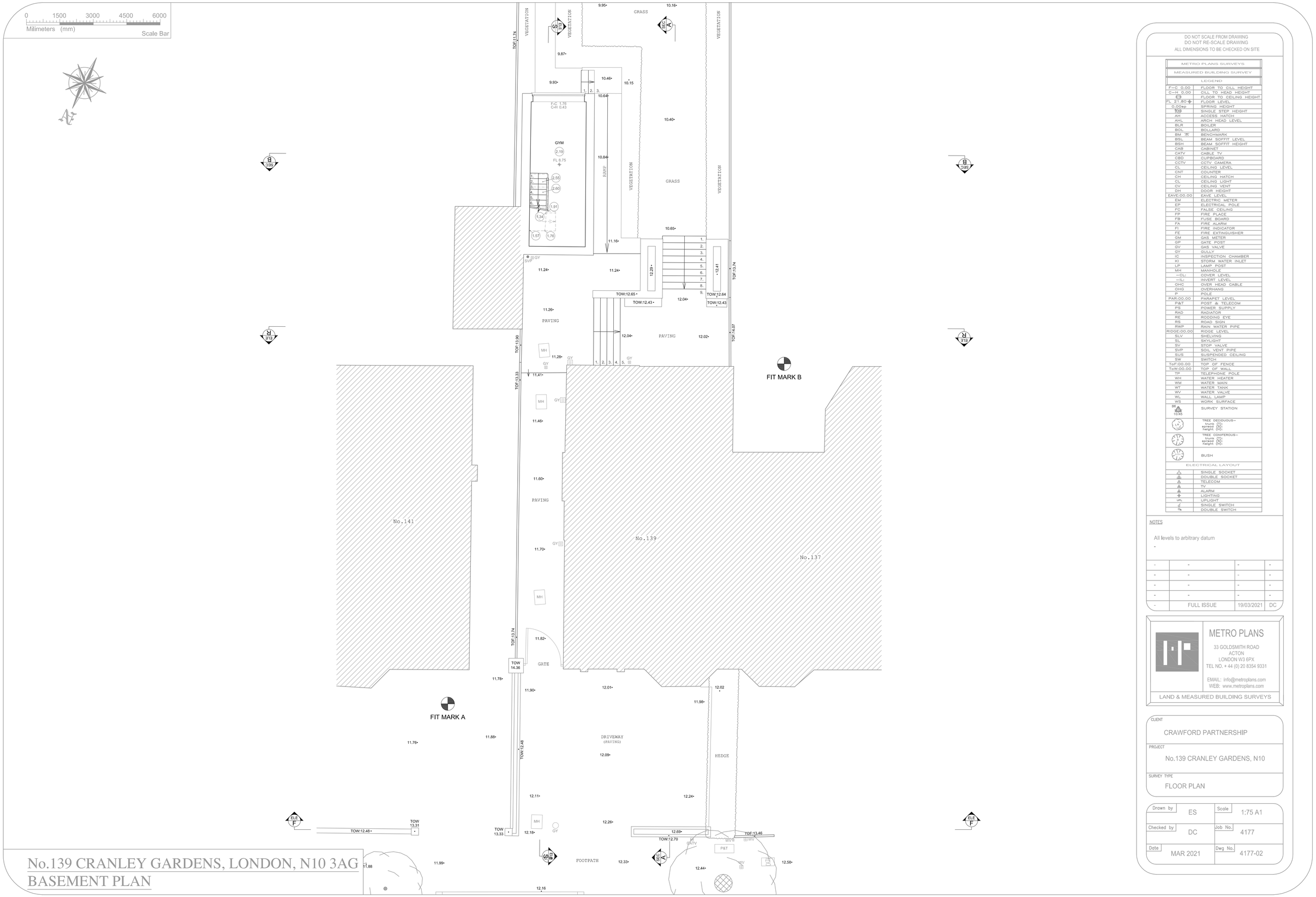
LAND & MEASURED BUILDING SURVEYS

CLIENT
CRAWFORD PARTNERSHIP

PROJECT
No.139 CRANLEY GARDENS, N10

SURVEY TYPE
SITE PLAN

Drawn by	TZ	Scale	1:125 A1
Checked by	DC	Job No.	4177
Date	MAR 2021	Dwg No.	4177-01



No.139 CRANLEY GARDENS, LONDON, N10 3AG
BASEMENT PLAN

DO NOT SCALE FROM DRAWING
DO NOT RE-SCALE DRAWING
ALL DIMENSIONS TO BE CHECKED ON SITE

METRO PLANS SURVEYS

MEASURED BUILDING SURVEY

LEGEND

F–C 0.00	FLOOR TO CILL HEIGHT
C–H 0.00	CILL TO HEAD HEIGHT
↔	FLOOR TO CEILING HEIGHT
FL 21.80	FLOOR LEVEL
0.00sp	SPRING HEIGHT
	SINGLE STEP HEIGHT
AH	ACCESS HATCH
AHL	ARCH HEAD LEVEL
BLR	BOILER
BOL	BOLLARD
BM	BENCHMARK
BSL	BEAM SOFFIT LEVEL
BSH	BEAM SOFFIT HEIGHT
CAB	CABINET
CATV	CABLE TV
CBD	CUPBOARD
CCTV	CCTV CAMERA
CL	CEILING LEVEL
CNT	COUNTER
CH	CEILING HATCH
CL	CEILING LIGHT
CV	CEILING VENT
DH	DOOR HEIGHT
EAVE:00.00	EAVE LEVEL
EM	ELECTRIC METER
EP	ELECTRICAL POLE
FC	FALSE CEILING
FP	FIRE PLACE
FB	FUSE BOARD
FA	FIRE ALARM
FI	FIRE INDICATOR
FE	FIRE EXTINGUISHER
GM	GAS METER
GP	GATE POST
GV	GAS VALVE
GY	GULLY
IC	INSPECTION CHAMBER
KI	STORM WATER INLET
LP	LAMP POST
MH	MANHOLE
–CL:	COVER LEVEL
–IL:	INVERT LEVEL
OHC	OVER HEAD CABLE
OHG	OVERHANG
P	POLE
PAR:00.00	PARAPET LEVEL
P&T	POST & TELECOM
PS	POWER SUPPLY
RAD	RADIATOR
RE	RODDING EYE
RS	ROAD SIGN
RWP	RAIN WATER PIPE
RIDGE:00.00	RIDGE LEVEL
SLV	SHELVING
SL	SKYLIGHT
SV	STOP VALVE
SVP	SOIL VENT PIPE
SUS	SUSPENDED CEILING
SW	SWITCH
ToF:00.00	TOP OF FENCE
ToW:00.00	TOP OF WALL
TP	TELEPHONE POLE
WH	WATER HEATER
WM	WATER MAIN
WT	WATER TANK
WV	WATER VALVE
WL	WALL LAMP
WS	WORK SURFACE
B6 10.45	SURVEY STATION
	TREE DECIDUOUS– trunk (T): spread (S): height (H):
	TREE CONIFEROUS– trunk (T): spread (S): height (H):
	BUSH
ELECTRICAL LAYOUT	
	SINGLE SOCKET
	DOUBLE SOCKET
	TELECOM
	TV
	ALARM
	LIGHTING
UPL	UPLIGHT
	SINGLE SWITCH
	DOUBLE SWITCH

NOTES

All levels to arbitrary datum

-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	FULL ISSUE	19/03/2021	DC

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33 GOLDSMITH ROAD
ACTON
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TEL NO. + 44 (0) 20 8354 9331
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LAND & MEASURED BUILDING SURVEYS

CLIENT
CRAWFORD PARTNERSHIP

PROJECT
No.139 CRANLEY GARDENS, N10

SURVEY TYPE
FLOOR PLAN

Drawn by	ES	Scale	1:75 A1
Checked by	DC	Job No.	4177
Date	MAR 2021	Dwg No.	4177-02

No.139 CRANLEY GARDENS, LONDON, N10 3AG
GROUND FLOOR PLAN

DO NOT SCALE FROM DRAWING
DO NOT RE-SCALE DRAWING
ALL DIMENSIONS TO BE CHECKED ON SITE

METRO PLANS SURVEYS

MEASURED BUILDING SURVEY

LEGEND

F–C 0.00	FLOOR TO CILL HEIGHT
C–H 0.00	CILL TO HEAD HEIGHT
6'9	FLOOR TO CEILING HEIGHT
FL 21.80	FLOOR LEVEL
0.00sp	SPRING HEIGHT
1'10	SINGLE STEP HEIGHT
AH	ACCESS HATCH
AHL	ARCH HEAD LEVEL
BLR	BOILER
BOL	BOLLARD
BM	BENCHMARK
BSL	BEAM SOFFIT LEVEL
BSH	BEAM SOFFIT HEIGHT
CAB	CABINET
CATV	CABLE TV
CBD	CUPBOARD
CCTV	CCTV CAMERA
CL	CEILING LEVEL
CNT	COUNTER
CH	CEILING HATCH
CL	CEILING LIGHT
CV	CEILING VENT
DH	DOOR HEIGHT
EAVE:00.00	EAVE LEVEL
EM	ELECTRIC METER
EP	ELECTRICAL POLE
FC	FALSE CEILING
FP	FIRE PLACE
FB	FUSE BOARD
FA	FIRE ALARM
FI	FIRE INDICATOR
FE	FIRE EXTINGUISHER
GM	GAS METER
GP	GATE POST
GV	GAS VALVE
GY	GULLY
IC	INSPECTION CHAMBER
KI	STORM WATER INLET
LP	LAMP POST
MH	MANHOLE
–CL:	COVER LEVEL
–IL:	INVERT LEVEL
OHC	OVER HEAD CABLE
OHG	OVERHANG
P	POLE
PAR:00.00	PARAPET LEVEL
P&T	POST & TELECOM
PS	POWER SUPPLY
RAD	RADIATOR
RE	RODDING EYE
RS	ROAD SIGN
RWP	RAIN WATER PIPE
RIDGE:00.00	RIDGE LEVEL
SLV	SHELVING
SL	SKYLIGHT
SV	STOP VALVE
SVP	SOIL VENT PIPE
SUS	SUSPENDED CEILING
SW	SWITCH
ToF:00.00	TOP OF FENCE
ToW:00.00	TOP OF WALL
TP	TELEPHONE POLE
WH	WATER HEATER
WM	WATER MAIN
WT	WATER TANK
WV	WATER VALVE
WL	WALL LAMP
WS	WORK SURFACE
B6 10.45	SURVEY STATION
1.2	TREE DECIDUOUS– trunk (T): spread (S): height (H):
1.2	TREE CONIFEROUS– trunk (T): spread (S): height (H):
	BUSH
ELECTRICAL LAYOUT	
	SINGLE SOCKET
	DOUBLE SOCKET
	TELECOM
	TV
	ALARM
	LIGHTING
UPL	UPLIGHT
	SINGLE SWITCH
	DOUBLE SWITCH

NOTES

All levels to arbitrary datum

-

-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	FULL ISSUE	19/03/2021	DC

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33 GOLDSMITH ROAD
ACTON
LONDON W3 6PX
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WEB: www.metroplans.com

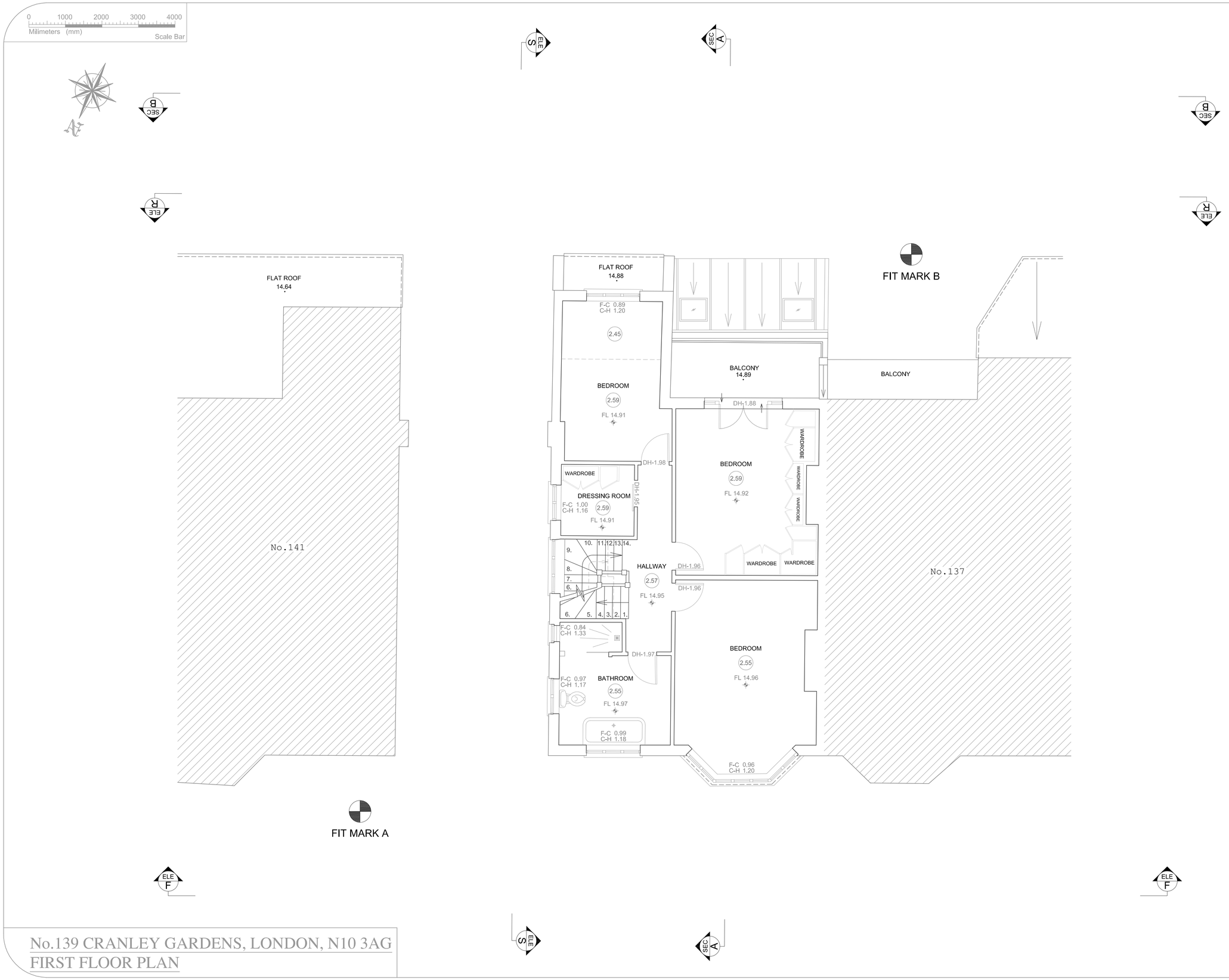
LAND & MEASURED BUILDING SURVEYS

CLIENT
CRAWFORD PARTNERSHIP

PROJECT
No.139 CRANLEY GARDENS, N10

SURVEY TYPE
FLOOR PLAN

Drawn by	LZ	Scale	1:75 A1
Checked by	DC	Job No.	4177
Date	MAR 2021	Dwg No.	4177-03



DO NOT SCALE FROM DRAWING
DO NOT RE-SCALE DRAWING
ALL DIMENSIONS TO BE CHECKED ON SITE

METRO PLANS SURVEYS

MEASURED BUILDING SURVEY

LEGEND

F—C 0.00	FLOOR TO CILL HEIGHT
C—H 0.00	CILL TO HEAD HEIGHT
⊕	FLOOR TO CEILING HEIGHT
FL 21.80 ⊕	FLOOR LEVEL
0.00sp	SPRING HEIGHT
	SINGLE STEP HEIGHT
AH	ACCESS HATCH
AHL	ARCH HEAD LEVEL
BLR	BOILER
BOL	BOLLARD
BM	BENCHMARK
BSL	BEAM SOFFIT LEVEL
BSH	BEAM SOFFIT HEIGHT
CAB	CABINET
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CBD	CUPBOARD
CCTV	CCTV CAMERA
CL	CEILING LEVEL
CNT	COUNTER
CH	CEILING HATCH
CL	CEILING LIGHT
CV	CEILING VENT
DH	DOOR HEIGHT
EAVE:00.00	EAVE LEVEL
EM	ELECTRIC METER
EP	ELECTRICAL POLE
FC	FALSE CEILING
FP	FIRE PLACE
FB	FUSE BOARD
FA	FIRE ALARM
FI	FIRE INDICATOR
FE	FIRE EXTINGUISHER
GM	GAS METER
GP	GATE POST
GV	GAS VALVE
GY	GULLY
IC	INSPECTION CHAMBER
KI	STORM WATER INLET
LP	LAMP POST
MH	MANHOLE
—CL:	COVER LEVEL
—IL:	INVERT LEVEL
OHC	OVER HEAD CABLE
OHG	OVERHANG
P	POLE
PAR:00.00	PARAPET LEVEL
P&T	POST & TELECOM
PS	POWER SUPPLY
RAD	RADIATOR
RE	RODDING EYE
RS	ROAD SIGN
RWP	RAIN WATER PIPE
RIDGE:00.00	RIDGE LEVEL
SLV	SHELVING
SL	SKYLIGHT
SV	STOP VALVE
SVP	SOIL VENT PIPE
SUS	SUSPENDED CEILING
SW	SWITCH
ToF:00.00	TOP OF FENCE
ToW:00.00	TOP OF WALL
TP	TELEPHONE POLE
WH	WATER HEATER
WM	WATER MAIN
WT	WATER TANK
WV	WATER VALVE
WL	WALL LAMP
WS	WORK SURFACE
B6 10.45	SURVEY STATION
	TREE DECIDUOUS— trunk (T): spread (S): height (H):
	TREE CONIFEROUS— trunk (T): spread (S): height (H):
	BUSH
ELECTRICAL LAYOUT	
	SINGLE SOCKET
	DOUBLE SOCKET
	TELECOM
	TV
	ALARM
	LIGHTING
UPL	UPLIGHT
	SINGLE SWITCH
	DOUBLE SWITCH

NOTES

All levels to arbitrary datum

-

-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	FULL ISSUE	19/03/2021	DC

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33 GOLDSMITH ROAD
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LAND & MEASURED BUILDING SURVEYS

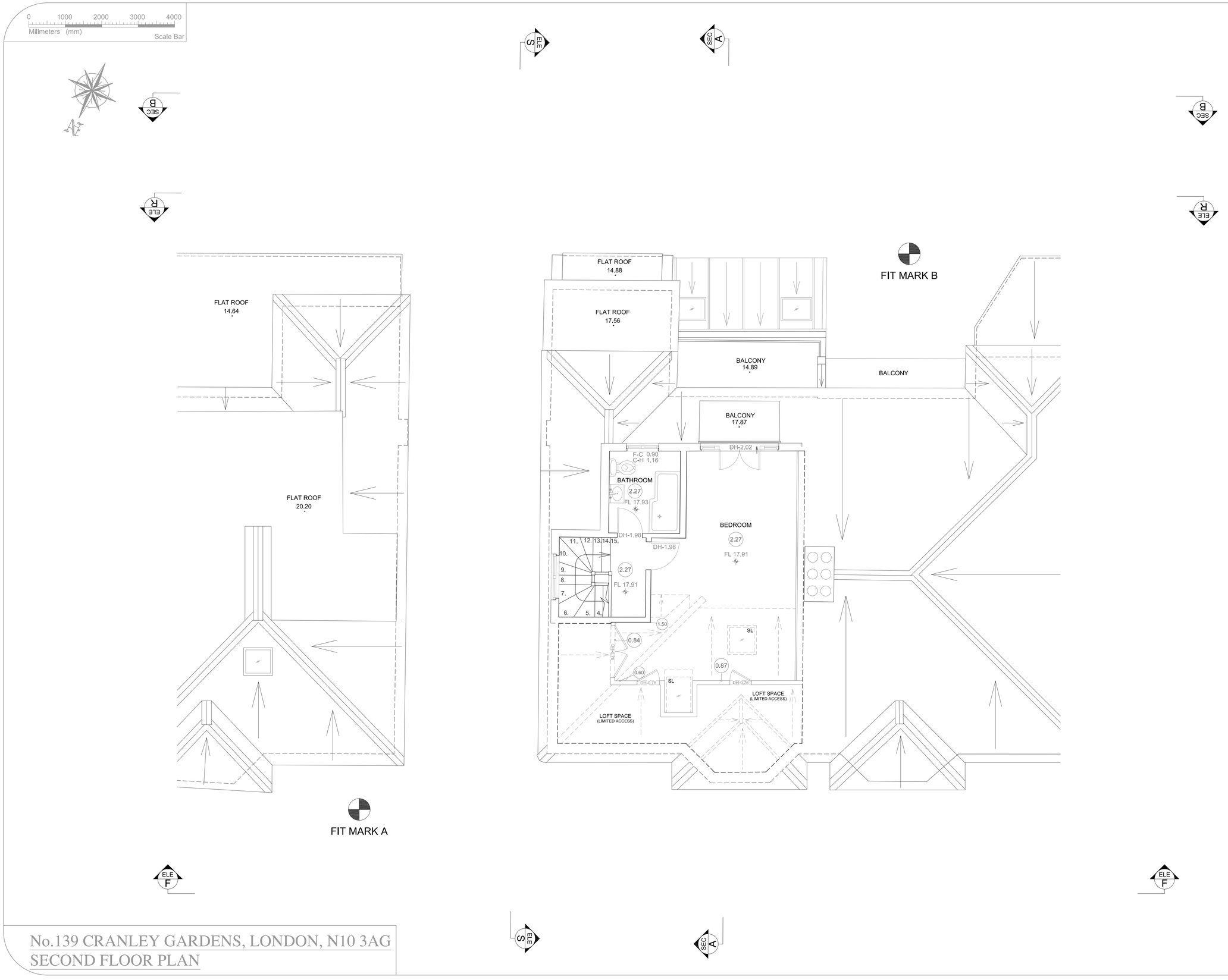
CLIENT
CRAWFORD PARTNERSHIP

PROJECT
No.139 CRANLEY GARDENS, N10

SURVEY TYPE
FLOOR PLAN

Drawn by	LZ	Scale	1:50 A1
Checked by	DC	Job No.	4177
Date	MAR 2021	Dwg No.	4177-04

No.139 CRANLEY GARDENS, LONDON, N10 3AG
FIRST FLOOR PLAN



DO NOT SCALE FROM DRAWING
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ALL DIMENSIONS TO BE CHECKED ON SITE

METRO PLANS SURVEYS

MEASURED BUILDING SURVEY

LEGEND

F–C 0.00	FLOOR TO CILL HEIGHT
C–H 0.00	CILL TO HEAD HEIGHT
⊕	FLOOR TO CEILING HEIGHT
FL 21.80 ⊕	FLOOR LEVEL
0.00sp	SPRING HEIGHT
	SINGLE STEP HEIGHT
AH	ACCESS HATCH
AHL	ARCH HEAD LEVEL
BLR	BOILER
BOL	BOLLARD
BM	BENCHMARK
BSL	BEAM SOFFIT LEVEL
BSH	BEAM SOFFIT HEIGHT
CAB	CABINET
CATV	CABLE TV
CBD	CUPBOARD
CCTV	CCTV CAMERA
CL	CEILING LEVEL
CNT	COUNTER
CH	CEILING HATCH
CL	CEILING LIGHT
CV	CEILING VENT
DH	DOOR HEIGHT
EAVE:00.00	EAVE LEVEL
EM	ELECTRIC METER
EP	ELECTRICAL POLE
FC	FALSE CEILING
FP	FIRE PLACE
FB	FUSE BOARD
FA	FIRE ALARM
FI	FIRE INDICATOR
FE	FIRE EXTINGUISHER
GM	GAS METER
GP	GATE POST
GV	GAS VALVE
GY	GULLY
IC	INSPECTION CHAMBER
KI	STORM WATER INLET
LP	LAMP POST
MH	MANHOLE
–CL:	COVER LEVEL
–IL:	INVERT LEVEL
OHC	OVER HEAD CABLE
OHG	OVERHANG
P	POLE
PAR:00.00	PARAPET LEVEL
P&T	POST & TELECOM
PS	POWER SUPPLY
RAD	RADIATOR
RE	RODDING EYE
RS	ROAD SIGN
RWP	RAIN WATER PIPE
RIDGE:00.00	RIDGE LEVEL
SLV	SHELVING
SL	SKYLIGHT
SV	STOP VALVE
SVP	SOIL VENT PIPE
SUS	SUSPENDED CEILING
SW	SWITCH
ToF:00.00	TOP OF FENCE
ToW:00.00	TOP OF WALL
TP	TELEPHONE POLE
WH	WATER HEATER
WM	WATER MAIN
WT	WATER TANK
WV	WATER VALVE
WL	WALL LAMP
WS	WORK SURFACE
B6 10.45	SURVEY STATION
1.2	TREE DECIDUOUS– trunk (T): spread (S): height (H):
	TREE CONIFEROUS– trunk (T): spread (S): height (H):
	BUSH

ELECTRICAL LAYOUT

	SINGLE SOCKET
	DOUBLE SOCKET
	TELECOM
	TV
	ALARM
	LIGHTING
UPL	UPLIGHT
	SINGLE SWITCH
	DOUBLE SWITCH

NOTES

All levels to arbitrary datum

-

-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	FULL ISSUE	19/03/2021	DC

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33 GOLDSMITH ROAD
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LONDON W3 6PX
TEL NO. + 44 (0) 20 8354 9331
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LAND & MEASURED BUILDING SURVEYS

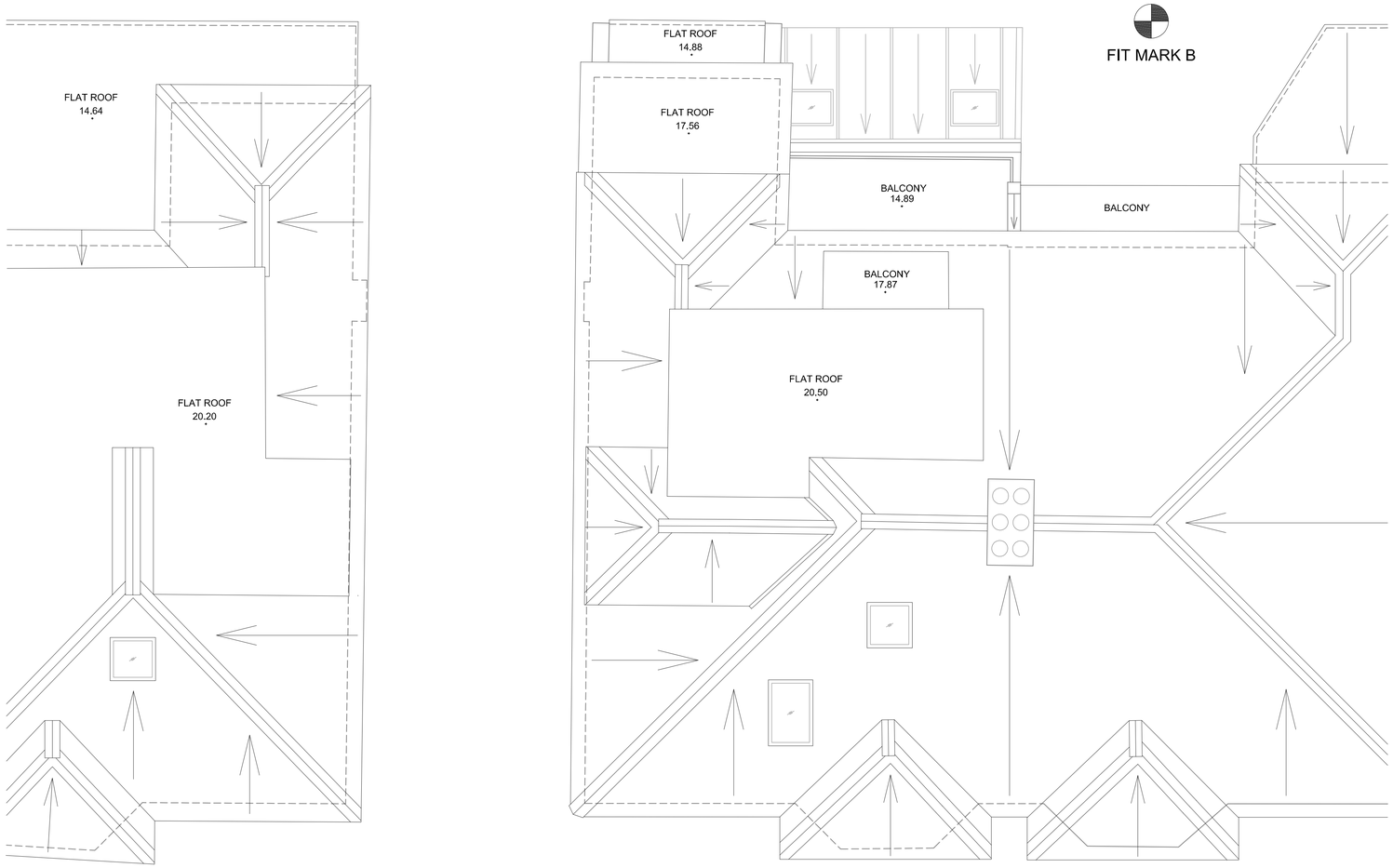
CLIENT
CRAWFORD PARTNERSHIP

PROJECT
No.139 CRANLEY GARDENS, N10

SURVEY TYPE
FLOOR PLAN

Drawn by	LZ	Scale	1:50 A1
Checked by	DC	Job No.	4177
Date	MAR 2021	Dwg No.	4177-05

No.139 CRANLEY GARDENS, LONDON, N10 3AG
SECOND FLOOR PLAN



0 1000 2000 3000 4000
Milimeters (mm)
Scale Bar

DO NOT SCALE FROM DRAWING
DO NOT RE-SCALE DRAWING
ALL DIMENSIONS TO BE CHECKED ON SITE

METRO PLANS SURVEYS

MEASURED BUILDING SURVEY

LEGEND

F–C 0.00	FLOOR TO CILL HEIGHT
C–H 0.00	CILL TO HEAD HEIGHT
⊕	FLOOR TO CEILING HEIGHT
FL 21.80 ⊕	FLOOR LEVEL
0.00sp	SPRING HEIGHT
	SINGLE STEP HEIGHT
AH	ACCESS HATCH
AHL	ARCH HEAD LEVEL
BLR	BOILER
BOL	BOLLARD
BM	BENCHMARK
BSL	BEAM SOFFIT LEVEL
BSH	BEAM SOFFIT HEIGHT
CAB	CABINET
CATV	CABLE TV
CBD	CUPBOARD
CCTV	CCTV CAMERA
CL	CEILING LEVEL
CNT	COUNTER
CH	CEILING HATCH
CL	CEILING LIGHT
CV	CEILING VENT
DH	DOOR HEIGHT
EAVE:00.00	EAVE LEVEL
EM	ELECTRIC METER
EP	ELECTRICAL POLE
FC	FALSE CEILING
FP	FIRE PLACE
FB	FUSE BOARD
FA	FIRE ALARM
FI	FIRE INDICATOR
FE	FIRE EXTINGUISHER
GM	GAS METER
GP	GATE POST
GV	GAS VALVE
GY	GULLY
IC	INSPECTION CHAMBER
KI	STORM WATER INLET
LP	LAMP POST
MH	MANHOLE
–CL:	COVER LEVEL
–IL:	INVERT LEVEL
OHC	OVER HEAD CABLE
OHG	OVERHANG
P	POLE
PAR:00.00	PARAPET LEVEL
P&T	POST & TELECOM
PS	POWER SUPPLY
RAD	RADIATOR
RE	RODDING EYE
RS	ROAD SIGN
RWP	RAIN WATER PIPE
RIDGE:00.00	RIDGE LEVEL
SLV	SHELVING
SL	SKYLIGHT
SV	STOP VALVE
SVP	SOIL VENT PIPE
SUS	SUSPENDED CEILING
SW	SWITCH
ToF:00.00	TOP OF FENCE
ToW:00.00	TOP OF WALL
TP	TELEPHONE POLE
WH	WATER HEATER
WM	WATER MAIN
WT	WATER TANK
WV	WATER VALVE
WL	WALL LAMP
WS	WORK SURFACE
B6 10.45	SURVEY STATION
	TREE DECIDUOUS– trunk (T): spread (S): height (H):
	TREE CONIFEROUS– trunk (T): spread (S): height (H):
	BUSH
ELECTRICAL LAYOUT	
	SINGLE SOCKET
	DOUBLE SOCKET
	TELECOM
	TV
	ALARM
	LIGHTING
UPL	UPLIGHT
	SINGLE SWITCH
	DOUBLE SWITCH

NOTES

All levels to arbitrary datum

-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	FULL ISSUE	19/03/2021	DC

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33 GOLDSMITH ROAD
ACTON
LONDON W3 6PX
TEL NO. + 44 (0) 20 8354 9331

EMAIL: info@metroplans.com
WEB: www.metroplans.com

LAND & MEASURED BUILDING SURVEYS

CLIENT
CRAWFORD PARTNERSHIP

PROJECT
No.139 CRANLEY GARDENS, N10

SURVEY TYPE
ROOF PLAN

Drawn by	TZ	Scale	1:50 A1
Checked by	DC	Job No.	4177
Date	MAR 2021	Dwg No.	4177-06

No.139 CRANLEY GARDENS, LONDON, N10 3AG
ROOF PLAN

0 1000 2000 3000 4000
Milimeters (mm)
Scale Bar

FIT MARK A

Datum Line 5.00m

5.00

No.139 CRANLEY GARDENS, LONDON, N10 3AG
FRONT ELEVATION

DO NOT SCALE FROM DRAWING
DO NOT RE-SCALE DRAWING
ALL DIMENSIONS TO BE CHECKED ON SITE

METRO PLANS SURVEYS

MEASURED BUILDING SURVEY

LEGEND

F–C 0.00	FLOOR TO CILL HEIGHT
C–H 0.00	CILL TO HEAD HEIGHT
↔	FLOOR TO CEILING HEIGHT
FL 21.80	FLOOR LEVEL
0.00sp	SPRING HEIGHT
	SINGLE STEP HEIGHT
AH	ACCESS HATCH
AHL	ARCH HEAD LEVEL
BLR	BOILER
BOL	BOLLARD
BM	BENCHMARK
BSL	BEAM SOFFIT LEVEL
BSH	BEAM SOFFIT HEIGHT
CAB	CABINET
CATV	CABLE TV
CBD	CUPBOARD
CCTV	CCTV CAMERA
CL	CEILING LEVEL
CNT	COUNTER
CH	CEILING HATCH
CL	CEILING LIGHT
CV	CEILING VENT
DH	DOOR HEIGHT
EAVE:00.00	EAVE LEVEL
EM	ELECTRIC METER
EP	ELECTRICAL POLE
FC	FALSE CEILING
FP	FIRE PLACE
FB	FUSE BOARD
FA	FIRE ALARM
FI	FIRE INDICATOR
FE	FIRE EXTINGUISHER
GM	GAS METER
GP	GATE POST
GV	GAS VALVE
GY	GULLY
IC	INSPECTION CHAMBER
KI	STORM WATER INLET
LP	LAMP POST
MH	MANHOLE
–CL:	COVER LEVEL
–IL:	INVERT LEVEL
OHC	OVER HEAD CABLE
OHG	OVERHANG
P	POLE
PAR:00.00	PARAPET LEVEL
P&T	POST & TELECOM
PS	POWER SUPPLY
RAD	RADIATOR
RE	RODDING EYE
RS	ROAD SIGN
RWP	RAIN WATER PIPE
RIDGE:00.00	RIDGE LEVEL
SLV	SHELVING
SL	SKYLIGHT
SV	STOP VALVE
SVP	SOIL VENT PIPE
SUS	SUSPENDED CEILING
SW	SWITCH
ToF:00.00	TOP OF FENCE
ToW:00.00	TOP OF WALL
TP	TELEPHONE POLE
WH	WATER HEATER
WM	WATER MAIN
WT	WATER TANK
WV	WATER VALVE
WL	WALL LAMP
WS	WORK SURFACE
B6 10.45	SURVEY STATION
	TREE DECIDUOUS– trunk (T): spread (S): height (H):
	TREE CONIFEROUS– trunk (T): spread (S): height (H):
	BUSH

ELECTRICAL LAYOUT

	SINGLE SOCKET
	DOUBLE SOCKET
	TELECOM
	TV
	ALARM
	LIGHTING
UPL	UPLIGHT
	SINGLE SWITCH
	DOUBLE SWITCH

NOTES

All levels to arbitrary datum

-

-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	FULL ISSUE	19/03/2021	DC

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PROJECT
No.139 CRANLEY GARDENS, N10

SURVEY TYPE
ELEVATION

Drawn by	TZ	Scale	1:50 A1
Checked by	DC	Job No.	4177
Date	MAR 2021	Dwg No.	4177-07

0 1000 2000 3000 4000
Milimeters (mm)
Scale Bar

FIT MARK B

Datum Line 5.00m

5.00

DO NOT SCALE FROM DRAWING
DO NOT RE-SCALE DRAWING
ALL DIMENSIONS TO BE CHECKED ON SITE

METRO PLANS SURVEYS

MEASURED BUILDING SURVEY

LEGEND

F–C 0.00	FLOOR TO CILL HEIGHT
C–H 0.00	CILL TO HEAD HEIGHT
⇔	FLOOR TO CEILING HEIGHT
FL 21.80 ⊕	FLOOR LEVEL
0.00sp	SPRING HEIGHT
⊢⊣	SINGLE STEP HEIGHT
AH	ACCESS HATCH
AHL	ARCH HEAD LEVEL
BLR	BOILER
BOL	BOLLARD
BM	BENCHMARK
BSL	BEAM SOFFIT LEVEL
BSH	BEAM SOFFIT HEIGHT
CAB	CABINET
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DH	DOOR HEIGHT
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EM	ELECTRIC METER
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FB	FUSE BOARD
FA	FIRE ALARM
FI	FIRE INDICATOR
FE	FIRE EXTINGUISHER
GM	GAS METER
GP	GATE POST
GV	GAS VALVE
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IC	INSPECTION CHAMBER
KI	STORM WATER INLET
LP	LAMP POST
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P	POLE
PAR:00.00	PARAPET LEVEL
P&T	POST & TELECOM
PS	POWER SUPPLY
RAD	RADIATOR
RE	RODDING EYE
RS	ROAD SIGN
RWP	RAIN WATER PIPE
RIDGE:00.00	RIDGE LEVEL
SLV	SHELVING
SL	SKYLIGHT
SV	STOP VALVE
SVP	SOIL VENT PIPE
SUS	SUSPENDED CEILING
SW	SWITCH
ToF:00.00	TOP OF FENCE
ToW:00.00	TOP OF WALL
TP	TELEPHONE POLE
WH	WATER HEATER
WM	WATER MAIN
WT	WATER TANK
WV	WATER VALVE
WL	WALL LAMP
WS	WORK SURFACE
B6 1045	SURVEY STATION
12	TREE DECIDUOUS– trunk (T): spread (S): height (H):
12	TREE CONIFEROUS– trunk (T): spread (S): height (H):
	BUSH

ELECTRICAL LAYOUT

	SINGLE SOCKET
	DOUBLE SOCKET
	TELECOM
	TV
	ALARM
	LIGHTING
UPL	UPLIGHT
	SINGLE SWITCH
	DOUBLE SWITCH

NOTES

All levels to arbitrary datum

-

-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	FULL ISSUE	19/03/2021	DC

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33 GOLDSMITH ROAD
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TEL NO. + 44 (0) 20 8354 9331

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WEB: www.metroplans.com

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PROJECT
No.139 CRANLEY GARDENS, N10

SURVEY TYPE
ELEVATION

Drawn by	TZ	Scale	1:50 A1
Checked by	DC	Job No.	4177
Date	MAR 2021	Dwg No.	4177-08

No.139 CRANLEY GARDENS, LONDON, N10 3AG
REAR ELEVATION

0 1000 2000 3000 4000
Milimeters (mm)
Scale Bar

FIT MARK A

Datum Line 5.00m

5.00

DO NOT SCALE FROM DRAWING
DO NOT RE-SCALE DRAWING
ALL DIMENSIONS TO BE CHECKED ON SITE

METRO PLANS SURVEYS

MEASURED BUILDING SURVEY

LEGEND

F–C 0.00	FLOOR TO CILL HEIGHT
C–H 0.00	CILL TO HEAD HEIGHT
⊕	FLOOR TO CEILING HEIGHT
FL 21.80 ⊕	FLOOR LEVEL
0.00sp	SPRING HEIGHT
⊕	SINGLE STEP HEIGHT
AH	ACCESS HATCH
AHL	ARCH HEAD LEVEL
BLR	BOILER
BOL	BOLLARD
BM	BENCHMARK
BSL	BEAM SOFFIT LEVEL
BSH	BEAM SOFFIT HEIGHT
CAB	CABINET
CATV	CABLE TV
CBD	CUPBOARD
CCTV	CCTV CAMERA
CL	CEILING LEVEL
CNT	COUNTER
CH	CEILING HATCH
CL	CEILING LIGHT
CV	CEILING VENT
DH	DOOR HEIGHT
EAVE:00.00	EAVE LEVEL
EM	ELECTRIC METER
EP	ELECTRICAL POLE
FC	FALSE CEILING
FP	FIRE PLACE
FB	FUSE BOARD
FA	FIRE ALARM
FI	FIRE INDICATOR
FE	FIRE EXTINGUISHER
GM	GAS METER
GP	GATE POST
GV	GAS VALVE
GY	GULLY
IC	INSPECTION CHAMBER
KI	STORM WATER INLET
LP	LAMP POST
MH	MANHOLE
–CL:	COVER LEVEL
–IL:	INVERT LEVEL
OHC	OVER HEAD CABLE
OHG	OVERHANG
P	POLE
PAR:00.00	PARAPET LEVEL
P&T	POST & TELECOM
PS	POWER SUPPLY
RAD	RADIATOR
RE	RODDING EYE
RS	ROAD SIGN
RWP	RAIN WATER PIPE
RIDGE:00.00	RIDGE LEVEL
SLV	SHELVING
SL	SKYLIGHT
SV	STOP VALVE
SVP	SOIL VENT PIPE
SUS	SUSPENDED CEILING
SW	SWITCH
ToF:00.00	TOP OF FENCE
ToW:00.00	TOP OF WALL
TP	TELEPHONE POLE
WH	WATER HEATER
WM	WATER MAIN
WT	WATER TANK
WV	WATER VALVE
WL	WALL LAMP
WS	WORK SURFACE
B6 10.45	SURVEY STATION
	TREE DECIDUOUS– trunk (T): spread (S): height (H):
	TREE CONIFEROUS– trunk (T): spread (S): height (H):
	BUSH

ELECTRICAL LAYOUT

	SINGLE SOCKET
	DOUBLE SOCKET
	TELECOM
	TV
	ALARM
	LIGHTING
UPL	UPLIGHT
	SINGLE SWITCH
	DOUBLE SWITCH

NOTES

All levels to arbitrary datum

-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	FULL ISSUE	19/03/2021	DC

METRO PLANS
33 GOLDSMITH ROAD
ACTON
LONDON W3 6PX
TEL NO. + 44 (0) 20 8354 9331
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SURVEY TYPE
ELEVATION

Drawn by	TZ	Scale	1:50 A1
Checked by	DC	Job No.	4177
Date	MAR 2021	Dwg No.	4177-09

No.139 CRANLEY GARDENS, LONDON, N10 3AG
SIDE ELEVATION

0 1000 2000 3000 4000
Milimeters (mm)
Scale Bar

DO NOT SCALE FROM DRAWING
DO NOT RE-SCALE DRAWING
ALL DIMENSIONS TO BE CHECKED ON SITE

METRO PLANS SURVEYS

MEASURED BUILDING SURVEY

LEGEND

F–C 0.00	FLOOR TO CILL HEIGHT
C–H 0.00	CILL TO HEAD HEIGHT
F–F	FLOOR TO CEILING HEIGHT
FL 21.80	FLOOR LEVEL
0.00sp	SPRING HEIGHT
	SINGLE STEP HEIGHT
AH	ACCESS HATCH
AHL	ARCH HEAD LEVEL
BLR	BOILER
BOL	BOLLARD
BM	BENCHMARK
BSL	BEAM SOFFIT LEVEL
BSH	BEAM SOFFIT HEIGHT
CAB	CABINET
CATV	CABLE TV
CBD	CUPBOARD
CCTV	CCTV CAMERA
CL	CEILING LEVEL
CNT	COUNTER
CH	CEILING HATCH
CL	CEILING LIGHT
CV	CEILING VENT
DH	DOOR HEIGHT
EAVE:00.00	EAVE LEVEL
EM	ELECTRIC METER
EP	ELECTRICAL POLE
FC	FALSE CEILING
FP	FIRE PLACE
FB	FUSE BOARD
FA	FIRE ALARM
FI	FIRE INDICATOR
FE	FIRE EXTINGUISHER
GM	GAS METER
GP	GATE POST
GV	GAS VALVE
GY	GULLY
IC	INSPECTION CHAMBER
KI	STORM WATER INLET
LP	LAMP POST
MH	MANHOLE
–CL:	COVER LEVEL
–IL:	INVERT LEVEL
OHC	OVER HEAD CABLE
OHG	OVERHANG
P	POLE
PAR:00.00	PARAPET LEVEL
P&T	POST & TELECOM
PS	POWER SUPPLY
RAD	RADIATOR
RE	RODDING EYE
RS	ROAD SIGN
RWP	RAIN WATER PIPE
RIDGE:00.00	RIDGE LEVEL
SLV	SHELVING
SL	SKYLIGHT
SV	STOP VALVE
SVP	SOIL VENT PIPE
SUS	SUSPENDED CEILING
SW	SWITCH
ToF:00.00	TOP OF FENCE
ToW:00.00	TOP OF WALL
TP	TELEPHONE POLE
WH	WATER HEATER
WM	WATER MAIN
WT	WATER TANK
WV	WATER VALVE
WL	WALL LAMP
WS	WORK SURFACE
B6 10.45	SURVEY STATION
	TREE DECIDUOUS– trunk (T): spread (S): height (H):
	TREE CONIFEROUS– trunk (T): spread (S): height (H):
	BUSH
ELECTRICAL LAYOUT	
	SINGLE SOCKET
	DOUBLE SOCKET
	TELECOM
	TV
	ALARM
	LIGHTING
	UPLIGHT
	SINGLE SWITCH
	DOUBLE SWITCH

NOTES

All levels to arbitrary datum
-

-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	FULL ISSUE	19/03/2021	DC

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33 GOLDSMITH ROAD
ACTON
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WEB: www.metroplans.com
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PROJECT
No.139 CRANLEY GARDENS, N10

SURVEY TYPE
SECTION

Drawn by	LZ	Scale	1:50 A1
Checked by	DC	Job No.	4177
Date	MAR 2021	Dwg No.	4177-10

No.139 CRANLEY GARDENS, LONDON, N10 3AG
SECTION A-A

0 1000 2000 3000 4000
Milimeters (mm)
Scale Bar

FIT MARK B

Datum Line 5.00m

5.00

DO NOT SCALE FROM DRAWING
DO NOT RE-SCALE DRAWING
ALL DIMENSIONS TO BE CHECKED ON SITE

METRO PLANS SURVEYS

MEASURED BUILDING SURVEY

LEGEND

F–C 0.00	FLOOR TO CILL HEIGHT
C–H 0.00	CILL TO HEAD HEIGHT
⊕	FLOOR TO CEILING HEIGHT
FL 21.80 ⊕	FLOOR LEVEL
0.00sp	SPRING HEIGHT
⊕	SINGLE STEP HEIGHT
AH	ACCESS HATCH
AHL	ARCH HEAD LEVEL
BLR	BOILER
BOL	BOLLARD
BM	BENCHMARK
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FE	FIRE EXTINGUISHER
GM	GAS METER
GP	GATE POST
GV	GAS VALVE
GY	GULLY
IC	INSPECTION CHAMBER
KI	STORM WATER INLET
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OHG	OVERHANG
P	POLE
PAR:00.00	PARAPET LEVEL
P&T	POST & TELECOM
PS	POWER SUPPLY
RAD	RADIATOR
RE	RODDING EYE
RS	ROAD SIGN
RWP	RAIN WATER PIPE
RIDGE:00.00	RIDGE LEVEL
SLV	SHELVING
SL	SKYLIGHT
SV	STOP VALVE
SVP	SOIL VENT PIPE
SUS	SUSPENDED CEILING
SW	SWITCH
ToF:00.00	TOP OF FENCE
ToW:00.00	TOP OF WALL
TP	TELEPHONE POLE
WH	WATER HEATER
WM	WATER MAIN
WT	WATER TANK
WV	WATER VALVE
WL	WALL LAMP
WS	WORK SURFACE
B6 / 10.45	SURVEY STATION
	TREE DECIDUOUS– trunk (T): spread (S): height (H):
	TREE CONIFEROUS– trunk (T): spread (S): height (H):
	BUSH
ELECTRICAL LAYOUT	
	SINGLE SOCKET
	DOUBLE SOCKET
	TELECOM
	TV
	ALARM
	LIGHTING
UPL	UPLIGHT
	SINGLE SWITCH
	DOUBLE SWITCH

NOTES

All levels to arbitrary datum

-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	FULL ISSUE	19/03/2021	DC

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LAND & MEASURED BUILDING SURVEYS

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PROJECT
No.139 CRANLEY GARDENS, N10

SURVEY TYPE
SECTION

Drawn by	LZ	Scale	1:50 A1
Checked by	DC	Job No.	4177
Date	MAR 2021	Dwg No.	4177-11

No.139 CRANLEY GARDENS, LONDON, N10 3AG
SECTION B-B

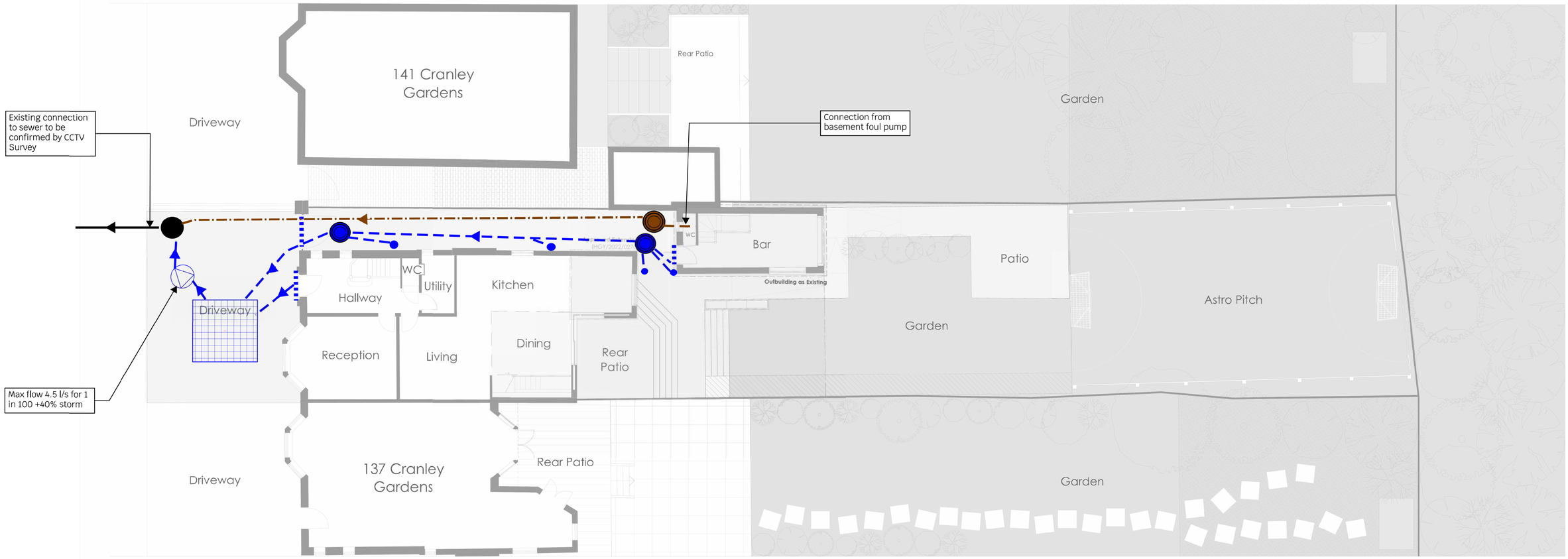
SYMMETRYS
STRUCTURAL / CIVIL ENGINEERS

APPENDIX C
OUTLINE DRAINAGE STRATEGY

KEY

- 100mm dia Surface Water Drain @ 1:100 UNO
- 100mm dia Foul Water Drain @ 1:40 UNO
- Existing Combined Water Sewer
- Proposed 450mm dia Surface Water PPIC
- Proposed 450mm dia Foul Water PPIC
- 8m3 attenuation tank with 95% porosity.
- SVP/SS — Proposed Soil Vent Pipe/Stub Stack
- RWP — Proposed Rainwater Pipe
- CH — Linear Channel
- Existing Manhole
- Flow control chamber

NOTES
1. DESIGN SUBJECT TO COMPLETION OF CCTV DRAINAGE SURVEY
2. DRAINAGE POINTS SHOWND INDICATIVELY ONLY
3. SUBJECT TO LLFA APPROVAL
4. 50% REDUCTION OF THE EXISTING RUNOFF RATES FOR A TOTAL CATCHMENT AREA OF 310sqm UP TO THE 1 IN 100 FOR 40% CLIMATE CHANGE EVENT.



SYMMETRYS
STRUCTURAL / CIVIL ENGINEERS

21066-SYM-C-Sk002-Rev A
SUDS Strategy
139 Cranley Garden
YP
1:100
06/04/2023

APPENDIX D
CALCULATIONS

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	5	PIMP (%)	100
M5-60 (mm)	21.000	Add Flow / Climate Change (%)	0
Ratio R	0.437	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)
0-4	0.031

Total Area Contributing (ha) = 0.031

Total Pipe Volume (m³) = 0.265

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	6.089	0.085	71.6	0.031	2.00	0.0	0.600	o	150	Pipe/Conduit	
S1.001	3.719	0.064	58.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.002	2.597	0.026	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.003	2.597	0.026	99.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	2.09	11.000	0.031	0.0	0.0	0.0	1.19	21.0	4.2
S1.001	50.00	2.13	10.915	0.031	0.0	0.0	0.0	1.32	23.4	4.2
S1.002	50.00	2.18	10.851	0.031	0.0	0.0	0.0	1.00	17.8	4.2
S1.003	50.00	2.22	10.825	0.031	0.0	0.0	0.0	1.01	17.8	4.2

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.031	0.031	0.031
1.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.031	0.031	0.031

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	5	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	21.000	Storm Duration (mins)	30
Ratio R	0.437		

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S4, DS/PN: S1.002, Volume (m³): 0.2

Unit Reference	MD-SHE-0102-4500-0900-4500
Design Head (m)	0.900
Design Flow (l/s)	4.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	102
Invert Level (m)	10.851
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	**Head (m)**	**Flow (l/s)**
Design Point (Calculated)	0.900	4.5
Flush-Flo™	0.269	4.5
Kick-Flo®	0.585	3.7
Mean Flow over Head Range	-	3.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**
0.100	3.4	1.200	5.1	3.000	7.9	7.000	11.8
0.200	4.4	1.400	5.5	3.500	8.5	7.500	12.2
0.300	4.5	1.600	5.9	4.000	9.0	8.000	12.6
0.400	4.4	1.800	6.2	4.500	9.6	8.500	13.0
0.500	4.2	2.000	6.5	5.000	10.1	9.000	13.3
0.600	3.7	2.200	6.8	5.500	10.5	9.500	13.6
0.800	4.3	2.400	7.1	6.000	11.0		
1.000	4.7	2.600	7.4	6.500	11.4		

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Storage Structures for Storm

Cellular Storage Manhole: S3, DS/PN: S1.001

Invert Level (m) 10.915 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	8.0	8.0	1.001	0.0	19.3
1.000	8.0	19.3			

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.436
Region England and Wales Cv (Summer) 0.900
M5-60 (mm) 20.700 Cv (Winter) 0.900

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status OFF
DVD Status ON
Inertia Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.000	S1	15 minute 1 year Summer I+0%	12.000	11.068	-0.082	0.000	0.42
S1.001	S3	15 minute 1 year Summer I+0%	12.000	11.022	-0.043	0.000	0.24
S1.002	S4	15 minute 1 year Summer I+0%	12.000	11.016	0.015	0.000	0.34
S1.003	S4	15 minute 1 year Summer I+0%	12.000	10.885	-0.090	0.000	0.34

PN	US/MH Name	Overflow (l/s)	Infil. Flow (l/s)	Infil. Vol (m³)	Maximum Vol (m³)	Discharge Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1				0.004	2.306		7.4	OK
S1.001	S3		0.0	0.000	0.870	2.306	6	3.8	OK
S1.002	S4				0.070	2.306		3.7	SURCHARGED
S1.003	S4				0.021	2.306		3.7	OK

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.436
Region England and Wales Cv (Summer) 0.900
M5-60 (mm) 20.700 Cv (Winter) 0.900

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status OFF
DVD Status ON
Inertia Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.000	S1	15 minute 30 year Summer I+0%	12.000	11.283	0.133	0.000	0.97
S1.001	S3	15 minute 30 year Summer I+0%	12.000	11.269	0.204	0.000	0.30
S1.002	S4	30 minute 30 year Summer I+0%	12.000	11.434	0.434	0.000	0.41
S1.003	S4	15 minute 30 year Summer I+0%	12.000	10.892	-0.083	0.000	0.41

PN	US/MH Name	Overflow (l/s)	Infil. Flow (l/s)	Infil. Vol (m³)	Maximum Vol (m³)	Discharge Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1				0.020	5.662		17.0	SURCHARGED
S1.001	S3		0.0	0.000	2.850	5.662	11	4.8	SURCHARGED
S1.002	S4				0.150	7.261		4.4	SURCHARGED
S1.003	S4				0.024	5.661		4.5	OK

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.436
Region England and Wales Cv (Summer) 0.900
M5-60 (mm) 20.700 Cv (Winter) 0.900

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status OFF
DVD Status ON
Inertia Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.000	S1	30 minute 100 year Summer I+40%	12.000	11.771	0.621	0.000	1.32
S1.001	S3	30 minute 100 year Summer I+40%	12.000	11.764	0.699	0.000	0.33
S1.002	S4	30 minute 100 year Summer I+40%	12.000	11.930	0.930	0.000	0.41
S1.003	S4	30 minute 100 year Summer I+40%	12.000	10.892	-0.083	0.000	0.41

PN	US/MH Name	Overflow (l/s)	Infil. Flow (l/s)	Infil. Vol (m³)	Maximum Vol (m³)	Discharge Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1				0.054	13.331		23.2	FLOOD RISK
S1.001	S3		0.0	0.000	6.690	13.202	20	5.2	FLOOD RISK
S1.002	S4				0.229	13.189		4.5	FLOOD RISK
S1.003	S4				0.024	13.180		4.5	OK

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APPENDIX E
SUDS PROFORMA

Haringey LONDON

GREATER**LONDON**AUTHORITY

LoDEG

1. Project & Site Details	
Project / Site Name (including sub-catchment / stage / phase where appropriate)	139 Cranley Gardens
Address & post code	139 Cranley Gardens, London N10 3AH
OS Grid ref. (Easting, Northing)	E 529257
	N 189072
LPA reference (if applicable)	
Brief description of proposed work	basement extension to implement a new gym, swimming pool, sauna room, plant room and bathroom.
Total site Area	590 m^2
Total existing impervious area	310 m^2
Total proposed impervious area	310 m^2
Is the site in a surface water flood risk catchment (ref. local Surface Water Management Plan)?	yes
Existing drainage connection type and location	assumed connection to surface water sewer at Cranley Gardens
Designer Name	Yare Perez
Designer Position	Senior Civil Engineer
Designer Company	Symmetrys

2. Proposed Discharge Arrangements

2a. Infiltration Feasibility

Superficial geology classification	none
Bedrock geology classification	London Clay
Site infiltration rate	0 m/s
Depth to groundwater level	m below ground level
Is infiltration feasible?	no

2b. Drainage Hierarchy

	Feasible (Y/N)	*Proposed (Y/N)*
1 store rainwater for later use	Y	N
2 use infiltration techniques, such as porous surfaces in non-clay areas	N	N
3 attenuate rainwater in ponds or open water features for gradual release		N
4 attenuate rainwater by storing in tanks or sealed water features for gradual release	Y	Y
5 discharge rainwater direct to a watercourse	N	N
6 discharge rainwater to a surface water sewer/drain	Y	Y
7 discharge rainwater to the combined sewer.	N	N

2c. Proposed Discharge Details

Proposed discharge location	sewer at Cranley Gardens
Has the owner/regulator of the discharge location been consulted?	NO

3. Drainage Strategy

3a. Discharge Rates & Required Storage				
	Greenfield (GF) runoff rate (l/s)	*Existing discharge rate (l/s)*	*Required storage for GF rate (m^3)*	*Proposed discharge rate (l/s)*
Qbar	0.26			
1 in 1	0.22	2.97	2	3.7
1 in 30	0.6	6.47	12	4.5
1 in 100	0.82	8.7	13	4.5
1 in 100 + CC			14	4.5
Climate change allowance used		40%		
3b. Principal Method of Flow Control				

3c. Proposed SuDS Measures			
	Catchment area (m^2)	*Plan area (m^2)*	*Storage vol. (m^3)*
Rainwater harvesting	0		0
Infiltration systems	0		0
Green roofs	0	0	0
Blue roofs	0	0	0
Filter strips	0	0	0
Filter drains	0	0	0
Bioretention / tree pits	0	0	0
Pervious pavements	0	0	0
Swales	0	0	0
Basins/ponds	0	0	0
Attenuation tanks	310		8
Total	**310**	**0**	**8**

4. Supporting Information

4a. Discharge & Drainage Strategy	*Page/section of drainage report*
Infiltration feasibility (2a) – geotechnical factual and interpretive reports, including infiltration results	15 / 10.6.2
Drainage hierarchy (2b)	15 / 10.6.2
Proposed discharge details (2c) – utility plans, correspondence / approval from owner/regulator of discharge location	n/a
Discharge rates & storage (3a) – detailed hydrologic and hydraulic calculations	15/10.8
Proposed SuDS measures & specifications (3b)	15/10.8

4b. Other Supporting Details	*Page/section of drainage report*
Detailed Development Layout	BIA Report - Appendix A
Detailed drainage design drawings, including exceedance flow routes	Appendix C
Detailed landscaping plans	BIA Report - Appendix A
Maintenance strategy	16 / 10.9
Demonstration of how the proposed SuDS measures improve:	15 / 10.6.2
a) water quality of the runoff?	
b) biodiversity?	
c) amenity?	

CONTINUE THE CONVERSATION

TO DISCUSS YOUR PROJECT WITH US
PLEASE GET IN TOUCH ON 020 8340 4041
OR EMAIL US AT INFO@SYMMETRYS.COM