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Development • Planning • Environment

Hillingdon Water Sports Facility and Activity Centre, Broadwater Lake, Harefield

Surface Water Drainage Proposal

Clarification Note

Project ref:	5784 Broadwater Lake, Harefield
Prepared by:	Kevin Tilford BSc (Hons) MSc (Eng) PhD MBA C.WEM FCIWEM CEnv *Managing Director* Duncan Nicholls BSc (Hons) *Principal Flood Risk Consultant*
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Background

1. A planning application for the "*Redevelopment of the site to create the Hillingdon Watersports Facility and Activity Centre …..*" was submitted to Hillingdon Council on 6 October 2023. The application was validated on 14 November 2023 with the planning reference 2382/APP/2023/2906.

2. The application was accompanied by a Flood Risk, Drainage and Sequential Assessment report ("the 2023 FRA report") prepared by Weetwood Services Ltd (Report ref: 5784/FRDSA/Final/v1.0/2023-09-26).

3. The submitted scheme was subsequently revised in response to feedback from consultees across a range of technical disciplines. In respect of flood risk, the most significant change was the removal of the proposal to extend the northern part of the peninsula. In addition, the area of land reclamation was substantially reduced and the proposals for some of the existing islands in the lake were revised. The revised proposal results in an overall increase in the open water area of 716 sq m.

4. An updated FRA report to suit the amended proposal was submitted in August 2025 (Report ref: 5784/FRDSA/Final/v2.1/2025-08-12) ("the 2025 FRA report").

Environment Agency Objection

5. The Environment Agency (EA) objected to the proposal by way of a consultation letter dated 9 January 2026 (Ref. NE/2023/136465/02) based on a concern that the increase in the area of open water could lead to an increase in flood risk downstream of the site. The consultation letter also referenced an outfall from the lake to the River Colne although this point is believed to be informative rather than a point of objection.

Response to the Objection

6. By way of context, Broadwater Lake is a man-made gravel pit. Water levels are sustained due to hydraulic connectively with the underlying aquifer, and with the River Colne through the gravel bank between the river and the lake. As such, the lake is not a traditional online impounding reservoir, i.e. it does not have an inflow, an outflow, and a raised retaining structure.

7. As stated in para. 3 above the revised proposals ensure that the overall amount of fill does not exceed the amount of cut, specifically so that the proposal would not increase flood risk elsewhere (which may have been the case if the proposal resulted in a reduction in the storage volume of the lake).

8. Broadwater Lake currently has an open water area 639,654 sq m (63.965 ha). As set out in the 2025 FRA report, the revised proposal will result in an increase in the area of open water of 716 sq m (0.072 ha). This corresponds to a 0.11% increase in the open water area of the lake.

9. To assess the impact that the proposal will have on flood risk elsewhere, the latest (2025) EA river model of the Upper Colne was obtained from the EA.

10. The model is a linked 1D-2D model developed by AECOM using the Flood Modeller Pro (1D) and TUFLOW (2D) modelling platforms. The use of 1D and 2D domains enables river channels and hydraulic structures to be represented (in 1D) whilst allowing floodplain flow routes (including Broadwater Lake) to also be modelled (in 2D).

11. The 2025 Upper Colne model covers approximately 90 km of watercourse and takes many days to simulate design flood events. To enable the model to run in more reasonable timescales (hours vs days) the 2025 model was truncated at a point 3 km upstream of Broadwater Lake. A comparison of outputs from the full and truncated models for the current (baseline) scenario confirms that outputs from the truncated model closely replicate the original model outputs.

12. All modelling presented herein is based on the EA's 2025 Upper Colne model (not the 2010 model), using a validated truncated version of the model.

13. The 2025 model represents Broadwater Lake in the 2D floodplain as the water surface of the lake. Accordingly, the truncated 2025 model was amended to represent the proposed (post development) scenario as follows:

    a) Removal of one island: The removed island was set entirely to the existing lake level in the model;

    b) Reduction in above the water line extent of two islands: The two islands were reduced to existing lake level only in the areas where they are proposed to be altered.

    c) New slipway and other infrastructure in an area that is currently below lake water level: The model geometry was updated to represent the infilling.

14. The changes outlined in (a) and (b) above increase the volume available for flood water to be stored in the lake during times of high flows in the River Colne, whilst the change outlined in (c) reduces the volume available.

15. A comparison of outputs from the baseline and proposed scenario models for the 1% AEP + 21% climate change event (the design flood event) (refer **Annex 1**) demonstrates that peak lake water levels for the proposed scenario are within 0.5 mm of the peak lake water levels for the existing scenario.

16. The reason that the effect of the proposal is negligible is because the increase in volume stored at any given level due to the proposal is insignificant compared to the total volume of water in the lake.

17. Para. 7-001 of the Planning Practice Guidance (PPG) defines flood risk to be "*a combination of the probability and the potential consequences of flooding*". Based on this definition of flood risk, and given that the negligible potential maximum increase in flood level, it is concluded that that the proposal would not increase downstream flood risk for the 1% AEP + 21% climate change event (the design flood event).

18. **Whilst the risk of a failure of the river banks between the River Colne and the lake, or of the causeway along the southwest end of the lake cannot be disregarded, it is concluded that the proposal would not increase the risk of failure. Accordingly, it is concluded that in accordance with the PPG definition of flood risk, the proposals would not increase flood risk elsewhere, e.g. due to overtopping or a breach in the lake banks, and as such, the proposals fully comply with para. 181 of the National Planning Policy Framework[1].**

Details of the Outfall Pipe

19. The outfall pipe the EA letter refers to is located in the southwest corner of the lake. According to a site inspection and the topographical survey (refer **Annex 2**), the outfall is a 360 mm diameter concrete pipe with no outlet control. The pipe has an inlet invert on the lake side of 36.96 m AOD (soffit level 37.32 m AOD) and an outlet invert level on the river side of 36.77 m AOD (soffit level 37.13 m AOD).

20. The inlet and outlet of the pipe comprise substantial concrete headwalls.

[1] The principle of this conclusion is supported by the Inspector's decision for a recent planning appeal (ref. APP/D0121/W/24/3343144 - Land at Rectory Farm, Chescombe Road, Yatton) in which the Inspector stated (in para. 97) "*At the Inquiry, the Council and the EA agreed with the appellant that an additional flood depth of 17 mm would not cause any additional dwellings to be flooded. Moreover, neither the Council nor the EA could point to any practical consequences of such an increase in terms of the risks faced by those affected. This is not to minimize the impacts of flooding, which I comment on further below. Nevertheless, the Framework seeks to ensure that development does not increase flood risk elsewhere. It has not been shown that an increase in depth of 17 mm would materially affect flood risk in circumstances where no additional dwellings would be affected. Consequently, notwithstanding the views of the EA, I conclude that the proposal would not increase the risk of tidal flooding on adjoining land*." The Inspector concludes (para. 182) "*Fourth, I have concluded that the proposal would not increase flood risk on adjoining land*."

21. The outfall pipe is not included in either the 2010 or 2025 model provided by the EA for the River Colne. As the outfall pipe has no control and operates as an overflow for the lake only when lake levels exceed the upstream invert level, and the downstream level is not restricted from discharging due to raised river levels, this is considered appropriate. The outfall pipe is not the only means of water moving between the lake and river (referrer to paragraph 6). Given the scale of the pipe relative to the River Colne the lack of this feature being explicitly included in the EA 2025 river model will have no material influence on flood levels in the river or the lake.

22. Outputs from the 2025 Upper Colne model indicate that the peak in-channel water levels in the river adjacent to the lake outfall pipe are as follows: 1 in 2 year event (50% annal exceedance probability) 36.91 m AOD, 1 in 5 event (20% AEP) 36.98 m AOD, 1 in 10 event (10% AEP) 37.06 m AOD, 1 in 20 (5% AEP) 37.25 m AOD.

23. Outputs from the 2025 Upper Colne model indicate that the peak lake water levels at the location of the outfall pipe are as follows: 1 in 2 year event (50% annal exceedance probability) 36.98 m AOD, 1 in 5 event (20% AEP) 37.32 m AOD, 1 in 10 event (10% AEP) 37.45 m AOD, 1 in 20 (5% AEP) 37.52 m AOD

24. The 2025 Upper Colne model indicates that lake levels are typically 0.07 m to 0.39 m higher than the river levels in this location. Whilst lake levels are not driven entirely by levels in the River Colne, this does suggest that the pipe will activate (overflow) relatively infrequently as the invert level of the outfall pipe is below the 1 in 2 (50% AEP) peak level in the River Colne. The data also indicates that due to the shallow gradient, the pipe outlet may become river locked when the water level in the River Colne is higher than the pipe soffit level, typically (approximately) during a 1 in 5 (20%) AEP event.

(a) Pipe inlet

(b) Pipe outlet

Figure 1: Lake Overflow Pipe

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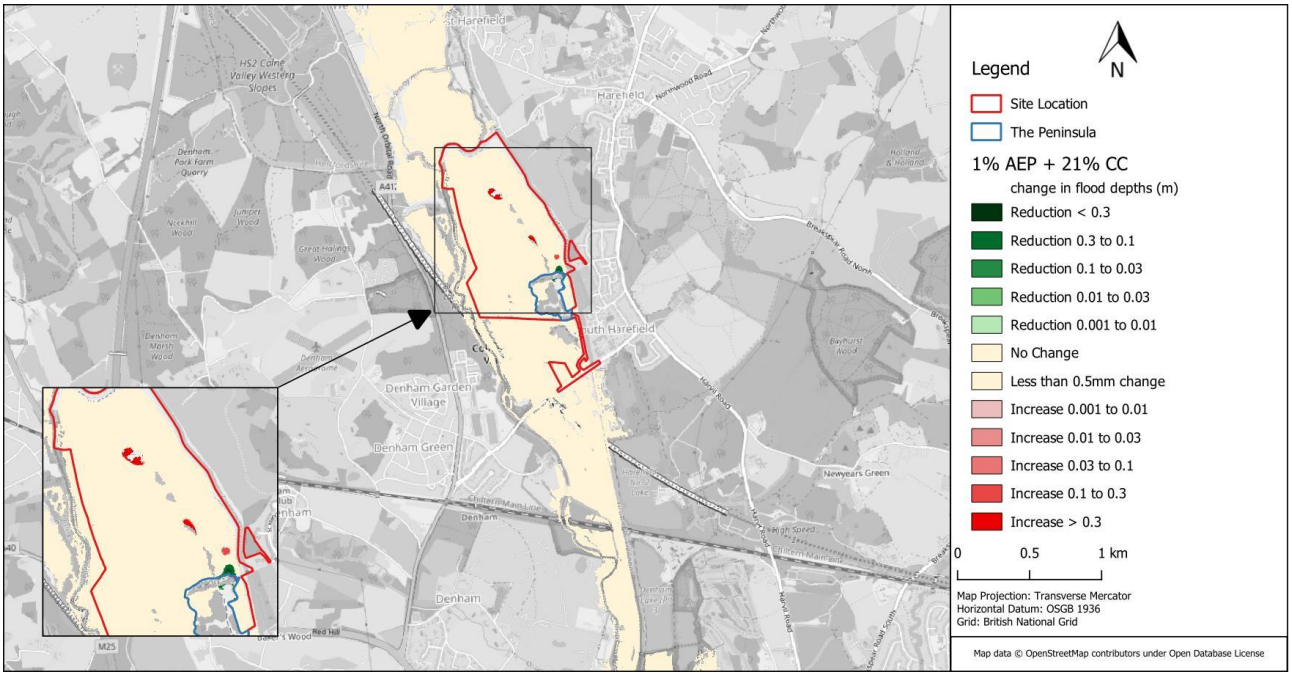
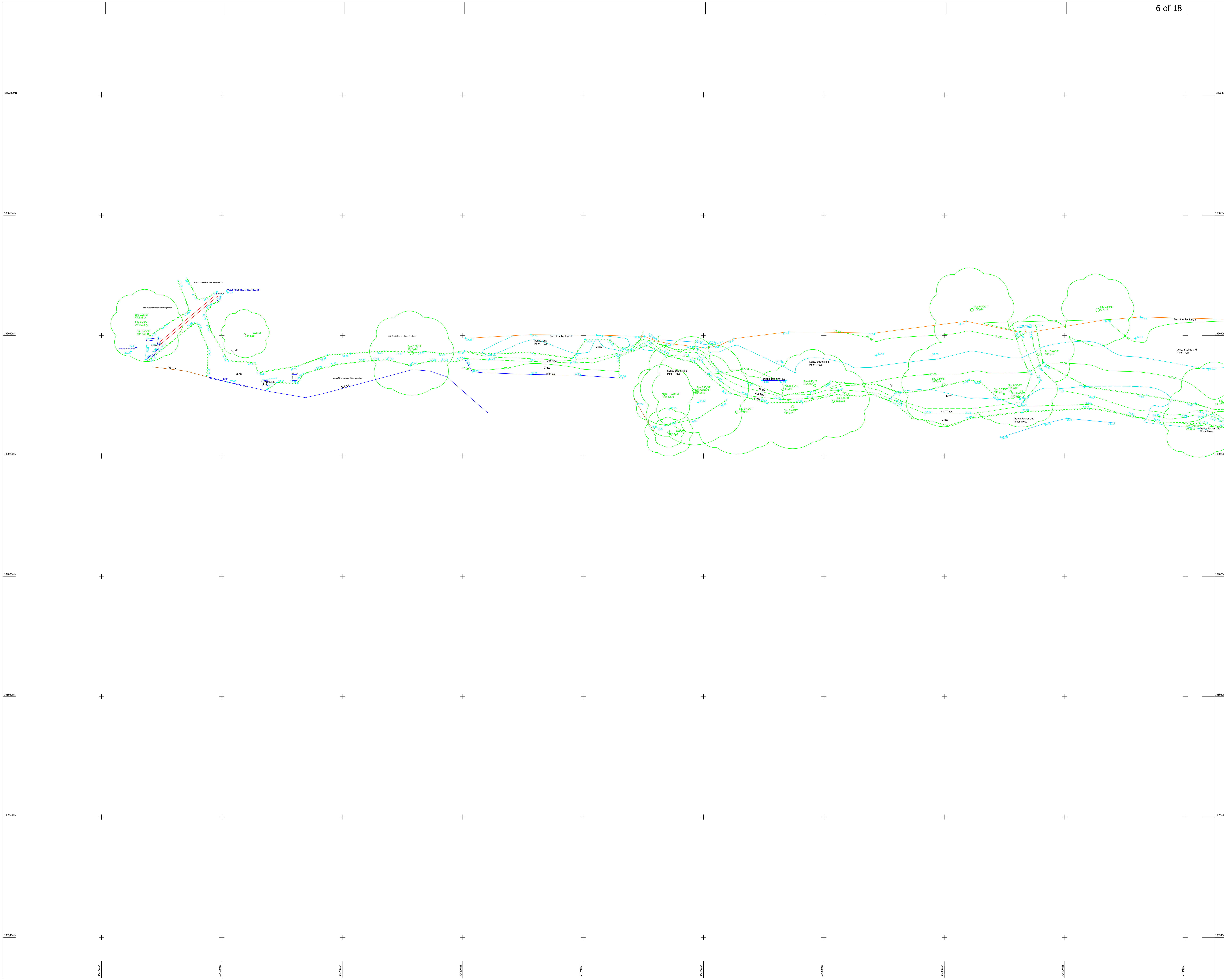
Annex 1

Comparison of maximum flood depths for the pre and post development scenarios during the 1% AEP event + 21% climate change (the design flood event)



Annex 2

Topographical Survey of Southwest Corner of the Lake



NOTES:

Drainage:
Inspection Covers are lifted where possible and all drainage invert information has been obtained through visual inspection only, with no entry into manholes. Therefore the complete accuracy cannot be guaranteed. Where drainage is of critical importance we suggest the services of a specialist drainage expert be used.

Trees:
Every effort has been made to identify and detail all trees on site but where trees are of critical importance we suggest the use of a specialist such as an arborist. Tree spread and heights are indicative.

GPS:
GPS detail is relative to the time and date of survey. GPS levels and grid are obtained using industry standard guidelines and can vary according to the quality of the GPS network at the time of survey. Unless stated otherwise, surveys are Scale factor 1 and Horizontal and Vertical Datums are established from a central site fix and baseline orientation station utilising GNSS correction data.

Survey notes:
Survey specification is linked to the original purpose of the survey commissioned at source and is to be used for this purpose only. Survey is accurate within limitations of site conditions at the time of survey. In areas difficult to survey due to restricted access, lines of sight or dense vegetation, critical dimensions and positions should be verified following suitable clearance.
Survey detail obtained and shown is relative to the plotting scale.

LEGEND

TREE SPECIES INFORMATION

ALDER	ALD	LOCUST	LOC
ASH	ASH	LONDON PLANE	LPN
ASPEN	ASP	MAGNOLIA	MAG
BEECH	BCH	MAPLE	MPL
CEDAR	CED	OAK	OAK
CHERRY	CHY	PINE	PNE
CYPRESS	CYP	POPLAR	POP
ELM	ELM	PRUNUS	PNS
FIR	FIR	RHODODENDRONS	RDN
FRUIT	FRT	ROWAN	RWN
HAWTHORN	HAW	SILVER BIRCH	SIB
HAZEL	HAZ	SORBUS	SOR
HOLLY	HLY	SWEET CHESTNUT	SCH
HORSE CHESTNUT	HCH	SYCAMORE	SYC
HORNBEAM	HRM	WALNUT	WNT
LABURNUM	LRM	WILLOW	WLW
LARCH	LAR	YEW	YEW
LIME	LIM	SPECIES UNKNOWN	SPU
		COPPICED	COP

TREE ANNOTATIONS: Tree Species / Tree Boll Size / No of Bolls
Tree Height / Tree Canopy Spread

FENCE INFORMATION

BARBED WIRE FENCE	BWF
CORRUGATED IRON FENCE	CIF
CLOSE BOARD FENCE	CBF
CHAIN LINK FENCE	CLF
CHESTNUT PALING	CPF
CRASH BARRIER	CBR
HANDRAIL	HDL
IRON RAILINGS	IRF
LARCH LAP FENCE	LLF
MISCELLANEOUS FENCE	MSF
PALISADE FENCE	PSF
PICKET FENCE	PKF
POST AND CHAIN FENCE	PCF
POST AND RAIL FENCE	PRF
POST AND WIRE FENCE	PWF
STOCK WIRE FENCE	SWF
TRELLIS FENCING	TLF

LEVEL INFORMATION

BASEMENT LEVEL	BTL
BED LEVEL	BL
COVER LEVEL	CL
DAMP PROOF COURSE	DPC
FLOOR LEVEL	FL
INVERT LEVEL	IL
OUTFALL LEVEL	OL
THRESHOLD LEVEL	THL
FOUL WATER	FW
SURFACE WATER	SW
UNABLE TO LIFT	UTL
WATER LEVEL	WL

SURFACE INFORMATION

CONCRETE	Conc
BRICK PAVERS	BP
FLOWERBED	FB
PAVING SLABS	PS
RETAINING WALL	RWall
TACTILE PAVING	Tac

FEATURE INFORMATION

BOLLARD	BO	NOTICE BOARD	NB
BRITISH TELECOM BOX	BTB	POST	P
BRITISH TELECOM IC	BTIC	RAIN WATER PIPE	RWP
BUS STOP	BS	RAISED FLOWERBED	RFB
CABLE TELEVISION BOX	CATB	ROAD SIGN	RS
CABLE TELEVISION IC	CATV	RODDING EYE	RE
EARTHING ROD	ER	SERVICE MARKER POST	SMP
ELECTRICITY CABLE PIT	ELCP	SOIL VENT PIPE	SVP
ELECTRICITY CONTROL BOX	ECB	STOP COCK	SC
ELECTRICITY POLE	EP	STOP VALVE	SV
FIRE HYDRANT	FH	TELEGRAPH POLE	TP
INSPECTION COVER	IC	TELEPHONE CALL BOX	TCB
LAMP POST	LP	TRAFFIC SIGNAL	TS
LETTER BOX	LB	TRAFFIC SIGNALS IC	TSIC
LITTER BIN	BIN	WATER METER	WM
KERB OUTLET	KO	WATER TAP	Tap
NAME PLATE	NP		

Level Datum:
Levels are related to OSGB15 derived from the GPS network

Grid:
Grid is related to OSGB15 derived from the GPS network

Northpoint:
The Northpoint position shown on this drawing has been located as accurately as possible, but is only indicative of true North

ENCOMPASS SURVEYS

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Client:	Mace Group		
Survey Location:	Broadwater Lake Uxbridge UB9 6PE		
Survey type:	Topographical	Scale:	1:200@A0
Drawing ref:	ENC/05/23/2740X1-6	Date:	May 2023
Drawn/QA:	SC/ZZ/KG	Plot:	6 of 18

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