MEC Consulting Group

FLOOD RISK AND DRAINAGE

St. Helen's School, Eastbury Road, Northwood

Flood Risk Assessment

May 2026

Report Ref: 30518-FLD-0101

St. Helen's School, Eastbury Road, Northwood
Flood Risk Assessment
May 2026

REPORT REF: 30518-FLD-0101

CLIENT: St. Helen's School

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REGISTRATION OF AMENDMENTS

Date	Rev	Comment	Prepared By	Checked By	Approved By
May 2026	-	First issue	**Ben Oyston** MSc, BSc (Hons) Assistant Flood Risk Engineer	**Zoe Jordan** BSc (Hons) Flood Risk Engineer	**Ryan Chafer** BSc (Hons) Principal Flood Risk Engineer

EXECUTIVE SUMMARY

Site Address	St Helen's School, Eastbury Road, Northwood, HA3 3AS. Grid Reference E:509461, N:191666.
Site Description and Setting	The site is located within St Helen's School, which is located in Northwood. The site measures approximately 0.13ha. The site comprises an existing tennis court and grassed area. The site is bound to the north by school buildings, to the east and south by grassed areas and to the west by astro turfed athletics areas
Proposed Development	The proposed development is for the removal of the existing tennis court and development of two padel courts with a canopy roof.
Flood Risk Information	The site is located within Flood Zone 1, which is defined as land with a 0.1% annual probability of flooding from rivers or the sea. The Risk of Flooding from Surface Water Map from the Environment Agency shows the site to be at low risk of surface water flooding. All other sources of flooding on site are low risk.
Surface Water Drainage Strategy	Existing greenfield runoff conditions have been calculated using the FEH module within Flow Causeway. For an impermeable area of 0.05ha, the QBAR Greenfield Rate has been calculated as 0.3l/s. As this is a low discharge rate, that may increase risk of blockages in the system, a minimum discharge rate of 2.0l/s has been applied. This is a 68% betterment from the existing brownfield discharge rate. In accordance with the National SuDS Standards the strategy involves conveying surface water flows to a geo-cellular tank before discharging into the existing 225mm surface water sewer along Carew Road at 2.0l/s. A storage volume of 22.24m^3 is required for an impermeable area of 0.05ha within the geo-cellular tank to allow surface water flows to discharge at 2.0l/s into the 225mm surface water sewer along Carew Road for all events up to and including the 1%AEP25CC event. The proposed filter drains located along the low points of the canopy cover would provide surface water treatment for the site in accordance with the Simple Index Method.
Conclusions	With the above measures in place, the development is unlikely to create any flood risk issues within the wider area.
This summary should be read in conjunction with the full report and reflects an assessment of the site based on information received by MEC at the time of production.	

CONTENTS

APPENDICES

1.0 INTRODUCTION

1.1 MEC Consulting Group Ltd (MEC) has been commissioned by St Helens School (hereafter referred to as 'the Client') to undertake a Drainage Strategy and supplementary report for two new padels courts with a canopy (hereafter referred to as 'the Site'). A site location plan is provided in **Appendix A,** and a proposed site plan is presented in **Appendix B.**

1.2 The proposed development will take place within St Helen's School, Eastbury Road, Northwood, HA6 3AS. The Grid Reference for the site is E:509461, N:191666.

1.3 The assessment has been undertaken to ascertain the constraints of the development to the site and assess the impact of the design, concerning flood risk.

1.4 The Local Planning Authority for the site is the London Borough of Hillingdon, who also act as the Lead Local Flood Authority. The site falls within the Thames Water (TW) Catchment.

1.5 The assessment has been prepared using best engineering judgment; however, there are levels of uncertainty implicit in the historical data and methods of analysis. The report is based on the following information:

- National Planning Policy Framework (NPPF) – December 2024
- Flood Risk and Coastal Change Planning Practice Guidance (PPG) – September 2025
- Environment Agency Flood Map for Planning and Risk of Flooding from Surface Water datasets from the DEFRA Spatial Data Catalogue
- DEFRA Magic Map, 2026
- British Geological Survey Geology Viewer, 2026
- Hillingdon Local Plan: Part 1 – Strategic Policies – November 2012
- The West Lond Level 1 Strategic Flood Risk Assessment – April 2018
- The London Borough of Hillingdon Preliminary Flood Risk Assessment Report - July 2011
- The London Borough of Hillingdon Local Flood Risk Management Strategy (LFRMS) – June 2024
- The London Plan – March 2021

Disclaimer

1.6 MEC has completed this report for the benefit of the individuals referred to in paragraph 1.1 and any relevant statutory authority which may require reference in relation to approvals for the proposed development. Other third parties should not use or rely upon the contents of this report unless explicit written approval has been gained from MEC.

1.7 MEC accepts no responsibility or liability for:

- The consequence of this documentation being used for any purpose or project other than that for which it was commissioned;
- The issue of this document to any third party with whom approval for use has not been agreed.

2.0 POLICY CONTEXT

National Planning Policy Framework

2.1 The National Planning Policy Framework (NPPF) was published and updated most recently in December 2024 by the Ministry of Housing, Communities and Local Government.

2.2 The NPPF is the primary source of national planning guidance in England, setting out the Government's planning policies for England, and how they are expected to be applied by local councils.

2.3 'Chapter 14: Meeting the challenge of climate change, flooding, and coastal change' outlines the guiding principles for managing flood risk as part of the planning process, notably paragraphs 161 - 186.

2.4 The Planning Practice Guidance (PPG) sets out the vulnerability to flooding of different land uses. It encourages development to be in areas of lower flood risk where possible and stresses the importance of preventing increases in flood risk off site to the wider catchment.

2.5 The PPG also states that alternative sources of flooding, other than fluvial (river flooding), should be considered when preparing an FRA. The document also includes a series of tables that define Flood Zones, the flood risk vulnerability classification of development land use, and 'compatibility' of development within the defined Flood Zones.

2.6 Therefore, this FRA has been completed in line with the guidance and requirements of the NPPF and PPG.

Local Plan

2.7 The Hillingdon Local Plan: Part 1 – Strategic Policies was adopted in November 2012. The Local Plan Core Strategy sets out how land within the authorities' boundaries can be used and developed, providing policies which the Council uses to determine planning applications. The plan aims to ensure future growth and changes to the district are appropriate to local needs now and in the future.

2.8 More generally, the plan lists policies that guide the design and principles of all development within the authority's land. Those relevant to this document are as follows;

- Policy EM6 – Flood Risk Management
- Policy EM8 – Land, Water, Air and Noise

2.9 Additionally, to the Hillingdon Local Plan is the London Plan, which was adopted in March 2021. The London Plan represents a step-change in the approach to development and serves as a blueprint for the future development and sustainable, inclusive growth of the city.

Local SFRA

2.10 The West London Level 1 Strategic Flood Risk Assessment (SFRA) was published in April 2018. The SFRA was produced to provide an appropriate evidence base for the Local Plan and provide a summary of flood risk across the district.

2.11 Appropriate background information has been used to inform this document and will be referenced accordingly.

Local PFRA

2.12 The London Borough of Hillingdon Preliminary Flood Risk Assessment Report (PFRA) was published in 2011, with an addendum published in 2017, and was prepared to assist the London Borough of Hillingdon meet its duties to manage local flood risk and deliver any legal requirements placed on it as Lead Local Flood Authority (LLFA) under the Flood Risk Regulations 2009.

2.13 Appropriate background information has been used to inform this document and will be referenced accordingly.

Local Flood Risk Management Strategy

2.14 The London Borough of Hillingdon Local Flood Risk Management Strategy (LFRMS) was published in June 2024 to comply with Section 9 of the Flood and Water Management Act 2010 and aims to provide a framework for meeting its requirements to develop, maintain, apply, and monitor a local strategy for flood risk management and how the London Borough of Hillingdon aim to achieve this.

2.15 The LFRMS provides further information regarding surface water runoff, groundwater and sewer flooding and flood risk around the Borough and the introduction of flood risk alleviation schemes at various scales, including SuDS.

3.0 SITE DESCRIPTION

Site Location and Features

3.1 The site is located within St Helen's School, which is located in Northwood. The site measures approximately 0.13ha. The site comprises an existing tennis court and grassed area. The site is bound to the north by school buildings, to the east and south by grassed areas and to the west by astro turfed athletics areas, see Figure 3.1.

Figure 3.1: Site Location Plan

Topographical Data

3.2 Full details of the topographical survey are included in **Appendix C**. The information indicates the site generally slopes from south to the north with levels ranging from 84.30m AOD to 83.86m AOD.

Fluvial and Surface Water Flood Risk

3.3 Information relating to the current flood risk of the site has been obtained from the Environment Agency and gov.uk websites. The site is located within Flood Zone 1, which is defined as land with a 0.1% annual probability of flooding from rivers or the sea.

3.4 The Risk of Flooding from Surface Water Map from the Environment Agency shows the site to be at low risk of surface water flooding.

3.5 According to the SFRA's Susceptibility to Groundwater Flooding, the site is not located within an area highlighted as a potential for groundwater flooding to occur. Borehole records taken to the northwest of the proposed site encountered no groundwater. Given the above the risk of groundwater flooding is considered low.

3.6 The proposed site area is not near to any canals or reservoirs.

3.7 All other sources of flooding on site are low risk.

Flood Zone Maps & Flood Defence Data

3.8 Information relating to the current flood risk to the application site has been obtained from the Environment Agency and.gov.uk websites. There are no flood defences within 250m of the site.

Watercourses & Hydrology

3.9 The closest designated Main River is the River Pinn located approximately 940m to the south of the site. The River Colne is located approximately 2.4km to the north of the site.

3.10 There is an unnamed ditch network located approximately 490m northwest of the site that feeds into the River Colne.

Historic Flooding

3.11 The Environment Agency's Historic Flood Map shows no records of historic flood events in the vicinity of the site.

Geological Data

3.12 The British Geological Survey (BGS) GeoIndex shows the site is entirely underlain by a bedrock geology of the London Clay Formation, comprising of Clay. There are no recorded superficial deposits.

Sewers

3.13 Sewer records, obtained from Thames Water, see **Appendix D,** shows there are no existing public sewers within the site area.

3.14 To the north of the site along Carew Road is the presence of two public surface water sewers, one is 225mm in diameter and the other is 525mm in diameter. Within Carew Road is also a 225mm diameter public foul water sewer. These sewers all flow west and connect into Eastbury Road to the west of the site.

3.15 A drainage survey was undertaken on site, the survey can be seen within **Appendix E**. The survey showed the presence of a private surface water sewer system to the northeast of the site. To the north of the padel courts is the presence of a private foul water sewer.

4.0 SURFACE WATER MANAGEMENT STRATEGY

4.1 It is essential that the proposed development does not increase flood risk to adjacent land or downstream of the Site, as well as protecting the development from flooding itself. To ensure that the flood risk is minimised, the drainage design will incorporate the following flood mitigation measures:

- Site levels will be designed to direct all overland surface water flows away from the courts following the land's natural topography.
- The proposed development will include a surface water drainage system that will intercept runoff generated within the development. This will minimise the risk of flooding within the new padel courts and also reduce the incidence of overland flows.
- The surface water drainage system will convey flows into a geo-cellular tank located next to the proposed covered padel courts. Surface water flows will be discharged at 2.0l/s into the existing surface water sewer along Carew Road.

Surface Water Outfall

4.2 Surface water arising from developed sites should, as far as practical, be managed in a sustainable manner to mimic the surface water flows arising from the undeveloped site. When considering the surface water discharge the SuDS hierarchy needs to be adhered to. The SuDS hierarchy states that the options below must be adhered to in order of sustainability or evidenced otherwise before moving down to a less sustainable discharge method;

- Priority 1: Collected for non-potable use
- Priority 2: Infiltrated to ground
- Priority 3: Discharged to an above ground surface water body
- Priority 4: Discharged to a surface water sewer, or another piped surface water drainage system
- Priority 5: Discharged to a combined sewer

Priority 1: Water Reuse

4.3 Consideration should be given to the implementation of rainwater harvesting systems, including but not limited to water butts on residential dwellings, and green planters to ensure water re-use.

4.4 The first 5mm of rainfall could be collected via rainwater harvesting techniques. However, given the scale of development and attenuation requirements calculated, it is, at this stage, not considered feasible to have the collection of rainwater for non-potable uses to provide a wholesale means of surface water runoff attenuation within the site boundary.

4.5 As such, an alternative method of disposal should be investigated, with non-potable use further considered within the detailed design of the proposed development.

Priority 2: Infiltrated to ground

4.6 The British Geological Survey (BGS) GeoIndex shows the site is entirely underlain by a bedrock geology of the London Clay Formation, comprising of Clay. There are no recorded superficial deposits.

4.7 Given the existing bedrock geology of the site, it is deemed unlikely that infiltration will be a viable method of surface water outfall. An alternative method is required.

Priority 3: Discharged to an above ground surface water body

4.8 The closest designated Main River is the River Pinn located approximately 940m to the south of the site. The River Colne is located approximately 2.4km to the north of the site. There is an unnamed ditch network located approximately 490m northwest of the site that feeds into the River Colne.

4.9 Given the distance from the proposed site and the requirement to cross multiple areas of third-party land it is deemed that discharging via an above ground surface water body will not be viable, and therefore an alternative option is required.

Priority 4: Discharged to a surface water sewer, or another piped surface water drainage system

4.10 Sewer records, obtained from Thames Water, see **Appendix D,** shows there are no existing public sewers within the site area. To the north of the site along Carew Road is the presence of two public surface water sewers, one is 225mm in diameter and the other is 525mm in diameter. Within Carew Road is also a 225mm diameter public foul water sewer. These sewers all flow west and connect into Eastbury Road to the west of the site.

4.11 A drainage survey was undertaken on site, the survey can be seen within **Appendix E**. The survey showed the presence of a private surface water sewer system to the northeast of the site. To the north of the padel courts is the presence of a private foul water sewer.

4.12 Given the levels of the private surface water sewers to the northeast of the site it is determined a connection cannot be made into these. A connection is therefore proposed into the existing 225mm surface water sewer along Carew Road via a new connection subject to agreement with Thames Water.

4.13 It is considered that the drainage hierarchy is satisfied by the above.

Land Use

4.14 In order to calculate the drainage requirements, an understanding of the land uses on-site needs to be known. Table 4.1, below summarises the proposed land uses within the site. The site within the red line boundary currently comprises of an existing tennis court and grassed area. The current land use has been calculated using the existing site plan and the post-development land use has been measured from the proposed layout. Urban creep has not been applied to the calculations given it is not a residential development.

Table 4.1: Land Use Summary.

Land Use Type	Existing Site Areas		Proposed Site Areas	
	Ha	%	Ha	%
Impermeable Areas	0.05	79	0.05	71
Green Landscape / Permeable areas	0.02	21	0.02	29
TOTAL	**0.07**	**100**	**0.07**	**100**

Climate Change Allowances

4.15 The influence of climate change on rivers and watercourses is likely to increase the frequency of flood events and the overall volume of water that passes the site. When considering surface water runoff from the site, the increase in peak rainfall intensity varies over the lifetime of the development. Where leisure developments with a lifetime up to 2060 are proposed the NPPF states the central allowance for the 2050's epoch allowance should be used, as highlighted in red in Table 4.2.

Table 4.2: Peak Rainfall intensity allowance in small and urban catchments from the Flood Risk Assessments: Climate Change Allowances Guidance

Annual Exceedance Probability	Total potential change anticipated for the '2050s' (2022 to 2060)		Total potential change anticipated for the '2070s' (2061 to 2125)	
	Central	Upper End	Central	Upper End
3.3 % AEP	20%	35%	20%	35%
1 % AEP	20%	40%	25%	40%

Discharge Rate

4.16 Existing runoff conditions have been calculated using the Modified Rational Method to calculate the Brownfield Discharge Rate. For the existing impermeable area of 0.05ha, the peak discharge rate has been calculated as 6.26l/s, based on a rainfall intensity of 50mm/hr.

4.17 Existing greenfield runoff conditions have been calculated using the FEH module within Flow Causeway. For an impermeable area of 0.05ha, the QBAR Greenfield Rate has been calculated as 0.3l/s. As this is a low discharge rate, that may increase the risk of blockages in the system, a minimum discharge rate of 2.0l/s has been applied. See supporting calculations in **Appendix F**. This is a 68% betterment from the existing brownfield discharge rate.

Drainage Strategy

4.18 The overall drainage strategy has been based on the impermeable areas and the current site layout, presented in **Appendix B**. In accordance with the National SuDS Standards the strategy involves conveying surface water flows to a geo-cellular tank before discharging into the existing 225mm surface water sewer along Carew Road at 2.0l/s.

4.19 Given the proposed padel courts will be built under a canopy cover, a series of perimeter drains and downpipes will be placed around the canopy to catch the surface water flows generated on site.

4.20 A storage volume of 22.24m^3 is required for an impermeable area of 0.05ha within the geo-cellular tank to allow surface water flows to discharge at 2.0l/s into the 225mm surface water sewer along Carew Road for all events up to and including the 1%AEP25CC event.

4.21 A drainage strategy based on the principles above is shown in drawing 30518_01_230_01 in **Appendix G** and calculations can be found in **Appendix F**.

Applicable SuDS Techniques

4.22 The National Standards for Sustainable Drainage Systems that deals with SuDS cover a whole range of sustainable approaches to surface water drainage management including:

- source control measures including rainwater recycling and drainage;
- filter strips and swales, which are vegetated features that hold and drain water downhill mimicking natural drainage patterns;
- filter drains and porous pavements to allow rainwater and run-off to infiltrate into permeable material below ground and provide storage if needed; and
- basins and ponds to hold excess water after rain and allow controlled discharge that avoids flooding.

4.23 Each of the five SuDS considerations listed above is discussed below in Table 4.3 with reference to their suitability for the proposed development.

Table 4.3: Suitability of SuDS techniques

	COMPONENT	SUITABILITY	REASON
Source Control	Rainwater Harvesting	No	Insignificant area for source control features to be implemented.
	Green Roofs	No	This would not be appropriate given the scope and scale of the development.
	Bio-retention Systems/ Rain Gardens	No	This would not be appropriate given the scope and scale of the development.
Proprietary Systems	Proprietary bio-retention systems	No	More appropriate SuDS features can be accommodated within the development and are preferred.
Infiltration Devices	Permeable Paving	No	A canopy will be built over the proposed padel courts so a porous surface will not be viable .
	Infiltration trenches/ Soakaways	No	Given the geology of the site it is assumed infiltration is not a viable means of outfall.
Filtration	Open Swales, Filter Strips/ Drains	Yes	Filter drains have been proposed at the low points around the canopy to collect flows
Retention/ Detention	Detention Basin, Attenuation Pond/ Tanks	Yes	A geo-cellular tank will store and convey surface water flows.

Surface Water Quality

4.24 The SuDS Manual CIRIA document C753, indicates the minimum treatment indices appropriate for contributing pollution hazards for different land use classifications. To deliver adequate treatment, the selected SuDS components should have a total pollution mitigation index (for each contaminant) that equals or exceeds the pollution hazard index.

4.25 Surface water runoff from the proposed padel courts will have a very low pollution hazard. The only likely pollutants from the site would be from the proposed canopy cover of the padel courts. To provide the correct level of treatment, an assessment needs to be made of the mitigation provided by each SuDS feature. This is shown in Table 4.4.

4.26 When using more than one SuDS components in series, the mitigation indices are multiplied by a factor of 0.5, This is to account for the reduced performance of secondary or tertiary components associated with the already reduced inflow concentrations. The SuDS mitigation index from the additional components with then be added together up to a maximum value of 0.95, regardless of the number of components in series.

4.27 The pollution hazard indices, mitigation indices of each SuDS component and the accompanying calculations are provided in Table 4.4.

Table 4.4: SuDS Mitigation Indices (from CIRIA SuDS Manual)

SuDS Component	Mitigation Indices		
	Total Suspended Solids	*Metal*	*Hydrocarbons*
Canopy Roof	0.3	0.2	0.05
Filter Drains	0.4	0.4	0.4
Mitigation Requirement Met?	**Yes**	**Yes**	**Yes**

4.28 The proposed filter drains located along the low points of the canopy cover would provide surface water treatment for the site in accordance with the Simple Index Method.

Exceedance and Flow Routing

4.29 The risk of overland flooding from adjacent land to courts is very low. The design of levels and features on the site will follow best practice by ensuring any overland flow on the site is routed safely away from courts and to areas of the lowest risk on site. Any surcharging and subsequent flooding of sewers will be mitigated by the flood routing described above. The exceedance flows will remain within the site and will flow away from the proposed dwellings.

Maintenance and Management

4.30 An integrated approach to the maintenance and management of SuDS systems is a requirement of the NPPF and by the Flood & Water Management Act 2010. The aim of a maintenance and management plan is to ensure that there is a clear understanding of drainage responsibilities and that a maintenance regime is implemented for all new drainage systems for the lifetime of the development, so they can continue to function as required and will not result in additional pollution entering the watercourse.

4.31 All private drainage systems, will be maintained by St Helen's School. The maintenance plan for the court surface will include:

- Monthly litter removal
- Bi-Annual suction sweeping
- Annual inspection and repairs as/if required,
- Weed and invasive plant control,
- Remedial maintenance: Surface reconditioning

4.32 A proposed maintenance schedule that breaks down the maintenance requirements of the various proposed assets can be found in Table 4.5.

Table 4.5: Drainage Maintenance Regime

Drainage Asset	Responsible Organisation	Maintenance Work	Frequency
Pipework / Manholes	Private Ownership / Management Company	Inspect pipework and clear blockages	Annually or after severe storms.
		Inspect manholes and clear blockages	
		Repair any defects in the network	
		Inspect flow control, ensure operating freely and pivoting bypass door and penstock valve operating correctly	

Gullies	Private Ownership / Management Company	Inspect structure and remove any debris/litter on structure	Annually or after severe storms
		Replace malfunctioning parts or structures	As required
		Pump repairs	
Filter Drains	Private Ownership / Management Company	Remove litter and debris from filter drain surface, access chambers and pre-treatment devices	Monthly
		Inspect filter drain surface, inlet/outlet pipework and control systems for blockages, clogging, standing water and structural damage	
		Inspect pre-treatment systems, inlets and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies	6 monthly
		Remove the sediment from pre-treatment devices	
		Remove or control tree roots where they are encroaching the sides of the filter drain, using recommended methods	As required / 5 yearly
		At locations with high pollution loads, remove surface geotextile and replace and wash or replace overlaying filter medium	
		Clear perforated pipework of blockages	
Geo-cellular Tank	Private Ownership / Management Company	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months then annually
		Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
		For systems where rainfall infiltrates into the tank from above, check the surface of the filter for blockages by sediment, algae or other matter; remove and replace surface infiltration medium as necessary	Annually
		Remove the sediment from pre-treatment structures and/or internal forebays	
		Repair/rehabilitate inlets, outlets, overflows and vents	As required
		Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
		Survey inside of the tank for sediment build-up and remove if necessary	Every 5 years or as required

5.0 CONCLUSIONS

5.1 MEC, has been commissioned by St Helens School to prepare a drainage strategy and supplementary report for two canopied padel courts within St. Helens School, Eastbury Road, Northwood. This assessment has been undertaken to ascertain the constraints of the development of the site and to assess the impact of the design, with respect to flood risk.

- The whole site is located within Flood Zone 1 and is low risk of surface water flooding.
- All other sources of flood risk to the site can be considered low.
- Existing greenfield runoff conditions have been calculated using the FEH module within Flow Causeway. For an impermeable area of 0.05ha, the QBAR Greenfield Rate has been calculated as 0.3l/s. As this is a low discharge rate, that may increase the chance of blockages in the system, a minimum discharge rate of 2.0l/s has been applied. This is a 68% betterment from the existing brownfield discharge rate.
- In accordance with the National SuDS Standards the strategy involves conveying surface water flows to a geo-cellular tank before discharging into the existing 225mm surface water sewer along Carew Road at 2.0l/s.
- Given the proposed padel courts will be built under a canopy cover, a series of perimeter drains and downpipes will be placed around the canopy to catch the surface water flows generated on site.
- A storage volume of 22.24m^3 is required for an impermeable area of 0.05ha within the geo-cellular tank to allow surface water flows to discharge at 2.0l/s into the 225mm surface water sewer along Carew Road for all events up to and including the 1%AEP25CC event.
- The proposed filter drains located along the low points of the canopy cover would provide surface water treatment for the site in accordance with the Simple Index Method.

5.2 With the above measures in place, the development of the site is unlikely to create any flood risk issues to the wider area.

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Consulting Group

APPENDICES

Appendix A

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SITE LOCATION PLAN

Project: St Helen's School, Eastbury Road, Northwood.

File Ref: 30518

O.S. Grid Ref: E:509461, N:191666.

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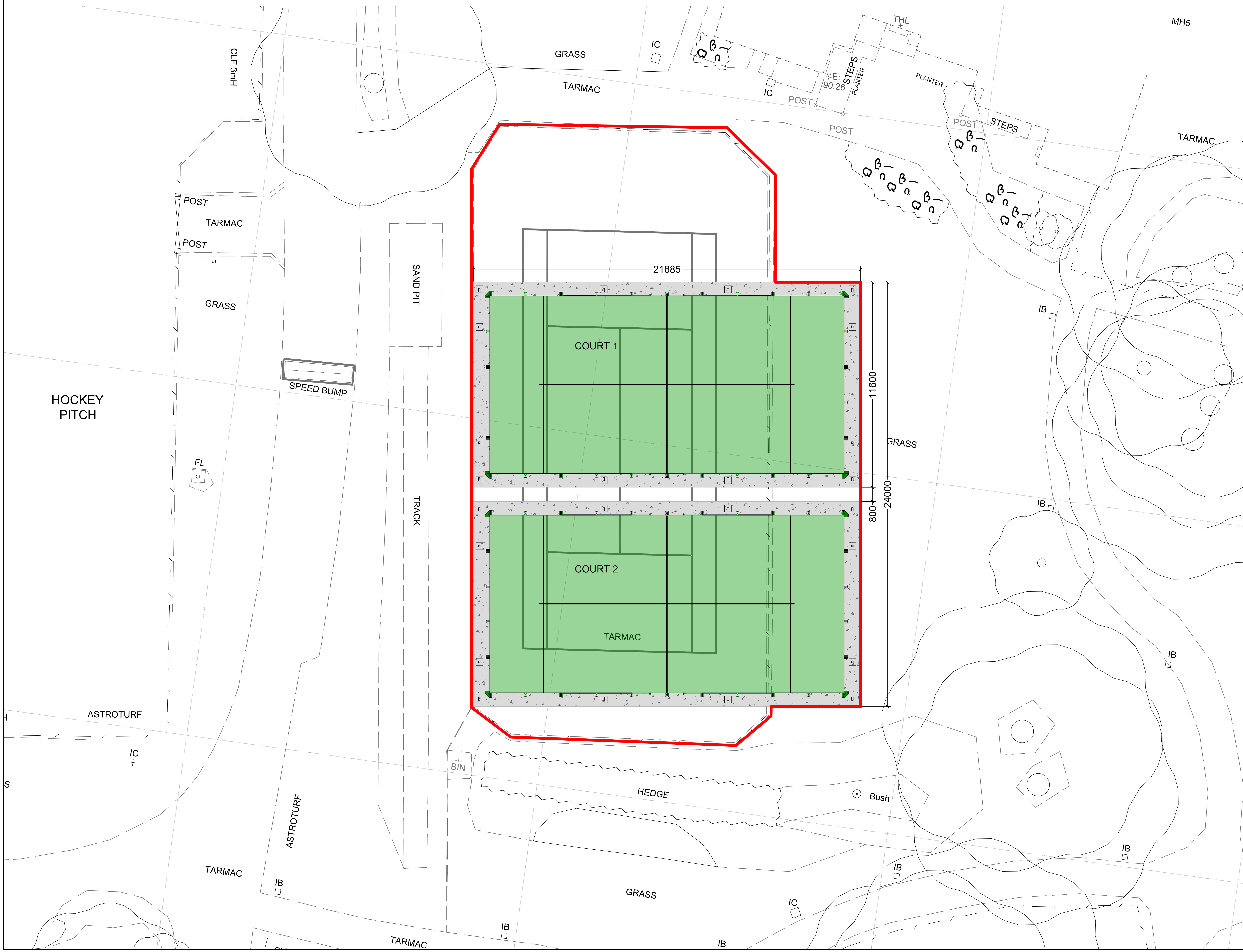
APPENDICES

Appendix B

01 SITE PLAN
1:100



1:100
2m 0 2m 4m 6m

N

KEY

- Courts carpet
- Concrete foundation
- Application site boundary

NOTES

REV:	DESCRIPTION:	BY:	DATE:
B	Updated with Topo	AC	13.04

STATUS: FULL PLANNING APPLICATION

CLIENT: ST Helens School

SITE: Northwood

TITLE: PROPOSED SITE PLAN

SCALE	DATE:	DRAWN:	CHECKED:
1:100 @A1	31.07.25	AC	DC

PROJECT No:	DRAWING No:	REVISION:
2502-51	002	B

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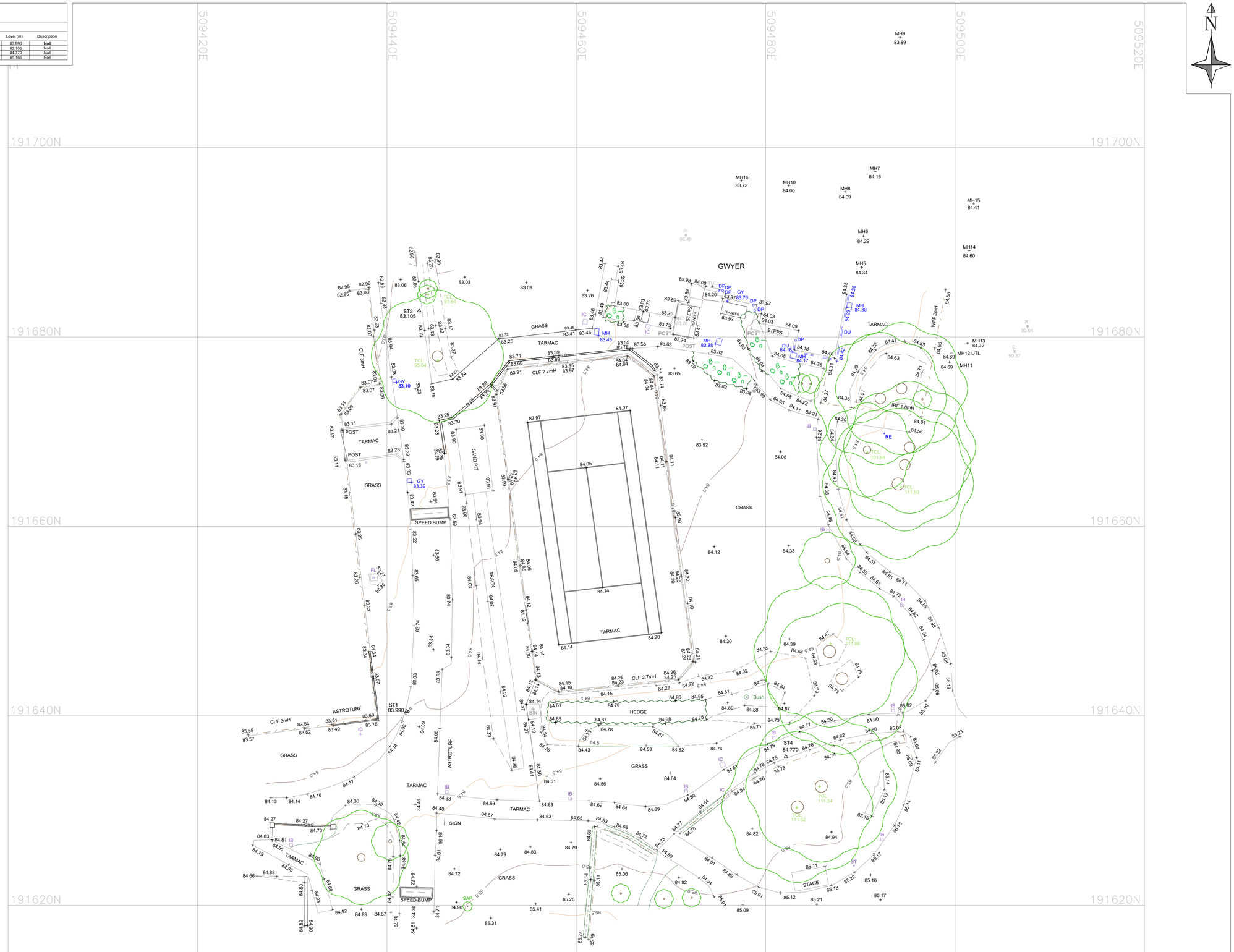
APPENDICES

Appendix C

Level Datum:	O.S (G.P.S Verified)
Grid Orientation:	O.S (G.P.S Verified)

Station Information:

Station	Easting (m)	Northing (m)	Level (m)	Description
ST1	509442.080	191640.471	83.990	Nail
ST2	509443.405	191682.756	83.105	Nail
ST4	509482.142	191635.721	84.770	Nail
STA1	509445.073	191599.550	85.165	Nail



SURVEY NOTES

1. THIS PLAN SHOULD BE USED FOR ITS ORIGINAL PURPOSE ONLY. MEC CONSULTING GROUP ACCEPTS NO RESPONSIBILITY FOR ITS DRAWINGS IF THEY ARE SUPPLIED TO ANY OTHER PARTY OTHER THAN THE ORIGINAL CLIENT.
2. THE INFORMATION SHOWN HAS BEEN SURVEYED IN ACCORDANCE TO THE ACCURACY OUTLINED WITHIN THE ORIGINAL FEE QUOTATION.
3. BOUNDARIES SHOWN ARE PHYSICAL SITE FEATURES AND MAY NOT REPRESENT LEGALLY CONVEYED OWNERSHIP.
4. ALL FEATURES SHOWN WERE CURRENT AT THE TIME OF SURVEY. SOME FEATURES MAY HAVE BEEN MISSED OR OMITTED DUE TO ACCESS, PARKED VEHICLES, TEMPORARY STRUCTURES OR DENSE VEGETATION.
5. ALL GLOBAL NAVIGATION AND SATELLITE SYSTEM (GNSS) DETAIL AND REFERENCE STATIONS HAVE BEEN CAPTURED AND TRANSFORMED ONTO ORDNANCE SURVEY NATIONAL GRID AND DATUM OSGB36 USING THE O.S. ACTIVE NETWORK (OS NET) TRANSFORMATION AND GEOID MODEL OSTN15 & OSGM15.
6. NO SCALE FACTOR HAS BEEN APPLIED TO THE SURVEY CONTROL STATIONS AND RELATED DETAIL, THEREFORE ALL THE APPLICABLE COORDINATES SHOWN ARE NOT ON TRUE OSGB36(15), AND HAVE BEEN GEOREFERENCED USING A PSEUDO-OSGB36(15) COORDINATE ST1, AND ROTATED ON A BEARING USING A GNSS REFERENCE STATION FROM SURVEY CONTROL STATION STA1 TO ST2.
7. THE LEVELS SHOWN ARE RELATIVE TO THE GNSS REFERENCE STATION LEVEL CAPTURED AT ALL SURVEY CONTROL STATIONS.
8. ALL LEVELS ARE REPRESENTATIVE TO METRES ABOVE ORDNANCE DATUM.
9. PLEASE REFER TO THE SURVEY STATION TABLE TO ENABLE ESTABLISHMENT OF THE ON SITE GRID.
10. PLEASE NOTE THAT THE 3D TOPOGRAPHICAL SURVEY CAN BE ACCESSED BY TURNING ON 3D LAYERS VIA THE LAYER FILTER IN THE LAYER MANAGER.
11. REFERENCE GRID IS 20m X 20m.
12. ALL UNITS ARE IN METRES UNLESS OTHERWISE SPECIFIED.
13. SURVEY SHOWN UNDERTAKEN BY MEC CONSULTING GROUP IN MARCH 2026.
14. NOT ALL LEGEND DETAIL MAY BE APPLICABLE IN THIS DRAWING. IF ANY CLARIFICATION IS REQUIRED, PLEASE INFORM MEC CONSULTING GROUP.

TOPOGRAPHICAL LEGEND

ABBREVIATIONS

BUILDING HEIGHTS:
- E: EAVES LEVEL
- F: FLAT ROOF LEVEL
- R: RIDGE LEVEL

FENCE TYPES:
- BWF BARBED WIRE
- CLF CHAIN LINK
- CPF CONCRETE PANEL
- IRF IRON RAILING
- MF METAL FENCE
- PIF POST & IRON RAIL
- PRF POST AND RAIL
- PWF POST & WIRE
- SPF STEEL PALISADE
- WMF WIRE MESH FENCE
- WPF WOOD PANEL FENCE

TREE/VEGETATION:
- G TREE GIRTH (METRES)
- MG MULTI GIRTH TREE
- TC AVG TREE CANOPY
- TCL TREE CANOPY LEVEL
- VL AVG VEG LEVEL

OTHER:
- CRW CONCRETE RETAINING WALL
- FFL FINISHED FLOOR LVL
- GW GABION WALL
- LBOX LETTER BOX
- RW RETAINING WALL
- SP SIGN POST
- SRW STONE RETAINING WALL
- STL STILE
- THL THRESHOLD LEVEL
- TRW TIMBER RETAINING WALL
- TW TOP OF WALL LEVEL

DRAINAGE
- 250Ø PIPE DIAMETER (mm)
- BG BACK GULLY
- CL COVER LEVEL
- DP DOWN PIPE
- GY GULLY
- IC INSPECTION CHAMBER
- IL INVERT LEVEL
- MH MANHOLE
- SO SOFFIT LEVEL

SYMBOLS
- SERVICE COVER
- GATE
- TREE/BUSH/SAPLING
- BH BOREHOLE
- TH TRIAL HOLE
- P1 STAKEOUT
- WOODLAND
- VEGETATION
- PLANTED FOREST

UTILITIES:
- AV AIR VALVE
- BO BOLLARD
- BT BRITISH TELECOM
- BUS BUS STOP
- CCTV CLOSED CIRCUIT CAMERA
- CTV CABLE TELEVISION
- DP DOWN PIPE
- ER EARTH ROD
- EP ELECTRIC POST
- FH FIRE HYDRANT
- FL FLOODLIGHT
- GMK GAS MARKER POST
- GV GAS VALVE
- IB ILLUMINATED BOLLARD
- JB JUNCTION BOX
- LP LAMP POST
- MKR MARKER POST
- MW MONITORING WELL
- PM PARKING METER
- RE RODDING EYE
- ST STOP TAP
- SV SLUICE VALVE
- TL TRAFFIC LIGHT
- TP TELEGRAPH POST
- VP VENT PIPE
- WM WATER METER
- WO WASH OUT
- WSC WATER SERVICE COVER

WATERCOURSE:
- B.L BED LEVEL
- WL WATER LEVEL

FEATURE LINES
- BOTTOM OF BANK
- BUILDING
- CANOPY
- CHANNEL
- DROP KERB
- EDGE OF TREES
- EDGE OF VEG
- FENCE
- GATE
- LINE MARKING
- OVERHEAD LINES
- PIPELINE
- RIVER EMBANKMENT
- ROOTLINE
- STEPS
- TOP OF BANK
- TOP OF KERB
- TRACK
- VERGE
- WALL
- WATER LINE

STATIONS
- 100.000m STATION LEVEL
- MEC1 STATION AND NAME

SURFACE KEY
- BP BLOCK PAVING
- CPS CONCRETE PAVING SLABS
- TT TACTILE PAVING

*	FIRST ISSUE	ML	DG	NA	02.04.2026
REV:	AMENDMENTS:	DRN:	CHK:	APP:	DATE:

PROJECT:
ST. HELEN'S SCHOOL,
EASTBURY ROAD,
NORTHWOOD

DRAWING TITLE:
TOPOGRAPHICAL SURVEY

CLIENT:
ST. HELEN'S SCHOOL

DRAWING NUMBER:
30518_06_170_01

REVISION:	SHEET SIZE:	SCALE:
–	A1	1:200

STATUS:
FOR INFORMATION

MEC Consulting Group
Birmingham | Brighton | Leicester
Telephone: 01530 264 753
Email: group@m-ec.co.uk
Website: www.m-ec.co.uk

MEC
Consulting Group

APPENDICES

Appendix D

Asset Location Search

Property Searches

M-EC Consulting Group Ltd
THE OLD CHAPEL, STATION ROAD
HUGGLESCOTE
LE67 2GB

Search address supplied 30518 - St. Helen's School
Eastbury Road
Northwood
HA6 3AS

Your reference 30518

Our reference ALS/ALS Standard/2026_5300647

Search date 12 March 2026

Keeping you up-to-date

Notification of price changes

We're changing our report prices from 4th June 2025. The price will increase by 3.5% based on Retail Price Index (RPI).

Find our new prices on our website thameswater.co.uk/property-searches

Any Questions? We're happy to talk through the changes with you – give our Property Searches team a call on 0800 009 4540 .

Thames Water Utilities Ltd
Property Searches,
Clearwater Court, Vastern Road, Reading RG1 8DB

property.searches@thameswater.co.uk
thameswater.co.uk/propertysearches

0800 009 4540

Asset Location Search

Property Searches

Search address supplied: 30518 - St. Helen's School, Eastbury Road, Northwood, HA6 3AS

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 search provides maps showing the position and 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 contact details below:

Thames Water Utilities Ltd
Property Searches
Clearwater Court
Vastern Road
Reading
RG1 8DB

Email: property.searches@thameswater.co.uk
Web: thameswater.co.uk/propertysearches

Asset Location Search

Thames Water Property Searches

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. The public sewer map 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.

With regard to the fresh water supply, this site falls within the boundary of another water company. For more information, please redirect your enquiry to the following address:

Affinity Water Ltd

Asset Location Search

Property Searches

Tamblin Way
Hatfield
AL10 9EZ
Tel: 0845 7823333

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.

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. You can do this by emailing customer.feedback@thameswater.co.uk with the email subject header 'Enquiry – TWOSA', along with details of the request.

If you have any questions regarding sewer connections, budget estimates, diversions or building over 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 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 Standard/2026_5300647

The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 509491,191674

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.

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
491A	n/a	n/a
591F	n/a	n/a
591G	n/a	n/a
591E	n/a	n/a
7807	n/a	n/a
7813	n/a	n/a
6807	n/a	n/a
6808	n/a	n/a
6804	n/a	n/a
6803	n/a	n/a
7802	88.52	85.31
7801	88.37	86.13
7814	n/a	n/a
7817	n/a	n/a
7904	n/a	n/a
6904	83.97	81.03
6903	84.05	82.05
6602	n/a	n/a
6601	n/a	n/a
6607	89.15	87.39
6806	n/a	n/a
6701	n/a	n/a
6805	n/a	n/a
6809	n/a	n/a
7808	n/a	n/a
7701	n/a	n/a
6608	n/a	n/a
6603	n/a	n/a
6606	n/a	n/a
6610	n/a	n/a
6605	n/a	n/a
6604	n/a	n/a
6501	n/a	n/a
6609	n/a	n/a
6611	90.47	88.7
651A	n/a	n/a
6503	n/a	n/a
6502	n/a	n/a
7605	92.19	89.93
7606	92.22	90.42
7607	92.47	90.66
7501	90.5	89.5
7503	88.73	87.73
641F	n/a	n/a
741B	n/a	n/a
741A	n/a	n/a
641E	n/a	n/a
641D	n/a	n/a
641C	n/a	n/a
641B	n/a	n/a
641A	n/a	n/a
7504	n/a	n/a
7502	89.63	88.88
641G	n/a	n/a
4908	n/a	n/a
4905	n/a	n/a
4907	n/a	n/a
4906	n/a	n/a
5904	n/a	n/a
5903	n/a	n/a
5802	n/a	n/a
5803	n/a	n/a
5810	n/a	n/a
5811	n/a	n/a
5804	n/a	n/a
691D	n/a	n/a
691E	n/a	n/a
6902	n/a	n/a
4701	82.59	81.02
4803	n/a	n/a
4806	n/a	n/a
4703	83.24	80.57
4702	83.58	80.87
571D	n/a	n/a
571C	n/a	n/a
5801	n/a	n/a
5702	84.56	81.7
5701	84.95	83.25
571E	n/a	n/a
571F	n/a	n/a
571B	n/a	n/a
571A	n/a	n/a
5703	86.75	84.83
5807	n/a	n/a
5812	n/a	n/a
5809	n/a	n/a
5813	n/a	n/a
5814	n/a	n/a
5805	n/a	n/a
5806	n/a	n/a
5808	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
5601	87.22	85.52
6810	n/a	n/a
6801	n/a	n/a
671A	n/a	n/a
641K	n/a	n/a
641H	n/a	n/a
4408	n/a	n/a
641J	n/a	n/a
641I	n/a	n/a
6450	81.44	80.63
6402	80.94	77.39
6452	80.95	79.7
5453	81.66	80.56
5450	79.8	77.83
4403	79.67	78.53
5401	79.6	n/a
4402	79.61	75.84
4401	80.03	76.14
4404	79.88	78.89
5452	79.81	78.39
5451	79.55	78.56
3913	n/a	n/a
3912	n/a	n/a
3911	n/a	n/a
3914	n/a	n/a
4903	n/a	n/a
4804	n/a	n/a
4801	n/a	n/a
4904	n/a	n/a
341A	n/a	n/a
3902	79.11	76.97
3919	78.99	76.71
3905	78.21	72.49
3906	n/a	n/a
281H	n/a	n/a
281E	n/a	n/a
271A	n/a	n/a
2602	83.15	82.01
271D	n/a	n/a
2601	83.55	81.87
2604	83.5	81.55
2603	83.58	70.94
2703	82.48	80.61
2705	82.16	79.86
2704	82.47	80.49
2707	82.67	71.21
2708	82.6	79.58
2706	n/a	n/a
2803	81.14	78.44
2804	81.16	78.08
3805	80.57	78.37
3801	81.02	71.77
3804	80.44	78.71
3701	82.26	80.8
3803	n/a	n/a
3802	n/a	n/a
3702	n/a	n/a
3703	n/a	n/a
4704	n/a	n/a
4805	n/a	n/a
4802	n/a	n/a
341B	n/a	n/a
341C	n/a	n/a
341F	n/a	n/a
241J	n/a	n/a
241P	n/a	n/a
241L	n/a	n/a
241O	n/a	n/a
241K	n/a	n/a
2409	78.85	77.93
2402	78.88	69.91
3401	80.11	76.37
2403	77.41	74.76
3403	80.47	79.65
241I	n/a	n/a
2405	78.01	76.17
2406	77.43	75.93
3404	80.53	79.21
241F	n/a	n/a
241D	n/a	n/a
241E	n/a	n/a
4406	79.97	78.96
241H	n/a	n/a
241G	n/a	n/a
341D	n/a	n/a
341E	n/a	n/a
2404	78.33	76.17
4405	80.14	79.22
271B	n/a	n/a
2408	75.69	74.13
281F	n/a	n/a
2503	79.77	70.34
2502	80.36	78.42

Manhole Reference	Manhole Cover Level	Manhole Invert Level
2504	81.74	80.2
2505	82.15	70.61
2501	82.29	80.29

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.

Asset Location Search - Sewer Key

Public Sewer Types (Operated and maintained by Thames Water)

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

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

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

- Storm Sewer
- Sludge Sewer
- Foul Trunk Sewer
- Surface Trunk Sewer
- Combined Trunk Sewer
- Foul Rising Main
- Surface Water Rising Main
- Combined Rising Main
- Vacuum
- Thames Water Proposed
- Vent Pipe
- Gallery

Other Sewer Types (Not operated and maintained by Thames Water)

- Sewer
- Culverted Watercourse
- Proposed
- Decommissioned Sewer
- Content of this drainage network is currently unknown
- Ownership of this drainage network is currently unknown

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
- Meter
- Dam Chase
- Vent
- Fitting

Operational Controls

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

- Ancillary
- Drop Pipe
- Control Valve
- 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.

- Inlet
- Outfall
- Undefined End

Other Symbols

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

- Change of Characteristic Indicator
- Public / Private Pumping Station
- Invert Level
- Summit

Areas

Lines denoting areas of underground surveys, etc.

- Agreement
- Chamber
- Operational Site

Ducts or Crossings

- Casement

Ducts may contain high voltage cables. Please check with Thames Water.

- Conduit Bridge
- Subway
- Tunnel

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plan are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate the 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 indicates that data is unavailable.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimeters. 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, please contact Property Searches on 0800 009 4540.

MEC Consulting Group

APPENDICES

Appendix E

SURVEY NOTES

THIS DRAWING AND INFORMATION CONTAINED WITHIN IS ISSUED IN CONFIDENCE AND IS THE COPYRIGHT OF MEC CONSULTING GROUP. IF THE TOPOGRAPHICAL INFORMATION OR BASE MAPPING HAS BEEN SUPPLIED BY A THIRD PARTY, MEC CONSULTING GROUP IS NOT LIABLE FOR ANY INACCURACIES CONTAINED THEREIN. IF INACCURACIES TO SUPPLIED MAPPING HAVE BEEN IDENTIFIED (AND MEC CONSULTING GROUP HAVE BEEN MADE AWARE OF THESE) OR IF ANY OTHER INACCURACIES THESE WILL BE HIGHLIGHTED IN THE ACCOMPANYING REPORT. DISCLOSURE OF THIS INFORMATION TO THIRD PARTIES AND UNAUTHORISED COPYING OR REPLICATION OF THIS DATA WITHOUT APPROVAL IS FORBIDDEN.

THE DATA PRESENTED IN THIS DRAWING HAS BEEN COLLECTED USING A COMBINATION OF THE FOLLOWING: CONSULTATION OF UTILITY ASSET INFORMATION; VISUAL SURVEY & INSPECTION OF MANHOLES AND INSPECTION CHAMBERS; ELECTROMAGNETIC LOCATION TECHNIQUES; GROUND PENETRATING RADAR; AND, WHERE APPLICABLE, TRIAL HOLE EXCAVATIONS. THESE TECHNIQUES HAVE BEEN DEPLOYED IN ACCORDANCE WITH THE BSI PAS128 SPECIFICATION FOR UNDERGROUND UTILITY DETECTION, VERIFICATION AND LOCATION USING THE SEARCH METHODOLOGIES DEEMED APPLICABLE AT TIME OF SITE VISIT.

UNLESS OTHERWISE STATED, ALL UTILITIES SHOWN ON THIS PLAN HAVE BEEN SURVEYED USING APPROVED DETECTORS AND THE CONNECTIONS BETWEEN INSPECTION CHAMBERS. IF UNABLE TO BE DETECTED, ARE GENERALLY ASSUMED TO BE STRAIGHT LINES. THE LEVEL OF CONFIDENCE (QL-A, QL-B1, QL-B2, QL-B3, QL-C OR QL-D) FOR EACH UTILITY SEGMENT IS DEPICTED IN LINE WITH THE PAS128 SCHEME OUTLINED BELOW. INFORMATION DEPICTED AS QL-C OR QL-D CANNOT BE GUARANTEED AS IT IS BASED ON HISTORIC UTILITY RECORDS WHICH CAN BE INACCURATE AND INCOMPLETE.

THE UTILITY ROUTES DEPICTED MAY REFLECT THE ROUTES OF MULTIPLE CABLES OR PIPES. IT IS NOT ALWAYS POSSIBLE TO DIFFERENTIATE BETWEEN BURIED CONSTRUCTION FEATURES, UTILITIES AND OTHER SUBSURFACE LINEAR FEATURES. THEREFORE, IT IS POSSIBLE THAT SOME FEATURES SHOWN ARE NOT UTILITY RELATED, AND DUE TO THE LIMITATIONS OF ELECTROMAGNETIC TECHNIQUES ALL UTILITY IDENTIFICATIONS SHOULD BE TREATED WITH CAUTION AND VERIFIED PRIOR TO USE DURING DESIGN/BUILDING WORKS.

IF THE LOCATION OR DEPTH OF UTILITIES AND FEATURES IS OF PARTICULAR IMPORTANCE TO A PROJECT THEN IT IS RECOMMENDED THAT DISCUSSIONS ARE HELD WITH MEC CONSULTING GROUP REGARDING ANY POSSIBLE LIMITATIONS OR ANOMALIES.

PLEASE NOTE THAT NOT ALL BURIED PIPES, CABLES AND DUCTS CAN BE DETECTED AND MAPPED IN CONSIDERATION OF THEIR DEPTH, LOCATION, MATERIAL TYPE, GEOLOGY AND PROXIMITY TO OTHER UTILITIES. EVEN AN APPROPRIATE AND PROFESSIONALLY EXECUTED SURVEY MAY NOT BE ABLE TO ACHIEVE A 100% DETECTION RATE. WHERE AN AREA OF UTILITIES IS LIKELY TO AFFECT CLIENT DESIGN/BUILDING WORKS IT IS STRONGLY RECOMMENDED THAT A PAS128 QUALITY LEVEL A VERIFICATION SURVEY IS CARRIED OUT.

NO UTILITY MAPPING SURVEY CAN BE CONSIDERED A 100% ACCURATE DEPICTION OF THE SUB-SURFACE ENVIRONMENT, AND THE USE OF THESE DRAWINGS DOES NOT REMOVE THE REQUIREMENT FOR THE USE OF SAFE DIGGING TECHNIQUES AT ALL TIMES, IN LINE WITH THE REQUIREMENTS OF HSG47 AND CURRENT CDM REGULATIONS.

BOUNDARIES SHOWN ARE PHYSICAL SITE FEATURES AND MAY NOT REPRESENT LEGAL OWNERSHIP.

UTILITY MAPPING LEGEND

AC	ASBESTOS CEMENT	LP	LAMP POST
AR	ASSUMED ROUTE	MH	MANHOLE
AV	AIR VALVE	MKR	UTILITY MARKER POST
BL	BED LEVEL	MW	MONITORING WELL
BB	BASE BEND	OH	OVERHEAD
BD	BACK DROP	OSA	OFF SURVEY AREA
BH	BOREHOLE	PE	POLYETHYLENE
BR	BRICK	PL	PLASTIC
BT	BT INSPECTION CHAMBER	PM	PARKING METER
CI	CAST IRON	PR	PIPE RISER
CL	COVER LEVEL	PVC	POLYVINYL CHLORIDE
CR	CABLE RISER	RE	RODDING EYE
CTV	CABLE TV INSPECTION CHAMBER	RWP	RAIN WATER PIPE
CP	CATCHPIT	S/A	SOAKAWAY
d	DEPTH	SI	SPUN IRON
DI	DUCTILE	ST	STOP TAP
DP	DOWN PIPE	SV	SLUICE VALVE
ED	EMPTY DUCT	SVP	SOIL VENT PIPE
EOSC	END OF TRENCH SCAR	TE	TRAPPED EXIT
EOT	END OF TRACE	TFR	TAKEN FROM RECORD
EP	ELECTRIC POST	TL	TRAFFIC LIGHT
ER	EARTH ROD	TP	TELEGRAPH POST
FH	FIRE HYDRANT	UTOCTV	UNABLE TO CCTV
FL	FLOOD LIGHT	UTF	UNABLE TO FIND
GPR	GROUND PENETRATING RADAR	UTL	UNABLE TO LIFT
GRP	GLASS REINFORCED PLASTIC	UTS	UNABLE TO SURVEY
GV	GAS VALVE	UTT	UNABLE TO TRACE
GY	GULLY	VC	VITRIFIED CLAY
HL	HIGH LEVEL	VP	VENT PIPE
HOR	HEAD OF RUN	VR	VAPOUR RECOVERY
IB	ILLUMINATION BOLLARD	WL	WATER LEVEL
IC	INSPECTION CHAMBER	WM	WATER METER
IL	INVERT LEVEL	WO	WASH OUT VALVE
JB	JUNCTION BOX	WSC	WATER SERVICE COVER

SEWER IDENTIFICATION

- COMBINED WATER SEWER
- FOUL WATER SEWER
- SURFACE WATER SEWER
- UNKNOWN WATER SEWER

SUB-SURFACE KEY

- ELEC B2 — ELECTRIC CABLE
- HV B2 — ELECTRIC HIGH VOLTAGE
- LV B2 — ELECTRIC LOW VOLTAGE
- ST B2 — TELECOMMS CABLE
- CATV B2 — CABLE TELEVISION
- COMM B2 — COMMUNICATION CABLE
- FO B2 — FIBRE OPTIC
- WATER B2 — WATER PIPE
- GAS B2 — GAS PIPE
- FWS B2++ — FOUL WATER DRAINAGE
- SWS B2++ — SURFACE WATER DRAINAGE
- CWS B2++ — COMBINED DRAINAGE
- UWS B2++ — UNIDENTIFIED DRAINAGE
- FU B2 — FUEL PIPE
- UN B2 — UNIDENTIFIED SERVICE
- GPR B2 — GPR LINEAR FEATURE
- GPR AREA ANOMALY
- GPR AREA ANOMALY - REBAR
- OVERHEAD CABLE
- CABLE/PIPE RISER
- BACKDROP/TRAPPED EXIT
- ANOMALY FOUND WITH GPR
- PIPE DIAMETER (mm)
- END OF TRACE
- CHANGE IN QUALITY
- START OF RUN
- BLOCKED RUN
- SURVEY BOUNDARY — SURVEY BOUNDARY
- GPR SURVEY AREA
- VEGETATED AREA

UTILITY CONFIDENCE LEVELS

QL-A	HORIZONTAL AND VERTICAL POSITION VERIFIED VISUALLY HA +/-250MM VA +/-50MM.
QL-B1	HORIZONTAL AND VERTICAL POSITION DETECTED BY MULTIPLE METHODS HA +/-150MM OR +/-15% OF DEPTH.
QL-B2	HORIZONTAL AND VERTICAL POSITION DETECTED BY A SINGLE METHOD HA +/-250MM OR +/-40% OF DETECTED DEPTH.
QL-B3	HORIZONTAL POSITION DETECTED BY A SINGLE METHOD HA +/-500MM DEPTH UNDEFINED.
QL-B4	UTILITY IS SUSPECTED TO EXIST BUT HAS NOT BEEN DETECTED. ASSUMED ROUTE HORIZONTAL & DEPTH UNDEFINED.
QL-C	UNDERGROUND UTILITY PLOTTED FROM UTILITY RECORD DATA ONLY, BUT WITH SITE RECONNAISSANCE TO MATCH UTILITY RECORD WITH PHYSICAL UTILITY STREET FURNITURE AS A BEST FIT.
QL-D	DESKTOP UTILITY RECORD SEARCH. THOROUGH DESKTOP SEARCH OF ALL STATUTORY ASSET OWNERS TO SUPPLY THEIR RECORD DATA.
QL-S	SEWER CONNECTION CONFIRMED VIA ACOUSTIC TESTING ONLY. HORIZONTAL AND VERTICAL POSITION ASSUMED TO BE MOST DIRECT ROUTE.

REV.	AMENDMENTS:	DRN	CHK	APP	DATE:
–	FIRST ISSUE	FA	DG	GS	07.04.26

PROJECT:
ST. HELEN'S SCHOOL,
EASTBURY ROAD,
NORTHWOOD

DRAWING TITLE:
UNDERGROUND UTILITY SURVEY

CLIENT:
ST. HELEN'S SCHOOL

DRAWING NUMBER:
30518_06_200_01

REVISION:	SHEET SIZE:	SCALE:
–	A0	1:200

STATUS:
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APPENDICES

Appendix F

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Doc. Ref.	30518-CALC-0101
Sheet	1 of 8
Engineer	B. Oyston
Date	08 May 26
Revision	-

DESIGN CALCULATIONS FRONT SHEET

SCHEME	St Helen's School, Eastbury Road, Northwood.
CLIENT	St Helen's School.
ASPECTS OF SCHEME TO BE DESIGNED	• Greenfield Calculations • Brownfield Calculations • Surface Water Sewer Design • 1 in 2, 1 in 30 year +20% climate change and 1 in 100 year +25% climate change design simulations
CODES OF PRACTICE, DESIGN SPECIFICATIONS & BRITISH STANDARDS	• Design and analysis of urban storm drainage. Wallingford Procedure Vol. 1. • National Standards for Sustainable Drainage Systems (SuDS) - 2025. • The SuDS Manual – CIRIA C753.
NOTES	• In accordance with the National SuDS Standards, the strategy involves conveying surface water flows to a geo-cellular tank before discharging into the existing 225mm surface water sewer along Carew Road at 2.0l/s. • A storage volume of 22.24m^3 is required for an impermeable area of 0.05ha within the geo-cellular tank to allow surface water flows to discharge at 2.0l/s into the 225mm surface water sewer along Carew Road for all events up to and including the 1%AEP25CC event. • Drainage calculations were carried out within Flow Causeway.

INDEX

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Brownfield Run-off Calculation

Project: **St Helen's School, Eastbury Road, Northwood**

File Ref: **30518**

O.S. Grid Ref: **509461 Easting ,191666 Northing**

The Rational Method equation used to calculate peak stormwater runoff rate is:

$$Q = 2.78\ CiA$$

Where;

Q = The peak stormwater runoff rate from the drainage area (L/S).

2.78 = Conversion factor to use standard units.

C = Runoff coefficient for drainage area (A).

i= The intensity of the design storm for peak runoff calculation (mm/hr).

A = The area of the watershed that drains to the point for which the peak runoff rate is calculated (ha).

The following figures will be used to calculate the peak runoff for the site;

C = 0.9, as not all run-off will discharge from the site.

i= 50 mm/hr

A = 0.05 ha

Peak run-off for the site;

$$Q = 2.78\ X\ 0.9\ X\ 50\ X\ 0.05$$

$$\boldsymbol{Q = 6.26\ l/s}$$

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
Tank	0.050	5.00	84.070	1200	509455.082	191673.352	1.000
Flow Control			83.970	1200	509453.340	191673.190	1.100
S1			83.230	1200	509443.858	191674.567	1.318
Outfall			82.300	1200	509433.128	191725.788	1.320

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	Tank	Flow Control	2.000	0.600	83.070	82.870	0.200	10.0	225	5.01	50.0
1.001	Flow Control	S1	9.581	0.600	82.870	81.912	0.958	10.0	225	5.05	50.0
1.002	S1	Outfall	53.000	0.600	81.912	80.980	0.932	56.9	225	5.55	50.0

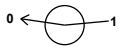
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	4.161	165.5	9.0	0.775	0.875	0.050	0.0
1.001	4.161	165.5	9.0	0.875	1.093	0.050	0.0
1.002	1.738	69.1	9.0	1.093	1.095	0.050	0.0

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	2.000	10.0	225	Circular	84.070	83.070	0.775	83.970	82.870	0.875
1.001	9.581	10.0	225	Circular	83.970	82.870	0.875	83.230	81.912	1.093
1.002	53.000	56.9	225	Circular	83.230	81.912	1.093	82.300	80.980	1.095

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	Tank	1200	Manhole	Adoptable	Flow Control	1200	Manhole	Adoptable
1.001	Flow Control	1200	Manhole	Adoptable	S1	1200	Manhole	Adoptable
1.002	S1	1200	Manhole	Adoptable	Outfall	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
Tank	509455.082	191673.352	84.070	1.000	1200				
						0	1.000	83.070	225
Flow Control	509453.340	191673.190	83.970	1.100	1200	1	1.000	82.870	225
									
						0	1.001	82.870	225
S1	509443.858	191674.567	83.230	1.318	1200		1.001	81.912	225
						0	1.002	81.912	225
Outfall	509433.128	191725.788	82.300	1.320	1200	1	1.002	80.980	225
									

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	x	2 year (l/s)	0.0
Rainfall Events	Singular	Drain Down Time (mins)	240	30 year (l/s)	0.0
Summer CV	1.000	Additional Storage (m³/ha)	0.0	100 year (l/s)	0.0
Winter CV	1.000	Starting Level (m)		Check Discharge Volume	x
Analysis Speed	Normal	Check Discharge Rate(s)	✓		

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	20	0	0
100	25	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.95
Greenfield Method	FEH	Growth Factor 100 year	2.48
Positively Drained Area (ha)	0.050	Betterment (%)	0
SAAR (mm)	678	QMed	0.3
Host	1	QBar	0.3
BFIHost	0.172	Q 2 year (l/s)	
Region	6	Q 30 year (l/s)	
QBar/QMed conversion factor	1.136	Q 100 year (l/s)	
Growth Factor 2 year	0.88		

Node Flow Control Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	82.870	Product Number	CTL-SHE-0073-2000-0600-2000
Design Depth (m)	0.600	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node Tank Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	83.070
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	98

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	65.0	0.0	0.400	65.0	0.0	0.401	0.0	0.0

Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	Tank	24	83.112	0.042	7.6	2.6249	0.0000	OK
30 minute summer	Flow Control	23	83.133	0.263	8.3	0.2969	0.0000	SURCHARGED
360 minute summer	S1	200	81.938	0.026	2.0	0.0299	0.0000	OK
360 minute summer	Outfall	200	81.006	0.026	2.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	Tank	1.000	Flow Control	8.3	0.510	0.050	0.0448	
30 minute summer	Flow Control	1.001	S1	2.0	1.080	0.012	0.0192	
360 minute summer	S1	1.002	Outfall	2.0	0.773	0.029	0.1372	12.7

Results for 30 year +20% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	Tank	98	83.303	0.233	14.2	14.6301	0.0000	SURCHARGED
120 minute summer	Flow Control	98	83.303	0.433	5.8	0.4894	0.0000	SURCHARGED
60 minute winter	S1	184	81.938	0.026	2.0	0.0299	0.0000	OK
60 minute winter	Outfall	184	81.006	0.026	2.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute summer	Tank	1.000	Flow Control	5.8	0.427	0.035	0.0795	
120 minute summer	Flow Control	1.001	S1	2.0	1.014	0.012	0.0192	
60 minute winter	S1	1.002	Outfall	2.0	0.773	0.029	0.1372	20.3

Results for 100 year +25% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	Tank	114	83.424	0.354	12.0	22.2435	0.0000	SURCHARGED
120 minute winter	Flow Control	116	83.423	0.553	8.0	0.6256	0.0000	SURCHARGED
720 minute winter	S1	300	81.938	0.026	2.0	0.0299	0.0000	OK
720 minute winter	Outfall	300	81.006	0.026	2.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute winter	Tank	1.000	Flow Control	8.0	0.546	0.048	0.0795	
120 minute winter	Flow Control	1.001	S1	2.0	1.013	0.012	0.0192	
720 minute winter	S1	1.002	Outfall	2.0	0.773	0.029	0.1372	51.3

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APPENDICES

Appendix G

SURFACE WATER FLOWS TO DISCHARGE TO THE NORTH OF THE SITE VIA AN EXISTING 225mm SURFACE WATER SEWER IN CAREW ROAD (SEE INSET 1).

FLOW CONTROL DEVICE
COVER LEVEL = 83.97m
INVERT LEVEL = 82.87m
DESIGN DEPTH = 0.60m
DESIGN HEAD = 2.0l/s

PERIMETER DRAIN PLACED ALONG LOW POINT OF CANOPY COVER OF PADEL COURTS. SURFACE WATER FLOWS WILL BE COLLECTED WITHIN THE DRAIN AND CONVEYED TO THE PROPOSED GEO-CELLULAR TANK.

GEO-CELLULAR TANK
DESIGN BASED ON IMPERMEABLE AREA OF 0.05ha.

COVER LEVEL = 84.07m
TOP OF TANK = 83.47m
INVERT OF TANK = 83.07m
DEPTH OF TANK = 0.40m
DEPTH OF COVER = 0.60m
PLAN AREA = 65.00m²

A TOTAL STORAGE VOLUME OF 22.24m³ TO ACCOMMODATE STORAGE FOR ALL STORM EVENTS UP TO AND INCLUDING A 1 IN 100 YEAR RETURN PERIOD WITH A 25% CLIMATE CHANGE ALLOWANCE.

PADEL COURTS TO BE COVERED BY PROPOSED CANOPY COVER.

SURFACE WATER DRAINAGE STRATEGY
SCALE - 1:100m

PROPOSED SURFACE WATER OUTFALL INTO EXISTING 225mm SURFACE WATER SEWER SUBJECT TO AGREEMENT.

PROPOSED OUTFALL LEVELS BASED ON INTERPOLATED DATA OF MH4701 AND MH3701.

INVERT LEVEL = 80.98m

MH4701
COVER LEVEL = 82.59m
INVERT LEVEL = 81.02m

SURFACE WATER OUTFALL
SCALE - 1:250m

NOTES:

1. DO NOT SCALE THIS DRAWING.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ENGINEERS, ARCHITECTS AND SPECIALIST DESIGN DRAWINGS AND DETAILS.
3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE. ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.
4. THIS DRAWING IS FOR STRATEGY PURPOSES ONLY AND IS NOT TO BE USED FOR CONSTRUCTION PURPOSES.
5. DESIGN BASED ON EXISTING LEVELS AND SUBJECT TO CHANGE WITH EXTERNAL WORKS DESIGN / CONFIRMATION OF FFLS.
6. DRAINAGE STRATEGY IS SUBJECT TO AGREEMENT WITH RELEVANT THIRD PARTIES, INCLUDING LOCAL PLANNING AUTHORITY, LEAD LOCAL FLOOD AUTHORITY AND WATER AUTHORITY.
7. THE DRAINAGE STRATEGY WILL NEED UPDATING IF THE LAYOUT IS REVISED.
8. THE IMPERMEABLE AREA IS BASED ON THE CANOPY COVER ON TOP OF THE PROPOSED PADEL COURTS.
9. SURFACE WATER FLOWS GENERATED ON SITE TO BE CONVEYED VIA THE PROPOSED GEO-CELLULAR TANK.
10. PERIMETER PIPES AND DOWNPIPES WILL BE POSITIONED ON LOWEST AREA OF THE SITE TO CATCH FLOWS AND CONVEY TO GEO-CELLULAR TANK.
11. SURFACE WATER FLOWS TO DISCHARGE FROM GEO-CELLULAR TANK AT CONTROLLED RATE OF 2.0l/s.
12. SURFACE WATER FLOWS TO OUTFALL INTO THE EXISTING 225mm SURFACE WATER SEWER WITHIN CAREW ROAD TO THE NORTH OF THE SITE SUBJECT TO AGREEMENT.

KEY

- SITE BOUNDARY
- PROPOSED PADEL AREAS
- PROPOSED PERIMETER DRAIN
- PROPOSED SURFACE WATER SEWER
- EXISTING PUBLIC SURFACE WATER SEWER
- EXISTING PUBLIC FOUL WATER SEWER
- EXISTING PRIVATE SURFACE WATER SEWER
- EXISTING PRIVATE FOUL WATER SEWER
- EXISTING PRIVATE CLEAN WATER SEWER
- PROPOSED GEO-CELLULAR TANK
- OVERLAND FLOW ROUTES

REV:	AMENDMENTS:	DRN:	CHK:	APP:	DATE:
-	FIRST ISSUE	BO	ZJ	RC	08.05.26

PROJECT:
ST HELEN'S SCHOOL
EASTBURY ROAD
NORTHWOOD

DRAWING TITLE:
OUTLINE DRAINAGE STRATEGY

CLIENT:
ST HELEN'S SCHOOL

DRAWING NUMBER:
30518_01_230_01

REVISION:	SHEET SIZE:	SCALE:
-	A1	AS SHOWN

STATUS:
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- CIVIL ENGINEERING
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