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Flood Risk and Surface Water Assessment Rev0

46 Charlgrove Road,
London,
N17 0JD

20 October 2024

1. Introduction 4
Site Details 4
Proposals 4
2. Planning Policy- Flood Risk, and Surface Water Management 5
National Planning Policy Framework 5
The London Plan 2021 7
Haringey Council 10
Non-Statutory Technical Standards for SuDS 13
3. Sources of Flood Risk 14
Fluvial Flood Risk 14
Groundwater Flooding 14
Surface Water Flooding 14
Sewer Flooding 15
4. Flood Mitigation 15
Finished Floor Levels 16
Flood Resilient Measures 16
Natural flood management techniques 16
5. Surface Water Management 18
Rates of Runoff 18
Surface Water Runoff from the Existing Site 18
Surface Water Runoff from the Redeveloped Site 19
SuDS Option 20
5. Conclusions 22
Appendices 25

Appendices

Appendix A - Site Location Plan and Existing site Layout
Appendix B - Proposed Site Layout
Appendix C - Greenfield Runoff (Total Site)
Appendix D - British Geological Society Borehole Record
Appendix E – Micro Drainage Storage Calculations

Prepared by	Checked by	Date
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This document has been prepared solely as a Surface Water and SuDS Assessment for Hill Patru Architects. Base Energy accepts no responsibility or liability for any use that is made of this document other than by the Client for the purposes for which it was originally commissioned and prepared.

1. Introduction

This Flood Risk and Surface Water Assessment (Rev0) has been prepared to support the planning application for proposals at 46 Charlgrove Road.

A site location plan is provided in **Appendix A.**

Site Details

The site is currently a single property with two allocated postal numbers.

No.46 is an end of the terrace house.

At number 46A there are a series of unused garages of assorted scales (including two storeys) built on the boundary with neighbouring gardens and forming a yard in the centre of the site. Having functioned as a builder's yard, the site has now been unused for several years.

A copy of the existing site plans is also provided in **Appendix A**.

Proposals

Proposals are for the removal of the existing buildings, and the development of 6no. residential dwellings with associated hard and soft landscaped areas.

A copy of the proposed site layout is provided in **Appendix B**.

2. Planning Policy- Flood Risk, and Surface Water Management

National Planning Policy Framework

The aim of the National Planning Policy Framework (NPPF) (and accompanying Planning Practice Guidance (PPG)) is to direct development away from areas at highest risk of flooding; where development is necessary, it should be made safe without increasing flood risk elsewhere.

The NPPF states that a Flood Risk Assessment (FRA) is required to support a planning application for developments that are:

- located in Flood Zone 2 and/or Flood Zone 3
- located in Flood Zone 1 and comprise 1ha or above

In some instances, for example where a site is located in Flood Zone 1 and comprises less than 1ha, an FRA may be required if the site is within an area which has critical drainage problems (i.e. a Critical Drainage Area - CDA) as notified to the Local Authority by the Environment Agency (EA).

In order to provide an indication of the flood zone classification of the site, and to ascertain whether an FRA is required, the starting point is the EA flood maps which are available on the EA website.

Environment Agency Flood Map

The EA flood maps show fluvial and tidal flood outlines based on the following:

- Flood Zone 1 - land assessed as having less than 1 in 1000 annual probability of river or sea flooding
- Flood Zone 2 - land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding, or between a 1 in 200 and 1 in 1000 annual probability of flooding from the sea
- Flood Zone 3 - land assessed as having a 1 in 100 or greater annual probability of river flooding, or a 1 in 200 or greater annual probability of flooding from the sea

The flood maps available on the EA website confirm that the site is located in Flood Zone 2.

Flood Risk Assessment

Based on the above, under the NPPF an FRA is required to support the planning application.

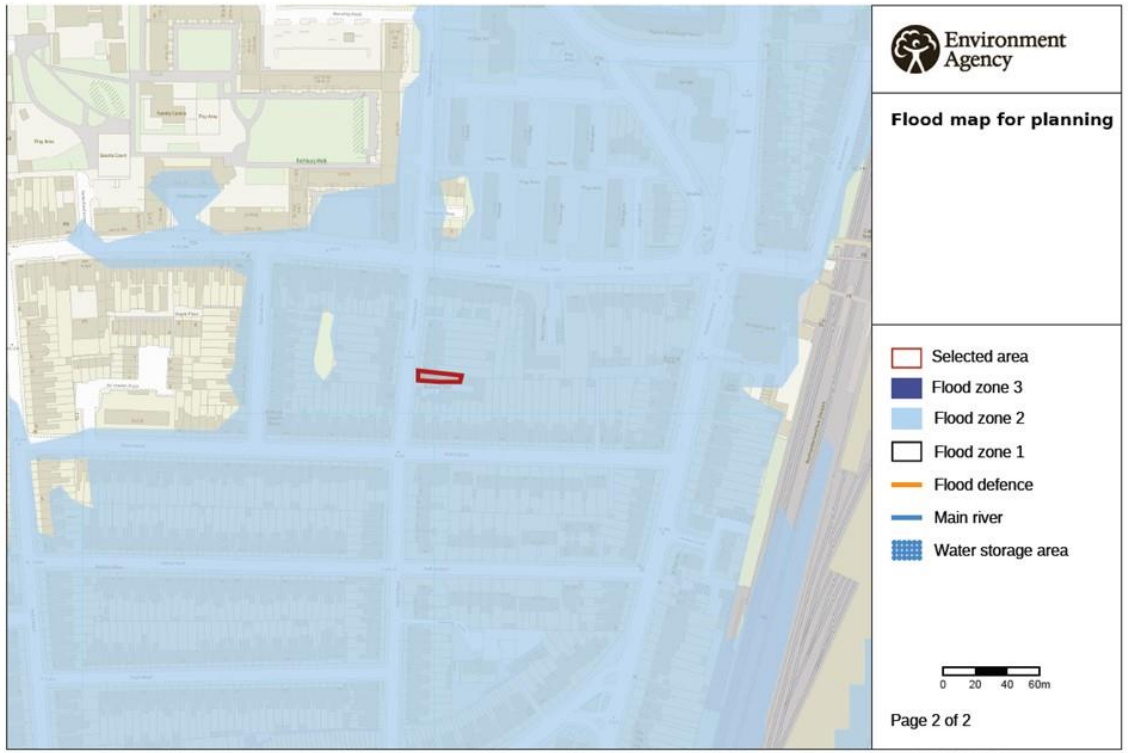

Figure 1 - Environment Agency Flood Map

The London Plan 2021

Policy SI 12 Flood risk management

A Current and expected flood risk from all sources across London should be managed in a sustainable and cost-effective way in collaboration with the Environment Agency, the Lead Local Flood Authorities, developers and infrastructure providers.

B Development Plans should use the Mayor's Regional Flood Risk Appraisal and their Strategic Flood Risk Assessment as well as Local Flood Risk Management Strategies, where necessary, to identify areas where particular and cumulative flood risk issues exist and develop actions and policy approaches aimed at reducing these risks. Boroughs should cooperate and jointly address cross-boundary flood risk issues including with authorities outside London.

C Development proposals should ensure that flood risk is minimised and mitigated, and that residual risk is addressed. This should include, where possible, making space for water and aiming for development to be set back from the banks of watercourses.

D Developments Plans and development proposals should contribute to the delivery of the measures set out in Thames Estuary 2100 Plan. The Mayor will work with the Environment Agency and relevant local planning authorities, including authorities outside London, to safeguard an appropriate location for a new Thames Barrier.

E Development proposals for utility services should be designed to remain operational under flood conditions and buildings should be designed for quick recovery following a flood

F Development proposals adjacent to flood defences will be required to protect the integrity of flood defences and allow access for future maintenance and upgrading. Unless exceptional circumstances are demonstrated for not doing so, development proposals should be set back from flood defences to allow for any foreseeable future maintenance and upgrades in a sustainable and cost-effective way.

G Natural flood management methods should be employed in development proposals due to their multiple benefits including increasing flood storage and creating recreational areas and habitat

Policy SI 13 Sustainable drainage

A Lead Local Flood Authorities should identify – through their Local Flood Risk Management Strategies and Surface Water Management Plans – areas where there are particular surface water management issues and aim to reduce these risks. Increases in surface water run-off outside these areas also need to be identified and addressed.

B Development proposals should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible. There should also be a preference for green over grey features, in line with the following drainage hierarchy:

1) rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation)
2) rainwater infiltration to ground at or close to source
3) rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)
4) rainwater discharge direct to a watercourse (unless not appropriate)
5) controlled rainwater discharge to a surface water sewer or drain
6) controlled rainwater discharge to a combined sewer.

C Development proposals for impermeable surfacing should normally be resisted unless they can be shown to be unavoidable, including on small surfaces such as front gardens and driveways.

D Drainage should be designed and implemented in ways that promote multiple benefits including increased water use efficiency, improved water quality, and enhanced biodiversity, urban greening, amenity and recreation.

9.13.1 London is at particular risk from surface water flooding, mainly due to the large extent of impermeable surfaces. Lead Local Flood Authorities have responsibility for managing surface water drainage through the planning system, as well as ensuring that appropriate maintenance arrangements are put in place. Local Flood Risk Management Strategies and Surface Water Management Plans should ensure they address flooding from multiple sources including surface water, groundwater and small watercourses that occurs as a result of heavy rainfall.

9.13.2 Development proposals should aim to get as close to greenfield run-off rates as possible depending on site conditions. The well-established drainage hierarchy set out in this policy helps to reduce the rate and volume of surface water run-off**. Rainwater should be managed as close to the top of the hierarchy as possible. There should be a preference for green over grey features, and drainage by gravity over pumped systems**. A blue roof is an attenuation tank at roof or podium level; the combination of a blue and green roof is particularly beneficial, as the attenuated water is used to irrigate the green roof.

9.13.3 For many sites, **it may be appropriate to use more than one form of drainage**, for example a proportion of rainwater can be managed by more sustainable methods, with residual rainwater managed lower down the hierarchy. In some cases, direct discharge into the watercourse is an appropriate approach, for example rainwater discharge into the tidal Thames or a dock. This should include suitable pollution prevention filtering measures, ideally by using soft engineering or green infrastructure.

In addition, if direct discharge is to a watercourse where the outfall is likely to be affected by tide-locking, suitable storage should be designed into the system. However, in other cases direct discharge will not be appropriate, for example discharge into a small stream at the headwaters of a catchment, which may cause flooding. This will need to be assessed on a case-by-case basis, taking into account the location, scale and quality of the discharge and the receiving watercourse. The maintenance of identified drainage measures should also be considered in development proposals.

9.13.4 The London Sustainable Drainage Action Plan complements this policy. It contains a series of actions to make the drainage system work in a more natural way with a particular emphasis on retrofitting.

Haringey Council

Local SuDS Standards

Haringey Council Local SuDS Standards document states:

SuDS Principles

LS1a *Sustainable drainage systems are to be designed to control surface water run off close to where it falls as rainfall and mimic natural drainage as closely as possible in accordance with National Planning Practice Policy.*

LS1b *Proposals for SuDS must result in capture for reuse, discharge into the ground, to a surface water body or, where these are demonstrated to be not achievable, to the storm sewer or combined sewer where no storm sewer is available. The destination of runoff for proposed SuDS must be justified using a methodology acceptable to Haringey.*

LS1c *Storage and treatment of surface runoff should be provided through provision of a management train.*

Peak flow control

LS2a *For greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event should never exceed the peak greenfield runoff rate for the same event.*

LS2b *The design of the drainage system accounts for the likely impacts of climate change and potential changes in impermeable area over the design life of the development.*

LS3a *For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.*

LS3b *Where Greenfield rates cannot be achieved Haringey request that 50% of the Greenfield runoff rate attenuation volume be provided and outflows controlled to Greenfield runoff rates.*

LS3c *For developments which were previously developed, the design of the drainage system accounts for the likely impacts of climate change and potential changes in impermeable area over the design life of the development.*

Volume control

LS4 *To ensure no increase in flood risk elsewhere, for greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event should never exceed the greenfield runoff volume for the same event.*

LS5 *To make provision for reduction in catchment floodrisk, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event. Haringey will seek to ensure that all means of volume reduction have been fully explored.*

LS6 *Where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body in accordance with* ***S4*** *or* ***S5*** *above, the runoff volume must be discharged at a rate that does not adversely affect flood risk. Haringey will request this rate to be a maximum discharge rate of Qbar for the 1 in 100 year rainfall event with allowance made for climate change and application of urban creep where appropriate. Where development proposals do not meet these proposals Haringey will request that detailed hydraulic modelling be provided to demonstrate that there is no increased flood risk elsewhere in the receiving catchment.*

Flood risk within the development

LS7 *The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30 year rainfall event.*

LS8 *The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development.*

LS9a *The design of the site must ensure that, so far as is reasonably practicable, flows resulting from rainfall in excess of a 1 in 100 year rainfall event are managed in exceedance routes that minimise the risks to people and property.*

LS9b *SuDS design to ensure resilience to blockage and provide for exceedance. Drainage design proposals should be examined for the likelihood and consequences of any potential failure scenarios (e.g. structural failure, blockage of inlets or outlets, blockage of pipes, impediments along conveyance routes), and the associated flood risks reduced where possible.*

LS9c *Where development proposals do not meet these proposals Haringey will request that detailed hydraulic modelling be provided to demonstrate the risk of flooding within the development is manageable and that there is no increased flood risk elsewhere in the receiving catchment.*

Structural integrity

LS10 *Components must be designed to ensure structural integrity of the drainage system and any adjacent structures or infrastructure under anticipated loading conditions over the design life of the development taking into account the requirement for reasonable levels of maintenance.*

LS11 *The materials, including products, components, fittings or naturally occurring materials, which are specified by the designer must be of a suitable nature and quality for their intended use.*

Designing for maintenance considerations

LS12 *Pumping should only be used to facilitate drainage for those parts of the site where it is not reasonably practicable to drain water by gravity. Designs should ensure accordance with* ***S1a*** *before pumping is considered.*

Construction

LS13 *The mode of construction of any communication with an existing sewer or drainage system must be such that the making of the communication would not be prejudicial to the structural integrity and functionality of the sewerage or drainage system.*

LS14 *Damage to the drainage system resulting from associated construction activities must be minimised and must be rectified before the drainage system is considered to be completed.*

Water Quality

LS15 *For greenfield developments, the frequency of runoff from the development to any highway drain, sewer or surface water body should not be increased. The surface water runoff should be managed to prevent any discharge of surface water from the site for rainfall events less than 5mm in depth and prevent runoff from the first 5mm of rainfall for larger events. This should be achieved for the majority of all rainfall events that take throughout the year. S1a should be adhered to, otherwise the design should demonstrate that there is no runoff from 80% of rainfall events during summer events and 50% for winter rainfall events using time series rainfall hydraulic modelling analysis.*

LS16 *Where surface water is likely to be contaminated, effective management is required to reduce contaminant loads and concentrations in the runoff to acceptable levels, in order minimise the risk of pollution of receiving waterbodies and/or protect receiving sewers.*

Non-Statutory Technical Standards for SuDS

The Non-Statutory Technical Standards for SuDS, (and accompanying Local Authority SuDS Officer Organisation (LASOO) Practice Guidance) sets out the details which should be addressed within a SuDS Report, including:

- Flood Risk Outside of the Development
- Peak Flow Control and Volume Control
- Flood Risk Within the Development
- Runoff Destinations
- Structural Integrity
- Designing for Maintenance Considerations
- Construction

3. Sources of Flood Risk

Fluvial Flood Risk

As previously detailed, the site is shown to be located within Flood Zone 2.

More detailed flood information has been obtained from the Environment Agency.

Detailed Flood Information

The more detailed flood information confirms that the site is within the 1 in 1000 year flood outline, with 2D levels of ~10.05m AOD.

Groundwater Flooding

Groundwater flooding generally occurs during intense, long-duration rainfall events, when infiltration of rainwater into the ground raises the level of the water table until it exceeds ground levels. It is most common in low-lying areas overlain by permeable soils and permeable geology, or in areas with a naturally high water table.

Reference has also been made to the British Geological Survey geology maps; these indicate that the site us underlain by Enfield Silt Member (clay and silt). The underlying bedrock is comprised of London Clay.

Based on the above, the risk of groundwater flooding is considered to be low.

Surface Water Flooding

Surface water flooding results from rainfall generated overland flows, before the runoff reaches a watercourse/ drainage system, or where the watercourse/ drainage system is overwhelmed and unable to accept further runoff. Surface water runoff is usually associated with high intensity rainfall events but may also occur with lower intensity rainfall where the ground is saturated, developed or otherwise has low permeability resulting in overland flows and ponding within depressions in the topography.

The EA provide maps on their website which illustrate the risk of surface water flooding along with potential depths and velocities; these show that the site is in a location at low risk of surface water flooding with potential depths up to 900mm.

Sewer Flooding

Sewer flooding occurs when the capacity of underground sewerage systems is exceeded, resulting in flooding inside and outside of buildings. Normal discharge of sewers and drains through outfalls may be impeded by high water levels in receiving waters.

There are no known records of sewer water flooding at the site location.

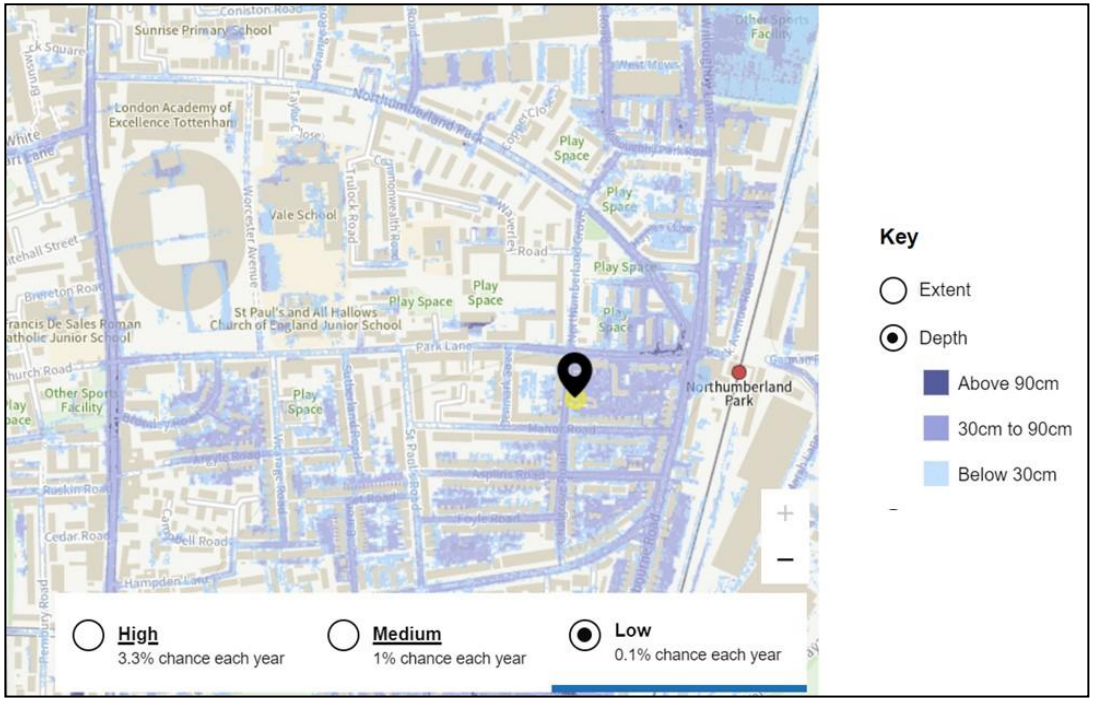

Figure 2 - Environment Agency Surface Water Flooding Map

4. Flood Mitigation

Based on the assessment of all sources of flood risk in the previous section, the main sources of flooding are shown to be fluvial and surface water. The following measure are proposed to mitigate any risk of flooding from these sources.

Finished Floor Levels

Finished floor levels will be set above existing ground levels.

Flood Resilient Measures

Wherever feasible, flood resilient measures will be included in line with guidance provided in the Communities and Local Government Document, *Improving the Flood Performance of New Buildings: Flood Resilient Construction'*[1]. These could include:

- Where possible, all service entries will be sealed (e.g. with expanding foam or similar closed cell material).
- Pipework: Closed cell insulation
- Drainage services: Non-return valves in the drainage system to prevent back-flow of diluted sewage in situations where there is an identified risk of the foul sewer surcharging. Maintenance of these valves is important to ensure their continued effectiveness.
- Water, electricity and gas meters raised
- Electrical services: electrical sockets raised

Natural flood management techniques

Natural flood management techniques work with natural processes to protect, restore and emulate the natural functions of catchments, floodplains, rivers and the coast. They aim to manage the sources and pathways of flood waters whilst providing wider benefits to people, wildlife and the environment.

[1] Improving the Flood Performance of New Buildings: Flood Resilient Construction. Department for Communities and Local Government. May 2007.

As shown in **Appendix B**, landscaping is a key feature of the proposals in terms of natural flood management and also from an ecological and bio-diversity perspective.

These measures, in combination with the SuDS strategy (as detailed in the following section) will ensure that surface water is managed on site.

5. Surface Water Management

The total site area is ~ 620m^2.

Rates of Runoff

As previously noted, Policy 9.13.2 of the London Plan 2021 states: *Development proposals should aim to get as close to greenfield run-off rates as possible depending on site conditions. The well-established drainage hierarchy set out in this policy helps to reduce the rate and volume of surface water run-off. Rainwater should be managed as close to the top of the hierarchy as possible. There should be a preference for green over grey features, and drainage by gravity over pumped systems.*

As such, in the first instance the **ICP SuDS** method within Micro Drainage has been used to calculate flow rates from the total site (as detailed in **Appendix C** and shown in **Table 1**.

Table 1 – ICP SuDS – Site Greenfield Runoff Rates (l/s)

Return Period	Flow Rate for 620m^2 (l/s)
QBAR	0.2
1 in 30 year	0.5
1 in 100 year	0.7

Surface Water Runoff from the Existing Site

It is understood that surface water runoff from the existing site connects into the public sewer system.

Surface Water Runoff from the Redeveloped Site

- Roof areas - 345m^2
- Hardstanding areas - 225m^2
- Garden areas - 50m^2

The following sets out the preferred methods for the management of surface water runoff from roof and hardstanding areas (totalling 570m^2) at the redeveloped site in line with the London Plan hierarchy for the disposal of surface water runoff.

The London Plan 2021 Hierarchy

***1**) Rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation)*
There is the potential for simple rainwater reuse. See the following section of this report.

***2)** Rainwater infiltration to ground at or close to source*
At the time of writing, no site / ground investigation or infiltration testing (to BRE Digest 365) has been undertaken to confirm the underlying ground conditions.

As such, and as previously detailed, the British Geological Survey geology maps; these indicate that the site us underlain by Enfield Silt Member (clay and silt). The underlying bedrock is comprised of London Clay.

Reference has also been made to the BGS borehole records; a record is available for the nearby Manor Road, and this confirms the presence of London Clay (see **Appendix D**).

On this basis, and without further investigative works, we do not recommend full infiltration of surface water. However, a Type C permeable paving system could feasibly be installed.

3) *Rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)*
The landscaping will help with the natural conveyance of surface water.

4) *Rainwater discharge direct to a watercourse (unless not appropriate)*
There are no known watercourses in the immediate vicinity of the site.

5) *Controlled rainwater discharge to a surface water sewer or drain*
It is proposed that surface water runoff from hardstanding areas will continue to connect into the public sewer system, via Type C permeable paving with a controlled outlet.

SuDS Option

Based on the proposed site layout and the desktop study of the underlying ground conditions, and in line with the London Plan drainage hierarchy, the following are the preferred options for the management of surface water runoff from hardstanding areas:

- Water Butts
- Landscaping for the natural conveyance of surface water
- Type C permeable paving with a controlled outlet into the public sewer system

Water Butts

In order to provide a level of rainwater recycling, a water butt will be provided. Water butts afford the opportunity to reduce the impact on already stretched potable water supply by enabling future occupants to reuse water collected in the water butt, for example when watering the garden/or washing cars etc. If this supply is used frequently this may also ensure that some additional storage is available during an extreme rainfall event (noting that there is a possibility that the tank may be full before the onset of a storm and as such there is no guarantee as to the level of attenuation storage they can provided).

Ideally, an overflow should be provided to prevent the rainwater tank from overflowing. This could be via a perforated hose to allow the tank to empty after a rainfall event thus making capacity for the next event.

Type C Permeable Paving with a Controlled Outlet

Micro Drainage has been used to calculate storage for surface water runoff from the roof and hardstanding areas (totalling 570m^2) in up to the 1 in 100 year plus 40% allowance for climate change.

Flows have been restricted to 0.7l/s which is the 1 in 100 year greenfield rate of runoff.

As shown in **Appendix E**, a total storage volume of 26.4m^3 will be required. The storage has been designed at a depth of 1.5m, filling to 1.0m and with a 0.5m freeboard provided, should any excess flows be received.

- *The SuDS strategy has been put together based on our understanding of the ground conditions and site layout.*
- *Details drainage drawings will be provided at detailed design stage*
- *Building Control will need to be consulted on the siting of the SuDS, and the recommendations and advice of the SuDS manufacturer / installer should always be followed.*

5. Conclusions

This Flood Risk and Surface Water Assessment (Rev0) has been prepared to support the planning application for proposals at 46 Charlgrove Road.

The site is currently a single property with two allocated postal numbers.

No.46 is an end of the terrace house.

At number 46A there are a series of unused garages of assorted scales (including two storeys) built on the boundary with neighbouring gardens and forming a yard in the centre of the site.

Proposals are for the removal of the existing buildings, and the development of 6no. residential dwellings with associated hard and soft landscaped areas.

Flood Risk

- The site is shown to be located within fluvial Flood Zone 2, with 2D levels of ~10.05m AOD.
- Based on the desktop study of underlying ground conditions, the risk of groundwater flooding is considered to be low.
- The EA surface water flooding maps show that the site is in a location at low risk of surface water flooding with potential depths up to 900mm.

Flood Mitigation

Based on the assessment of all sources of flood risk, the main sources of flooding are shown to be fluvial and surface water. The following measure are proposed to mitigate any risk of flooding from these sources.

- Finished floor levels will be set above existing ground levels.
- Wherever feasible, flood resilient measures will be included in line with best practice guidance.
- Landscaping is a key feature of the proposals in terms of natural flood management and also from an ecological and bio-diversity perspective. These measures, in combination with the SuDS strategy will ensure that surface water is managed on site.

Surface Water and SuDS

Based on the proposed site layout and the desktop study of the underlying ground conditions, and in line with the London Plan drainage hierarchy, the following are the preferred options for the management of surface water runoff from hardstanding areas:

- Water Butts
- Landscaping for the natural conveyance of surface water
- Type C permeable paving with a controlled outlet into the public sewer system.

  Micro Drainage has been used to calculate storage for surface water runoff from the roof and hardstanding areas (totalling 570m^2) in up to the 1 in 100 year plus 40% allowance for climate change. Flows have been restricted to 0.7l/s which is the 1 in 100 year greenfield rate of runoff. On this basis, a total storage volume of 26.4m^3 will be required. The storage has been designed at a depth of 1.5m, filling to 1.0m and with a 0.5m freeboard provided, should any excess flows be received.

- *The SuDS strategy has been put together based on our understanding of the ground conditions and site layout.*
- *Details drainage drawings will be provided at detailed design stage*
- *Building Control will need to be consulted on the siting of the SuDS, and the recommendations and advice of the SuDS manufacturer / installer should always be followed.*

Appendices

Appendix A - Site Location Plan and Existing site Layout

01 Location Plan
1:1250 @A3

0 5m 10m 20m 50m 100m

GENERAL PLANNING NOTES

1. No dimensions to be scaled from this drawing.
2. All errors, omissions or inconsistencies to be reported to the architect Immediately.
3. Use figured dimensions only. All dimensions to be checked on site prior to construction and/or fabrication.

LEGEND

Boundary Line

Existing fabric

Proposed fabric

PLANNING

Project No.	2306
Client	Steven Eagling
Date	Feb 2024
Scale	1:1250 @ A3
Project	46, Chalgrove Road, N17 0JD
Drawing Title:	Location Plan
Drawing No.	2306_01_001
Rev.	/
Drawn	
Approved	
Signed	

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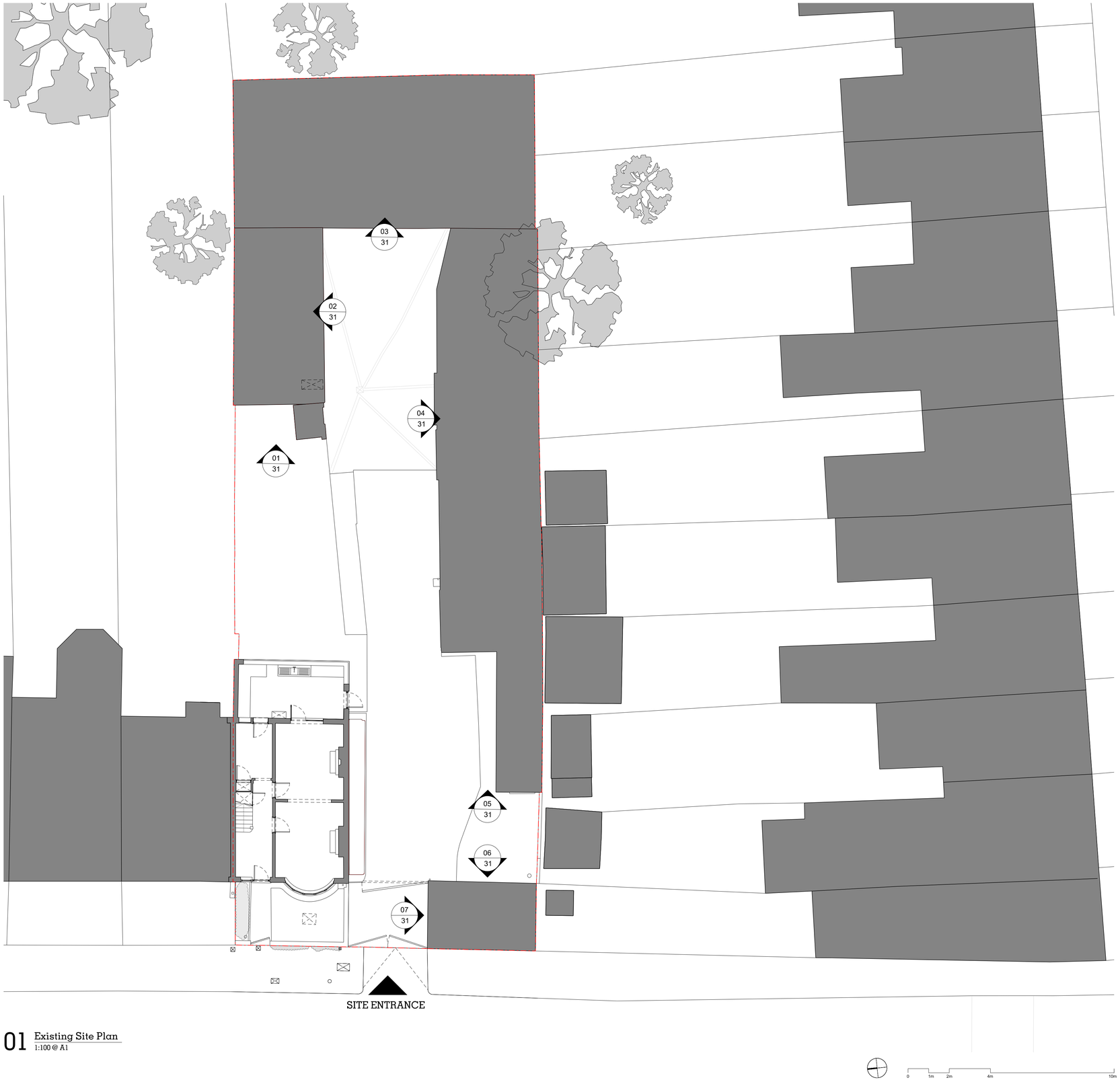

01 Existing Site Plan
1:100 @ A1

GENERAL PLANNING NOTES

1. No dimensions to be scaled from this drawing.

2. All errors, omissions or inconsistencies to be reported to the architect immediately.

3. Use figured dimensions only. All dimensions to be checked on site prior to construction and/or fabrication.

LEGEND

Boundary Line

Existing fabric

Proposed fabric

PRELIMINARY

Project No.	2306
Client	Steven Eagling
Date	Feb 2024
Scale	1:200 @A3 / 1:100 @A1
Project	46, Chalgrove Road, N17 0JD
Drawing Title:	2306_01_10
Drawing No.	Existing Site Plan
Rev.	/
Drawn	
Approved	
Signed	

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RIBA

arb Architects Registration Board

Appendix B - Proposed Site Layout

01 Proposed Site Ground Floor Plan
1:100 @ A1

KEY

1. Private amenity
2. Private courtyard
3. Planter and defensive planting
4. Planting
5. New mews
6. General Waste & Recycling bins store
7. Bicycle store
8. New brick wall to line mews
9. Planting / landscaping along path

LEGEND

Boundary Line

Existing fabric

Proposed fabric

PRELIMINARY

Project No. 2306

Client Steven Eagling

Date 11/06/24

Scale 1:200 @A3 / 1:100 @A1

Project 46, Chalgrove Road, N17 0JD

Drawing Title: Proposed Site Ground Floor Plan

Drawing No. 2306_00_10 Rev. /

Drawn Approved Signed

DRAFT

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Appendix C - Greenfield Runoff (Total Site)

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	0.060	Urban	0.000
SAAR (mm)	607	Region Number	Region 6

Results l/s

QBAR Rural	0.2
QBAR Urban	0.2
Q100 years	0.7
Q1 year	0.2
Q30 years	0.5
Q100 years	0.7

Appendix D - British Geological Society Borehole Record

TQ39SW/15(BD)
3466.9093
256
Page 242

GROUND EXPLORATIONS LIMITED

BOREHOLE SECTION SHEET

Date January 19 53

CONTRACT NAME MANOR ROAD. ORDER NO. 171/49/H.

Bored for : The Tottenham Borough Council.

Address : Town Hall, Tottenham, N.15.

Address of Site : Manor Road.

District or Town : Tottenham, N.17. County : London.

Standing Water Level : 7'0" (2.29 m) Below Surface : Dia. of Borehole : 6 Inches.

Water Struck (1) 7'0" (2) (3)

Boring Commenced : 11. 12. 52. Boring Completed : 13. 12. 52.

Special Remarks :

Jar Samples : 1'0"-4365; Water-4392;

Core Samples : 5'0"-4'6"-4366; 8'0"-4367; 12'0"-4368; 17'0"-18'0"-4369;
23'6"-24'6"-4370; 28'6"-30'0"-4371;

DESCRIPTION OF STRATA	Thickness (m)	Thickness Feet	Thickness Inches	Depth Below Surface (m)	Depth Below Surface Feet	Depth Below Surface Inches
Clients are requested to examine the samples of the Strata submitted, as the descriptions employed below are general terms and responsibility is not accepted for their application to commercial purposes.						
No. 2 Boring						
Topsoil and Fill	0.53	1	9	0.53	1	9
Sandy Clay	1.75	5	9	2.29	7	6
Gravel	2.51	8	3	4.80	15	9
Blue Clay	4.34	14	3	9.14	30	0
TOTAL FROM SURFACE ...		30	0		30	0
		9.14 m			9.14 m	

This form is to be returned to Head Office immediately the borehole is finished.

Foreman's Signature..... *Date* January 1953.

F. & R. Ltd.—9479

Appendix E – Micro Drainage Storage Calculations

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	0.528	0.528	0.5	13.5	O K
30 min Summer	0.669	0.669	0.6	17.1	O K
60 min Summer	0.791	0.791	0.6	20.3	O K
120 min Summer	0.878	0.878	0.7	22.5	O K
180 min Summer	0.898	0.898	0.7	23.0	O K
240 min Summer	0.891	0.891	0.7	22.8	O K
360 min Summer	0.857	0.857	0.7	21.9	O K
480 min Summer	0.826	0.826	0.6	21.1	O K
600 min Summer	0.796	0.796	0.6	20.4	O K
720 min Summer	0.767	0.767	0.6	19.6	O K
960 min Summer	0.714	0.714	0.6	18.3	O K
1440 min Summer	0.621	0.621	0.6	15.9	O K
2160 min Summer	0.502	0.502	0.5	12.9	O K
2880 min Summer	0.398	0.398	0.5	10.2	O K
4320 min Summer	0.199	0.199	0.5	5.1	O K
5760 min Summer	0.111	0.111	0.5	2.8	O K
7200 min Summer	0.073	0.073	0.5	1.9	O K
8640 min Summer	0.058	0.058	0.4	1.5	O K
10080 min Summer	0.049	0.049	0.4	1.3	O K
15 min Winter	0.593	0.593	0.6	15.2	O K
30 min Winter	0.753	0.753	0.6	19.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	143.954	0.0	14.0	22
30 min Summer	92.629	0.0	18.0	37
60 min Summer	56.713	0.0	22.1	66
120 min Summer	33.583	0.0	26.2	124
180 min Summer	24.424	0.0	28.6	182
240 min Summer	19.389	0.0	30.2	240
360 min Summer	13.924	0.0	32.6	300
480 min Summer	11.018	0.0	34.4	362
600 min Summer	9.182	0.0	35.8	428
720 min Summer	7.908	0.0	37.0	496
960 min Summer	6.245	0.0	38.9	636
1440 min Summer	4.471	0.0	41.8	910
2160 min Summer	3.197	0.0	44.9	1320
2880 min Summer	2.518	0.0	47.1	1708
4320 min Summer	1.796	0.0	50.4	2376
5760 min Summer	1.413	0.0	52.9	3008
7200 min Summer	1.172	0.0	54.8	3680
8640 min Summer	1.006	0.0	56.5	4408
10080 min Summer	0.884	0.0	57.9	5136
15 min Winter	143.954	0.0	15.7	22
30 min Winter	92.629	0.0	20.2	36

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	0.894	0.894	0.7	22.9	O K
120 min Winter	0.999	0.999	0.7	25.6	O K
180 min Winter	1.029	1.029	0.7	26.3	O K
240 min Winter	1.030	1.030	0.7	26.4	O K
360 min Winter	0.994	0.994	0.7	25.4	O K
480 min Winter	0.955	0.955	0.7	24.5	O K
600 min Winter	0.918	0.918	0.7	23.5	O K
720 min Winter	0.880	0.880	0.7	22.5	O K
960 min Winter	0.806	0.806	0.6	20.6	O K
1440 min Winter	0.671	0.671	0.6	17.2	O K
2160 min Winter	0.499	0.499	0.5	12.8	O K
2880 min Winter	0.322	0.322	0.5	8.2	O K
4320 min Winter	0.107	0.107	0.5	2.7	O K
5760 min Winter	0.059	0.059	0.4	1.5	O K
7200 min Winter	0.047	0.047	0.4	1.2	O K
8640 min Winter	0.040	0.040	0.3	1.0	O K
10080 min Winter	0.035	0.035	0.3	0.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	56.713	0.0	24.8	64
120 min Winter	33.583	0.0	29.3	122
180 min Winter	24.424	0.0	32.0	178
240 min Winter	19.389	0.0	33.9	234
360 min Winter	13.924	0.0	36.5	338
480 min Winter	11.018	0.0	38.5	380
600 min Winter	9.182	0.0	40.1	458
720 min Winter	7.908	0.0	41.4	534
960 min Winter	6.245	0.0	43.6	686
1440 min Winter	4.471	0.0	46.8	982
2160 min Winter	3.197	0.0	50.3	1408
2880 min Winter	2.518	0.0	52.8	1816
4320 min Winter	1.796	0.0	56.5	2340
5760 min Winter	1.413	0.0	59.2	2944
7200 min Winter	1.172	0.0	61.4	3664
8640 min Winter	1.006	0.0	63.3	4408
10080 min Winter	0.884	0.0	64.8	5136

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.450	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.052

Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)
0	4	0.025	4	8	0.027

Model Details

Storage is Online Cover Level (m) 1.500

Tank or Pond Structure

Invert Level (m) 0.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	25.6	0.700	25.6	1.400	25.6	2.100	25.6
0.100	25.6	0.800	25.6	1.500	25.6	2.200	25.6
0.200	25.6	0.900	25.6	1.600	25.6	2.300	25.6
0.300	25.6	1.000	25.6	1.700	25.6	2.400	25.6
0.400	25.6	1.100	25.6	1.800	25.6	2.500	25.6
0.500	25.6	1.200	25.6	1.900	25.6		
0.600	25.6	1.300	25.6	2.000	25.6		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0039-7000-1000-7000
Design Head (m)	1.000
Design Flow (l/s)	0.7
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	39
Invert Level (m)	0.000
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	0.7
Flush-Flo™	0.172	0.5
Kick-Flo®	0.345	0.4
Mean Flow over Head Range	-	0.5

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	0.5	1.200	0.8	3.000	1.1	7.000	1.7
0.200	0.5	1.400	0.8	3.500	1.2	7.500	1.7
0.300	0.5	1.600	0.9	4.000	1.3	8.000	1.8
0.400	0.5	1.800	0.9	4.500	1.4	8.500	1.8
0.500	0.5	2.000	1.0	5.000	1.4	9.000	1.9
0.600	0.6	2.200	1.0	5.500	1.5	9.500	1.9
0.800	0.6	2.400	1.0	6.000	1.6		
1.000	0.7	2.600	1.1	6.500	1.6		