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34 BELGRAVE MEWS SOUTH, LONDON. SW1X 8BT

SURFACE WATER DRAINAGE AND FLOOD RISK ASSESSMENT

Client:	Leconfield Property Group
Prepared By:	David Smith Associates
Date:	1st December 2023
Reference:	23/54121
Revision:	01

DSA LLP VAT REG : 443 6613 95

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CONTENTS

1. INTRODUCTION

1.1 Purpose of Report

1.1.1 David Smith Associates have been instructed on behalf of Leconfield Property Group to assess flood risk and drainage for a proposed development at 34 Belgrave Mews South, London.

1.2 Documents Referred To

1.2.1 The following documents specific to the site have been referred to.

- Leconfield Property Group suite of existing and proposed drawings.
- Westminster City Council, 'Basement Development in Westminster' Supplementary Planning Document' (SPD), October 2014
- London Plan, Policy 5.12 Flood Risk Management, and Policy 5.13 Sustainable Drainage
- Ground & Water Ground Investigation Report No. GWPR5680/PS/November 2023
- CCTV Survey Report, Express Solutions Group Ref LE16328. Dec 2023.
- Gov.uk Long Term Flood Risk Maps

2. EXISTING SITE AND PROPOSED DEVELOPMENT

2.1 Site Location

2.1.1 The site is located at 34 Belgrave Mews South, London. SW1X 8BT The site comprises of an existing dwelling and external paved courtyard. The overall plan area is approximately 90m^2.

2.2 Development Proposals

2.2.1 It is proposed to construct a new basement beneath the existing dwelling and undertake refurbishment to the ground and upper floors. The external paved area shall be extended in to for additional floor area for the dwelling. Remaining external areas shall be modified to become courtyards at ground level and basement level.

2.3 Ground Conditions

2.3.1 Approx 1.3m depth of Made Ground underlain by Kempton Park Gravel Member to approx. 4.1m bgl, then underlain by bedrock of the London Clay Formation.

2.3.2 Groundwater was not encountered during initial investigations. The Made Ground and underlying strata may be susceptible to seasonal groundwater.

3. FLOOD RISK

3.1 River or Tidal Flooding

3.1.1 With reference to Gov.uk Long Term Flood Risk Map, and 'Basement Development in Westminster' SPD, the site is located in Flood Zone 1. This is an area that has a VERY LOW chance of flooding from rivers. This means that each year, this area has a chance of flooding of less than 1 in 1000 (0.1%).

3.2 Surface Water Flooding

3.2.1 With reference to 'Basement Development in Westminster' SPD, the site is located outside of any Surface Water Flood Risk Hotspot.

3.2.2 With reference to Gov.uk Long Term Flood Risk Map, the site is located in an area that has a VERY LOW chance of flooding from surface water. This means that each year, this area has a chance of flooding of less than 1 in 1000 (0.1%).

3.3 Reservoir Flooding

3.3.1 With reference to Gov.uk Long Term Flood Risk Map, the site is situated outside of the area at risk of flooding from reservoirs.

3.4 Groundwater Flooding

3.4.1 The proposed basement is situated in the Kempton Park Gravel Member underlain by bedrock of the London Clay Formation. There is a risk of a perched water table which could interact with the proposed basement.

3.4.2 The use of specialist construction materials and drainage systems shall mitigate this risk. These are described in more detail in the Structural Report.

3.4.3 With reference to ‘The Lost Rivers of London’, the property is located almost equidistant between the the historic courses of the Westbourne River and Tyburn River. There is not considered to be any significant influence to the development from these watercourses.

3.5 Sewer Flooding

3.5.1 A Thames Water combined public sewer system is located under Belgrave Mews South. Proposed drainage systems from the property shall connect to the public sewer, as existing.

3.5.2 Outfalls from the property shall be fitted with one-way valves to prevent backwash from the public sewer if this is surcharged.

3.5.3 The existing combined drainage system within the property is proposed to be replaced with separate foul and surface water systems to reduce the risk of rainwater compromising sanitary appliances within the property.

4. DRAINAGE

4.1 Existing Drainage

4.1.1 Rainwater from the roofs, and wastewater from sanitary appliances, drain to combined systems within the property. These outfall to the Thames Water public sewer under Belgrave Mews South.

4.2 Proposed Drainage Considerations

4.2.1 The footprint of the existing buildings and external paved areas is approximately 90m^2.

4.2.2 The property is not located in an area prone to surface water flooding, as identified in 'Basement Development in Westminster' SPD.

4.2.3 The drainage hierarchy of London Plan Policy 5.13 is as follows:

1. Store rainwater for later use

   Viable to store some roof water in an above ground water butt, and ‘rain garden’ in ground floor courtyard (with overflow to main property drainage).

2. Use infiltration techniques, such as porous surfaces in non-clay areas

   The available external courtyard space is relatively small (approx. 2.7m x 3.4m) and bounded by critical structures. The underlying strata is susceptible to groundwater. It is not considered appropriate to concentrate rainwater from the wider property curtilage to an infiltration system in this area, but a permeable surface with infiltration shall be used for the courtyard.

3. Attenuate rainwater in ponds or open water features for gradual release

   Impractical due to space limitations

4. Attenuate rainwater by storing in tanks or sealed water features for gradual release

   It is proposed to pump a percentage of rainwater which is conveyed via the basement. The pump shall be specified with a reduced flow rate, and the wet well sized to hold the volume of water held back in the 100 year storm event + 40% additional flow to allow for climate change.

5. Discharge rainwater direct to a watercourse

   Impractical due to the distance to the nearest known watercourse.

6. Discharge rainwater to a surface water sewer/drain

   Impractical due to the distance to the nearest surface water sewer/drain.

7. Discharge rainwater to the combined sewer.

   Practical and reasonable solution, continuing the existing arrangement. Flow rate to be limited b the pump to offer a benefit to the sewer capacity.

4.3 Proposed Drainage

4.3.1 The part of the roof with frontage to the street measures approximately 24m^2 (27% of site area). It is proposed to maintain existing flows to the public sewer from this area as opportunities to control flows are limited or impractical.

4.3.2 The rear roofs, terraces and basement courtyard shall drain rainwater to the basement pump. This is then lifted to outfall to the public sewer at a flow rate limited to be less than existing.

4.3.3 Part of the rear roof area shall flow through a raised landscape planter, to slow the flow and provide irrigation to the planter. There is an opportunity to provide a water butt at this location if the homeowner finds this advantageous. The opportunities for a rain garden and water butt are not allowed for in the calculations to size the pump wet well, as a conservative approach.

4.3.4 The rear courtyard at ground level shall be constructed of permeable materials to allow rainwater falling on this area to infiltrate directly to the underlying strata in the same way as a vegetated area. This area accounts for 11m^2 (12% of site area). Soil infiltration properties shall be verified by testing prior to construction.

4.3.5 The formation level of the small courtyard area at basement level forms part of the structural works of the basement, with no opportunities for infiltration.

4.3.6 In summary, rainwater from 27% of the site area outfalls as existing, 12% shall now infiltrate, and the remaining 61% shall have a restricted outfall flow rate controlled by a pump.

4.3.7 In the new basement, groundwater shall be collected by a Delta Membrane system and directed to the surface water pump. Foul water shall have a separate pump.

4.3.8 The separate foul and surface water systems outfall and combine at the existing manholel chamber in the footway of Belgrave Mews South prior to their outfall to the public sewer. This chamber forms a junction/inspection point and shall be adapted to suit the construction of the basement and have one-way valves fitted.

4.3.9 The combined flows from the development then outfall to the Thames Water public sewers under Belgrave Mews South, as existing.

4.3.10 Any ceiling fixed drainage in subterranean areas shall be a sealed pipe system fixed in ceiling voids or beneath ceilings. This shall have appropriate fixings and access points to enable full inspection and maintenance.

4.3.11 The preliminary drainage strategy is indicated on drawing 23/54141/50P1 in the appendices.

4.3.12 With reference the SuDS Manual, CIRIA C753, Table 26.2, the pollution hazard for surface water from domestic roofs and garden areas is very low. Outfall by infiltration and to the combined public sewer reduce the risk of any contamination of watercourses.

4.3.13 Measures to re-use water to assist the maintenance of landscaping within the garden area can provide a benefit to biodiversity and amenity.

5. DRAINAGE MAINTENANCE

5.1 Responsibilities

5.1.1 Drainage serving the property shall be the responsibility of the property owner.

5.2 Maintenance Regime

5.2.1 6 monthly , when extreme rainfall is forecast, and after significant storm events

- Clear leaves litter and debris from all areas of the site and from visible surface features of the drainage system. This shall include above ground roof gutters and downpipes, and channel drains (ACO or similar).
- Inspect all manholes, sumps/outfalls of channel drains, roof gutters, and downpipes. Collect and dispose of any silt and debris present. Monitor the speed of silt and debris build up and increase frequency of maintenance if required.
- Ensure correct operation of one-way valves. Repair or replace if required.
- Ensure all access points to sealed drainage systems are accessible and all seals are intact.
- Monitor the Rain Garden during heavy rain for any issues. Significant issues with water not draining away may require the planter to be dismantled for pipework to be checked and cleansed.

5.2.2 At 5-10 year intervals

- CCTV survey of piped drainage system on site, through to the outfall to the third party system off site. Removal of silt and debris as required. Replace or repair any areas of failure.

5.2.3 For pumps, rising mains and groundwater systems a maintenance contract should be entered into with a specialist maintenance contractor. The manufacturer of the units can make recommendations and advise on initial frequency of inspection and maintenance.

5.2.4 All manufacturers recommendations should be followed in the maintenance of these units.

5.2.5 Permeable Paving

12 weekly

For the first 12 months following regular use, additional 2-4mm quartzite/gritstone to BS EN 1097-2:1998 to be brushed into joints at 12 week intervals to accommodate the initial settlement of permeable block paving.

12 monthly , when extreme rainfall is forecast, and after significant storm events

Brush silt and organic matter from all joints with stiff brush and vacuum.

Additional 2-4mm quartzite/gritstone to BS EN 1097-2:1998 to be brushed into joints.

At 5 year intervals (or if drainage issues are observed)

Shallow trial holes to be carried out at a low point of the paving to assess silt and organic matter build up in the joints between paviours and the laying course.

If the silt build up is significant and forms a seal which prevents water flowing into the sub base layers easily, localised areas shall be taken up and the paviours relaid with new laying course and jointing grit.

At 20 year intervals

Deep trial holes to be carried out at a low point of the paving to assess silt and organic matter build up in the joints between paviours, the laying course, the sub base and the surfaces of the geotextiles.

If the silt build up is significant and affects the ability of the system to satisfactorily hold and dispose of surface water, the affected parts shall be taken up and replaced.

6. CONCLUSION

6.1.1 Relevant local authority guidance has been used to assess flood risk and drainage aspects of the development.

6.1.2 The development is situated in an area with no significant risk of flooding from external sources.

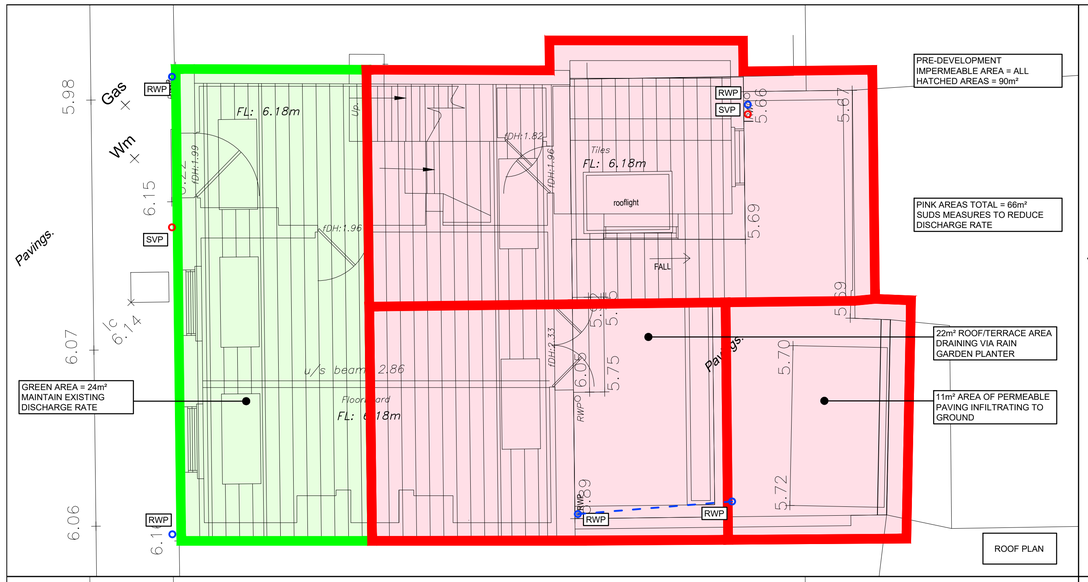
6.1.3 Opportunities have been taken to drain rainwater from some areas of the site via infiltration to the Kempton Park Gravel Member.

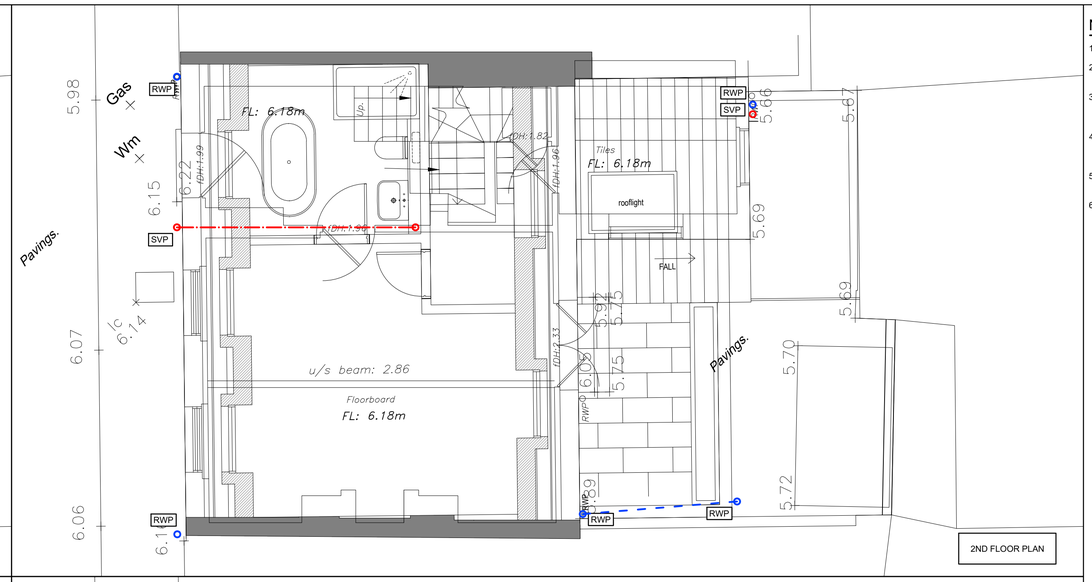
6.1.4 The remaining areas shall continue to drain safely to nearby sewers as per the existing situation, except at reduced flow rates. A new, robust drainage system to modern design standards is proposed which is practical and reasonable for installation, operation, and maintenance. It is unlikely to develop significant operational issues and therefore adds to the sustainability of the development.

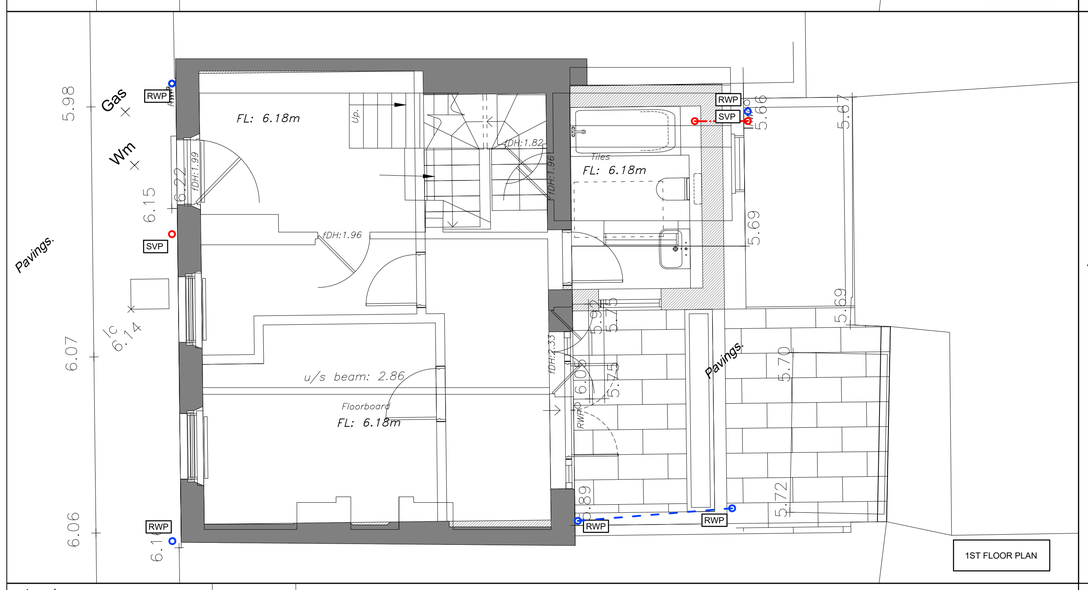
6.1.5 It is proposed to take the preliminary drainage strategy described in this report forward to detailed design and construction.

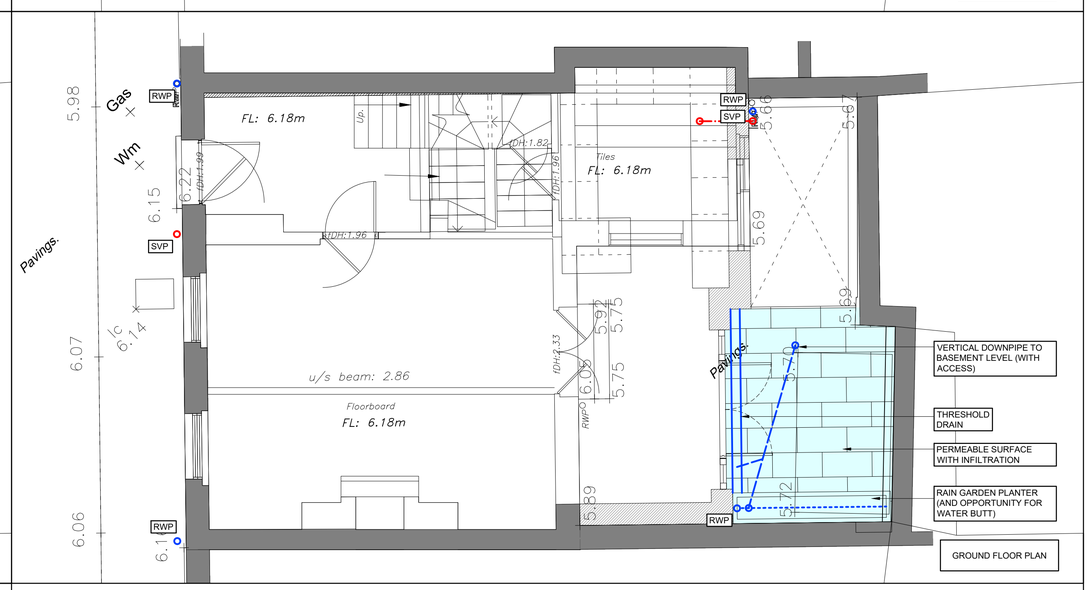
APPENDIX A

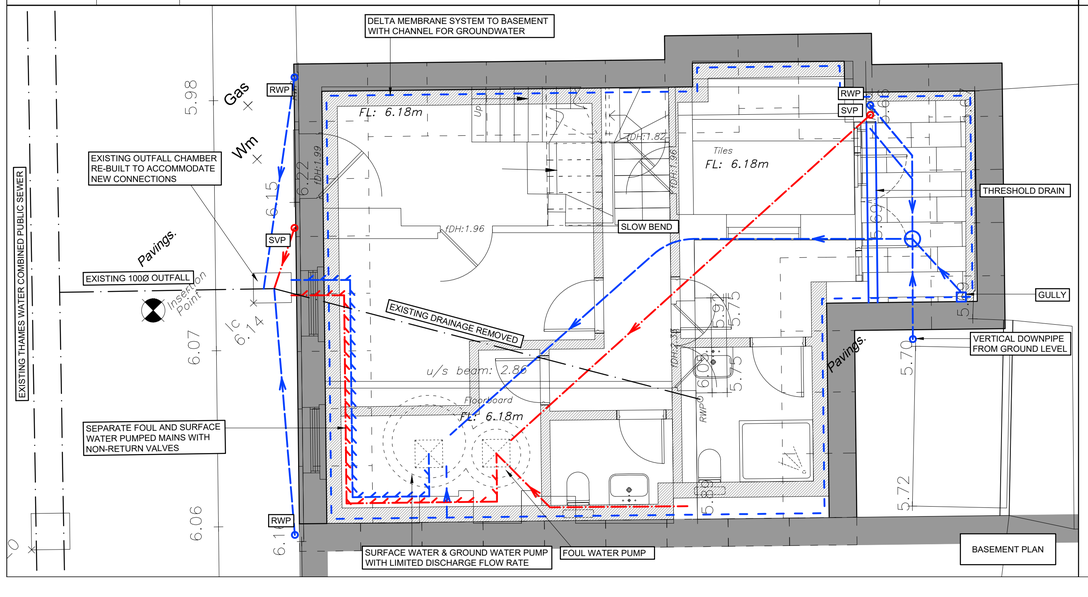
DSA Drawing 21/44116/50P1 – Surface Water Drainage Strategy

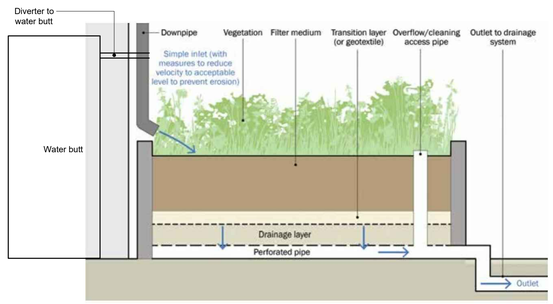




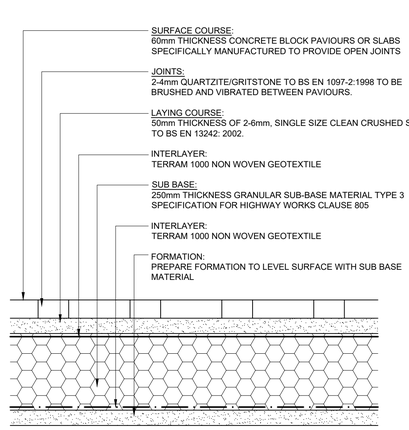








TYPICAL RAIN GARDEN PLANTER AND WATER BUTT
(FIGURE 18.5 CIRIA C753 THE SUDS MANUAL)



PERMEABLE PAVING CONSTRUCTION
1:10

Notes

1. IF IN DOUBT - ASK !!! DO NOT SCALE
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ARCHITECTS AND ENGINEERS DRAWINGS.
3. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH THE RELEVANT BRITISH STANDARDS, CODES OF PRACTICE AND BUILDING PRACTICE.
4. ALL DIMENSIONS TO BE CHECKED PRIOR TO STARTING THE WORKS ON SITE. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER IMMEDIATELY.
5. CONTRACTOR TO ASCERTAIN THE LOCATION OF SERVICES ON SITE PRIOR TO STARTING THE WORK.
6. ALL DIMENSIONS FOR CONSTRUCTION ARE TO BE OBTAINED FROM SITE MEASUREMENTS OR ARCHITECTS SETTING OUT DRAWINGS PRIOR TO MANUFACTURE/BUILDING.

DRAINAGE SHOWN IS PRELIMINARY ONLY AND SUBJECT TO PLANNING APPROVAL AND DETAILED DESIGN

ISSUE	REVISION	BY	DATE
P1	FIRST ISSUE	CS	01.12.23

ISSUE
CONSTRUCTION

CLIENT
LECONFIELD PROPERTY GROUP

CONTRACT
34 BELGRAVE MEWS SOUTH
LONDON

TITLE
PROPOSED DRAINAGE

ARCHITECT
LEWIS STROUD ARCHITECTS

DRAWN	CHECKED	DATE	SCALE
CS	TG	DEC' 23	1:50 @A1

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8 Duncan Close
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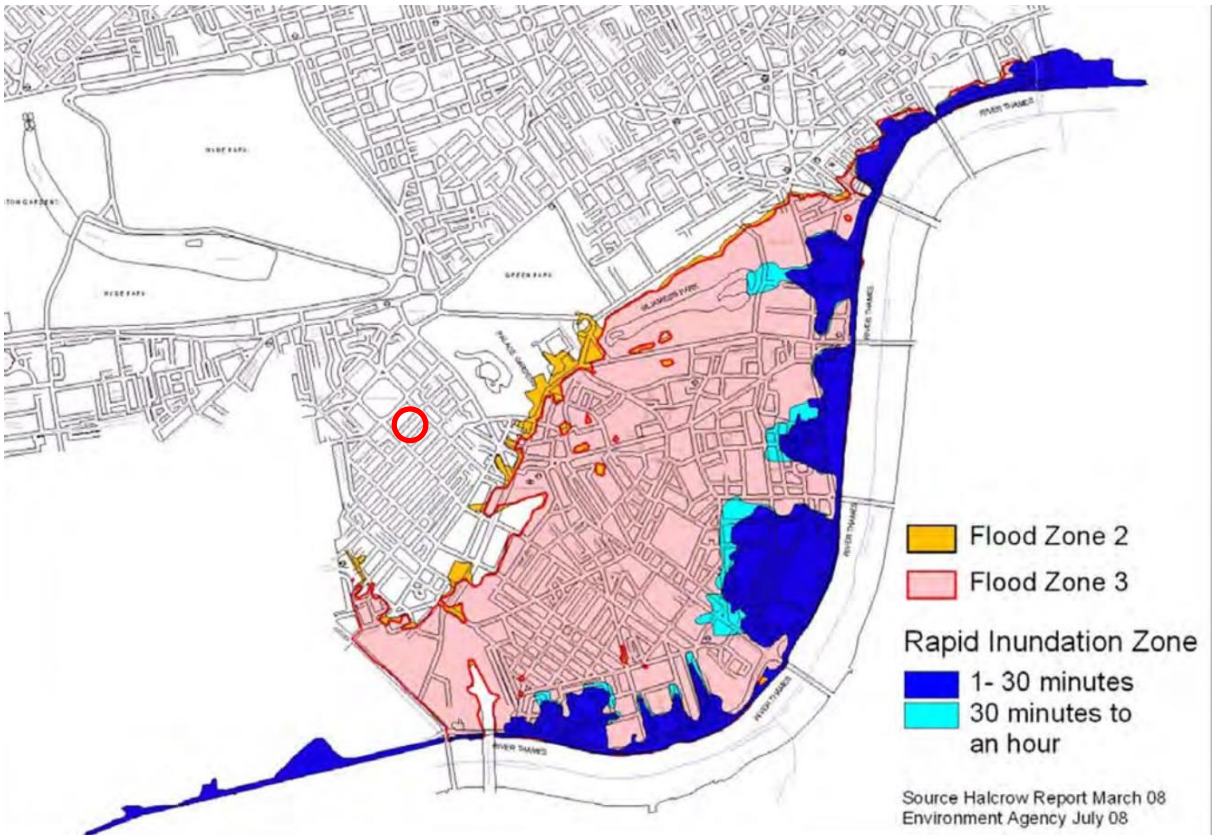
DRAWING NUMBER	23	54121/50	REVISION P1

01.12.23

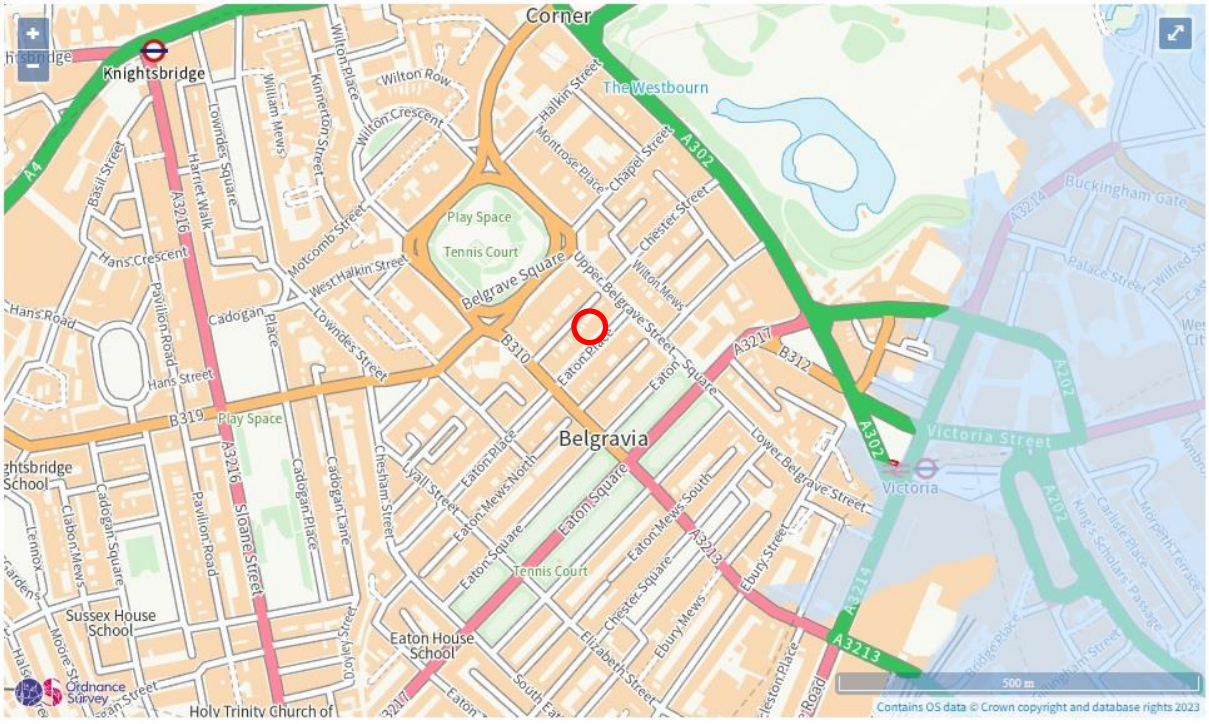
APPENDIX B

Flood Risk Mapping

River & Tidal Flood Risk

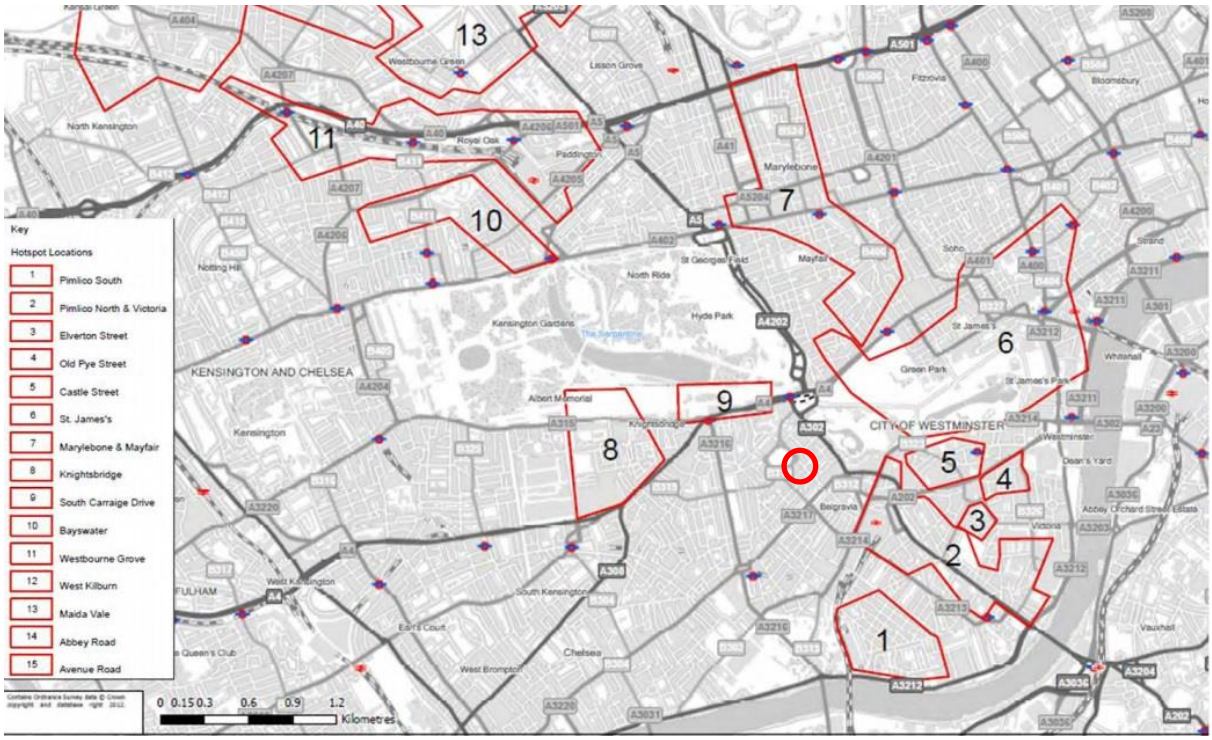


Source: Westminster City Council, 'Basement Development in Westminster' Supplementary Planning Document' (SPD), October 2014



Source: Gov.uk Long Term Flood Risk Map. Nov 2023

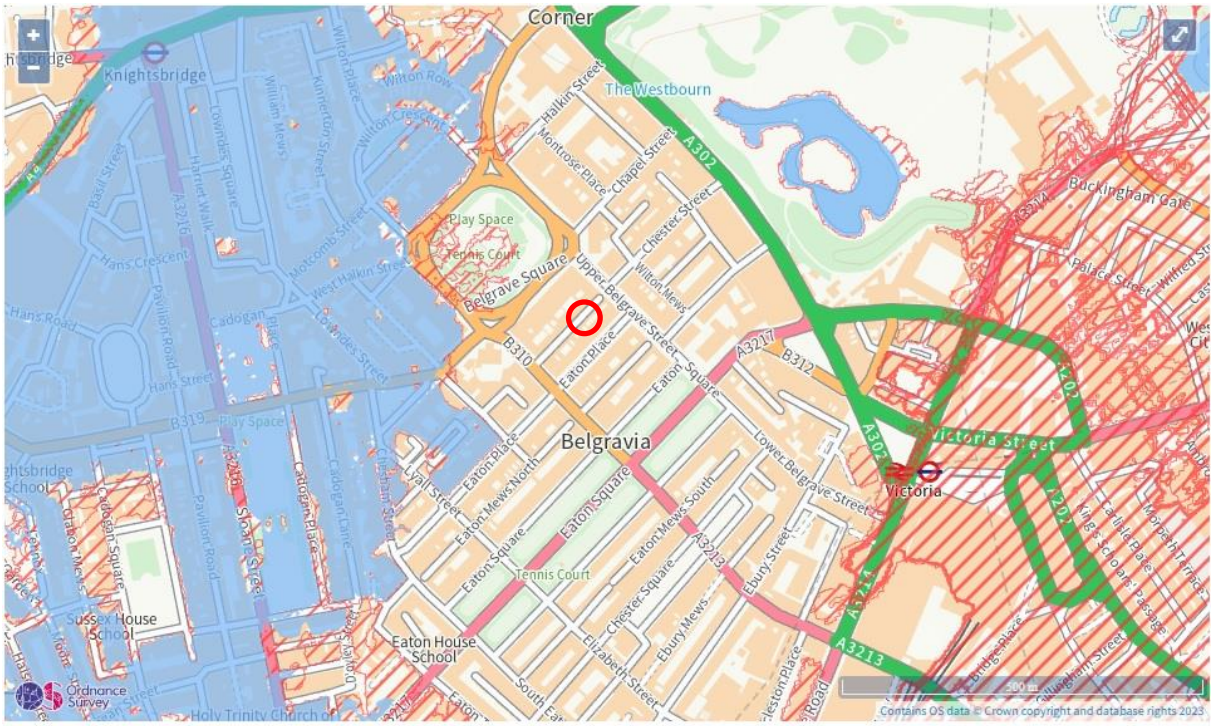
Surface Water Flood Risk



Source: Westminster City Council, 'Basement Development in Westminster' Supplementary Planning Document' (SPD), October 2014

Source: Gov.uk Long Term Flood Risk Map. Nov 2023

Flood Risk from Reservoirs



Maximum extent of flooding from reservoirs:

when river levels are normal | when there is also flooding from rivers | Location you selected

Source: Gov.uk Long Term Flood Risk Map. Nov 2023

APPENDIX C

City of Westminster SuDS Proforma

City of Westminster

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LoDEG

1. Project & Site Details		
	Project / Site Name (including sub-catchment / stage / phase where appropriate)	34 BELGRAVE MEWS SOUTH
	Address & post code	34 BELGRAVE MEWS SOUTH, LONDON SW1X 8BT
	OS Grid ref. (Easting, Northing)	E 528407
		N 179315
	LPA reference (if applicable)	
	Brief description of proposed work	PROPOSED EXTENSION AND REFURBISHMENT OF DWELLING, INCLUDING NEW BASEMENT
	Total site Area	90 m^2
	Total existing impervious area	90 m^2
	Total proposed impervious area	79 m^2
	Is the site in a surface water flood risk catchment (ref. local Surface Water Management Plan)?	NO
	Existing drainage connection type and location	THAMES WATER COMBINED PUBLIC SEWER ON BELGRAVE MEWS SOUTH
	Designer Name	BOB TURRELL
	Designer Position	SENIOR ENGINEER
	Designer Company	DAVID SMITH ASSOCIATES

2. Proposed Discharge Arrangements			
	2a. Infiltration Feasibility		
	Superficial geology classification	KEMPTON PARK GRAVEL MEMBER	
	Bedrock geology classification	LONDON CLAY FORMATION	
	Site infiltration rate	5x10-6 m/s	
	Depth to groundwater level	VARIABLE m below ground level	
	Is infiltration feasible?	Partial	
	2b. Drainage Hierarchy		
		Feasible (Y/N)	*Proposed (Y/N)*
	1 store rainwater for later use	Y	Y
	2 use infiltration techniques, such as porous surfaces in non-clay areas	Y	Y
	3 attenuate rainwater in ponds or open water features for gradual release	N	N
	4 attenuate rainwater by storing in tanks or sealed water features for gradual release	Y	Y
	5 discharge rainwater direct to a watercourse	N	N
	6 discharge rainwater to a surface water sewer/drain	N	N
	7 discharge rainwater to the combined sewer.	Y	Y
	2c. Proposed Discharge Details		
	Proposed discharge location	i) INFILTRATION ii) RE-USE CONNECTION TO COMBINED TW SEWER.	
	Has the owner/regulator of the discharge location been consulted?	NO	

City of Westminster

GREATERLONDONAUTHORITY

LoDEG

3. Drainage Strategy

3a. Discharge Rates & Required Storage

	Greenfield (GF) runoff rate (l/s)	*Existing discharge rate (l/s)*	*Required storage for GF rate (m^3)*	*Proposed discharge rate (l/s)*
Qbar	0			
1 in 1	0	1.2		0.9
1 in 30	0	3		2
1 in 100	0	3.8		2.3
1 in 100 + CC				2.8
Climate change allowance used		40%		
3b. Principal Method of Flow Control		PUMP		

3c. Proposed SuDS Measures

	Catchment area (m^2)	*Plan area (m^2)*	*Storage vol. (m^3)*
Rainwater harvesting	22		0.5
Infiltration systems	0		0
Green roofs	0	0	0
Blue roofs	0	0	0
Filter strips	0	0	0
Filter drains	0	0	0
Bioretention / tree pits	0	0	0
Pervious pavements	11	0	1
Swales	0	0	0
Basins/ponds	0	0	0
Attenuation tanks	33		1.5
Total	**66**	**0**	**3**

4. Supporting Information

4a. Discharge & Drainage Strategy	*Page/section of drainage report*
Infiltration feasibility (2a) – geotechnical factual and interpretive reports, including infiltration results	SECTION 2.3
Drainage hierarchy (2b)	SECTION 4.2
Proposed discharge details (2c) – utility plans, correspondence / approval from owner/regulator of discharge location	SECTION 4.2
Discharge rates & storage (3a) – detailed hydrologic and hydraulic calculations	APPENDIX D
Proposed SuDS measures & specifications (3b)	SECTION 4.3
4b. Other Supporting Details	*Page/section of drainage report*
Detailed Development Layout	APPENDIX A
Detailed drainage design drawings, including exceedance flow routes	APPENDIX A
Detailed landscaping plans	BY OTHERS
Maintenance strategy	SECTION 5
Demonstration of how the proposed SuDS measures improve:	
a) water quality of the runoff?	SECTION 4.3
b) biodiversity?	SECTION 4.3
c) amenity?	SECTION 4.3

APPENDIX D

Infodrainage Calculations

Greenfield Runoff

Project:	Date:		
34 BELGRAVE MEWS SOUTH LONDON 23/54121	30/11/2023		
	Designed by: DSA	Checked by:	Approved By:
Report Title: UK and Ireland Rural Runoff Calculator	David Smith Associates: 8 Duncan Close Moulton Park Industrial Estate Northampton. NN3 6WL		

ICP SUDS / IH 124

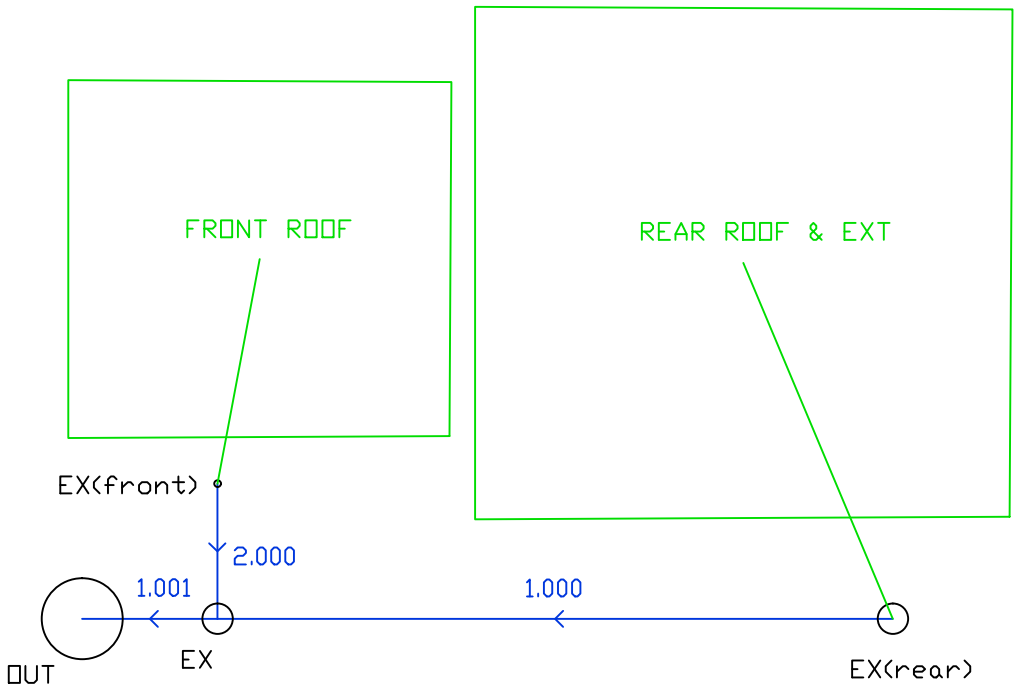
Details

Method	ICP SUDS
Area (ha)	0.009
SAAR (mm)	600.0
Soil	0.3
Region	Region 6
Urban	0
Return Period (years)	0

Results

Region	QBAR Rural (L/s)	QBAR Urban (L/s)	Q 1 (years) (L/s)	Q 30 (years) (L/s)	Q 100 (years) (L/s)
Region 6	0.0	0.0	0.0	0.0	0.0

Pre-development Flow Rate to Sewer


FRONT ROOF
REAR ROOF & EXT
EX(front)
2.000
1.001
1.000
OUT
EX
EX(rear)

Project:	Date:		
34 BELGRAVE MEWS SOUTH LONDON 23/54121	30/11/2023		
	Designed by:	Checked by:	Approved By:
	DSA		
Report Details: Type: Junctions Storm Phase: Phase	David Smith Associates: 8 Duncan Close Moulton Park Industrial Estate Northampton. NN3 6WL		

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)
OUT	Manhole	528426805.768	179329533.233	5.750	0.950
EX	Manhole	528426807.768	179329533.233	5.750	0.850
EX(front)	Manhole	528426807.768	179329535.233	5.750	0.750
EX(rear)	Manhole	528426817.768	179329533.233	5.750	0.750

Name	Invert Level (m)	Chamber Shape	Diameter (m)	Manhole Locked
OUT	4.800	Circular	1.200	☐
EX	4.900	Circular	0.450	☐
EX(front)	5.000	Circular	0.100	☐
EX(rear)	5.000	Circular	0.450	☐

Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
OUT	Inlet	1.001	(None)	No Restriction
EX	Inlet	1.000 2.000	(None)	No Restriction
EX(front)	Inlet	FRONT ROOF	(None)	No Restriction
EX(rear)	Inlet	REAR ROOF & EXT	(None)	No Restriction

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
EX	Outlet	1.001	Free Discharge
EX(front)	Outlet	2.000	Free Discharge
EX(rear)	Outlet	1.000	Free Discharge

Project:	Date:		
34 BELGRAVE MEWS SOUTH LONDON 23/54121	30/11/2023		
	Designed by: DSA	Checked by:	Approved By:
Report Details: Type: Connections Storm Phase: Phase	David Smith Associates: 8 Duncan Close Moulton Park Industrial Estate Northampton. NN3 6WL		

Name	From	To	Length (m)	Connection Type	Slope (1:x)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)
1.000	EX(rear)	EX	10.000	Pipe	100.00		0.6	100
2.000	EX(front)	EX	2.000	Pipe	20.00		0.6	100
1.001	EX	OUT	2.000	Pipe	20.00		0.6	100

Name	Upstream Cover Level (m)	Upstream Invert Level (m)	Downstream Cover Level (m)	Downstream Invert Level (m)	Velocity (m/s)
1.000	5.750	5.000	5.750	4.900	
2.000	5.750	5.000	5.750	4.900	
1.001	5.750	4.900	5.750	4.800	

Project:	Date:		
34 BELGRAVE MEWS SOUTH LONDON 23/54121	30/11/2023		
	Designed by: DSA	Checked by:	Approved By:
Report Details: Type: Inflow Summary Storm Phase: Phase	David Smith Associates: 8 Duncan Close Moulton Park Industrial Estate Northampton. NN3 6WL		

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
FRONT ROOF	EX(front)		Time of Concentration	0.003	100	0	100	0.003
REAR ROOF & EXT	EX(rear)		Time of Concentration	0.006	100	0	100	0.006
TOTAL		**0.0**		**0.009**				**0.009**

Project:	Date:		
34 BELGRAVE MEWS SOUTH LONDON 23/54121	30/11/2023		
	Designed by:	Checked by:	Approved By:
	DSA		
Report Title:	David Smith Associates:		
Rainfall Analysis Criteria	8 Duncan Close Moulton Park Industrial Estate Northampton. NN3 6WL		

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall

FSR

Type: FSR

Region	England and Wales
M5-60 (mm)	20.0
Ratio R	0.400
Summer	☑
Winter	☑

Return Period

Return Period (years)	Increase Rainfall (%)
1.0	0
30.0	0
100.0	0

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
180	360
240	480
360	720

Project:	Date:		
34 BELGRAVE MEWS SOUTH LONDON 23/54121	30/11/2023		
	Designed by: DSA	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	David Smith Associates: 8 Duncan Close Moulton Park Industrial Estate Northampton. NN3 6WL		

FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
OUT	FSR: 1 years: +0 %: 15 mins: Winter	5.750	4.800	4.820	0.020	1.2	0.000	0.000	1.2	0.579	OK
EX	FSR: 1 years: +0 %: 15 mins: Winter	5.750	4.900	4.921	0.021	1.2	0.003	0.000	1.2	0.579	OK
EX(front)	FSR: 1 years: +0 %: 15 mins: Winter	5.750	5.000	5.012	0.012	0.4	0.000	0.000	0.4	0.190	OK
EX(rear)	FSR: 1 years: +0 %: 15 mins: Winter	5.750	5.000	5.026	0.026	0.8	0.004	0.000	0.8	0.390	OK

Project:	Date:		
34 BELGRAVE MEWS SOUTH LONDON 23/54121	30/11/2023		
	Designed by: DSA	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	David Smith Associates: 8 Duncan Close Moulton Park Industrial Estate Northampton. NN3 6WL		

FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
OUT	FSR: 30 years: +0 %: 15 mins: Winter	5.750	4.800	4.831	0.031	3.0	0.000	0.000	3.0	1.432	OK
EX	FSR: 30 years: +0 %: 15 mins: Winter	5.750	4.900	4.936	0.036	3.0	0.006	0.000	3.0	1.432	OK
EX(front)	FSR: 30 years: +0 %: 15 mins: Winter	5.750	5.000	5.019	0.019	1.0	0.000	0.000	1.0	0.478	OK
EX(rear)	FSR: 30 years: +0 %: 15 mins: Winter	5.750	5.000	5.042	0.042	2.1	0.007	0.000	2.0	0.956	OK

Project:	Date:		
34 BELGRAVE MEWS SOUTH LONDON 23/54121	30/11/2023		
	Designed by:	Checked by:	Approved By:
	DSA		
Report Details: Type: Junctions Summary Storm Phase: Phase	David Smith Associates: 8 Duncan Close Moulton Park Industrial Estate Northampton. NN3 6WL		

FSR: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
OUT	FSR: 100 years: +0 %: 15 mins: Winter	5.750	4.800	4.836	0.036	3.8	0.000	0.000	3.8	1.857	OK
EX	FSR: 100 years: +0 %: 15 mins: Winter	5.750	4.900	4.942	0.042	3.9	0.007	0.000	3.8	1.857	OK
EX(front)	FSR: 100 years: +0 %: 15 mins: Winter	5.750	5.000	5.022	0.022	1.3	0.000	0.000	1.3	0.619	OK
EX(rear)	FSR: 100 years: +0 %: 15 mins: Winter	5.750	5.000	5.048	0.048	2.7	0.008	0.000	2.6	1.240	OK

Project:	Date:		
34 BELGRAVE MEWS SOUTH LONDON 23/54121	30/11/2023		
	Designed by: DSA	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	David Smith Associates: 8 Duncan Close Moulton Park Industrial Estate Northampton. NN3 6WL		

FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	EX (rear)	EX	5.8	5.026	0.024	0.390	0.6	0.13	0.8	OK
2.000	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	EX (front)	EX	5.8	5.012	0.017	0.190	0.5	0.03	0.4	OK
1.001	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	EX	OUT	5.8	4.921	0.021	0.579	1.0	0.09	1.2	OK

Project:	Date:		
34 BELGRAVE MEWS SOUTH LONDON 23/54121	30/11/2023		
	Designed by: DSA	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	David Smith Associates: 8 Duncan Close Moulton Park Industrial Estate Northampton. NN3 6WL		

FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item

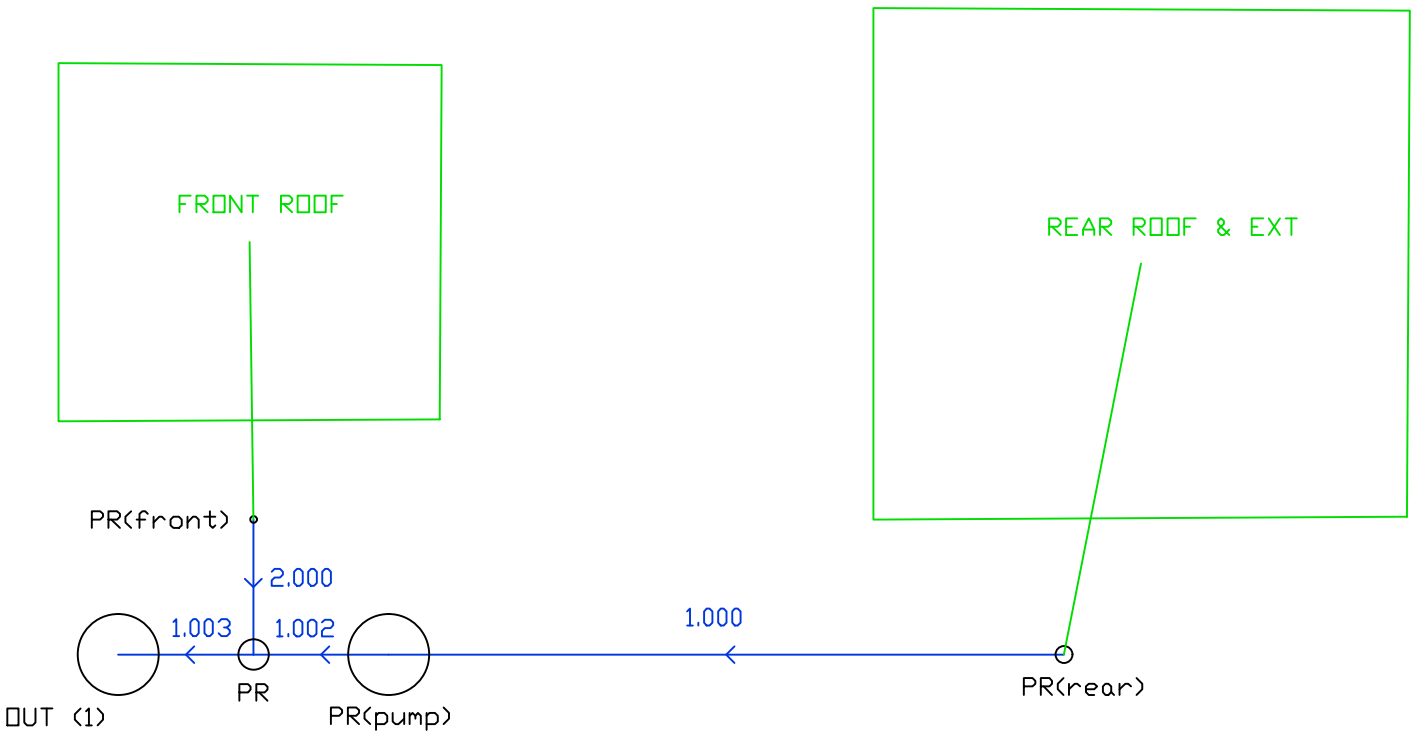
Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	EX (rear)	EX	5.8	5.042	0.039	0.956	0.7	0.33	2.0	OK
2.000	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	EX (front)	EX	5.8	5.019	0.027	0.478	0.6	0.07	1.0	OK
1.001	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	EX	OUT	5.8	4.936	0.034	1.432	1.3	0.22	3.0	OK

Project:	Date:		
34 BELGRAVE MEWS SOUTH LONDON 23/54121	30/11/2023		
	Designed by: DSA	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	David Smith Associates: 8 Duncan Close Moulton Park Industrial Estate Northampton. NN3 6WL		

FSR: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	EX (rear)	EX	5.8	5.048	0.045	1.240	0.8	0.43	2.6	OK
2.000	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	EX (front)	EX	5.8	5.022	0.032	0.619	0.6	0.1	1.3	OK
1.001	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	EX	OUT	5.8	4.942	0.039	1.857	1.4	0.28	3.8	OK

Post development Flow Rate to Sewer


FRONT ROOF
REAR ROOF & EXT
PR(front)
2.000
1.003
1.002
1.000
OUT (1)
PR
PR(pump)
PR(rear)

Project:	Date:		
34 BELGRAVE MEWS SOUTH LONDON 23/54121	30/11/2023		
	Designed by:	Checked by:	Approved By:
	DSA		
Report Details: Type: Junctions Storm Phase: Phase	David Smith Associates: 8 Duncan Close Moulton Park Industrial Estate Northampton. NN3 6WL		

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)
PR(rear)	Manhole	528426819.768	179329543.291	5.750	0.750
PR(front)	Manhole	528426807.768	179329545.291	5.750	0.750
PR	Manhole	528426807.768	179329543.291	5.750	1.600
OUT (1)	Manhole	528426805.768	179329543.291	5.750	1.700
PR(pump)	Manhole	528426809.768	179329543.291	5.750	1.500

Name	Invert Level (m)	Chamber Shape	Diameter (m)	Manhole Locked
PR(rear)	5.000	Circular	0.250	☐
PR(front)	5.000	Circular	0.100	☐
PR	4.150	Circular	0.450	☐
OUT (1)	4.050	Circular	1.200	☐
PR(pump)	4.250	Circular	1.200	☐

Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
PR(rear)	Inlet	REAR ROOF & EXT	(None)	No Restriction
PR(front)	Inlet	FRONT ROOF	(None)	No Restriction
PR	Inlet	1.002	(None)	No Restriction
	Inlet (1)	2.000	(None)	No Restriction
OUT (1)	Inlet	1.003	(None)	No Restriction
PR(pump)	Inlet	1.000	(None)	No Restriction

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
PR(rear)	Outlet	1.000	Free Discharge
PR(front)	Outlet	2.000	Free Discharge
PR	Outlet	1.003	Free Discharge
PR(pump)	Outlet	1.002	Pump

Invert Level (m)	4.250

Depth (m)	Outflow (L/s)
0.100	1.0
1.500	1.0

Project:	Date:		
34 BELGRAVE MEWS SOUTH LONDON 23/54121	30/11/2023		
	Designed by: DSA	Checked by:	Approved By:
Report Details: Type: Connections Storm Phase: Phase	David Smith Associates: 8 Duncan Close Moulton Park Industrial Estate Northampton. NN3 6WL		

Name	From	To	Length (m)	Connection Type	Slope (1:x)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)
1.000	PR(rear)	PR(pump)	10.000	Pipe	13.333		0.6	100
1.002	PR(pump)	PR	2.000	Pipe	20.000		0.6	100
2.000	PR(front)	PR	2.000	Pipe	2.353		0.6	100
1.003	PR	OUT (1)	2.000	Pipe	20.000		0.6	100

Name	Upstream Cover Level (m)	Upstream Invert Level (m)	Downstream Cover Level (m)	Downstream Invert Level (m)	Flow Restriction (L/s)	Velocity (m/s)
1.000	5.750	5.000	5.750	4.250		
1.002	5.750	4.250	5.750	4.150	1.0	
2.000	5.750	5.000	5.750	4.150		
1.003	5.750	4.150	5.750	4.050		

Project:	Date:		
34 BELGRAVE MEWS SOUTH LONDON 23/54121	30/11/2023		
	Designed by: DSA	Checked by:	Approved By:
Report Details: Type: Inflow Summary Storm Phase: Phase	David Smith Associates: 8 Duncan Close Moulton Park Industrial Estate Northampton. NN3 6WL		

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
FRONT ROOF	PR(front)		Time of Concentration	0.003	100	0	100	0.003
REAR ROOF & EXT	PR(rear)		Time of Concentration	0.006	100	0	100	0.006
TOTAL		**0.0**		**0.009**				**0.009**

Project:	Date:		
34 BELGRAVE MEWS SOUTH LONDON 23/54121	30/11/2023		
	Designed by:	Checked by:	Approved By:
	DSA		
Report Title:	David Smith Associates:		
Rainfall Analysis Criteria	8 Duncan Close Moulton Park Industrial Estate Northampton. NN3 6WL		

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Shortest
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall

FSR

Type: FSR

Region	England and Wales
M5-60 (mm)	20.0
Ratio R	0.400
Summer	☑
Winter	☑

Return Period

Return Period (years)	Increase Rainfall (%)
1.0	0
30.0	0
100.0	40

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
180	360
240	480
360	720

Project:	Date:		
34 BELGRAVE MEWS SOUTH LONDON 23/54121	30/11/2023		
	Designed by: DSA	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	David Smith Associates: 8 Duncan Close Moulton Park Industrial Estate Northampton. NN3 6WL		

FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
PR(rear)	FSR: 1 years: +0 %: 15 mins: Winter	5.750	5.000	5.015	0.015	0.8	0.001	0.000	0.8	0.392	OK
PR(front)	FSR: 1 years: +0 %: 15 mins: Winter	5.750	5.000	5.007	0.007	0.4	0.000	0.000	0.4	0.192	OK
PR	FSR: 1 years: +0 %: 15 mins: Winter	5.750	4.150	4.169	0.019	0.9	0.003	0.000	0.9	0.581	OK
OUT (1)	FSR: 1 years: +0 %: 15 mins: Winter	5.750	4.050	4.067	0.017	0.9	0.000	0.000	0.9	0.581	OK
PR(pump)	FSR: 1 years: +0 %: 15 mins: Winter	5.750	4.250	4.303	0.053	0.8	0.060	0.000	0.5	0.391	OK

Project:	Date:		
34 BELGRAVE MEWS SOUTH LONDON 23/54121	30/11/2023		
	Designed by: DSA	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	David Smith Associates: 8 Duncan Close Moulton Park Industrial Estate Northampton. NN3 6WL		

FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
PR(rear)	FSR: 30 years: +0 %: 15 mins: Winter	5.750	5.000	5.023	0.023	2.1	0.001	0.000	2.0	0.959	OK
PR(front)	FSR: 30 years: +0 %: 15 mins: Winter	5.750	5.000	5.011	0.011	1.0	0.000	0.000	1.0	0.480	OK
PR	FSR: 30 years: +0 %: 15 mins: Winter	5.750	4.150	4.179	0.029	2.0	0.005	0.000	2.0	1.435	OK
OUT (1)	FSR: 30 years: +0 %: 15 mins: Winter	5.750	4.050	4.076	0.026	2.0	0.000	0.000	2.0	1.435	OK
PR(pump)	FSR: 30 years: +0 %: 15 mins: Winter	5.750	4.250	4.486	0.236	2.0	0.267	0.000	1.0	0.959	Surcharged

Project:	Date:		
34 BELGRAVE MEWS SOUTH LONDON 23/54121	30/11/2023		
	Designed by: DSA	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	David Smith Associates: 8 Duncan Close Moulton Park Industrial Estate Northampton. NN3 6WL		

FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
PR(rear)	FSR: 100 years: +40 %: 30 mins: Winter	5.750	5.000	5.032	0.032	2.5	0.002	0.000	2.5	2.285	OK
PR(front)	FSR: 100 years: +40 %: 15 mins: Winter	5.750	5.000	5.014	0.014	1.9	0.000	0.000	1.9	0.873	OK
PR	FSR: 100 years: +40 %: 15 mins: Winter	5.750	4.150	4.185	0.035	2.9	0.006	0.000	2.8	2.374	OK
OUT (1)	FSR: 100 years: +40 %: 15 mins: Winter	5.750	4.050	4.081	0.031	2.8	0.000	0.000	2.8	2.374	OK
PR(pump)	FSR: 100 years: +40 %: 30 mins: Winter	5.750	4.250	5.028	0.778	2.5	0.880	0.000	1.0	2.288	Surcharged

Project:	Date:		
34 BELGRAVE MEWS SOUTH LONDON 23/54121	30/11/2023		
	Designed by: DSA	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	David Smith Associates: 8 Duncan Close Moulton Park Industrial Estate Northampton. NN3 6WL		

FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	PR (rear)	PR(pump)	5.8	5.015	0.034	0.392	0.5	0.05	0.8	OK
1.002	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	PR (pump)	PR	5.8	4.303	0.016	0.391	0.0	0.04	0.5	OK
2.000	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	PR (front)	PR	5.8	5.007	0.013	0.192	0.7	0.01	0.4	OK
1.003	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	PR	OUT (1)	5.8	4.169	0.018	0.581	0.9	0.07	0.9	OK

Project:	Date:		
34 BELGRAVE MEWS SOUTH LONDON 23/54121	30/11/2023		
	Designed by: DSA	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	David Smith Associates: 8 Duncan Close Moulton Park Industrial Estate Northampton. NN3 6WL		

FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	PR (rear)	PR(pump)	5.8	5.023	0.100	0.959	0.5	0.12	2.0	OK
1.002	FSR: 30 years: +0 %: 15 mins: Summer	Pipe	PR (pump)	PR	5.8	4.437	0.022	0.854	0.0	0.07	1.0	Surcharged
2.000	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	PR (front)	PR	5.8	5.011	0.020	0.480	0.9	0.03	1.0	OK
1.003	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	PR	OUT (1)	5.8	4.179	0.027	1.435	1.2	0.15	2.0	OK

Project:	Date:		
34 BELGRAVE MEWS SOUTH LONDON 23/54121	30/11/2023		
	Designed by:	Checked by:	Approved By:
	DSA		
Report Details: Type: Connections Summary Storm Phase: Phase	David Smith Associates: 8 Duncan Close Moulton Park Industrial Estate Northampton. NN3 6WL		

FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	PR (rear)	PR(pump)	5.8	5.032	0.100	1.741	0.5	0.22	3.7	OK
1.002	FSR: 100 years: +40 %: 15 mins: Summer	Pipe	PR (pump)	PR	5.8	4.913	0.022	1.473	0.0	0.07	1.0	Surcharged
2.000	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	PR (front)	PR	5.8	5.014	0.025	0.873	1.2	0.05	1.9	OK
1.003	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	PR	OUT (1)	5.8	4.185	0.033	2.374	1.3	0.21	2.8	OK

APPENDIX E

Ground Investigation (Selected Pages)

2 The Long Barn,
Norton Farm, Selborne Road,
Alton, Hampshire GU34 3NB

0333 600 1221
enquiries@groundandwater.co.uk

groundandwater.co.uk

PRELIMINARY SUMMARY	
CLIENT	Leconfield Property Group
SITE ADDRESS	34 Belgrave Mews South London SW1X 8BT
REPORT REFERENCE	GWPR5680/PS/November 2023 Conditions and limitations of this preliminary summary can be viewed within Appendix A.
ENGINEER	Aubyn Shortland, Ground and Water Limited
INVESTIGATION LOCATIONS AND SCOPE OF WORKS	Site works were undertaken between the 7th – 8th November 2023 and comprised the drilling of 1No. modular windowless sampler trial hole (WS01) to a depth of 5.45m bgl. Standard penetration testing was conducted at 1.00m intervals. A super heavy dynamic probe (DP01) was then undertaken through the base to a final depth of 10.00m bgl. A groundwater monitoring well was installed within WS01 to a depth of 4.50m bgl. Site works also included the excavation of 4No. trial pits (TP/FE01 – TP/FE02 and TP01 – TP02) to depths of between 0.80m – 1.40m bgl. A trial hole location plan is provided in Figure 1, foundation exposure diagrams are displayed within Figure 2 – Figure 5. A selection of soil samples was taken for laboratory chemical and geotechnical testing. Upon completion of the site works all trial holes and/or trial pits were backfilled and made good/reinstated in relation to the surrounding area.
GROUND CONDITIONS ENCOUNTERED	A summary of the ground conditions encountered within all trial holes can be viewed below. Trial hole logs can be viewed within Appendix B.

Summary of Strata Encountered (BH01; TP/FE01 – TP/FE02 &TP01 – TP02)

Strata	Top Depth (m bgl)	Base Depth (m bgl)	Thickness (m)
MADE GROUND: Pale grey very gravelly fine to coarse SAND. Gravel is fine to coarse angular to sub-rounded flint (30% - 70%), concrete (20% - 60%) and brick (10%).	GL	0.30	0.30
MADE GROUND: Orangish brown very gravelly fine to coarse SAND. Gravel is fine to coarse angular to subrounded flint (50%) and concrete (50%).	GL	0.90	0.90
MADE GROUND: Dark brown gravelly very sandy CLAY. Gravel is fine to coarse sub-angular to subrounded. Sand is fine to coarse flint (50% - 60%), concrete (30%), brick (20% - 30%) and calcareous material (10%).	0.30	0.70	0.40
MADE GROUND: Dark reddish brown sandy fine to coarse sub-rounded GRAVEL of brick (100%). Sand is fine to coarse.	0.30	0.70	0.40
KEMPTON PARK GRAVEL MEMBER: Dark orangish brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse sub-angular to sub rounded of flint.	0.30 – 0.90	>0.80 - >1.40	>0.30 - >0.50
KEMPTON PARK GRAVEL MEMBER: Dark orangish brown very gravelly fine to coarse SAND. Gravel is fine to coarse sub-angular to subrounded of flint.	1.30	4.10	2.80
LONDON CLAY FORMATION: Dark greyish brown silty CLAY.	4.10	>5.45	>1.35

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PRELIMINARY SUMMARY

IN-SITU STRENGTH TESTING (SPTs)

An interpretation of the in-situ geotechnical testing results for BH01 are given in the table below.

Interpretation of In-situ Geotechnical Testing Results

Strata	SPT "N" Blow Counts	Equivalent Undrained Shear Strength (Cu) (kPa)	Granular (Density)	Cohesive Soil Type (Cu)	Trial Hole/s
Kempton Park Gravel Member	20	-	Medium Dense	-	WS01/1.20m – 1.65m bgl
	50	-	Very Dense	-	WS01/2.00m – 3.45m bgl
London Clay Formation	16	80	-	High	WS01/5.00m – 5.45m bgl
	30	150	-	Very High	WS01/4.00m – 4.45m bgl
Assumed London Clay Formation	~7 - ~17	~35 - ~85	-	Low – High	DP01/~6.00m - ~10.00m bgl

*It should be noted that superheavy dynamic probing may underestimate the strength of the underlying soils.

ROOTS

Fresh roots were noted to a proven depth of 0.80m bgl within WS01. No fresh roots were noted within the remaining trial holes.

It should be noted that roots may be found to greater depths at other locations on the site, particularly close to trees and/or trees that have been removed both within the site and its close environs.

GROUNDWATER

No groundwater strikes were noted within the trial holes.

Groundwater however may be found within the Made Ground and underlying strata where silty/sandy/gravelly bands are noted, especially after periods of intense or prolonged rainfall or during/after winter months.

Changes in groundwater level occur for a number of reasons including seasonal effects and variations in drainage. The investigation was undertaken in November 2023 when groundwater levels are likely to be at/approaching their annual maximum (highest elevation). Exact groundwater levels may only be determined through long term measurements from monitoring wells installed on-site.

ANTICIPATED VOLUME CHANGE POTENTIAL

The following volume change potential was anticipated based on a physical and visual appraisal of the soils encountered and was subject to confirmation of results of geotechnical classification testing:

- **Kempton Park Gravel Member (Cohesive):** Likely to have **medium** volume change potential in accordance with NHBC Standards Chapter 4.2 and BRE240.
- **Kempton Park Gravel Member (Granular):** Likely to have **no to low** volume change potential in accordance with NHBC Standards Chapter 4.2 and BRE240.

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PRELIMINARY SUMMARY	
	• **London Clay Formation** Likely to have **high** volume change potential in accordance with NHBC Standards Chapter 4.2 and BRE240.
GENERAL FOUNDATION RECOMMENDATION	At the time of reporting, November 2023, the proposed development was understood to comprise the construction of a full footprint basement level to a depth of 2.70m bgl. • Made Ground was noted from ground level to a maximum depth of 0.90m bgl. **As a result of the inherent variability Made Ground, these materials are usually unpredictable in terms of bearing capacity and settlement characteristics. Foundations should, therefore, be taken through any Made Ground and either into, or onto a suitable underlying natural stratum of adequate bearing characteristics.** • Granular superficial soils of the Kempton Park Gravel Member were likely to have no/low volume change potential whilst the cohesive strata was likely to have medium, in accordance with NHBC Standards Chapter 4.2 and BRE240. The London Clay Formation was likely to have high volume change potential. **Foundations should be designed in accordance with the volume change potential classification, confirmed from geotechnical testing.** • The superficial Kempton Park Gravel Member were classified as medium dense to very dense granular soils. The London Clay Formation was classified as high to very high undrained shear strengths. **The loads of proposed foundations should not exceed the bearing capacity of the soils they are founding upon, nor should >25mm of load-induced settlement occur.** • Fresh roots were noted to a proven depth of 0.80m bgl within WS01. No fresh roots were noted within the remaining trial holes. **Foundations must not be placed within root penetrated and/or desiccated soils with volume change potential. It is recommended that foundations are taken at least 300mm into non-root penetrated strata if soils have volume change potential, or into soils of no volume change potential. The influence of trees on or surrounding the site will need to be taken into account in final design (NHBC Standards Chapter 4. 2) (tree rings).** • No groundwater strikes were noted within the trial holes. **Any groundwater or surface water ingress must be prevented from entering excavations. Excavations must be kept dry and either concreted or blinded as soon after excavation as possible. If water were allowed to accumulate on the formation for even a short time not only would an increase in heave occur resulting from the soil increasing in volume by taking up water, but also the shear strength and hence the bearing capacity would also be reduced,**

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PRELIMINARY SUMMARY

and this could result in increased settlements. Perched water may be recorded within excavations, especially after a period of prolonged rainfall. Instability issues may arise within the foundation trenches, in case of perched water being present.

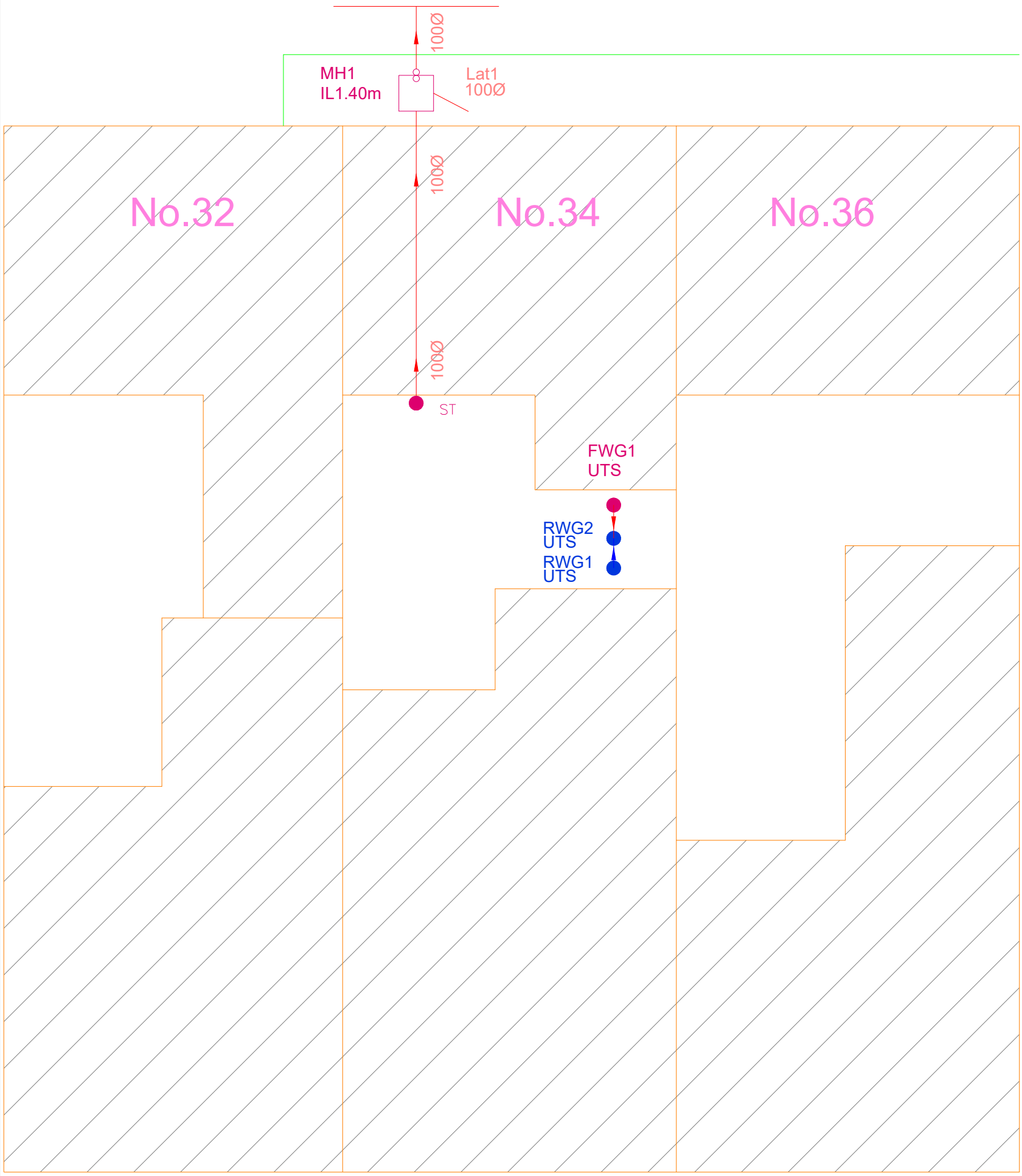
Foundations constructed on the superficial granular Kempton Park Gravel at a depth of 2.70m bgl can be designed based on a presumed allowable bearing capacity of 250kN/m^2.

This is based on trial hole records, the results of in-situ testing, inspection of samples recovered, and referral to BS 8004:2015, Code of Practice for Foundations, and based on a 5m long by 1m wide foundation and a maximum settlement of 25mm. Settlement is likely to be low.

This preliminary information may be subject to amendment in the final report and no liability can be accepted for any actions based on this preliminary information.

APPENDIX F

Drainage CCTV Survey (Record Plan)



JOB No. 16328

LEGEND

FW MH/IC

SW MH/IC

INTERCEPTOR

FW GULLY

SW GULLY

ST/VP:STACK

RWP

SW:SURFACE WATER
SURFACE WATER ROUTE

FW:FOUL WATER
FOUL WATER ROUTE

BUILDING OUTLINE

OVERHEAD BUILDING LINE

BOUNDARY LINE

ROAD

PROPOSED

BANK

BANK SYMBOL

UTS: Unable to Survey

UTL: Unable to Lift

TREE

NOT TO SCALE

Drawing Notes
EDS information shown in red

Rev.	Date	Description	By

EXPRESS SOLUTIONS GROUP

Chas Accredited

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VAT 851970604
Company No 04935559

Client	DSA Group
Site Address	34 Belgrave Mews South London SW1X 8BT
Drawing title	SITE PLAN
Scales	NOT TO SCALE
Surveyor	LM
Drawn By	EA
Date	01.12.2023
JOB No.	16328