technical note

elliottwood

Title:	Sustainable Drainage Strategy Addendum	Date Approved:	18.04.23
Discipline:	Civils	Author:	LKi
Note Ref:	2220367-EWP-ZZ-XX-TN-C-0001		

			Issued for planning				
revision:	P1	prepared by:	Laura Kirk MEng (Hons) CEng MICE	checked by:	Paul Davis BEng (Hons) MSc CEng MICE	approved by:	Paul Davis BEng (Hons) MSc CEng MICE
date:	18.04.23	signature:		signature:		signature:	

Aim

This Addendum has been prepared to provide additional information to the report 2220367-EWP-ZZ-XX-RP-C-0002 Sustainable Drainage Strategy which was produced in support of the proposed redevelopment at Braemar Avenue Baptist Church, Braemar Avenue, Wood Green, London, N22 7BY in the London Borough of Haringey.
The purpose of this Addendum is to provide additional supporting information for the scheme as requested by the London Borough of Haringey as Lead Local Flood Authority (LLFA).

Addendum to the report 2220367-EWP-ZZ-XX-RP-C-0002 Sustainable Drainage Strategy

Existing Surface Water Runoff Rates (ref. Section 8.1 of report 2220367-EWP-ZZ-XX-RP-C-0002)

Existing runoff rates for the site (315m^2 hardstanding) have been calculated using the Wallingford Procedure and are reproduced in Appendix A of this Addendum. These rates are all for a storm duration of 15 minutes, using a Cv value of 0.95 for roof areas and 0.9 for other hardstanding areas as stated in the Haringey LLFA Technical Assessment requirements.

Proposed Surface Water Runoff Rates (ref. Section 8.3.3 of report 2220367-EWP-ZZ-XX-RP-C-0002)

Surface water runoff rates for the development have been calculated using FEH data.

As outlined in the report 2220367-EWP-ZZ-XX-RP-C-0002 Sustainable Drainage Strategy, attenuation is to be provided in the form of blue roofs, permeable paving and a below ground tank. The below ground tank is to serve all external amenity areas located at lower ground floor level, external hardstanding areas which lie over the basement footprint and all rainwater downpipes serving the building terraces. The outlets from the blue roofs and permeable paving will discharge to the sewer by gravity; the outlet from the below ground tank will be pumped.

It is proposed that runoff from the small external hardstanding area which is to be served by the permeable paving be restricted via an orifice plate to control the runoff rate to 0.4l/s. It is proposed that the pump rate from the below ground attenuation tank be set at 1.0l/s. Runoff rates from the blue roof areas have been calculated by a blue roof manufacturer; it should be noted that the runoff rate, storage depth and number of outlets for each blue roof area may be subject to alteration if another blue roof manufacturer is approached at a later design stage.

Whilst water butts and green roofs are to be incorporated within the scheme, they have been excluded from the attenuation calculations as these SuDS will not offer any storage volume should a storm event occur when they are already at capacity or saturated.

The total surface water runoff rates using FEH data are presented in Table 1. For flats and apartments, no urban creep allowance is required in line with the Haringey SuDS Design Requirements for LLFA Technical Assessment. MicroDrainage Source Control calculations are presented in Appendix A of this Addendum.

Table 1: Proposed surface water runoff rates using FEH data

Storm event*	Proposed total surface water runoff rate (l/s)**	Improvement over existing runoff rates
1 in 2-year	1.7	61%
1 in 30-year	2.2	74%
1 in 100-year	2.3	79%
1 in 100-year + 40% climate change	2.5	84%

Notes:
* 1 in 1-year runoff rates are not available for the blue roofs using FEH datasets.
** Runoff rates for each blue roof area may be subject to alteration if another blue roof manufacturer is approached at a later design stage.

As stated in the Sustainable Drainage Strategy report 2220367-EWP-ZZ-XX-RP-C-0002, in line with the Haringey Development Management DPD requirements where the 1 in 100-year greenfield runoff rate cannot be met for all storm events, runoff rates have been reduced as far as possible. The runoff rate for the 1 in 2-year event is reduced below the 1 in 100-year greenfield runoff rate (1.9l/s), with a greater than 50% betterment achieved for greater storm events.

Calculations are presented in Appendix A of this Addendum. Revised drawings are presented in Appendix B of this Addendum.

Exceedance Events (ref. Section 8.3.3 of report 2220367-EWP-ZZ-XX-RP-C-0002)

The LLFA has requested that exceedance events be considered for the site, including the 1 in 200 year storm event plus climate change for overflows for the blue/green roofs.

The blue roof outlets will have an overflow weir to carry exceedance flows so that in the event of a blockage or exceedance event which exceeds the design storm (i.e. the 1 in 100 year storm event plus 40% climate change), water can continue to discharge from the blue roof areas. A blue roof manufacturer has been contacted and has advised that during an exceedance storm event, the blue roofs would continue to drain at the designed restricted rate for the 1 in 100 year storm event plus 40% climate change with surplus flows discharging unrestricted via the overflows. As the blue roofs discharge by gravity directly to the public sewer, any exceedance flows will also discharge by gravity to the public sewer.

Proposed Surface Water Outfall (ref. Section 8.3.4 of report 2220367-EWP-ZZ-XX-RP-C-0002)

The proposed flows to the sewer have been accepted by Thames Water via a pre-planning enquiry, as appended in the report 2220367-EWP-ZZ-XX-RP-C-0002 Sustainable Drainage Strategy.

The proposed reuse of the existing connection will be subject to a S106 agreement with Thames Water. The existing surface water drain serving the church which passes through the proposed development footprint is proposed to be replaced to run at high level at the lower ground floor of the new development. Existing flows, levels and outfall of this connection are to remain the same as existing.

Sensitivity Analysis (ref. Section 10 of report 2220367-EWP-ZZ-XX-RP-C-0002)

The LLFA has requested that a sensitivity analysis be undertaken for the basement attenuation tank. A duty/standby pump arrangement is to be specified in the event that if one pump fails, the other will continue to run to allow the basement tank to empty. A duty/assist pump arrangement is not considered suitable due to the proposed low flow rates from the pump chambers.

A pump manufacturer (All Pump Solutions) has been approached for guidance. With the pumps connected either to a BMS or via a monitoring agreement with the pump supplier, a typical call-out time to implement repairs to a pump system in the event of a failure would be within a 24-hour period. It is recommended that the pumps are subject to regular servicing and maintenance as per the manufacturer's recommendations and in accordance with British Standards (BS EN 12056-4) to reduce the risk of pump failure due to lack of maintenance. The servicing and maintenance requirements for the pumps are to be listed in the site's O&M Manual at handover to the site owner.

The worst-case storm scenario for the attenuation tank is shown from calculations to be the 180 min winter storm event. For this storm scenario, the attenuation tank is shown to fully empty within 522 minutes (under 9 hours) at a flow rate of 1l/s under normal operating circumstances. Combined with the 24-hour call-out time for a pump manufacturer to attend site in the event of a failure of the pump system, the residual risk of the basement tank flooding in the event of a pump failure is considered to be low. Non-return valves are recommended to be built into the yard gullies serving external amenity spaces so that the risk of surcharge into the residential areas from the external amenity spaces is reduced.

The basement pumps will be connected to the building's BMS/control system, with a suitable back-up power mechanism provided for the surface water pump to allow for the pumps serving the attenuation tank to continue operating for a period of time in the event of a power cut.

Addendum Appendix A - Calculations

Modified Ration Method for Brownfield Runoff
Project Number: 2220367
Project Name: Braemar Avenue Baptist Church
Date: 14/11/2022

Q= 2.78 * Cv * Cr * I * A

Q = flow rate (l/s)
Cv = Volumetric Runoff Coefficient
Cr = Routing Coefficient
I - Rainfall intensity
A = Area (Ha)

Under summer rainfall conditions Cv ranges from 0.6 - 0.9, for fully impermeable areas value of 0.75 should be used.

The routing coeffcieint varies between 1 and 2 and accounts for the effect of rainfall characterisitcs and catchment shape on the peak runoff magnitude.
The SuDS manual recoomends a fixed value for Cr of 1.3 for design.

Rainfall intensity is calculated following Walling Procedure Volume 4 and is as follows:

1.0 Determination of M5-60 min and r

60 minute, 5 year storm (M5-60) has a rainfall depth

M5-60	20.000
Ratio r	0.4

2.0 Determination of M5-D

M5-D = Z1 (M5-60min)
Z1 is taken from A3.a or A.3b for values between 0.12 and 0.45 and for durations between 5 minutes and 48 hours read to 0.01.

Assuming 1yr 15min, 2yr 15min, 30yr 15 min, 100yr 15min

Z1 0.64
M5-15 12.8 mm

3.0 Determination of MT-D

MT-D is obtained from the relationship:
MT-D = Z2(M5-D)

Taken from Table A1 for 1yr return period 15min storm
Z2 = 0.62
M1-15= 7.9

Taken from Table A1 for 2yr return period 15min storm
Z2= 0.8
M2-15= 10.2

Taken from Table A1 for 30yr return period 15min storm
Z2= 1.56
M30-15= 20.0

Taken from Table A1 for 100yr return period 15min storm
Z2= 1.99
M100-15= 25.5

4 **Determination of point rainfall intensities**

i= 31.744 mm/hr
i= 40.96 mm/hr
i= 79.872 mm/hr
i= 101.888 mm/hr

5 Application of areal reduction factor

From chart A4 where area is greater than 1km2
ARF= 1

Average 1yr intensity	Average 2yr intensity	Average 30yr intensity	Average 100yr intensity	Average 100yr+40% intensity
31.7	41.0	79.9	101.9	142.6

EXISTING SITE

Area building (Ha)	0.0251
Area hardstanding (Ha)	0.0064

If using Cv = 0.95 for roofs and 0.9 from external areas.

Storm Return Period	Existing Discharge (L/S)
1yr	3.4
2yr	4.4
30yr	8.5
100yr	10.9
100yr+40%	15.3

BLUE ROOF ATTENUATION AND OUTFLOW SUMMARY

PRIVATE & CONFIDENTIAL - NOT FOR DISTRIBUTION

abg creative geosynthetic engineering

Project Name:	Braemar Avenue, Wood Green, London, N22 7BY - Roof 1		
Prepared for:	Elliott Wood, London.		
Date:	06/03/2022		
ABG Project ID:	24694	Calculator version:	1.30
Prepared by:	Andrew Keer, andrew@abgltd.com, 07525-808700		
Notes/description:	Green roof; with free-standing/ballasted PV panels to be installed, on top of the 'blue roof' system (recommended). Maintenance access only - TBC. Warm/inverted roof, construction, with zero falls - TBC.		

Blue Roof Estimate

Input Parameters - Rainfall Information (Flood Estimation Handbook 2013)			
Return period:	100	years	*As supplied by Client*
Allowance for Climate Change:	40	%	*As supplied by Client*
OS grid reference selected for FEH data:	TQ 30481 90780		

Input Parameters - Roof Information			
Total catchment area:	172	m^2	*As supplied by Client*
Attenuation area:	145	m^2	*As supplied by Client*
Maximum allowable runoff:	0.6	l/s	*As supplied by Client*

Output - Rainfall Calculation

Duration	Time to Empty	Restricted Outflow (l/s)
15 mins	6 hours and 0 minutes	0.5
30 mins	6 hours and 50 minutes	0.5
1 hour	7 hours and 40 minutes	0.6
2 hours	8 hours and 30 minutes	0.6
4 hours	8 hours and 40 minutes	0.6
6 hours	8 hours and 20 minutes	0.6
10 hours	6 hours and 50 minutes	0.5
24 hours	1 hour and 50 minutes	0.2
48 hours	0 hours and 0 minutes	0.0

Total attenuation required: 13.7 m^3
Half empty time: 2 hours and 40 minutes.

Output - Recommended Blue Roof System

System Name:	ABG blueroof VF HD 129mm	
Description:	The blue roof depth of 129mm, already includes for a 25mm reservoir board. No. of control positions TBC by design team, and also with the structural engineer's deflection analysis. Additional 'tell-tale'/emergency parapet overflow outlets, may also be added by the architect.	
Total attenuation capacity:	16.5	m^3
Number of Blue Roof outlets:	2	

Notes:

1. This document contains an estimate which has been prepared by ABG Ltd and is illustrative only and not a detailed design.
2. Further details on the theories used in this estimate are available upon request from ABG. The values given for the performance of the system relate to testing, modelling and analysis of our systems obtained from laboratories and testing institutes. In line with our policy of continuous improvement the right is reserved to make changes to our systems without notice at any time.
3. The estimate given in this report is based on the stated parameters as per the brief. If these parameters are not correct or have changed, ABG should be contacted to provide a revised estimate.
4. This estimate is specific to the characteristics of ABG products/systems and is not applicable to other competitor products. The substitution of the whole or any component of this design for a material supplied from another source renders this estimate invalid.
5. Final determination of the suitability of any information is the sole responsibility of the user. ABG will be pleased to discuss the use of this or any other product but responsibility for selection of a material and its application in any specific project remains with the user.

abg ltd. E7 Meltham Mills Rd, Meltham, West Yorkshire, HD9 4DS
UK t 01484 852096 **e** geo@abgltd.com **Export t** +44(0)1484 852250 **e** export@abgltd.com
www.abgltd.com

1. DEFINITIONS

'Consultant' means ABG Geosynthetics Ltd and its legal successors. 'Client' means the person, firm, company or organisation for whom the Consultant is performing the Services. 'Agreement' means the contract referred to in Clause 2. 'Services' means the services to be performed by the Consultant in accordance with the proposal from the Consultant. 'Project' means the project or works for which the Client has commissioned the Services.

2. GENERAL

Unless and until a formal agreement is entered into, the Client's acceptance of the proposal for Services from the Consultant or a request for some or all the Services to be performed by the Consultant, shall constitute a binding
contract between the Client and the Consultant which contract will be subject to any terms and conditions contained or referred to in the aforementioned proposal and these terms and conditions. In the event of any conflict, the terms and conditions in the proposal shall prevail over these terms and conditions. The Agreement so formed shall supersede all previous understandings, commitments or agreements whether written or oral between the Client and the Consultant relating to the subject matter hereof. No person or entity shall have any rights in relation to this Agreement, whether as third parties or otherwise, save the parties to this Agreement. Should any term or condition of this Agreement be held to be unenforceable or invalid by the courts of any jurisdiction to which it is subject then such term or condition shall be disregarded and the remaining terms and conditions shall remain in full force and effect.

3. PERFORMANCE OF SERVICES AND SCOPE

The Consultant shall perform the Services using the degree of skill care and diligence to be expected from a consultant experienced in the provision of services of similar scope size and complexity. The Consultant shall use reasonable endeavours to complete the Services within the time or programme agreed but shall not be responsible for any delay beyond the reasonable control of the Consultant.

The fee contained in the proposal is for the scope of services as defined therein. If not already contained in the proposal the Consultant and the Client shall agree as an initial activity an integrated project services programme to
include the activities of all the parties to the Project relevant to the Services to be supplied by the Consultant. The
aforesaid programme shall show the key dates for final information and the delivery of such to the Consultant so as to enable the Consultant to carry out the services in an efficient once through manner to achieve the programme delivery dates for the Services.

The Consultant provides various services including Design and Product use advice which is distinct from a Design Service. The Design Service may or may not attract a fee.

Where the Consultant's services are of an advisory nature and dependent upon the degree of information and release thereof by the Client then the Client agrees that any reliance placed on the services by the Client shall take due account of such constraints.

4. CONFIDENTIALITY AND INTELLECTUAL PROPERTY RIGHTS

i. The Consultant and the Client shall keep confidential all information pertaining to the Services.

ii. Copyright for all reports, documents and the like produced by the Consultant in the performance of the Services
shall remain vested with the Consultant but the Consultant shall grant an irrevocable royalty free license to the Client to use such reports, documents and the like for any purpose in connection with the Project.

5. LIABILITY

i. The Consultant shall be liable to pay compensation to the Client arising out of or in connection with this
Agreement only if a breach of the duty of care in Clause 3 is established against the Consultant.

ii. Notwithstanding any other term to the contrary in this Agreement or any related document and whether the cause of action for any claim arises under or in connection with the Agreement in contract or in tort, in negligence or for breach of statutory duty or otherwise the Consultant shall have no liability to the Client in respect of any claim for loss or damage arising from acts of war or terrorism or arising from flooding, burst water mains or failed drainage or arising from any incidence of toxic mould or asbestos but otherwise in relation to any cause of action as aforesaid the total liability of the Consultant in the aggregate for all claims shall be limited to a sum equivalent to ten (10) times the fee payable under this Agreement or £50,000, whichever is the lesser, or such other sum as may be expressly stated in the Consultant's proposal, and further but without prejudice to the aforesaid limit of liability any such liability of the Consultant shall be limited to such sum or sums as it would be just and equitable for the Consultant to pay having regard to the Consultant's responsibility for the same and on the basis that all other parties appointed or to be appointed by the Client to perform related services in connection with the Project shall be deemed to have provided undertakings on terms no less onerous than this Agreement and shall be deemed to have paid to the Client such contribution as it would be just and equitable for them to pay having regard to their responsibility for any loss or damage and providing that it shall be deemed that such other parties have not limited or excluded their liability to the Client for such loss or damage in any way which may be prejudicial to the Consultant's liability under this clause. Nothing in this clause shall operate to exclude or limit the Consultant's liability for death or personal injury.

iii. The Client shall indemnify and keep indemnified the Consultant from and against all claims, demands,
proceedings, damages, costs and expenses arising out of or in connection with this Agreement or the Project
arising from acts of terrorism or arising otherwise in excess of the liability of the Consultant under this
Agreement or which may be made in respect of events occurring after the expiry of the period of liability stated
in this Agreement.

iv. No action or proceedings under or in connection with this Agreement shall be commenced against the Consultant after the expiry of one year from completion of the Services.

v. ABG Geosynthetics Ltd is not responsible for consequential, indirect or incidental losses.

6. INSURANCE

The Consultant shall arrange Professional Indemnity Insurance cover for the amount stated in Clause 5(ii). The Consultant will use all reasonable endeavours to maintain Professional Indemnity Insurance cover for the period stated in 5(iv) above, providing such insurance remains available to the Consultant at commercially reasonable rates.

7. CLIENT'S OBLIGATIONS

The Client shall supply, without charge and in such time so as not to delay or disrupt the performance of the Consultant in carrying out the Services, all necessary and relevant information, in his possession or available to him from his other agents or consultants and all necessary approvals or consents. Any deviation on any information from the proposal shall be confirmed in writing and any attendant consequential fees will be forwarded for approval by the Client before any changes are made. The Consultant shall not be liable for any consequential delays on site. Every reasonable effort will be made to mitigate against delays, however no liability for losses and costs will be accepted. The approval or consent by the Client to the Services shall not relieve the Consultant from any liability under this Agreement. All work undertaken by the Consultant must be ratified and signed off by the Client.

8. PAYMENT

i. The Client shall pay the Consultant for the Services in accordance with the proposal and this Agreement. If the Consultant performs any additional services or if the Services are delayed or disrupted for reasons beyond the
reasonable control of the Consultant then the Consultant shall be entitled to such additional fees as are fair and
reasonable in the circumstances. The Consultant may render an invoice at monthly intervals for services properly
performed. The agreed invoice, or in the event of a dispute the undisputed element, shall be paid within 28 days of receipt of the invoice by the Client. Any invoice paid after this period will attract interest at 3% above the base
rate of the central bank of the country of the currency of payment along with any collection costs which may occur.

ii. The Client shall not withhold any payment of any sum or part of a sum due to the Consultant under this
Agreement by reason of claims or alleged claims against the Consultant unless the amount to be withheld has
been agreed between the Client and the Consultant as due to the Client or such sum arises from an award in
adjudication, arbitration or litigation in favour of the Client and arises under or in connection with the Agreement.
Save as aforesaid all rights of set off at common law, in equity or otherwise which the Client may otherwise be
entitled to exercise are hereby expressly excluded.

9. TERMINATION

If a party is in breach of a material term of this Agreement and despite written notice from the other party fails to
remedy such breach within 30 days or such other period as may be agreed between the parties, then the other party shall be entitled to terminate this Agreement forthwith. The Consultant may seek to recoup costs incurred for works completed prior to termination.

10. DISPUTE RESOLUTION

Any dispute between the parties that cannot be settled by mutual agreement shall be referred for final settlement to the arbitration of a person agreed between the parties or failing such agreement appointed upon the application of either party by the President of the Chartered Institute of Arbitrators and the said arbitration shall be carried out in accordance with the Construction Industry Model Arbitration Rules 1998 or such other version current at the time of the referral under this clause. Where the Agreement is subject to a governing law other than that of England and Wales then any dispute between the parties that cannot be settled by mutual agreement shall be finally settled by arbitration in accordance with the UNCITRAL Arbitration Rules by one arbitrator appointed in compliance with the said Rules. In either case such rules as appropriate are deemed to be incorporated into this Agreement by reference.

11. COMPLIANCE WITH LAWS

This Agreement shall be governed by and construed in accordance with the law of England and Wales unless stated
otherwise in the proposal for services from the Consultant.

Changes to the above terms and conditions will only be considered if agreed in writing as
part of the appointment process prior to ABG Geosynthetics commencing work.

BLUE ROOF ATTENUATION AND OUTFLOW SUMMARY

PRIVATE & CONFIDENTIAL - NOT FOR DISTRIBUTION

abg creative geosynthetic engineering

Project Name:	Braemar Avenue, Wood Green, London, N22 7BY - Roof 2		
Prepared for:	Elliott Wood, London.		
Date:	06/03/2023		
ABG Project ID:	24694	Calculator version:	1.30
Prepared by:	Andrew Keer, andrew@abgltd.com, 07525-808700		
Notes/description:	Green roof and/or hard landscaping (pavers on pedestals/ballast) - TBC; with potential free-standing/ballasted PV panels, and planters, to be installed, on top of the 'blue roof' system (recommended). Pedestrian/amenity access and/or maintenance access - TBC. Warm/inverted roof, construction, with zero falls - TBC.		

Blue Roof Estimate

Input Parameters - Rainfall Information (Flood Estimation Handbook 2013)			
Return period:	100	years	*As supplied by Client*
Allowance for Climate Change:	40	%	*As supplied by Client*
OS grid reference selected for FEH data:	TQ 30481 90780		

Input Parameters - Roof Information			
Total catchment area:	63	m^2	*As supplied by Client*
Attenuation area:	50	m^2	*As supplied by Client*
Maximum allowable runoff:	0.6	l/s	*As supplied by Client*

Output - Rainfall Calculation

Duration	Time to Empty	Restricted Outflow (l/s)
15 mins	2 hours and 10 minutes	0.5
30 mins	2 hours and 20 minutes	0.5
1 hour	2 hours and 20 minutes	0.5
2 hours	2 hours and 20 minutes	0.5
4 hours	1 hour and 50 minutes	0.4
6 hours	1 hour and 10 minutes	0.3
10 hours	0 hours and 10 minutes	0.1
24 hours	0 hours and 0 minutes	0.0
48 hours	0 hours and 0 minutes	0.0

Total attenuation required: 3.4 m^3
Half empty time: 0 hours and 30 minutes.

Output - Recommended Blue Roof System	
System Name:	ABG blueroof VF HD 108mm/129mm
Description:	The blue roof depth of 129mm, already includes for a 25mm reservoir board. No. of control positions TBC by design team, and also with the structural engineer's deflection analysis. Additional 'tell-tale'/emergency parapet overflow outlets, may also be added by the architect.
Total attenuation capacity:	4.8 m^3
Number of Blue Roof outlets:	2

Notes:

1. This document contains an estimate which has been prepared by ABG Ltd and is illustrative only and not a detailed design.
2. Further details on the theories used in this estimate are available upon request from ABG. The values given for the performance of the system relate to testing, modelling and analysis of our systems obtained from laboratories and testing institutes. In line with our policy of continuous improvement the right is reserved to make changes to our systems without notice at any time.
3. The estimate given in this report is based on the stated parameters as per the brief. If these parameters are not correct or have changed, ABG should be contacted to provide a revised estimate.
4. This estimate is specific to the characteristics of ABG products/systems and is not applicable to other competitor products. The substitution of the whole or any component of this design for a material supplied from another source renders this estimate invalid.
5. Final determination of the suitability of any information is the sole responsibility of the user. ABG will be pleased to discuss the use of this or any other product but responsibility for selection of a material and its application in any specific project remains with the user.

abg ltd. E7 Meltham Mills Rd, Meltham, West Yorkshire, HD9 4DS
UK t 01484 852096 **e** geo@abgltd.com **Export t** +44(0)1484 852250 **e** export@abgltd.com
www.abgltd.com

1. DEFINITIONS

'Consultant' means ABG Geosynthetics Ltd and its legal successors. 'Client' means the person, firm, company or organisation for whom the Consultant is performing the Services. 'Agreement' means the contract referred to in Clause 2. 'Services' means the services to be performed by the Consultant in accordance with the proposal from the Consultant. 'Project' means the project or works for which the Client has commissioned the Services.

2. GENERAL

Unless and until a formal agreement is entered into, the Client's acceptance of the proposal for Services from the Consultant or a request for some or all the Services to be performed by the Consultant, shall constitute a binding
contract between the Client and the Consultant which contract will be subject to any terms and conditions contained or referred to in the aforementioned proposal and these terms and conditions. In the event of any conflict, the terms and conditions in the proposal shall prevail over these terms and conditions. The Agreement so formed shall supersede all previous understandings, commitments or agreements whether written or oral between the Client and the Consultant relating to the subject matter hereof. No person or entity shall have any rights in relation to this Agreement, whether as third parties or otherwise, save the parties to this Agreement. Should any term or condition of this Agreement be held to be unenforceable or invalid by the courts of any jurisdiction to which it is subject then such term or condition shall be disregarded and the remaining terms and conditions shall remain in full force and effect.

3. PERFORMANCE OF SERVICES AND SCOPE

The Consultant shall perform the Services using the degree of skill care and diligence to be expected from a consultant experienced in the provision of services of similar scope size and complexity. The Consultant shall use reasonable endeavours to complete the Services within the time or programme agreed but shall not be responsible for any delay beyond the reasonable control of the Consultant.

The fee contained in the proposal is for the scope of services as defined therein. If not already contained in the proposal the Consultant and the Client shall agree as an initial activity an integrated project services programme to
include the activities of all the parties to the Project relevant to the Services to be supplied by the Consultant. The
aforesaid programme shall show the key dates for final information and the delivery of such to the Consultant so as to enable the Consultant to carry out the services in an efficient once through manner to achieve the programme delivery dates for the Services.

The Consultant provides various services including Design and Product use advice which is distinct from a Design Service. The Design Service may or may not attract a fee.

Where the Consultant's services are of an advisory nature and dependent upon the degree of information and release thereof by the Client then the Client agrees that any reliance placed on the services by the Client shall take due account of such constraints.

4. CONFIDENTIALITY AND INTELLECTUAL PROPERTY RIGHTS

i. The Consultant and the Client shall keep confidential all information pertaining to the Services.

ii. Copyright for all reports, documents and the like produced by the Consultant in the performance of the Services
shall remain vested with the Consultant but the Consultant shall grant an irrevocable royalty free license to the Client to use such reports, documents and the like for any purpose in connection with the Project.

5. LIABILITY

i. The Consultant shall be liable to pay compensation to the Client arising out of or in connection with this
Agreement only if a breach of the duty of care in Clause 3 is established against the Consultant.

ii. Notwithstanding any other term to the contrary in this Agreement or any related document and whether the cause of action for any claim arises under or in connection with the Agreement in contract or in tort, in negligence or for breach of statutory duty or otherwise the Consultant shall have no liability to the Client in respect of any claim for loss or damage arising from acts of war or terrorism or arising from flooding, burst water mains or failed drainage or arising from any incidence of toxic mould or asbestos but otherwise in relation to any cause of action as aforesaid the total liability of the Consultant in the aggregate for all claims shall be limited to a sum equivalent to ten (10) times the fee payable under this Agreement or £50,000, whichever is the lesser, or such other sum as may be expressly stated in the Consultant's proposal, and further but without prejudice to the aforesaid limit of liability any such liability of the Consultant shall be limited to such sum or sums as it would be just and equitable for the Consultant to pay having regard to the Consultant's responsibility for the same and on the basis that all other parties appointed or to be appointed by the Client to perform related services in connection with the Project shall be deemed to have provided undertakings on terms no less onerous than this Agreement and shall be deemed to have paid to the Client such contribution as it would be just and equitable for them to pay having regard to their responsibility for any loss or damage and providing that it shall be deemed that such other parties have not limited or excluded their liability to the Client for such loss or damage in any way which may be prejudicial to the Consultant's liability under this clause. Nothing in this clause shall operate to exclude or limit the Consultant's liability for death or personal injury.

iii. The Client shall indemnify and keep indemnified the Consultant from and against all claims, demands,
proceedings, damages, costs and expenses arising out of or in connection with this Agreement or the Project
arising from acts of terrorism or arising otherwise in excess of the liability of the Consultant under this
Agreement or which may be made in respect of events occurring after the expiry of the period of liability stated
in this Agreement.

iv. No action or proceedings under or in connection with this Agreement shall be commenced against the Consultant after the expiry of one year from completion of the Services.

v. ABG Geosynthetics Ltd is not responsible for consequential, indirect or incidental losses.

6. INSURANCE

The Consultant shall arrange Professional Indemnity Insurance cover for the amount stated in Clause 5(ii). The Consultant will use all reasonable endeavours to maintain Professional Indemnity Insurance cover for the period stated in 5(iv) above, providing such insurance remains available to the Consultant at commercially reasonable rates.

7. CLIENT'S OBLIGATIONS

The Client shall supply, without charge and in such time so as not to delay or disrupt the performance of the Consultant in carrying out the Services, all necessary and relevant information, in his possession or available to him from his other agents or consultants and all necessary approvals or consents. Any deviation on any information from the proposal shall be confirmed in writing and any attendant consequential fees will be forwarded for approval by the Client before any changes are made. The Consultant shall not be liable for any consequential delays on site. Every reasonable effort will be made to mitigate against delays, however no liability for losses and costs will be accepted. The approval or consent by the Client to the Services shall not relieve the Consultant from any liability under this Agreement. All work undertaken by the Consultant must be ratified and signed off by the Client.

8. PAYMENT

i. The Client shall pay the Consultant for the Services in accordance with the proposal and this Agreement. If the Consultant performs any additional services or if the Services are delayed or disrupted for reasons beyond the
reasonable control of the Consultant then the Consultant shall be entitled to such additional fees as are fair and
reasonable in the circumstances. The Consultant may render an invoice at monthly intervals for services properly
performed. The agreed invoice, or in the event of a dispute the undisputed element, shall be paid within 28 days of receipt of the invoice by the Client. Any invoice paid after this period will attract interest at 3% above the base
rate of the central bank of the country of the currency of payment along with any collection costs which may occur.

ii. The Client shall not withhold any payment of any sum or part of a sum due to the Consultant under this
Agreement by reason of claims or alleged claims against the Consultant unless the amount to be withheld has
been agreed between the Client and the Consultant as due to the Client or such sum arises from an award in
adjudication, arbitration or litigation in favour of the Client and arises under or in connection with the Agreement.
Save as aforesaid all rights of set off at common law, in equity or otherwise which the Client may otherwise be
entitled to exercise are hereby expressly excluded.

9. TERMINATION

If a party is in breach of a material term of this Agreement and despite written notice from the other party fails to
remedy such breach within 30 days or such other period as may be agreed between the parties, then the other party shall be entitled to terminate this Agreement forthwith. The Consultant may seek to recoup costs incurred for works completed prior to termination.

10. DISPUTE RESOLUTION

Any dispute between the parties that cannot be settled by mutual agreement shall be referred for final settlement to the arbitration of a person agreed between the parties or failing such agreement appointed upon the application of either party by the President of the Chartered Institute of Arbitrators and the said arbitration shall be carried out in accordance with the Construction Industry Model Arbitration Rules 1998 or such other version current at the time of the referral under this clause. Where the Agreement is subject to a governing law other than that of England and Wales then any dispute between the parties that cannot be settled by mutual agreement shall be finally settled by arbitration in accordance with the UNCITRAL Arbitration Rules by one arbitrator appointed in compliance with the said Rules. In either case such rules as appropriate are deemed to be incorporated into this Agreement by reference.

11. COMPLIANCE WITH LAWS

This Agreement shall be governed by and construed in accordance with the law of England and Wales unless stated
otherwise in the proposal for services from the Consultant.

Changes to the above terms and conditions will only be considered if agreed in writing as
part of the appointment process prior to ABG Geosynthetics commencing work.

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	28.194	0.594	1.0	10.1	O K
30 min Summer	28.330	0.730	1.0	12.4	O K
60 min Summer	28.416	0.816	1.0	13.9	O K
120 min Summer	28.521	0.921	1.0	15.7	O K
180 min Summer	28.538	0.938	1.0	15.9	O K
240 min Summer	28.529	0.929	1.0	15.8	O K
360 min Summer	28.480	0.880	1.0	15.0	O K
480 min Summer	28.414	0.814	1.0	13.8	O K
600 min Summer	28.342	0.742	1.0	12.6	O K
720 min Summer	28.269	0.669	1.0	11.4	O K
960 min Summer	28.130	0.530	1.0	9.0	O K
1440 min Summer	27.900	0.300	1.0	5.1	O K
2160 min Summer	27.703	0.103	1.0	1.7	O K
2880 min Summer	27.651	0.051	0.9	0.9	O K
4320 min Summer	27.624	0.024	0.6	0.4	O K
5760 min Summer	27.610	0.010	0.5	0.2	O K
7200 min Summer	27.602	0.002	0.4	0.0	O K
8640 min Summer	27.600	0.000	0.4	0.0	O K
10080 min Summer	27.600	0.000	0.3	0.0	O K
15 min Winter	28.194	0.594	1.0	10.1	O K
30 min Winter	28.333	0.733	1.0	12.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	172.317	0.0	11.0	18
30 min Summer	110.609	0.0	14.2	32
60 min Summer	67.371	0.0	17.3	62
120 min Summer	43.495	0.0	22.3	120
180 min Summer	33.130	0.0	25.5	152
240 min Summer	27.051	0.0	27.8	184
360 min Summer	19.995	0.0	30.8	250
480 min Summer	15.949	0.0	32.7	318
600 min Summer	13.297	0.0	34.1	386
720 min Summer	11.418	0.0	35.1	452
960 min Summer	8.918	0.0	36.6	578
1440 min Summer	6.223	0.0	38.3	820
2160 min Summer	4.318	0.0	39.9	1144
2880 min Summer	3.332	0.0	41.0	1468
4320 min Summer	2.317	0.0	42.8	2200
5760 min Summer	1.800	0.0	44.3	2936
7200 min Summer	1.490	0.0	45.9	3624
8640 min Summer	1.284	0.0	47.4	0
10080 min Summer	1.137	0.0	49.0	0
15 min Winter	172.317	0.0	11.0	18
30 min Winter	110.609	0.0	14.2	32

©1982-2020 Innovyze

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	28.421	0.821	1.0	14.0	O K
120 min Winter	28.532	0.932	1.0	15.8	O K
180 min Winter	28.543	0.943	1.0	16.0	O K
240 min Winter	28.525	0.925	1.0	15.7	O K
360 min Winter	28.451	0.851	1.0	14.5	O K
480 min Winter	28.353	0.753	1.0	12.8	O K
600 min Winter	28.248	0.648	1.0	11.0	O K
720 min Winter	28.145	0.545	1.0	9.3	O K
960 min Winter	27.956	0.356	1.0	6.1	O K
1440 min Winter	27.697	0.097	1.0	1.6	O K
2160 min Winter	27.637	0.037	0.8	0.6	O K
2880 min Winter	27.620	0.020	0.6	0.3	O K
4320 min Winter	27.602	0.002	0.4	0.0	O K
5760 min Winter	27.600	0.000	0.3	0.0	O K
7200 min Winter	27.600	0.000	0.3	0.0	O K
8640 min Winter	27.600	0.000	0.2	0.0	O K
10080 min Winter	27.600	0.000	0.2	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	67.371	0.0	17.3	60
120 min Winter	43.495	0.0	22.3	116
180 min Winter	33.130	0.0	25.5	168
240 min Winter	27.051	0.0	27.7	190
360 min Winter	19.995	0.0	30.7	266
480 min Winter	15.949	0.0	32.7	340
600 min Winter	13.297	0.0	34.1	410
720 min Winter	11.418	0.0	35.1	478
960 min Winter	8.918	0.0	36.6	604
1440 min Winter	6.223	0.0	38.3	796
2160 min Winter	4.318	0.0	39.9	1104
2880 min Winter	3.332	0.0	41.0	1468
4320 min Winter	2.317	0.0	42.8	2200
5760 min Winter	1.800	0.0	44.3	0
7200 min Winter	1.490	0.0	45.9	0
8640 min Winter	1.284	0.0	47.4	0
10080 min Winter	1.137	0.0	49.0	0

©1982-2020 Innovyze

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 530476 190756 TQ 30476 90756
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.950
Cv (Winter)	0.950
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.027

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

©1982-2020 Innovyze

Model Details

Storage is Online Cover Level (m) 29.400

Tank or Pond Structure

Invert Level (m) 27.600

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	17.0	1.000	17.0	1.001	0.0

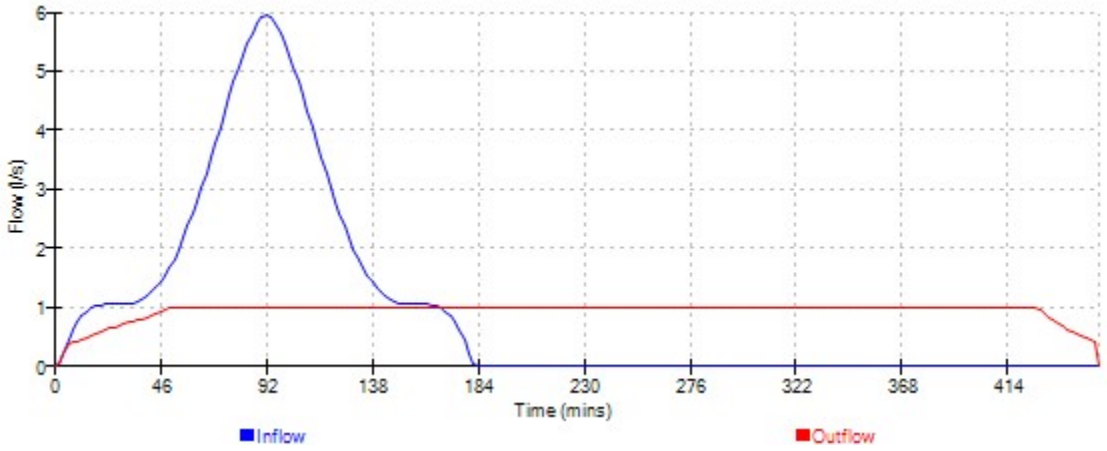
Pump Outflow Control

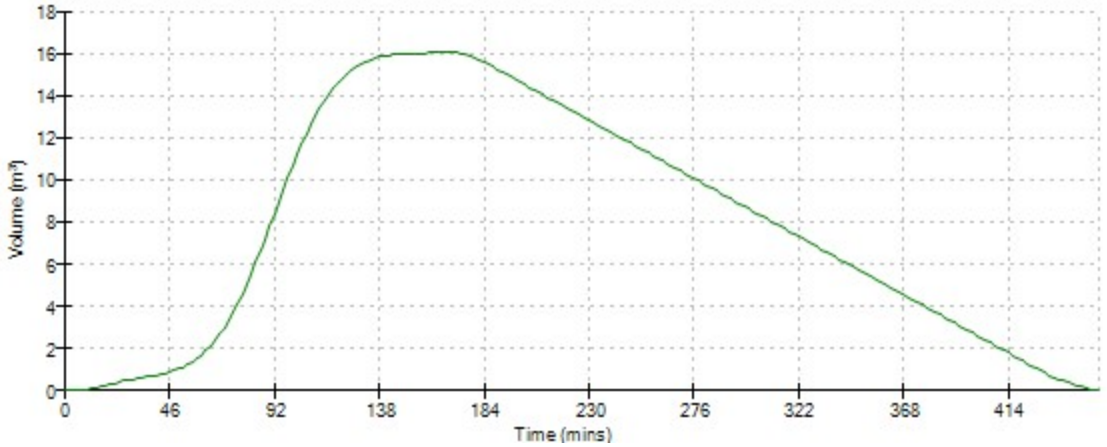
Invert Level (m) 27.260

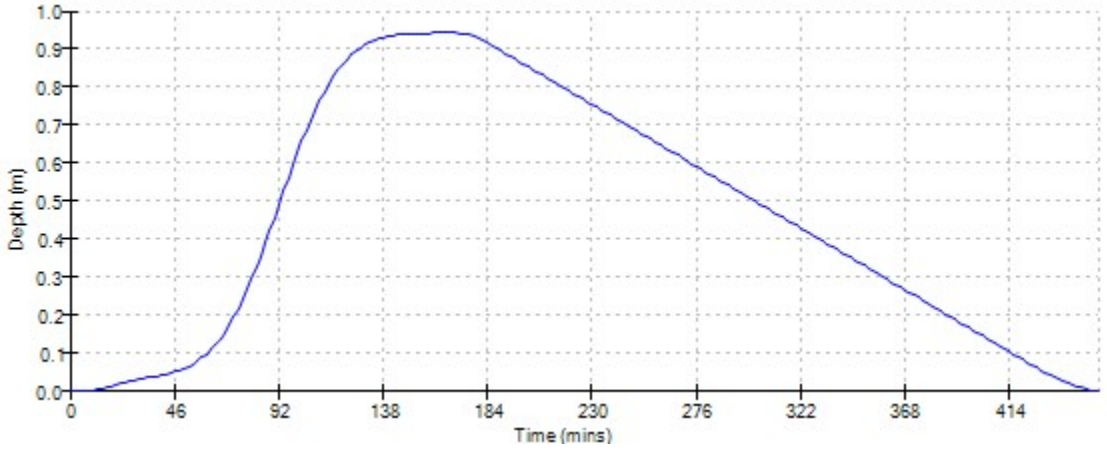
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.0000	0.900	1.0000	1.700	1.0000	2.500	1.0000
0.200	0.0000	1.000	1.0000	1.800	1.0000	2.600	1.0000
0.300	0.0000	1.100	1.0000	1.900	1.0000	2.700	1.0000
0.400	1.0000	1.200	1.0000	2.000	1.0000	2.800	1.0000
0.500	1.0000	1.300	1.0000	2.100	1.0000	2.900	1.0000
0.600	1.0000	1.400	1.0000	2.200	1.0000	3.000	1.0000
0.700	1.0000	1.500	1.0000	2.300	1.0000		
0.800	1.0000	1.600	1.0000	2.400	1.0000		

©1982-2020 Innovyze

Event: 180 min Winter







©1982-2020 Innovyze

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

Half Drain Time : 72 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	36.127	0.137	0.0	0.3	0.3	1.8	O K
30 min Summer	36.156	0.166	0.0	0.4	0.4	2.2	Flood Risk
60 min Summer	36.166	0.176	0.0	0.4	0.4	2.4	Flood Risk
120 min Summer	36.177	0.187	0.0	0.4	0.4	2.5	Flood Risk
180 min Summer	36.175	0.185	0.0	0.4	0.4	2.5	Flood Risk
240 min Summer	36.169	0.179	0.0	0.4	0.4	2.4	Flood Risk
360 min Summer	36.149	0.159	0.0	0.4	0.4	2.1	Flood Risk
480 min Summer	36.127	0.137	0.0	0.3	0.3	1.8	O K
600 min Summer	36.104	0.114	0.0	0.3	0.3	1.5	O K
720 min Summer	36.084	0.094	0.0	0.3	0.3	1.2	O K
960 min Summer	36.049	0.059	0.0	0.3	0.3	0.7	O K
1440 min Summer	36.008	0.018	0.0	0.3	0.3	0.1	O K
2160 min Summer	35.990	0.000	0.0	0.3	0.3	0.0	O K
2880 min Summer	35.990	0.000	0.0	0.2	0.2	0.0	O K
4320 min Summer	35.990	0.000	0.0	0.1	0.1	0.0	O K
5760 min Summer	35.990	0.000	0.0	0.1	0.1	0.0	O K
7200 min Summer	35.990	0.000	0.0	0.1	0.1	0.0	O K
8640 min Summer	35.990	0.000	0.0	0.1	0.1	0.0	O K
10080 min Summer	35.990	0.000	0.0	0.1	0.1	0.0	O K
15 min Winter	36.127	0.137	0.0	0.3	0.3	1.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	172.317	0.0	2.1	17
30 min Summer	110.609	0.0	2.7	31
60 min Summer	67.371	0.0	3.4	58
120 min Summer	43.495	0.0	4.5	90
180 min Summer	33.130	0.0	5.1	126
240 min Summer	27.051	0.0	5.6	160
360 min Summer	19.995	0.0	6.2	228
480 min Summer	15.949	0.0	6.6	294
600 min Summer	13.297	0.0	6.9	358
720 min Summer	11.418	0.0	7.1	420
960 min Summer	8.918	0.0	7.4	538
1440 min Summer	6.223	0.0	7.7	752
2160 min Summer	4.318	0.0	7.9	0
2880 min Summer	3.332	0.0	8.1	0
4320 min Summer	2.317	0.0	8.3	0
5760 min Summer	1.800	0.0	8.5	0
7200 min Summer	1.490	0.0	8.7	0
8640 min Summer	1.284	0.0	8.9	0
10080 min Summer	1.137	0.0	9.1	0
15 min Winter	172.317	0.0	2.1	17

©1982-2020 Innovyze

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	36.156	0.166	0.0	0.4	0.4	2.2	Flood Risk
60 min Winter	36.167	0.177	0.0	0.4	0.4	2.4	Flood Risk
120 min Winter	36.176	0.186	0.0	0.4	0.4	2.5	Flood Risk
180 min Winter	36.170	0.180	0.0	0.4	0.4	2.5	Flood Risk
240 min Winter	36.158	0.168	0.0	0.4	0.4	2.3	Flood Risk
360 min Winter	36.127	0.137	0.0	0.3	0.3	1.8	O K
480 min Winter	36.094	0.104	0.0	0.3	0.3	1.4	O K
600 min Winter	36.065	0.075	0.0	0.3	0.3	0.9	O K
720 min Winter	36.039	0.049	0.0	0.3	0.3	0.6	O K
960 min Winter	36.004	0.014	0.0	0.3	0.3	0.1	O K
1440 min Winter	35.990	0.000	0.0	0.2	0.2	0.0	O K
2160 min Winter	35.990	0.000	0.0	0.2	0.2	0.0	O K
2880 min Winter	35.990	0.000	0.0	0.1	0.1	0.0	O K
4320 min Winter	35.990	0.000	0.0	0.1	0.1	0.0	O K
5760 min Winter	35.990	0.000	0.0	0.1	0.1	0.0	O K
7200 min Winter	35.990	0.000	0.0	0.1	0.1	0.0	O K
8640 min Winter	35.990	0.000	0.0	0.0	0.0	0.0	O K
10080 min Winter	35.990	0.000	0.0	0.0	0.0	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	110.609	0.0	2.7	31
60 min Winter	67.371	0.0	3.4	58
120 min Winter	43.495	0.0	4.5	94
180 min Winter	33.130	0.0	5.1	134
240 min Winter	27.051	0.0	5.6	172
360 min Winter	19.995	0.0	6.2	244
480 min Winter	15.949	0.0	6.6	310
600 min Winter	13.297	0.0	6.9	372
720 min Winter	11.418	0.0	7.1	428
960 min Winter	8.918	0.0	7.4	520
1440 min Winter	6.223	0.0	7.7	0
2160 min Winter	4.318	0.0	7.9	0
2880 min Winter	3.332	0.0	8.1	0
4320 min Winter	2.317	0.0	8.3	0
5760 min Winter	1.800	0.0	8.5	0
7200 min Winter	1.490	0.0	8.7	0
8640 min Winter	1.284	0.0	8.9	0
10080 min Winter	1.137	0.0	9.1	0

©1982-2020 Innovyze

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 530476 190756 TQ 30476 90756
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.900
Cv (Winter)	0.900
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.006

Time (mins) From:	To:	Area (ha)
0	4	0.006

©1982-2020 Innovyze

Model Details

Storage is Online Cover Level (m) 36.440

Porous Car Park Structure

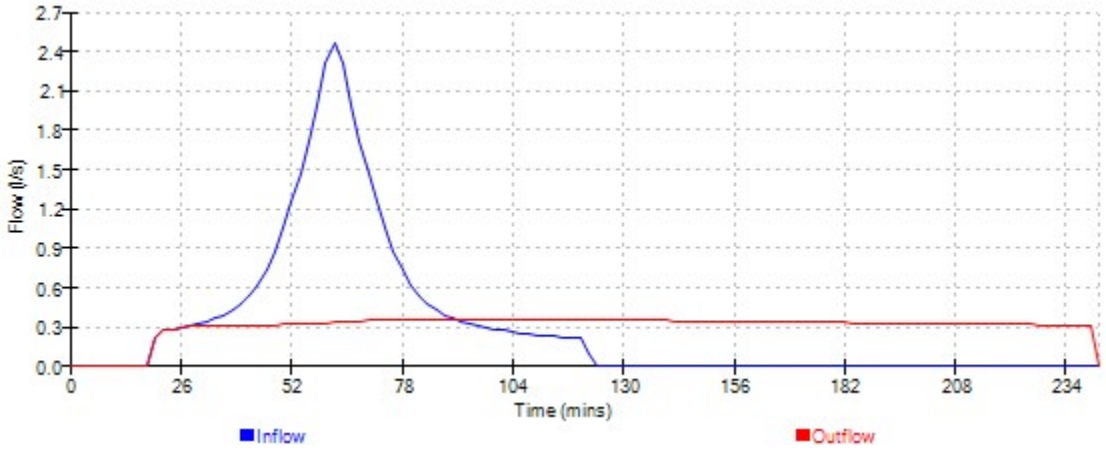
Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	12.0
Membrane Percolation (mm/hr)	1000	Length (m)	4.0
Max Percolation (l/s)	13.3	Slope (1:X)	200.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	35.990	Membrane Depth (m)	150

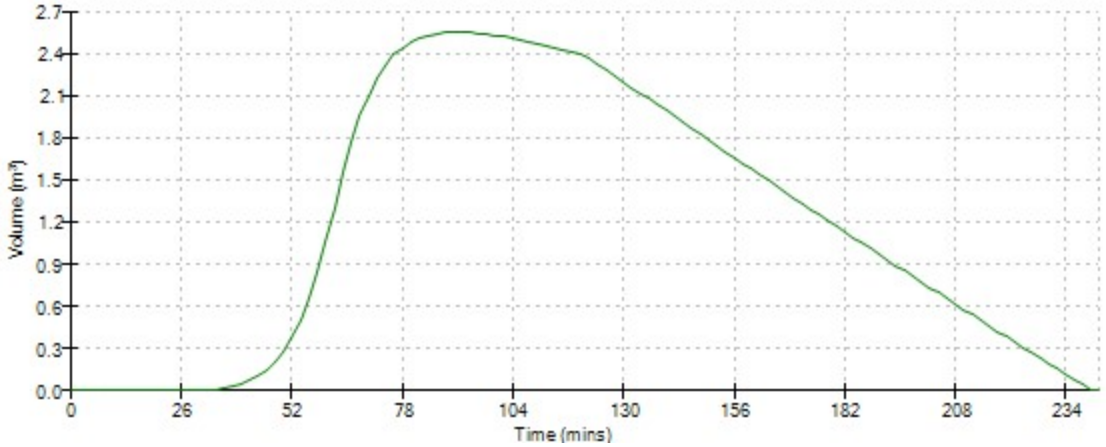
Orifice Outflow Control

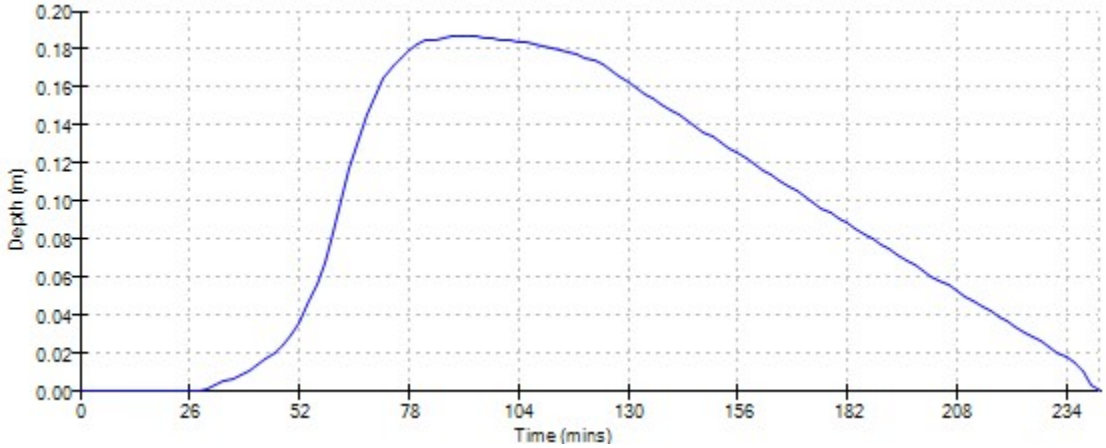
Diameter (m) 0.014 Discharge Coefficient 0.600 Invert Level (m) 35.405

©1982-2020 Innovyze

Event: 120 min Summer

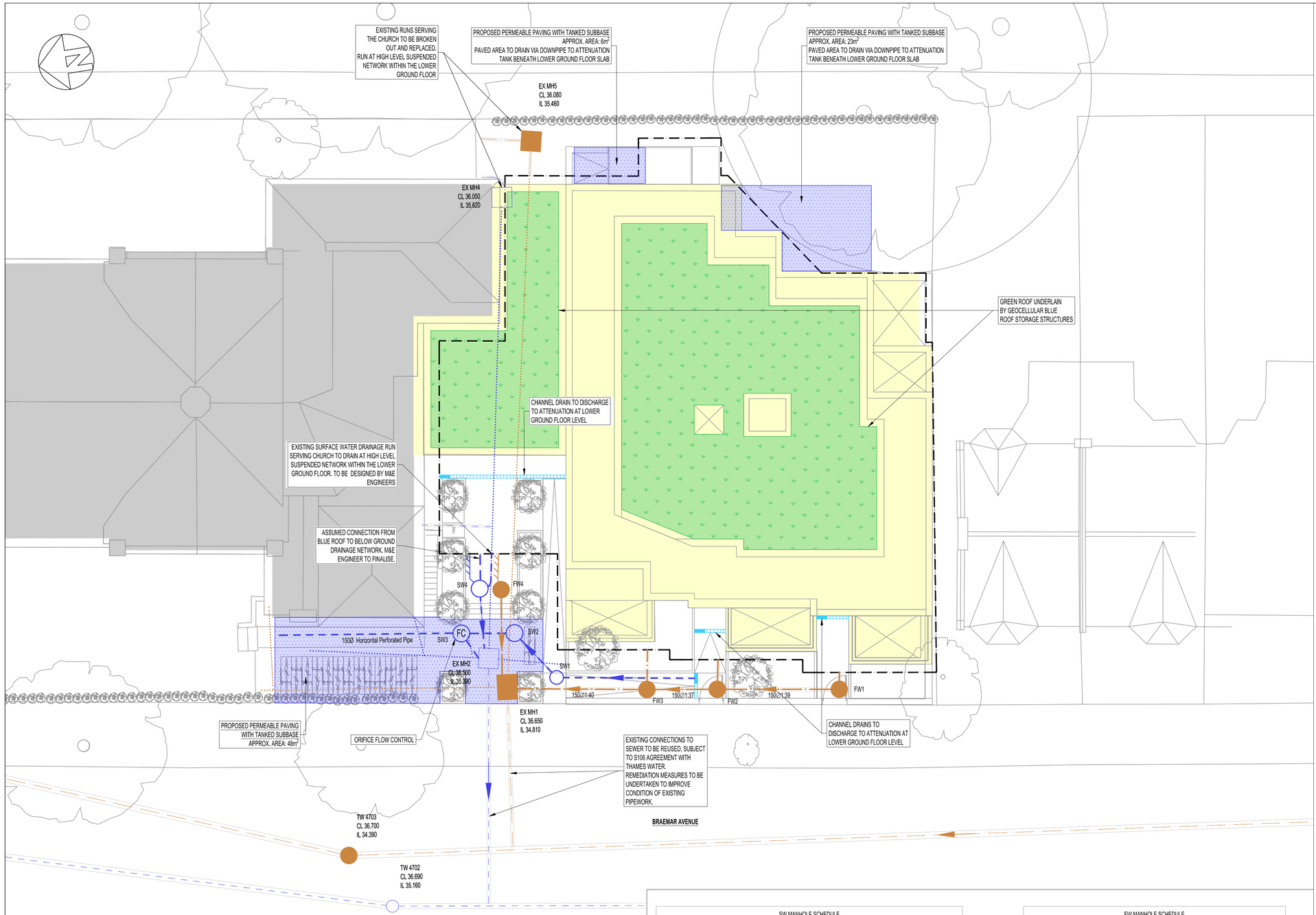






©1982-2020 Innovyze

Addendum Appendix B - Drawings



SW MANHOLE SCHEDULE						
Manhole	Chamber Type	Cover Level (m)	Depth	Chamber Size	Clear Opening	Cover Grade
SW1	PPIC	CL = 36.660 SUMP LEVEL OF MANHOLE = 35.460 INV IN = 35.460 INV OUT = 35.460	1.200	450Ø	450x450	B125
SW2	PPIC	CL = 36.440 SUMP LEVEL OF MANHOLE = 35.435 INV IN = 35.435 INV OUT = 35.435	1.005	450Ø	450x450	B125
SW3	PPIC	CL = 36.500 SUMP LEVEL OF MANHOLE = 35.405 INV IN = 35.405 INV OUT = 35.405	1.095	450Ø	450x450	B125
SW4	PPIC	CL = 36.190 SUMP LEVEL OF MANHOLE = 35.420 INV IN = 35.420 INV OUT = 35.420	0.770	450Ø	450x450	B125

FW MANHOLE SCHEDULE						
Manhole	Chamber Type	Cover Level (m)	Depth	Chamber Size	Clear Opening	Cover Grade
FW1	PPIC	CL = 36.760 INV IN = 35.260 INV OUT = 35.260	1.500	450Ø	450x450	B125
FW2	PPIC	CL = 36.760 INV IN = 35.110 INV IN = 35.110 INV OUT = 35.110	1.650	450Ø	450x450	B125
FW3	PPIC	CL = 36.690 INV IN = 35.020 INV IN = 35.020 INV OUT = 35.020	1.670	450Ø	450x450	B125
FW4	PPIC	CL = 36.190 INV OUT = 34.970	1.220	450Ø	450x450	B125

BELOW GROUND DRAINAGE NOTES

1. THE LOCATION AND LEVEL OF EXISTING DRAINAGE CONNECTIONS AND EXISTING SERVICES IS TO BE CHECKED PRIOR TO COMMENCEMENT OF DRAINAGE WORKS. ANY VARIANCE TO THE DETAILS ON THIS DRAWING AND THE SCHEDULE IS TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER.
2. THE DESIGN IS BASED ON THE INFORMATION AVAILABLE ON THE DATE OF ISSUE FROM OTHER PARTIES (EG. ARCHITECT AND M & E ENGINEER). IT IS SUBJECT TO CHANGE RESULTING FROM UPDATES TO THE AVAILABLE INFORMATION FROM OTHERS.
3. THE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE NBS SPECIFICATIONS, ASSOCIATED MANHOLE SCHEDULE AND STANDARD DRAINAGE DETAIL DRAWINGS WHERE APPLICABLE.
4. THE POSITIONS OF FOUL AND SURFACE WATER DRAINAGE POINTS ARE INDICATIVE ONLY, REFER TO THE ARCHITECTS DRAWINGS FOR SETTING OUT DETAILS.
5. PRIVATE FOUL AND SURFACE WATER DRAINAGE IS TO BE CONSTRUCTED IN ACCORDANCE WITH BUILDING REGULATIONS PART H, BS EN752 AND BS EN12056.
6. DRAINS AT BASEMENT LEVEL ARE TO BE CONSTRUCTED USING CAST IRON (ENSIGN OR EQUIVALENT) AND FLEXIBLY JOINTED TO BS 437.
7. DRAINS AT GROUND LEVEL ARE TO BE CONSTRUCTED USING VITRIFIED CLAY PIPES TO BS EN 295-1 SUPER STRENGTH SPECIFICATION (HEPWORTH SUPERSLEVE) OR SIMILAR APPROVED.
8. ALL SOIL CONNECTIONS UNDER BUILDINGS TO BE 100mm DIA LAID AT A MINIMUM GRADIENT OF 1/40 UNLESS NOTED OTHERWISE.
9. ALL SURFACE WATER CONNECTIONS TO BE 150mm DIAMETER AND TO BE LAID AT A MINIMUM GRADIENT OF 1/80 UNLESS NOTED OTHERWISE .
10. ALL SOIL CONNECTIONS AND RAINWATER PIPES SHOULD BE RODDABLE FROM GROUND LEVEL.
11. RAINWATER DOWN PIPES ARE TO CONNECT TO A DRAIN VIA A REST BEND. WHERE DRAINAGE IS COMBINED A 'P' TRAP MUST ALSO BE PROVIDED.
12. IN CASES OF IN SITU CONCRETE FLOOR SLABS, DRAINS ARE TO BE CAST INTEGRAL WITH THE SLAB WHERE PIPE COVER TO THE CROWN IS LESS THAN 300mm. - NOTE SPECIAL PROVISIONS APPLY TO BASEMENT FLOOR SLABS - SEE DETAILED DRAINAGE AND STRUCTURAL DRAWINGS. CONCRETE ENCASEMENT TO BE REINFORCED AS PER DRAINAGE DETAIL.
13. IN CASES OF SUSPENDED FLOORS WHERE A VOID OF 300mm OR MORE EXISTS BELOW FLOOR DRAINS ARE TO BE SUSPENDED USING A PROPRIETARY HANGER SYSTEM OR CAST INTEGRAL WITH THE FLOOR.
14. WHERE DRAINS PASS THROUGH FOUNDATIONS OR OTHER RIGID STRUCTURES A LINTEL OR SLEEVE IS TO BE USED AND PROVISION FOR FLEXIBILITY IS TO BE MADE USING ROCKER PIPES.
15. BACKFILLING OF DRAIN TRENCHES ADJACENT TO BUILDING OR OTHER STRUCTURES IS TO BE IN ACCORDANCE WITH DIAGRAM 8 OF THE BUILDING REGULATIONS.
16. ANY PIPE OR GULLY OR OTHER FITTING OR DUCT PENETRATING THE BASEMENT SLAB OR WALL IS TO BE WATERPROOFED USING HYDROPHILIC STRIPS OR PUDDLE FLANGES TO ENSURE A WATER TIGHT JOINT. CONCRETE SURROUND TO DRAINAGE PIPES AND FITTINGS MAY BE REQUIRED IN CERTAIN CASES - REFER TO DETAILED DRAINAGE DRAWINGS AND RELEVANT STRUCTURAL DETAILS.
17. EXISTING FOUNDATIONS AND RETAINING WALLS MUST NOT BE UNDERMINED BY NEW DRAINAGE RUNS UNLESS AGREED IN WRITING WITH THE STRUCTURAL ENGINEER. CONTRACTOR TO SUBMIT METHOD STATEMENTS AND TEMPORARY WORKS PROPOSALS TO THE STRUCTURAL ENGINEER FOR COMMENT PRIOR TO COMMENCEMENT OF WORKS.
18. ALL DRAINAGE EXCAVATIONS SHOULD BE RISK ASSESSED BY THE CONTRACTOR TO ENSURE TRENCH SAFETY / STABILISATION MEASURES ARE CONSIDERED DURING THE CONSTRUCTION PERIOD. ANY EXCAVATIONS LEFT EXPOSED SHOULD BE INSPECTED BY A COMPETENT PERSON ON A DAILY BASIS. GROUND CONDITIONS SHOULD BE MONITORED AND TOOL BOX TALKS SHOULD INCLUDE SITE INVESTIGATION INFORMATION TO AID THE CONTRACTORS ONGOING RISK ASSESSMENT AND METHOD OF EXCAVATION. ALL EXCAVATIONS SHOULD BE ASSESSED BY A COMPETENT PERSON FOR CONFINED SPACES REQUIREMENTS.
19. THE CONTRACTOR IS TO CONSIDER PHASING OF THE DRAINAGE INSTALLATION AND ARE TO PROVIDE TEMPORARY DRAINAGE MEASURES THEY DETERMINE ARE REQUIRED.
20. SuDS ARE TO BE INSTALLED IN ACCORDANCE WITH THE RECOMMENDATIONS MADE WITHIN THE CIRIA SuDS MANUAL C753 (WITH PARTICULAR ATTENTION DRAWN TO CHAPTER 31) AND CIRIA GUIDANCE ON THE CONSTRUCTION OF SuDS C768. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONSIDER CONSTRUCTION PROGRAMME OF SuDS.
21. DETAILED DESIGN OF GEOCELLULAR ATTENUATION CRATES IS A CDP ITEM AND SHOULD BE BASED ON LEVEL, LAYOUT AND VOLUME DETAILS SHOWN. DETAILED DESIGN INFORMATION SHOULD BE PROVIDED TO THE CIVIL ENGINEER TO PASS COMMENT.
22. ALL MANHOLE COVER LEVELS SHOWN ARE APPROXIMATE AND ARE TO SUIT THE FINAL GROUND OR BUILDING LEVELS .
23. MANHOLE COVERS IN BLOCK PAVED AREAS ARE TO BE RECESSED UNLESS NOTED OTHERWISE.
24. ALL INTERNAL MANHOLE COVERS ARE TO BE NON-VENTILATING AND DOUBLE SEALED.
25. ALL EXTERNAL FOUL AND COMBINED WATER MANHOLE COVERS IN FOOTPATHS AND PAVED AREAS (OTHER THAN ROADS) ARE TO BE NON-VENTILATING AND SINGLE SEALED UNLESS NOTED OTHERWISE.
26. ALL EXTERNAL SURFACE WATER MANHOLE COVERS ARE TO BE NON-VENTILATING UNLESS NOTED OTHERWISE.
27. ALL MANHOLE COVERS ARE TO BE INSTALLED SQUARE TO PAVING, KERB LINES OR BUILDINGS.
28. FOR ADOPTED DRAINAGE, MANHOLE COVERS ARE TO BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE DCG OR SPECIFIC WATER AUTHORITY REQUIREMENT.
29. INSPECTION CHAMBERS ARE TO HAVE A REDUCED ACCESS PIECE WHEN THE DEPTH IS GREATER THAN 1.2m TO THE BASE OF THE CHAMBER.

This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.

Do not scale from this drawing.

LEGEND

- FOUL WATER MANHOLE
- SURFACE WATER MANHOLE
- EXISTING FOUL WATER MANHOLE
- EXISTING SURFACE WATER MANHOLE
- EXISTING FOUL WATER
- EXISTING SURFACE WATER
- PROPOSED FOUL WATER
- PROPOSED SURFACE WATER
- PROPOSED FOUL WATER RISING MAIN
- PROPOSED SURFACE WATER RISING MAIN
- PROPOSED LINEAR CHANNEL WITH HEELGUARD GRATING
- FC FLOW CONTROL CHAMBER
- EXISTING BUILDING
- PROPOSED BUILDING
- LOWER GROUND FLOOR OUTLINE
- EXISTING FOUL WATER TO BE ABANDONED
- EXISTING SURFACE WATER TO BE ABANDONED
- PROPOSED PERMEABLE PAVING

NOT FOR CONSTRUCTION

rev	sc	date	by	chk	description
P2	S2	16.12.22	MAs	LKi	Issued for information
P1	S2	12.12.22	MAs	LKi	Issued for information

elliottwood | engineering a better society

Elliott Wood Partnership Ltd
Central London • Wimbledon • Nottingham
Consulting Structural and Civil Engineers
(020) 7499 5888 • elliottwood.co.uk

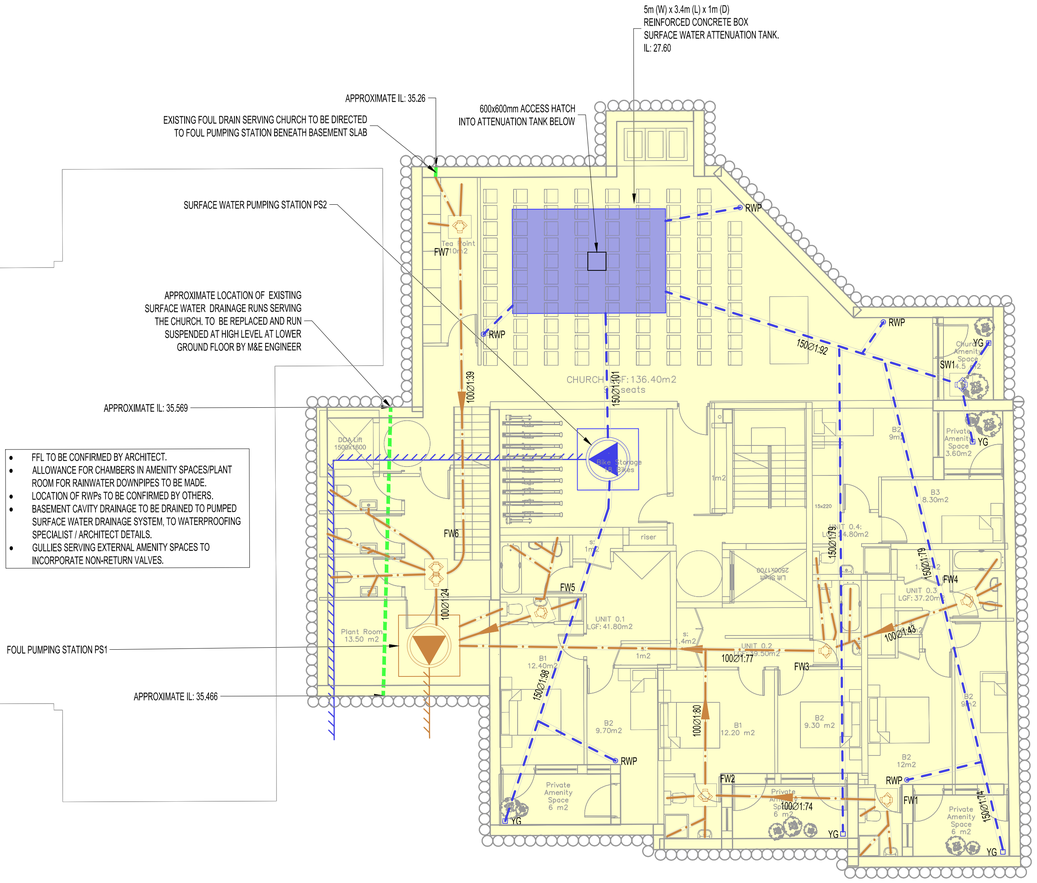
Project
Braemar Avenue Baptist Church
N22 7NY

Drawing title
Proposed Below Ground Drainage General Arrangement - Ground Floor

Scale (s)	Date	Drawn
1:100@ A1; 1:200@ A3	December 2022	MAs

Drawing status	Status	Revision
Preliminary	S2	P1

Project no.	Originator	Zone	Level	Type	Role	drg no.
2220367	EWP	ZZ	XX	DR	C	10000



- FFL TO BE CONFIRMED BY ARCHITECT.
- ALLOWANCE FOR CHAMBERS IN AMENITY SPACES/PLANT ROOM FOR RAINWATER DOWNPIPES TO BE MADE.
- LOCATION OF RWPs TO BE CONFIRMED BY OTHERS.
- BASEMENT CAVITY DRAINAGE TO BE DRAINED TO PUMPED SURFACE WATER DRAINAGE SYSTEM, TO WATERPROOFING SPECIALIST / ARCHITECT DETAILS.
- GULLIES SERVING EXTERNAL AMENITY SPACES TO INCORPORATE NON-RETURN VALVES.

PACKAGED PUMP STATION 1

-PUMPING AT 1 L/S
-24-HOUR EMERGENCY STORAGE REQUIRED TO SERVE PROPOSED BUILDING, ADDITIONAL VOLUME REQUIRED TO ALSO SERVE EXISTING FOUL FLOWS FROM CHURCH (FLOWS TO BE CONFIRMED) - VOLUME TO BE FURTHER EVALUATED AT NEXT DESIGN STAGE
-FOUL WATER PUMPING STATION WITH DUTY AND STANDBY VORTEX IMPELLER PUMPS WITH ALARMS, TELEMETRY AND NON-RETURN VALVES
-PUMPING STATION TO BE HOUSED WITHIN A 2.25M SQUARE RC BOX TO STRUCTURAL ENGINEER'S DETAILS
-PUMPING STATION TO BE INSTALLED AND COMMISSIONED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS
-PUDDLE FLANGES TO BE INSTALLED WHERE PIPES PASS THROUGH RC WALLS
-PUMPING STATION TO BE CONNECTED TO BMS - ARCHITECT AND M&E TO PROVIDE DETAILS
-PUMPING STATION TO BE VENTED TO ATMOSPHERE AT HIGH LEVEL.
-VENT PIPE ROUTE, ELECTRIC AND TERMINATION POINT TO BE CONFIRMED BY OTHERS
-ARCHITECT / M&E TO CONFIRM POSITION OF CONTROL KIOSK
-CONCRETE BACKFILL TO BE PROVIDED BETWEEN PUMP AND R/C BOX WALL STRICTLY IN ACCORDANCE WITH MANUFACTURERS INSTALLATION GUIDE
-1000mm X 750mm CLEAR OPENING RECESSED DOUBLE SEALED LOCKABLE ACCESS COVER
-ACCESS COVER TO BE CENTRALLY LOCATED OVER PUMPING STATION AS PER MANUFACTURER'S REQUIREMENTS
-CL = 29.40 (I.E FFL)
-TOP OF GRP TANK IS TO ALIGN WITH THE UNDERSIDE OF THE STRUCTURAL SLAB
-LOWEST INCOMING PIPE INVERT = 28.34
-PUMP TANK TO BE BEDDED ON 100MM OF WET CONCRETE

PACKAGED PUMP STATION 2

-PUMPING AT 1 L/S
-SURFACE WATER WATER PUMPING STATION WITH DUTY AND STANDBY VORTEX IMPELLER PUMPS WITH ALARMS, TELEMETRY AND NON-RETURN VALVES
-PUMPING STATION TO BE HOUSED WITHIN A 2.25M SQUARE RC BOX TO STRUCTURAL ENGINEERS DETAILS
-PUMPING STATION TO BE INSTALLED AND COMMISSIONED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS
-PUDDLE FLANGES TO BE INSTALLED WHERE PIPES PASS THROUGH RC WALLS
-PUMPING STATION TO BE CONNECTED TO BMS - ARCHITECT AND M&E TO PROVIDE DETAILS
-PUMPING STATION TO BE VENTED TO ATMOSPHERE AT HIGH LEVEL.
-VENT PIPE ROUTE, ELECTRIC AND TERMINATION POINT TO BE CONFIRMED BY OTHERS
-ARCHITECT / M&E TO CONFIRM POSITION OF CONTROL KIOSK
-CONCRETE BACKFILL TO BE PROVIDED BETWEEN PUMP AND R/C BOX WALL STRICTLY IN ACCORDANCE WITH MANUFACTURERS INSTALLATION GUIDE
-1000mm X 750mm CLEAR OPENING RECESSED DOUBLE SEALED LOCKABLE ACCESS COVER
-ACCESS COVER TO BE CENTRALLY LOCATED OVER PUMPING STATION AS PER MANUFACTURER'S REQUIREMENTS
-CL = 29.40 (I.E FFL)
-TOP OF GRP TANK IS TO ALIGN WITH THE UNDERSIDE OF THE STRUCTURAL SLAB
-LOWEST INCOMING PIPE INVERT = 27.56
-PUMP TANK TO BE BEDDED ON 100MM OF WET CONCRETE

SW MANHOLE SCHEDULE

Manhole	Chamber Type	Cover Level (m)	Depth	Chamber Size	Clear Opening	Cover Grade
SW1	Reinforced Concrete	CL = 29.400 SUMP LEVEL OF MANHOLE = 28.120 INV IN = 28.495 INV IN = 28.495 INV OUT = 28.420	1.280	750x750	750x750	B125

FW MANHOLE SCHEDULE

Manhole	Chamber Type	Cover Level (m)	Depth	Chamber Size	Clear Opening	Cover Grade
FW1	Reinforced Concrete	CL = 29.400 INV IN = 28.690 INV IN = 28.690 INV OUT = 28.690	0.710	750x750	750x750	B125
FW2	Reinforced Concrete	CL = 29.400 INV IN = 28.610 INV IN = 28.610 INV IN = 28.610 INV OUT = 28.610	0.790	750x750	750x750	B125
FW3	Reinforced Concrete	CL = 29.400 INV IN = 28.500 INV IN = 28.600 INV IN = 28.600 INV OUT = 28.500	0.900	750x750	750x750	B125
FW4	Reinforced Concrete	CL = 29.400 INV IN = 28.665 INV IN = 28.665 INV IN = 28.665 INV OUT = 28.615	0.785	750x750	750x750	B125
FW5	Reinforced Concrete	CL = 29.400 INV IN = 28.480 INV IN = 28.480 INV OUT = 28.430	0.970	750x750	750x750	B125
FW6	Reinforced Concrete	CL = 29.400 INV IN = 28.440 INV IN = 28.440 INV IN = 28.490 INV IN = 28.440 INV OUT = 28.440	0.985	1000x750	1220x675	B125
FW7	Reinforced Concrete	CL = 29.400 INV IN = 28.750 INV IN = 28.750 INV IN = 28.750 INV OUT = 28.750	0.650	750x750	750x750	B125

BELOW GROUND DRAINAGE NOTES

1. THE LOCATION AND LEVEL OF EXISTING DRAINAGE CONNECTIONS AND EXISTING SERVICES IS TO BE CHECKED PRIOR TO COMMENCEMENT OF DRAINAGE WORKS. ANY VARIANCE TO THE DETAILS ON THIS DRAWING AND THE SCHEDULE IS TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER.
2. THE DESIGN IS BASED ON THE INFORMATION AVAILABLE ON THE DATE OF ISSUE FROM OTHER PARTIES (EG. ARCHITECT AND M & E ENGINEER). IT IS SUBJECT TO CHANGE RESULTING FROM UPDATES TO THE AVAILABLE INFORMATION FROM OTHERS.
3. THE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE NBS SPECIFICATIONS, ASSOCIATED MANHOLE SCHEDULE AND STANDARD DRAINAGE DETAIL DRAWINGS WHERE APPLICABLE.
4. THE POSITIONS OF FOUL AND SURFACE WATER DRAINAGE POINTS ARE INDICATIVE ONLY, REFER TO THE ARCHITECTS DRAWINGS FOR SETTING OUT DETAILS.
5. PRIVATE FOUL AND SURFACE WATER DRAINAGE IS TO BE CONSTRUCTED IN ACCORDANCE WITH BUILDING REGULATIONS PART H, BS EN752 AND BS EN12056.
6. DRAINS AT BASEMENT LEVEL ARE TO BE CONSTRUCTED USING CAST IRON (ENSIGN OR EQUIVALENT) AND FLEXIBLY JOINTED TO BS 437.
7. DRAINS AT GROUND LEVEL ARE TO BE CONSTRUCTED USING VITRIFIED CLAY PIPES TO BS EN 295-1 SUPER STRENGTH SPECIFICATION (HEPWORTH SUPERSLEVE) OR SIMILAR APPROVED.
8. ALL SOIL CONNECTIONS UNDER BUILDINGS TO BE 100mm DIA LAID AT A MINIMUM GRADIENT OF 1/40 UNLESS NOTED OTHERWISE.
9. ALL SURFACE WATER CONNECTIONS TO BE 150mm DIAMETER AND TO BE LAID AT A MINIMUM GRADIENT OF 1/80 UNLESS NOTED OTHERWISE .
10. ALL SOIL CONNECTIONS AND RAINWATER PIPES SHOULD BE RODDABLE FROM GROUND LEVEL.
11. RAINWATER DOWN PIPES ARE TO CONNECT TO A DRAIN VIA A REST BEND. WHERE DRAINAGE IS COMBINED A 'P' TRAP MUST ALSO BE PROVIDED.
12. IN CASES OF IN SITU CONCRETE FLOOR SLABS, DRAINS ARE TO BE CAST INTEGRAL WITH THE SLAB WHERE PIPE COVER TO THE CROWN IS LESS THAN 300mm. - NOTE SPECIAL PROVISIONS APPLY TO BASEMENT FLOOR SLABS - SEE DETAILED DRAINAGE AND STRUCTURAL DRAWINGS. CONCRETE ENCASEMENT TO BE REINFORCED AS PER DRAINAGE DETAIL.
13. IN CASES OF SUSPENDED FLOORS WHERE A VOID OF 300mm OR MORE EXISTS BELOW FLOOR DRAINS ARE TO BE SUSPENDED USING A PROPRIETARY HANGER SYSTEM OR CAST INTEGRAL WITH THE FLOOR.
14. WHERE DRAINS PASS THROUGH FOUNDATIONS OR OTHER RIGID STRUCTURES A LINTEL OR SLEEVE IS TO BE USED AND PROVISION FOR FLEXIBILITY IS TO BE MADE USING ROCKER PIPES.
15. BACKFILLING OF DRAIN TRENCHES ADJACENT TO BUILDING OR OTHER STRUCTURES IS TO BE IN ACCORDANCE WITH DIAGRAM 8 OF THE BUILDING REGULATIONS.
16. ANY PIPE OR GULLY OR OTHER FITTING OR DUCT PENETRATING THE BASEMENT SLAB OR WALL IS TO BE WATERPROOFED USING HYDROPHILIC STRIPS OR PUDDLE FLANGES TO ENSURE A WATER TIGHT JOINT. CONCRETE SURROUND TO DRAINAGE PIPES AND FITTINGS MAY BE REQUIRED IN CERTAIN CASES - REFER TO DETAILED DRAINAGE DRAWINGS AND RELEVANT STRUCTURAL DETAILS.
17. EXISTING FOUNDATIONS AND RETAINING WALLS MUST NOT BE UNDERMINED BY NEW DRAINAGE RUNS UNLESS AGREED IN WRITING WITH THE STRUCTURAL ENGINEER. CONTRACTOR TO SUBMIT METHOD STATEMENTS AND TEMPORARY WORKS PROPOSALS TO THE STRUCTURAL ENGINEER FOR COMMENT PRIOR TO COMMENCEMENT OF WORKS.
18. ALL DRAINAGE EXCAVATIONS SHOULD BE RISK ASSESSED BY THE CONTRACTOR TO ENSURE TRENCH SAFETY / STABILISATION MEASURES ARE CONSIDERED DURING THE CONSTRUCTION PERIOD. ANY EXCAVATIONS LEFT EXPOSED SHOULD BE INSPECTED BY A COMPETENT PERSON ON A DAILY BASIS. GROUND CONDITIONS SHOULD BE MONITORED AND TOOL BOX TALKS SHOULD INCLUDE SITE INVESTIGATION INFORMATION TO AID THE CONTRACTORS ONGOING RISK ASSESSMENT AND METHOD OF EXCAVATION. ALL EXCAVATIONS SHOULD BE ASSESSED BY A COMPETENT PERSON FOR CONFINED SPACES REQUIREMENTS.
19. THE CONTRACTOR IS TO CONSIDER PHASING OF THE DRAINAGE INSTALLATION AND ARE TO PROVIDE TEMPORARY DRAINAGE MEASURES THEY DETERMINE ARE REQUIRED.
20. SuDS ARE TO BE INSTALLED IN ACCORDANCE WITH THE RECOMMENDATIONS MADE WITHIN THE CIRIA SUDS MANUAL C753 (WITH PARTICULAR ATTENTION DRAWN TO CHAPTER 31) AND CIRIA GUIDANCE ON THE CONSTRUCTION OF SuDS C768. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONSIDER CONSTRUCTION PROGRAMME OF SuDS.
21. DETAILED DESIGN OF GEOCELLULAR ATTENUATION CRATES IS A CDP ITEM AND SHOULD BE BASED ON LEVEL, LAYOUT AND VOLUME DETAILS SHOWN. DETAILED DESIGN INFORMATION SHOULD BE PROVIDED TO THE CIVIL ENGINEER TO PASS COMMENT.
22. ALL MANHOLE COVER LEVELS SHOWN ARE APPROXIMATE AND ARE TO SUIT THE FINAL GROUND OR BUILDING LEVELS .
23. MANHOLE COVERS IN BLOCK PAVED AREAS ARE TO BE RECESSED UNLESS NOTED OTHERWISE.
24. ALL INTERNAL MANHOLE COVERS ARE TO BE NON-VENTILATING AND DOUBLE SEALED.
25. ALL EXTERNAL FOUL AND COMBINED WATER MANHOLE COVERS IN FOOTPATHS AND PAVED AREAS (OTHER THAN ROADS) ARE TO BE NON-VENTILATING AND SINGLE SEALED UNLESS NOTED OTHERWISE.
26. ALL EXTERNAL SURFACE WATER MANHOLE COVERS ARE TO BE NON-VENTILATING UNLESS NOTED OTHERWISE.
27. ALL MANHOLE COVERS ARE TO BE INSTALLED SQUARE TO PAVING, KERB LINES OR BUILDINGS.
28. FOR ADOPTED DRAINAGE, MANHOLE COVERS ARE TO BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE DCG OR SPECIFIC WATER AUTHORITY REQUIREMENT.
29. INSPECTION CHAMBERS ARE TO HAVE A REDUCED ACCESS PIECE WHEN THE DEPTH IS GREATER THAN 1.2m TO THE BASE OF THE CHAMBER.

This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.

Do not scale from this drawing.

LEGEND

- PROPOSED FOUL WATER
- PROPOSED SURFACE WATER
- PROPOSED SURFACE WATER PACKAGED PUMPING STATION
- PROPOSED FOUL WATER PACKAGED PUMPING STATION
- PROPOSED FOUL WATER RISING MAIN
- PROPOSED SURFACE WATER RISING MAIN
- YG TRAPPED YARD GULLY
- RWP RAINWATER PIPE (POSITION BY OTHERS)
- SURFACE WATER ATTENUATION TANK
- PROPOSED SINGLE ENSIGN ED012 CHAMBER IN 750x750mm (INTERNAL DIMS) RC BOX
- PROPOSED SINGLE ENSIGN ED012 CHAMBER IN 1200x1000mm (INTERNAL DIMS) RC BOX (DEPTH TO SOFFIT > 1.5m)
- PROPOSED DOUBLE ENSIGN ED012 CHAMBER IN 1000x750mm (INTERNAL DIMS) RC BOX
- PROPOSED DOUBLE ENSIGN ED012 CHAMBER IN 1200x1000mm (INTERNAL DIMS) RC BOX (DEPTH TO SOFFIT > 1.5m)
- EXISTING DRAINAGE RUNS TO BE SUSPENDED AT HIGH LEVEL
- PROPOSED BUILDING

NOT FOR CONSTRUCTION

rev	sc	date	by	chk	description
P3	S2	17.04.23	LKi	PDa	Issued for information
P2	S2	16.12.22	MAs	LKi	Issued for information
P1	S2	12.12.22	MAs	LKi	Issued for information

elliottwood | engineering a better society

Elliott Wood Partnership Ltd
Central London • Wimbledon • Nottingham
Consulting Structural and Civil Engineers
(020) 7499 5888 • elliottwood.co.uk

Project
Braemar Avenue Baptist Church
N22 7BY

Drawing title
Proposed Below Ground Drainage General Arrangement - Lower Ground Floor

Scale (s)	Date	Drawn
1:100@ A1; 1:200@ A3	April 2023	MAs

Drawing status: Preliminary
Status: S2 Revision: P1

Project no. - Originator - Zone - Level - Type - Role - drg no.
2220367 - EWP - ZZ - B1 - DR - C - 09000