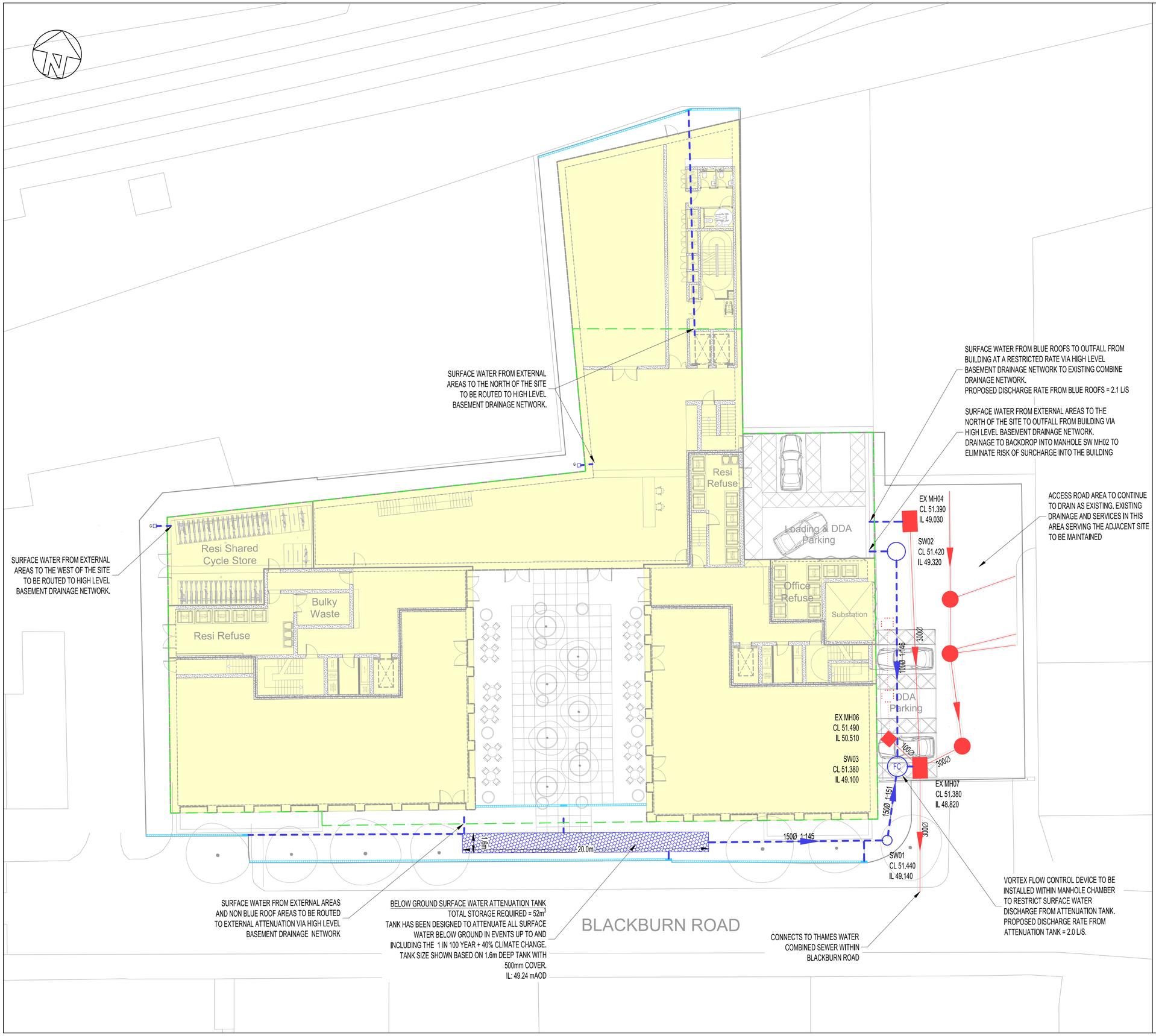

BELOW GROUND DRAINAGE NOTES

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 (TIMESAVER 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 AND RAINWATER PIPES SHOULD BE RODDABLE FROM GROUND LEVEL.
9. RAINWATER DOWN PIPES ARE TO CONNECT TO A DRAIN VIA A REST BEND. WHERE DRAINAGE IS COMBINED A 'P' TRAP MUST ALSO BE PROVIDED.
10. 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.
11. 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.
12. 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.
13. BACKFILLING OF DRAIN TRENCHES ADJACENT TO BUILDING OR OTHER STRUCTURES IS TO BE IN ACCORDANCE WITH DIAGRAM 8 OF THE BUILDING REGULATIONS.
14. 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.
15. 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.
16. 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.
17. THE CONTRACTOR IS TO CONSIDER PHASING OF THE DRAINAGE INSTALLATION AND ARE TO PROVIDE TEMPORARY DRAINAGE MEASURES THEY DETERMINE ARE REQUIRED.
18. 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.
19. 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.

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

- EXISTING COMBINED WATER MANHOLE
- EXISTING COMBINED WATER
- EXISTING COMBINED WATER PIPE TO BE ABANDONED
- PROPOSED SURFACE WATER MANHOLE
- PROPOSED SURFACE WATER
- PROPOSED LINEAR CHANNEL DRAIN
- G TRAPPED GULLY
- GEOCELLULAR SURFACE WATER ATTENUATION (TO CONTRACTOR DESIGN)
- FC FLOW CONTROL CHAMBER
- PROPOSED BUILDING
- PROPOSED BASEMENT OUTLINE

NOT FOR CONSTRUCTION

P2	S2	10/06/20	MTr	WHu	Issued for planning
P1	S2	05/06/20	MTr	WHu	Issued for information
rev	sc	date	by	chk	description

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Elliott Wood Partnership Ltd
Central London • Wimbledon • Nottingham
Consulting Structural and Civil Engineers
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Project
13 Blackburn Road
Camden, London

Drawing title
Below Ground Drainage
Proposed GF Plan

Scale (s)	Date	Drawn
1:150@ A1;	June 2020	MTr

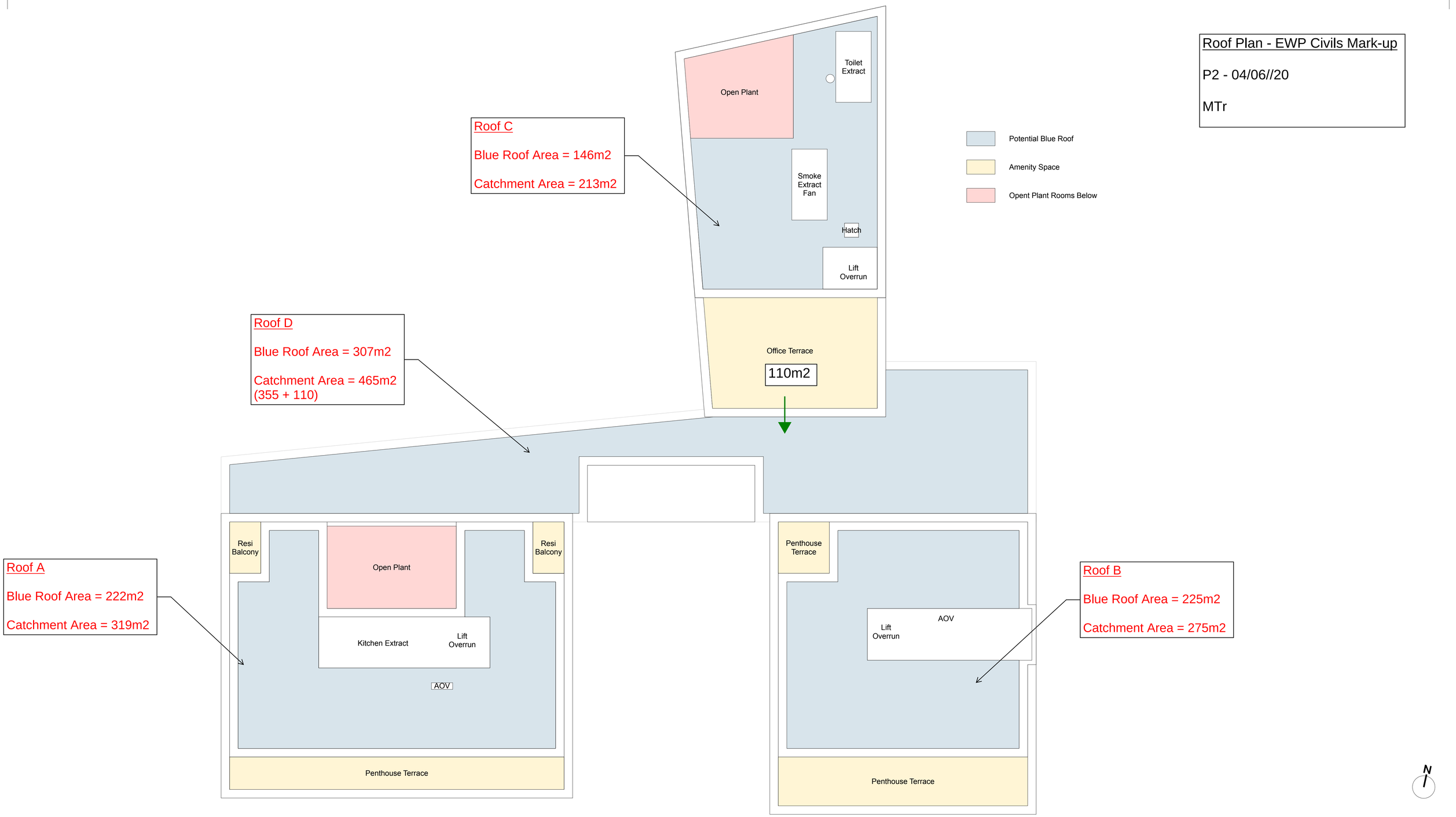
Drawing status: Preliminary — Status S2 — Revision P2

Project no. 2190511 - Originator EWP - Zone ZZ - Level 00 - Type DR - Role C - drg no. 1000

Roof Plan - EWP Civils Mark-up

P2 - 04/06//20

MTr



1 ROOF PLAN - PROPOSED
Scale: 1:125

GENERAL NOTES:
Do not scale from this drawing.
Check drawing on receipt and immediately report any discrepancies to the Architect.
Verify all dimensions and levels on site prior to construction.

Revisions

Rev.	Date	Note	Approved

Key Plan

Stiff + Trevillion

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London W9 2BE

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mail@stiffandtrevillion.com
www.stiffandtrevillion.com

Client: GP

Drawing Status: STAGE 2

Project No.	Project	Date	Scale @ A1	Scale @ A3
4153	BLACKBURN ROAD NW6 1RZ	APRIL 2019	1:125	1:250

Drawing Title: ROOF PLAN PROPOSED

Drawing No.: ST-SK200604-001

Revision:

DRAFT

F Blue Roof Calculation Summary

BLUE ROOF STORAGE AND OUTFLOW SUMMARY

PRIVATE & CONFIDENTIAL - NOT FOR DISTRIBUTION

Project Name:	13, Blackburn Road, London, NW6 1RZ - Roof A		
Prepared for:	Elliott Wood, London		
Date:	12/06/2020		
ABG Project ID:	20597	Calculator version:	1.26
Prepared by:	Andrew Keer, andrew@abgltd.com, 07525-808700		
Notes/description:	Green roof or biodiverse roof; with pavers on pedestals for a maintenance walkway - TBC. Maintenance access only - TBC. Warm roof, or inverted roof, construction, with zero falls (BBA approved) - TBC. Potential for freestanding/ballasted PV panels. Kitchen Extract Fan unit to be supported on top of the 'blue roof' - expected EF weight of approx. 250-300kg - TBC.		

Blue Roof Estimate

Input Parameters - Rainfall Information (Flood Studies Report 1975)			
Return period:	100	years	*As supplied by Client*
Allowance for Climate Change:	40	%	*As supplied by Client*
Location selected for FSR data:	London (NW)		

Input Parameters - Roof Information			
Total catchment area:	319	m^2	*As supplied by Client*
Attenuation area:	222	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	11 hours and 20 minutes	0.4
30 mins	13 hours and 30 minutes	0.4
1 hour	15 hours and 30 minutes	0.5
2 hours	16 hours and 50 minutes	0.5
4 hours	17 hours and 20 minutes	0.5
6 hours	17 hours and 20 minutes	0.5
10 hours	16 hours and 30 minutes	0.5
24 hours	11 hours and 40 minutes	0.4
48 hours	3 hours and 20 minutes	0.2

Total attenuation required: 22.5 m^3
Half empty time: 5 hours and 50 minutes.

Output - Recommended Blue Roof System		
System Name:	ABG blueroof VF HD 129mm	
Description:	The 'blue roof' depth of 129mm, includes for a 25mm deep, reservoir board. Positions of RWO's to be coordinated with the structural engineer's deflection analysis. Potential additional (visual) overflow positions, should also be considered by the design team.	
Total attenuation capacity:	25.3	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.

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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 STORAGE AND OUTFLOW SUMMARY

PRIVATE & CONFIDENTIAL - NOT FOR DISTRIBUTION

abg creative geosynthetic engineering

Project Name:	13, Blackburn Road, London, NW6 1RZ - Roof B		
Prepared for:	Elliott Wood, London		
Date:	07/05/2020		
ABG Project ID:	20597	Calculator version:	1.26
Prepared by:	Andrew Keer, andrew@abgltd.com, 07525-808700		
Notes/description:	Green roof or biodiverse roof; with pavers on pedestals for a maintenance walkway - TBC. Maintenance access only - TBC. Warm roof, or inverted roof, construction, with zero falls (BBA approved) - TBC. Potential for freestanding/ballasted PV panels.		

Blue Roof Estimate

Input Parameters - Rainfall Information (Flood Studies Report 1975)			
Return period:	100	years	*As supplied by Client*
Allowance for Climate Change:	40	%	*As supplied by Client*
Location selected for FSR data:	London (NW)		

Input Parameters - Roof Information			
Total catchment area:	275	m^2	*As supplied by Client*
Attenuation area:	225	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	10 hours and 20 minutes	0.4
30 mins	12 hours and 20 minutes	0.4
1 hour	14 hours and 10 minutes	0.5
2 hours	15 hours and 20 minutes	0.5
4 hours	15 hours and 50 minutes	0.5
6 hours	15 hours and 40 minutes	0.5
10 hours	14 hours and 50 minutes	0.5
24 hours	9 hours and 50 minutes	0.3
48 hours	2 hours and 10 minutes	0.1

Total attenuation required: 19.3 m^3
Half empty time: 4 hours and 0 minutes.

Output - Recommended Blue Roof System		
System Name:	ABG blueroof VF HD 129mm	
Description:	The 'blue roof' depth of 129mm, includes for a 25mm deep, reservoir board. Positions of RWO's to be coordinated with the structural engineer's deflection analysis. Potential additional (visual) overflow positions, should also be considered by the design team.	
Total attenuation capacity:	25.6	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.
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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.

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5. LIABILITY

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Agreement only if a breach of the duty of care in Clause 3 is established against the Consultant.

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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.

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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.

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BLUE ROOF STORAGE AND OUTFLOW SUMMARY

PRIVATE & CONFIDENTIAL - NOT FOR DISTRIBUTION

Project Name:	13, Blackburn Road, London, NW6 1RZ - Roof C		
Prepared for:	Elliott Wood, London		
Date:	12/06/2020		
ABG Project ID:	20597	Calculator version:	1.26
Prepared by:	Andrew Keer, andrew@abgltd.com, 07525-808700		
Notes/description:	Green roof or biodiverse roof; with pavers on pedestals for a maintenance walkway - TBC. Maintenance access only - TBC. Warm roof, or inverted roof, construction, with zero falls (BBA approved) - TBC. Potential for freestanding/ballasted PV panels. Smoke Extract Fan unit to be supported on top of the 'blue roof' - expected EF weight of approx. 250-300kg - TBC.		

Blue Roof Estimate

Input Parameters - Rainfall Information (Flood Studies Report 1975)			
Return period:	100	years	*As supplied by Client*
Allowance for Climate Change:	40	%	*As supplied by Client*
Location selected for FSR data:	London (NW)		

Input Parameters - Roof Information			
Total catchment area:	213	m^2	*As supplied by Client*
Attenuation area:	146	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	7 hours and 30 minutes	0.4
30 mins	9 hours and 0 minutes	0.4
1 hour	10 hours and 10 minutes	0.5
2 hours	10 hours and 50 minutes	0.5
4 hours	10 hours and 50 minutes	0.5
6 hours	10 hours and 20 minutes	0.5
10 hours	9 hours and 10 minutes	0.5
24 hours	4 hours and 10 minutes	0.3
48 hours	0 hours and 0 minutes	0.0

Total attenuation required: 13.5 m^3
Half empty time: 3 hours and 10 minutes.

Output - Recommended Blue Roof System		
System Name:	ABG blueroof VF HD 129mm	
Description:	The 'blue roof' depth of 129mm, includes for a 25mm deep, reservoir board. Positions of RWO's to be coordinated with the structural engineer's deflection analysis. Potential additional (visual) overflow positions, should also be considered by the design team.	
Total attenuation capacity:	16.6	m^3
Number of Blue Roof outlets:	2	

Notes:

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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.

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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.

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Agreement or which may be made in respect of events occurring after the expiry of the period of liability stated
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BLUE ROOF STORAGE AND OUTFLOW SUMMARY

PRIVATE & CONFIDENTIAL - NOT FOR DISTRIBUTION

Project Name:	13, Blackburn Road, London, NW6 1RZ - Roof D		
Prepared for:	Elliott Wood, London		
Date:	12/06/2020		
ABG Project ID:	20597	Calculator version:	1.26
Prepared by:	Andrew Keer, andrew@abgltd.com, 07525-808700		
Notes/description:	Green roof or biodiverse roof; with pavers on pedestals for a maintenance walkway - TBC. Maintenance access only - TBC. Warm roof, or inverted roof, construction, with zero falls (BBA approved) - TBC. Potential for freestanding/ballasted PV panels.		

Blue Roof Estimate

Input Parameters - Rainfall Information (Flood Studies Report 1975)			
Return period:	100	years	*As supplied by Client*
Allowance for Climate Change:	40	%	*As supplied by Client*
Location selected for FSR data:	London (NW)		

Input Parameters - Roof Information			
Total catchment area:	465	m^2	*As supplied by Client*
Attenuation area:	307	m^2	*As supplied by Client*
Maximum allowable runoff:	0.7	l/s	*As supplied by Client*

Output - Rainfall Calculation

Duration	Time to Empty	Restricted Outflow (l/s)
15 mins	15 hours and 20 minutes	0.4
30 mins	18 hours and 10 minutes	0.5
1 hour	20 hours and 50 minutes	0.6
2 hours	22 hours and 40 minutes	0.6
4 hours	23 hours and 50 minutes	0.6
6 hours	24 hours and 0 minutes	0.6
10 hours	23 hours and 40 minutes	0.6
24 hours	19 hours and 10 minutes	0.5
48 hours	10 hours and 10 minutes	0.3

Total attenuation required: 34.7 m^3
Half empty time: 9 hours and 0 minutes.

Output - Recommended Blue Roof System	
System Name:	ABG blueroof VF HD 129mm
Description:	The 'blue roof' depth of 129mm, includes for a 25mm deep, reservoir board. Positions of RWO's to be coordinated with the structural engineer's deflection analysis. Potential additional (visual) overflow positions, should also be considered by the design team.
Total attenuation capacity:	34.9 m^3
Number of Blue Roof outlets:	2

Notes:

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G Microdrainage Network Modelling

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	21.000	Add Flow / Climate Change (%)	0
Ratio R	0.436	Minimum Backdrop Height (m)	0.010
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.010
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.061	4-8	0.046

Total Area Contributing (ha) = 0.108

Total Pipe Volume (m³) = 1.481

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	17.098	0.120	142.5	0.095	6.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	6.000	0.040	150.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	3.651	0.100	36.5	0.013	6.00	0.0	0.600	o	100	Pipe/Conduit	
2.001	17.523	0.220	79.6	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.002	1.832	0.032	57.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	6.34	49.240	0.095	0.0	0.0	0.0	0.84	14.8	12.9
1.001	50.00	6.46	49.120	0.095	0.0	0.0	0.0	0.82	14.5	12.9
2.000	50.00	6.05	51.000	0.013	0.0	0.0	0.0	1.28	10.1	1.7
2.001	50.00	6.39	49.350	0.013	0.0	0.0	0.0	0.86	6.8	1.7
1.002	50.00	6.48	49.080	0.108	0.0	0.0	0.0	1.34	23.6	14.6

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
3.000	20.099	0.210	95.7	0.000	6.00	2.1	0.600	o	100	Pipe/Conduit	
1.003	10.130	0.100	101.3	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

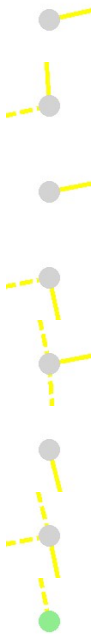
Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
3.000	50.00	6.43	49.030	0.000	2.1	0.0	0.0	0.79	6.2	2.1
1.003	50.00	6.59	48.620	0.108	2.1	0.0	0.0	1.56	110.4	16.7

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)
DMH1 (TANK)	51.340	2.100	Open Manhole	1200	1.000	49.240	150			
SW01	51.440	2.320	Open Manhole	450	1.001	49.120	150	1.000	49.120	150
DMH2	51.420	0.420	Open Manhole	1200	2.000	51.000	100			
SW2	51.420	2.070	Open Manhole	1200	2.001	49.350	100	2.000	50.900	100
SW3 (FC)	51.380	2.300	Open Manhole	1200	1.002	49.080	150	1.001	49.080	150
								2.001	49.130	100
CW01 (Blue Roof)	51.390	2.360	Open Manhole	1200	3.000	49.030	100			
CW02 (Access Road)	51.380	2.760	Open Manhole	1200	1.003	48.620	300	1.002	49.048	150
								3.000	48.820	100
	51.400	2.880	Open Manhole	0		OUTFALL		1.003	48.520	300

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
DMH1 (TANK)	525624.607	184701.090	525624.607	184701.090	Required	
SW01	525641.293	184704.818	525641.293	184704.818	Required	
DMH2	525633.558	184727.209	525633.558	184727.209	Required	
SW2	525637.139	184727.918	525637.139	184727.918	Required	
SW3 (FC)	525640.905	184710.805	525640.905	184710.805	Required	
CW01 (Blue Roof)	525637.600	184730.586	525637.600	184730.586	Required	
CW02 (Access Road)	525642.705	184711.146	525642.705	184711.146	Required	
	525644.770	184701.229			No Entry	



PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	150	DMH1 (TANK)	51.340	49.240	1.950	Open Manhole	1200
1.001	o	150	SW01	51.440	49.120	2.170	Open Manhole	450
2.000	o	100	DMH2	51.420	51.000	0.320	Open Manhole	1200
2.001	o	100	SW2	51.420	49.350	1.970	Open Manhole	1200
1.002	o	150	SW3 (FC)	51.380	49.080	2.150	Open Manhole	1200
3.000	o	100	CW01 (Blue Roof)	51.390	49.030	2.260	Open Manhole	1200
1.003	o	300	CW02 (Access Road)	51.380	48.620	2.460	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	17.098	142.5	SW01	51.440	49.120	2.170	Open Manhole	450
1.001	6.000	150.0	SW3 (FC)	51.380	49.080	2.150	Open Manhole	1200
2.000	3.651	36.5	SW2	51.420	50.900	0.420	Open Manhole	1200
2.001	17.523	79.6	SW3 (FC)	51.380	49.130	2.150	Open Manhole	1200
1.002	1.832	57.0	CW02 (Access Road)	51.380	49.048	2.182	Open Manhole	1200
3.000	20.099	95.7	CW02 (Access Road)	51.380	48.820	2.460	Open Manhole	1200
1.003	10.130	101.3		51.400	48.520	2.580	Open Manhole	0

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.095	0.095	0.095
1.001	-	-	100	0.000	0.000	0.000
2.000	User	-	100	0.013	0.013	0.013
2.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.000	0.000	0.000
3.000	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.108	0.108	0.108

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.003		51.400	48.520	0.000	0	0

Online Controls for Storm

Hydro-Brake® Optimum Manhole: SW3 (FC), DS/PN: 1.002, Volume (m³): 2.8

Unit Reference	MD-SHE-0059-2000-1700-2000
Design Head (m)	1.700
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	59
Invert Level (m)	49.080
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.700	2.0
Flush-Flo™	0.257	1.5
Kick-Flo®	0.527	1.2
Mean Flow over Head Range	-	1.5

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.3	1.200	1.7	3.000	2.6	7.000	3.8
0.200	1.4	1.400	1.8	3.500	2.8	7.500	4.0
0.300	1.4	1.600	1.9	4.000	3.0	8.000	4.1
0.400	1.4	1.800	2.1	4.500	3.1	8.500	4.2
0.500	1.3	2.000	2.2	5.000	3.3	9.000	4.3
0.600	1.3	2.200	2.2	5.500	3.4	9.500	4.4
0.800	1.4	2.400	2.3	6.000	3.6		
1.000	1.6	2.600	2.4	6.500	3.7		

Storage Structures for Storm

Cellular Storage Manhole: DMH1 (TANK), DS/PN: 1.000

Invert Level (m) 49.240 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	32.0	0.0	1.601	0.0	0.0
1.600	32.0	0.0			

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.437
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	21.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
1.000	DMH1 (TANK)	60 Winter	1	+0%	1/15 Winter		
1.001	SW01	60 Winter	1	+0%	1/15 Summer		
2.000	DMH2	15 Winter	1	+0%			
2.001	SW2	60 Winter	1	+0%	1/60 Winter		
1.002	SW3 (FC)	60 Winter	1	+0%	1/15 Summer		
3.000	CW01 (Blue Roof)	30 Winter	1	+0%			
1.003	CW02 (Access Road)	360 Summer	1	+0%			

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
1.000	DMH1 (TANK)		49.461	0.071	0.000	0.18		2.5
1.001	SW01		49.457	0.187	0.000	0.14		1.7
2.000	DMH2		51.031	-0.069	0.000	0.21		1.8
2.001	SW2		49.456	0.006	0.000	0.15		1.0
1.002	SW3 (FC)		49.456	0.226	0.000	0.13		1.4
3.000	CW01 (Blue Roof)		49.071	-0.059	0.000	0.35		2.1

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
1.003	CW02 (Access Road)		48.661	-0.259	0.000	0.04		3.5

PN	US/MH Name	Status	Level Exceeded
1.000	DMH1 (TANK)	SURCHARGED	
1.001	SW01	SURCHARGED	
2.000	DMH2	OK	
2.001	SW2	SURCHARGED	
1.002	SW3 (FC)	SURCHARGED	
3.000	CW01 (Blue Roof)	OK	
1.003	CW02 (Access Road)	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.437
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	21.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
1.000	DMH1 (TANK)	120 Winter	30	+0%	1/15 Winter		
1.001	SW01	120 Winter	30	+0%	1/15 Summer		
2.000	DMH2	15 Winter	30	+0%			
2.001	SW2	120 Winter	30	+0%	1/60 Winter		
1.002	SW3 (FC)	120 Winter	30	+0%	1/15 Summer		
3.000	CW01 (Blue Roof)	60 Winter	30	+0%			
1.003	CW02 (Access Road)	120 Winter	30	+0%			

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
1.000	DMH1 (TANK)		49.960	0.570	0.000	0.13		1.8
1.001	SW01		49.955	0.685	0.000	0.12		1.5
2.000	DMH2		51.051	-0.049	0.000	0.52		4.4
2.001	SW2		49.954	0.504	0.000	0.17		1.1
1.002	SW3 (FC)		49.952	0.722	0.000	0.13		1.5
3.000	CW01 (Blue Roof)		49.071	-0.059	0.000	0.35		2.1

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
1.003	CW02 (Access Road)		48.661	-0.259	0.000	0.05		3.6

PN	US/MH Name	Status	Level Exceeded
1.000	DMH1 (TANK)	SURCHARGED	
1.001	SW01	SURCHARGED	
2.000	DMH2	OK	
2.001	SW2	SURCHARGED	
1.002	SW3 (FC)	SURCHARGED	
3.000	CW01 (Blue Roof)	OK	
1.003	CW02 (Access Road)	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.437
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	21.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
1.000	DMH1 (TANK)	120 Winter	100	+40%	1/15 Winter		
1.001	SW01	120 Winter	100	+40%	1/15 Summer		
2.000	DMH2	15 Winter	100	+40%			
2.001	SW2	120 Winter	100	+40%	1/60 Winter		
1.002	SW3 (FC)	120 Winter	100	+40%	1/15 Summer		
3.000	CW01 (Blue Roof)	60 Winter	100	+40%			
1.003	CW02 (Access Road)	120 Winter	100	+40%			

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
1.000	DMH1 (TANK)		50.735	1.345	0.000	0.17		2.4
1.001	SW01		50.727	1.457	0.000	0.15		1.9
2.000	DMH2		51.077	-0.023	0.000	0.94		8.0
2.001	SW2		50.726	1.276	0.000	0.30		2.0
1.002	SW3 (FC)		50.723	1.493	0.000	0.18		2.0
3.000	CW01 (Blue Roof)		49.071	-0.059	0.000	0.35		2.1

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
1.003	CW02 (Access Road)		48.663	-0.257	0.000	0.05		4.1

PN	US/MH Name	Status	Level Exceeded
1.000	DMH1 (TANK)	SURCHARGED	
1.001	SW01	SURCHARGED	
2.000	DMH2	OK	
2.001	SW2	SURCHARGED	
1.002	SW3 (FC)	SURCHARGED	
3.000	CW01 (Blue Roof)	OK	
1.003	CW02 (Access Road)	OK	

H Camden SuDS Pro-forma

Camden

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1. Project & Site Details

Project / Site Name (including sub-catchment / stage / phase where appropriate)	13 Blackburn Road
Address & post code	13Blackburn Road, London, NW6 1RZ
OS Grid ref. (Easting, Northing)	E 525614
	N 184710
LPA reference (if applicable)	
Brief description of proposed work	Demolition of existing building. Construction of 3 buildings and connecting pavillion standing between 1-9 storeys (plus basement)
Total site Area	2635 m^2
Total existing impervious area	2635 m^2
Total proposed impervious area	2635 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	Existing combined demarcation chmaber within access road outfalls via 300mm dia. Connection to sewer within
Designer Name	Marco Tranchina
Designer Position	Civil Engineer

2. Proposed Discharge Arrangements

2a. Infiltration Feasibility

Superficial geology classification	n/a
Bedrock geology classification	London Clay
Site infiltration rate	m/s
Depth to groundwater level	m below ground level
Is infiltration feasible?	No

2b. Drainage Hierarchy

	Feasible (Y/N)	*Proposed (Y/N)*
1 store rainwater for later use	N	N
2 use infiltration techniques, such as porous surfaces in non-clay areas	N	N
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	Existing demarcation chamber in access roa
Has the owner/regulator of the discharge location been	No

	Designer Company	Elliott Wood Partnership		consulted?	

Camden

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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	1.16			
1 in 1	0.99	24.7		2.7
1 in 30	1.67	60.4		6.6
1 in 100	3.7	78.7		8.6
1 in 100 + CC				8.6
Climate change allowance used		40%		

3b. Principal Method of Flow Control	Orifice & vortex flow controls

3c. Proposed SuDS Measures

	Catchment area (m^2)	*Plan area (m^2)*	*Storage vol. (m^3)*
Rainwater harvesting	0		0
Infiltration systems	0		0
Green roofs	1272	900	0
Blue roofs	1272	900	85
Filter strips	0	0	0
Filter drains	0	0	0
Bioretention / tree pits	0	0	0
Pervious pavements	0	0	0
Swales	0	0	0
Basins/ponds	0	0	0
Attenuation tanks	1076		51
Total	**3620**	**1800**	**136**

4. Supporting Information

4a. Discharge & Drainage Strategy	*Page/section of drainage report*
Infiltration feasibility (2a) – geotechnical factual and interpretive reports, including infiltration results	Section 6.3 (Page 4)
Drainage hierarchy (2b)	Section 6.1 (Page 4)
Proposed discharge details (2c) – utility plans, correspondence / approval from owner/regulator of discharge location	Section 9.3 (page 7)
Discharge rates & storage (3a) – detailed hydrologic and hydraulic calculations	Section 6 (pages 4, 5 & 6)
Proposed SuDS measures & specifications (3b)	Section 6 (pages 4, 5 & 6)
4b. Other Supporting Details	*Page/section of drainage report*
Detailed Development Layout	Appendix E
Detailed drainage design drawings, including exceedance flow routes	Appendix E
Detailed landscaping plans	Appendix E
Maintenance strategy	Section 7 (Page 6)
Demonstration of how the proposed SuDS measures improve:	
a) water quality of the runoff?	Section 6 (Pages 4, 5 & 6)
b) biodiversity?	Section 6 (Pages 4, 5 & 6)
c) amenity?	Section 6 (Pages 4, 5 & 6)

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