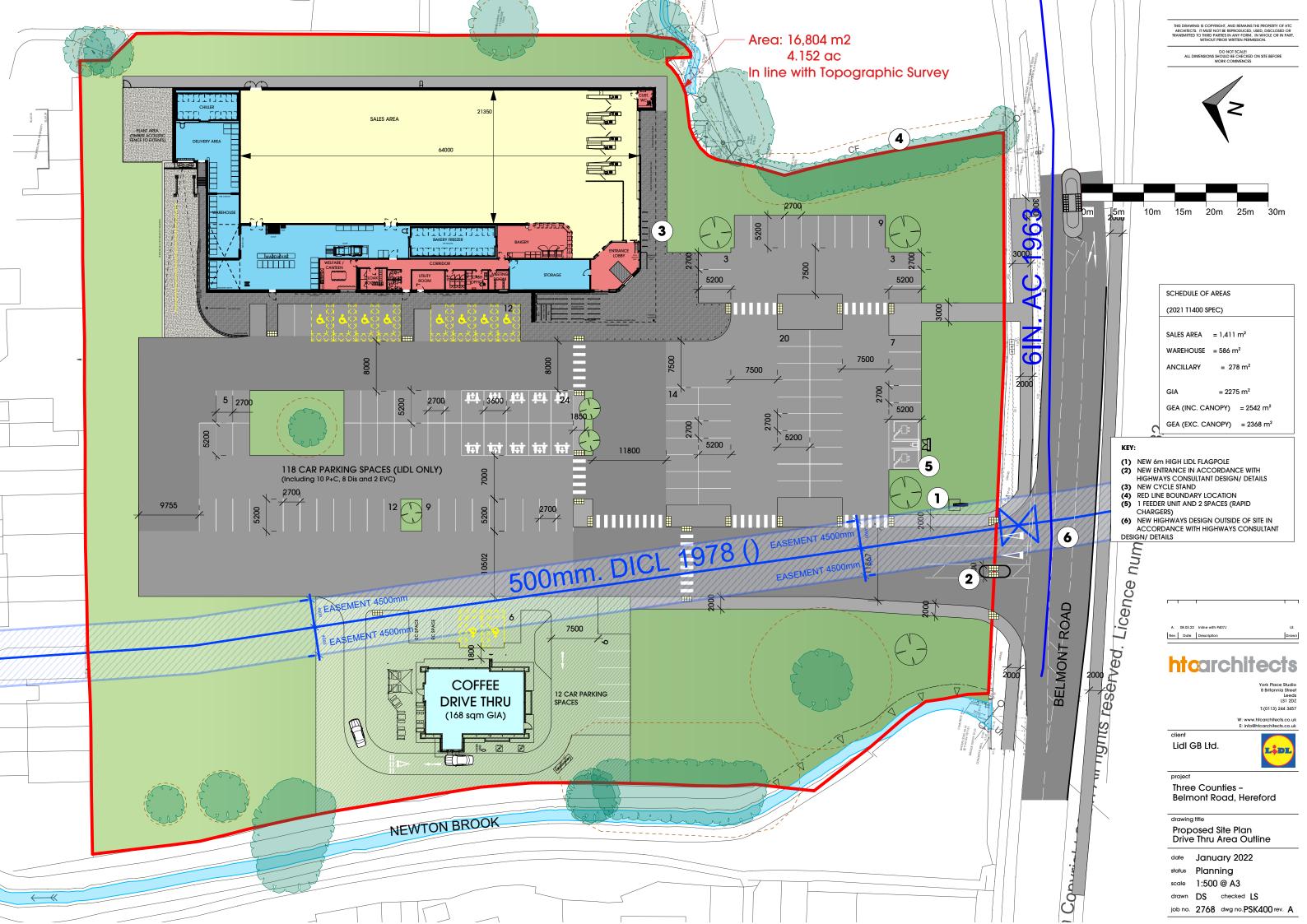
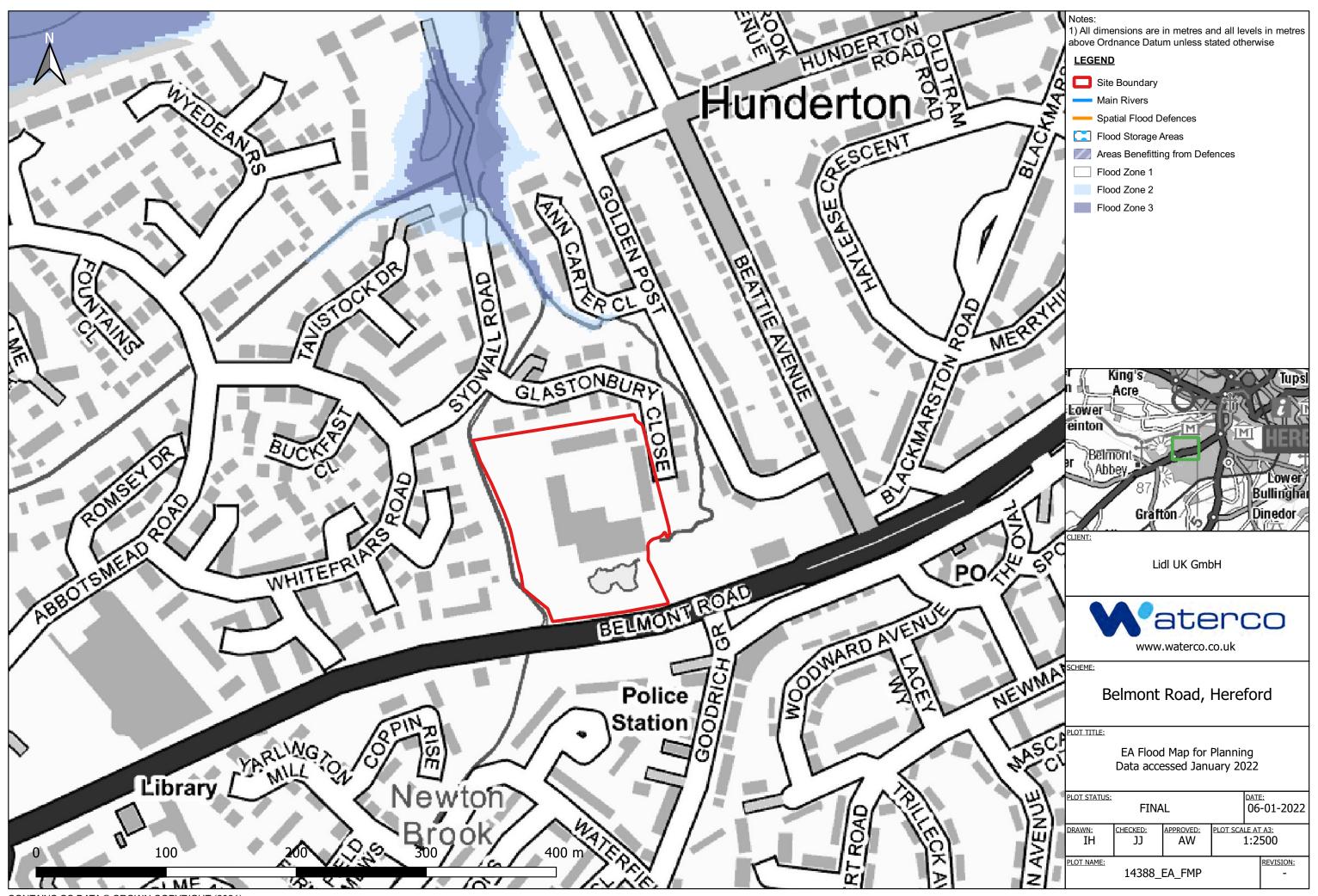
Appendix H Proposed Development Plan

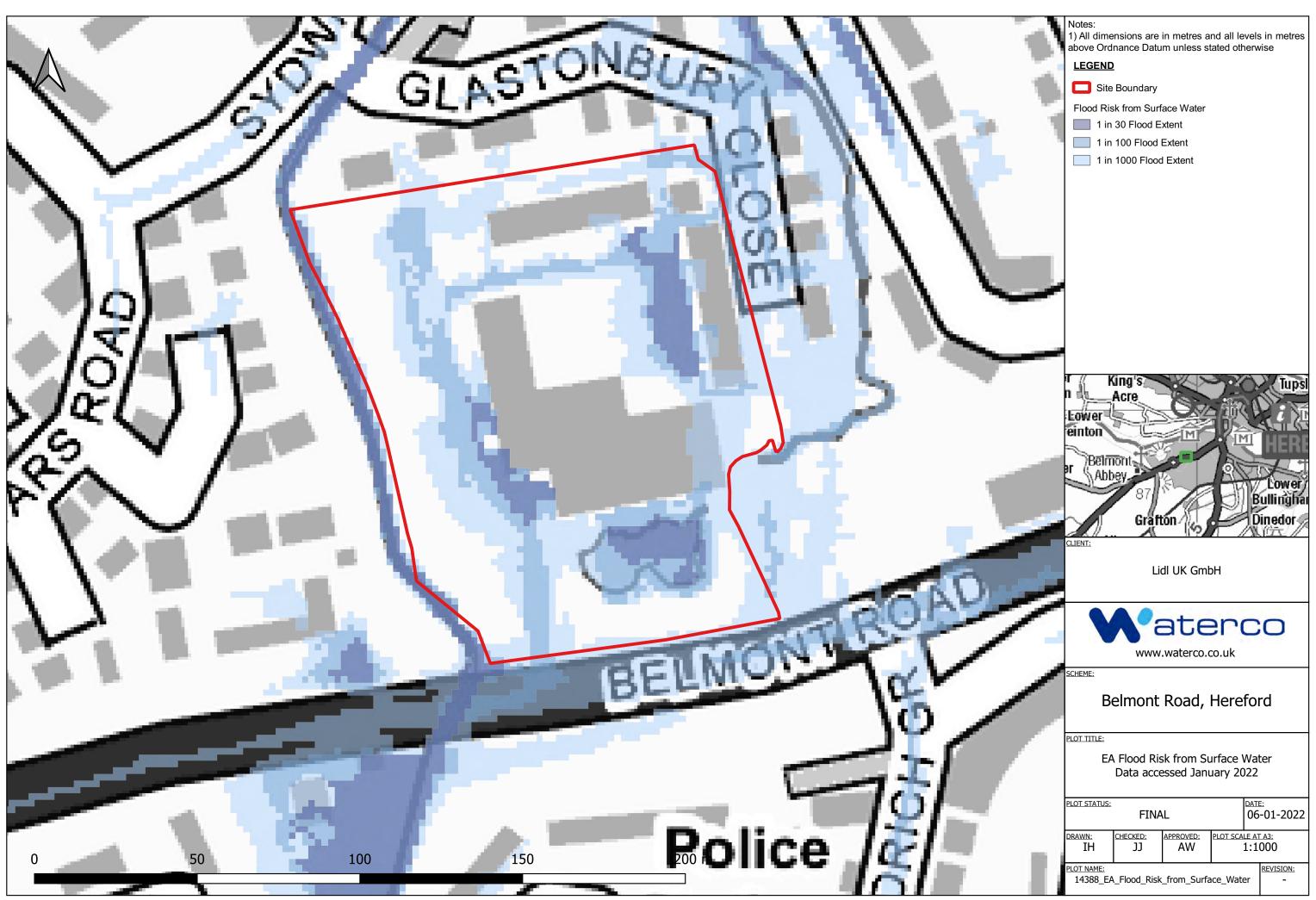




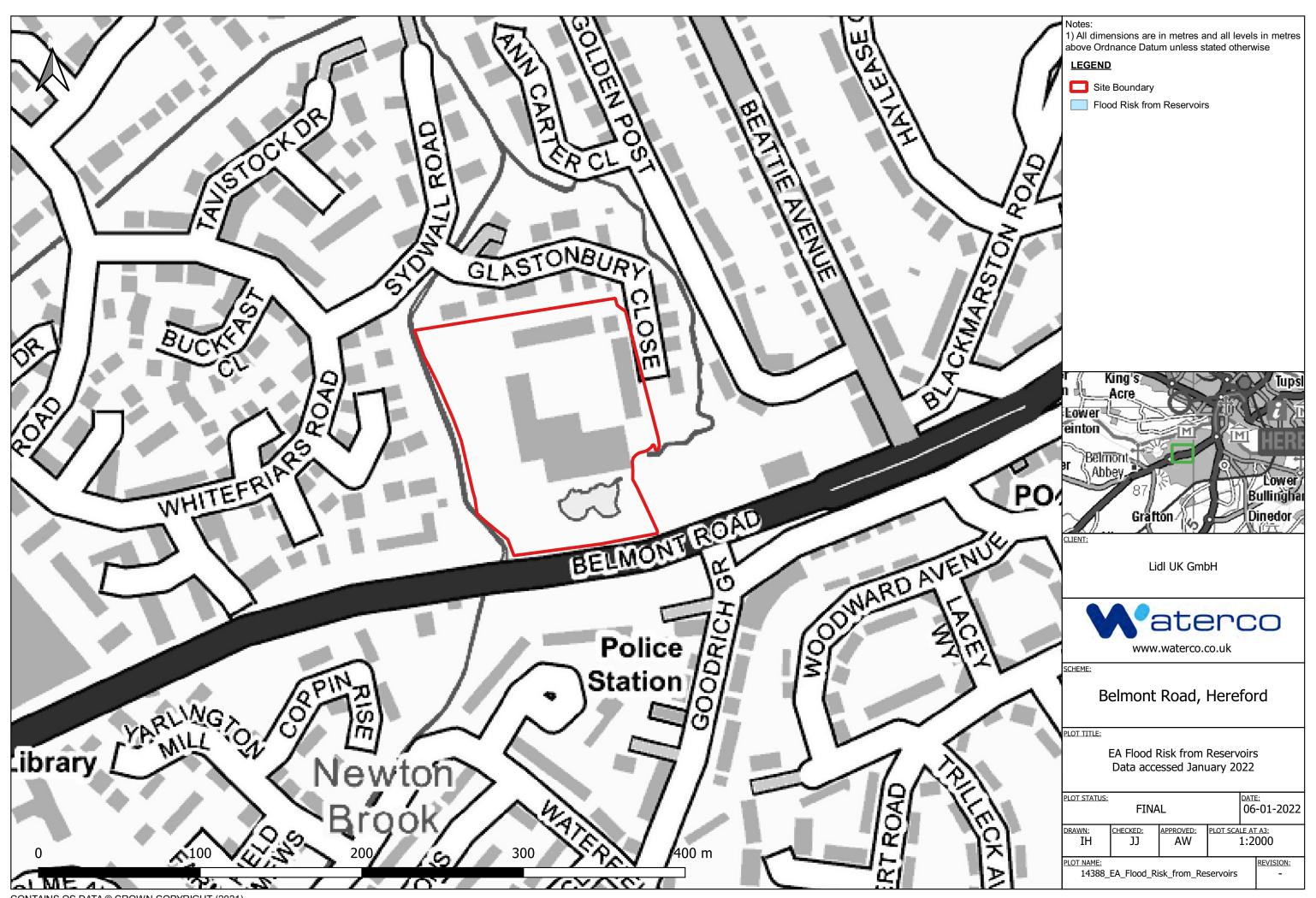
Appendix I Environment Agency Flood Maps

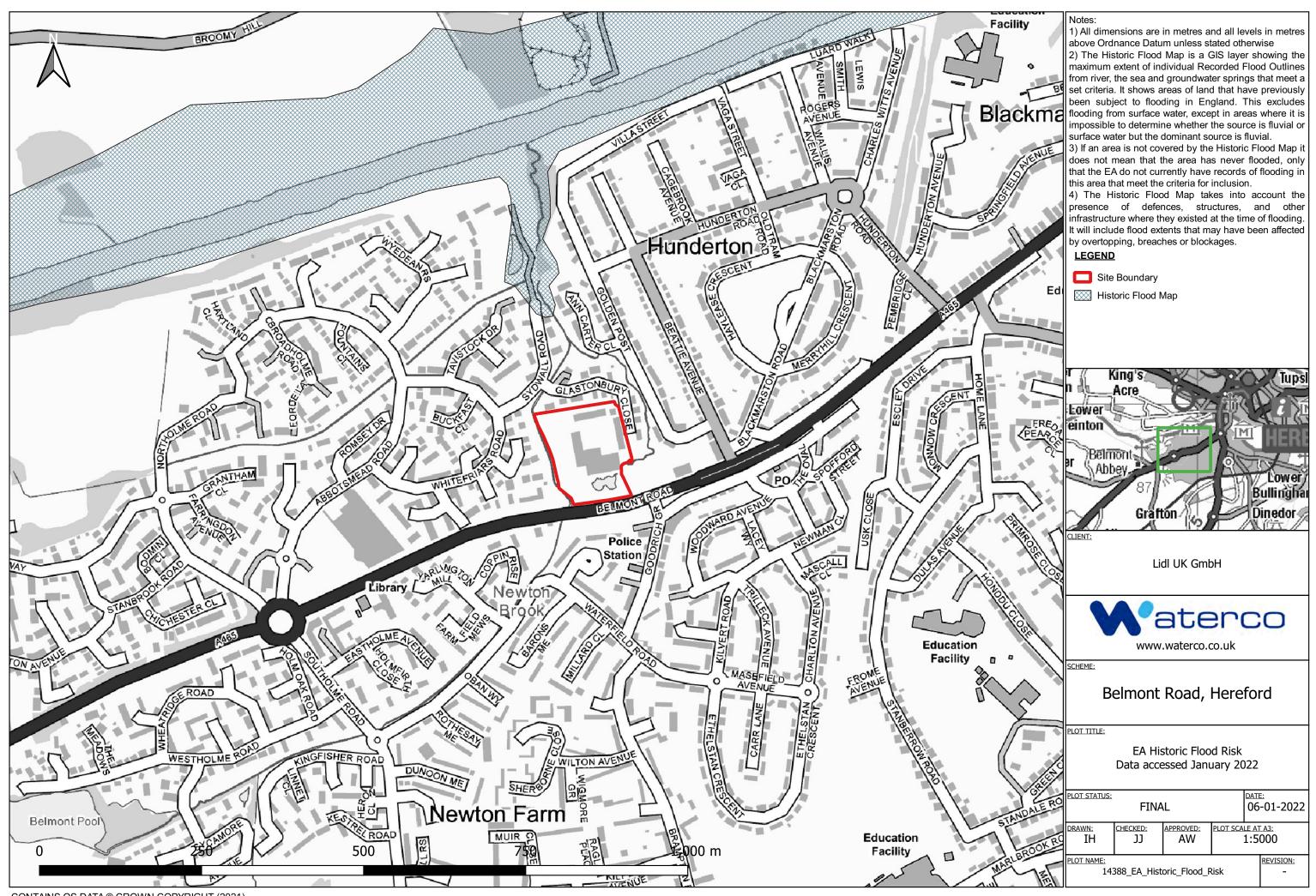






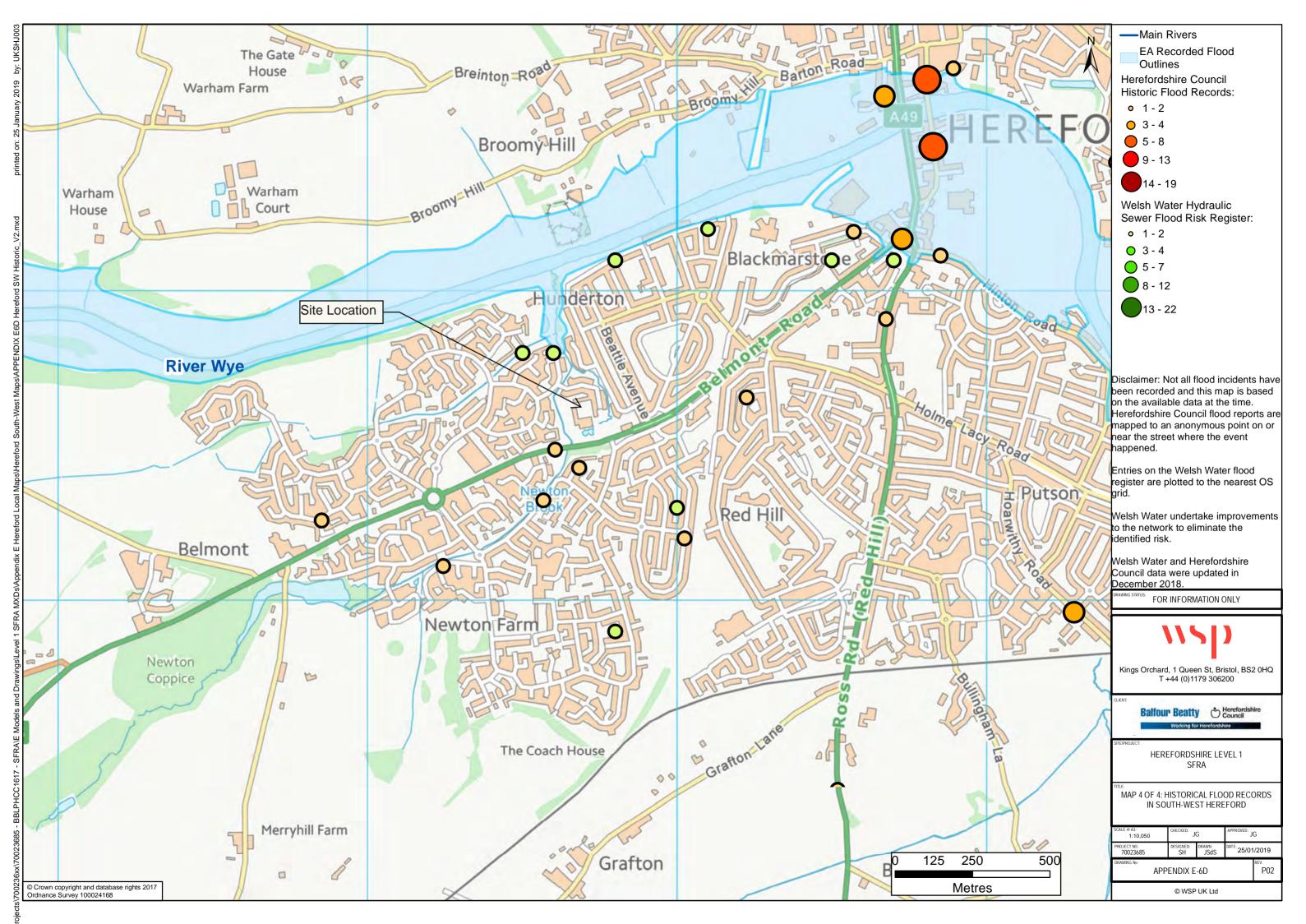
CONTAINS OS DATA © CROWN COPYRIGHT (2021)





Appendix J SFRA Map





Appendix K ReFH2 Greenfield Runoff Rates



DOCUMENT VERIFICATION RECORD					
Project:	Belmont Road, Hereford				
Client:	Lidl UK GmbH				
Report Title:	Flood Risk Assessment & Drainage Strategy				
Date:	March 2022				

DOCUMENT REVIEW & APPROVAL					
Author:	Jordan Jones BSc (Hons) MCIWEM				
Checker:	Aled Williams BSc (Hons) MCIWEM				
Approver:	Nigel Jones BEng (Hons) CEng				

ReFH2 RUNOFF RATES*						
Return Period (Years)	As-rural Peak Flow (I/s)					
1	4.664245					
2	5.3118					
5	7.500692					
10	9.179763					
30	12.29721					
50	14.09967					
75	15.77795					
100	17.12254					
200	20.91592					
1000	31.98243					

^{*}Runoff Rates printed from the ReFH Flood Modelling software package



Appendix L MicroDrainage Attenuation Storage Estimate



Waterco Ltd		Page 1
Eden Court	Belmont Road	
Lon Parcwr Business Park	Hereford	The same of
Denbighshire LL15 1NJ	1 in 100yr plus 40%CC	Micro
Date 09/03/2022	Designed by JJ	Drainage
File 14388-1in100plus40cc-1	Checked by AW	Diamage
XP Solutions	Source Control 2020.1.3	

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

Storm Event		Max Level (m)	Max Depth (m)	Max Control (1/s)	Max Volume (m³)	Status	
15	min	Summer	9.517	0.317	4.6	304.4	ОК
30	min	Summer	9.618	0.418	4.6	401.3	O K
60	min	Summer	9.723	0.523	4.6	502.3	Flood Risk
120	min	Summer	9.812	0.612	4.6	588.2	Flood Risk
180	min	Summer	9.856	0.656	4.6	630.0	Flood Risk
240	min	Summer	9.880	0.680	4.6	653.3	Flood Risk
360	min	Summer	9.901	0.701	4.6	673.8	Flood Risk
480	min	Summer	9.906	0.706	4.6	678.5	Flood Risk
600	min	Summer	9.904	0.704	4.6	676.3	Flood Risk
720	min	Summer	9.897	0.697	4.6	670.1	Flood Risk
960	min	Summer	9.878	0.678	4.6	651.7	Flood Risk
1440	min	Summer	9.836	0.636	4.6	610.8	Flood Risk
2160	min	Summer	9.788	0.588	4.6	565.3	Flood Risk
2880	min	Summer	9.751	0.551	4.6	529.2	Flood Risk
4320	min	Summer	9.688	0.488	4.6	469.4	O K
5760	min	Summer	9.643	0.443	4.6	425.7	O K
7200	min	Summer	9.610	0.410	4.6	394.0	O K
8640	min	Summer	9.584	0.384	4.6	369.0	O K
10080	min	Summer	9.563	0.363	4.6	349.2	O K
15	min	Winter	9.555	0.355	4.6	341.1	O K
30	min	Winter	9.668	0.468	4.6	450.0	O K

Storm		Rain	Flooded	Discharge	Time-Peak	
Event		(mm/hr)	Volume	Volume	(mins)	
				(m³)	(m³)	
15	min	Summer	149.893	0.0	278.3	16
30	min	Summer	99.291	0.0	353.8	31
60	min	Summer	62.666	0.0	499.3	62
120	min	Summer	37.278	0.0	588.8	122
180	min	Summer	27.049	0.0	635.3	182
240	min	Summer	21.378	0.0	663.6	242
360	min	Summer	15.172	0.0	693.2	362
480	min	Summer	11.826	0.0	704.9	480
600	min	Summer	9.731	0.0	706.6	600
720	min	Summer	8.291	0.0	702.0	720
960	min	Summer	6.438	0.0	686.5	960
1440	min	Summer	4.517	0.0	650.2	1226
2160	min	Summer	3.194	0.0	934.2	1600
2880	min	Summer	2.518	0.0	979.3	2016
4320	min	Summer	1.838	0.0	1062.0	2808
5760	min	Summer	1.495	0.0	1176.0	3576
7200	min	Summer	1.292	0.0	1270.1	4392
8640	min	Summer	1.158	0.0	1363.5	5184
10080	min	Summer	1.063	0.0	1455.7	5944
15	min	Winter	149.893	0.0	308.9	16
30	min	Winter	99.291	0.0	376.2	31

©1982-2020 Innovyze

Waterco Ltd				
Eden Court	Belmont Road			
Lon Parcwr Business Park	Hereford	The same of		
Denbighshire LL15 1NJ	1 in 100yr plus 40%CC	Micro		
Date 09/03/2022	Designed by JJ	Designado		
File 14388-1in100plus40cc-1	Checked by AW	Diamage		
XP Solutions	Source Control 2020.1.3			

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

	Stor Even		Max Level (m)	Max Depth (m)	Max Control (1/s)	Max Volume (m³)	Status
60	min	Winter	9.787	0.587	4.6	563.6	Flood Risk
120	min	Winter	9.887	0.687	4.6	660.4	Flood Risk
180	min	Winter	9.937	0.737	4.6	708.3	Flood Risk
240	min	Winter	9.965	0.765	4.6	735.5	Flood Risk
360	min	Winter	9.991	0.791	4.6	760.6	Flood Risk
480	min	Winter	9.999	0.799	4.6	768.0	Flood Risk
600	min	Winter	9.999	0.799	4.6	767.6	Flood Risk
720	min	Winter	9.994	0.794	4.6	762.8	Flood Risk
960	min	Winter	9.977	0.777	4.6	746.5	Flood Risk
1440	min	Winter	9.932	0.732	4.6	703.5	Flood Risk
2160	min	Winter	9.872	0.672	4.6	645.7	Flood Risk
2880	min	Winter	9.824	0.624	4.6	599.5	Flood Risk
4320	min	Winter	9.740	0.540	4.6	519.4	Flood Risk
5760	min	Winter	9.659	0.459	4.6	441.5	O K
7200	min	Winter	9.600	0.400	4.6	383.9	O K
8640	min	Winter	9.551	0.351	4.6	337.8	O K
10080	min	Winter	9.512	0.312	4.6	300.1	O K

Storm		Rain	Flooded	Discharge	Time-Peak		
		Event (n		(mm/hr)	Volume	Volume	(mins)
					(m³)	(m³)	
	60			60 666	0 0	556.7	60
			Winter	62.666	0.0	556.7	62
	120	min	Winter	37.278	0.0	652.0	120
	180	min	Winter	27.049	0.0	696.8	180
	240	min	Winter	21.378	0.0	718.6	238
	360	min	Winter	15.172	0.0	728.5	356
	480	min	Winter	11.826	0.0	723.6	472
	600	min	Winter	9.731	0.0	716.9	588
	720	min	Winter	8.291	0.0	709.6	700
	960	min	Winter	6.438	0.0	694.1	924
	1440	min	Winter	4.517	0.0	662.1	1354
	2160	min	Winter	3.194	0.0	1044.7	1688
	2880	min	Winter	2.518	0.0	1093.9	2160
	4320	min	Winter	1.838	0.0	1173.6	3072
	5760	min	Winter	1.495	0.0	1317.2	3912
	7200	min	Winter	1.292	0.0	1422.5	4688
	8640	min	Winter	1.158	0.0	1527.7	5448
	10080	min	Winter	1.063	0.0	1632.0	6248

Waterco Ltd		Page 3
Eden Court	Belmont Road	
Lon Parcwr Business Park	Hereford	The same
Denbighshire LL15 1NJ	1 in 100yr plus 40%CC	Mirro
Date 09/03/2022	Designed by JJ	Drainage
File 14388-1in100plus40cc-1	Checked by AW	Diamage
XP Solutions	Source Control 2020.1.3	

Rainfall Details

Rainfall Model						FEH
Return Period (years)						100
FEH Rainfall Version						2013
Site Location	GB	349700	238577	SO	49700	38577
Data Type						Point
Summer Storms						Yes
Winter Storms						Yes
Cv (Summer)						0.750
Cv (Winter)						0.840
Shortest Storm (mins)						15
Longest Storm (mins)						10080
Climate Change %						+40

Time Area Diagram

Total Area (ha) 1.093

 Time
 (mins)
 Area

 From:
 To:
 (ha)

 0
 1
 1.093

Waterco Ltd				
Eden Court	Belmont Road			
Lon Parcwr Business Park	Hereford			
Denbighshire LL15 1NJ	1 in 100yr plus 40%CC	Micro		
Date 09/03/2022	Designed by JJ	Drainage		
File 14388-1in100plus40cc-1	Checked by AW	Dialilade		
XP Solutions	Source Control 2020.1.3			

Model Details

Storage is Online Cover Level (m) 10.000

Tank or Pond Structure

Invert Level (m) 9.200

Depth (m) Area (m²) Depth (m) Area (m²) 0.000 961.0 0.800 961.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0104-4600-0800-4600
Design Head (m)	0.800
Design Flow (1/s)	4.6
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	104
Invert Level (m)	9.195
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

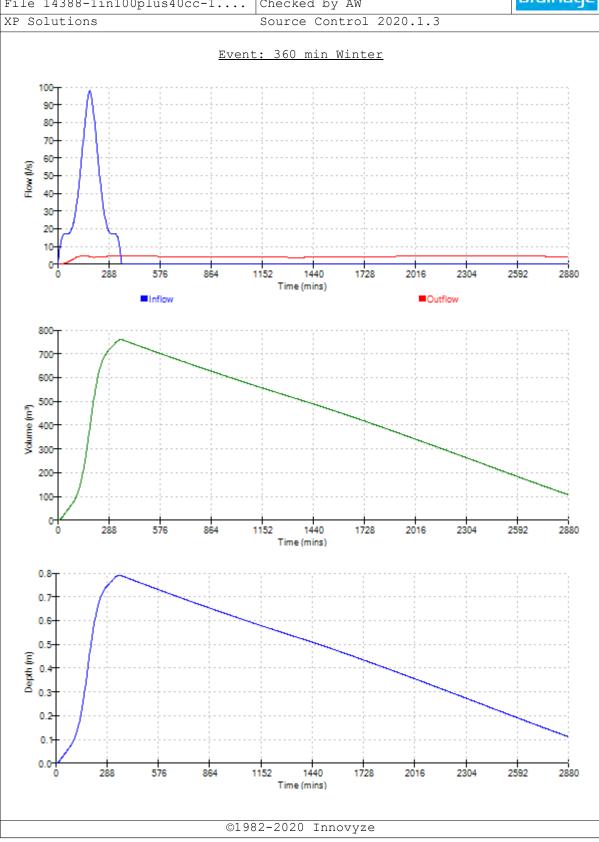
Control	Points	Head (m)	Flow (1/s)
Design Point	(Calculated)	0.800	4.6
	Flush-Flo™	0.240	4.6
	Kick-Flo®	0.532	3.8
Mean Flow ove	r Head Range	_	4.0

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

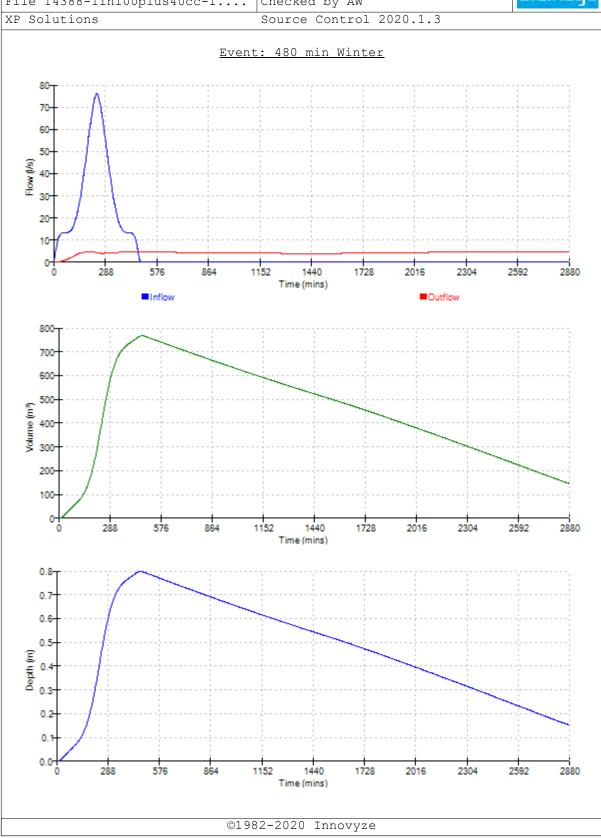
Depth (m) Fl	low (1/s)	Depth (m) Flow	(1/s)	Depth (m) Flow	(1/s)	Depth (m)	Flow (1/s)
0.100	3.5	1.200	5.5	3.000	8.5	7.000	12.8
0.200	4.6	1.400	6.0	3.500	9.2	7.500	13.2
0.300	4.6	1.600	6.3	4.000	9.8	8.000	13.6
0.400	4.4	1.800	6.7	4.500	10.3	8.500	14.0
0.500	4.1	2.000	7.0	5.000	10.9	9.000	14.4
0.600	4.0	2.200	7.4	5.500	11.4	9.500	14.8
0.800	4.6	2.400	7.7	6.000	11.8		
1.000	5.1	2.600	8.0	6.500	12.3		

©1982-2020 Innovyze

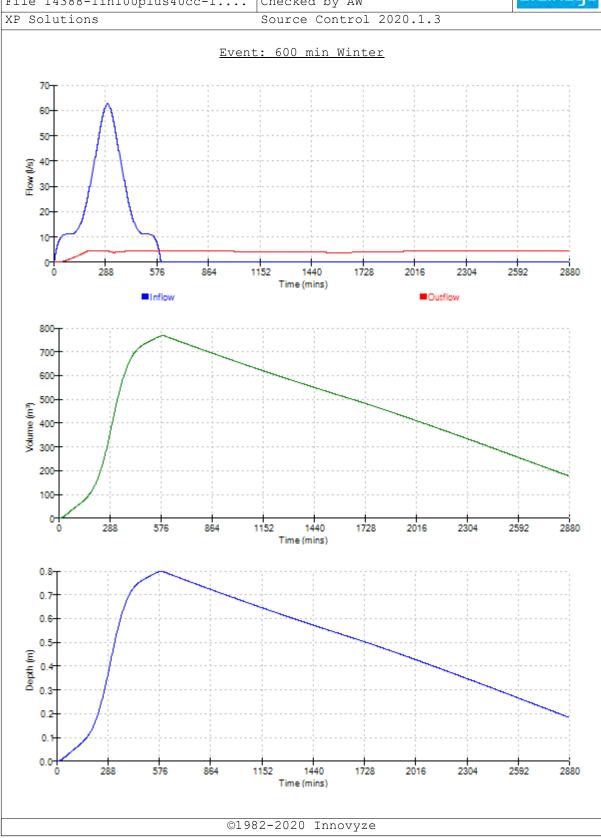
Waterco Ltd		Page 5
Eden Court	Belmont Road	
Lon Parcwr Business Park	Hereford	Carlo and
Denbighshire LL15 1NJ	1 in 100yr plus 40%CC	Micro
Date 09/03/2022	Designed by JJ	Drainage
File 14388-1in100plus40cc-1	Checked by AW	niamade
XP Solutions	Source Control 2020.1.3	



Waterco Ltd		Page 6
Eden Court	Belmont Road	
Lon Parcwr Business Park	Hereford	the same
Denbighshire LL15 1NJ	1 in 100yr plus 40%CC	Micro
Date 09/03/2022	Designed by JJ	Drainage
File 14388-1in100plus40cc-1	Checked by AW	Diali laye
XP Solutions	Source Control 2020.1.3	•

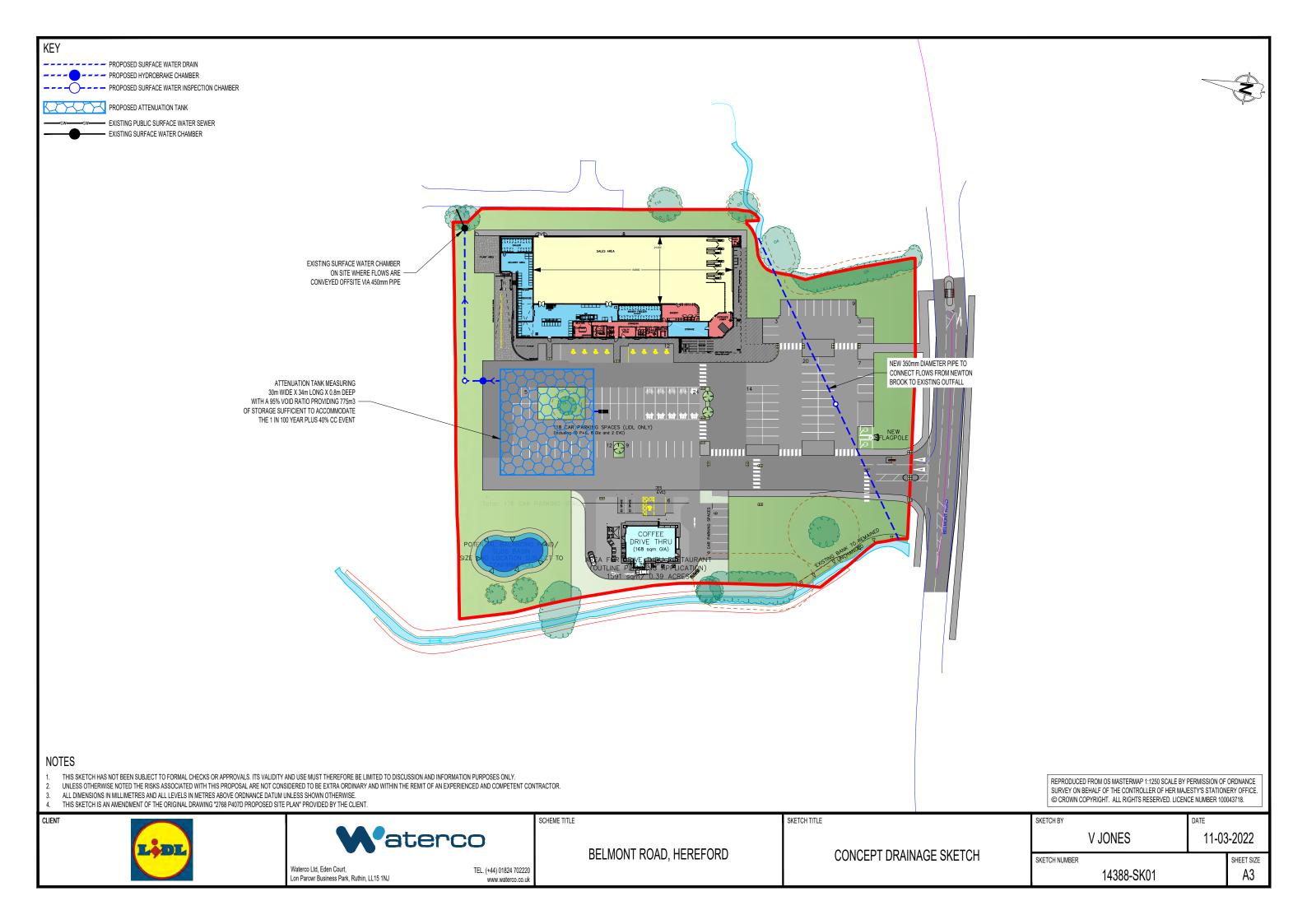


Waterco Ltd		Page 7
Eden Court	Belmont Road	
Lon Parcwr Business Park	Hereford	Carlos and
Denbighshire LL15 1NJ	1 in 100yr plus 40%CC	Micro
Date 09/03/2022	Designed by JJ	Drainage
File 14388-1in100plus40cc-1	Checked by AW	Diali laye
XP Solutions	Source Control 2020.1.3	•



Appendix M Concept Drainage Sketch





Appendix N Maintenance Schedule





Operation and Maintenance Requirements for Attenuation Storage Tanks

Maintenance Schedule	Required Action	Typical Frequency
	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
Regular maintenance	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary	Annually
	Remove sediment from pre-treatment structures and/ or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove If necessary	Every 5 years or as required

Ref. Table 21.3, CIRIA C753 'The SuDS Manual'

The maintenance requirements detailed above are to be undertaken by the site owner.			
Name	:		
Position	:		
Date	:		
Signed on behalf of the site owner	:		
3			

Appendix O Concept Designers Risk Assessment





CONCEPT DESIGNER'S RISK ASSESSMENT

Project:	Belmont Road, Hereford			Project No:	14388
Client:	Lidl UK GmbH			•	
Report Reference:	14388-FRA & Drainage Strategy-01				
	-				
Prepared by:	Jordan Jones	Date:	01/03/2022		
Checked by:	Aled Williams	Date:	04/03/2022		
Reviewed by:	Nigel Jones	Date:	11/03/2022		

Requirement:

The Construction (Design and Management) Regulations 2015 (CDM 2015) place an obligation on the Designer to take all reasonable steps to provide, with the design, sufficient information about the design, construction or maintenance of the structure, to adequately assist the client, other designers and contractors to comply with their duties under CDM. The Designer has undertaken this assessment to identify any extra-ordinary risks, or those that would not be expected on this particular project by an experienced and competent Contractor. The aim is to avoid needless paperwork and bureaucracy and ensure the assessment is project specific, relevant and proportionate to the risk.

DRA Summary

Each of the following risk areas has been considered using the question below. Is a risk present which is considered to be extra-ordinary or unexpected in this instance?

If YES - A detailed risk assessment is required at design stage

If **UNKNOWN** - Insufficient information has been provided at concept design stage and the risks are unknown. Further consideration must be given at design stage(s) If **NO** - No further action is required.

Hazard Ref.	Risk Areas	YES, UNKNOWN or NO	Comments
1	Ground Conditions	Unknown	
2	Hazardous Environment	Unknown	
3	Existing Working Environment	Unknown	
4	Existing Services	Yes	Exisiting water main and other burried services on site
5	Proximity to Other Structure(s)	Unknown	
6	Near Waterbody / flood risk	Yes	Newton Brook to west and east of the site
7	Proximity to Other Activities	Unknown	
8	Sequence of Construction	Unknown	
9	Access	Unknown	
10	Interfaces	Unknown	
11	Confined Space Working	Unknown	
12	Maintenance Considerations	Unknown	
13	Working at Height	Unknown	
14	Steep Slopes	Unknown	
15	Demolition / Refurbishment / Repair	Yes	Exisitng hotel and ornamental pond to be removed
16	Welfare	Unknown	
17	Occupational Health	Unknown	
18	Environmental Issues	Unknown	
19	Other Significant Hazards not Identified Above	Unknown	
20	Residual Risk to Future Users	Unknown	