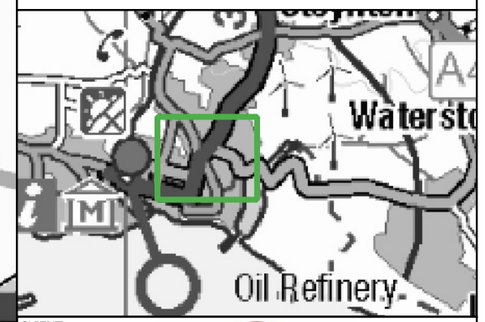
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary

Flood Risk from Surface Water

- Flood Zone 2
- Flood Zone 3
- Flood Zone 1



CLIENT:

LIDL

Waterco
www.waterco.co.uk

SCHEME:

Lidl, Great North Road, Milford Haven

PLOT TITLE:

NRW Flood Risk from Surface Water & Small Watercourses
Data accessed January 2024

PLOT STATUS:			DATE:
FINAL			20-02-2024
DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
MJW	AW	MW	1:3500

PLOT NAME:	REVISION:
15678_NRW_Flood_Risk_from_Surface_Water	-

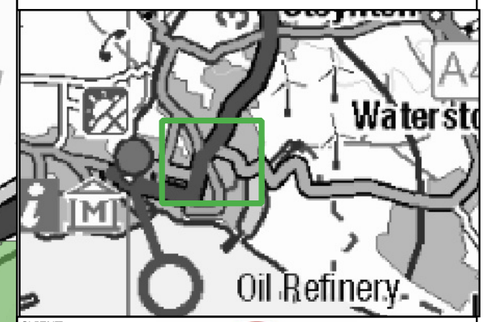
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary

Flood Risk from Sea

- Flood Zone 2
- Flood Zone 3



CLIENT:

Lidl

waterco
www.waterco.co.uk

SCHEME:

Lidl, Great North Road, Milford Haven

PLOT TITLE:

NRW Flood Risk from the Sea
Data accessed January 2024

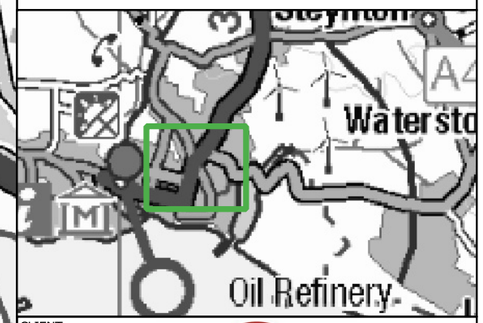
PLOT STATUS:			DATE:
FINAL			20-02-2024
DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
MJW	AW	MW	1:3500

PLOT NAME:	REVISION:
15678_NRW_Flood_Risk_from_the_Sea	-

Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- Flood Risk from Reservoirs Extent



CLIENT: LIDL

waterco
www.waterco.co.uk

SCHEME:
Lidl, Great North Road, Milford Haven

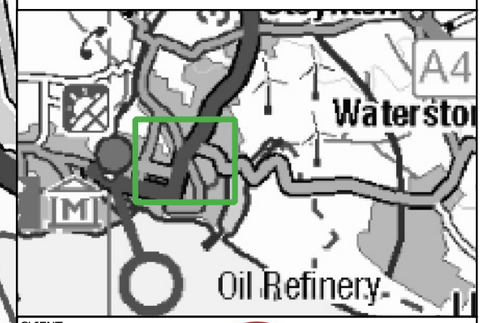
PLOT TITLE:
NRW Flood Risk from Reservoirs
Data accessed January 2024

PLOT STATUS:			DATE:
FINAL			20-02-2024
DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
MJW	AW	MW	1:3500
PLOT NAME:			REVISION:
15678_NRW_Flood_Risk_from_Reservoirs			-

Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- NRW Historic Flood Map



CLIENT: Lidl

waterco
www.waterco.co.uk

SCHEME:
Lidl, Great North Road, Milford Haven

PLOT TITLE:
NRW Historic Flood Risk
Data accessed January 2024

PLOT STATUS:			DATE:
FINAL			20-02-2024
DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
MJW	AW	MW	1:3500
PLOT NAME:			REVISION:
15678_NRW_Historic_Flood_Risk			-

Appendix F SAB Correspondence

Megan Williams

From: Davies, Neville <Neville.Davies@pembrokeshire.gov.uk>
Sent: 29 January 2024 15:10
To: Aled Williams
Subject: RE: Lidl - Milford Haven

Good afternoon Aled

This does not impact our comments on the proposal.

Regards

Neville

From: Aled Williams <Aled.Williams@waterco.co.uk>
Sent: 29 January 2024 11:11
To: Davies, Neville <Neville.Davies@pembrokeshire.gov.uk>
Cc: Llewelyn, Angharad <Angharad.Llewelyn@pembrokeshire.gov.uk>
Subject: RE: Lidl - Milford Haven

Hi SAB team,

Thank you for the response below. We've since had to amend the layout as to make an allowance for a 3m stand off from a DCWW public sewer in the southern extent of the site (see latest site plan attached). The presence of the public sewer means we can no longer incorporate the bioretention channel to the rear of the store.

Please can you advise if this has any impact on your comments below (all other drainage elements remain the same as previous). A planting scheme is proposed for all landscaped areas, however these areas will not be part of the drainage system.

Kind Regards,

Aled Williams BSc (Hons) MCIWEM C.WEM
Associate

01244 986026
Aled.Williams@waterco.co.uk

From: Davies, Neville <Neville.Davies@pembrokeshire.gov.uk>
Sent: Tuesday, January 23, 2024 9:50 AM
To: Aled Williams <Aled.Williams@waterco.co.uk>
Cc: Llewelyn, Angharad <Angharad.Llewelyn@pembrokeshire.gov.uk>
Subject: Lidl - Milford Haven

Morning Aled

Further to your pre-application for the above site we have the following comments.

We have no adverse comments with regard to the principle of the SuDS strategy that is proposed although DCWW agreement to the connection and discharge rate of 3.8 l/sec will be required for full app.

- Construction details required for all SuDS features at full app stage.
- All pipe runs to be shown on drainage drawing including gullys, silt traps, etc.
- Location plan required for full app
- Plan showing exceedance flood routes required for full app.
- Planting scheme required for the landscaped areas.
- Maintenance schedule required for SuDs features.

We look forward to receiving your full applications in due course.

If you want to discuss any of the above, please do not hesitate to call me on 01437 776142

Regards

SAB Team

We welcome correspondence in Welsh and English and will respond within a maximum of 15 working days. We will respond in the language in which the correspondence is received (unless you ask us to do otherwise). For a copy in large print, easy-read, Braille, audio or an alternative language, please contact the person who sent this email. Pembrokeshire County Council: Website | Contact Us | Privacy Notices	Rydym yn croesawu gohebiaeth yn Gymraeg a Saesneg a byddwn yn ymateb cyn pen 15 diwrnod gwaith fan bellaf. Byddwn yn ymateb yn yr un iaith â'r ohebiaeth a dderbyniwyd (oni bai eich bod yn gofyn i ni wneud yn wahanol). Os am gael copi mewn print bras, fformat hawdd ei ddeall, Braille, sain neu iaith arall, cysylltwch â'r sawl a anfonodd yr e-bost hwn. Cyngor Sir Benfro: Gwefan | Cysylltwch â ni | Rhybudd Preifatrwydd

We welcome correspondence in Welsh and English and will respond within a maximum of 15 working days. We will respond in the language in which the correspondence is received (unless you ask us to do otherwise). For a copy in large print, easy-read, Braille, audio or an alternative language, please contact the person who sent this email. Pembrokeshire County Council: Website | Contact Us | Privacy Notices	Rydym yn croesawu gohebiaeth yn Gymraeg a Saesneg a byddwn yn ymateb cyn pen 15 diwrnod gwaith fan bellaf. Byddwn yn ymateb yn yr un iaith â'r ohebiaeth a dderbyniwyd (oni bai eich bod yn gofyn i ni wneud yn wahanol). Os am gael copi mewn print bras, fformat hawdd ei ddeall, Braille, sain neu iaith arall, cysylltwch â'r sawl a anfonodd yr e-bost hwn. Cyngor Sir Benfro: Gwefan | Cysylltwch â ni | Rhybudd Preifatrwydd

Appendix G Greenfield Runoff Rates

DOCUMENT VERIFICATION RECORD	
Project:	15678 – Lidl, Great North Road, Milford Haven
Client:	Lidl Great Britain Limited
Report Title:	15678- FCA & Drainage Strategy-01
Date:	08/02/2024

DOCUMENT REVIEW & APPROVAL	
Author:	Megan Williams BSc (Hons) MSc MCIWEM
Checker:	Aled Williams BSc (Hons) MCIWEM C.WEM
Approver:	Mike Wellington BEng (Hons) MSc CEng CEnv FICE FCIWEM C.WEM IMaPS MAPM

ReFH2 RUNOFF RATES*	
Return Period (Years)	**As-rural Peak Flow (l/s)**
1	3.500043459
2	3.961242972
5	5.460496039
10	6.508643341
30	8.18520062
50	9.011124165
75	9.696179623
100	10.2055492
200	11.54497902
1000	15.53979408

*Runoff Rates printed from the ReFH Flood Modelling software package

Appendix H MicroDrainage Simulations

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 1225 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	9.669	0.169	0.0	3.5	3.5	173.4	O K
30 min Summer	9.730	0.230	0.0	3.5	3.5	240.0	Flood Risk
60 min Summer	9.800	0.300	0.0	3.5	3.5	316.8	Flood Risk
120 min Summer	9.850	0.350	0.0	3.5	3.5	371.9	Flood Risk
180 min Summer	9.882	0.382	0.0	3.5	3.5	406.2	Flood Risk
240 min Summer	9.904	0.404	0.0	3.5	3.5	430.1	Flood Risk
360 min Summer	9.932	0.432	0.0	3.5	3.5	461.3	Flood Risk
480 min Summer	9.949	0.449	0.0	3.5	3.5	480.0	Flood Risk
600 min Summer	9.960	0.460	0.0	3.5	3.5	491.6	Flood Risk
720 min Summer	9.966	0.466	0.0	3.5	3.5	498.6	Flood Risk
960 min Summer	9.971	0.471	0.0	3.5	3.5	503.8	Flood Risk
1440 min Summer	9.966	0.466	0.0	3.5	3.5	498.6	Flood Risk
2160 min Summer	9.953	0.453	0.0	3.5	3.5	484.5	Flood Risk
2880 min Summer	9.938	0.438	0.0	3.5	3.5	467.5	Flood Risk
4320 min Summer	9.902	0.402	0.0	3.5	3.5	428.5	Flood Risk
5760 min Summer	9.870	0.370	0.0	3.5	3.5	393.3	Flood Risk
7200 min Summer	9.846	0.346	0.0	3.5	3.5	367.3	Flood Risk
8640 min Summer	9.825	0.325	0.0	3.5	3.5	344.6	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.337	0.0	161.4	16
30 min Summer	83.012	0.0	219.3	31
60 min Summer	55.008	0.0	321.8	62
120 min Summer	32.785	0.0	381.3	122
180 min Summer	24.227	0.0	419.6	182
240 min Summer	19.540	0.0	447.9	242
360 min Summer	14.408	0.0	487.7	362
480 min Summer	11.590	0.0	513.1	480
600 min Summer	9.783	0.0	528.4	600
720 min Summer	8.515	0.0	534.8	720
960 min Summer	6.840	0.0	528.6	960
1440 min Summer	5.007	0.0	503.1	1212
2160 min Summer	3.658	0.0	778.9	1596
2880 min Summer	2.928	0.0	824.9	1992
4320 min Summer	2.134	0.0	871.6	2848
5760 min Summer	1.718	0.0	973.5	3688
7200 min Summer	1.480	0.0	1046.4	4472
8640 min Summer	1.320	0.0	1118.2	5272

Summary of Results for 100 year Return Period (+30%)

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
10080 min Summer	9.807	0.307	0.0	3.5	3.5	324.9	Flood Risk
15 min Winter	9.669	0.169	0.0	3.5	3.5	173.3	O K
30 min Winter	9.730	0.230	0.0	3.5	3.5	239.9	Flood Risk
60 min Winter	9.800	0.300	0.0	3.5	3.5	316.6	Flood Risk
120 min Winter	9.850	0.350	0.0	3.5	3.5	371.7	Flood Risk
180 min Winter	9.882	0.382	0.0	3.5	3.5	405.9	Flood Risk
240 min Winter	9.903	0.403	0.0	3.5	3.5	429.8	Flood Risk
360 min Winter	9.932	0.432	0.0	3.5	3.5	461.2	Flood Risk
480 min Winter	9.950	0.450	0.0	3.5	3.5	480.2	Flood Risk
600 min Winter	9.960	0.460	0.0	3.5	3.5	492.1	Flood Risk
720 min Winter	9.967	0.467	0.0	3.5	3.5	499.5	Flood Risk
960 min Winter	9.973	0.473	0.0	3.5	3.5	506.0	Flood Risk
1440 min Winter	9.967	0.467	0.0	3.5	3.5	498.8	Flood Risk
2160 min Winter	9.948	0.448	0.0	3.5	3.5	478.3	Flood Risk
2880 min Winter	9.925	0.425	0.0	3.5	3.5	453.6	Flood Risk
4320 min Winter	9.871	0.371	0.0	3.5	3.5	394.0	Flood Risk
5760 min Winter	9.812	0.312	0.0	3.5	3.5	330.4	Flood Risk
7200 min Winter	9.771	0.271	0.0	3.5	3.5	285.6	Flood Risk
8640 min Winter	9.737	0.237	0.0	3.5	3.5	248.0	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Summer	1.204	0.0	1186.9	6048
15 min Winter	120.337	0.0	161.4	16
30 min Winter	83.012	0.0	219.4	31
60 min Winter	55.008	0.0	321.8	62
120 min Winter	32.785	0.0	381.3	120
180 min Winter	24.227	0.0	419.7	180
240 min Winter	19.540	0.0	448.1	238
360 min Winter	14.408	0.0	487.9	356
480 min Winter	11.590	0.0	513.5	472
600 min Winter	9.783	0.0	529.0	584
720 min Winter	8.515	0.0	535.8	700
960 min Winter	6.840	0.0	530.2	922
1440 min Winter	5.007	0.0	505.7	1338
2160 min Winter	3.658	0.0	779.1	1664
2880 min Winter	2.928	0.0	825.6	2132
4320 min Winter	2.134	0.0	877.6	3068
5760 min Winter	1.718	0.0	973.5	3864
7200 min Winter	1.480	0.0	1046.4	4680
8640 min Winter	1.320	0.0	1118.2	5440

Summary of Results for 100 year Return Period (+30%)

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
10080 min Winter	9.707	0.207	0.0	3.5	3.5	215.6	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Winter	1.204	0.0	1187.4	6152

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 190867 206150 SM 90867 06150
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	1.000
Cv (Winter)	1.000
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.602

Time (mins) From:	To:	Area (ha)
0	1	0.602

Model Details

Storage is Online Cover Level (m) 10.000

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000
Membrane Percolation (mm/hr)	1000
Max Percolation (l/s)	319.4
Safety Factor	2.0
Porosity	0.95
Invert Level (m)	9.500
Width (m)	57.5
Length (m)	20.0
Slope (1:X)	1000.0
Depression Storage (mm)	5
Evaporation (mm/day)	3
Membrane Depth (m)	0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0096-3500-0500-3500
Design Head (m)	0.500
Design Flow (l/s)	3.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	96
Invert Level (m)	9.495
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.500	3.5
Flush-Flo™	0.162	3.5
Kick-Flo®	0.359	3.0
Mean Flow over Head Range	-	2.9

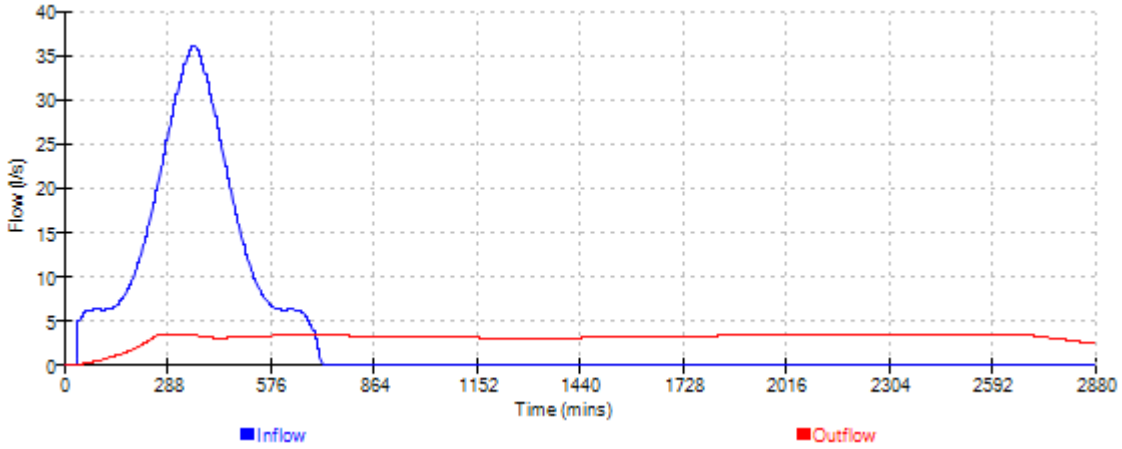
The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

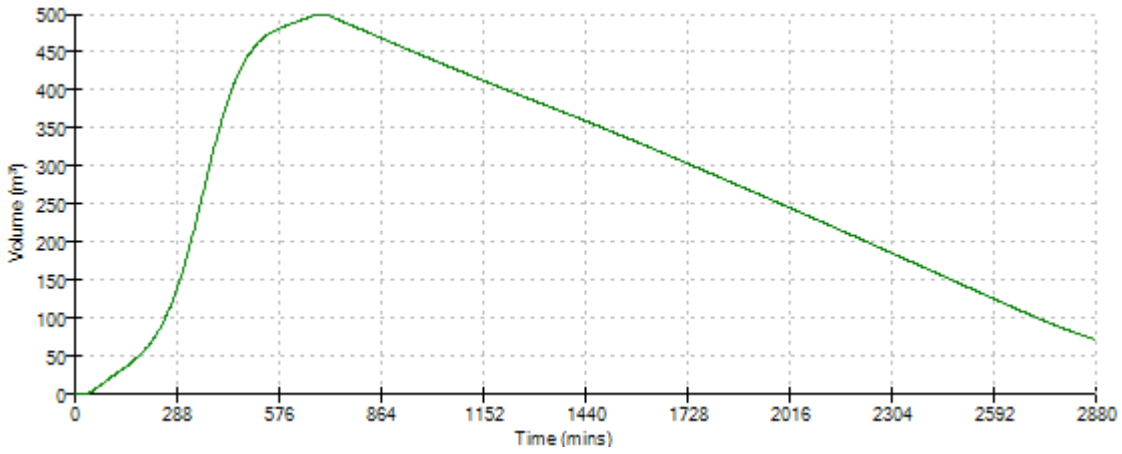
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.1	0.500	3.5	1.200	5.2
0.200	3.5	0.600	3.8	1.400	5.6
0.300	3.3	0.800	4.3	1.600	6.0
0.400	3.2	1.000	4.8	1.800	6.3

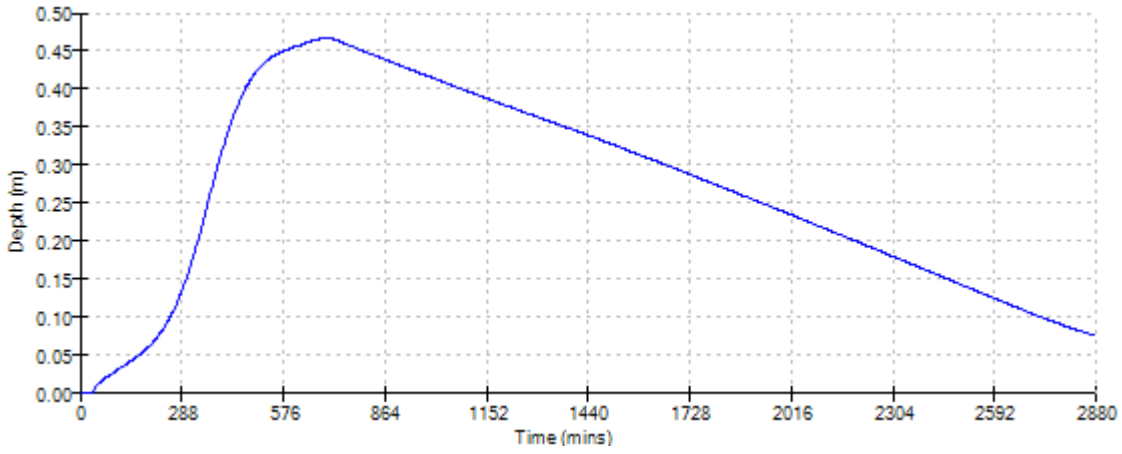
Hydro-Brake® Optimum Outflow Control

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
2.000	6.7	4.000	9.2	7.000	12.1
2.200	7.0	4.500	9.8	7.500	12.6
2.400	7.3	5.000	10.3	8.000	13.0
2.600	7.5	5.500	10.7	8.500	13.4
3.000	8.1	6.000	11.2	9.000	13.8
3.500	8.7	6.500	11.7	9.500	14.1

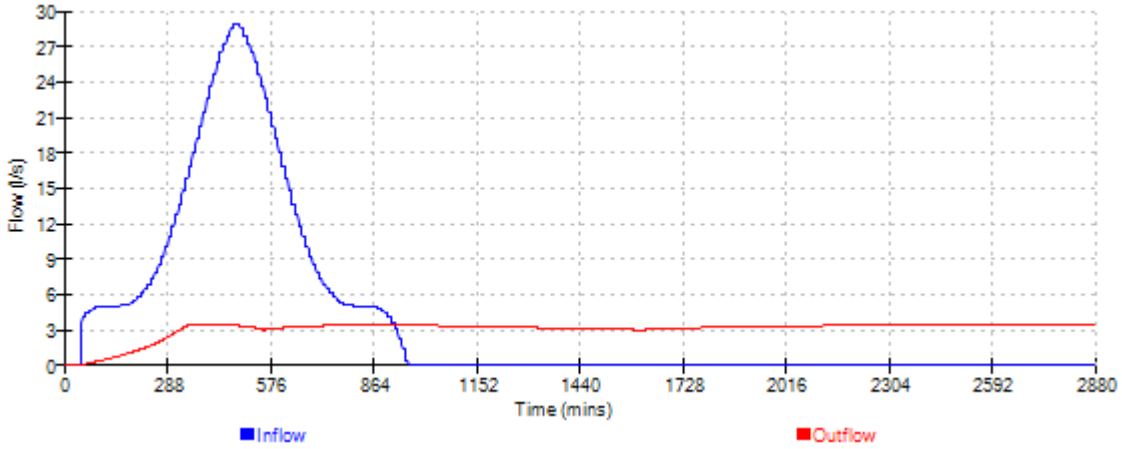
Event: 720 min Winter

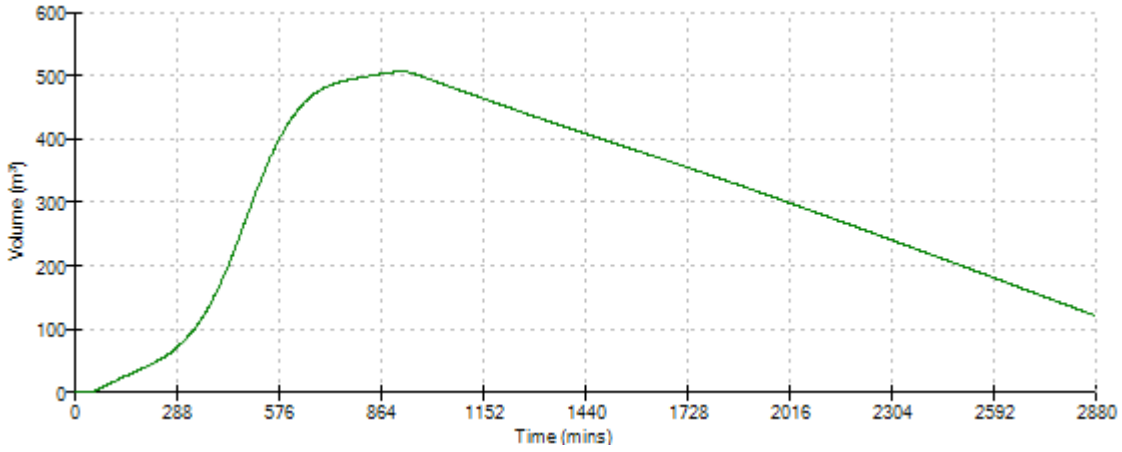


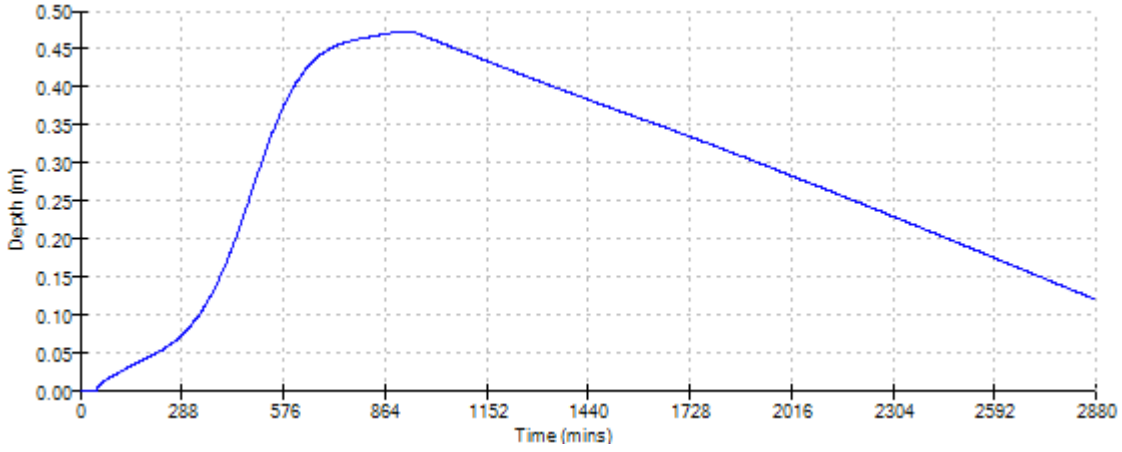




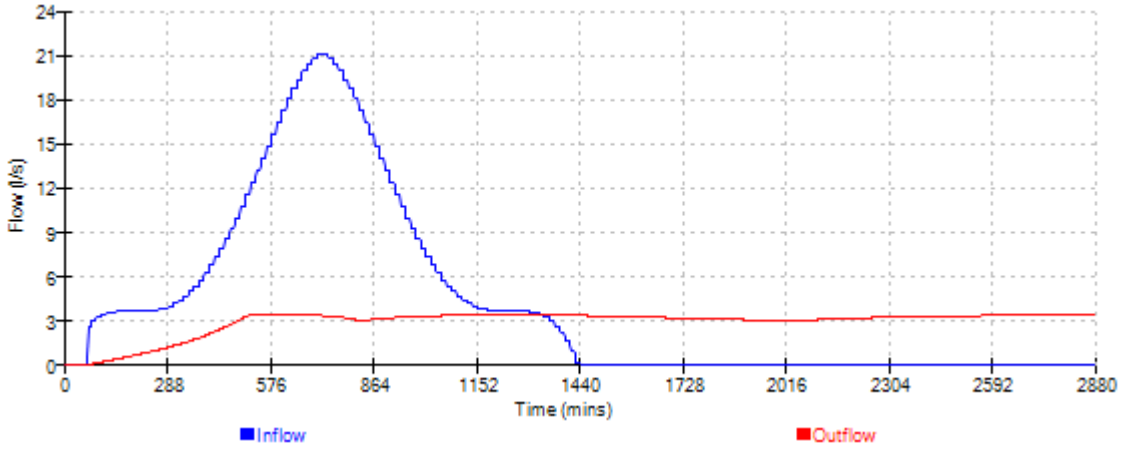
Event: 960 min Winter

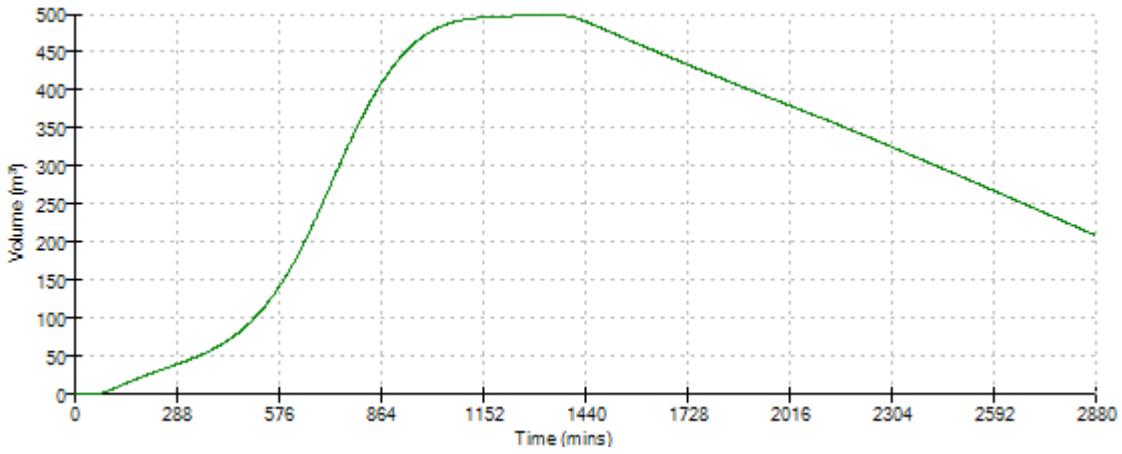


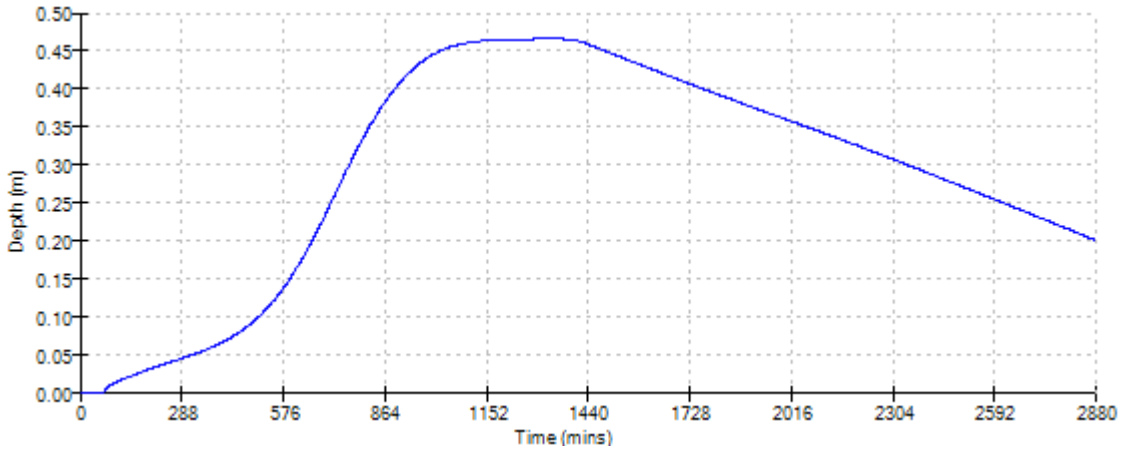




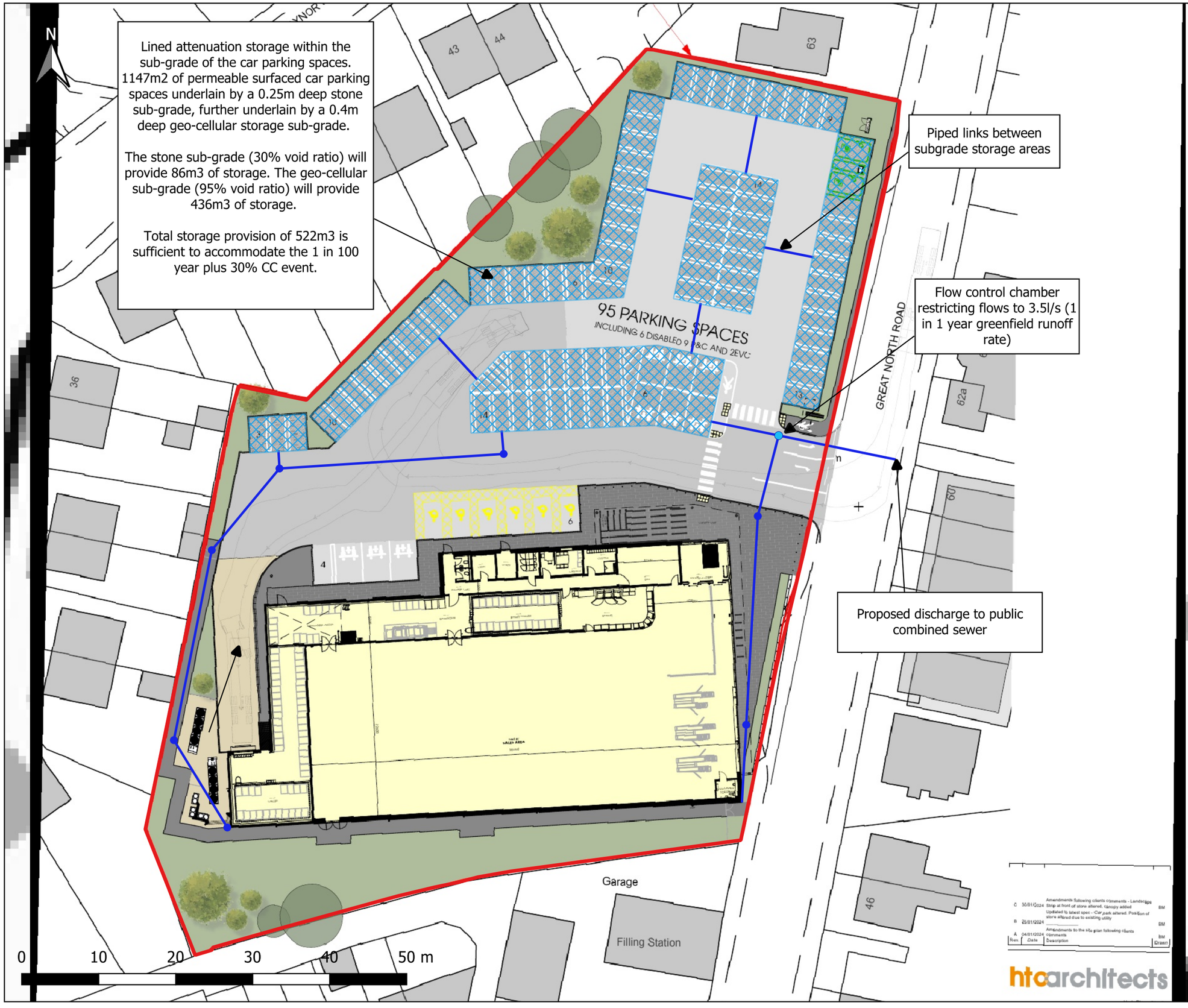
Event: 1440 min Winter







Appendix I Concept Drainage Sketch



Notes:
1) This sketch has not been subject to formal checks or approvals. Its validity and use must therefore be limited to discussion and information purposes only.
2) Unless otherwise noted the risks associated with this proposal are not considered to be extra ordinary and within the remit of an experienced and competent contractor.
3) All dimensions in millimetres and all levels in metres above ordnance datum unless shown otherwise.
4) This drawing is an ammendment of the 'Proposed Site Plan' by 'htcarchitects'. This drawing provides a concept only and is not intended for detailed design.

LEGEND

- Site boundary
- Permeable Surfacing
- Hydrobrake
- Surface Water Drain
- Surface Water Inspection Chamber

Rev.	Date	Description	Drawn
C	30/01/2024	Amendments following clients comments - Landscape Strip at front of store altered, canopy added. Updated to latest spec - Car park altered. Position of store altered due to existing utility	BM
B	25/01/2024	Amendments to the site plan following clients comments	BM
A	04/01/2024		BM

htcarchitects

CLIENT: LIDL

waterco
www.waterco.co.uk

SCHEME:
Lidl, Great North Road, Milford Haven

PLOT TITLE:
Concept Drainage Sketch

PLOT STATUS:	DATE:
SKETCH	29-02-2024

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
MJW	AW	MW	1:500

PLOT NAME:	REVISION:
_Concept_Drainage_Sketch	-

Appendix J Maintenace Schedules

Operation and Maintenance Requirements for Permeable Paving

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and move contributing and adjacent areas	As required
	Removal of weeds or management using glyphospate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level or the paving	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Inspect for evidence of poor operation and / or weed growth – if required, take remedial action	Three-monthly, 48hr after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Ref. Table 20.15, 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 :

Appendix K Concept Designers Risk Assessment (cDRA)

CONCEPT DESIGNER'S RISK ASSESSMENT

Project:	Milford Haven, Pembrokeshire	**Project No:**	15678
Client:	Lidl UK GmbH		
Report Reference:	15678-FCA &Drainage Strategy-01		

Prepared by:	Megan Williams	**Date:**	08/02/2024
Checked by:	Aled Williams	**Date:**	20/02/2024
Reviewed by:	Mike Wellington	**Date:**	21/02/2024

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	Made Ground underlain by firm, variably sandy and gravelly clay. Full details can be found within the Phase 2 Ground Investigation.
2	Hazardous Environment	Unknown	To be determined at detailed design stage
3	Existing Working Environment	Unknown	The site comprises an existing Lidl store, car park, 2no. residential properties and former petrol filling station.
4	Existing Services	Yes	225mm public combined sewer crossing the southern extent of the site. Other services shown on utilities survey
5	Proximity to Other Structure(s)	Unknown	Residential properties to the north, south and west.
6	Near Waterbody / flood risk	No	
7	Proximity to Other Activities	Unknown	To be determined at detailed design stage
8	Sequence of Construction	Unknown	To be determined at detailed design stage
9	Access	Unknown	Access provided from Great North Road to the east
10	Interfaces	Unknown	Existing car park. Further consideration required at detailed design stage.
11	Confined Space Working	Unknown	To be determined at detailed design stage
12	Maintenance Considerations	Unknown	Maintenace of drainage features required.
13	Working at Height	Unknown	To be determined at detailed design stage
14	Steep Slopes	No	Refer to LiDAR and topographical survey for further details
15	Demolition / Refurbishment / Repair	Yes	Existing Lidl store to be demolished. Further consideration required at detailed design stage.
16	Welfare	Unknown	To be determined at detailed design stage
17	Occupational Health	Unknown	To be determined at detailed design stage
18	Environmental Issues	Unknown	To be determined at detailed design stage
19	Other Significant Hazards not Identified Above	Unknown	To be determined at detailed design stage
20	Residual Risk to Future Users	Unknown	To be determined at detailed design stage