Dŵr Cymru
Welsh Water

Cardigan, Ceredigion Council, SA43 1NA

N
W E
S

LEGEND(Representative of most common features)

Waste network:

- Foul chamber
- Surface water chamber
- Combined chamber
- Combined sewer overflow
- Special purpose chamber
- Treatment works
- Pumping station
- Outfall
- Lamphole
- Storm Overflow
- Rising main
- Gravity sewer
- Private sewer
- Private sewer subject to Sect. 104 adoption agreement
- Private Sewer Transfer
- Lateral Drain
- Inspection Chamber

NB: Sewer symbol colour indicates the type.

RED - Combined
GREEN - Surface Water
BROWN - Foul
Purple - Former S24 sewers (for indicative purposes only)

Notes:

Whilst every reasonable effort has been taken to correctly record the pipe material of DCWW assets, there is a possibility that in some cases pipe material (other than Asbestos Cement or Pitch Fibre) may be found to be asbestos cement (AC) or Pitch Fibre (PF) . It is therefore advisable that the possible presence of AC or PF pipes be anticipated and considered as part of any risk assessment prior to excavation

EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.

Map Ref:	218792,246869
Map scale:	1:1500
Printed by:	Jessica Formosa
Printed on:	15 Sep 2025

Dŵr Cymru
Welsh Water

Developer Services
PO Box 3146
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CF30 0EH

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E.mail: developer.services@dwrcymru.com

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Ffacs: +44 (0)2920 740472
E.bost: developer.services@dwrcymru.com

Mr Adam McCulloch
Waterco
11 Lon Parcwr
Ruthin
Denbighshire
LL15 1NJ

Date: 13/10/2025
Our Ref: PPA0009669

Dear Mr McCulloch.

Grid Ref: 218786 246843
Site Address: Aberystwyth Road, Cardigan
Development: B&M Store, Cardigan

I refer to your pre-planning enquiry received relating to the above site, seeking our views on the capacity of our network of assets and infrastructure to accommodate your proposed development. Having reviewed the details submitted I can provide the following comments which should be taken into account within any future planning application for the development.

Firstly, we note that the proposal relates to the redevelopment of the B&M Store and comprises of a potential windfall development with no allocated status in the Local Development Plan (LDP). Accordingly, whilst it does not appear an assessment has been previously undertaken of the public sewerage and watermains systems, we offer the following comments as part of our appraisal of this development.

PUBLIC SEWERAGE NETWORK

The proposed development site is located in the immediate vicinity of a combined sewerage system, which drains to Cardigan Wastewater Treatment Works (WwTW).

You are advised that some public sewers and lateral drains may not be recorded on our maps of public sewers because they were originally privately owned and were transferred into public ownership by nature of the Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011. The presence of such assets may affect the proposal. In order to assist you may contact Dwr Cymru Welsh Water on 0800 085 3968 to establish the location and status of the apparatus in and around your site.

Please be mindful that under the Water Industry Act 1991 Dwr Cymru Welsh Water has rights of access to its apparatus at all times.

SURFACE WATER DRAINAGE

As of 7th January 2019, this proposed development is subject to Schedule 3 of the Flood and Water Management Act 2010. The development therefore requires approval of Sustainable Drainage Systems (SuDS) features, in accordance with the 'Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems'. As highlighted in these standards, the developer is required to explore and fully exhaust all surface water drainage options in accordance with a hierarchy preferring infiltration (PL2) and, where infiltration is not possible, disposal to a surface water body (PL3), in liaison with the Lead Local Flood Authority and/or Natural Resources Wales, or surface water sewer or highway drain (PL4) in liaison with the riparian owner and/or Local Highways Authority.

Please note, DCWW is a statutory consultee to the SAB application process and will provide comments to any SuDS proposals by response to SAB consultation. Please refer to further detailed advice relating to surface water management included in our attached Advice & Guidance note and our Developer Services website at https://developers.dwrcymru.com/en/help-advice/regulation-to-be-aware-of/sustainable-drainage-systems.

FOUL WATER DRAINAGE – SEWERAGE NETWORK

We have considered the impact of foul flows generated by the proposed development and concluded that flows can be accommodated within the public combined sewerage system. We advise that the flows should be connected to the combined sewer at manhole SN18467804 located in Aberystwyth Road.

You may need to apply to Dwr Cymru Welsh Water for any connection to the public sewer under Section 106 of the Water industry Act 1991. However, if the connection to the public sewer network is either via a lateral drain (i.e. a drain which extends beyond the connecting property boundary) or via a new sewer (i.e. serves more than one property), it is now a mandatory requirement to first enter into a Section 104 Adoption Agreement (Water Industry Act 1991).

The design of the sewers and lateral drains must also conform to the Welsh Ministers Standards for Foul Sewers and Lateral Drains, and conform with the publication "Sewers for Adoption"- 7th Edition. Further information can be obtained via the Developer Services pages of www.dwrcymru.com

SEWERAGE TREATMENT

The proposed development would overload Cardigan Waste water Treatment Works. However, reinforcement works are planned through our AMP8 capital investment programme due for completion by 31st March 2027.

No buildings on the application site shall be brought into beneficial use earlier than 31st March 2027 unless the upgrading of the Waste Water Treatment Works, into which the development shall drain, has been completed and written confirmation of this has been issued by the Local Planning Authority (LPA). We will be advising the LPA at planning application stage that occupation of these premises are controlled until the scheme is completed, in the interest of protecting our customers and the environment.

WATER SUPPLY

We anticipate this development will require the installation of a new single water connection to serve the new premise. The provisions of Section 45 of the Water industry Act 1991 apply. We therefore rely on the Local Planning Authority to control the delivery of any required reinforcement or offsite works by way of planning condition at planning application stage. Capacity is currently available in the water supply system to accommodate the development.

We reserve the right however to reassess our position at planning application stage to ensure there is sufficient capacity available to serve the development without causing detriment to existing customers' supply as demands upon our water systems change continually.

I trust the above information is helpful and will assist you in forming water and drainage strategies that should accompany any future planning application. I also attach copies of our water and sewer extract plans for the area, and a copy of our Planning Guidance Note which provides further information on our approach to the planning process, making connections to our systems and ensuring any existing public assets or infrastructure located within new development sites are protected.

Please note that our response is based on the information provided in your enquiry and should the information change we reserve the right to make a new representation. Should you have any queries or wish to discuss any aspect of our response please do not hesitate to contact our dedicated team of planning officers, either on 0800 917 2652 or via email at **developer.services@dwrcymru.com**

Please quote our reference number in all communications and correspondence.

Yours faithfully,

Matthew Lord
Planning Liaison Manager
Developer Services

***Please Note** that demands upon the water and sewerage systems change continually; consequently the information given above should be regarded as reliable for a maximum period of 12 months from the date of this letter.*

Dŵr Cymru
Welsh Water

Planning and new development

What you should do, and how we can help

dwrcymru.com

WWDEV 0400

Whether you're a homeowner with plans to extend your home, a builder working on a new house or a developer working on a new housing site, you need to involve us in the planning process. Even if you are just thinking about building, getting us involved early can help your project run smoothly and address any water and drainage matters as early as possible in the development process.

How can we help?

As water and waste services are at the forefront of public health and protection of the environment, we play a key part in the town and country planning process.

If you're planning on building new houses, our team of dedicated planning officers can give you advice and guidance at all stages of the process, including pre-application, planning application and discharge of condition.

When it comes to your new development, by getting us involved in the planning stages, we can:

- Assess whether the current local water and sewerage networks have capacity to service your new site (and if they can't, then identify whether the network can be reinforced to support your new site)
- Mitigate any potential negative impact that the new development could have on the performance of our infrastructure, the service we provide to customers, and the wider environment
- Identify where new development and growth is planned so that we can target investment in our existing infrastructure within these areas
- Provide advice on making new water and waste connections to our networks once your development is complete and ready to be occupied
- Identify any existing water or waste pipes in or near to the site, so we can advise on their location and let you know your options for protecting and/or diverting our assets for the lifetime of the development

Step 1: Use our pre-planning service

What is our pre-planning service?

We encourage all developers to engage with us as early as possible to ensure any water and drainage matters that might arise during the planning process are identified and addressed early on. In order to facilitate this, you can engage with us via our dedicated pre-planning service, which will provide:

- An assessment of the impact of your proposed development and whether our local water and waste networks can support it
- Confirmation of whether off-site water mains and/or sewers will need to be provided, and
- Water main and sewer plans indicating the location of our assets crossing the site or located in close proximity. *Please note that these are for general guidance only and all assets need to be accurately located on site before any excavation works begin.*

How can I access it?

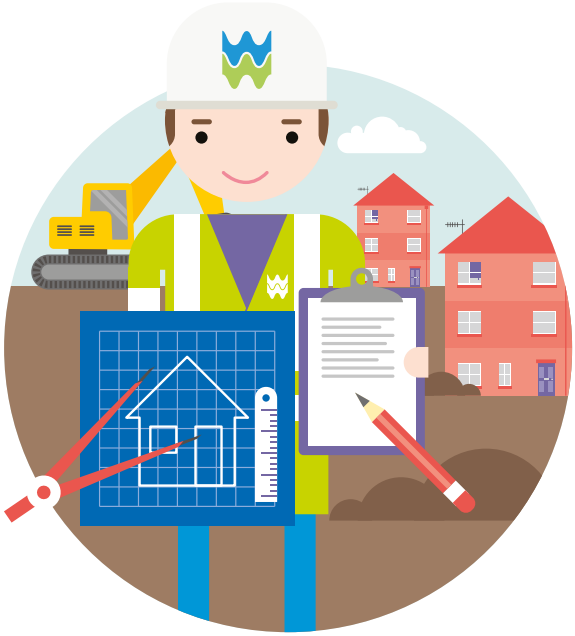
You can submit a 'pre-planning advice' application online via our website. To make sure that we can provide you with the most comprehensive advice, you should include the following information:

- Site location plan
- Details of the proposed development
- Proposed points of communication to our local network of sewers and/or water mains (if known)
- Relevant planning history relating to the site e.g. any previous permissions granted or status within the council's development plan

You can see how much this service will cost on our website, and we'll aim to get back to you with a written **response within 21 days** of your application. The advice provided will be valid for 12 months and help inform our response when consulted on your planning application by the local planning authority (LPA).

For larger developments in Wales:

- You have to undertake pre-application consultation as set out in Schedule 4 of the Town & Country Planning (Development Management Procedure) (Wales) (Amendment) Order 2016 for any developments that:
  - Include 10 dwellings or larger
  - Have 1000sqm or larger non-residential floor space or
  - Have a site area that's 1 hectare or larger
- This means you need to consult with us and we will **respond within 28 days**.
- While there's no charge for this service, as it's a statutory requirement, we do recommend that you apply for our pre-planning service in advance of this consultation, as it will help to identify any potential issues that need to be addressed in advance of your planning application.



Step 2: Once you have our pre-planning advice

Locate our assets

Before you build, it's important to identify if any of our pipes, water mains or sewers are underneath the ground in or adjacent to your development site. Under section 159 of the Water Industry Act 1991, we have the rights of access to inspect, maintain, adjust, repair or alter any asset or apparatus at all times.

If your land does contain assets

If your land does indeed contain some of our assets, then this will have an impact on the layout and general arrangement of the new development site. We strongly recommend that you contact us to discuss accurately locating our assets to ensure that they are protected during and after construction. Please contact our Plan and Protect team via **planandprotect@dwrcymru.com** or **08009172652** to discuss further.

If you want to divert or remove the assets contained in your land

If you decide the asset located within or adjacent to your site can't be incorporated within the layout of the new development, or our rights of access to the asset may be hindered by your proposal, you can ask us to alter, divert or remove it in accordance with section 185 of the Water Industry Act 1991. You can find the application forms on our website.

How will you manage surface water?

As with all new development sites, you'll need to think about how to deal with surface water runoff from any new buildings and hard standings. Legislation in both England and Wales now actively encourages the use of sustainable urban drainage systems (SUDS). This approach manages surface water runoff by imitating natural drainage systems and retaining water on or near the site.

There are such a variety of SUDS techniques including green roofs, rainwater harvesting and permeable pavements that any development should be able to include a SUDS scheme. There would need to be good justification not to incorporate a SUDS scheme on your site.

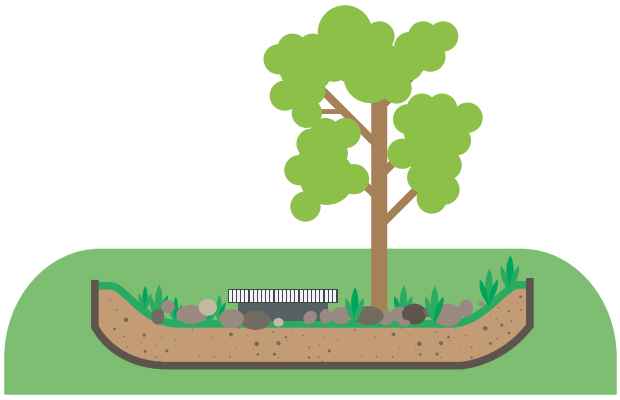
SUDS in Wales

All new development of more than one building or a construction area of 100m2 or more will require consent from the sustainable drainage system (SUDS) approval body (also known as a SAB) for any new SUDS features, as required by Schedule 3 of the Flood and Water Management Act 2010. SABs are delivered by local authorities across Wales.

In accordance with this and the Welsh Government 'Statutory standards for sustainable drainage systems', you need to explore and fully exhaust all surface water drainage options, using discharge to a combined sewer only as a last resort.

SUDS in England

Even if your new development is based in England, it's important to keep Part H of the 'Building Regulations 2000' in mind. On this basis, all new developments in England will also be expected to consider surface water management techniques and demonstrate all technical options have been explored and exhausted, in liaison with the land drainage authority and/or the Environment Agency. You need to consider the management of highway or land drainage runoff as these flows won't be allowed to discharge directly or indirectly into the public sewerage system.



Step 3: The planning application process

Once you've used our pre-planning service and identified any potential issues before building, it's time to incorporate our advice into your proposals to your local planning authority (LPA).

As part of the planning application consultation process we will provide similar advice to that provided in our pre-application **response within 21 days**. It's important to note that while we share our expert opinion during this process, the ultimate decision to grant planning permission is the LPA's.

What are the options if we can't currently support your development?

Network hydraulic modelling/WwTW feasibility studies

As our aim is to support economic development and growth, we do not want to resist new development where possible. However, we must take the capacity of our existing assets, the service we are providing to existing customers and the environment into account. In areas where there are capacity constraints either on our networks or at the wastewater treatment works (WwTW), we may well already have proposals in place to deliver reinforcement works and to create capacity for new developments.

That being said, you may want to develop your site in advance of us undertaking these works. If this is the case, to ensure there's no detriment to our existing customers, you may be required to implement solutions identified by an assessment of either the network or WwTW. It's important to note that you won't be expected to resolve any existing operational issues.

Where further assessments are recommended, you will need to allow sufficient time in your development programme for these studies to be carried out and any reinforcement works to be delivered, as in some circumstances we won't permit a communication to our networks until these works are completed. The delivery of the works will need to align with occupation rather than construction.

Where possible, we will control the delivery of any solutions as part of the planning process. Dependent on the progress of the assessment, we may be in a position to recommend appropriate planning conditions so that the outcomes of the assessment can be delivered as part of any planning permission.

This approach allows us to support the progression of the site through the planning process, however in the absence of a completed assessment and known solutions we may need to work with you and the LPA until the assessment is completed and the outcomes are known.

Step 4: Connecting to our network

If you've had the green light from us and planning permission has been granted for your development, then it's time to start thinking about the different ways you'll need to connect to our network.

On our website you can find detailed guidance around applying for new water connections, new water mains, new public sewers and new sewer connections.

Contact us

If you've still got any questions or queries, then feel free to contact us:

Email: developer.services@dwrcymru.com

Visit: **www.dwrcymru.com**

Tel: 0800 917 2652

Contact Us:

If you've got any questions or queries, then feel free to contact us:

Call
0800 917 2652

Email
developer.services@dwrcymru.com

Visit
www.dwrcymru.com

@dwrcymru

/dwrcymruwelshwater

Appendix E Existing & Proposed Development Plans

ALL DIMENSIONS SHOULD BE CHECKED ON SITE BEFORE WORK COMMENCES

BOUNDARY BASED ON TITLE REGISTER REFERENCES: CYM601635, CYM808828, CYM735060

BASED TOPOSURVEY DWG
22635_TOPOGRAPHIC AND SERVICES SURVEY_FINAL
20203_TOPOGRAPHIC AND SERVICES SURVEY_FINAL

SUBJECT TO HIGHWAYS CONSULTANT AND DESIGNS

SUBJECT TO LANDSCAPE ARCHITECTS

6

11

bury Lodge

ng Home

SITE AREA: 7183 SQM / 1.775 ACRES

Brondesbury

Park

39.7m

Shelter

0 10 20 30 40 50 m

SCALE BAR 1:500

rev.	Date	Description	Drawn
A	20/08/2025	Planning pack updated in line with clients comments recieved 18.08.2025.	KA

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York Place Studio
8 Britannia Street
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T: (0113) 244 3457
W: www.htcarchitects.co.uk
E: info@htcarchitects.co.uk

client
Lidl GB Ltd.

project
Aberystwyth Road, Cardigan

drawing title
Existing Site Plan

date	August 2025
status	Planning
scale	1:500 @ A3
drawn	KA
checked	BMS
job no.	2806
dwg no.	P411
rev.	A

ALL DIMENSIONS SHOULD BE CHECKED ON SITE BEFORE WORK COMMENCES

BOUNDARY BASED ON TITLE REGISTER REFERENCES: CYM601635, CYM308828, CYM735060

BASED TOPO SURVEY DWG
22635_TOPOGRAPHIC AND SERVICES SURVEY_FINAL
20203_TOPOGRAPHIC AND SERVICES SURVEY_FINAL

SUBJECT TO HIGHWAYS CONSULTANT AND DESIGNS

SUBJECT TO LANDSCAPE ARCHITECTS

11/8/25
REDUCED NUMBER OF P&C, SUBJECT TO CONFIRMATION BY LIDL

97 CAR PARKING SPACES
(INC 2 EVC, 6 ACCESSIBLE & 7 P&C)

SALES AREA
1347 m²

SITE AREA: 7183 SQM / 1.775 ACRES

7/8/25
PROPOSE HIGHWAYS & PEDESTRIAN FOOTPATH TO BE ADAPTED.
HIGHWAYS ARRANGEMENT SUBJECT TO HIGHWAYS CONSULTATION.

Brondesbury Park

39.7m

Shelter

0 10 20 30 40 50 m

SCALE BAR 1:500

Rev.	Date	Description	Drawn
B	02/09/2025	Proposed site plan updated. Spec trolley bay added and parking amended. Elevations updated to match.	KA
A	20/08/2025	Planning pack updated in line with clients comments recieved 18.08.2025.	KA

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client
Lidl GB Ltd.

project
Aberystwyth Road, Cardigan

drawing title
Proposed Setting Out Site Plan

date	August 2025		
status	Planning		
scale	1:500 @ A3		
drawn	KA	checked	BMS
job no.	2806	dwg no.	P412 rev. B

ALL DIMENSIONS SHOULD BE CHECKED ON SITE BEFORE WORK COMMENCES

BOUNDARY BASED ON TITLE REGISTER REFERENCES: CYM601635, CYM308828, CYM735060

BASED TOPO SURVEY DWG
22635_TOPOGRAPHIC AND SERVICES SURVEY_FINAL
20203_TOPOGRAPHIC AND SERVICES SURVEY_FINAL

SUBJECT TO HIGHWAYS CONSULTANT AND DESIGNS

SUBJECT TO LANDSCAPE ARCHITECTS

SURFACES KEY:

- BLOCK PAVING TO PEDESTRIAN ROUTES AND STORE ENTRANCE. PAVING TO BE LAID IN A STRETCHER BOND PATTERN COLOUR: DARK GREY/ ANTHRACITE
- PERMEABLE PAVING AS PER SPECIALIST DESIGN
- CONCRETE DELIVERY YARD AND PLANT ROOM
- FOOTWAY SMA TO PEDESTRIAN ROUTES.
- 2 BITUMINOUS LAYER TO CAR AND LIGHT VEHICLE CAR PARK LOCATIONS.
- 3 BITUMINOUS LAYER TO ACCESS ROAD AND HGV LOCATIONS
- REFER TO LANDSCAPING ARCHITECTS DRAWINGS AND DETAILS FOR ALL SOFT LANDSCAPING SPECIFICATIONS AND FINISHES
- YELLOW / WHITE & GREEN AS INDICATED THERMOPLASTIC LINING TO DENOTE ALL CAR PARKING SPACES

Rev.	Date	Description	Drawn
B	02/09/2025	Proposed site plan updated. Spec trolley bay added and parking amended. Elevations updated to match.	KA
A	20/08/2025	Planning pack updated in line with clients comments recieved 18.08.2025.	KA

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client
Lidl GB Ltd.

project
Aberystwyth Road, Cardigan

drawing title
Proposed Surface Treatment

date	August 2025
status	Planning
scale	1:500 @ A3
drawn	KA
checked	BMS
job no.	2806
dwg no.	P414
rev.	B

ALL DIMENSIONS SHOULD BE CHECKED ON SITE BEFORE WORK COMMENCES

BOUNDARY BASED ON TITLE REGISTER REFERENCES: CYM601635, CYM308828, CYM735060

BASED TOPO SURVEY DWG
22635_TOPOGRAPHIC AND SERVICES SURVEY_FINAL
20203_TOPOGRAPHIC AND SERVICES SURVEY_FINAL

SUBJECT TO HIGHWAYS CONSULTANT AND DESIGNS

SUBJECT TO LANDSCAPE ARCHITECTS

0.0 RETAINING
0.3 RETAINING
PLANT AREA @ 41.25m
7/8/25
TOPOGRAPHICAL SURVEY LIMITED
LEVELS IN AREA. SUBJECT TO
FURTHER SITE INVESTIGATION.
3.2m RETAINING STORE
3.0m RETAINING STORE
3.2m RETAINING WALL
LANDING @ 42.0m
2.0m RETAINING WALL
LANDING @ 41.5m
1.3m RETAINING WALL
LANDING WITH REFUGE @ 41.167m
0.5m RETAINING WALL
EXISTING LEVEL @ 40m
FFL = 42.5m AOD
0.0 RETAINING
0.1 RETAINING
0.0 RETAINING
0.0m RETAINING WALL
0.5m RETAINING WALL
1.0m RETAINING WALL
2.0m RETAINING WALL
2.4m RETAINING WALL
6
11
Brondesbury Lodge
Nursing Home
Brondesbury Park
Shelter
39.7m

0 10 20 30 40 50 m
SCALE BAR 1:500

KEY	
110.2m	EXISTING LEVEL
110.2m	PROPOSED LEVEL
1:0.0 0 0	HARD LANDSCAPING GRADE
1:0.0 0 0	SOFT LANDSCAPING GRADE
	FINISHED FLOOR LEVEL
1:0.0 0 0	ESTIMATED GRADE
110.2m	RETAINING WALL LEVEL

rev.	date	description	drawn
B	02/09/2025	Proposed site plan updated. Spec trolley bay added and parking amended. Elevations updated to match.	KA
A	20/08/2025	Planning pack updated in line with clients comments recieved 18.08.2025.	KA

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Leeds
LS1 2DZ
T:(0113) 244 3457
W: www.htcarchitects.co.uk
E: info@htcarchitects.co.uk

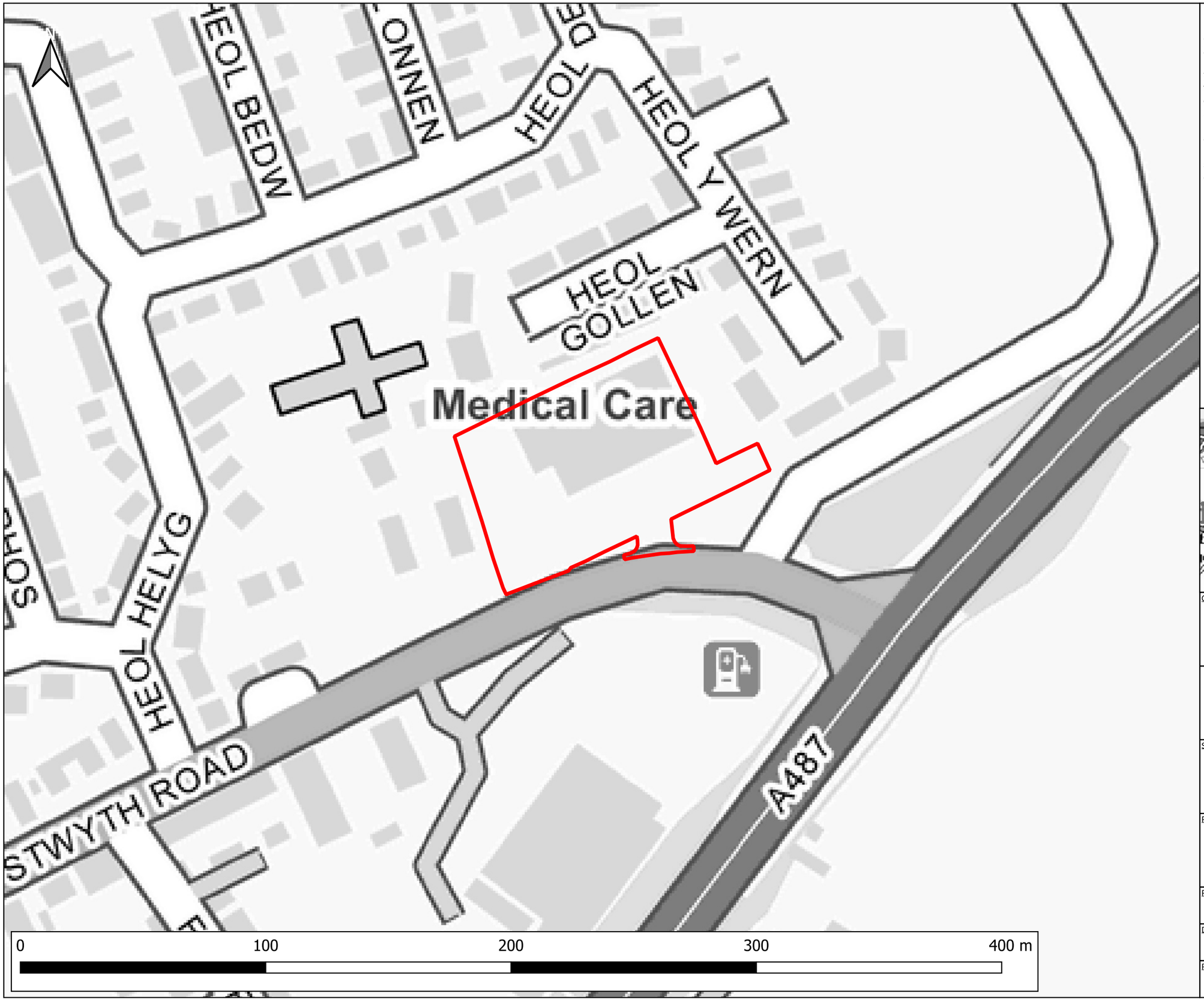
client: Lidl GB Ltd.

project: Aberystwyth Road, Cardigan

drawing title: Proposed Levels Strategy

date	August 2025
status	Planning
scale	1:500 @ A3
drawn	KA
checked	BMS
job no.	2806
dwg no.	P416
rev.	B

Appendix F NRW Flood Maps



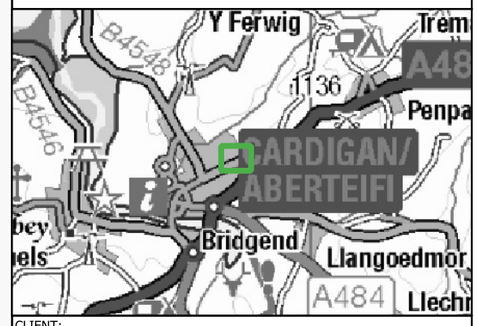
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise
2) Flood Zone 3 displays the extent of flooding from rivers with a 1% AEP or greater of flooding in a given year including and allowance for climate change and the sea with a 0.5% AEP or greater of flooding in a given year including and allowance for climate change
3) Flood Zone 2 displays the extent of flooding from rivers with a less than 1% AEP but greater than or equal to 0.1% AEP of flooding in a given year including and allowance for climate change and the sea with a less than 0.5% AEP but greater than or equal to 0.1% AEP of flooding in a given year including an allowance for climate change

LEGEND

- Site Boundary
- TAN15 Defended Zones

Flood Map for Planning

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



CLIENT:
Lidl Great Britain Limited

waterco
www.waterco.co.uk

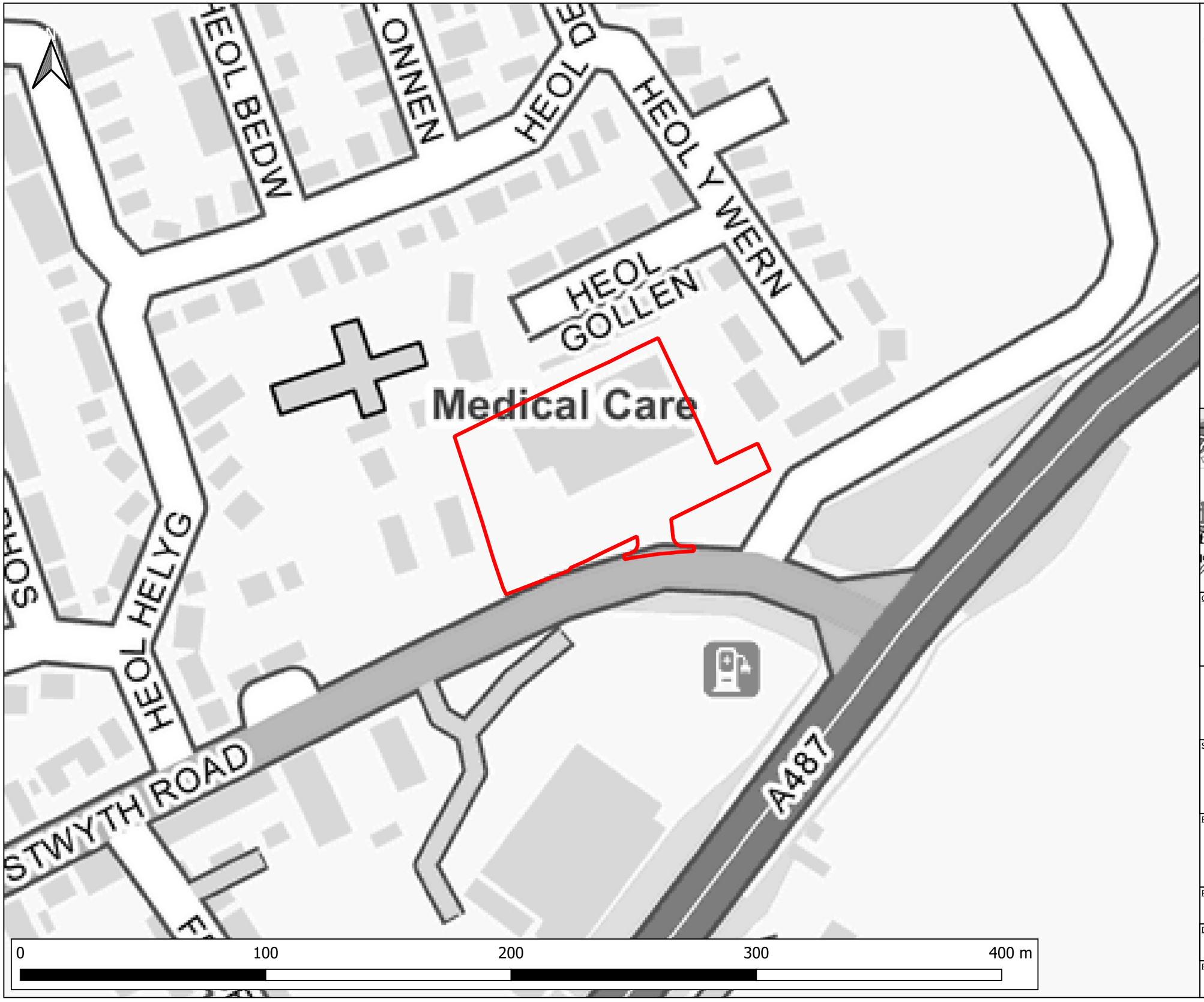
SCHEME:
B&M, Aberystwyth Road, Cardigan

PLOT TITLE:
NRW Flood Map for Planning (Rivers and Sea)
Data published May 2025

PLOT STATUS:	DATE:
FINAL	10-09-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:1500

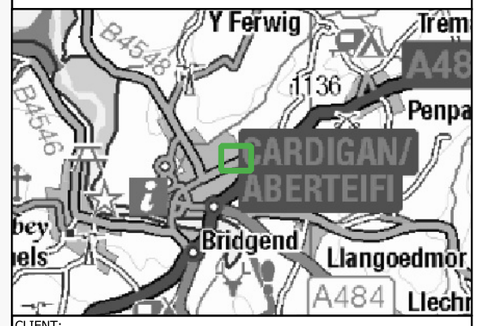
PLOT NAME:	REVISION:
17128_NRW_FMfP	-



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

LEGEND

- Site Boundary
- Flood Zones - Rivers
  - Flood Zone 1
  - Flood Zone 2
  - Flood Zone 3



CLIENT:
Lidl Great Britain Limited

waterco
www.waterco.co.uk

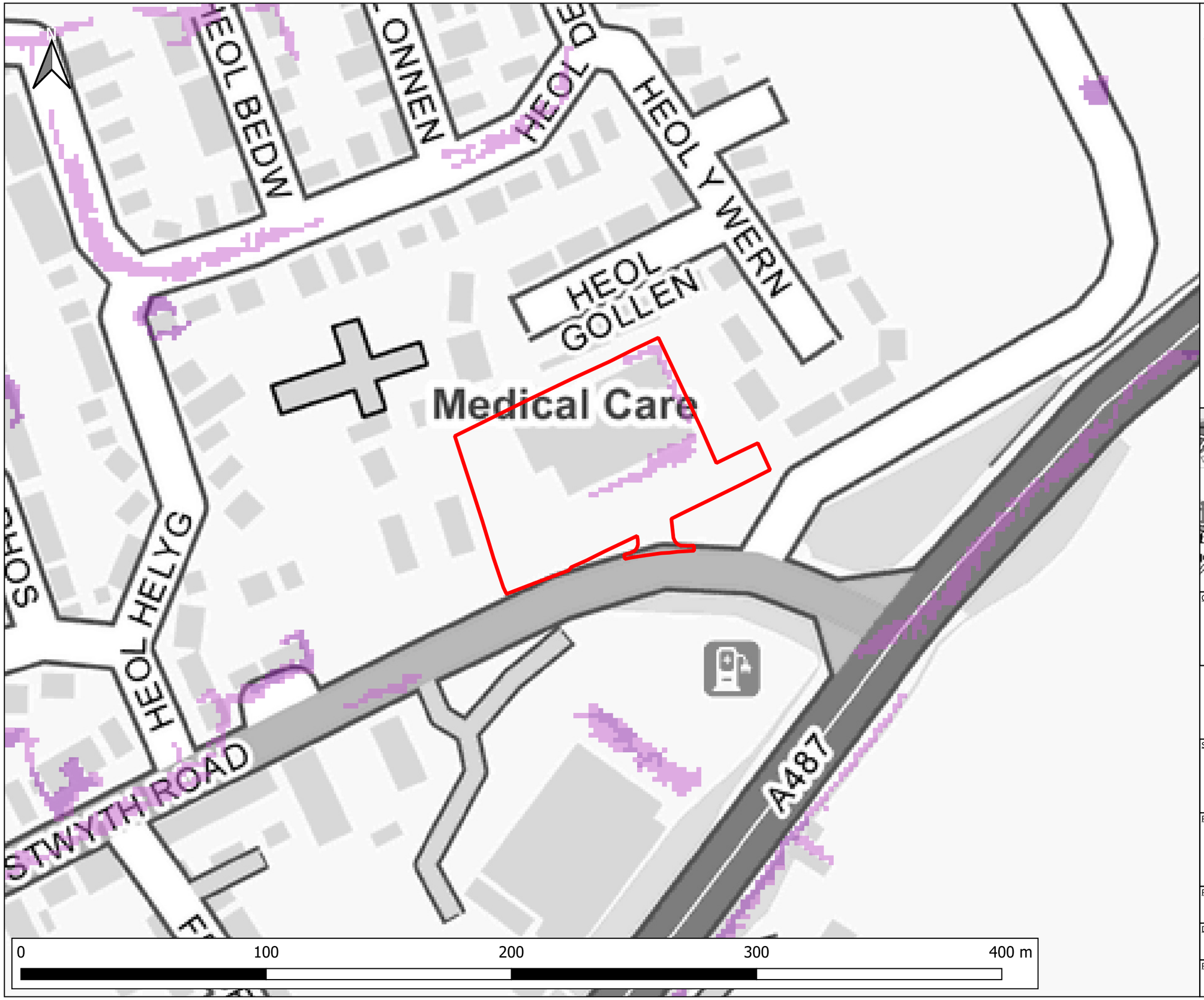
SCHEME:
B&M, Aberystwyth Road, Cardigan

PLOT TITLE:
NRW Flood Zones - Rivers
Data published May 2025

PLOT STATUS:	DATE:
FINAL	10-09-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:1500

PLOT NAME:	REVISION:
17128_NRW_Flood_Zones_Rivers	-



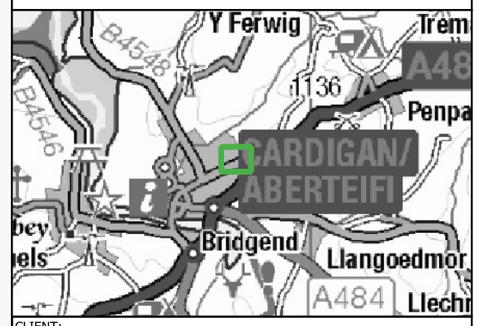
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary

Flood Zones - Surface Water & Small Watercourses

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



CLIENT:
Lidl Great Britain Limited

waterco
www.waterco.co.uk

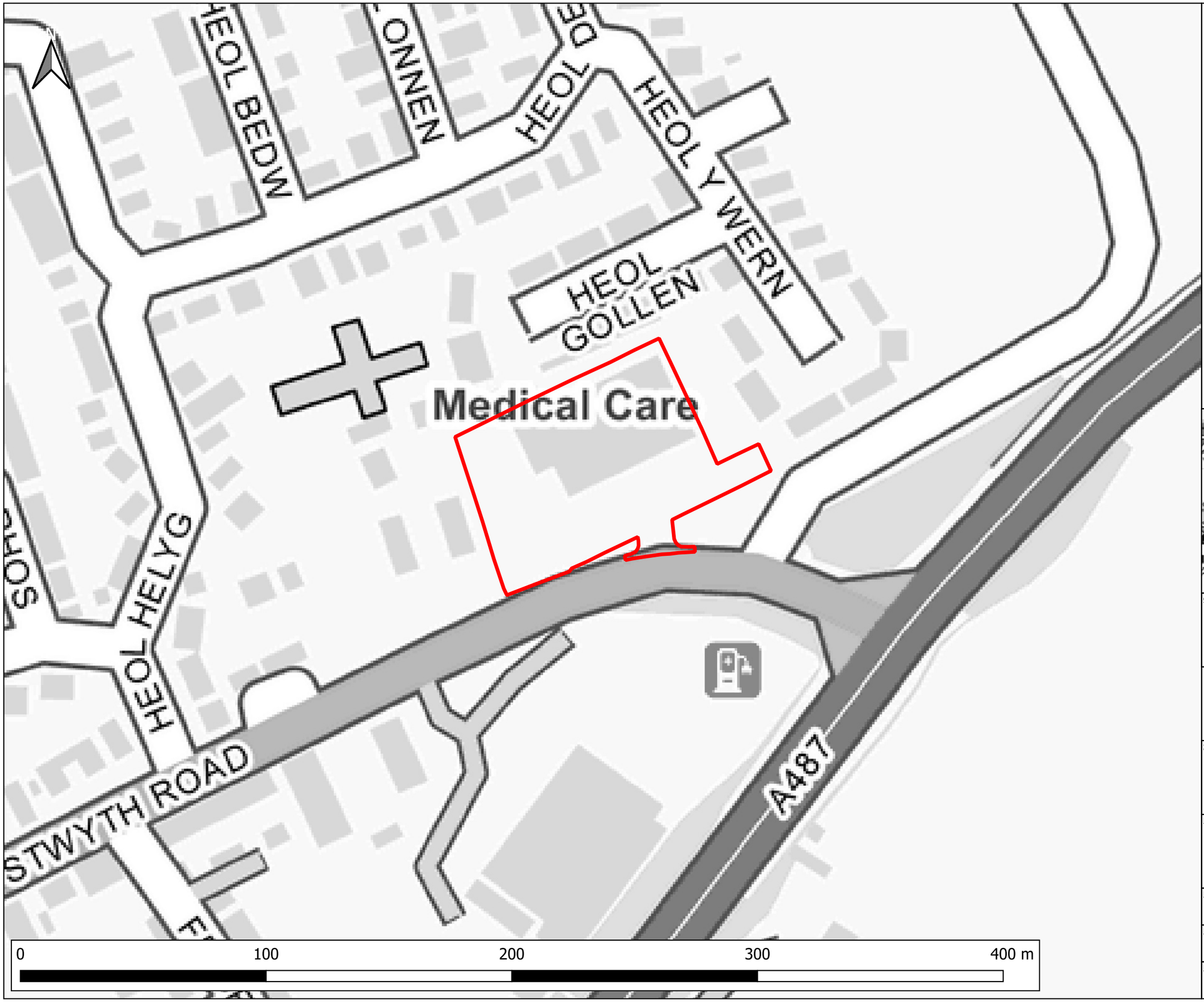
SCHEME:
B&M, Aberystwyth Road, Cardigan

PLOT TITLE:
NRW Flood Zones - Surface Water & Small Watercourses
Data published May 2025

PLOT STATUS:	DATE:
FINAL	10-09-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:1500

PLOT NAME:	REVISION:
17128_NRW_Flood_Zones_Surface_Water	-



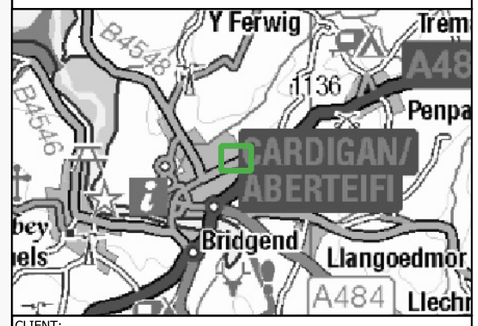
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary

Flood Zones - Sea

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



CLIENT:
Lidl Great Britain Limited

waterco
www.waterco.co.uk

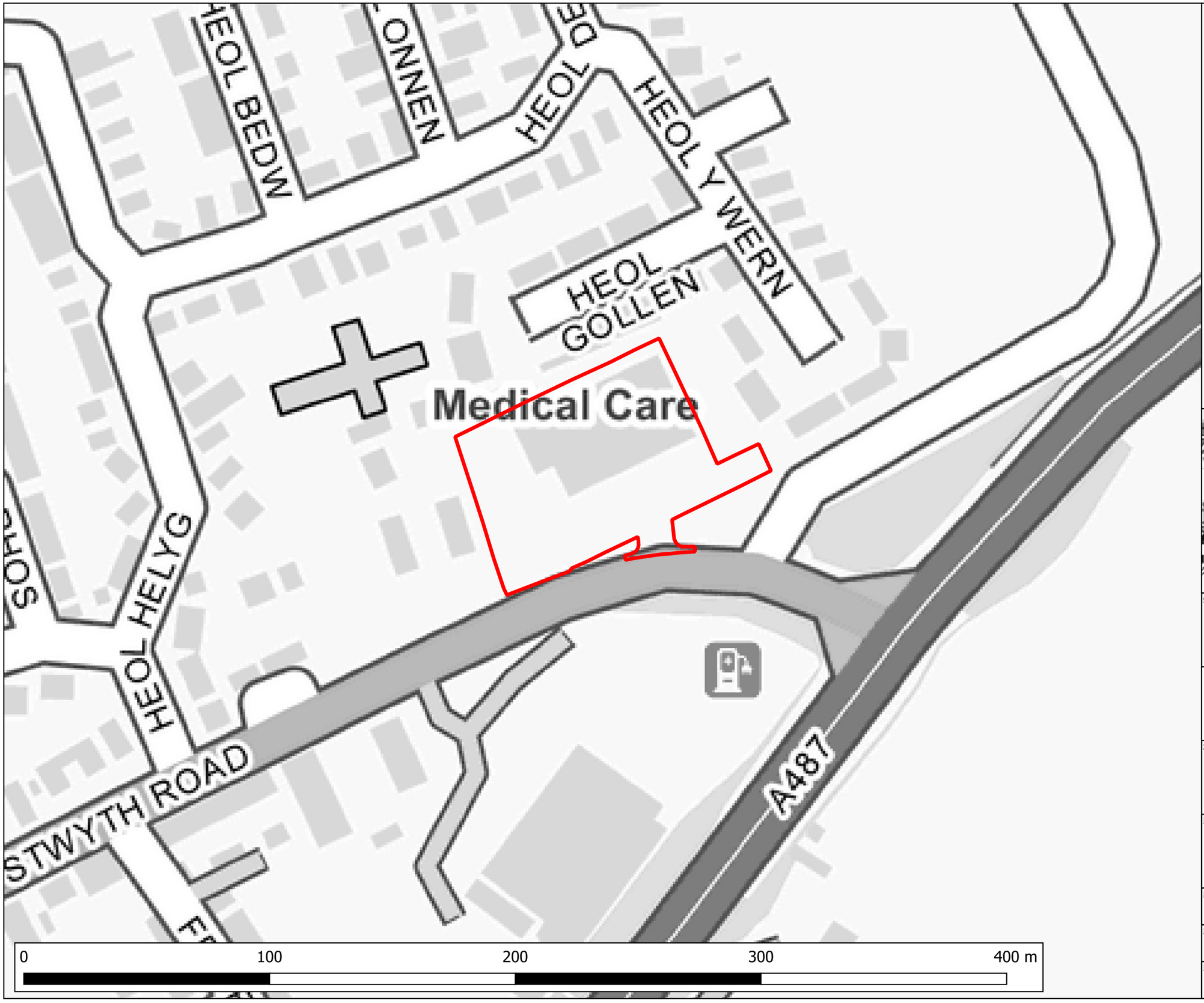
SCHEME:
B&M, Aberystwyth Road, Cardigan

PLOT TITLE:
NRW Flood Risk from the Sea
Data published May 2025

PLOT STATUS:	DATE:
FINAL	10-09-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:1500

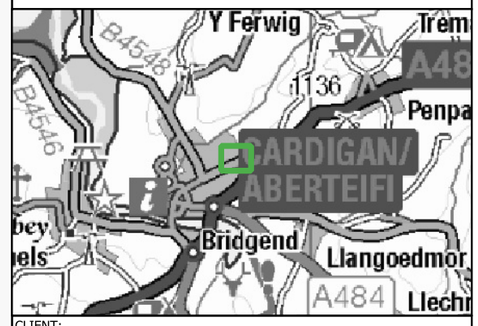
PLOT NAME:	REVISION:
17128_NRW_Flood_Zones_Sea	-



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

LEGEND

- Site Boundary
- NRW Recorded Flood Extents



CLIENT:
Lidl Great Britain Limited

waterco
www.waterco.co.uk

SCHEME:
B&M, Aberystwyth Road, Cardigan

PLOT TITLE:
NRW Recorded Flood Extents
Data published May 2025

PLOT STATUS:	DATE:
FINAL	10-09-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:1500

PLOT NAME:	REVISION:
17128_NRW_Recorded_Flood_Extents	-

Appendix G ReFH2 Greenfield Runoff Rates

DOCUMENT VERIFICATION RECORD	
Project:	B&M, Aberystwyth Road, Cardigan
Client:	Lidl Great Britain Limited
Report Title:	Flood Consequences Assessment & Drainage Strategy
Date:	09/10/25

DOCUMENT REVIEW & APPROVAL	
Author:	Adam McCulloch BSc (Hons)
Checker:	Aled Williams BSc (Hons) MCIWEM C.WEM
Approver:	Nigel Jones Beng (Hons) CEng MICE

ReFH2 RUNOFF RATES*	
Return Period (Years)	**As-rural Peak Flow (l/s)**
1	3.3
2	3.7
5	5.2
10	6.2
30	7.9
50	8.7
75	9.4
100	10
200	11.3
1000	15

*Runoff Rates printed from the ReFH Flood Modelling software package

UK Design Flood Estimation

Generated on 06 November 2025 16:21:49 by adam.mcculloch
Printed from the ReFH2 Flood Modelling software package, version 4.1.8704.23947

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH2)

Site details Checksum: 2185-EE71

Site name: FEH_Point_Descriptors_218794_246862_v5_1_0

Easting: 218794

Northing: 246862

Country: England, Wales or Northern Ireland

Catchment Area (km²): 0.01 [0.5]*

Using plot scale calculations: Yes

Model: 2.3

Site description: None

Model run: 1 year

Summary of results

Rainfall - FEH22 (mm):	15.92	Total runoff (ML):	0.02
Total Rainfall (mm):	11.10	Total flow (ML):	0.07
Peak Rainfall (mm):	3.02	Peak flow (m³/s):	0.00

Parameters

Where the user has overriden a system-generated value, this original value is shown in square brackets after the value used.
** Indicates that the user locked the duration/timestep*

Rainfall parameters (Rainfall - FEH22)

Name	Value	User-defined?
Duration (hh:mm:ss)	02:15:00	No
Timestep (hh:mm:ss)	00:15:00	No
SCF (Seasonal correction factor)	0.7	No
ARF (Areal reduction factor)	1	No
Seasonality	Winter	No

Loss model parameters

Name	Value	User-defined?
Cini (mm)	100.48	No
Cmax (mm)	321.39	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	1.07 [1]	Yes
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m^3/s)	0	No
BL (hr)	30.87 [22.12]	Yes
BR	2.03	No

Urbanisation parameters

Name	Value	User-defined?
Sewer capacity (m^3/s)	0	No
Exporting drained area (km^2)	0	No
Urban area (km^2)	0	No
Effective URBEXT2000	0	n/a
Impervious runoff factor	0.7	No
Imperviousness factor	0.4	No
Tp scaling factor	0.75	No
Depression storage depth (mm)	0.5	No

Time series data

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m^3/s)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
00:00:00	0.3171	0.0000	0.0993	0.0000	0.000253	0.000253
00:15:00	0.5950	0.0000	0.1872	0.0000	0.000251	0.000264
00:30:00	1.1064	0.0000	0.3509	0.0001	0.00025	0.00031
00:45:00	2.0211	0.0000	0.6509	0.0002	0.00025	0.000424
01:00:00	3.0181	0.0000	0.9957	0.0004	0.000253	0.000665
01:15:00	2.0211	0.0000	0.6826	0.0008	0.000261	0.0011
01:30:00	1.1064	0.0000	0.3791	0.0014	0.000277	0.00171
01:45:00	0.5950	0.0000	0.2054	0.0021	0.000304	0.00237
02:00:00	0.3171	0.0000	0.1099	0.0026	0.00034	0.00294
02:15:00	0.0000	0.0000	0.0000	0.0029	0.000382	0.00328
02:30:00	0.0000	0.0000	0.0000	0.0029	0.000426	0.00328
02:45:00	0.0000	0.0000	0.0000	0.0026	0.000467	0.00306
03:00:00	0.0000	0.0000	0.0000	0.0022	0.000503	0.00272
03:15:00	0.0000	0.0000	0.0000	0.0018	0.000532	0.00236
03:30:00	0.0000	0.0000	0.0000	0.0015	0.000555	0.00204
03:45:00	0.0000	0.0000	0.0000	0.0012	0.000572	0.00176
04:00:00	0.0000	0.0000	0.0000	0.0009	0.000585	0.00151
04:15:00	0.0000	0.0000	0.0000	0.0007	0.000594	0.00128
04:30:00	0.0000	0.0000	0.0000	0.0005	0.000598	0.00107
04:45:00	0.0000	0.0000	0.0000	0.0003	0.0006	0.000889
05:00:00	0.0000	0.0000	0.0000	0.0001	0.000598	0.000748
05:15:00	0.0000	0.0000	0.0000	0.0001	0.000595	0.000662
05:30:00	0.0000	0.0000	0.0000	0.0000	0.000591	0.000617
05:45:00	0.0000	0.0000	0.0000	0.0000	0.000587	0.000593
06:00:00	0.0000	0.0000	0.0000	0.0000	0.000582	0.000583
06:15:00	0.0000	0.0000	0.0000	0.0000	0.000578	0.000578
06:30:00	0.0000	0.0000	0.0000	0.0000	0.000573	0.000573
06:45:00	0.0000	0.0000	0.0000	0.0000	0.000568	0.000568
07:00:00	0.0000	0.0000	0.0000	0.0000	0.000564	0.000564
07:15:00	0.0000	0.0000	0.0000	0.0000	0.000559	0.000559
07:30:00	0.0000	0.0000	0.0000	0.0000	0.000555	0.000555
07:45:00	0.0000	0.0000	0.0000	0.0000	0.00055	0.00055
08:00:00	0.0000	0.0000	0.0000	0.0000	0.000546	0.000546
08:15:00	0.0000	0.0000	0.0000	0.0000	0.000541	0.000541

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m^3/s)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
08:30:00	0.0000	0.0000	0.0000	0.0000	0.000537	0.000537
08:45:00	0.0000	0.0000	0.0000	0.0000	0.000533	0.000533
09:00:00	0.0000	0.0000	0.0000	0.0000	0.000528	0.000528
09:15:00	0.0000	0.0000	0.0000	0.0000	0.000524	0.000524
09:30:00	0.0000	0.0000	0.0000	0.0000	0.00052	0.00052
09:45:00	0.0000	0.0000	0.0000	0.0000	0.000516	0.000516
10:00:00	0.0000	0.0000	0.0000	0.0000	0.000511	0.000511
10:15:00	0.0000	0.0000	0.0000	0.0000	0.000507	0.000507
10:30:00	0.0000	0.0000	0.0000	0.0000	0.000503	0.000503
10:45:00	0.0000	0.0000	0.0000	0.0000	0.000499	0.000499
11:00:00	0.0000	0.0000	0.0000	0.0000	0.000495	0.000495
11:15:00	0.0000	0.0000	0.0000	0.0000	0.000491	0.000491
11:30:00	0.0000	0.0000	0.0000	0.0000	0.000487	0.000487
11:45:00	0.0000	0.0000	0.0000	0.0000	0.000483	0.000483
12:00:00	0.0000	0.0000	0.0000	0.0000	0.000479	0.000479
12:15:00	0.0000	0.0000	0.0000	0.0000	0.000475	0.000475
12:30:00	0.0000	0.0000	0.0000	0.0000	0.000472	0.000472
12:45:00	0.0000	0.0000	0.0000	0.0000	0.000468	0.000468
13:00:00	0.0000	0.0000	0.0000	0.0000	0.000464	0.000464
13:15:00	0.0000	0.0000	0.0000	0.0000	0.00046	0.00046
13:30:00	0.0000	0.0000	0.0000	0.0000	0.000457	0.000457
13:45:00	0.0000	0.0000	0.0000	0.0000	0.000453	0.000453
14:00:00	0.0000	0.0000	0.0000	0.0000	0.000449	0.000449
14:15:00	0.0000	0.0000	0.0000	0.0000	0.000446	0.000446
14:30:00	0.0000	0.0000	0.0000	0.0000	0.000442	0.000442
14:45:00	0.0000	0.0000	0.0000	0.0000	0.000438	0.000438
15:00:00	0.0000	0.0000	0.0000	0.0000	0.000435	0.000435
15:15:00	0.0000	0.0000	0.0000	0.0000	0.000431	0.000431
15:30:00	0.0000	0.0000	0.0000	0.0000	0.000428	0.000428
15:45:00	0.0000	0.0000	0.0000	0.0000	0.000425	0.000425
16:00:00	0.0000	0.0000	0.0000	0.0000	0.000421	0.000421
16:15:00	0.0000	0.0000	0.0000	0.0000	0.000418	0.000418
16:30:00	0.0000	0.0000	0.0000	0.0000	0.000414	0.000414
16:45:00	0.0000	0.0000	0.0000	0.0000	0.000411	0.000411
17:00:00	0.0000	0.0000	0.0000	0.0000	0.000408	0.000408

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m^3/s)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
17:15:00	0.0000	0.0000	0.0000	0.0000	0.000404	0.000404
17:30:00	0.0000	0.0000	0.0000	0.0000	0.000401	0.000401
17:45:00	0.0000	0.0000	0.0000	0.0000	0.000398	0.000398
18:00:00	0.0000	0.0000	0.0000	0.0000	0.000395	0.000395
18:15:00	0.0000	0.0000	0.0000	0.0000	0.000391	0.000391
18:30:00	0.0000	0.0000	0.0000	0.0000	0.000388	0.000388
18:45:00	0.0000	0.0000	0.0000	0.0000	0.000385	0.000385
19:00:00	0.0000	0.0000	0.0000	0.0000	0.000382	0.000382
19:15:00	0.0000	0.0000	0.0000	0.0000	0.000379	0.000379
19:30:00	0.0000	0.0000	0.0000	0.0000	0.000376	0.000376
19:45:00	0.0000	0.0000	0.0000	0.0000	0.000373	0.000373
20:00:00	0.0000	0.0000	0.0000	0.0000	0.00037	0.00037
20:15:00	0.0000	0.0000	0.0000	0.0000	0.000367	0.000367
20:30:00	0.0000	0.0000	0.0000	0.0000	0.000364	0.000364
20:45:00	0.0000	0.0000	0.0000	0.0000	0.000361	0.000361
21:00:00	0.0000	0.0000	0.0000	0.0000	0.000358	0.000358
21:15:00	0.0000	0.0000	0.0000	0.0000	0.000355	0.000355
21:30:00	0.0000	0.0000	0.0000	0.0000	0.000352	0.000352
21:45:00	0.0000	0.0000	0.0000	0.0000	0.00035	0.00035
22:00:00	0.0000	0.0000	0.0000	0.0000	0.000347	0.000347
22:15:00	0.0000	0.0000	0.0000	0.0000	0.000344	0.000344
22:30:00	0.0000	0.0000	0.0000	0.0000	0.000341	0.000341
22:45:00	0.0000	0.0000	0.0000	0.0000	0.000338	0.000338
23:00:00	0.0000	0.0000	0.0000	0.0000	0.000336	0.000336
23:15:00	0.0000	0.0000	0.0000	0.0000	0.000333	0.000333
23:30:00	0.0000	0.0000	0.0000	0.0000	0.00033	0.00033
23:45:00	0.0000	0.0000	0.0000	0.0000	0.000328	0.000328
24:00:00	0.0000	0.0000	0.0000	0.0000	0.000325	0.000325
24:15:00	0.0000	0.0000	0.0000	0.0000	0.000322	0.000322
24:30:00	0.0000	0.0000	0.0000	0.0000	0.00032	0.00032
24:45:00	0.0000	0.0000	0.0000	0.0000	0.000317	0.000317
25:00:00	0.0000	0.0000	0.0000	0.0000	0.000315	0.000315
25:15:00	0.0000	0.0000	0.0000	0.0000	0.000312	0.000312
25:30:00	0.0000	0.0000	0.0000	0.0000	0.00031	0.00031
25:45:00	0.0000	0.0000	0.0000	0.0000	0.000307	0.000307

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m^3/s)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
26:00:00	0.0000	0.0000	0.0000	0.0000	0.000305	0.000305
26:15:00	0.0000	0.0000	0.0000	0.0000	0.000302	0.000302
26:30:00	0.0000	0.0000	0.0000	0.0000	0.0003	0.0003
26:45:00	0.0000	0.0000	0.0000	0.0000	0.000297	0.000297
27:00:00	0.0000	0.0000	0.0000	0.0000	0.000295	0.000295
27:15:00	0.0000	0.0000	0.0000	0.0000	0.000292	0.000292
27:30:00	0.0000	0.0000	0.0000	0.0000	0.00029	0.00029
27:45:00	0.0000	0.0000	0.0000	0.0000	0.000288	0.000288
28:00:00	0.0000	0.0000	0.0000	0.0000	0.000285	0.000285
28:15:00	0.0000	0.0000	0.0000	0.0000	0.000283	0.000283
28:30:00	0.0000	0.0000	0.0000	0.0000	0.000281	0.000281
28:45:00	0.0000	0.0000	0.0000	0.0000	0.000279	0.000279
29:00:00	0.0000	0.0000	0.0000	0.0000	0.000276	0.000276
29:15:00	0.0000	0.0000	0.0000	0.0000	0.000274	0.000274
29:30:00	0.0000	0.0000	0.0000	0.0000	0.000272	0.000272
29:45:00	0.0000	0.0000	0.0000	0.0000	0.00027	0.00027
30:00:00	0.0000	0.0000	0.0000	0.0000	0.000268	0.000268
30:15:00	0.0000	0.0000	0.0000	0.0000	0.000265	0.000265
30:30:00	0.0000	0.0000	0.0000	0.0000	0.000263	0.000263
30:45:00	0.0000	0.0000	0.0000	0.0000	0.000261	0.000261
31:00:00	0.0000	0.0000	0.0000	0.0000	0.000259	0.000259
31:15:00	0.0000	0.0000	0.0000	0.0000	0.000257	0.000257
31:30:00	0.0000	0.0000	0.0000	0.0000	0.000255	0.000255

Appendix

Catchment descriptors *

Name	Value	User-defined value used?
BFIHOST	0.46	No
BFIHOST19	0.44	No
PROPWET	0.5	No
SAAR (mm)	969	No

Values in square brackets are the original values loaded from the FEH Web Service or FEH CD-ROM

Appendix H MicroDrainage Attenuation Storage Estimate

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

Half Drain Time : 1626 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	9.561	0.161	0.0	3.3	3.3	167.1	O K
30 min Summer	9.624	0.224	0.0	3.3	3.3	233.6	O K
60 min Summer	9.696	0.296	0.0	3.3	3.3	309.8	O K
120 min Summer	9.758	0.358	0.0	3.3	3.3	375.2	Flood Risk
180 min Summer	9.799	0.399	0.0	3.3	3.3	417.9	Flood Risk
240 min Summer	9.829	0.429	0.0	3.3	3.3	449.8	Flood Risk
360 min Summer	9.872	0.472	0.0	3.3	3.3	494.9	Flood Risk
480 min Summer	9.902	0.502	0.0	3.3	3.3	526.9	Flood Risk
600 min Summer	9.925	0.525	0.0	3.3	3.3	550.9	Flood Risk
720 min Summer	9.942	0.542	0.0	3.3	3.3	569.3	Flood Risk
960 min Summer	9.967	0.567	0.0	3.3	3.3	595.0	Flood Risk
1440 min Summer	9.986	0.586	0.0	3.3	3.3	615.4	Flood Risk
2160 min Summer	9.995	0.595	0.0	3.3	3.3	624.7	Flood Risk
2880 min Summer	9.993	0.593	0.0	3.3	3.3	622.5	Flood Risk
4320 min Summer	9.971	0.571	0.0	3.3	3.3	599.0	Flood Risk
5760 min Summer	9.942	0.542	0.0	3.3	3.3	569.2	Flood Risk
7200 min Summer	9.911	0.511	0.0	3.3	3.3	536.2	Flood Risk
8640 min Summer	9.881	0.481	0.0	3.3	3.3	504.9	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	112.153	0.0	148.1	16
30 min Summer	78.120	0.0	206.0	31
60 min Summer	51.978	0.0	306.8	62
120 min Summer	31.899	0.0	375.1	122
180 min Summer	23.978	0.0	419.7	182
240 min Summer	19.584	0.0	452.0	242
360 min Summer	14.720	0.0	493.4	362
480 min Summer	12.043	0.0	510.0	482
600 min Summer	10.315	0.0	507.4	600
720 min Summer	9.093	0.0	501.6	720
960 min Summer	7.459	0.0	491.1	960
1440 min Summer	5.617	0.0	474.8	1370
2160 min Summer	4.224	0.0	909.1	1728
2880 min Summer	3.439	0.0	954.9	2108
4320 min Summer	2.547	0.0	888.6	2940
5760 min Summer	2.055	0.0	1207.7	3800
7200 min Summer	1.734	0.0	1269.8	4616
8640 min Summer	1.513	0.0	1324.0	5448

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
10080 min Summer	9.853	0.453	0.0	3.3	3.3	475.4	Flood Risk
15 min Winter	9.561	0.161	0.0	3.3	3.3	167.0	O K
30 min Winter	9.624	0.224	0.0	3.3	3.3	233.5	O K
60 min Winter	9.696	0.296	0.0	3.3	3.3	309.6	O K
120 min Winter	9.758	0.358	0.0	3.3	3.3	375.0	Flood Risk
180 min Winter	9.798	0.398	0.0	3.3	3.3	417.6	Flood Risk
240 min Winter	9.829	0.429	0.0	3.3	3.3	449.4	Flood Risk
360 min Winter	9.871	0.471	0.0	3.3	3.3	494.5	Flood Risk
480 min Winter	9.902	0.502	0.0	3.3	3.3	526.8	Flood Risk
600 min Winter	9.925	0.525	0.0	3.3	3.3	551.1	Flood Risk
720 min Winter	9.943	0.543	0.0	3.3	3.3	569.9	Flood Risk
960 min Winter	9.968	0.568	0.0	3.3	3.3	596.7	Flood Risk
1440 min Winter	9.990	0.590	0.0	3.3	3.3	619.9	Flood Risk
2160 min Winter	9.993	0.593	0.0	3.3	3.3	623.1	Flood Risk
2880 min Winter	9.988	0.588	0.0	3.3	3.3	617.0	Flood Risk
4320 min Winter	9.952	0.552	0.0	3.3	3.3	579.2	Flood Risk
5760 min Winter	9.907	0.507	0.0	3.3	3.3	531.7	Flood Risk
7200 min Winter	9.857	0.457	0.0	3.3	3.3	478.9	Flood Risk
8640 min Winter	9.802	0.402	0.0	3.3	3.3	421.6	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Summer	1.351	0.0	1372.0	6256
15 min Winter	112.153	0.0	148.1	16
30 min Winter	78.120	0.0	206.0	31
60 min Winter	51.978	0.0	306.8	62
120 min Winter	31.899	0.0	375.1	120
180 min Winter	23.978	0.0	419.7	180
240 min Winter	19.584	0.0	452.1	238
360 min Winter	14.720	0.0	493.9	356
480 min Winter	12.043	0.0	510.9	472
600 min Winter	10.315	0.0	508.6	588
720 min Winter	9.093	0.0	502.8	704
960 min Winter	7.459	0.0	492.2	932
1440 min Winter	5.617	0.0	476.0	1368
2160 min Winter	4.224	0.0	909.4	1772
2880 min Winter	3.439	0.0	956.6	2216
4320 min Winter	2.547	0.0	897.3	3156
5760 min Winter	2.055	0.0	1207.8	4088
7200 min Winter	1.734	0.0	1270.2	4976
8640 min Winter	1.513	0.0	1325.3	5872

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
10080 min Winter	9.747	0.347	0.0	3.3	3.3	362.8	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Winter	1.351	0.0	1375.1	6560

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 218794 246862 SN 18794 46862
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 %	+40

Time Area Diagram

Total Area (ha) 0.622

Time (mins) From:	To:	Area (ha)
0	1	0.622

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)	308.3
Safety Factor	2.0
Porosity	0.95
Invert Level (m)	9.400
Width (m)	22.2
Length (m)	50.0
Slope (1:X)	10000.0
Depression Storage (mm)	5
Evaporation (mm/day)	3
Membrane Depth (m)	0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0092-3300-0600-3300
Design Head (m)	0.600
Design Flow (l/s)	3.3
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	92
Invert Level (m)	9.395
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	**Head (m)**	**Flow (l/s)**
Design Point (Calculated)	0.600	3.3
Flush-Flo™	0.181	3.3
Kick-Flo®	0.412	2.8
Mean Flow over Head Range	-	2.8

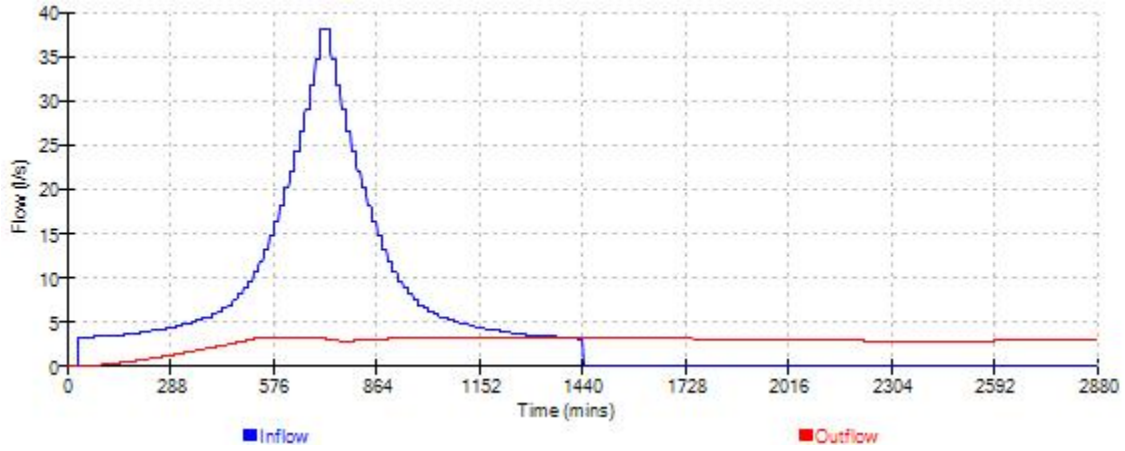
The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

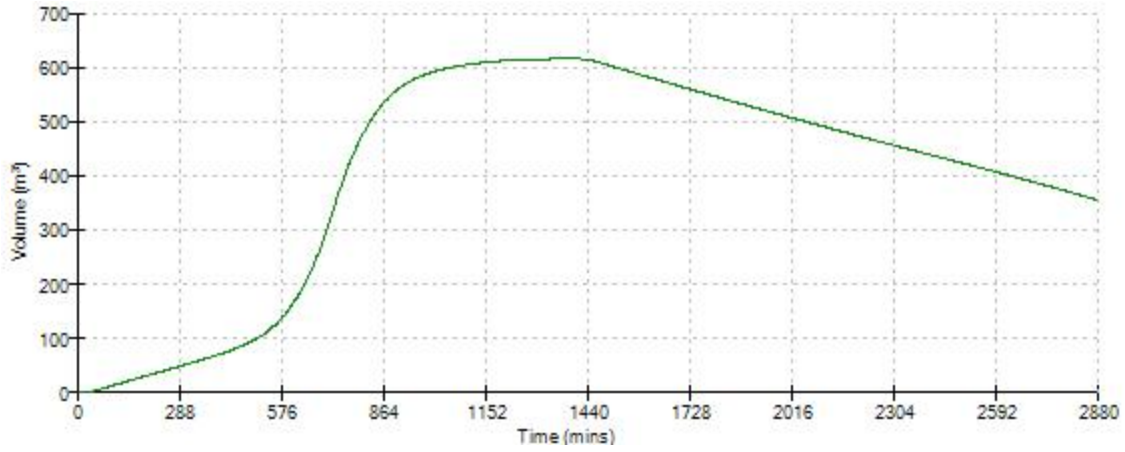
Depth (m)	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**
0.100	2.9	0.500	3.0	1.200	4.5
0.200	3.3	0.600	3.3	1.400	4.9
0.300	3.2	0.800	3.8	1.600	5.2
0.400	2.9	1.000	4.2	1.800	5.5

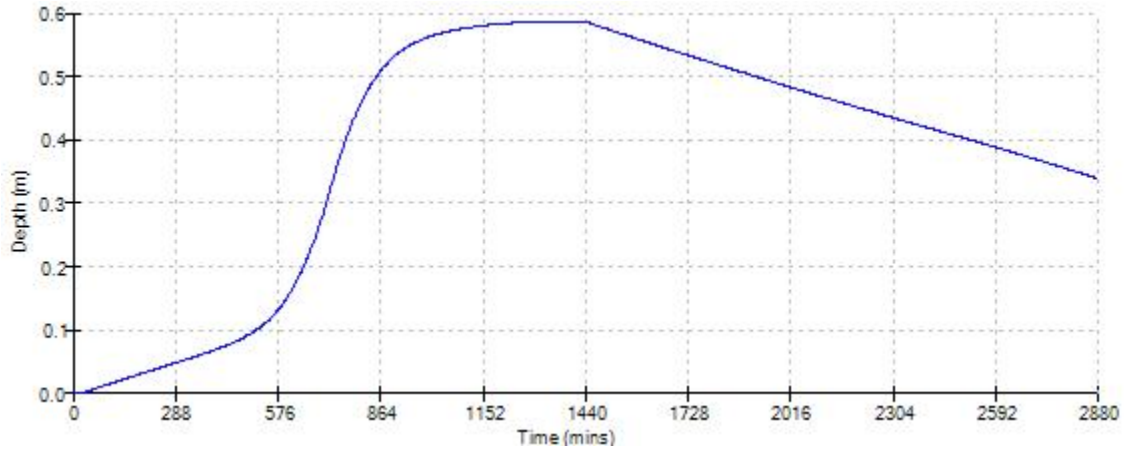
Hydro-Brake® Optimum Outflow Control

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
2.000	5.8	4.000	8.0	7.000	10.4
2.200	6.0	4.500	8.4	7.500	10.8
2.400	6.3	5.000	8.9	8.000	11.2
2.600	6.5	5.500	9.3	8.500	11.5
3.000	7.0	6.000	9.7	9.000	11.8
3.500	7.5	6.500	10.0	9.500	12.2

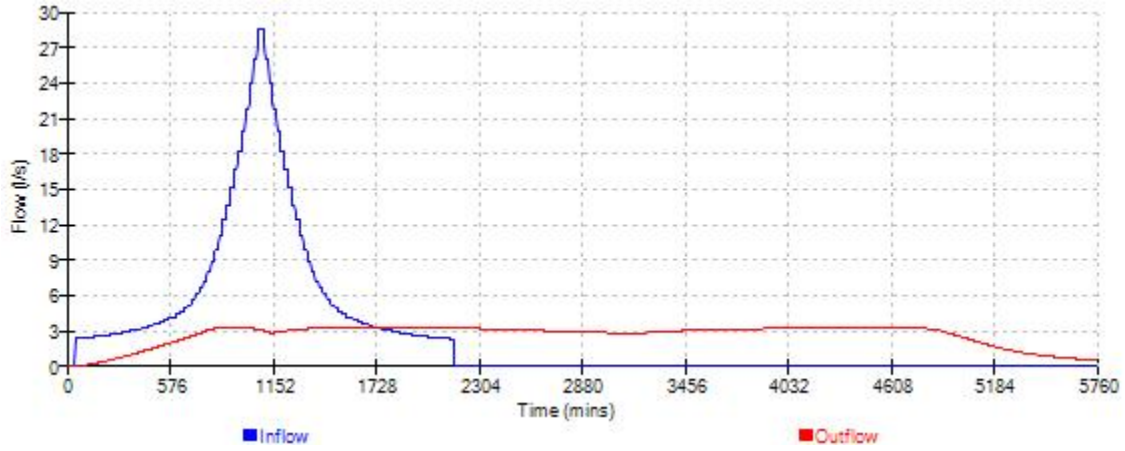
Event: 1440 min Summer

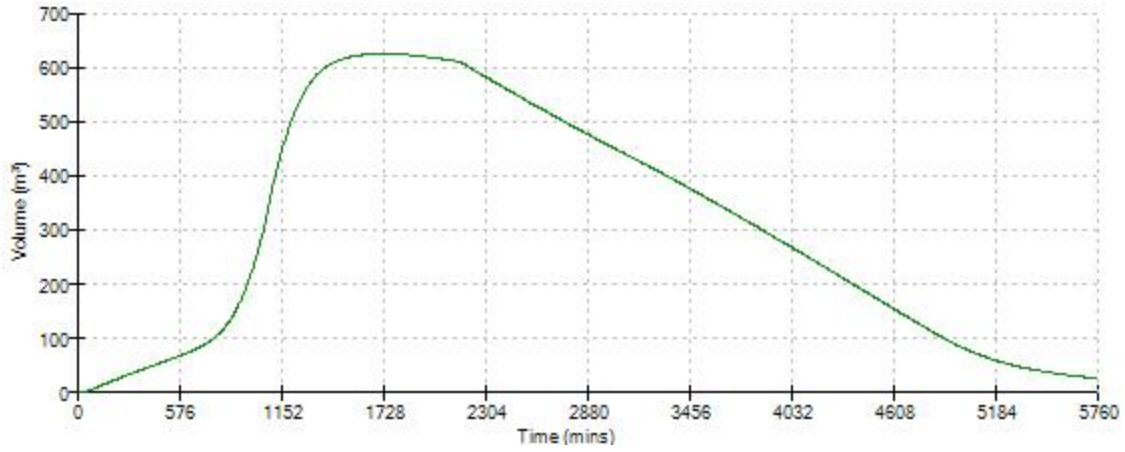


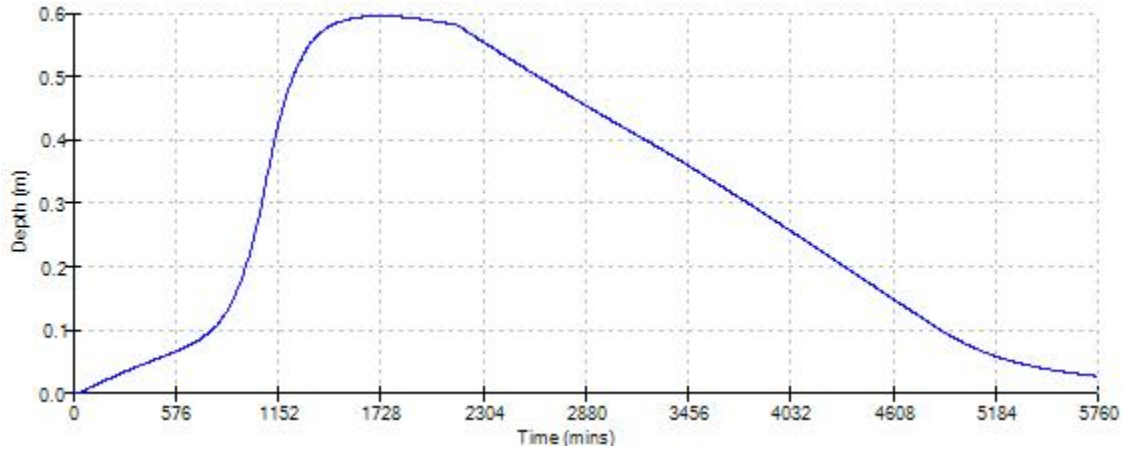




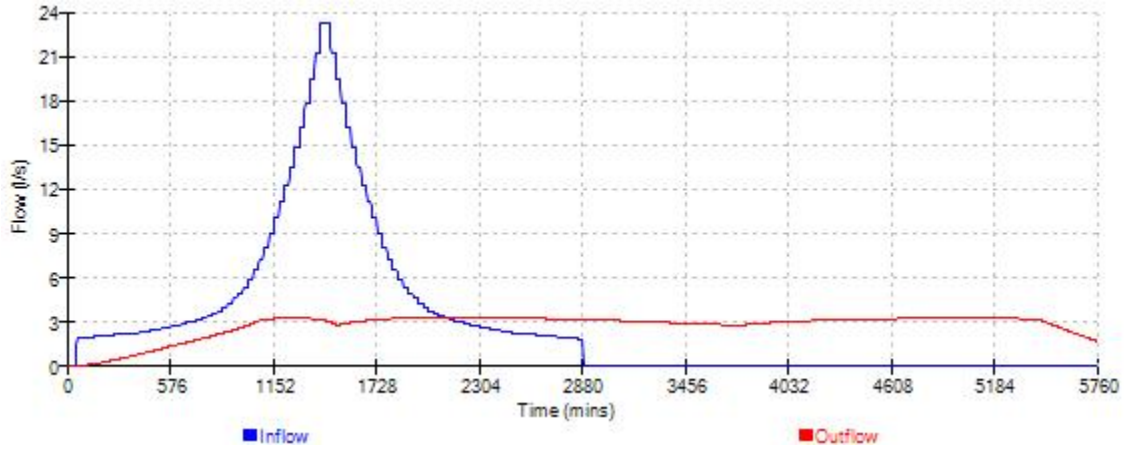
Event: 2160 min Summer

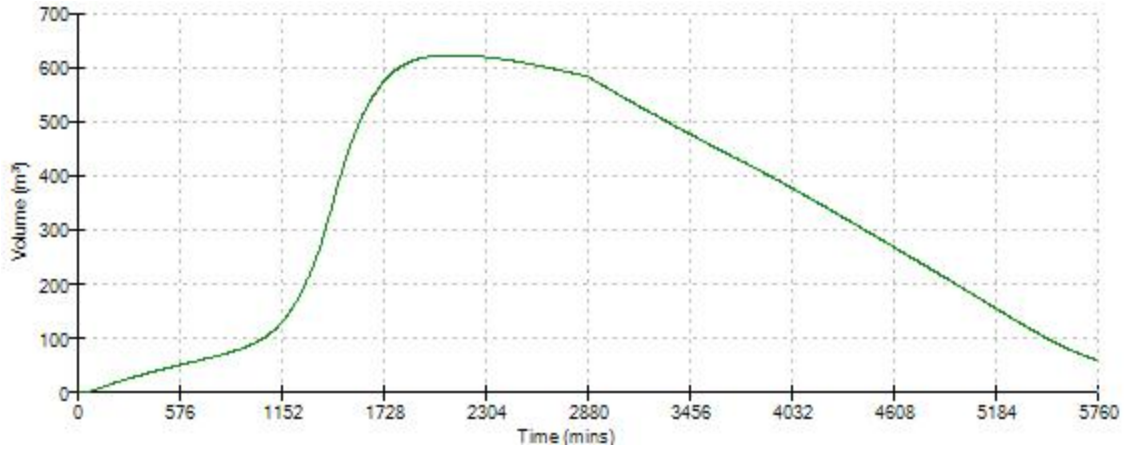


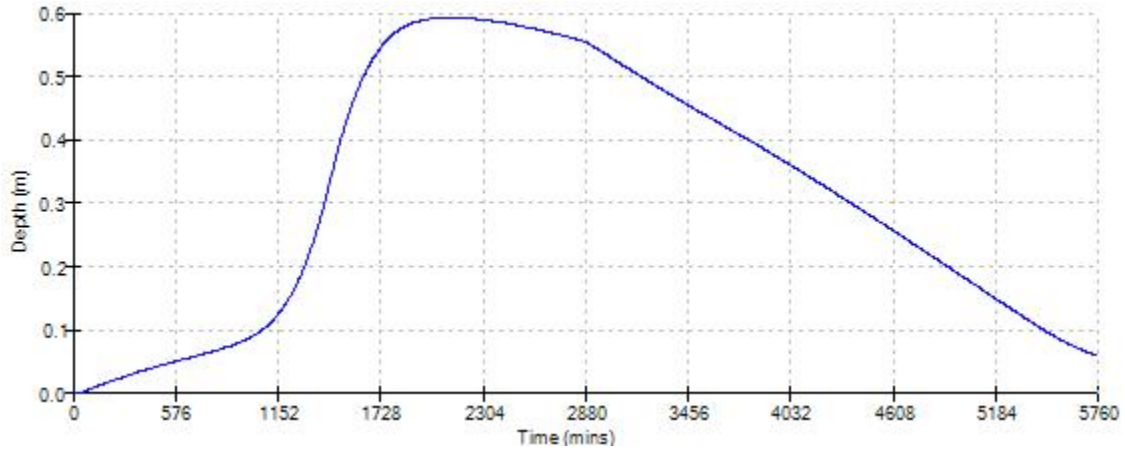




Event: 2880 min Summer







Appendix I Concept Drainage Sketch