B&M, Aberystwyth Road, Cardigan

Flood Consequences Assessment & Drainage Strategy

November 2025

Waterco

Assessment | Modelling | Design

Project Information	
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Report Title:	Flood Consequences Assessment & Drainage Strategy
Client:	Lidl Great Britain Limited
Instruction:	The instruction to undertake this Flood Consequences Assessment & Drainage Strategy was received from Rhydian Griffiths of Lidl Great Britain Limited
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Approval Record	
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Document History		
Revision	**Date**	**Comment**
01	10/11/2025	First issue

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Introduction

Waterco has been instructed to prepare a Flood Consequences Assessment (FCA) and Drainage Strategy in respect of a proposed Lidl store at the existing B&M Store, Aberystwyth Road, Cardigan, SA43 1NA.

The purpose of this report is to outline the potential flood risk to the site, the impact of the proposed development on flood risk elsewhere, and the proposed measures which could be incorporated to mitigate the identified flood risk (if any). This report has been prepared in accordance with the guidance contained in Planning Policy Wales (PPW) and Technical Advice Note 15 (TAN15): Development, Flooding and Coastal Erosion.

This report also includes a Drainage Strategy. The aim of the Drainage Strategy is to identify water management measures, including Sustainable Drainage Systems (SuDS), to provide surface water runoff reduction and treatment. This report has been prepared in accordance with the Welsh Government 'Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems' (2018) – herein referred to as 'the Statutory Standards for SuDS'.

Existing Conditions

The site covers an area of approximately 7,183m² and is located at National Grid Reference (NGR) 218793, 246856. A location plan and an aerial image are included in Appendix A.

Online mapping (including Google Maps / Google Streetview imagery, accessed November 2025) shows that the site comprises a B&M Store with associated garden centre, access and parking. The site is bordered by residential properties to the north, residential properties and New Mill Road to the east, Aberystwyth Road (B4548) to the south, and a commercial building to the west. Access to the site is provided from Aberystwyth Road.

Local Topography

A topographical and buried utilities survey has been undertaken by EDI Surveys Ltd in January 2022. The topographical survey shows that the site slopes from 43.07 metres Above Ordnance Datum (m AOD) in the east to 39.98m AOD in the south-west.

Topographic levels to m AOD have also been derived from a 1m resolution Natural Resources Wales (NRW) composite 'Light Detecting and Ranging' (LiDAR) Digital Terrain Model (DTM). The LiDAR data generally corroborates with the topographical survey.

Topographical information is provided as Appendix B.

Ground Conditions

The British Geological Survey (BGS) online mapping (1:50,000 scale) indicates that the site is underlain by superficial deposits of Devensian Till, generally comprising diamicton. The superficial deposits are identified as being underlain by the Dinas Island Formation consisting of sandstone and mudstone.

The geological mapping is available at a scale of 1:50,000 and as such may not be accurate on a site-specific basis.

The closest historical BGS borehole record (BGS reference: SN14NE8) is located approximately 110m east of the site and is included in Appendix C, together with a borehole location plan. The borehole record identifies:

- Made ground from ground level to 0.3 metres below ground level (m.bgl.
- Sandy silty clay from 0.3m.bgl to 3m.bgl (base of the trial pit).
- A slight water seepage was recorded at 1.2m.bgl.

According to NRW's Aquifer Designation data, obtained from the BGS GeoIndex online mapping [accessed November 2025], the Devensian Till is classified as a Secondary Undifferentiated Aquifer. Secondary Undifferentiated Aquifers are aquifers where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type.

The underlying Dinas Island Formation is classified as a Secondary B Aquifer. Secondary B Aquifers are mainly lower permeability layers that may store and yield limited amounts of groundwater through characteristics like thin cracks (called fissures) and openings or eroded layers.

The Cranfield University 'Soilscapes' map [accessed November 2025] indicates that the site is underlain by '*Freely draining loamy soils'.*

Local Drainage

Public sewer records have been obtained from Dwr Cymru Welsh Water (DCWW) and are included in Appendix D. The DCWW sewer records show that there is a 150mm public foul sewer located immediately north of the site serving the adjacent residential properties. There is also a 225mm public combined sewer located immediately south of the site within Aberystwyth Road flowing south-west.

The topographical and buried utilities survey (Appendix B) shows that surface water from the store roof, car park and garden centre area discharge to a surface water pumping chamber in the south-western extent of the site. The manhole upstream of the pump chamber has a cover level of 40.44m AOD and an invert level of 38.36m AOD. It is assumed that the rising main emanating from the pump chamber discharges surface water to an unnamed watercourse located approximately 25m east of the site adjacent to the New Mill Road (this is subject to confirmation by survey).

Foul flows from the existing B&M store currently drain to the public combined sewer immediately south of the site. The receiving manhole on the public combined sewer has a cover level of 41.55m AOD and an invert level of 39.3m AOD.

Development Proposals

The proposed development is for the demolition of the existing B&M store and the erection of a Lidl store with associated access and parking. Existing and proposed development plans are included in Appendix E.

The proposed development will introduce hardstanding areas in the form of the Lidl Store, access roads and car parking. Hardstanding will comprise 6,218m^2 or 86.6% of the total site area. The remaining permeable, soft landscaped areas will occupy 965m^2 or 13.4% of the total site area. Measurements have been taken from a PDF version of the 'Proposed Setting Out Site Plan' and are approximate only.

Flood Zone Category and Policy Context

Flood Zone Category

The NRW 'Flood Map for Planning (Rivers and Sea)', included in Appendix F, shows that the site is located within Flood Zone 1, meaning it has a less than 0.1% annual probability of flooding, including the effects of climate change (CC).

Development Vulnerability Classification

The proposed development is considered to be 'less vulnerable' development in accordance with Figure 4 of the Welsh Government's Technical Advice Note 15 (TAN15): Development, Flooding and Coastal Erosion.

TAN15 states that applications for all types of development are acceptable in principle within Flood Zone 1.

Local Policy

The Ceredigion Council Local Development Plan (adopted April 2013) contains the following policies relating to flood risk & drainage:

'Policy DM11:

Designing for Climate Change

The LDP will help ensure that development addresses the implications of climate change by requiring that:

1. *Justified development in the flood zone is resilient and adaptable to the effects of flooding; and*
2. *The long term sustainability of the development has been taken into account.*

Policy DM13:

Sustainable Drainage Systems

In addition to requirements set out by national guidance, development will be permitted provided that:

1. *Where a site is being developed on a plot-by-plot basis a scheme for an appropriate SUDS for the*

entire site is put forward as part of the first application;

2. *If the site is capable of being extended at a future date it should not be developed in such a way that future SUDS systems cannot be implemented;*

3. *Non-residential development of 500m2 or more is accompanied by a SUDS that is capable of being adopted by the SUDS Approving Body; and*

4. *A management scheme is submitted detailing the maintenance of the SUDS scheme.*

If SUDS cannot be implemented a full written justification should be submitted explaining why this is the case.'

Local guidance documents including the Mid Wales Strategic Flood Consequences Assessment (SFCA) (November 2022) and the Ceredigion County Council Preliminary Flood Risk Assessment (PFRA) (June 2011) have been reviewed and inform this report.

Consultation

A pre-development enquiry request was submitted to DCWW in September 20225. In their response (Appendix D), DCWW have stated that:

'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.

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.'

Sources of Flooding and Probability

Fluvial

The nearest watercourse is an unnamed watercourse which is located approximately 25m east of the site adjacent to New Mill Road. The unnamed watercourse flows south in this location and is culverted beneath Aberystwyth Road (the culvert orientates towards the Tesco store to the south of the site). The watercourse emerges from the culvert approximately 605m south-west of the site and ultimately discharges to the Afon Teifi. The Afon Teifi is located approximately 985m south-west of the site at its nearest point and flows north-west.

The NRW 'Recorded Flood Extents' map (Appendix F) indicates that the site is not located within a historical flood extent.

Any potential flooding arising from the watercourse 25m east of the site would be contained on the lower southern edge of Aberystwyth Road and directed south-west, away from the site, following the local topography. The site is situated at a minimum of 35m above the Afon Teifi and as such would not be affected by a flood event of this watercourse.

The site is located within Flood Zone 1 on the NRW Flood Map for Planning and has a less than 0.1% annual probability of fluvial flooding. The risk of fluvial flooding is therefore considered to be very low.

Tidal

The site is situated at a minimum of approximately 39.98m AOD and is significantly above sea level. The site is therefore not at risk of tidal flooding.

Surface Water

Surface water flooding occurs when rainwater does not drain away through the normal drainage system or soak into the ground. It is usually associated with high intensity rainfall events but can also occur with lower intensity rainfall or melting snow where the ground is saturated, frozen or developed, resulting in overland flow and ponding in depressions in topography. Surface water flooding can occur anywhere without warning. However, flow paths can be determined by consideration of contours and relative levels.

The NRW 'Surface Water & Small Watercourses' map (Appendix F) shows that the majority of the site is located within Flood Zone 1, meaning it has a less than 0.1% annual probability of flooding, including the effects of climate change. Minimal areas located east and south of the existing B&M store are located within surface water Flood Zone 2, defined as having between a 1% and 0.1% annual probability of flooding, including the effects of climate change.

The surface water flooding shown on the NRW mapping is attributed to surface water ponding in a localised topographical low point. The proposed development will include a sustainable drainage strategy system which will accommodate surface water runoff from all rainfall events up to and including the 1% AEP plus 40% climate change event. The proposed drainage system will mitigate the risk of surface water ponding on site. Furthermore, the existing isolated topographical low points will be removed as part of the development. Proposed site levels are shown on the 'Proposed Levels Strategy' in Appendix E.

There are no distinct flow routes in the area which would direct any potential surface water flooding towards the site.

There are no records of surface water flooding at or near to the site. It can therefore be concluded that the risk of surface water flooding is very low.

Sewer

Flooding from sewers can occur when a sewer is overwhelmed by heavy rainfall, becomes blocked, is damaged, or is of inadequate capacity. Flooding is mostly applicable to combined and surface water sewers.

As described above, that there is a 150mm public foul sewer located immediately north of the site serving the adjacent residential properties. There is also a 225mm public combined sewer located immediately south of the site within Aberystwyth Road flowing south-west.

The 150mm public foul sewer immediately north of the site appears to serve 15no. residential properties. Based on the limited number of properties served by the 150mm public foul sewer, the risk of an exceedance event is very low.

Any potential flooding arising from the 225mm public combined sewer in Aberystwyth Road would be directed south-west, away from the site, following the local topography.

There are no records of sewer flooding at or near to the site. It can therefore be concluded that the risk of sewer flooding is very low.

Groundwater

Groundwater flooding occurs when water levels underneath the ground rise above normal levels. Prolonged heavy rainfall soaks into the ground and can cause the ground to become saturated. This results in rising groundwater levels which leads to flooding above ground.

As described above, the site is underlain by superficial deposits of Devensian Till, generally comprising diamicton. The impermeable nature of the underlying superficial deposits would limit the vertical migration of groundwater.

There are no records of groundwater flooding at or near to the site. It can therefore be concluded that the risk of groundwater flooding is very low.

Artificial Sources

There are no canals in the immediate vicinity of the site. The online NRW ‘Risk of Flooding from Reservoirs’ map shows that the site is not at risk of flooding from reservoirs. It can therefore be concluded that the risk of flooding from artificial sources is very low.

Summary of Potential Flooding

It can be concluded that the risk of flooding from all sources is very low. Therefore, no site-specific flood risk mitigation measures are considered necessary.

Surface Water Management

The site currently comprises a B&M store with associated access and parking. Surface water runoff currently drains to a surface water pump chamber on site which is assumed to discharge to a watercourse 25m east of the site.

It is highly unlikely that surface water is currently discharged to the public combined sewer system, as the existing site levels indicate that a gravity connection would be achievable, thereby negating the need for pumped discharge.

The proposed development will include 6,218m² of hardstanding in the form of buildings, access and parking. In order to ensure the proposed development will not increase flood risk elsewhere, and to comply with the Statutory Standards for Sustainable Drainage Systems in Wales, surface water discharge from the site will be controlled and attenuation storage will be provided to accommodate the 1 in 100 year plus 40% CC event.

Discharge Method

Standard S1 of the Statutory Standards for SuDS sets out the following hierarchy of drainage options:

> *Priority Level 1: Surface water runoff is collected for use;*
>
> *Priority Level 2: Surface water runoff is infiltrated to ground;*
>
> *Priority Level 3: Surface water runoff is discharged to a surface water body;*
>
> *Priority Level 4: Surface water runoff is discharged to a surface water sewer, highway drain, or another drainage system;*
>
> *Priority Level 5: Surface water runoff is discharged to a combined sewer.*

Priority Level 1: Surface water runoff collected for use

In line with section G1.4 of the Statutory Standards for SuDS, rainwater harvesting is not proposed for this site as:

1. There is no foreseeable need to harvest water at the site as DCWW water resources and drought management plans do not identify potential stresses on mains water supplies;
2. The use of rainwater harvesting is not a viable/ cost-effective part of the solution for managing surface water runoff on the site, taking account of the potential water supply benefits of such a system.

With regards to point 2 above, section G1.6 of the Statutory Standards for SuDS states that; in most cases, rainwater harvesting alone will not be adequate to deal with the site drainage and provision will be required for an overflow to a Level 2 or lower priority runoff destination. As downstream provision of attenuation storage will be required to accommodate for rainwater harvesting system overflows, rainwater harvesting is not considered a cost-effective solution for managing surface water runoff.

Priority Level 2: Surface water runoff is infiltrated to ground

As described above, the site is underlain by superficial deposits of Devensian Till generally comprising diamicton. A nearby borehole identified sandy silty clay from 0.3m.bgl to 3m.bgl.

Due to the impermeable nature of the underlying geology, infiltration techniques are unlikely to be suitable for the discharge of surface water.

Infiltration tests should be undertaken in accordance with the BRE365 specification to determine the suitability of infiltration drainage techniques.

Priority Level 3: Surface water runoff is discharged to a surface water body

Where infiltration is not suitable, a connection to watercourse is the next consideration. The nearest watercourse is an unnamed watercourse which is located approximately 25m east of the site, adjacent to New Mill Road. Surface water runoff currently drains to a surface water pump chamber on site which is assumed to discharge to the watercourse 25m east of the site.

It is therefore proposed to discharge to the watercourse 25m east of the site. The watercourse is situated at approximately 46m AOD and as per the existing situation, a pumped solution will be required. A pumped solution to watercourse is preferred (in line with the discharge priority levels) over a gravity solution to the public combined sewer.

Discharge could be made via the existing pump chamber in the south-western extent of the site (subject to survey). Or alternatively a new pump chamber could be installed.

As shown on the topographical and buried utilities survey (Appendix B), the surface water manhole chamber immediately upstream of the existing pump chamber has an invert level of 38.36m AOD. Based on a minimum proposed ground level of 41.25m AOD, a gravity connection to the pump chamber appears feasible. Discharge will be made at a limited discharge rate.

Discharge Rate

In order to establish the proposed limited discharge rate, greenfield runoff rates have been estimated using the Revitalised Flood Hydrograph Model (ReFH2) method. A summary of the greenfield runoff rates for a range of events is provided as Appendix G. The existing 1 in 1 year greenfield runoff rate for the 6,218m^2 contributing drainage area is 3.3 l/s. A discharge rate of 3.3 l/s is therefore proposed for this site.

Attenuation Storage

In order to achieve a discharge rate of 3.3 l/s, attenuation storage will be required. Attenuation will be provided in the form of a sub-grade layer beneath permeable surfaced parking bays.

An attenuation storage estimate has been provided using MicroDrainage and is included in Appendix H. An estimated storage volume of 625m^3 will be required to accommodate the 1 in 100 year plus 40% Climate Change (CC) event. The storage estimate is based on a discharge rate of 3.3 l/s, storage within a porous car park structure, an impermeable drainage area of 6,218m^2, a design head of 0.6m and hydro-brake flow control.

Based on a geo-cellular sub-grade depth of 0.8m with a void ratio of 95%, the 0.8m deep sub-grade would need to be extended across an area of approximately 825m^2 to accommodate the required storage volume of 625m^3 (assuming the base of the sub-grade will be formed at a level gradient).

A layer of filter media and a permeable geo-textile will be placed above the geo-cellular storage structures in order to provide treatment to runoff from the car park.

The attenuation volume is provided for indicative purposes only and should be verified at the detailed design stage.

Concept Surface Water Drainage Scheme

Where infiltration techniques are not feasible, surface water runoff will be discharged to the watercourse located approximately 25m east of the site at a limited greenfield runoff rate of 3.3 l/s. Surface water runoff will be pumped to the watercourse either using the existing surface water pump chamber (subject to survey), or via a new pump. Surface water runoff up to the 1 in 100 year plus 40% CC allowance event will be attenuated on site. A total attenuation volume of 625m^3 will be required to achieve the discharge rate and will be provided within the geo-cellular sub-grade of the permeable surfaced parking bays.

The proposed surface water drainage scheme will ensure no increase in runoff over the lifetime of the development and will provide betterment over the existing unrestricted brownfield runoff rate.

A Concept Drainage Sketch is included in Appendix I.

Surface Water Pumping

A pumped solution will be required to achieve a connection to the watercourse located approximately 25m east of the site. In accordance with Sewer Sector Guidance, 125m^3 of storage should be provided per hectare of impermeable drainage area. Storage is required to reduce the risk of flooding in the event of plant or power failure. Based on an impervious drainage area of 6,218m^2 a storage volume of 77.725m^3 would be required.

The total attenuation storage volume of 625m^3 required to accommodate the 1 in 100 year plus 40% climate change event can accommodate the 77.725m^3 required in the event of pumping system failure.

Provision of standby pumps, an automated pump exercise regime and a pump failure alarm system would limit the risk of pump failure.

Exceedance Event

Storage will be provided for the 1 in 100 year plus 40% CC event. Storm events in excess of the 1 in 100 year plus 40% CC event should be permitted to produce temporary shallow depth flooding within the car park and access road. As shown on the 'Proposed Levels Strategy' drawing (Appendix E), the store will be elevated above car park levels, ensuring exceedance flows will not affect the building.

Surface Water Treatment

The Statutory Standards for SuDS sets out the following guidance for surface water treatment:

S3 - Surface water quality management

Treatment for surface water runoff should be provided to prevent negative impacts on the receiving water quality and/or protect downstream drainage systems, including sewers.

In accordance with the CIRIA C753 publication 'The SuDS Manual' (2015), commercial roofs have a 'low' pollution hazard level, with non-residential car parking classified as having a 'medium' pollution hazard level. Table 1 shows the pollution hazard indices for each land use.

Table 1 – Pollution Hazard Indices

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Commercial Roofs	Low	0.3	0.2	0.05
Commercial Car Parking	Medium	0.7	0.6	0.7

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 26.2
* Indices values range from 0-1.

Runoff from roofs and the car park will be directed to permeable surfaced parking bays and its associated sub-grade. A suitable depth of filter media (clean stone) and a permeable geo-textile membrane will be placed between the permeable surfaced parking bays and underlying geo-cellular storage. Table 2 demonstrates that permeable surfacing provides sufficient treatment.

Table 2 – SuDS Mitigation Indices

	Mitigation Indices		
Type of SuDS	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Permeable Pavement	0.7	0.6	0.7

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 26.3

Amenity

The Statutory Standards for SuDS provide the following guidance in relation to Standard S4 – Amenity:

'The design of the surface water management system should maximise amenity benefits.'

The proposed development will include permeable surfacing which will maximise the amenity value of the proposed drainage system.

Biodiversity

The Statutory Standards for SuDS provide the following guidance in relation to Standard S5 – Biodiversity:

'The design of the surface water management system should maximise biodiversity benefits.'

The proposed permeable surfacing will maximise the biodiversity value of the proposed drainage system and provide betterment over the existing situation.

Construction, Operation and Maintenance

Standard S6 of the Statutory Standards for SuDS states:

S6 – Design of drainage for Construction, Operation and Maintenance

1) All elements of the surface water drainage system should be designed so that they can be constructed easily, safely, cost-effectively, in a timely manner, and with the aim of minimising the use of scarce resources and embedded carbon (energy).

2) All elements of the surface water drainage system should be designed to ensure maintenance and operation can be undertaken (by the relevant responsible body) easily, safely, cost-effectively, in a timely manner, and with the aim of minimising the use of scarce resources and embedded carbon (energy).

3) The surface water drainage system should be designed to ensure structural integrity of all elements under anticipated loading conditions over the design life of the development site, taking into account the requirement for reasonable levels of maintenance.

All drainage systems will be readily accessible for maintenance access.

Maintenance of the drainage system will be the responsibility of the site owner (Lidl Great Britain Limited). Maintenance schedules for permeable paving, geo-cellular storage, a flow control chamber and piped drainage systems are included in Appendix J.

Foul Drainage

Foul flows from the existing B&M store currently drain to the public combined sewer immediately south of the site. The receiving manhole on the public combined sewer has a cover level of 41.55m AOD and an invert level of 39.3m AOD.

Correspondence from DCWW (Appendix D) states that:

'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.'

Foul flows will therefore be discharged to the 225mm public combined sewer in Aberystwyth Road as per the

existing situation. A gravity solution is achievable.

Correspondence from DCWW further states that:

'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).'

It is noted that DCWW have assumed that the development would overload Cardigan Wastewater Treatment Works. However, an existing connection is already present from the B&M store. The proposed Lidl will comprise 1no. customer toilet and 2no staff toilets and foul flows will remain similar to those generated from the existing B&M store. It is therefore considered that the development would not contribute additional foul flows and would not overload Cardigan Wastewater Treatment Works.

Conclusions

The proposed development is for the demolition of an existing B&M store and the erection of a Lidl store with associated access and car parking.

Flood Risk

The site is located within Flood Zone 1 on the NRW 'Flood Map for Planning', meaning it has it has a less than 0.1% annual probability of flooding, including the effects of climate change.

The risk of flooding from all sources has been assessed and the flood risk to the site is considered to be very low.

Drainage

The proposed development will include impermeable drainage area in the form of buildings, access and car parking. In order to comply with the Statutory Standards for Sustainable Drainage Systems, flow control will be used and attenuation provided on site to accommodate storm events up to and including the 1 in 100 year plus 40% climate change event.

All methods of surface water discharge have been assessed. Where infiltration techniques are not possible, surface water runoff will be discharged to the watercourse located approximately 25m east of the site at a limited greenfield discharge rate of 3.3 l/s. Surface water runoff will be pumped to the watercourse either using the existing surface water pump chamber (subject to survey), or via a new pump.

Attenuation storage will be required on site in order to restrict surface water discharge to 3.3 l/s. Attenuation can be provided within the geo-cellular sub-grade of the permeable surfaced parking bays.

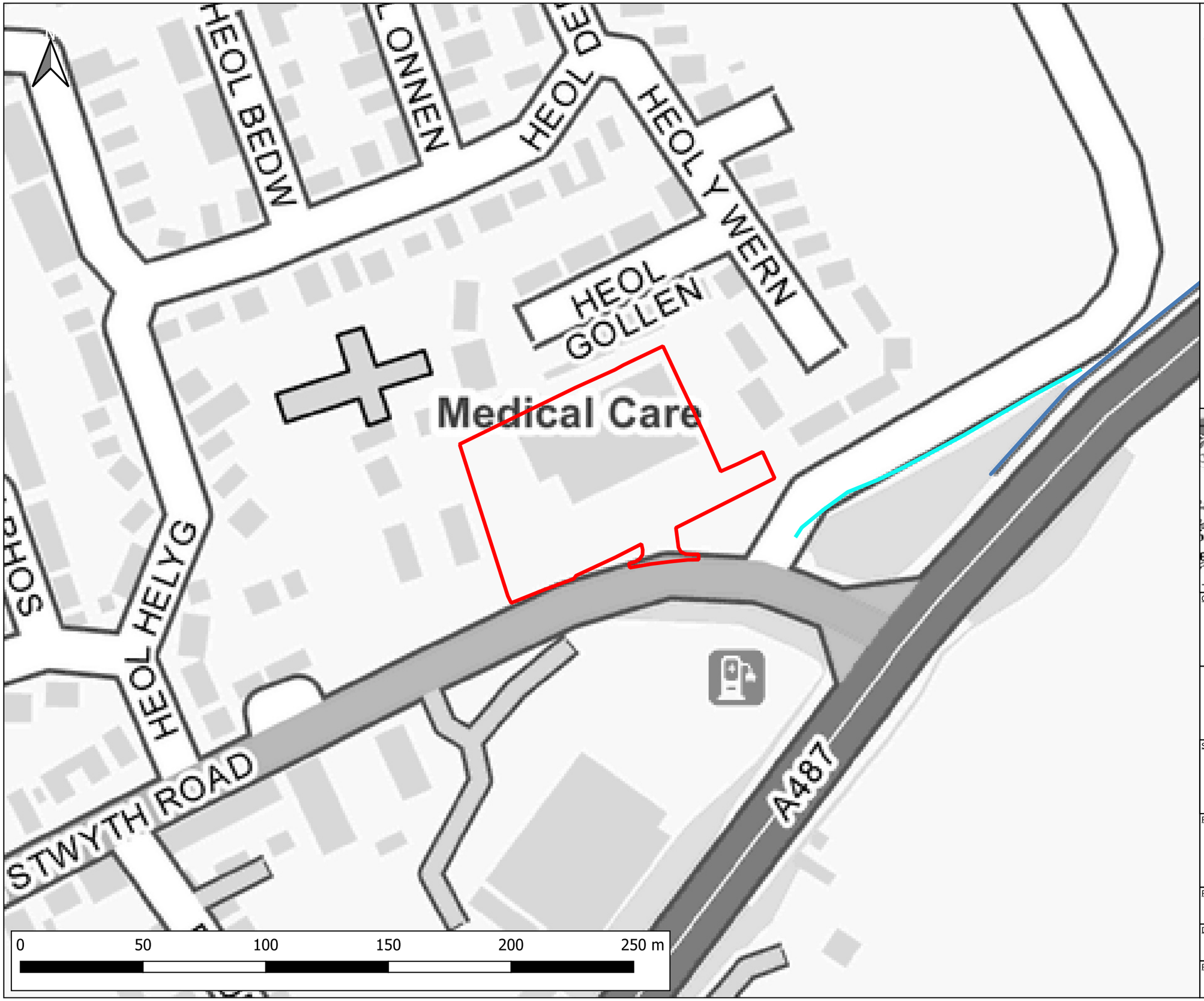
Foul flows will be discharged to the 200mm public combined sewer in Aberystwyth Road as agreed with DCWW. Based on site levels, a gravity connection is assumed to be achievable. The development would not contribute additional foul flows when compared to existing.

A Concept Designer's Risk Assessment (cDRA) has been prepared to inform future designers of any identified hazards associated with the scheme. The cDRA has been included in Appendix K.

Recommendations

1. Undertake BRE 365 infiltration testing to determine the suitability of infiltration techniques.
2. Verify the attenuation volumes included in this report when undertaking detailed drainage design.
3. Survey the surface water pump chamber on site to determine its discharge location.

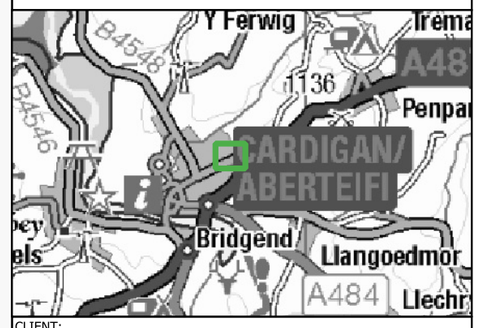
Appendix A Location Plan & Aerial Image



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

LEGEND

- Site Boundary
- Watercourses
- Waterbodies
- Unmapped Watercourse



CLIENT:

Lidl Great Britain Limited

www.waterco.co.uk

SCHEME:

B&M, Aberystwyth Road, Cardigan

PLOT TITLE:

Location Plan

PLOT STATUS:	DATE:
FINAL	10-11-2025

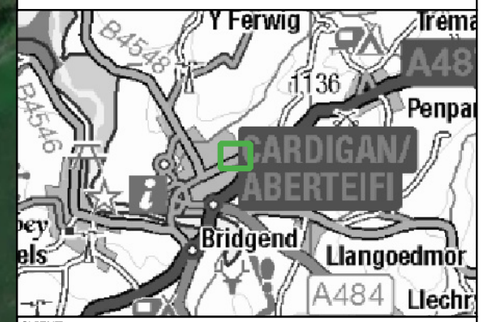
DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:1500

PLOT NAME:	REVISION:
17128_Location_Plan	-

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

LEGEND

Site Boundary



CLIENT:

Lidl Great Britain Limited

www.waterco.co.uk

SCHEME:

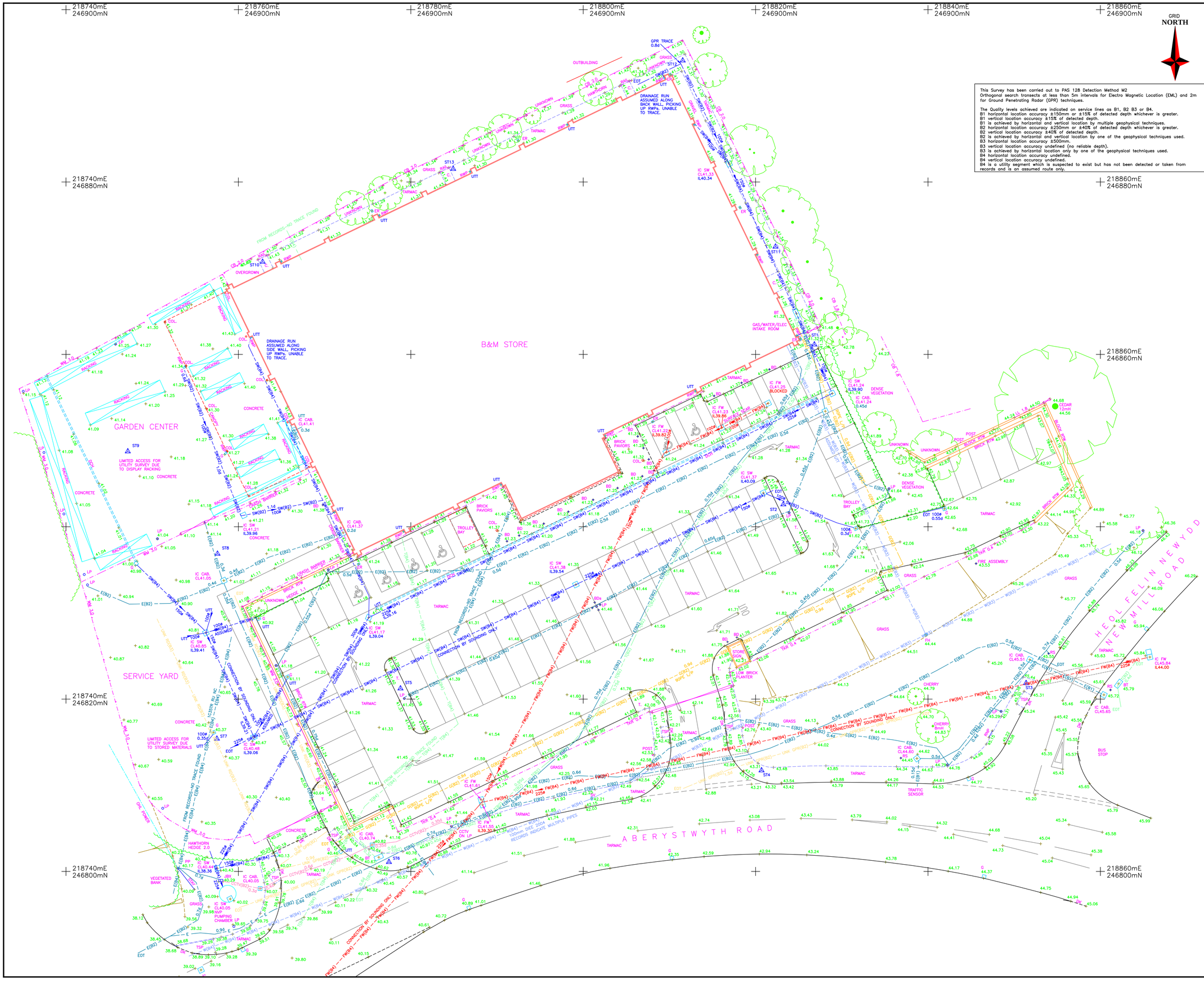
B&M, Aberystwyth Road, Cardigan

PLOT TITLE:

Aerial Plan

PLOT STATUS:			DATE:
FINAL			10-11-2025
DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:1500
PLOT NAME:			REVISION:
17128_Aerial_Plan			-

Appendix B Topographical Information



Original Drawing Size: A1

NOTES:–

The accuracy and content of this drawing are dependent on the original specification and EDI should be consulted before use at other scales.

Where underground services are shown, all reasonable care has been taken within the spirit of the original specification and requirement. Before use of this information the user should consult EDI and satisfy themselves of the completeness and accuracy of such detail before undertaking any works. Due to the nature of this work and limitations imposed by ground conditions and the detection equipment no guarantee can be given that all services have been recorded. Trial holes should be dug at critical locations.

All reasonable care has been taken in the survey detail represented on this drawing but any discrepancies must be reported to EDI immediately.

Our aim is to produce the best possible results within the specification and cost constraints of our clients. Any comments are most welcome.

Levels shown at kerbs are channel level unless stated.

This Survey has been carried out to PAS 128 Detection Method M2
Orthogonal search transects at less than 5m intervals for Electro Magnetic Location (EML) and 2m for Ground Penetrating Radar (GPR) techniques.

The Quality levels achieved are indicated on service lines as B1, B2 B3 or B4.
B1 horizontal location accuracy ±150mm or ±15% of detected depth whichever is greater.
B1 vertical location accuracy ±15% of detected depth.
B1 is achieved by horizontal and vertical location by multiple geophysical techniques.
B2 horizontal location accuracy ±250mm or ±40% of detected depth whichever is greater.
B2 vertical location accuracy ±40% of detected depth.
B2 is achieved by horizontal and vertical location by one of the geophysical techniques used.
B3 horizontal location accuracy ±500mm.
B3 vertical location accuracy undefined (no reliable depth).
B3 is achieved by horizontal location only by one of the geophysical techniques used.
B4 horizontal location accuracy undefined.
B4 vertical location accuracy undefined.
B4 is a utility segment which is suspected to exist but has not been detected or taken from records and is an assumed route only.

LEGEND

Features:
AV Air Valve
AB Air Brick
BD Bollard
BH Borehole
BM Benchmark
BP Boundary Post
BS Bus Stop
BT British Telecom
CL Cover Level
COL Column
CTV Cable TV Cover
DCH Drainage Channel
DF Drinking Fountain
DIS Disused
DK Drop Kerb
DPC Damp proof Course
EIC Electricity IC
EJ Expansion Joint
ER Earth Rod
FH Fire Hydrant
FHR Fire Hose Reel
FS Flagstaff
GY Gully
G Gas Valve
IC Inspection Cover
IL Invert Level
JBX Junction Box
KO Kerb Outlet
LB Letter Box
LBN Litter Bin
LLP Low Level LP
LP Lamp Post
MP Marker Post
MS Mile Stone
MT Mercury Telecom
OHL Overhead Line
OP Overflow Pipe
PM Parking Meter
PP Power Pole
RAD Radiator
RE Rodding Eye
RNP Road Name Plate
RS Road Sign
RSD Roller Shutter Door
RWP Rain Water Pipe
SD Service Duct
SV Stop Valve
TCB Telephone Call Box
THL Threshold Level
TP Telegraph Pole
TS Traffic Signal
UB Universal Beam
UNK Unknown
UR Urinal
UTL Unable to lift
V Vent
VP Vent Pipe
WM Water Meter
WO Wash Out
WP Waste Pipe

Building Level Details:
D Door
EL Eave Level
FFL Floor Level
FRL Flat Roof Level
HL Head Level
PPL Parapet Level
RL Ridge Level
SL Sill Level
SP Springer of Arch
TA Top of Arch
W Window
12.34 Ceiling/Beam Soffit

Boundary Types:
BW Barbed Wire
CB Close Boarded
CH Chainlink
CI Corrugated Iron
CP Chestnut Paling
IR Iron Railing
IW Interwoven
LL Larch Lap
PAL Palisade
PR Post & Rail
PW Post & Wire
TKR Timber Knee Rail
RTW Retaining Wall
VSF Vehicle Safety Fence
WMF Wire Mesh Fence

Surfaces & Finishes:
B Brickwork
BB Breeze Block
C Concrete
CLT Ceiling Tiles
CPT Carpet
CPS Concrete Paving Slabs
CPT Carpet Tiles
CR Cement Render
CT Ceramic Tiles
FT Floor Tiles
HBD Hardboard
L Linoleum
P Plaster
PAV Brick Pavors
S Steel work
T Tarmac
TSP Textured Safety Paving
VT Vinyl Tiles

Services:
C(B*) CATV cables
CCTV(B*) CCTV cables
D(B*) Data cables
E(B*) Electricity cables
FO(B*) Fibre Optic
FW(B*) Foul water drain
FUEL(B*) Fuel pipes
G(B*) Gas pipes
HD(B*) Heating duct
SD(B*) Service ducts
SW(B*) Storm water drain
T(B*) Telecom cables
UNK GPR(B*) Unidentified GPR
UNK EML(B*) Unidentified EML
W(B*) Water pipes
150/6 Pipe Diameter/Flow
OHL Overhead Lines
EOT End Of Trace
TFR Taken From Records
UTT Unable To Trace

Survey Station
Fence
Gate
Painted Road Markings
Edge of Vegetation
Kerb/Drop Kerb
Tree
Top / Bottom
Banks
Building
Overhead Building Detail
Wall

Control: All levels and co-ordinates are related to the datums described.

The horizontal control of this survey is based on Ordnance Survey grid as translated from GPS coordinates using Leica's SmartNet service. We have applied a reverse scale factor to maintain true ground distances, based on station ST5. The vertical control of this survey is based on OS datum as translated from GPS coordinates using the OSGM15 transformation as supplied by the OS. This may differ from the existing OS benchmarks in the area which should be disregarded; all levels should be taken from EDI survey stations.

Utility Depths
Depths obtained by EML are to the centre of the utility
Depths obtained by GPR are to the top of the utility
All depths are shown in metres in the format 0.7d

The services on this survey have been traced using a combination of Radiodetection RD8000 and PROCEQ GS8000 Ground Penetrating Radar. Whilst every effort has been made to locate all services no system or equipment is able to locate 100% of services without excavation. GPR works well in moist soils which are relatively undisturbed but works less well in very wet or very dry soils and ground which has been generally disturbed or built up, and it also works better with larger diameter cables and pipes – for example it is difficult to trace small bore connections to individual properties. The RD8000 cannot distinguish between services if they are adjacent, cannot always distinguish small pipes/cables adjacent to large ones and can be swamped by radiation from buildings (when very close to them) or high voltage overhead lines. Inspection covers have been lifted where possible without damage to covers.

Station Schedule

Station	Easting	Northing	Level	Type
1	218826.813	246861.144	41.355	Hilti Nail
2	218823.219	246842.589	41.553	Hilti Nail
3	218851.378	246821.849	45.418	Hilti Nail
4	218820.688	246811.726	43.398	Hilti Nail
5	218778.802	246821.235	41.461	Hilti Nail
6	218777.462	246801.101	40.678	Hilti Nail
7	218757.510	246815.403	40.389	Hilti Nail
8	218757.575	246836.859	41.110	Hilti Nail
9	218747.169	246848.739	41.128	Hilti Nail
10	218762.811	246870.735	41.434	Scratch Mark
11	218822.306	246872.495	41.328	Hilti Nail
12	218811.544	246894.092	41.311	Hilti Nail
13	218784.914	246881.522	41.415	Hilti Nail

Rev.	Job No.	Date	Revision Detail	Surveyor	Chkd

CLIENT
Lidl Great Britain Ltd
Waterton Industrial Estate
off Cowbridge Road
Bridgend
CF31 3PH

PROJECT
Topographic & Buried Utilities Survey
Aberystwyth Road
North Park Estate
Cardigan
SA43 1NA

Job No.	Surveyor	Checked	Date	Scale
20203	A Rose	TA	Jan. 2022	1:200

EDI SURVEYS LTD
163–165 Ranelagh Road, Ipswich, Suffolk IP2 0AH
Telephone | 01473 211222
Email | enquiries@edisurveys.co.uk
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DRAWING No. 20203/T&S/01–01
REV. –

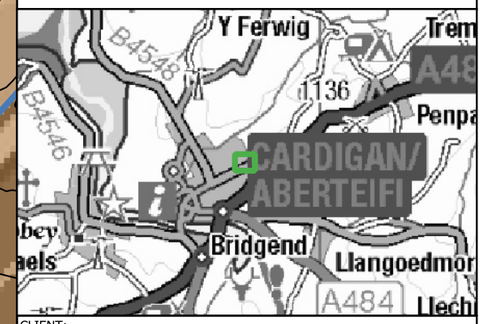
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- Site Levels (m AOD)
- 1m Contour

Ground Elevation (m AOD)

- <= 41
- 41 - 42
- 42 - 43
- 43 - 44
- > 44



CLIENT:
Lidl Great Britain Limited

Waterco
www.waterco.co.uk

SCHEME:
B&M, Aberystwyth Road, Cardigan

PLOT TITLE:
LiDAR Plan
xm Resolution
Data from Natural Resources Wales (flown month 202x)

PLOT STATUS:	DATE:
FINAL	11-09-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:1000

PLOT NAME:	REVISION:
17128_LiDAR_Plan	-

Appendix C BGS Borehole Information

SN 14 NE / 4-28.

KEY TO BOREHOLE LOGS

SOIL CLASSIFICATION

CLASS	TYPE	SYMBOL	GRAIN SIZE
COARSE GRAINED NON-COHESIVE	BOULDERS		LARGER THAN 200mm.
	COBBLES		200 to 60 mm.
	GRAVEL		COARSE 60-20mm. MEDIUM 20-6mm. FINE 6-2mm.
	SAND		COARSE 2-0·6mm. MEDIUM 0·6-0·2mm. FINE 0·2-0·06mm
FINE GRAINED COHESIVE	SILT		0·06 – 0·002mm.
	CLAY		MORE THAN 30% OF PARTICLES FINER THAN 0·002mm.
ORGANIC	PEAT		FIBROUS

STANDARD PENETRATION TEST
SANDS AND COARSE SILTS

No. of BLOWS Per 0.30m (N)	RELATIVE DENSITY	ANGLE of INT. FRICT.
0 – 4	Very loose	< 30°
4 – 10	Loose	30° – 35°
10 – 30	Med. dense	35° – 40°
30 – 50	Dense	40° – 45°
Over 50	Very dense	> 45°

(*after Meyerhof)

CONSISTENCY of COHESIVE SOIL
CLAYS AND FINE SILTS

CONSISTENCY	FIELD IDENTIFICATION	COHESION kN/m²
Very soft	Can squeeze through fingers easily	< 20
Soft		20 to 35
Firm	Can dent with little finger	35 to 75
Stiff	Can just dent with forefinger	75 to 150
Very stiff		150 to 200
Hard	Can scratch with fingernail	> 200

(F.M.C.) GRAIN SIZE of SAND or GRAVEL
Fine – Medium – Coarse

BOREHOLE LOG SYMBOLS

U	0.10m dia. undisturbed sample
U ( )	Undisturbed sample (diameter)
*	Sample not recovered
D	Small disturbed sample
B	Bulk disturbed sample
⊥	Ground water first noted
W	Water sample
N ( )	Standard penetration test (blows per 0.30m)
VN ( )	Vane test (natural shear strength kN/m²)
VR ( )	Vane test (remoulded shear strength kN/m²)
CR	Core recovery

FOUNDATION ENGINEERING LTD.

SN14NE/8

RECORD OF TRIAL PIT **No:** 5

Location : CARDIGAN BY-PASS
Contract No. : CF669/910
~~Type of Boring~~ :
Date (started) : 14.4.'72

~~Borehole Dia~~ :
~~Casing~~ :
Ground Level : 52.21m

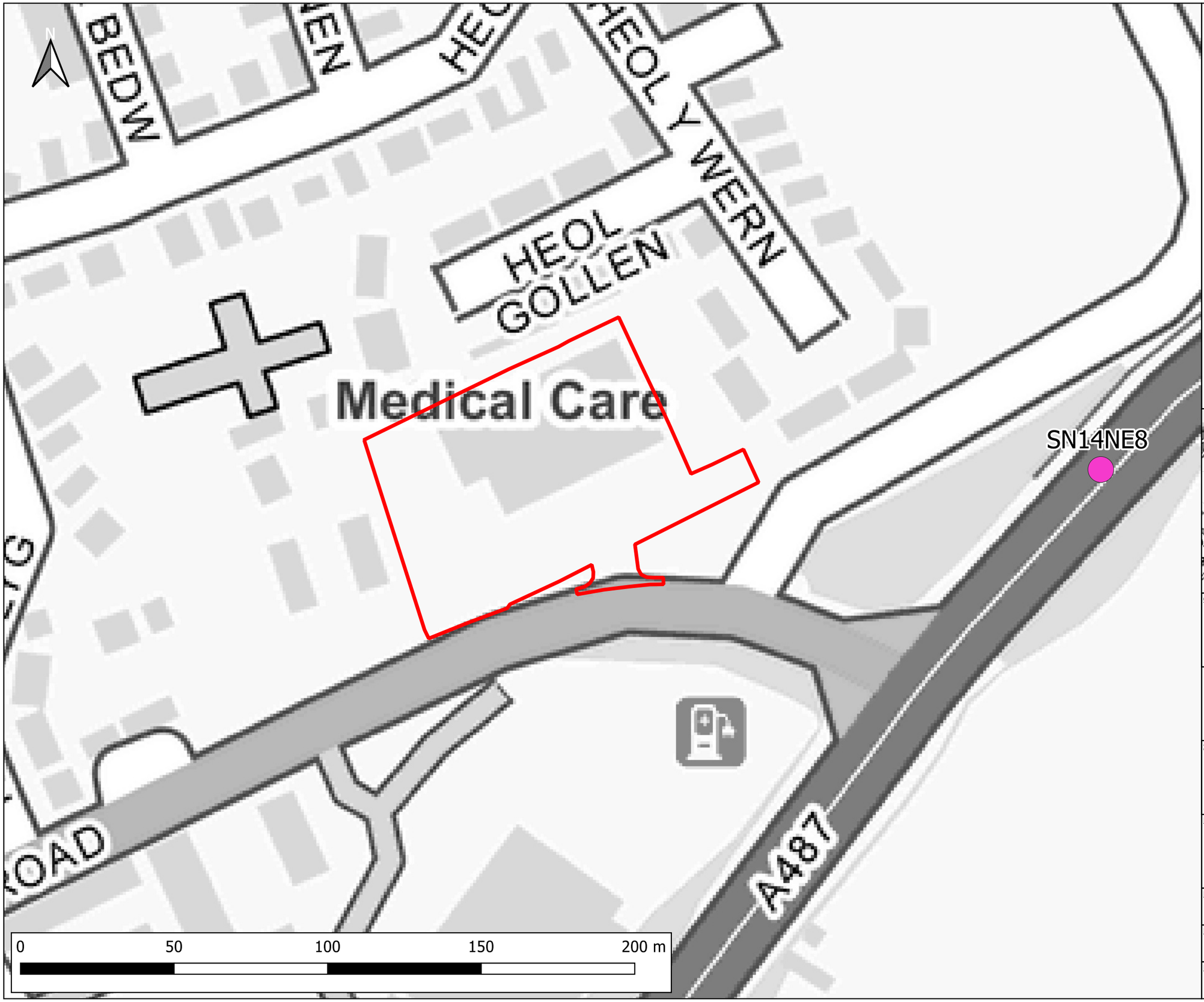
1" : 193
1897.4685

Depth of Casing	Water Level	SAMPLES Depth	Type	No.	STRATA Legend	Depth	Thickness	DESCRIPTION OF STRATA
		0.30m-0.60m	U	1		0.30m	0.30m	MADE GROUND
		0.60m	D	2				
		0.68m-0.98m	U	3				Firm to stiff brown grey sandy silty CLAY with decayed vegetation & occ. boulders.
		1.35m	D	4			2.70m	
		1.80m	B	5				
						3.00m		Trial Pit Terminated

REMARKS: Slight water seepage at 1.20m.

SCALE 1 : 50

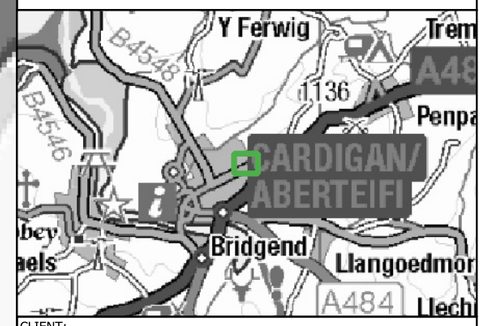
Foundation Engineering Ltd.



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

LEGEND

- Site Boundary
- BGS Borehole Location



CLIENT:

Lidl Great Britain Limited

waterco

www.waterco.co.uk

SCHEME:

B&M, Aberystwyth Road, Cardigan

PLOT TITLE:

BGS Borehole Location Plan
Data from British Geological Survey (BGS)

PLOT STATUS:	DATE:
FINAL	09-10-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:1200

PLOT NAME:	REVISION:
17128_BGS_Borehole_Location_Plan	-

Appendix D DCWW Sewer Records & Correspondence