

**Carmarthen West
Residential Development**

LOVELL

Lovell Homes

Flood Consequence Assessment & Drainage Strategy

2nd Issue

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Definitions and Abbreviations

TAN15: Technical Advice Note 15: Development, Flooding, and Coastal Erosion (2025): An updated version of the Welsh Government guidance document published on 31 March 2025. The new TAN15 and the Flood Map for Planning supersede TAN14 and TAN15 (2004) along with accompanying Development Advice Map.

NRW: Natural Resources Wales. The governing body responsible for environmental regulation in Wales.

DAM: Development Advice Map. Now superseded by Flood Map for Planning.

FMfP: Flood Map for Planning. A map produced by NRW as part of TAN15 guidance, outlining flood zones across Wales to accompany TAN15. The Flood Map for Planning includes climate change information to show how this will affect flood risk extents for rivers, the sea and surface water and small watercourses over the next century. It shows the potential extent of flooding assuming no defences are in place.

AEP: Annual Exceedance Probability. The probability of a flood of a certain size or larger occurring in any given year.

FFL: Finished Floor Level.

CC: Climate Change. Used in the context of assessing the impact of climate change on flood risk models.

Flood Zone 3 (FMfP): displays the extent of flooding from:

Rivers with a 1% (1 in 100) chance or greater of happening in any given year, including an allowance for climate change.

the sea with a 0.5% (1 in 200) chance or greater of happening in any given year, including an allowance for climate change.

Surface water & small watercourses with a 1% (1 in 100) chance or greater of happening in any given year, including an allowance for climate change.

Flood Zone 2 (FMfP): displays the extent of flooding from:

Rivers with less than 1% (1 in 100) but greater than or equal to 0.1% (1 in 1,000) chance of happening in any given year, including an allowance for climate change.

the Sea with less than 0.5% (1 in 200) but greater than or equal to 0.1% (1 in 1,000) chance of flooding in any given year, including an allowance for climate change.

Surface water & small watercourses with less than 1% (1 in 100) but greater than or equal to 0.1% (1 in 1,000) chance of happening in any given year, including an allowance for climate change.

Flood Zone 1 (FMfP): Less than 0.1% chance of flooding in a given year plus climate change.

TAN15 Defended Zones (FMfP): shows areas that benefit from risk management authority owned flood defence infrastructure, that have a minimum, Present Day level of protection of:

1% AEP for rivers, or

0.5% AEP for the sea.

1. Introduction

PHG Consulting is involved in a project located in Carmarthenshire and has been appointed to undertake a drainage strategy report to support a planning application for a residential development at Carmarthen West.

The purpose of the report is to inform and demonstrate how the surface and foul water drainage will be collected, conveyed, and discharged from the site accounting for site, conditions, development proposals, topography and intended points of discharge. This document aims to establish constraints, design requirements and appropriate principles for the safe conveyance and discharge of foul and surface water from the development.

This strategy report will draw on information currently made available from third parties, the findings and conclusions within the report are based upon the information provided and are assumed to be current and correct at the time of report writing.

The drainage strategy presents foul and surface water drainage proposals and has been prepared in accordance with current relevant standards, regional requirements and policy documents as noted below.

- Welsh Government – Statutory Standards for Sustainable Drainage Systems – 2018
- Flood and Water Management Act 2010
- CIRIA report C753 - The SuDS Manual – 2015
- WRC - Sewers for Adoption 7th Edition – 2012
- The Welsh Ministers standards for new gravity foul sewers and lateral drains – 2012
- Planning Policy Wales - 12th Edition – 2024
- Planning Policy Wales – Technical Advice Note 15 (TAN15) – Development and flood risk – 2025.
- Building Regulations Part H – 2010
- BS EN:2017 - Drain and sewer systems outside buildings.

From January 2019, all new developments in Wales with a construction area of 100m² or more must have an approved sustainable drainage system (SuDS) to manage on-site surface water.

Surface water drainage systems must be designed and built following mandatory standards published by Welsh Government and must be approved by the council's Sustainable Drainage Approving Body (SAB) before work starts.

Section 3 of this Drainage Strategy details how the proposed drainage scheme aims to comply with the Statutory Standards. A Full SAB application will be submitted for the approval of surface water drainage system.

The design of the SuDS features and the assessment of their efficiency to satisfy the SuDS Standards is undertaken by following the SuDS Manual.

Existing Site

The Site is located to the west of Ffordd Pendre which is approximately 1.5km west of Carmarthenshire town centre, at a national Grid Reference of 238590, 219710.

The site is roughly rectangular in shape and occupies an area of approximately 3.4ha. The boundaries of the site are defined by undeveloped fields to the north and west, an existing wooded track with residential development beyond to the south and Ffordd Pendre and associated roundabout to the east.

The site is situated on sloping ground which falls to the south and southeast from an approximate maximum elevation of 37m AOD in the northwest area of the site, falling to an approximate minimum elevation of 29m AOD in the southeast corner.

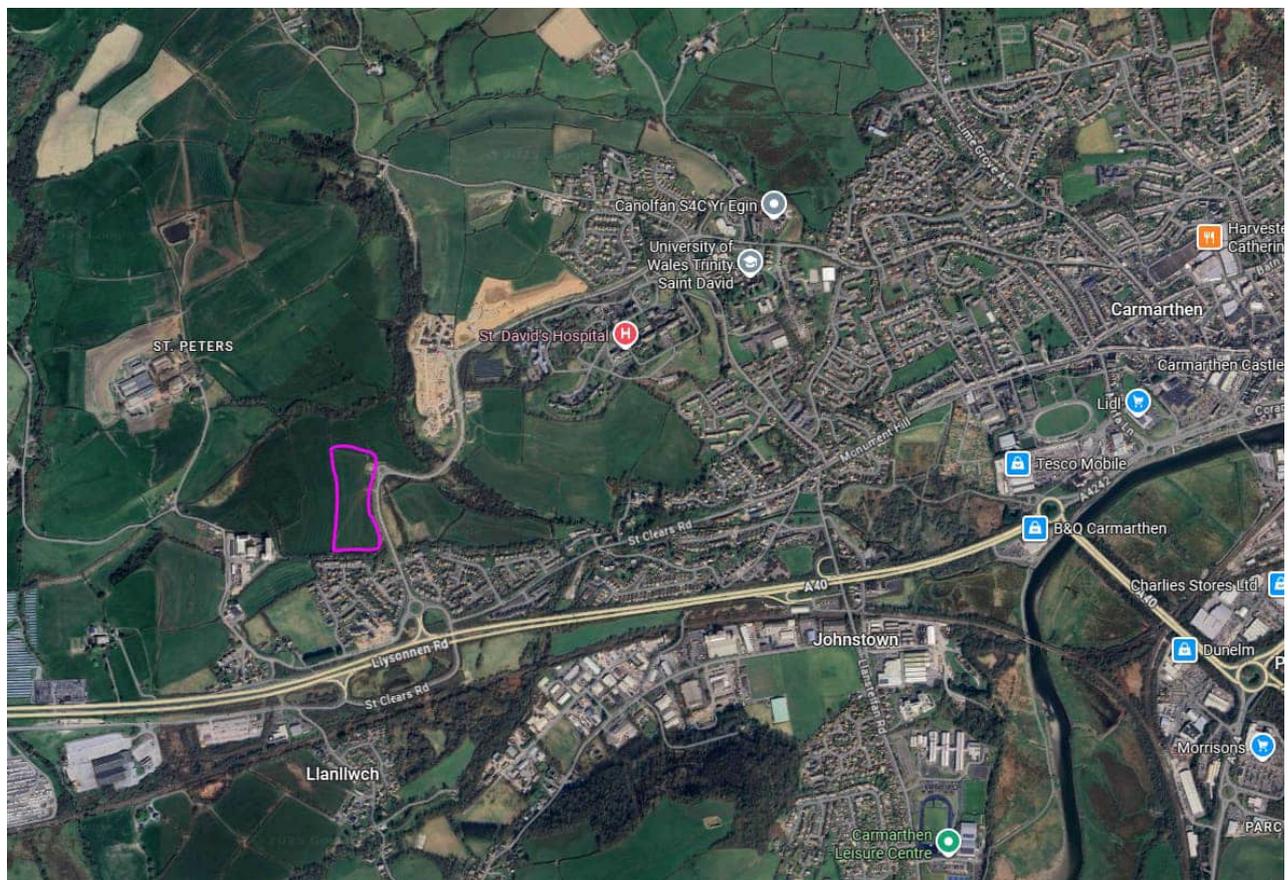


Figure 1. Site Location Plan.

Geology

This site investigation report carried out by Intergral Geotechnique summarises the geology below.

The 1:50,000 geological map indicates the site to be underlain by the solid strata of the Tetragraptus Beds of the Ordovician Period. The Tetragraptus are variable in nature but typically comprises of shale and mudstone.

Superficial Devensian Glaciofluvial Deposits of the Quaternary period are indicated to overlie the solid strata. These deposits are variable in nature but typically comprise sands and Gravel.

A summary of anticipated geological succession is shown below.

Geological Unit	Horizon	Description
Recent	Topsoil/subsoil with possible localised areas of made ground/reworked materials	Various materials
Quaternary	Devensian Glaciofluvial Deposits	Variable sands and gravels
Ordovician	Tetragraptus Beds	Shales and Mudstones

Ground Conditions

A site investigation was conducted by Integral Geotechnique which comprised of eight trail pits and six window samples was undertaken during July 2025.

A summary of the ground condition can be found below

Depth (m)	Tickness (m)	Stratum
0,00 – 0.20	0.2	TOPSOIL Soft brown gravelly sandy SLIT with roots and rootlets.
0.2 – 0.4/0.6	0.2 to 0.4	(Medium dense) brown gravelly silty SAND
0.2/0.6 – 0.7/1.6	0.3 to 1.4	(Medium dense to dense) light brown clayey gravelly SAND with low cobble content.
0.4/1.6 >2.5		Dense to very dense light grey locally light brown clayey SAND and GRAVELS with low cobble content.

Groundwater

No Groundwater was encountered during the excavation of any of the trial pits or during drilling of the windowless sample boreholes.

Site Permeability

Soakaway tests were carried out by Quantum Geotechnic in June 2024 in general accordance with BRE DG 365:2016. Trial Pits were excavated using a 9 tonne excavator. The test pits were located to provide general site coverage and were excavated to depths of 1.5 and 2.5mbgl.

Hole ID	Easting	Northing	Elevation (mAOD)
SA1	238613.716	219728.305	32.54
SA2	238624.109	219727.061	32.148
SA3	238620.808	219634.511	32.194
SA4	238632.326	219633.401	32.114
SA5	238569.389	219629.837	31.615
SA6	238557.973	219629.842	32.074
SA7	238579.389	219730.278	33.992
SA8	238569.228	219730.634	34.093
SA9	238566.639	219820.595	34.681
SA10	238587.008	219820.838	34.305
SA11	238607.052	219819.634	34.12
SA12	238623.695	219780.002	32.121

Exploratory Hole Locations

Soakaway Test Results

Pit ID	Test Zone (mbgl)	Test No	Soil Infiltration Rate (m/sec)
SA1	2.20 - 2.50	1	3.8194×10^{-4}
	2.12 - 2.50	2	3.5067×10^{-4}
	2.08 - 2.50	3	3.7019×10^{-4}
	Design Soil Infiltration Rate		3.5067×10^{-4}
SA2	0.62 - 1.50	1	5.2207×10^{-6}
	0.74 - 1.50	2	5.4485×10^{-6}
	0.80 - 1.50	3	6.8664×10^{-6}
	Design Soil Infiltration Rate		5.2207×10^{-6}

SA3	1.97 – 2.50	1	5.8010×10^{-4}
	1.90 – 2.50	2	4.9438×10^{-4}
	1.82 – 2.50	3	4.3743×10^{-4}
	Design Soil Infiltration Rate		4.3743×10^{-4}
SA4	Unable to raise head of water due to high permeability of strata		
SA5	1.95 – 2.50	1	4.8841×10^{-4}
	1.95 – 2.50	2	3.8445×10^{-4}
	1.82 – 2.5	3	4.1344×10^{-4}
	Design Soil Infiltration Rate		3.8445×10^{-4}
SA6	1.26 – 1.50	1	1.4226×10^{-3}
	1.17 – 1.50	2	1.7029×10^{-3}
	1.08 – 1.50	3	3.6109×10^{-4}
	Design Soil Infiltration Rate		3.6109×10^{-4}
SA7	1.80 – 2.50	1	1.4121×10^{-4}
	1.74 – 2.50	2	1.5358×10^{-4}
	1.68 – 2.50	3	1.6630×10^{-4}
	Design Soil Infiltration Rate		1.4121×10^{-4}
SA8	0.80 – 1.50	1	1.9609×10^{-4}
	0.70 – 1.50	2	4.4857×10^{-5}
	0.58 – 1.50	3	3.1833×10^{-5}
	Design Soil Infiltration Rate		3.1833×10^{-5}
SA9	1.95 – 2.50	1	3.3961×10^{-4}
	1.90 – 2.50	2	2.1343×10^{-4}
	1.90 – 2.50	3	1.5229×10^{-4}
	Design Soil Infiltration Rate		1.5229×10^{-4}
SA10	0.72 – 1.50	1	4.9368×10^{-5}
	0.58 – 1.50	2	4.3141×10^{-5}
	0.67 – 1.50	3	3.4274×10^{-5}
	Design Soil Infiltration Rate		3.4274×10^{-5}
SA11	1.82 – 2.50	1	2.2213×10^{-4}
	1.69 – 2.50	2	8.9114×10^{-5}
	1.68 – 2.50	3	3.9715×10^{-5}
	Design Soil Infiltration Rate		3.9715×10^{-5}
	0.68 – 1.50	1	1.8845×10^{-5}

SA12	0.56 – 1.50	2	1.3270×10^{-5}
	0.53 – 1.50	3	1.8444×10^{-5}
	Design Soil Infiltration Rate		1.3270×10^{-5}

Further infiltration tests were carried out at or near the proposed pond location on the 17/12/25, and the results can be found below.

Pit ID	Strata	Depth of Pit	Test No	Soil Infiltration Rate
SAX	Light brown sandy slightly silty gravel	2.3m	1	1.0×10^{-4}
			2	5.4×10^{-5}
			3	4.9×10^{-5}
SAY	Light brown sandy slightly silty gravel	1.9m	1	2.3×10^{-5}
			2	-
			3	-
SAZ	Orangish brown sandy slightly gravelly silty clay	2.5m	1	-
			2	-
			3	-

Development Proposals

The proposed development will comprise of a number of residential dwellings with associated infrastructure such as access road, car parking areas and private drives. The development will also include areas of landscaping and private garden. An attenuation area for drainage can be found in the southern section of the site.



2. Flood Consequence Assessment

The This assessment has been prepared to examine potential sources of flooding pertaining to the site and the immediate vicinity, determine the likelihood (flood frequency) and the impact (flood consequences) of flooding. In Wales, planning policy relating to flooding is governed by Technical Advice Note (TAN) 15: Development, Flooding and Coastal Erosion. This assessment has been prepared in accordance with latest version of TAN15 published on 31 March 2025, which replaces Technical Advice Note 14, published in 1998 and Technical Advice Note 15, published in 2004.

Development Category – Flood Zones Compatibility to Flood Map for Planning

The development site is classified as *Highly vulnerable development*¹ and its design life is 100 years². The Flood Map for Planning (FMfP) maps, which fully supersede Development Advice Map (which accompanied the previous version of TAN15), have been included in the assessment

Flood Map for Planning – Rivers and Seas

The site is located Flood Zone 1, outside areas at risk from river flooding, see Figure 3 below.

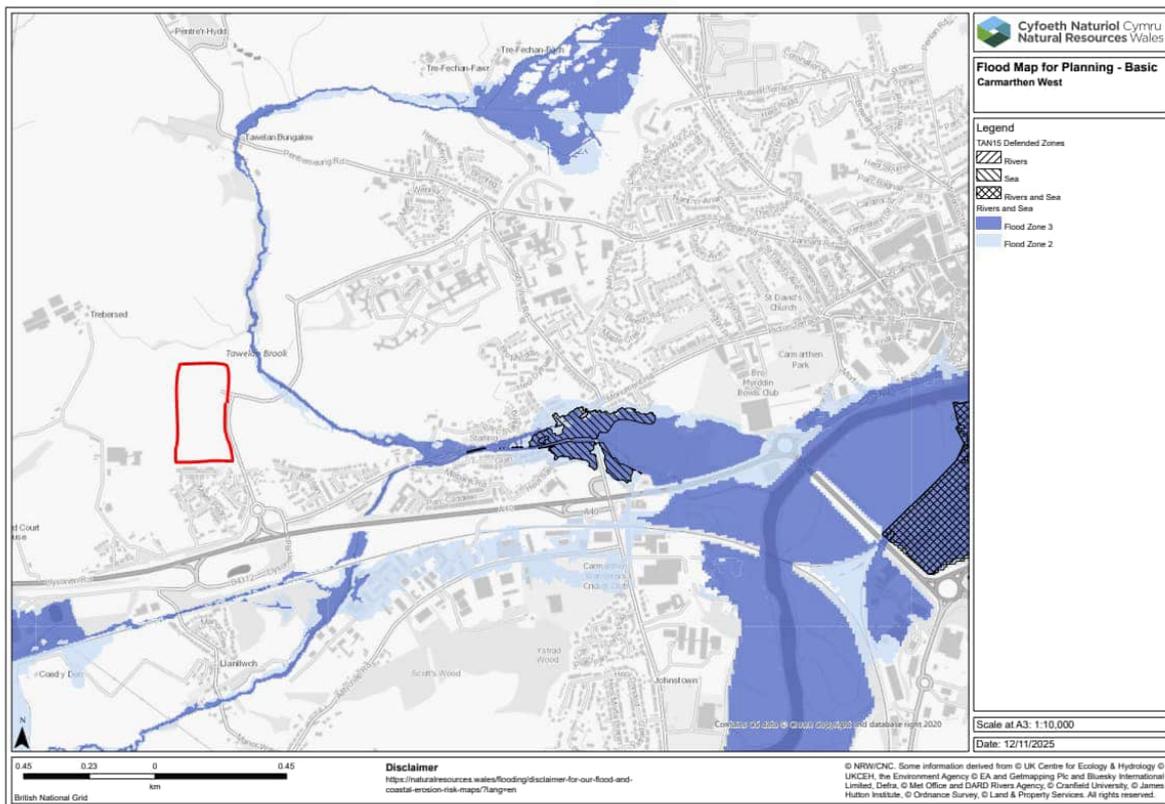


Figure 2. NRW – Flood Map for Planning - Flood Zone Rivers and Seas

¹ Technical Advice Note15 (2025): Figure 4- Development vulnerability categories

² Guidance on Climate Change Allowances for Planning Purposes, CL-03-16, Welsh Government

Flood Map for Planning - Surface Water and Small Water Courses

The site is located within Flood Zone 1 of Surface Water and Small Watercourses with no risk to flooding.

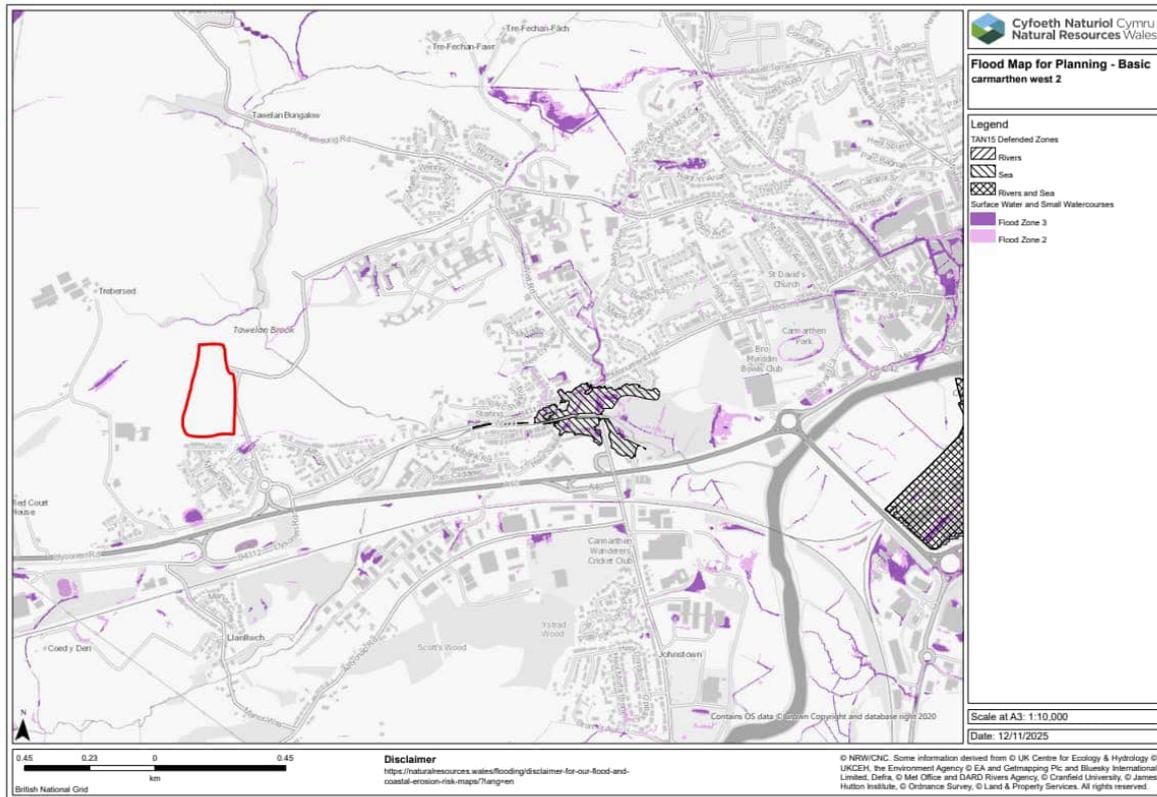


Figure 3. NRW – Flood Map for Planning - Surface Water and Small Watercourses

Impact on flooding elsewhere

In line with TAN15, the development must insure no increase in flooding elsewhere.

Given the site is located outside of the Flood Zones from Sea, Rivers, and the fact that the development will be positively drained, there will be no adverse effects on flooding elsewhere.

Therefore, it is considered that in an event of flooding, the development will not result in an increase of flooding elsewhere.

Summary of flood risk

Given the site is located outside the Flood Zone from Sea and Surface Water and Small Watercourses, it is concluded that the proposed development site is compliant with Planning Policy Wales and TAN15.

3. Drainage Strategy

Surface Water Features

The nearest major surface water feature to the site is the Tawelan Brook located 125m to the northeast.

There is also an unnamed water feature located to the south of the site that runs along the side of the existing PROW which gets culverted under Ffordd Pendre and runs adjacent to the lane to the east.

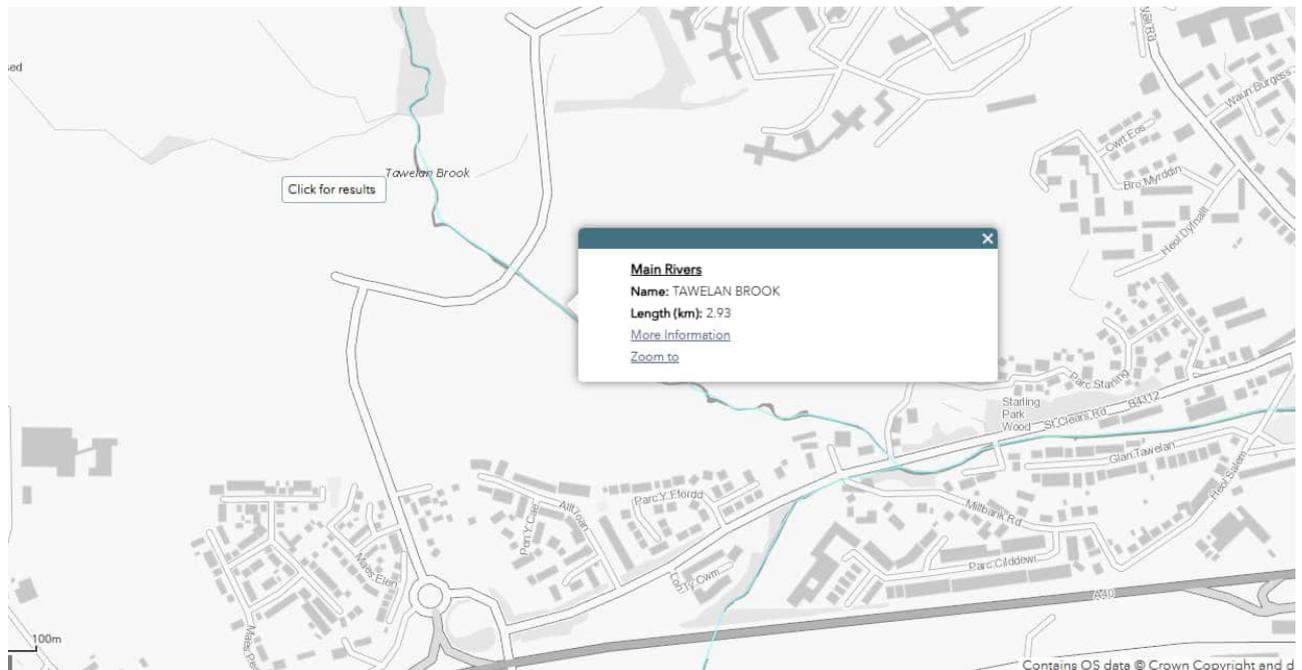


Figure 4. Watercourses near the site

Existing Sewers

The Welsh Water (DCWW) sewer records show that there is a 150mm Foul sewer located 50m south of the site in Ffordd Pendre running west to east through the existing development, see below.

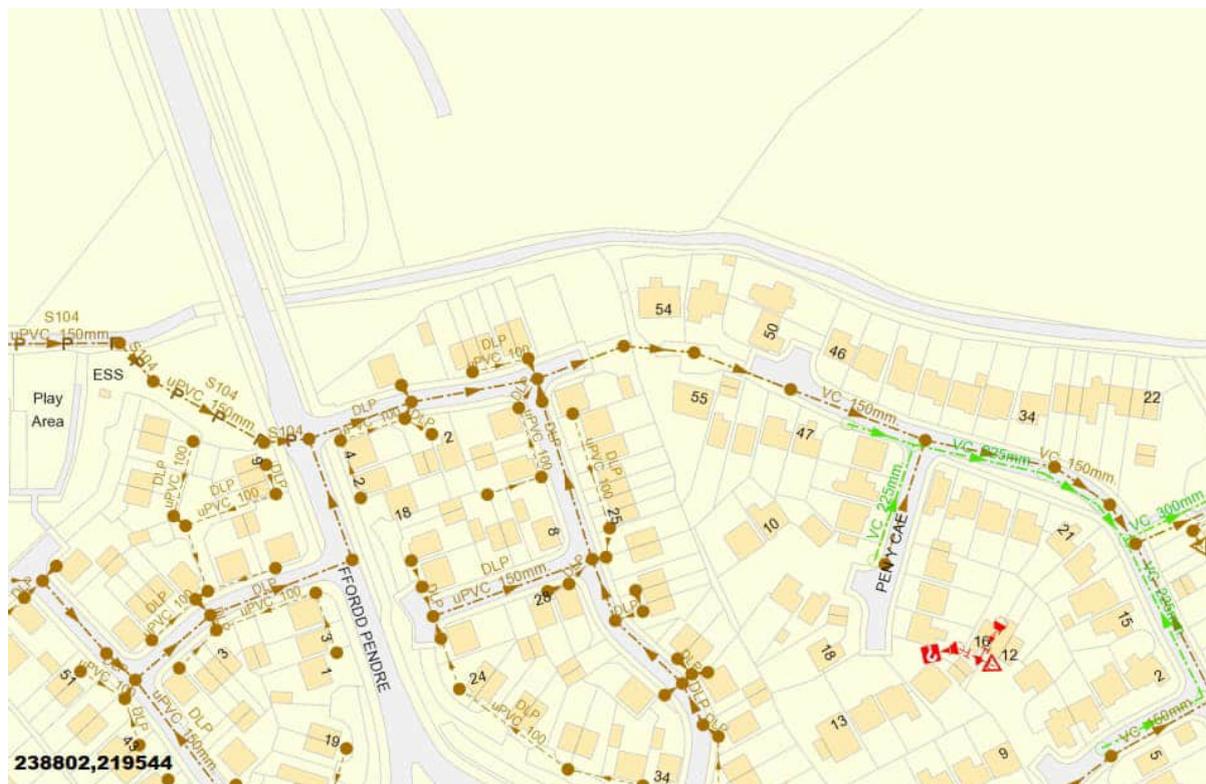


Figure 5. DCWW Sewer Records

Foul Drainage

Foul water system will connect into the foul water sewer to the south of the site at manhole SN38197509. The proposed foul system will be a conventional gravity system.

A Section 104 application will be made to Welsh Water.

Surface Water Drainage

The site is located in an area where Carmarthenshire County Councils are the Lead Local Flood Authority (LLFA) and the Sustainable Drainage Approval Body (SAB).

Surface water drainage will need to be designed in accordance with the SuDS Standards³ and a Full SAB application will have to be submitted and approved prior to any works being undertaken. The design of the surface water drainage system will need to comply with the principles and standards set out in the SuDS standards and take guidance from the Ciria SuDS Manual⁴.

Therefore, the surface water drainage strategy will comply with the principles and standards as set out in the Welsh Government's Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems. This document sets 11 principles and 6 standards;

³ Sustainable Drainage (SuDS) Statutory Guidance, Welsh Government 2019

⁴ The SuDS Manual. CIRIA 753, 2015

Principles

- Manage water on or close to the surface and as close to the source of the runoff as possible;
- Treat rainfall as a valuable natural resource;
- Ensure pollution is prevented at source, rather than relying on the drainage system to treat or intercept it;
- Manage rainfall to help protect people from increased flood risk, and the environment from morphological and associated ecological damage resulting from changes in flow rates, patterns and sediment movement caused by the development;
- Take account of likely future pressures on flood risk, the environment and water resources such as climate change and urban creep;
- Use the SuDS Management Train, using drainage components in series across a site to achieve a robust surface water management system (rather than using a single “end of pipe” feature, such as a pond, to serve the whole development);
- Maximise the delivery of benefits for amenity and biodiversity;
- Seek to make the best use of available land through multifunctional usage of public spaces and the public realm;
- Perform safely, reliably and effectively over the design life of the development taking into account the need for reasonable levels of maintenance;
- Avoid the need for pumping where possible; and
- Be affordable, taking into account both construction and long-term maintenance costs and the additional environmental and social benefits afforded by the system.

Standards

S1 *Surface water runoff destinations;*

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

S2 *Surface water runoff hydraulic control*

The aim of Standard S2 is to manage the surface water runoff from and on a site to protect people on the site from flooding from the drainage system for events up to a suitable return period, to mitigate any increased flood risk to people and property downstream of the site as a result of the development, and to protect the receiving water body from morphological damage.

S3 *Surface water quality management*

Standard S3 addresses the drainage design requirements to minimise the potential pollution risk posed by the surface water runoff to the receiving water body.

S4 Amenity

Standard S4 addresses the design of SuDS components to ensure that, where possible, they enhance the provision of high quality, attractive public space which can help provide health and wellbeing benefits, they improve liveability for local communities and they contribute to improving the climate resilience of new developments.

S5 Biodiversity

Standard S5 addresses the design of SuDS to ensure, where possible, they create ecologically rich green and blue corridors in developments and enrich biodiversity value by linking networks of habitats and ecosystems together. Biodiversity should be considered at the early design stage of a development to ensure the potential benefits are maximised.

S6 Design of drainage for Construction, Operation and Maintenance

Standard S6 deals with designing robust surface water drainage systems so they can be easily and safely constructed, maintained and operated, taking account of the need to minimise negative impacts on the environment and natural resources

S1 – Surface Water Destination**Level 1 – Surface Water runoff is collected for use**

The collection of water for re-use will be evaluated during the detailed design stage, however, the use of individual rainwater harvesting systems for this scheme is proving uneconomical. The use of rainwater butt will be looked at during detailed design.

Level 2 – Surface Water runoff is infiltrated to ground

Soakaway tests were carried out by Quantum Geotechnic in June 2024 in general accordance with BRE DG 365:2016. Trial Pits were excavated using a 9 tonne excavator. The test pits were located to provide general site coverage and were excavated to depths of 1.5 and 2.5mbgl.

Pit ID	Test Zone (mbgl)	Test No	Soil Infiltration Rate (m/sec)
SA1	2.20 - 2.50	1	3.8194x10 ⁻⁴
	2.12 – 2.50	2	3.5067x10 ⁻⁴
	2.08 – 2.50	3	3.7019x10 ⁻⁴
	Design Soil Infiltration Rate		3.5067x10⁻⁴
SA2	0.62 – 1.50	1	5.2207x10 ⁻⁶
	0.74 – 1.50	2	5.4485x10 ⁻⁶
	0.80 – 1.50	3	6.8664x10 ⁻⁶
	Design Soil Infiltration Rate		5.2207x10⁻⁶
SA3	1.97 – 2.50	1	5.8010x10 ⁻⁴
	1.90 – 2.50	2	4.9438x10 ⁻⁴
	1.82 – 2.50	3	4.3743x10 ⁻⁴

	Design Soil Infiltration Rate		4.3743x10⁻⁴
SA4	Unable to raise head of water due to high permeability of strata		
SA5	1.95 – 2.50	1	4.8841 x 10 ⁻⁴
	1.95 – 2.50	2	3.8445 x 10 ⁻⁴
	1.82 – 2.5	3	4.1344 x 10 ⁻⁴
	Design Soil Infiltration Rate		3.8445 x 10⁻⁴
SA6	1.26 – 1.50	1	1.4226 x 10 ⁻³
	1.17 – 1.50	2	1.7029 x 10 ⁻³
	1.08 – 1.50	3	3.6109 x 10 ⁻⁴
	Design Soil Infiltration Rate		3.6109 x 10⁻⁴
SA7	1.80 – 2.50	1	1.4121 x 10 ⁻⁴
	1.74 – 2.50	2	1.5358 x 10 ⁻⁴
	1.68 – 2.50	3	1.6630 x 10 ⁻⁴
	Design Soil Infiltration Rate		1.4121 x 10⁻⁴
SA8	0.80 – 1.50	1	1.9609 x 10 ⁻⁴
	0.70 – 1.50	2	4.4857 x 10 ⁻⁵
	0.58 – 1.50	3	3.1833 x 10 ⁻⁵
	Design Soil Infiltration Rate		3.1833 x 10⁻⁵
SA9	1.95 – 2.50	1	3.3961 x 10 ⁻⁴
	1.90 – 2.50	2	2.1343 x 10 ⁻⁴
	1.90 – 2.50	3	1.5229 x 10 ⁻⁴
	Design Soil Infiltration Rate		1.5229 x 10⁻⁴
SA10	0.72 – 1.50	1	4.9368 x 10 ⁻⁵
	0.58 – 1.50	2	4.3141 x 10 ⁻⁵
	0.67 – 1.50	3	3.4274 x 10 ⁻⁵
	Design Soil Infiltration Rate		3.4274 x 10⁻⁵
SA11	1.82 – 2.50	1	2.2213 x 10 ⁻⁴
	1.69 – 2.50	2	8.9114 x 10 ⁻⁵
	1.68 – 2.50	3	3.9715 x 10 ⁻⁵
	Design Soil Infiltration Rate		3.9715 x 10⁻⁵
SA12	0.68 – 1.50	1	1.8845 x 10 ⁻⁵
	0.56 – 1.50	2	1.3270 x 10 ⁻⁵
	0.53 – 1.50	3	1.8444 x 10 ⁻⁵
	Design Soil Infiltration Rate		1.3270 x 10⁻⁵

Further infiltration tests were carried out at or near the proposed pond location on the 17/12/25, and the results can be found below.

Pit ID	Strata	Depth of Pit	Test No	Soil Infiltration Rate
SAX	Light brown sandy slightly silty gravel	2.3m	1	1.0×10^{-4}
			2	5.4×10^{-5}
			3	4.9×10^{-5}
SAY	Light brown sandy slightly silty gravel	1.9m	1	2.3×10^{-5}
			2	-
			3	-
SAZ	Orangish brown sandy slightly gravelly silty clay	2.5m	1	-
			2	-
			3	-

Trial Pit SAY and SAZ were located a few meters northwest of the pond with SAX located at the pond therefore the rate at this pit has been used for design purposes.

Based on the above result is it considered that soakaway is a viable option and the design has been based on surface water discharging to ground.

Level 3 – Surface Water runoff is discharged to a surface water body

The nearest major surface water feature to the site is the Afon Rhondda Fach which is approximately 130m north of the site.

Based on the above this is Not Needed.

Level 4 - Surface water runoff is discharged to a surface water sewer Highway drain or another drainage system.

Not Needed

Level 5 - Surface water runoff is discharged to a combined sewer

Not Needed.

S2 – Surface Water runoff hydraulic control.

Surface water run-off from the site will discharge to ground via an infiltration basin located to the south of the site and a cellular soakaway to the north. All impermeable areas, excluding the access, will discharge to the pond, with the access road discharging to the cellular soakaway. In addition, drainage

across the site will be managed through the use of **raingardens, bioretention areas, and permeable paving**, providing further treatment and attenuation prior to infiltration.

Infiltration tests have been carried out at the location of the proposed basin on the 17/12/26. An infiltration rate of 4.88×10^{-5} m/s has been used based on the results a pit SAX.

The cellular soakaway to the north is located approximately 15m from Pit SA12, and therefore an infiltration rate of 1.3270×10^{-5} m/s has been applied for this element.

Storage for all events up to the 100yr plus 40% climate change will be provided in the form of attenuation basin to the south and cellular soakaway to the north.

The SuDS scheme is designed to ensure there is no runoff during the first 5 mm of the majority of events, this is achieved by relying on shallow features with plan areas compliant with Table G2.1 of the National Standards for SuDS. The reduction of discharge rate and volumes will reduce surface water flood risk within the development and wider area.

S3 – Water Quality

The Simple Index Procedure has been applied utilising the Simple Index Approach Tool showing compliance for both the SuDS elements

The proposed scheme will feature multiple SuDS features to ensure sufficient water quality which included raingardens for roof drainage. Bioretention areas for highway areas and permeable paving for parking areas.

S4 – Amenity

Use of swales, bioretention areas, and rain gardens provides attractive green corridors and soft landscaping, soft landscaping features dominate the drainage strategy.

SuDS elements integrated near POS (Public Open Space), supporting informal recreation and visual appeal.

Maintenance Routes are included, ensuring public safety and long-term usability

S5 – Biodiversity

SUDS should be designed to promote biodiversity through ecological connectivity and habitat enhancement.

The vegetated ditch, Bioretention areas and rain gardens planted with native species create diverse microhabitats. Linear features (ditches) provide wildlife corridors. The design included mixed planting, vegetation buffers and naturalised banks, supporting amphibians insects and small mammals

S6 – Construction, Operation and Maintenance of systems

The SuDS system is design so that can be easily and safely constructed, maintained and operated, taking account of the need to minimise negative impacts on the environment and natural resources. Its should be designed for long-term performance.

4. Conclusions

- The proposed development site is of 3.4ha plan area. It is a Greenfield development.
- The development will not increase flood risk elsewhere. Storage for all events up to the 100yr plus 40% climate change will be provided in the form of an infiltration basin located to the south of the site and a cellular soakaway to the north
- Given the site is located outside the Flood Zone from Sea, Rivers and Surface Water and Small Watercourses, it is concluded that, the proposed development site is compliant with Planning Policy Wales and TAN15.
- Surface Water run-off from the site will discharge to ground with a design rate of 4.9×10^{-4} used, this is based on infiltration test carried out in Dec 2025.
- The proposed SUDS areas provide biodiversity and amenity benefits.
- Foul water system will connect into the foul water sewer to the south of the site at manhole SN38197509. The proposed foul system will be a conventional gravity system.
- Considering the details provided, the development is deemed to be appropriately designed regarding its drainage strategy.

Appendix A Architects Layout

Proposed Accomodation Schedule				
Housestyle	GIA	Beds	Total No.	Percentage
Open Market				
Fairhaven	665	2	11	26
Newbury	1013	3	8	19
Lansdown	896	3	4	10
Milford	981	3	3	7
Ramsey	1124	4	3	7
Redbourne	1266	4	7	17
Rochester	1198	4	6	14
	Sub Total		42	100
Affordable				
Social Rent				
1B2P	549/638	1	4	16
2B4P	880	2	10	40
3B5P	966	3	8	32
4B7P	1236	4	3	12
	Sub Total		25	100
LCHO				
Fairhaven	665	2	7	41
Lansdown	896	3	7	41
Newbury	1013	3	3	18
	Sub Total		17	100



- Red line boundary
- Existing PROW brideway (indicative)
- Proposed building
- Proposed trees
- Existing trees to be retained
- Root protection area (RPA)
- Proposed Hoggin Footpath
- Existing vegetation retained
- Proposed hedgerow
- Proposed SuDS - attenuation
- Proposed Rain Garden
- Private Drive/Parking
- Private Footpath
- Tarmac Footway/Shared Path
- Tarmac Carriageway
- Block Paving (On plot)
- Bin Collection Point
- Affordable Rent Properties
- Open Market Properties
- Low Cost Home Ownership Homes
- Show Home-Site Office
- Show Home

For specific landscape proposals and detailed key please see drawing 2513-URB-XX-DR-LA-001-Landscape General Arrangement Plan

NOTES:
 SCALE: Do not scale from this drawing.
 SETTING OUT: All setting out, levels, dimensions to be agreed on site. Do not use the information on this drawing without checking all dimensions on site. Any discrepancies between drawings, specifications and site works are to be reported to The Urbanists. Order of construction and setting out is to be agreed on site.
 CHECK: This drawing must be the latest revision, read in conjunction with all other drawings, details, specifications and schedules. All dimensions are in millimetres unless otherwise stated. Where any contradiction or uncertainty arises between the drawings and/or the schedule of works / specification, it is the Contractor's responsibility to seek verification from The Urbanists before proceeding. No claims will be met by The Urbanists, where the Contractor continues work in absence of such confirmation.

No.	Date	By	Revision Notes
P01	14/11/2025		Initial review
P02	06/01/2026	LP	Highways amendments
P03	19/01/2026	LP	Attenuation amendment

PROJECT STATUS:
 S4 (SUITABLE FOR APPROVAL)

theurbanists

Client Lovell Homes
 Project Carmarthen West
 Title Planning Layout

Project ID: 2511 URB 00 XX DR UR 001 S4 P03
 Drawn TS Date 14/11/2025 Checked LP Scale 1:500

The Urbanists (Cardiff) - Westgate House - 11 Wormanby Street - CF10 1BR
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Appendix B Flood Risk Maps

Flood Map for Planning - Basic
Carmarthen West

Legend

TAN15 Defended Zones

 Rivers

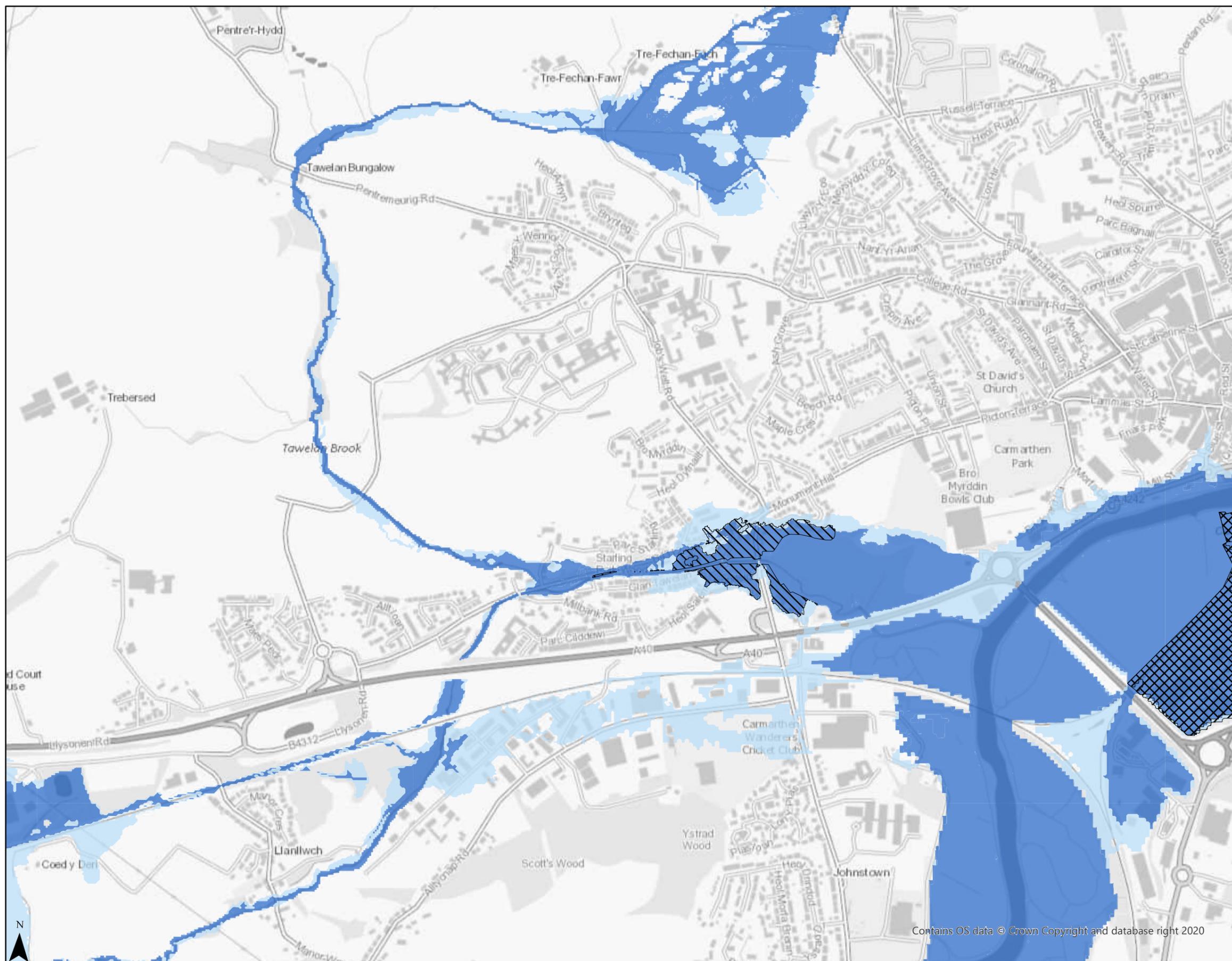
 Sea

 Rivers and Sea

Rivers and Sea

 Flood Zone 3

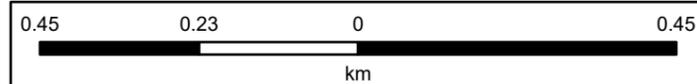
 Flood Zone 2



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Scale at A3: 1:10,000

Date: 12/11/2025



British National Grid

Disclaimer

<https://naturalresources.wales/flooding/disclaimer-for-our-flood-and-coastal-erosion-risk-maps/?lang=en>

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Flood Map for Planning - Basic
carmarthen west 2

Legend

TAN15 Defended Zones

 Rivers

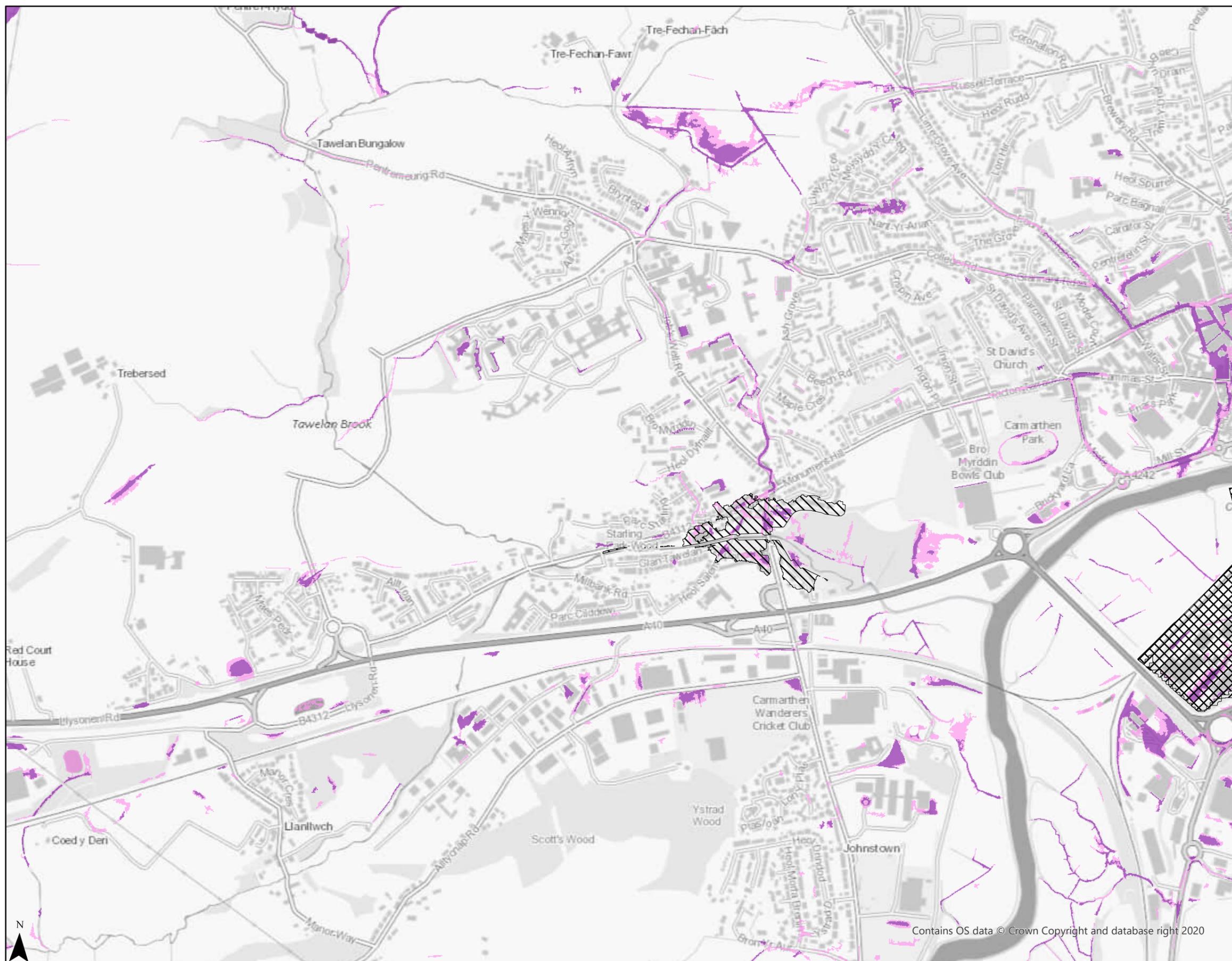
 Sea

 Rivers and Sea

Surface Water and Small Watercourses

 Flood Zone 3

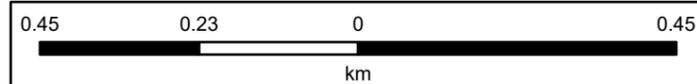
 Flood Zone 2



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Scale at A3: 1:10,000

Date: 12/11/2025



British National Grid

Disclaimer

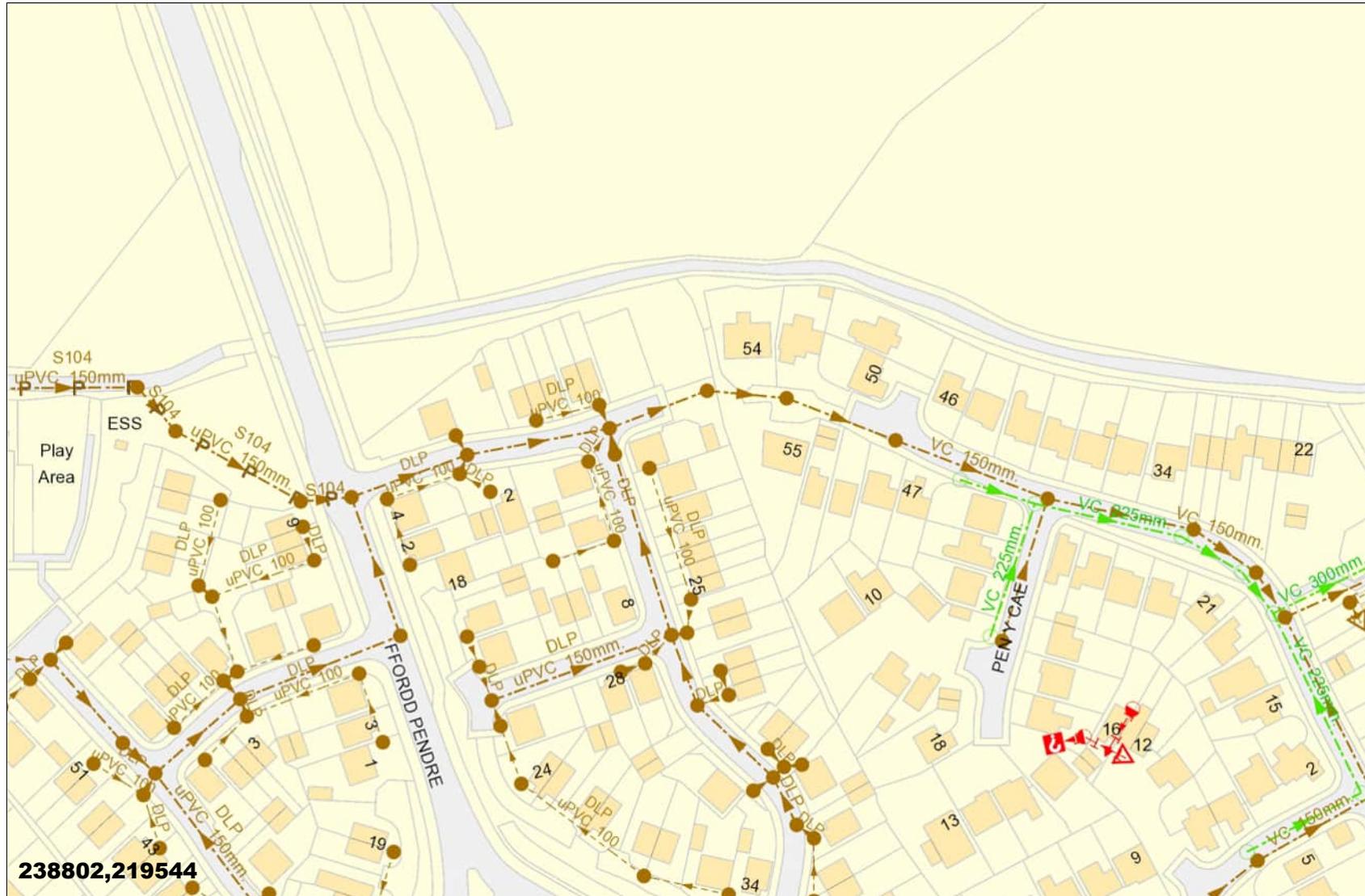
<https://naturalresources.wales/flooding/disclaimer-for-our-flood-and-coastal-erosion-risk-maps/?lang=en>

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Appendix C DCWW Maps

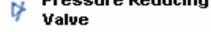


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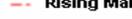
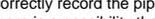
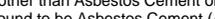


LEGEND

Clean Water

-  Sluice Val
-  Air Val, SINGLE
-  Tap
-  Pressure Reducing Valve
-  Meter
-  BULK Meter
-  FH
-  Cap
-  Existing Main
-  NON COMPANY

Sewerage External

-  Foul
-  Surface Water
-  Combined
-  Rising Main
-  Private
-  Treatment Works
-  Pumping Station
-  Special Purpose
-  Unknown End
-  Change, Combined Overflow
-  Outfall, FOUL
-  Lamp Hole, Foul
-  Private Sewer Transfer
-  Lateral Drain
-  Inspection Chamber

238802,219544

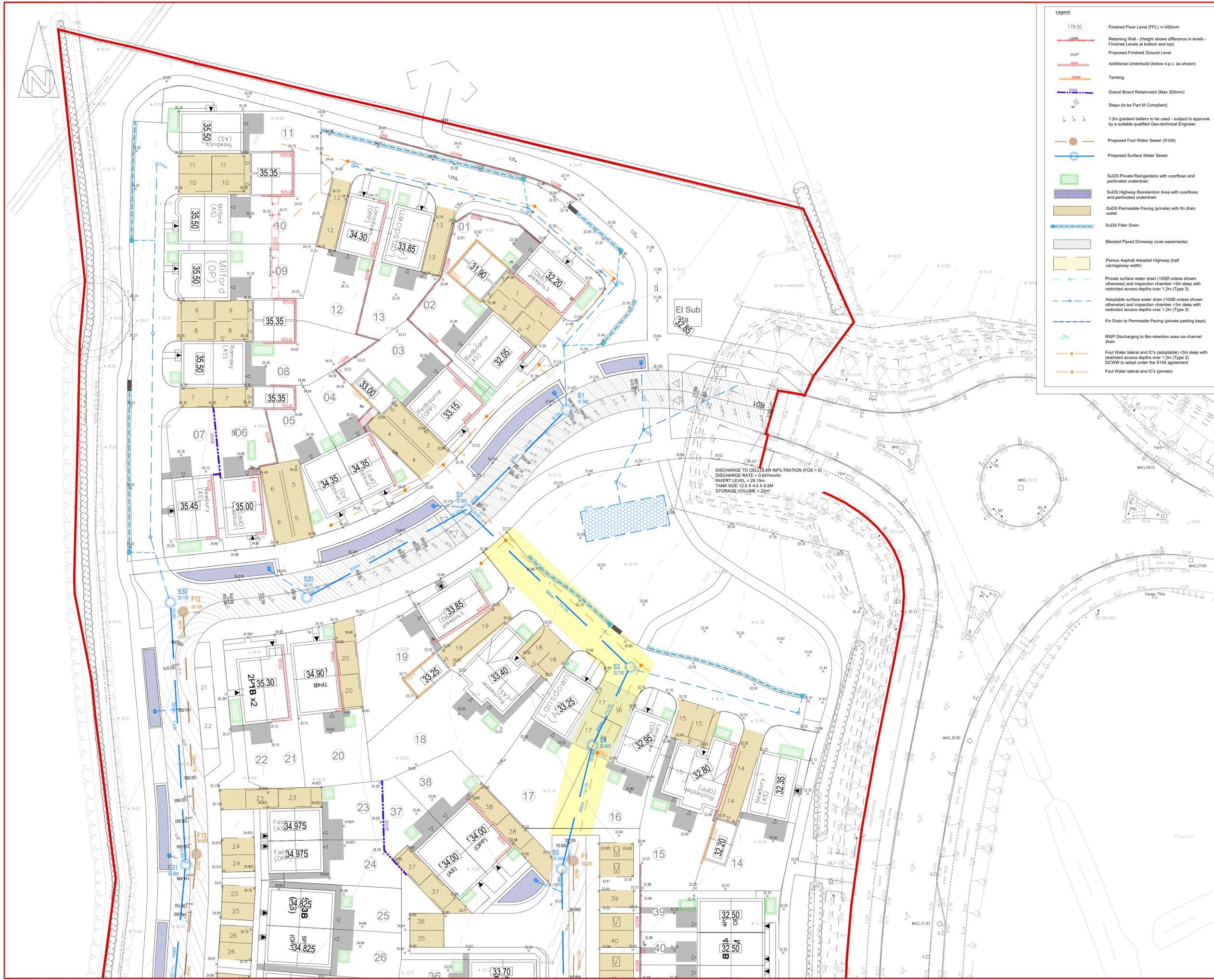
Dwr Cymru Cyfyngedig ('the Company') gives this information as to the position of its underground apparatus by way of general guidance only and on the strict understanding that it is based on the best information available and no warranty as to its correctness is relied upon in the event of excavations or other works made in the vicinity of the company's apparatus and any onus of locating the apparatus before carrying out any excavations rests entirely on you. The information which is supplied hereby by the company, is done so in accordance with statutory requirements of sections 198 and 199 of the water industry Act 1991 based upon the best information available and in particular, but without prejudice to the generality of the foregoing, it should be noted that the records that are available to the Company may not disclose the existence of a drain sewer or disposal main laid before 1 September 1989, or if they do, the particulars thereof including their position underground may not be accurate. It must be understood that the furnishing of this information is entirely without prejudice to the provision of the New Roads and Street Works Act 1991 and the company's right to be compensated for any damage to its apparatus.

EXACT LOCATION OF ALL APPARATUS TO BE DETERMINED ON SITE

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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

Appendix D Engineering Layout



Legend

- 179.50 Finished Floor Level (FFL) +/-450mm
- Retaining Wall (Height shows difference in levels - Finished Levels at bottom and top)
- Proposed Finished Ground Level
- Additional Underbld (below d.p.c. as shown)
- Tanking
- Gravel Board Retainment (Max 300mm)
- Steps (to be Part M Compliant)
- 1.2m gradient batters to be used - subject to approval by a suitable qualified Geo-technical Engineer.
- Proposed Foul Water Sewer (S104)
- Proposed Surface Water Sewer
- SuDS Private Raingardens with overflows and perforated underdrain
- SuDS Highway Discretion Area with overflows and perforated underdrain
- SuDS Permeable Paving (private) with fin drain outlet
- SuDS Filter Drain
- Blocked Paved Driveway (over easements)
- Porous Asphalt Adopted Highway (half carriageway width)
- Private surface water drain (1000 unless shown otherwise) and inspection chamber <3m deep with restricted access depths over 1.2m (Type 3)
- Adoptable surface water drain (1000 unless shown otherwise) and inspection chamber <3m deep with restricted access depths over 1.2m (Type 3)
- Fin Drain to Permeable Paving (private parking bays)
- RWP Discharging to Bio-retention area via channel drain
- Foul Water lateral and IC's (adoptable) <3m deep with restricted access depths over 1.2m (Type 3)
- Foul Water lateral and IC's (private)

- GENERAL NOTES**
1. Do not scale
 2. The contractor is to check and verify all buildings and site dimensions and levels, including sewer invert levels, before works start on site. The contractor is to comply in all aspects with the current Building Legislation, NRSWA1991, British Standards, Building Regulations etc.
 3. Positions of existing services/statutory undertakers apparatus adjacent to or crossing proposed excavations are to be checked by the contractor prior to starting work
 4. This drawing is to be read in conjunction with and checked against all other drawings, engineering details, specification and any structural, geotechnical or other specialist document provided.
 5. Any anomaly or contradiction between any of the above is to be reported to the client.
 6. This drawing is schematic for clarity only, positions of pipe runs and manholes may vary on site due to site conditions

- ROAD AND SEWER ADOPTION NOTES**
1. All works for Adoption under a Section 38 Agreement shall be carried out to the approval of Carmarthen County Council.
 2. All works for Adoption under a Section 104 Agreement shall be carried out to the National Water Council Guide "Sewers for Adoption" 7th Edition and Dwr Cymru Welsh Water's requirements.
 3. Street lighting positions to be pegged on site and agreed by the local authority prior to erection commencing.

- DRAINAGE NOTES**
1. All private drainage shall be in accordance with BS8301 and relevant sections of Approved Document H of the Building Regulations.
 2. The contractor is to check the level of existing sewers being used as outfalls or crossing proposed drainage runs PRIOR to laying any pipes. Any discrepancies are to be reported to PHG Consulting Engineers.
 3. Position of soil pipes, stubstacks, WC outlets, rainwater downpipes, etc. positions are to be checked against the house-type working drawings.
 4. Private house drainage will be flexibly jointed plastic or clay pipework. Diameter 100mm unless shown otherwise.
 5. All connections for House Drainage shall be 100mm unless noted otherwise and must extend 500mm behind the back of footway/homezone road. All connections when laid shall be plugged, protected as necessary and marked with a stake for future use.
 6. For private drains where cover to pipes is less than 900mm in vehicular areas or 500mm in other areas protection in the form of a 100mm thick concrete pad shall be provided over the pipe granular surround.
 7. Where pipes pass through screen walls, footings or retaining walls, lintels are to be provided over. Under buildings pipes shall be surrounded with 150mm thickness of granular material. Where drains pass within 1m of buildings the wall foundation shall be taken down below the invert of the pipe.
 8. Where drains do not exceed 600mm deep, plastic or clay access fittings minimum diameter 225mm shall be used. Elsewhere proprietary plastic or precast concrete inspection chambers shall be used. Unless shown otherwise FW inspection chambers are to be 750mm below dpc level and SW chambers and rodding eyes to be 600mm below dpc.
 9. All gullies and rainwater downpipes connected directly to drains are to be roddable.
 10. All drainage shall be laid upstream and each run between manholes shall be laid complete prior to backfilling. Where this is not practical trial holes or other means of identifying the line and level of services shall be carried out prior to works commencing.
 11. All branch drains, or connections, are to discharge to the collectors obliquely, and in the direction of the main flow.
 12. All low spots on hardstanding areas to have yard gullies unless permeable paving is used.
 13. The developer must self-verify and certify that the design criteria, material standards and workmanship specifications for the proposed adoptable sewers are in accordance with those set out in "Sewers for Adoption" 7th Edition, A Section 106 application to connect must be made to the water authority. The developer shall give 21 days' notice prior to connection, and the works may only be undertaken by a SSIP accredited contractor.
 14. The foul sewers must achieve a minimum flow velocity of 0.75 m/s at one third design flow or when the sewer has a nominal internal diameter of 100mm or where 10 properties or less are connected the sewer shall be laid at minimum of 1:80. Where the sewer has a nominal internal diameter of 150mm and at least 10 dwelling units are connected the sewer will be laid at a minimum gradient of 1:150. The maximum gradient a sewer can be laid is 1:5.
 15. The surface water sewers must achieve a minimum flow velocity of 1 m/s at pipe full flow or when the sewer has a nominal internal diameter of 100mm the sewer must be laid at minimum of 1:100. Where the sewer has a nominal internal diameter of 150mm or greater the sewer will be laid at a minimum gradient of 1:150. The maximum gradient a sewer can be laid is 1:5.
 16. All inspection chamber and manhole covers should adhere to BS EN 124 and be suitable for where the chambers and manholes are situated.
 17. Where sewers are located in proximity to or between buildings refer to Figures B.1 and B.2.
 18. Where new drains pass beneath existing foundations, the walls/foundations are to be fully supported in the temporary condition. Trenches to be filled with concrete post-construction with rocker pipes placed either side of the wall, in accordance with the details

D	13.01.26	Layout updated following highway comments	TP	SD
C	11.11.25	SW amended following Network design	TP	SD
B	11.11.25	Drainage design added	TP	SD
A	03.11.25	Minor Amendments to FFL's	TP	SD
-	31.10.25	First Issue	TP	SD

CLIENT:

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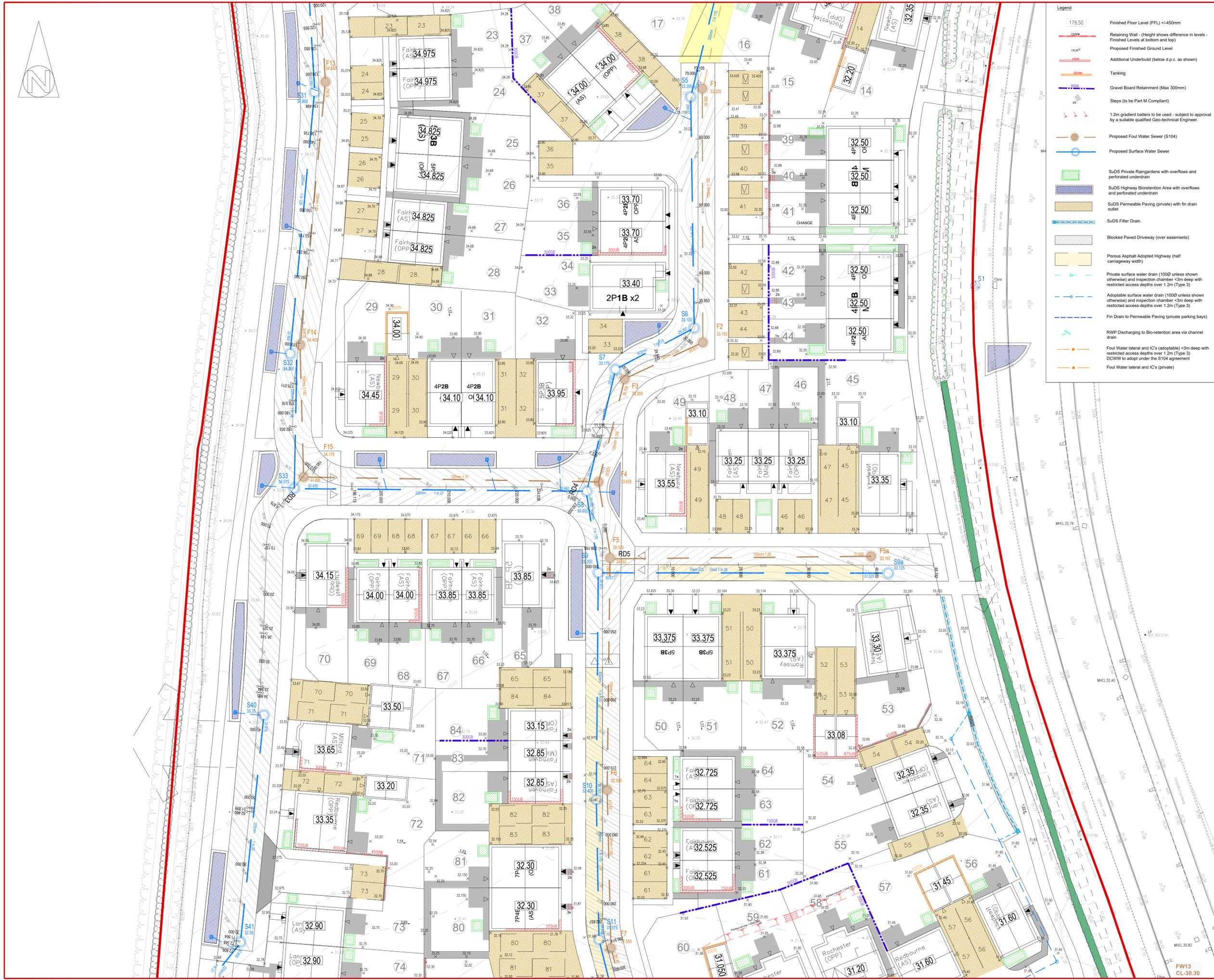
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PROJECT: Carmarthen West

DRAWING TITLE: Engineering Layout Sheet 1

DRAWN:	CHK:	STATUS:	SCALE:
TP	SJD	Preliminary	1:250@A1
DATE:	JOB NO:	DWG. NO.:	REV.:
October 2025	2262	100-1	D



Legend

	Finished Floor Level (FLL) +1450mm
	Retaining Wall - (Height shows difference in levels - Finished Levels at bottom and top)
	Proposed Finished Ground Level
	Additional Underbuild (below d.p.c. as shown)
	Tanking
	Gravel Road Retainment (Max 300mm)
	Steps (to be Part M Compliant)
	1:2m gradient batters to be used - subject to approval by a suitable qualified Geo-technical Engineer.
	Proposed Foul Water Sewer (S104)
	Proposed Surface Water Sewer
	SuDS Private Rain Gardens with overflows and perforated underdrain
	SuDS Highway Bioretention Area with overflows and perforated underdrain
	SuDS Permeable Paving (private) with fin drain outlet
	SuDS Filter Drain
	Blocked Paved Driveway (over easements)
	Porous Asphalt Adopted Highway (half carriageway width)
	Private surface water drain (1000 unless shown otherwise) and inspection chamber <3m deep with restricted access depths over 1.2m (Type 3)
	Adoptable surface water drain (1000 unless shown otherwise) and inspection chamber <3m deep with restricted access depths over 1.2m (Type 3)
	Fin Drain to Permeable Paving (private parking bays)
	RWP Discharging to Bio-retention area via channel drain
	Foul Water lateral and IC's (adoptable) <3m deep with restricted access depths over 1.2m (Type 3) DOWW to adopt under the S104 agreement
	Foul Water lateral and IC's (private)

- GENERAL NOTES**
1. Do not scale
 2. The contractor is to check and verify all buildings and site dimensions and levels, including sewer invert levels, before works start on site. The contractor is to comply in all aspects with the current Building Legislation, NRSWA1991, British Standards, Building Regulations etc.
 3. Positions of existing services/statutory undertakers apparatus adjacent to or crossing proposed excavations are to be checked by the contractor prior to starting work
 4. This drawing is to be read in conjunction with and checked against all other drawings, engineering details, specification and any structural, geotechnical or other specialist document provided.
 5. Any anomaly or contradiction between any of the above is to be reported to the client.
 6. This drawing is schematic for clarity only, positions of pipe runs and manholes may vary on site due to site conditions

- ROAD AND SEWER ADOPTION NOTES**
1. All works for Adoption under a Section 38 Agreement shall be carried out to the approval of Carmarthen County Council.
 2. All works for Adoption under a Section 104 Agreement shall be carried out to the National Water Council Guide "Sewers for Adoption" 7th Edition and Dwr Cymru Welsh Water's requirements.
 3. Street lighting positions to be pegged on site and agreed by the local authority prior to erection commencing.

- DRAINAGE NOTES**
1. All private drainage shall be in accordance with BS8301 and relevant sections of Approved Document H of the Building Regulations.
 2. The contractor is to check the level of existing sewers being used as outfalls or crossing proposed drainage runs PRIOR to laying any pipes. Any discrepancies are to be reported to PHG Consulting Engineers.
 3. Position of soil pipes, stubstabs, WC outlets, rainwater downpipes, etc. positions are to be checked against the house type working drawings.
 4. Private house drainage will be flexibly jointed plastic or clay pipework. Diameter 100mm unless shown otherwise.
 5. All connections for House Drainage shall be 100mm unless noted otherwise and must extend 500mm behind the back of footway/homezone road. All connections when laid shall be plugged, protected as necessary and marked with a stake for future use.
 6. For private drains where cover to pipes is less than 900mm in vertical areas or 500mm in other areas protection in the form of a 100mm thick concrete pad shall be provided over the pipe granular surround.
 7. Where pipes pass through screen walls, footings or retaining walls, lintels are to be provided over. Under buildings pipes shall be surrounded with 150mm thickness of granular material. Where drains pass within 1m of buildings the wall foundation shall be taken down below the invert of the pipe.
 8. Where drains do not exceed 600mm deep, plastic or clay access fittings minimum diameter 225mm shall be used. Elsewhere proprietary plastic or precast concrete inspection chambers shall be used. Unless shown otherwise FW inspection chambers are to be 750mm below dpc level and SW chambers and rodding eyes to be 600mm below dpc.
 9. All gullies and rainwater downpipes connected directly to drains are to be roddable.
 10. All drainage shall be laid upstream and each run between manholes shall be laid complete prior to backfilling. Where this is not practical trial holes or other means of identifying the line and level of services shall be carried out prior to works commencing.
 11. All branch drains, or connections, are to discharge to the collectors obliquely, and in the direction of the main flow.
 12. All low spots on hardstanding areas to have yard gullies unless permeable paving is used.
 13. The developer must self-verify and certify that the design criteria, material standards and workmanship specifications for the proposed adoptable sewers are in accordance with those set out in "Sewers for Adoption" 7th Edition, A Section 106 application to connect must be made to the water authority, the developer shall give 21 days' notice prior to connection, and the works may only be undertaken by a SSIP accredited contractor.
 14. The foul sewers must achieve a minimum flow velocity of 0.75 m/s at one third design flow or when the sewer has a nominal internal diameter of 100mm or where 10 properties or less are connected the sewer must be laid at minimum of 1:80. Where the sewer has a nominal internal diameter of 150mm and at least 10 dwelling units are connected the sewer will be laid at a minimum gradient of 1:150. The maximum gradient a sewer can be laid is 1:5.
 15. The surface water sewers must achieve a minimum flow velocity of 1 m/s at pipe full flow or when the sewer has a nominal internal diameter of 100mm the sewer must be laid at minimum of 1:100. Where the sewer has a nominal internal diameter of 150mm or greater the sewer will be laid at a minimum gradient of 1:150. The maximum gradient a sewer can be laid is 1:5.
 16. All inspection chamber and manhole covers should adhere to BS EN 124 and be suitable for where the chambers and manholes are situated.
 17. Where sewers are located in proximity or between buildings refer to Figures B.1 and B.2.
 18. Where new drains pass beneath existing foundations, the walls/foundations are to be fully supported in the temporary condition. Trenches to be filled with concrete post-construction with rodder pipes placed either side of the wall, in accordance with the details

D	13.01.26	Layout updated following highway comments	TP	SD
C	13.11.25	SW amended following Network design	TP	SD
B	11.11.25	Drainage design added	TP	SD
A	03.11.25	Minor Amendments to FFL's	TP	SD
-	31.10.25	First Issue	TP	SD

REV. DATE DETAILS AMENDMENTS BY CHK.

CLIENT:

LOVELL

CONSULTING ENGINEERS

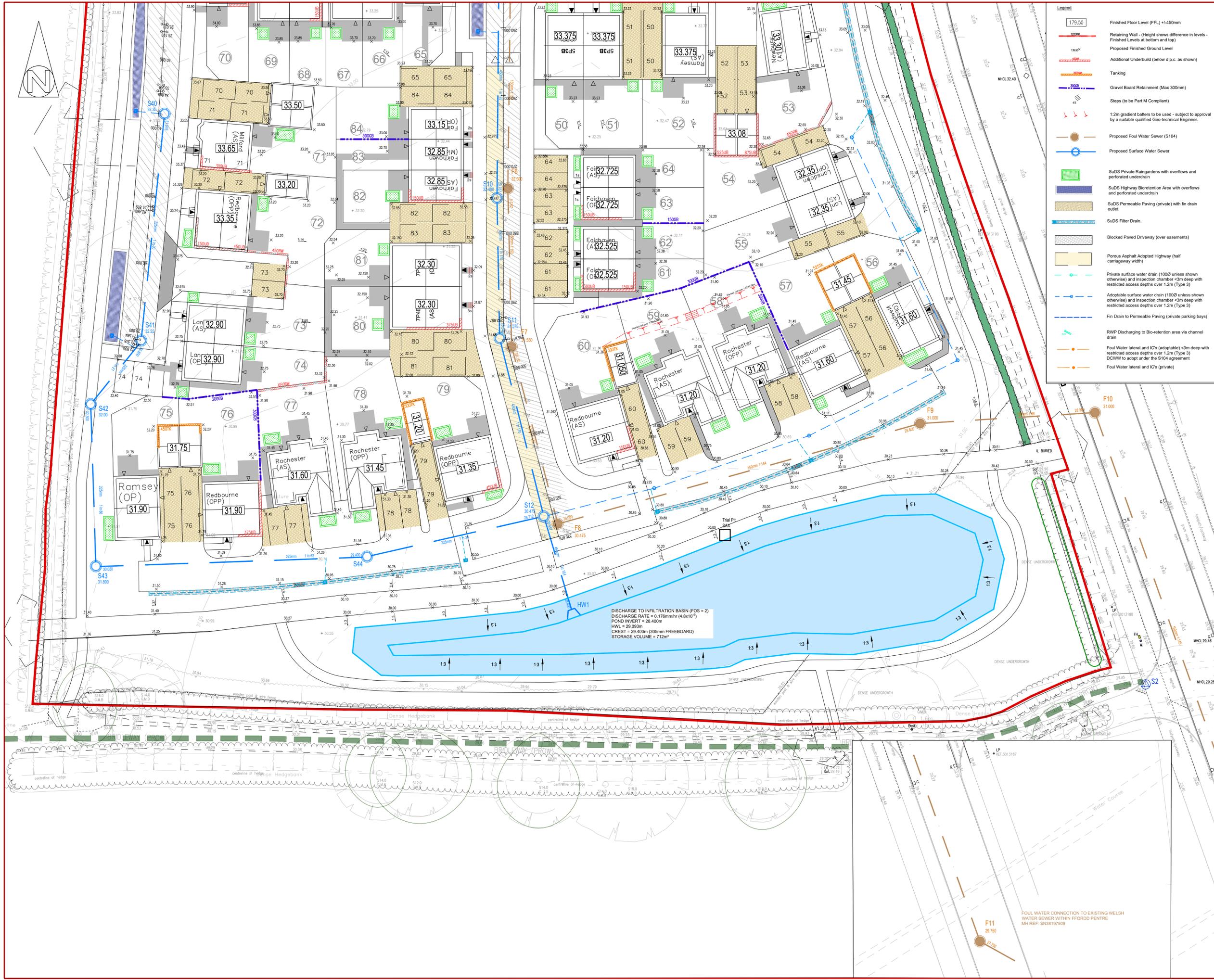
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PHG CONSULTING
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phg-consulting-engineers

PROJECT: Carmarthen West

DRAWING TITLE: Engineering Layout Sheet 2

DRAWN:	CHK:	STATUS:	SCALE:
TP	SJD	Preliminary	1:250@A1
DATE:	JOB NO:	DWG NO:	REV:
October 2025	2262	100-2	D



Legend

- 179.50 Finished Floor Level (FLL) +/-450mm
- Retaining Wall - (Height shows difference in levels - Finished Levels at bottom and top)
- Proposed Finished Ground Level
- Additional Underbuild (below d.p.c. as shown)
- Tanking
- Gravel Board Retainment (Max 300mm)
- Steps (to be Part M Compliant)
- 1:2m gradient batters to be used - subject to approval by a suitable qualified Geo-technical Engineer.
- Proposed Foul Water Sewer (S104)
- Proposed Surface Water Sewer
- SuDS Private Raingardens with overflows and perforated underdrain
- SuDS Highway Bioretention Area with overflows and perforated underdrain
- SuDS Permeable Paving (private) with fin drain outlet
- SuDS Filter Drain.
- Blocked Paved Driveway (over easements)
- Porous Asphalt Adopted Highway (half carriageway width)
- Private surface water drain (1000 unless shown otherwise) and inspection chamber -3m deep with restricted access depths over 1.2m (Type 3)
- Adoptable surface water drain (1000 unless shown otherwise) and inspection chamber -3m deep with restricted access depths over 1.2m (Type 3)
- Fin Drain to Permeable Paving (private parking bays)
- RWP Discharging to Bio-retention area via channel drain
- Foul Water lateral and IC's (adoptable) -3m deep with restricted access depths over 1.2m (Type 3)
- DCWW to adopt under the S104 agreement
- Foul Water lateral and IC's (private)

- GENERAL NOTES**
- Do not scale
 - The contractor is to check and verify all buildings and site dimensions and levels, including sewer invert levels, before works start on site. The contractor is to comply in all aspects with the current Building Legislation, NRSWA1991, British Standards, Building Regulations etc.
 - Positions of existing services/statutory undertakers apparatus adjacent to or crossing proposed excavations are to be checked by the contractor prior to starting work
 - This drawing is to be read in conjunction with and checked against all other drawings, engineering details, specification and any structural, geotechnical or other specialist document provided.
 - Any anomaly or contradiction between any of the above is to be reported to the client.
 - This drawing is schematic for clarity only; positions of pipe runs and manholes may vary on site due to site conditions

- ROAD AND SEWER ADOPTION NOTES**
- All works for Adoption under a Section 38 Agreement shall be carried out to the approval of Carmarthen County Council.
 - All works for Adoption under a Section 104 Agreement shall be carried out to the National Water Council Guide "Sewers for Adoption" 7th Edition and Dwr Cymru Welsh Water's requirements.
 - Street lighting positions to be pegged on site and agreed by the local authority prior to erection commencing.

- DRAINAGE NOTES**
- All private drainage shall be in accordance with BS8301 and relevant sections of Approved Document H of the Building Regulations.
 - The contractor is to check the level of existing sewers being used as outfalls or crossing proposed drainage runs PRIOR to laying any pipes. Any discrepancies are to be reported to PHG Consulting Engineers.
 - Position of soil pipes, stubstacks, WC outlets, rainwater downpipes, etc., positions are to be checked against the house type working drawings.
 - Private house drainage will be flexibly jointed plastic or clay pipework. Diameter 100mm unless shown otherwise.
 - All connections for House Drainage shall be 100mm unless noted otherwise and must extend 500mm behind the back of footpath/homezone road. All connections when laid shall be plugged, protected as necessary and marked with a stake for future use.
 - For private drains where cover to pipes is less than 900mm in vertical areas or 500mm in other areas protection in the form of a 100mm thick concrete pad shall be provided over the pipe grating surround.
 - Where pipes pass through screen walls, footings or retaining walls, intels are to be provided over. Under buildings pipes shall be surrounded with 150mm thickness of granular material. Where drains pass within 1m of buildings the wall foundation shall be taken down below the invert of the pipe.
 - Where drains do not exceed 600mm deep, plastic or clay access fittings minimum diameter 225mm shall be used. Elsewhere proprietary plastic or precast concrete inspection chambers shall be used. Unless shown otherwise SW inspection chambers are to be 750mm below dpc level and SW chambers and rodding eyes to be 600mm below dpc.
 - All gullies and rainwater downpipes connected directly to drains are to be roddable.
 - All drainage shall be laid upstream and each run between manholes shall be laid complete prior to backfilling. Where this is not practical trial holes or other means of identifying the line and level of services shall be carried out prior to works commencing.
 - All branch drains, or connections, are to discharge to the collectors obliquely, and in the direction of the main flow.
 - All low spots on hardstanding areas to have yard gullies unless permeable paving is used.
 - The developer must self-verify and certify that the design criteria, material standards and workmanship specifications for the proposed adoptable sewers are in accordance with those set out in "Sewers for Adoption" 7th Edition, A Section 106 application to connect must be made to the water authority, the developer shall give 21 days' notice prior to connection, and the works may only be undertaken by a SSIP accredited contractor.
 - The foul sewers must achieve a minimum flow velocity of 0.75 m/s at one third design flow or when the sewer has a nominal internal diameter of 100mm or where 10 properties or less are connected the sewer must be laid at minimum of 1:80. Where the sewer has a nominal internal diameter of 150mm and at least 10 dwelling units are connected the sewer will be laid at a minimum gradient of 1:150. The maximum gradient a sewer can be laid is 1:15.
 - The surface water sewers must achieve a minimum flow velocity of 1 m/s at pipe full flow or when the sewer has a nominal internal diameter of 100mm the sewer must be laid at minimum of 1:100. Where the sewer has a nominal internal diameter of 150mm or greater the sewer will be laid at a minimum gradient of 1:150. The maximum gradient a sewer can be laid is 1:15.
 - All inspection chamber and manhole covers should adhere to BS EN 124 and be suitable for where the chambers and manholes are situated.
 - Where sewers are located in proximity or between buildings refer to Figures B.1 and B.2.
 - Where new drains pass beneath existing foundations, the walls/foundations are to be fully supported in the temporary condition. Trenches to be filled with concrete post-construction with rocker pipes placed either side of the wall, in accordance with the details

DISCHARGE TO INFILTRATION BASIN (FOS = 2)
 DISCHARGE RATE = 0.176mm/hr (4.8x10⁻³)
 POND INVERT = 28.400m
 HWL = 29.026m
 CREST = 29.400m (305mm FREEBOARD)
 STORAGE VOLUME = 712m³

REV.	DATE	DETAILS	AMENDMENTS	BY	CHK.
E	30.01.26	Pond size amended following soakaway tests		TP	SD
D	13.01.26	Layout updated following highway comments		TP	SD
C	13.11.25	SW amended following Network design		TP	SD
B	11.11.25	Drainage design added		TP	SD
A	03.11.25	Minor Amendments to FFL's		TP	SD
-	31.10.25	First Issue		TP	SD

CLIENT:

LOVELL

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PROJECT: Carmarthen West

DRAWING TITLE: Engineering Layout Sheet 3

DRAWN	CHK	STATUS	SCALE
TP	SJD	Preliminary	1:250@A1
DATE	JOB NO.	DWG. NO.	REV.
October 2025	2262	100-3	E

Appendix E Drainage Calculations

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	18.500	Minimum Backdrop Height (m)	0.200
Ratio-R	0.250	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.094	5.00	31.600	1200	238608.854	219812.958	1.450
20	0.066	5.00	34.545	1200	238570.632	219785.380	1.845
2	0.078	5.00	32.960	1200	238594.294	219798.295	3.007
3	0.070	5.00	32.323	1200	238618.219	219775.127	2.566
4			32.695	1200	238612.681	219763.619	3.013
5	0.073	5.00	33.248	1500	238608.264	219745.430	3.751
6	0.072	5.00	33.096	1500	238608.662	219711.425	3.799
7			33.251	1500	238597.065	219705.360	4.031
30	0.110	5.00	35.139	1200	238550.538	219784.628	1.789
31	0.054	5.00	34.790	1200	238553.758	219745.993	1.840
32	0.048	5.00	34.350	1200	238550.236	219707.535	1.700
33	0.056	5.00	34.069	1200	238549.792	219687.884	1.619
8	0.047	5.00	33.551	1500	238591.958	219687.400	4.516
9a	0.090	5.00	33.034	1200	238628.425	219677.519	1.425
9	0.078	5.00	33.395	1500	238594.593	219677.554	4.420
10	0.078	5.00	32.398	1500	238594.257	219642.125	3.631
11	0.048	5.00	31.568	1500	238594.652	219621.526	2.922
40	0.065	5.00	33.326	1200	238545.318	219654.515	1.350
41	0.050	5.00	32.595	1200	238541.872	219621.188	1.745
42			31.904	1200	238536.197	219611.159	1.604
43	0.036	5.00	31.527	1200	238536.556	219587.974	1.507
44	0.050	5.00	30.532	1200	238575.120	219589.428	1.132
12	0.155	5.00	30.480	1500	238601.138	219595.328	1.993
Pond	0.027		29.400		238605.233	219581.633	1.000

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	1	2	20.664	0.600	30.150	30.028	0.122	170.0	225	5.34	49.8
2.000	20	2	26.957	0.600	32.700	31.352	1.348	20.0	225	5.15	50.0
1.001	2	3	33.304	0.600	29.953	29.757	0.196	170.0	300	5.81	48.3
1.002	3	4	12.771	0.600	29.757	29.682	0.075	170.0	300	5.98	47.8

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.000	39.7	12.7	1.225	2.707	0.094	0.0	87	0.892
2.000	2.939	116.8	8.9	1.620	1.383	0.066	0.0	42	1.751
1.001	1.203	85.0	31.2	2.707	2.266	0.238	0.0	126	1.113
1.002	1.203	85.0	39.9	2.266	2.713	0.308	0.0	144	1.184

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.003	4	5	18.718	0.600	29.682	29.572	0.110	170.0	300	6.24	47.0
1.004	5	6	34.007	0.600	29.497	29.297	0.200	170.0	375	6.65	45.8
1.005	6	7	13.087	0.600	29.297	29.220	0.077	170.0	375	6.81	45.4
1.006	7	8	18.672	0.600	29.220	29.110	0.110	170.0	375	7.03	44.8
3.000	30	31	38.769	0.600	33.350	32.950	0.400	96.9	225	5.49	49.3
3.001	31	32	38.619	0.600	32.950	32.650	0.300	128.7	225	6.05	47.6
3.002	32	33	19.656	0.600	32.650	32.450	0.200	98.3	225	6.29	46.8
3.003	33	8	42.169	0.600	32.450	30.860	1.590	26.5	225	6.57	46.0
1.007	8	9	10.192	0.600	29.035	28.975	0.060	170.0	450	7.14	44.5
4.000	9a	9	33.832	0.600	31.609	30.071	1.538	22.0	225	5.20	50.0
1.008	9	10	35.431	0.600	28.975	28.767	0.208	170.0	450	7.52	43.6
1.009	10	11	20.603	0.600	28.767	28.646	0.121	170.0	450	7.74	43.1
1.010	11	12	26.989	0.600	28.646	28.487	0.159	170.0	450	8.03	42.4
5.000	40	41	33.505	0.600	31.976	30.850	1.126	29.8	225	5.23	50.0
5.001	41	42	11.523	0.600	30.850	30.300	0.550	21.0	225	5.30	50.0
5.002	42	43	23.188	0.600	30.300	30.020	0.280	82.8	225	5.57	49.1
5.003	43	44	38.591	0.600	30.020	29.400	0.620	62.2	225	5.96	47.8
5.004	44	12	26.679	0.600	29.400	28.712	0.688	38.8	225	6.17	47.2
1.011	12	Pond	14.294	0.600	28.487	28.400	0.087	164.3	450	8.18	42.1

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.003	1.203	85.0	39.2	2.713	3.376	0.308	0.0	143	1.180
1.004	1.386	153.1	47.3	3.376	3.424	0.381	0.0	142	1.226
1.005	1.386	153.1	55.7	3.424	3.656	0.453	0.0	156	1.281
1.006	1.386	153.1	55.0	3.656	4.066	0.453	0.0	155	1.276
3.000	1.328	52.8	14.7	1.564	1.615	0.110	0.0	81	1.143
3.001	1.151	45.7	21.1	1.615	1.475	0.164	0.0	108	1.130
3.002	1.319	52.4	26.9	1.475	1.394	0.212	0.0	115	1.329
3.003	2.550	101.4	33.4	1.394	2.466	0.268	0.0	88	2.289
1.007	1.556	247.5	92.7	4.066	3.970	0.768	0.0	190	1.448
4.000	2.801	111.4	12.2	1.200	3.099	0.090	0.0	50	1.848
1.008	1.556	247.5	110.6	3.970	3.181	0.936	0.0	210	1.514
1.009	1.556	247.5	118.3	3.181	2.472	1.014	0.0	219	1.540
1.010	1.556	247.5	122.0	2.472	1.543	1.062	0.0	223	1.550
5.000	2.407	95.7	8.8	1.125	1.520	0.065	0.0	46	1.521
5.001	2.871	114.2	15.6	1.520	1.379	0.115	0.0	56	2.024
5.002	1.438	57.2	15.3	1.379	1.282	0.115	0.0	80	1.224
5.003	1.660	66.0	19.6	1.282	0.907	0.151	0.0	84	1.453
5.004	2.107	83.8	25.7	0.907	1.543	0.201	0.0	86	1.863
1.011	1.583	251.8	161.7	1.543	0.550	1.418	0.0	262	1.675

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	20.664	170.0	225	Circular_Default Sewer Type	31.600	30.150	1.225	32.960	30.028	2.707
2.000	26.957	20.0	225	Circular_Default Sewer Type	34.545	32.700	1.620	32.960	31.352	1.383
1.001	33.304	170.0	300	Circular_Default Sewer Type	32.960	29.953	2.707	32.323	29.757	2.266
1.002	12.771	170.0	300	Circular_Default Sewer Type	32.323	29.757	2.266	32.695	29.682	2.713
1.003	18.718	170.0	300	Circular_Default Sewer Type	32.695	29.682	2.713	33.248	29.572	3.376
1.004	34.007	170.0	375	Circular_Default Sewer Type	33.248	29.497	3.376	33.096	29.297	3.424
1.005	13.087	170.0	375	Circular_Default Sewer Type	33.096	29.297	3.424	33.251	29.220	3.656
1.006	18.672	170.0	375	Circular_Default Sewer Type	33.251	29.220	3.656	33.551	29.110	4.066
3.000	38.769	96.9	225	Circular_Default Sewer Type	35.139	33.350	1.564	34.790	32.950	1.615
3.001	38.619	128.7	225	Circular_Default Sewer Type	34.790	32.950	1.615	34.350	32.650	1.475
3.002	19.656	98.3	225	Circular_Default Sewer Type	34.350	32.650	1.475	34.069	32.450	1.394
3.003	42.169	26.5	225	Circular_Default Sewer Type	34.069	32.450	1.394	33.551	30.860	2.466
1.007	10.192	170.0	450	Circular_Default Sewer Type	33.551	29.035	4.066	33.395	28.975	3.970
4.000	33.832	22.0	225	Circular_Default Sewer Type	33.034	31.609	1.200	33.395	30.071	3.099
1.008	35.431	170.0	450	Circular_Default Sewer Type	33.395	28.975	3.970	32.398	28.767	3.181
1.009	20.603	170.0	450	Circular_Default Sewer Type	32.398	28.767	3.181	31.568	28.646	2.472
1.010	26.989	170.0	450	Circular_Default Sewer Type	31.568	28.646	2.472	30.480	28.487	1.543
5.000	33.505	29.8	225	Circular_Default Sewer Type	33.326	31.976	1.125	32.595	30.850	1.520
5.001	11.523	21.0	225	Circular_Default Sewer Type	32.595	30.850	1.520	31.904	30.300	1.379
5.002	23.188	82.8	225	Circular_Default Sewer Type	31.904	30.300	1.379	31.527	30.020	1.282
5.003	38.591	62.2	225	Circular_Default Sewer Type	31.527	30.020	1.282	30.532	29.400	0.907
5.004	26.679	38.8	225	Circular_Default Sewer Type	30.532	29.400	0.907	30.480	28.712	1.543
1.011	14.294	164.3	450	Circular_Default Sewer Type	30.480	28.487	1.543	29.400	28.400	0.550

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	1200	Manhole	Adoptable	2	1200	Manhole	Adoptable
2.000	20	1200	Manhole	Adoptable	2	1200	Manhole	Adoptable
1.001	2	1200	Manhole	Adoptable	3	1200	Manhole	Adoptable
1.002	3	1200	Manhole	Adoptable	4	1200	Manhole	Adoptable
1.003	4	1200	Manhole	Adoptable	5	1500	Manhole	Adoptable
1.004	5	1500	Manhole	Adoptable	6	1500	Manhole	Adoptable
1.005	6	1500	Manhole	Adoptable	7	1500	Manhole	Adoptable
1.006	7	1500	Manhole	Adoptable	8	1500	Manhole	Adoptable
3.000	30	1200	Manhole	Adoptable	31	1200	Manhole	Adoptable
3.001	31	1200	Manhole	Adoptable	32	1200	Manhole	Adoptable
3.002	32	1200	Manhole	Adoptable	33	1200	Manhole	Adoptable
3.003	33	1200	Manhole	Adoptable	8	1500	Manhole	Adoptable
1.007	8	1500	Manhole	Adoptable	9	1500	Manhole	Adoptable
4.000	9a	1200	Manhole	Adoptable	9	1500	Manhole	Adoptable
1.008	9	1500	Manhole	Adoptable	10	1500	Manhole	Adoptable
1.009	10	1500	Manhole	Adoptable	11	1500	Manhole	Adoptable
1.010	11	1500	Manhole	Adoptable	12	1500	Manhole	Adoptable
5.000	40	1200	Manhole	Adoptable	41	1200	Manhole	Adoptable
5.001	41	1200	Manhole	Adoptable	42	1200	Manhole	Adoptable
5.002	42	1200	Manhole	Adoptable	43	1200	Manhole	Adoptable
5.003	43	1200	Manhole	Adoptable	44	1200	Manhole	Adoptable
5.004	44	1200	Manhole	Adoptable	12	1500	Manhole	Adoptable
1.011	12	1500	Manhole	Adoptable	Pond		Junction	

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	✓
Rainfall Events	Singular	Drain Down Time (mins)	240
FSR Region	England and Wales	Additional Storage (m ³ /ha)	20.0
M5-60 (mm)	18.500	Starting Level (m)	
Ratio-R	0.250	Check Discharge Rate(s)	✓
Summer CV	0.750	Check Discharge Volume	✓
Winter CV	0.840	100 year 360 minute (m ³)	
Analysis Speed	Normal		

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	40	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.95
Greenfield Method	IH124	Growth Factor 100 year	2.48
Positively Drained Area (ha)		Betterment (%)	0
SAAR (mm)		QBar	
Soil Index	1	Q 1 year (l/s)	
SPR	0.10	Q 30 year (l/s)	
Region	1	Q 100 year (l/s)	
Growth Factor 1 year	0.85		

Pre-development Discharge Volume

Site Makeup	Greenfield	Return Period (years)	100
Greenfield Method	FSR/FEH	Climate Change (%)	0
Positively Drained Area (ha)		Storm Duration (mins)	360
Soil Index	1	Betterment (%)	0
SPR	0.10	PR	
CWI		Runoff Volume (m ³)	

Node Pond Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.17600	Safety Factor	2.0	Invert Level (m)	28.400
Side Inf Coefficient (m/hr)	0.17600	Porosity	1.00	Time to half empty (mins)	243

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	816.0	816.0	1.000	1423.0	1434.3

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.73%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute winter	1	10	30.230	0.080	10.5	0.1947	0.0000	OK
15 minute winter	20	10	32.738	0.038	7.3	0.0708	0.0000	OK
15 minute winter	2	10	30.068	0.115	26.0	0.1894	0.0000	OK
15 minute winter	3	11	29.900	0.143	33.4	0.2401	0.0000	OK
15 minute winter	4	11	29.821	0.139	33.5	0.1569	0.0000	OK
15 minute winter	5	11	29.634	0.137	41.2	0.2958	0.0000	OK
15 minute winter	6	11	29.456	0.159	48.5	0.3404	0.0000	OK
15 minute winter	7	12	29.373	0.153	47.7	0.2705	0.0000	OK
15 minute winter	30	10	33.422	0.072	12.2	0.1705	0.0000	OK
15 minute winter	31	11	33.048	0.098	17.9	0.1683	0.0000	OK
15 minute winter	32	11	32.761	0.111	22.8	0.1879	0.0000	OK
15 minute winter	33	11	32.533	0.083	28.7	0.1519	0.0000	OK
15 minute winter	8	11	29.245	0.210	79.9	0.4151	0.0000	OK
15 minute winter	9a	10	31.655	0.046	10.0	0.1093	0.0000	OK
15 minute winter	9	11	29.184	0.209	97.2	0.4424	0.0000	OK
15 minute winter	10	12	28.996	0.229	104.1	0.5021	0.0000	OK
15 minute winter	11	12	28.876	0.230	109.5	0.4827	0.0000	OK
15 minute winter	40	10	32.017	0.041	7.2	0.0866	0.0000	OK
15 minute winter	41	10	30.900	0.050	12.7	0.0855	0.0000	OK
15 minute winter	42	11	30.373	0.073	12.5	0.0820	0.0000	OK
15 minute winter	43	11	30.097	0.077	16.3	0.1241	0.0000	OK
15 minute winter	44	11	29.481	0.081	21.7	0.1623	0.0000	OK
15 minute winter	12	12	28.726	0.239	144.0	0.7943	0.0000	OK
180 minute winter	Pond	132	28.522	0.122	53.3	103.9727	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)
15 minute winter	1	1.000	2	10.2	0.829	0.256	0.2544
15 minute winter	20	2.000	2	7.2	1.622	0.061	0.1191
15 minute winter	2	1.001	3	25.9	0.897	0.304	0.9608
15 minute winter	3	1.002	4	33.5	1.030	0.394	0.4151
15 minute winter	4	1.003	5	33.4	1.099	0.393	0.5693
15 minute winter	5	1.004	6	41.0	1.016	0.268	1.3735
15 minute winter	6	1.005	7	47.7	1.109	0.312	0.5631
15 minute winter	7	1.006	8	48.0	1.195	0.314	0.7510
15 minute winter	30	3.000	31	11.9	0.875	0.226	0.5318
15 minute winter	31	3.001	32	17.8	0.986	0.388	0.6958
15 minute winter	32	3.002	33	22.8	1.393	0.435	0.3225
15 minute winter	33	3.003	8	28.5	2.172	0.281	0.5536
15 minute winter	8	1.007	9	80.3	1.117	0.325	0.7364
15 minute winter	9a	4.000	9	9.8	1.720	0.088	0.1921
15 minute winter	9	1.008	10	97.2	1.276	0.393	2.7003
15 minute winter	10	1.009	11	105.2	1.296	0.425	1.6732
15 minute winter	11	1.010	12	109.9	1.321	0.444	2.2554
15 minute winter	40	5.000	41	7.1	1.228	0.074	0.1938
15 minute winter	41	5.001	42	12.5	1.430	0.110	0.1015
15 minute winter	42	5.002	43	12.5	1.082	0.218	0.2674
15 minute winter	43	5.003	44	16.5	1.329	0.249	0.4782
15 minute winter	44	5.004	12	21.7	1.742	0.259	0.3322
15 minute winter	12	1.011	Pond	144.3	3.653	0.573	0.6541
180 minute winter	Pond	Infiltration		21.1			

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.93%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute winter	1	10	30.286	0.136	25.4	0.3310	0.0000	OK
15 minute winter	20	10	32.761	0.061	17.9	0.1118	0.0000	OK
15 minute winter	2	11	30.155	0.202	63.6	0.3341	0.0000	OK
15 minute winter	3	11	30.043	0.286	81.5	0.4788	0.0000	OK
15 minute winter	4	11	29.941	0.259	80.9	0.2932	0.0000	OK
15 minute winter	5	12	29.750	0.253	99.5	0.5454	0.0000	OK
15 minute winter	6	12	29.694	0.397	117.9	0.8528	0.0000	SURCHARGED
15 minute winter	7	12	29.639	0.419	113.1	0.7397	0.0000	SURCHARGED
15 minute winter	30	10	33.469	0.119	29.8	0.2808	0.0000	OK
15 minute winter	31	11	33.131	0.181	44.1	0.3107	0.0000	OK
15 minute winter	32	11	32.872	0.222	55.7	0.3762	0.0000	OK
15 minute winter	33	11	32.592	0.142	69.0	0.2591	0.0000	OK
15 minute winter	8	12	29.566	0.531	182.6	1.0495	0.0000	SURCHARGED
15 minute winter	9a	10	31.682	0.073	24.4	0.1742	0.0000	OK
15 minute winter	9	12	29.499	0.524	220.9	1.1118	0.0000	SURCHARGED
15 minute winter	10	12	29.279	0.512	237.9	1.1251	0.0000	SURCHARGED
15 minute winter	11	12	29.111	0.465	248.5	0.9746	0.0000	SURCHARGED
15 minute winter	40	10	32.041	0.065	17.7	0.1358	0.0000	OK
15 minute winter	41	10	30.930	0.080	31.0	0.1367	0.0000	OK
15 minute winter	42	10	30.423	0.123	30.7	0.1387	0.0000	OK
15 minute winter	43	11	30.150	0.130	40.1	0.2099	0.0000	OK
15 minute winter	44	11	29.531	0.131	53.1	0.2638	0.0000	OK
15 minute winter	12	11	28.910	0.423	334.0	1.4047	0.0000	OK
240 minute winter	Pond	188	28.754	0.354	99.9	327.4797	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)
15 minute winter	1	1.000	2	24.8	1.027	0.624	0.4991
15 minute winter	20	2.000	2	17.7	2.096	0.151	0.2270
15 minute winter	2	1.001	3	62.7	1.047	0.737	1.9946
15 minute winter	3	1.002	4	80.9	1.212	0.952	0.8550
15 minute winter	4	1.003	5	80.8	1.334	0.950	1.1287
15 minute winter	5	1.004	6	99.5	1.167	0.650	3.2202
15 minute winter	6	1.005	7	113.1	1.223	0.738	1.4435
15 minute winter	7	1.006	8	116.0	1.283	0.757	2.0595
15 minute winter	30	3.000	31	29.4	1.056	0.556	1.0673
15 minute winter	31	3.001	32	43.4	1.174	0.949	1.4260
15 minute winter	32	3.002	33	54.7	1.639	1.044	0.6491
15 minute winter	33	3.003	8	69.2	2.694	0.683	1.0834
15 minute winter	8	1.007	9	184.9	1.221	0.747	1.6149
15 minute winter	9a	4.000	9	24.1	2.212	0.216	0.3680
15 minute winter	9	1.008	10	221.2	1.419	0.894	5.6138
15 minute winter	10	1.009	11	238.2	1.504	0.963	3.2644
15 minute winter	11	1.010	12	247.8	1.574	1.001	4.2232
15 minute winter	40	5.000	41	17.5	1.582	0.183	0.3708
15 minute winter	41	5.001	42	30.7	1.771	0.269	0.2004
15 minute winter	42	5.002	43	30.4	1.330	0.532	0.5303
15 minute winter	43	5.003	44	40.2	1.683	0.610	0.9230
15 minute winter	44	5.004	12	53.6	2.047	0.639	0.8135
15 minute winter	12	1.011	Pond	341.0	3.902	1.354	1.3262
240 minute winter	Pond	Infiltration		24.8			

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.89%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute winter	1	11	31.600	1.450	45.9	3.5206	2.8681	FLOOD
15 minute winter	20	10	32.783	0.083	32.3	0.1536	0.0000	OK
15 minute winter	2	12	31.587	1.634	95.6	2.6958	0.0000	SURCHARGED
15 minute winter	3	12	31.448	1.691	113.5	2.8357	0.0000	SURCHARGED
15 minute winter	4	12	31.310	1.628	101.7	1.8408	0.0000	SURCHARGED
15 minute winter	5	12	31.125	1.628	129.6	3.5099	0.0000	SURCHARGED
15 minute winter	6	12	30.966	1.669	152.4	3.5814	0.0000	SURCHARGED
15 minute winter	7	12	30.845	1.625	149.3	2.8717	0.0000	SURCHARGED
15 minute winter	30	12	34.391	1.041	53.7	2.4569	0.0000	SURCHARGED
15 minute winter	31	12	34.089	1.139	68.4	1.9566	0.0000	SURCHARGED
15 minute winter	32	12	33.430	0.780	85.6	1.3227	0.0000	SURCHARGED
15 minute winter	33	12	32.832	0.382	106.3	0.6961	0.0000	SURCHARGED
15 minute winter	8	12	30.693	1.658	264.7	3.2745	0.0000	SURCHARGED
15 minute winter	9a	10	31.710	0.101	44.0	0.2421	0.0000	OK
15 minute winter	9	12	30.553	1.578	329.0	3.3444	0.0000	SURCHARGED
15 minute winter	10	12	30.071	1.304	357.4	2.8659	0.0000	SURCHARGED
15 minute winter	11	12	29.685	1.039	375.5	2.1787	0.0000	SURCHARGED
15 minute winter	40	10	32.064	0.088	31.8	0.1851	0.0000	OK
15 minute winter	41	11	30.985	0.135	55.9	0.2302	0.0000	OK
15 minute winter	42	12	30.820	0.520	55.5	0.5883	0.0000	SURCHARGED
15 minute winter	43	12	30.583	0.563	64.8	0.9056	0.0000	SURCHARGED
15 minute winter	44	12	29.956	0.556	83.8	1.1195	0.0000	SURCHARGED
15 minute winter	12	12	29.171	0.684	516.0	2.2735	0.0000	SURCHARGED
360 minute winter	Pond	288	29.093	0.693	136.6	712.1005	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)
15 minute winter	1	1.000	2	32.8	0.992	0.826	0.8218
15 minute winter	20	2.000	2	31.9	2.459	0.273	0.6823
15 minute winter	2	1.001	3	81.4	1.156	0.957	2.3452
15 minute winter	3	1.002	4	101.7	1.444	1.196	0.8993
15 minute winter	4	1.003	5	99.8	1.418	1.174	1.3181
15 minute winter	5	1.004	6	123.1	1.183	0.804	3.7509
15 minute winter	6	1.005	7	149.3	1.353	0.975	1.4435
15 minute winter	7	1.006	8	155.3	1.475	1.014	2.0595
15 minute winter	30	3.000	31	43.5	1.093	0.823	1.5419
15 minute winter	31	3.001	32	63.4	1.595	1.386	1.5359
15 minute winter	32	3.002	33	80.5	2.025	1.536	0.7817
15 minute winter	33	3.003	8	102.0	2.782	1.006	1.6770
15 minute winter	8	1.007	9	267.7	1.690	1.082	1.6149
15 minute winter	9a	4.000	9	43.8	2.517	0.393	0.9423
15 minute winter	9	1.008	10	327.5	2.067	1.323	5.6138
15 minute winter	10	1.009	11	357.0	2.254	1.443	3.2644
15 minute winter	11	1.010	12	375.4	2.370	1.517	4.2762
15 minute winter	40	5.000	41	31.5	1.799	0.329	0.6518
15 minute winter	41	5.001	42	55.5	1.904	0.486	0.3725
15 minute winter	42	5.002	43	48.3	1.425	0.845	0.9222
15 minute winter	43	5.003	44	61.5	1.731	0.931	1.5348
15 minute winter	44	5.004	12	81.0	2.072	0.967	1.0611
15 minute winter	12	1.011	Pond	516.4	4.647	2.051	1.7893
360 minute winter	Pond	Infiltration		30.2			

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

Half Drain Time : 1232 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	29.246	0.096	0.1	5.1	O K
30 min Summer	29.286	0.136	0.1	7.3	O K
60 min Summer	29.333	0.183	0.1	9.8	O K
120 min Summer	29.385	0.235	0.1	12.6	O K
180 min Summer	29.414	0.264	0.1	14.1	O K
240 min Summer	29.433	0.283	0.1	15.1	O K
360 min Summer	29.460	0.310	0.1	16.6	O K
480 min Summer	29.476	0.326	0.1	17.4	O K
600 min Summer	29.487	0.337	0.1	18.0	O K
720 min Summer	29.494	0.344	0.1	18.4	O K
960 min Summer	29.499	0.349	0.1	18.7	O K
1440 min Summer	29.500	0.350	0.1	18.7	O K
2160 min Summer	29.493	0.343	0.1	18.3	O K
2880 min Summer	29.482	0.332	0.1	17.8	O K
4320 min Summer	29.458	0.308	0.1	16.5	O K
5760 min Summer	29.433	0.283	0.1	15.1	O K
7200 min Summer	29.408	0.258	0.1	13.8	O K
8640 min Summer	29.384	0.234	0.1	12.5	O K
10080 min Summer	29.361	0.211	0.1	11.3	O K
15 min Winter	29.258	0.108	0.1	5.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	107.582	0.0	19
30 min Summer	76.594	0.0	34
60 min Summer	52.299	0.0	64
120 min Summer	34.365	0.0	124
180 min Summer	26.314	0.0	182
240 min Summer	21.616	0.0	242
360 min Summer	16.381	0.0	362
480 min Summer	13.424	0.0	482
600 min Summer	11.487	0.0	602
720 min Summer	10.106	0.0	720
960 min Summer	8.243	0.0	934
1440 min Summer	6.166	0.0	1168
2160 min Summer	4.595	0.0	1556
2880 min Summer	3.727	0.0	1960
4320 min Summer	2.781	0.0	2808
5760 min Summer	2.261	0.0	3624
7200 min Summer	1.928	0.0	4400
8640 min Summer	1.695	0.0	5184
10080 min Summer	1.522	0.0	5952
15 min Winter	107.582	0.0	19

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
30 min Winter	29.303	0.153	0.1	8.2	O K
60 min Winter	29.356	0.206	0.1	11.0	O K
120 min Winter	29.415	0.265	0.1	14.2	O K
180 min Winter	29.449	0.299	0.1	16.0	O K
240 min Winter	29.471	0.321	0.1	17.2	O K
360 min Winter	29.503	0.353	0.1	18.8	O K
480 min Winter	29.523	0.373	0.1	19.9	O K
600 min Winter	29.537	0.387	0.1	20.7	O K
720 min Winter	29.547	0.397	0.1	21.2	O K
960 min Winter	29.557	0.407	0.1	21.8	O K
1440 min Winter	29.559	0.409	0.1	21.9	O K
2160 min Winter	29.547	0.397	0.1	21.2	O K
2880 min Winter	29.531	0.381	0.1	20.3	O K
4320 min Winter	29.491	0.341	0.1	18.2	O K
5760 min Winter	29.449	0.299	0.1	16.0	O K
7200 min Winter	29.408	0.258	0.1	13.8	O K
8640 min Winter	29.369	0.219	0.1	11.7	O K
10080 min Winter	29.333	0.183	0.1	9.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
30 min Winter	76.594	0.0	33
60 min Winter	52.299	0.0	62
120 min Winter	34.365	0.0	122
180 min Winter	26.314	0.0	180
240 min Winter	21.616	0.0	238
360 min Winter	16.381	0.0	356
480 min Winter	13.424	0.0	472
600 min Winter	11.487	0.0	586
720 min Winter	10.106	0.0	700
960 min Winter	8.243	0.0	924
1440 min Winter	6.166	0.0	1342
2160 min Winter	4.595	0.0	1684
2880 min Winter	3.727	0.0	2136
4320 min Winter	2.781	0.0	3028
5760 min Winter	2.261	0.0	3920
7200 min Winter	1.928	0.0	4752
8640 min Winter	1.695	0.0	5528
10080 min Winter	1.522	0.0	6256

107 Cowbridge Road East
Cardiff
Wales, CF11 9AG



Date 11/11/2025 09:54
File Cellular Infiltration.SRCX

Designed by ThomasPugh
Checked by

Innovyze Source Control 2020.1.3

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.500	Shortest Storm (mins)	15
Ratio R	0.250	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.026

Time (mins)		Area
From:	To:	(ha)
0	4	0.026

PHG Consulting Engineers		Page 4
107 Cowbridge Road East Cardiff Wales, CF11 9AG		
Date 11/11/2025 09:54 File Cellular Infiltration.SRCX	Designed by ThomasPugh Checked by	
Innovyze	Source Control 2020.1.3	

Model Details

Storage is Online Cover Level (m) 32.400

Cellular Storage Structure

Invert Level (m) 29.150 Safety Factor 5.0
 Infiltration Coefficient Base (m/hr) 0.04770 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	56.3	56.3	0.600	0.0	73.3
0.500	56.3	73.3			

Appendix F Infiltration Test Results Extracts.

PREPARED BY:	Quantum Geotechnic Ltd	DOCUMENT:	Technical Note 01
CLIENT:	Carmarthenshire County Council	DATE:	27 th June 2024
PROJECT TITLE:	Land Adjacent to Ffordd Pendre Soakaway Testing	OUR REF:	Q1565-TN01

1.0 Introduction & Background

Quantum Geotechnic Ltd (QG) have been instructed by Carmarthenshire County Council (hereafter referred to as the Client) to undertake soakaway testing on land adjacent to Ffordd Pendre, Carmarthen.

The location of the site is shown in Figure 1 below;

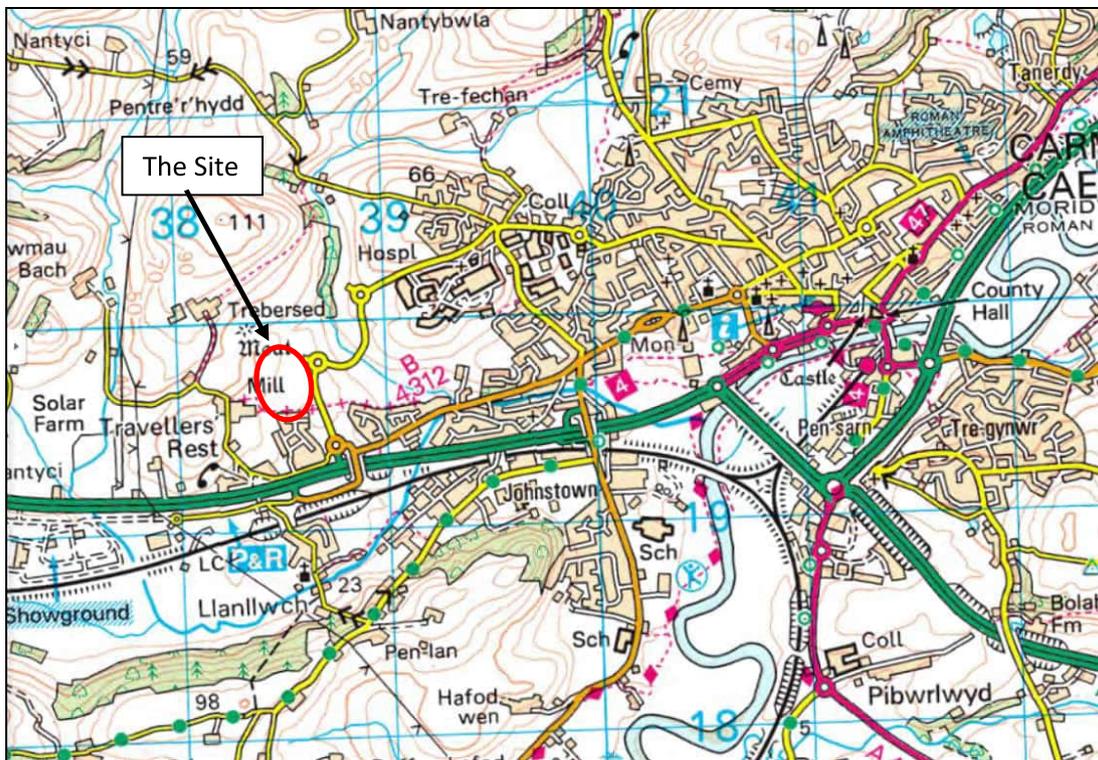


Figure 1: Site Study Area © Bing.

Trial Pits / Soakaway Test Pits were excavated using a 9 tonne rubber tracked 360° excavator. The test pits were located to provide general site coverage and were excavated to depths of 1.5 and 2.5mbgl. The exploratory hole positions are shown on the exploratory hole location plan in Appendix I.

Hole locations are presented in Table 1.

Table 1: Exploratory Holes Locations

Exploratory Hole ID:	Easting	Northing	Elevation (mAOD)
SA01	238613.716	219728.305	32.54
SA02	238624.109	219727.061	32.148
SA03	238620.808	219634.511	32.194

SA04	238632.326	219633.401	32.114
SA05	238569.389	219629.837	31.615
SA06	238557.973	219629.842	32.074
SA07	238579.389	219730.278	33.992
SA08	238569.228	219730.634	34.093
SA09	238566.639	219820.595	34.681
SA10	238587.008	219820.838	34.305
SA11	238607.052	219819.634	34.12
SA12	238623.695	219780.002	32.121

This method of investigation allows direct sampling of the near surface deposits for identification purposes, as well as assessment of any salient features and Made Ground or disturbed ground. The trial pits were logged in accordance with BS5930:2015; BS EN ISO 14688-1:2017 and BS EN ISO 14688-2:2017, and supervised at all times by an Engineering Geologist from QGL.

All Trial Pits / Soakaway Test Pits were backfilled with compacted layers of arisings upon completion. Surface reinstatement was levelled, and existing turf replaced where necessary.

The Trial Pit / Soakaway Test Pit logs are provided in Appendix II.

Soakaway Tests were undertaken within each Trial Pit / Soakaway Test Pit in accordance BRE 365. The test involves filling the Trial Pit / Soakaway Test Pit with water and measuring the water level over a period of time to allow the calculation of soil infiltration rates.

2.0 Soakaway Test Results

Table 2 summarises the soakaway test result findings.

Table 2: Soakaway Test Results Summary

Exploratory Pit ID	Test Zone (mbgl)	Test No.	Soil Infiltration Rate (m/sec)
SA01	2.20 – 2.50	1	3.8194x10 ⁻⁴
	2.12 – 2.50	2	3.5067x10 ⁻⁴
	2.08 – 2.50	3	3.7019x10 ⁻⁴
	Design Soil Infiltration Rate		3.5067x10⁻⁴
SA02	0.62 – 1.50	1	5.2207x10 ⁻⁶
	0.74 – 1.50	2	5.4485x10 ⁻⁶
	0.80 – 1.50	3	6.8664x10 ⁻⁶
	Design Soil Infiltration Rate		5.2207x10⁻⁶
SA03	1.97 – 2.50	1	5.8010x10 ⁻⁴
	1.90 – 2.50	2	4.9438x10 ⁻⁴
	1.82 – 2.50	3	4.3743x10 ⁻⁴
	Design Soil Infiltration Rate		4.3743x10⁻⁴
SA04	Unable to raise head of water due to high permeability of strata		
SA05	1.95 – 2.50	1	4.8841 x 10 ⁻⁴
	1.95 – 2.50	2	3.8445 x 10 ⁻⁴
	1.94 – 2.50	3	4.1344 x 10 ⁻⁴

	Design Soil Infiltration Rate		3.8445 x 10⁻⁴
SA06	1.26 – 1.50	1	1.4226 x 10 ⁻³
	1.17 – 1.50	2	1.7029 x 10 ⁻³
	1.08 – 1.50	3	3.6109 x 10 ⁻⁴
	Design Soil Infiltration Rate		3.6109 x 10⁻⁴
SA07	1.80 – 2.50	1	1.4121 x 10 ⁻⁴
	1.74 – 2.50	2	1.5358 x 10 ⁻⁴
	1.68 – 2.50	3	1.6630 x 10 ⁻⁴
	Design Soil Infiltration Rate		1.4121 x 10⁻⁴
SA08	0.80 – 1.50	1	1.9609 x 10 ⁻⁴
	0.70 – 1.50	2	4.4857 x 10 ⁻⁵
	0.58 – 1.50	3	3.1833 x 10 ⁻⁵
	Design Soil Infiltration Rate		3.1833 x 10⁻⁵
SA09	1.95 – 2.50	1	3.3961 x 10 ⁻⁴
	1.90 – 2.50	2	2.1343 x 10 ⁻⁴
	1.90 – 2.50	3	1.5229 x 10 ⁻⁴
	Design Soil Infiltration Rate		1.5229 x 10⁻⁴
SA10	0.72 – 1.50	1	4.9368 x 10 ⁻⁵
	0.58 – 1.50	2	4.3141 x 10 ⁻⁵
	0.67 – 1.50	3	3.4274 x 10 ⁻⁵
	Design Soil Infiltration Rate		3.4274 x 10⁻⁵
SA11	1.82 – 2.50	1	2.2213 x 10 ⁻⁴
	1.69 – 2.50	2	8.9114 x 10 ⁻⁵
	1.68 – 2.50	3	3.9715 x 10 ⁻⁵
	Design Soil Infiltration Rate		3.9715 x 10⁻⁵
SA12	0.68 – 1.50	1	1.8845 x 10 ⁻⁵
	0.56 – 1.50	2	1.3270 x 10 ⁻⁵
	0.53 – 1.50	3	1.8444 x 10 ⁻⁵
	Design Soil Infiltration Rate		1.3270 x 10⁻⁵

The Soakaway test results are provided in Appendix III.

We trust that the above is of assistance; however, if you need any further clarification or have any queries please do not hesitate to contact us.

Yours faithfully,
For and on behalf of
 QUANTUM GEOTECHNIC LTD



Phil Darby
 Principal Engineering Geologist
 B.Sc. (Hons), M.Sc., F.G.S., CGeol

14439/JM

15 January 2026

Lovell Partnerships
Unit 5 Cae Gwyrdd
Greenmeadow Business Park
Tongwynlais
Cardiff CF15 7AB

For the attention of James Whelan

Soil Infiltration Testing – Land Parcel at Carmarthen West, Carmarthen.

We have now completed the supplemental BRE 365 soil infiltration testing at the above site and can report as follows.

This report (including all appendices to it and any subsequent addendums or correspondence) has been prepared for the sole benefit, use and information of Lovell Partnerships and no third party is entitled or permitted to rely upon it. This report may not be used, reproduced, or circulated (in whole or part) for any purpose without the written consent of Intégral Géotechnique (Wales) Limited. Intégral Géotechnique (Wales) Limited shall not be liable to any third party who does not have express written permission to rely on the report for any losses they may suffer.

Background

Lovell Partnerships is proposing to develop a site at Carmarthen West for residential end use.

A previous Site Investigation Report was prepared for the site on behalf of Lovell Partnerships (refer to 'Site Investigation Report', ref: 14439/JM/25/SI, dated August 2025). Note that the previous Site Investigation Report should be read in conjunction with this report.

Scope of Works

Intégral Géotechnique were instructed to carry out a series of supplemental percolation tests in accordance with BRE 365 at locations advised by Lovell Partnership.

Fieldworks

An engineer from Intégral Géotechnique (Wales) Limited attended site on 17th December 2025 to carry out BRE365 compliant soil infiltration testing at three locations (referenced SAX, SAY and SAZ).

At each soil infiltration testing location, a single trial pit was excavated using a JCB 3CX.

The trial pits were excavated to depths ranging between 1.90mbgl and 2.50mbgl.

Upon reaching the final excavation depth, each trial pit was rapidly filled with water from a tractor-towed agricultural bowser and the water level monitored over a period of time.

The locations of the trial pits / soil infiltration tests are shown in Figure 2.

The trial pit logs are presented in Appendix A, while the soil infiltration test calculation sheets are presented in Appendix B.

Ground Conditions

The ground conditions encountered within the trial pits comprised a surface covering of grass over a layer of soft brown topsoil that comprised soft brown organic sandy slightly gravelly clayey silt with frequent roots and rootlets. The gravel encountered typically comprised subrounded to rounded fine to coarse sandstone and siltstone. The topsoil was encountered to depths of approximately 0.2m.

Within all trial pits, the topsoil was underlain by firm orangish brown slightly gravelly sandy clayey silt, with the gravels encountered comprising subrounded to rounded fine to coarse siltstone. This was encountered to depths between approximately 0.6mbgl and 1.0mbgl.

Within trial pits SAX and SAY, this was underlain by medium dense light brown gravelly slightly silty sand, with the gravels comprising subangular to subrounded fine to coarse sandstone and siltstone. This was encountered to depths between 0.8mbgl and 1.7mbgl.

This stratum was underlain by dense to very dense light brown sandy slightly silty subangular to rounded fine to coarse gravel if sandstone, siltstone and quartz with low cobble content. The cobbles comprised subrounded sandstone and siltstone. This was encountered to the base of trial pits SAX and SAY at depths between 1.9mbgl and 2.3mbgl.

Within trial pit SAZ, the firm orangish brown slightly gravelly sandy clayey silt encountered at 0.2mbgl was underlain by soft to firm orangish brown sandy slightly gravelly silty clay. The gravel comprised subrounded to rounded fine to coarse sandstone and siltstone. This was encountered to the base of trial pit SAZ at a depth of 2.5mbgl.

No groundwater was encountered within the excavation depth of any of the trial pits.

Soil Infiltration Testing Results

Soil infiltration testing was undertaken at each trial pit (SAX, SAY, SAZ) as shown in Figure 2.

The trial pits were rapidly filled with water from a tractor-towed agricultural bowser and the water level monitored over a period of time.

The results of the soil infiltration tests are presented in Appendix B and summarised below in Table 1.

Table 1: Summary of Soil Infiltration Testing						
Trial Pit Location	Depth of Pit (m)	Strata	Infiltration Rate (m/s)			Design infiltration rate (m/s)
			Cycle 1	Cycle 2	Cycle 3	
SAX	2.30	Light brown sandy slightly silty gravel	1.0×10^{-4}	5.4×10^{-5}	4.9×10^{-5}	4.8×10^{-5}
SAY	1.90	Light brown sandy slightly silty gravel	2.3×10^{-5}	-	-	-
SAZ	2.50	Orangish brown sandy slightly gravelly silty clay	-	-	-	-

The results of the soakaway testing indicate a design infiltration rate of 4.8×10^{-5} m/sec for trial pit SAX.

Within trial pits SAY and SAX, there was insufficient infiltration to calculate a design soil infiltration rate.

The soil infiltration test results are specific to the location and depth of the tests undertaken and may vary due to seasonal and other effects.

The results of the soakaway testing should be provided to a suitably qualified drainage engineer.

We trust the above and enclosed are to your satisfaction. However, if you have any queries or require any further information, please do not hesitate to contact us.

Yours faithfully,

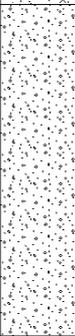
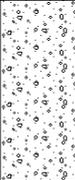


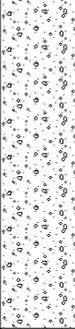
Joseph Massey
For
Intégral Géotechnique (Wales) Limited

Encl.

Appendix A – Trial Pit Logs
Appendix B – Soil Infiltration Test Calculation Sheets

Figure 1 - Site Location
Figure 2 - Illustrative Master Plan
Figure 3 - Site Plan

			Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Land at Carmarthen West			Project No.: 14439		Trial Pit No.: SAX Sheet 1 of 1	
Location: Carmarthen West			Client: Lovell Partnership			Logged By: JM		Scale 1:25				
Equipment: Wheeled Backhoe Excavator - JCB 3CX			Coordinates:			Dimensions 2.30m						
Date Excavated: 17/12/2025			Level:			Depth : 2.30m		0.70m				
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description						
Depth (m)	Type	Results										
0.50	ES		0.20			Grass over soft brown organic sandy slightly gravelly clayey SILT. Gravel is subrounded to rounded fine to coarse of sandstone and siltstone (TOPSOIL).						
			0.60			Firm orangish brown slightly gravelly sandy clayey SILT. Gravel is subrounded to rounded fine to coarse of siltstone (GLACIOFLUVIAL DEPOSITS).						
			1.70			(Medium dense) light brown gravelly slightly silty SAND. Gravel is subangular to subrounded fine to coarse of sandstone and siltstone (GLACIOFLUVIAL DEPOSITS).						
			2.30			(Dense to very dense) light brown sandy slightly silty subangular to rounded fine to coarse GRAVEL of sandstone, siltstone and quartz with low cobble content. Cobbles are subrounded of sandstone and siltstone (GLACIOFLUVIAL DEPOSITS).						
						End of Trialpit at 2.30 m						
Remarks: Machine excavated trial pit from GL to 2.30m bgl. Refusal at 2.30m due to slow/difficult excavation. Soil infiltration test carried out.			Groundwater: No groundwater encountered.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample						
			Stability: Stable during excavation.									

 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Land at Carmarthen West			Project No.: 14439	Trial Pit No.: SAY Sheet 1 of 1
		Location: Carmarthen West			Client: Lovell Partnership	Logged By: JM
Equipment: Wheeled Backhoe Excavator - JCB 3CX		Coordinates:			Dimensions: 2.30m	
Date Excavated: 17/12/2025		Level:			Depth: 1.90m	
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
			0.20			Grass over soft brown organic sandy slightly gravelly clayey SILT. Gravel is subrounded to rounded fine to coarse of sandstone and siltstone (TOPSOIL).
			0.60			Firm orangish brown slightly gravelly sandy clayey SILT. Gravel is subrounded to rounded fine to coarse of siltstone (GLACIOFLUVIAL DEPOSITS).
			0.80			(Medium dense) light brown gravelly slightly silty SAND. Gravel is subangular to subrounded fine to coarse of sandstone and siltstone (GLACIOFLUVIAL DEPOSITS).
			1.90			(Dense to very dense) light brown sandy slightly silty subangular to rounded fine to coarse GRAVEL of sandstone, siltstone and quartz with low cobble content. Cobbles are subrounded of sandstone and siltstone (GLACIOFLUVIAL DEPOSITS).
End of Trialpit at 1.90 m						
Remarks: Machine excavated trial pit from GL to 1.90m bgl. Refusal at 1.90m due to slow/difficult excavation. Soil infiltration test carried out.		Groundwater: No groundwater encountered.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample	
		Stability: Stable during excavation.				

 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Land at Carmarthen West			Project No.: 14439	Trial Pit No.: SAZ Sheet 1 of 1
		Location: Carmarthen West			Client: Lovell Partnership	Logged By: JM
Equipment: Wheeled Backhoe Excavator - JCB 3CX		Coordinates:			Dimensions: 2.30m	
Date Excavated: 17/12/2025		Level:			Depth : 2.50m	
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
			0.20			Grass over soft brown organic sandy slightly gravelly clayey SILT. Gravel is subrounded to rounded fine to coarse of sandstone and siltstone (TOPSOIL).
						Firm orangish brown slightly gravelly sandy clayey SILT. Gravel is subrounded to rounded fine to coarse of siltstone (GLACIOFLUVIAL DEPOSITS).
			1.00			Soft to firm orangish brown sandy slightly gravelly silty CLAY. Gravel is subrounded to rounded fine to coarse of sandstone and siltstone (GLACIOFLUVIAL DEPOSITS).
			2.50			End of Trialpit at 2.50 m
Remarks: Machine excavated trial pit from GL to 2.50m bgl. Terminated at 2.50m due to difficult excavation.		Groundwater: No groundwater encountered.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample	
		Stability: Stable during excavation.				

BRE365 SOIL INFILTRATION RATE TEST - SAX

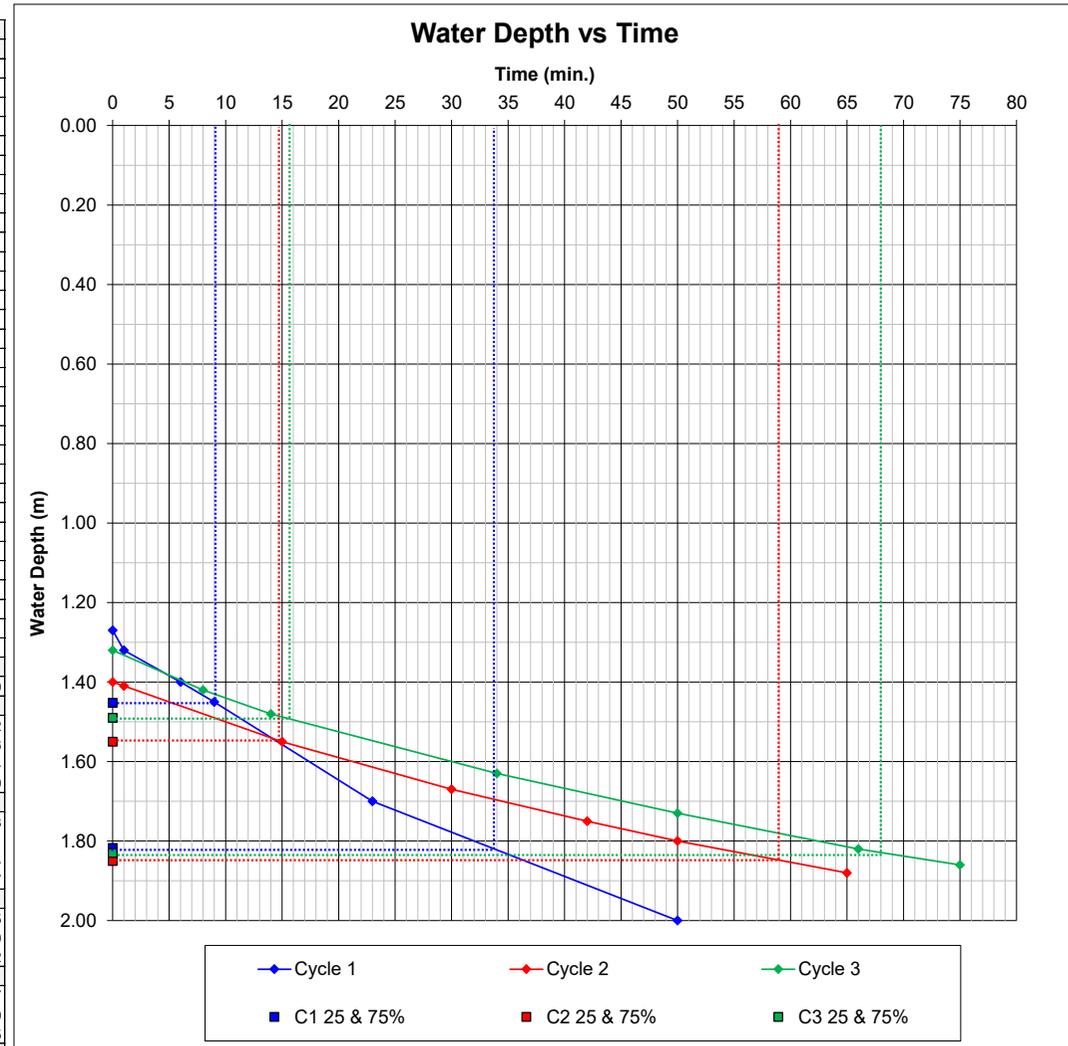
14439 Carmarthen West

Trial Pit Information	
Length (m)	2.30
Width (m)	0.70
Depth (m)	2.30
Groundwater	None
Weather Conditions	Heavy Rain
Date	17-Dec-25

Remarks
1. Test undertaken within natural deposits.

Cycle 1		Cycle 2		Cycle 3	
Time (min)	Depth (m)	Time (min)	Depth (m)	Time (min)	Depth (m)
0	1.27	0	1.40	0	1.32
1	1.32	1	1.41	8	1.42
6	1.40	15	1.55	14	1.48
9	1.45	30	1.67	34	1.63
23	1.70	42	1.75	50	1.73
50	2.00	50	1.80	66	1.82
		65	1.88	75	1.86

	Cycle 1	Cycle 2	Cycle 3
Final Excavation Depth (m)			
At end of testing cycle	2.00	2.00	2.00
Water Depths (m)			
Water depth at start of test	1.27	1.40	1.32
Water depth at end of test	2.00	1.88	1.86
Effective depth (measured)	0.73	0.48	0.54
% Effective storage depth	1.00	0.80	0.79
Effective Storage Depths (m)			
Effective storage depth (100%)	0.73	0.60	0.68
Effective storage depth (75%)	0.55	0.45	0.51
Effective storage depth (50%)	0.37	0.30	0.34
Effective storage depth (25%)	0.18	0.15	0.17
Outflow Time (min)			
Time for measured outflow	50	65	75
Time for 100% outflow	50	85	100
Time for 75-25% outflow	25	44	52
Volume of Outflow (m³)			
Over measured effective depth	1.18	0.77	0.87
Over 100% effective depth	1.18	0.97	1.09
From 75% - 25% effective depth	0.59	0.48	0.55
Surface Area (m²)			
For 100% effective storage	5.99	5.21	5.69
For 50% effective storage	3.80	3.41	3.65
Over measured depth	5.99	4.49	4.85
Soil Infiltration Rate (m/s)			
Over 100% effective depth	6.5E-05	3.6E-05	3.2E-05
Over measured depth	6.5E-05	4.4E-05	4.0E-05
Over 75% - 25% effective depth	1.0E-04	5.4E-05	4.9E-05



Design Soil Infiltration Rate: 4.8E-05 m/s

BRE365 SOIL INFILTRATION RATE TEST - SAY

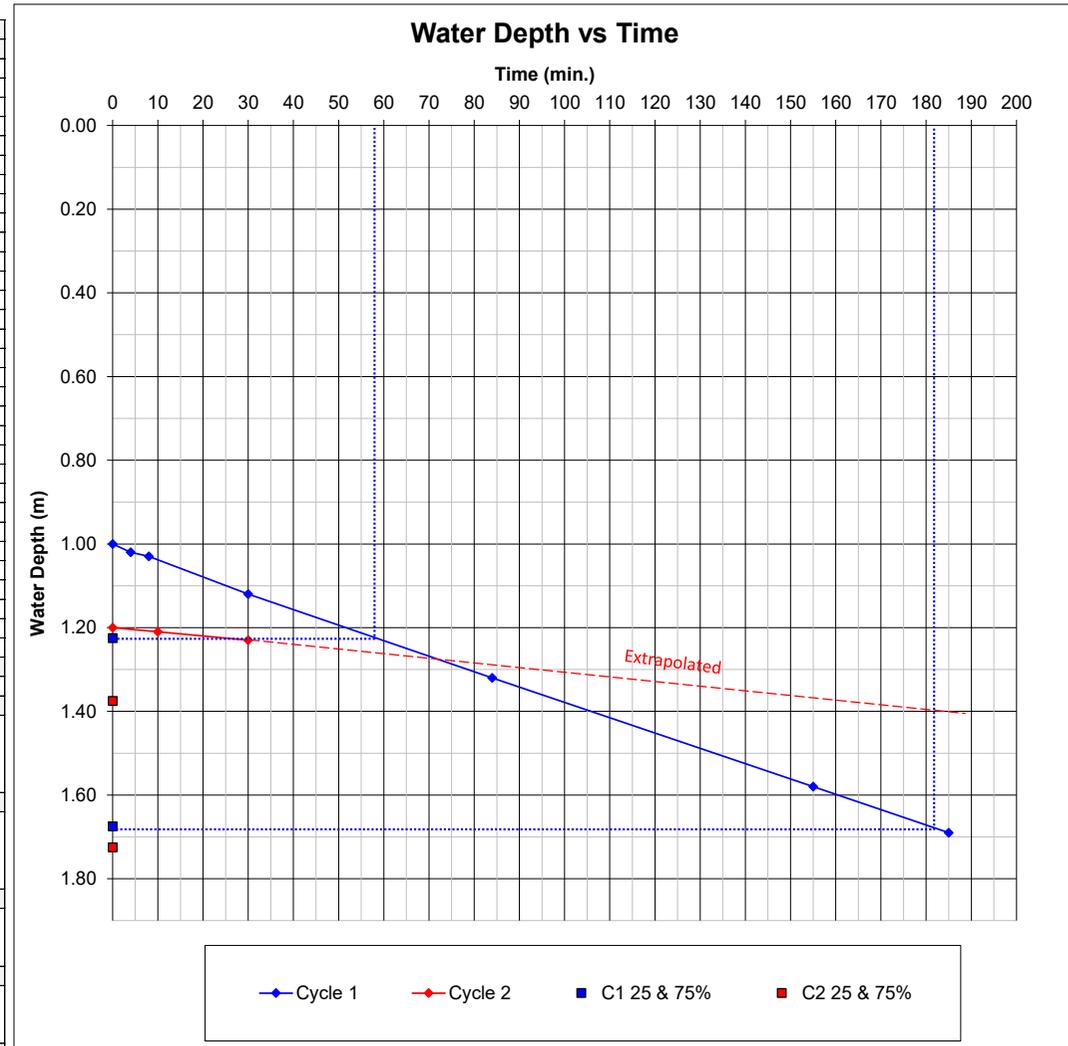
14439 Carmarthen West

Trial Pit Information	
Length (m)	2.30
Width (m)	0.70
Depth (m)	1.90
Groundwater	None
Weather Conditions	Heavy Rain
Date	17-Dec-25

Remarks	
<p>1. Test undertaken within natural deposits. 2. Insufficient infiltration encountered within second cycle.</p>	

Cycle 1		Cycle 2		Cycle 3	
Time (min)	Depth (m)	Time (min)	Depth (m)	Time (min)	Depth (m)
0	1.00	0	1.20		
4	1.02	10	1.21		
8	1.03	30	1.23		
30	1.12				
84	1.32				
155	1.58				
185	1.69				

	Cycle 1	Cycle 2	Cycle 3
Final Excavation Depth (m)			
At end of testing cycle	1.90	1.90	
Water Depths (m)			
Water depth at start of test	1.00	1.20	
Water depth at end of test	1.69	1.23	
Effective depth (measured)	0.69	0.03	
% Effective storage depth	0.77	0.04	
Effective Storage Depths (m)			
Effective storage depth (100%)	0.90	0.70	
Effective storage depth (75%)	0.68	0.53	
Effective storage depth (50%)	0.45	0.35	
Effective storage depth (25%)	0.23	0.18	
Outflow Time (min)			
Time for measured outflow	185	30	
Time for 100% outflow	230		
Time for 75-25% outflow	124		
Volume of Outflow (m³)			
Over measured effective depth	1.11	0.05	
Over 100% effective depth	1.45	1.13	
From 75% - 25% effective depth	0.72	0.56	
Surface Area (m²)			
For 100% effective storage	7.01	5.81	
For 50% effective storage	4.31	3.71	
Over measured depth	5.75	1.79	
Soil Infiltration Rate (m/s)			
Over 100% effective depth	1.5E-05	#DIV/0!	
Over measured depth	1.7E-05	1.5E-05	
Over 75% - 25% effective depth	2.3E-05	#DIV/0!	



◆ Cycle 1	● Cycle 2	■ C1 25 & 75%	■ C2 25 & 75%
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BRE365 SOIL INFILTRATION RATE TEST - SAZ

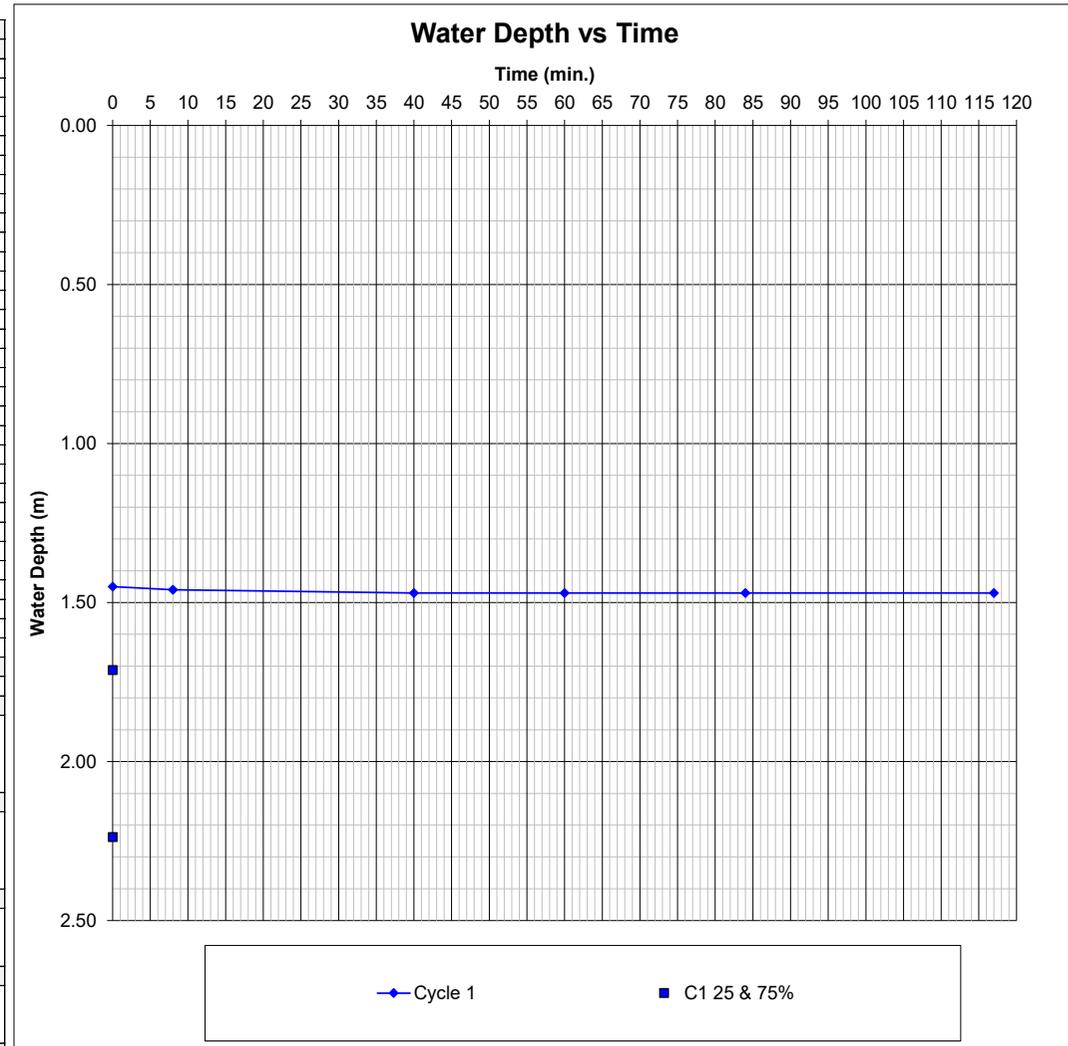
14439 Carmarthen West

Trial Pit Information	
Length (m)	2.30
Width (m)	0.70
Depth (m)	2.50
Groundwater	None
Weather Conditions	Heavy Rain
Date	17-Dec-25

Remarks	
1. Test undertaken within natural deposits.	2.
No infiltration rate encountered.	

Cycle 1		Cycle 2		Cycle 3	
Time (min)	Depth (m)	Time (min)	Depth (m)	Time (min)	Depth (m)
0	1.45				
8	1.46				
40	1.47				
60	1.47				
84	1.47				
117	1.47				

	Cycle 1	Cycle 2	Cycle 3
Final Excavation Depth (m)			
At end of testing cycle	2.50		
Water Depths (m)			
Water depth at start of test	1.45		
Water depth at end of test	1.47		
Effective depth (measured)	0.02		
% Effective storage depth	0.02		
Effective Storage Depths (m)			
Effective storage depth (100%)	1.05		
Effective storage depth (75%)	0.79		
Effective storage depth (50%)	0.53		
Effective storage depth (25%)	0.26		
Outflow Time (min)			
Time for measured outflow	117		
Time for 100% outflow			
Time for 75-25% outflow			
Volume of Outflow (m³)			
Over measured effective depth	0.03		
Over 100% effective depth	1.69		
From 75% - 25% effective depth	0.85		
Surface Area (m²)			
For 100% effective storage	7.91		
For 50% effective storage	4.76		
Over measured depth	1.73		
Soil Infiltration Rate (m/s)			
Over 100% effective depth	#DIV/0!		
Over measured depth	2.7E-06		
Over 75% - 25% effective depth	#DIV/0!		



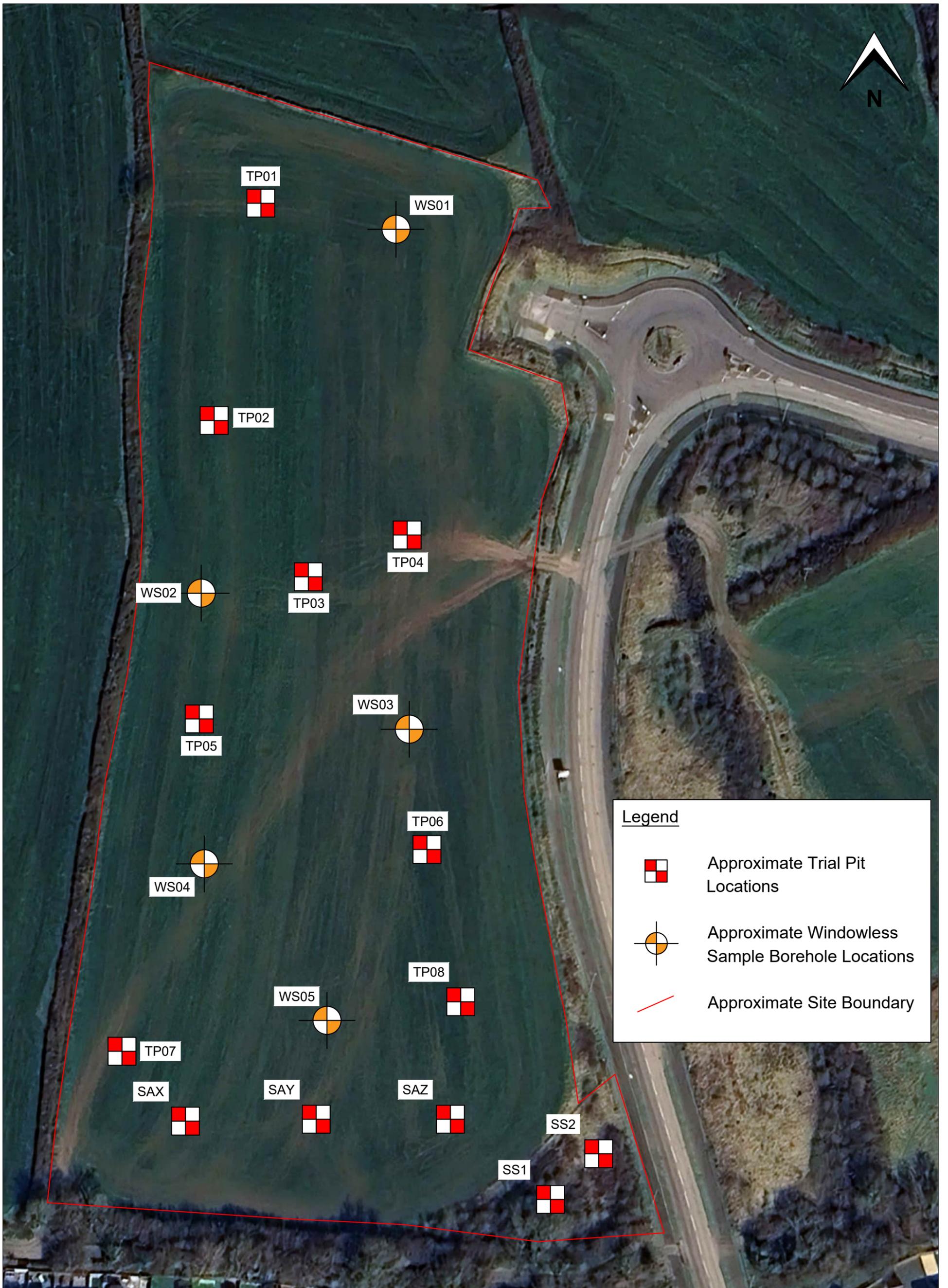


Figure 3: Site Plan

Project: Land at Carmarthen West

Client: Lovell Partnerships

Job No.: 14439

Scale: 1:900 at A3

Intégral
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