Land at Churchfields,

Devauden, Monmouthshire

Monmouthshire Housing Association

Flood Consequence Assessment

and

Drainage Strategy

May 2025

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DOCUMENT CONTROL

Project Number 2203

Project Title Churchfields, Devauden, Monmouthshire

Client Monmouthshire Housing Association

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Prepared by	Checked by	Verified by	Approved by
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Version History

Version	Revision date	Details	Authorized by	Position
Information	12 Aug 2021			
2	19 Aug 2021	Correspondence from DCWW added	Tony Owens-Redwood	Associate Director
3	22 May 2025	References updated to TAN15 March 2025	Tony Owens-Redwood	Associate Director

Contents

Appendices

Figures

Tables

1 Introduction

PHG Consulting has been commissioned by Monmouthshire Housing Association (MHA) to undertake a drainage strategy and flood consequence assessment for an area of land to the west of Churchfields, Devaunden.

The purpose of the report is to identify existing sources of flood risk to the site and ensure that surface and foul water drainage can be discharged from the site without detrimentally affecting the downstream catchments.

The report demonstrates how the drainage for the development will be discharged and how flows will be managed to prevent increased flood risk.

1.1 Existing Site

The site to be developed covers an area of approximately 1.1ha and is located at National Grid Reference ST481990. The proposed site is bounded by the Chruchfields residential development to the east and greenfield to the north, south and west. The site location is shown in Figure 1 below. The site topography slopes from the east to west with an average gradient of 1 in 10, the topographical survey is included in Appendix A.

Figure 1. Site Location Plan

1.2 Development Proposals

As stated, the proposed development site is 1.1ha in total and will consist of residential development, an architectural sketch plan is included in Appendix B,

2 Flood Consequence Assessment

The assessment will consider all possible sources of flooding pertaining the site and immediate vicinity, determine the risk (flood frequency) and the effects (flood consequences) of flooding. In Wales, planning policy relating to flooding is governed by TAN15:Development and Flood Risk. This assessment has been prepared in accordance with TAN15.

2.1 Flood Maps – NRW

The Natural Resources Wales (NRW) have produced Flood Maps for Planning (FMfP) in line with TAN 15 and all of Wales have been assigned a flood zone in relation to the risk of flooding.

According to the FMfP by NRW, the site is away from any area of flood risk, as shown in Figure 2. Flood Zone 1 is defined as an area that has a very low probability of flooding (less than 0.1% annual probability of flooding).

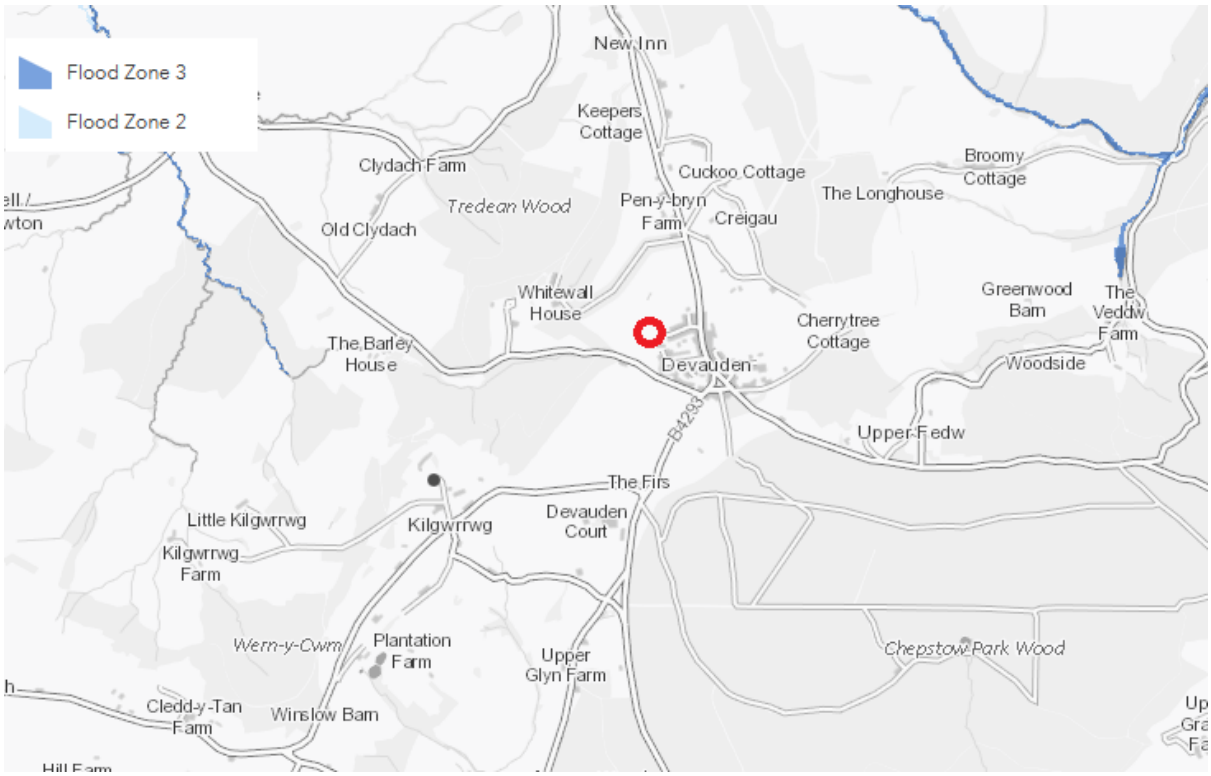


Figure 2. NRW – Flood Maps for Planning (FMfP)

According to the FMfP, the site is not at risk of flooding from either Rivers and/or Sea. Table 1 summarises the Flood Risks at the development the site from all sources in accordance with the NRW FMfP issued Maps, included in Appendix C.

There are some small areas of surface water flooding towards the western boundary of the site. These will be protected through the development and existing flow routes not impeded.

Table 1. NRW FRAW – Flood Risk Summary

Source of Flooding	Risk Probability
Risk from Rivers	No – Flooding (very low, less than 0.1% annual probability)
Risk from Surface Water & Small Watercourses	No – Flooding (very low, less than 0.1% annual probability)
Risk from Reservoirs	No risk

2.2 Development Category – Flood Zones Compatibility

The development site is classified as Highly Vulnerable Development and has a design life of 100 years. As mentioned above the site is not located within Flood Zone 2 or 3.

3 Drainage Strategy

3.1 Surface Water Features

There are no known surface water features within the development site. An existing watercourse is present near the south western corner of the land ownership boundary and flows north westwards away from the development.

3.2 Existing Sewers

The Welsh Water (DCWW) sewer records in Figure 4 below, show a 150mm foul sewer and a 225mm surface water sewer passing through the development site. The surface water sewer discharges to the existing watercourse to the south west of the development.

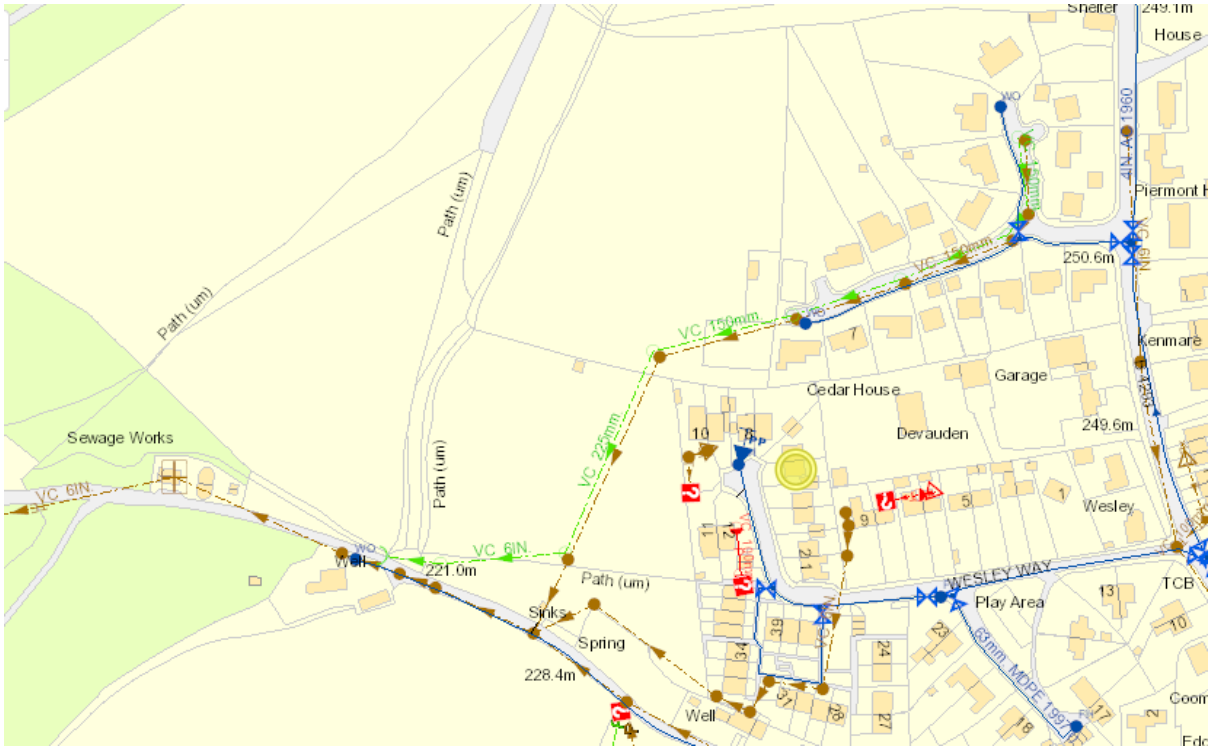


Figure 3. Welsh Water – Sewer Records

3.3 Foul Drainage

A pre-development enquiry had been made to DCWW to provide sewer records for the area and to ascertain whether there is capacity in the existing sewer network. DCWW have confirmed there is capacity within the existing network and flows should be connected to the foul sewer at or downstream of manhole ST48991002 and located grassland to the South.

DCWW have also confirmed that the site would discharge to Devauden Wastewater Treatment Works (WwTW).

Due to site topography, the existing foul drainage should be surveyed prior to any future design to ensure that a gravity connection can be made. The layout and site levels will also need to be considered to ensure that a gravity connection to the existing public sewer with the landownership boundary is achievable. DCWW correspondence is attached at Appendix D

3.4 Phosphate Assessment

As of January 2021, Natural Recourses Wales (NRW) have set new targets regarding phosphate pollution and nutrient neutral development. Where wastewater from a development discharges to a Special Area of Conservation (SAC), discharge must comply with NRW's targets. Following confirmation from DCWW that the site would discharge to Devauden WwTW, treated wastewater would discharge to an existing watercourse that is outside of the Phosphorus sensitive areas of the River Usk and Wye catchments. Therefore, there is no requirement for mitigation from this development.

3.5 Surface Water Drainage

The site is located in an area where Monmouthshire County Council 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 Standards[1] 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 Manual[2].

S1 – Surface Water Destination

Standard S1, regarding the surface water destination has five levels of priority as shown in table 2.

[1] Sustainable Drainage (SuDS) Statutory Guidance, Welsh Government 2019
[2] The SuDS Manual. CIRIA 753, 2015

Table 2. S1 Surface Water Runoff Destination

Priority Level	Surface Water Destination	Acceptability / Selection
Level 1	Surface water runoff is collected for use	Collection of water for re-use will be evaluated during the detail design stage, however the use of individual rainwater harvesting systems for residential units is proving uneconomical.
Level 2	Surface water runoff is infiltrated to ground	There has been no ground investigation undertaken at the development site at this stage, however specific infiltration testing will be undertaken prior to any future design. We have checked Winter Rain Acceptance Potential (WRAP) maps which indicate that the site is in an area where the underlying soils have good to very good permeability. Therefore, it is assumed that there will be potential for all or partial surface water to be infiltrated into the underlying soils.
Level 3	Surface water runoff is discharged to a surface water body	The nearest watercourse is located to the south west of the development and outside of the land ownership. Therefore, it is not possible to connect to the existing watercourse without passing third party land.
Level 4	Surface water runoff is discharged to a surface water sewer etc.	Given there is an existing surface water sewer passing through the site, any surface water not infiltrated would connect to this. A connection would be made approximately 60m east of the existing watercourse.
Level 5	Surface water runoff is discharged to a combined sewer	N/A

The surface water runoff from all impermeable areas will be managed via above ground, open techniques such as swales, rain gardens, and attenuated via a basin. All attenuated water will then be infiltrated to ground or discharged to the existing surface water sewer at a rate equivalent to greenfield runoff.

Qbar = 2l/s (for 0.66ha)

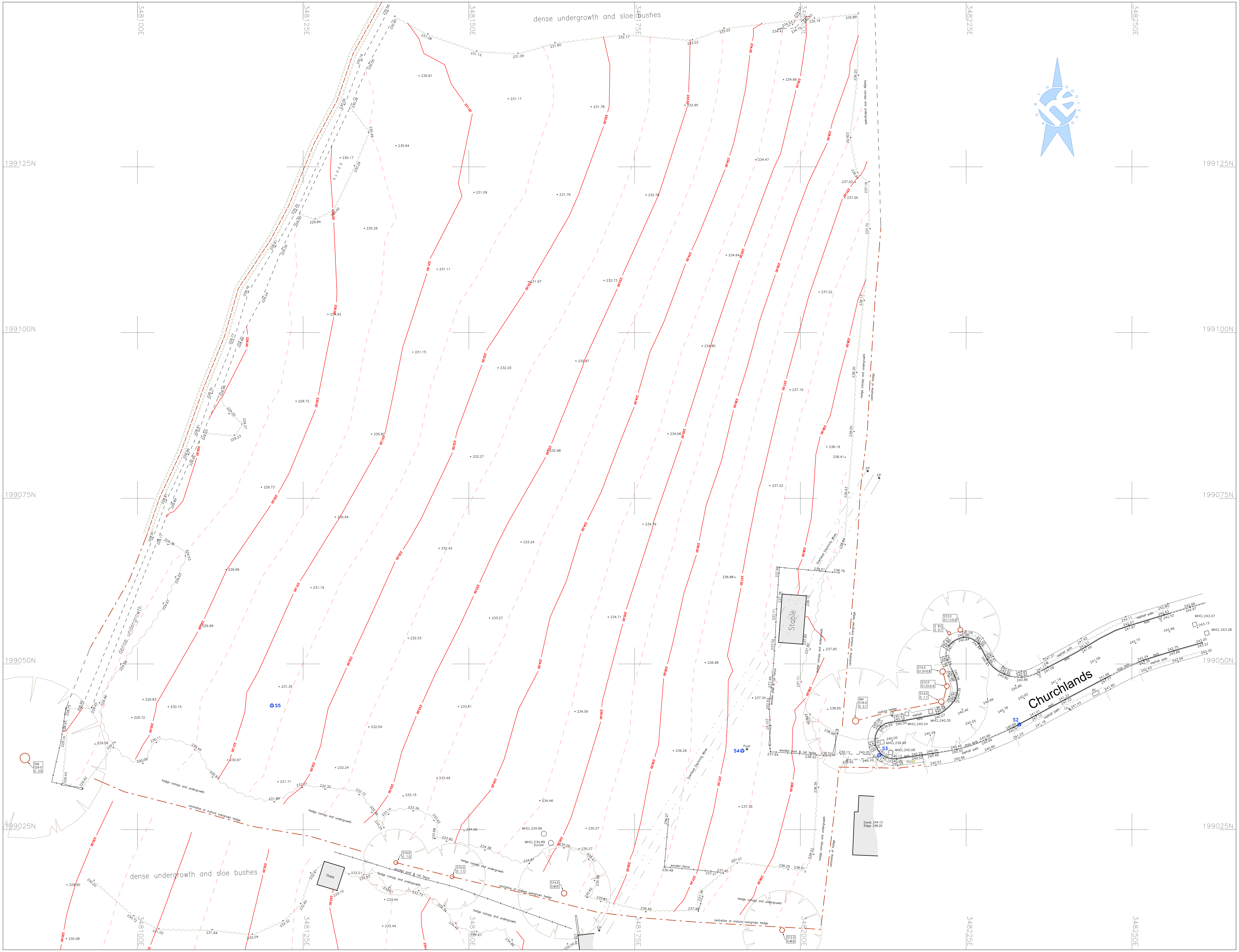
It is assumed that impermeable surfacing will cover 60% of the developable area and this equates to 0.66ha. Assuming a worst-case scenario where no runoff is infiltrated into the underlying soils and there are no losses through raingardens or swales, an attenuation basin with 1.5m depth of storage and a surface area of 880m^2 would be required. Calculations and a constraints plan showing a proposed basin can be found in Appendix E.

4 Conclusions

- The site is located within Flood Zone A – Areas considered to be at little or no risk of fluvial or tidal/coastal flooding
- The development is characterised as Highly Vulnerable and is allowed in Flood Zone A according to TAN15
- The development would not increase flood risk elsewhere and attenuation will be designed for events up to and including the 1in100yr with a 30% allowance for climate change. Any discharge from the site will be restricted to QBAR.
- The proposed basin provides betterment in terms of biodiversity/amenity.
- The foul drainage would discharge to the existing public sewer, subject to confirming invert levels.
- Given the above, it is considered that development is suitable in relation to flood risk and drainage.

Appendix A Topographical Survey

Return to text



Legend:

- Kerb line (& top of kerb).
- Drop Kerb (& top of kerb).
- Surface edge (type of surface annotated).
- Embankment (with slope demarkation).
- Fenceline (type and height as annotated).
- Wall (type and height as annotated).
- Hedgeline.
- Barrier (type as annotated).
- Gate.
- Stile.
- Building.
- TP Telegraph pole (and overhead wires).
- EP Electricity pole (and overhead wires).
- LP Lighting Column
- G. Road Gully.
- MHCL 50.00 Manhole and cover level.
- ICCL 50.00 Inspection Chamber and cover level.
- BT Telecomms. service box.
- CATV Cable TV service box.
- EB Electricity / BT Control Gear Box.
- W. Stop Tap (Water).
- SV Stop Valve (Water).
- AV Air Valve (Water).
- FH Fire Hydrant.
- Gas Gas Valve.
- Foliage (Ground vegetation) extent.
- Foliage (Overhanging canopy) extent.
- RS Road Sign (multiple).
- RS Road Sign (single).
- Mkr Marker Post.
- S10.0 G 1.2 Oak — Tree with Spread/Girth/Species.
- S1 Survey Station and Reference.

Notes:

Any surveyed features not shown above are annotated appropriately. Tree species is only annotated where known. Service covers are surveyed where accessible.
Healer Surveys cannot accept liability for missing covers due to them being buried or obscured by parked vehicles at the time of site visit.

Station Table:

Station	Easting	Northing	Level	Station description
S1	348274.046	199062.647	244.480	Road Nail
S2	348233.016	199040.861	241.005	Road Nail
S3	348211.878	199036.236	240.097	Road Nail
S4	348191.242	199036.897	237.365	Wooden Peg
S5	348120.289	199043.726	231.383	Wooden Peg

Grid Origin and Level Datum:

Ordnance Survey GPS OSGB36(15) Grid and Levels used.
GPS Grid to Ground Scale Factor used 1.00037401 centred on Survey Station ref. S4

Revisions:

A:	
B:	
C:	
D:	
E:	
F:	
G:	
H:	

Client:

MHA
Monmouthshire Housing
Tai Sir Fynwy

healer surveys
Land Surveyors
8 Oldfield Road, Bocam Park, Pencoed, Bridgend, CF35 5LJ
tel. 01656 865566
web. www.healersurveys.co.uk

Project:
Churchfields, Devauden

Drawing:
Topographic Survey

Date:	June 2021	
Surveyed:	JHP	
Drawn:	JHP	
Checked:	RE	
Scale: 1:250	Sheet Size: A1	Sheet No: 1 of 1

Job No: P3439

Rev.

Appendix B Architectural Sketch

Return to text

SITE BOUNDARY

LAND OWNERSHIP

INTACT HEDGES (RETAIN)

MATURE TREES (RETAIN)

LIKELY SUDS ZONE

KEY ELEVATION

LIKELY ACCESS

VIEWS of DEVELOPMENT (OPEN)

VIEWS of DEVELOPMENT (FILTERED).

LAND WEST of CHURCHFIELDS, DEVIZES

SKETCH OPPS & CONS.

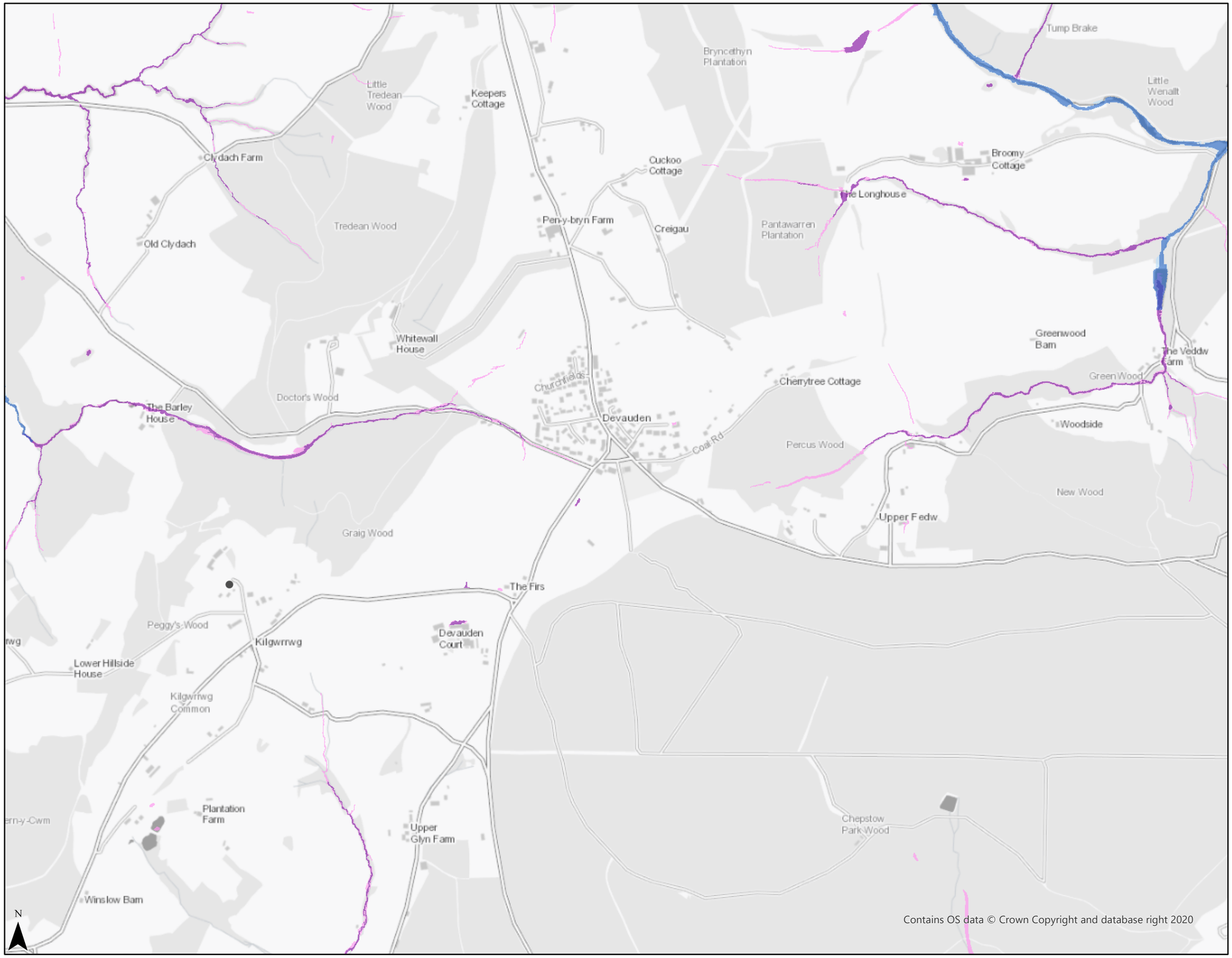
Appendix C NRW Flood Maps

Return to text

Cyfoeth Naturiol Cymru
Natural Resources Wales

Flood Map for Planning - Detail

Flood Map



Legend

- Flood Defence Locations

TAN15 Defended Zones

- Rivers
- Sea
- Rivers and Sea

Rivers

- Flood Zone 3
- Flood Zone 2

Sea

- Flood Zone 3
- Flood Zone 2

Surface Water and Small Watercourses

- Flood Zone 3
- Flood Zone 2

Scale at A3: 1:11,059

Date: 22/05/2025

0.5 0.25 0 0.5
km

British National Grid

Disclaimer

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

Appendix D DCWW Correspondence

Dŵr Cymru
Welsh Water

Developer Services
PO Box 3146
Cardiff
CF30 0EH

Tel: +44 (0)800 917 2652
Fax: +44 (0)2920 740472
E.mail: developer.services@dwrcymru.com

Gwasanaethau Datblygu
Blwch Post 3146
Caerdydd
CF30 0EH

Ffôn: +44 (0)800 917 2652
Ffacs: +44 (0)2920 740472
E.bost: developer.services@dwrcymru.com

Mr Steve Davis
PHG Consulting Engineers
107 Cowbridge Road East
Cardiff
CF11 9AG

Date: 17/08/2021
Our Ref: PPA0005934

Dear Mr Davis,

Site Address: Churchfields, Devauden
Development: 30 units

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

SEWERAGE

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

Please note, notwithstanding the following assessment, we would advise there is also a mandatory requirement to undertake pre-application consultation with all 'Specialist Consultees', including Dwr Cymru Welsh Water as the statutory water and sewerage undertaker, in accordance with Schedule 4 of Town & Country Planning (Development Management Procedure) (Wales) (Amendment) Order 2016. As a major development, amounting to more than 10 units, you will be statutorily required to consult Welsh Water and a substantive response will be issued within 28 days from the date of the notice as per the requirements of Article 2E.

Public Sewerage Network

The proposed development site is located in the immediate vicinity of a separate sewerage system, comprising foul water public sewer, which drains to Devauden Wastewater Treatment Works (WwTW)

We can advise that Devauden WwTW does not have a phosphate permit. You will need to discuss this matter further with the local planning authority.

This site is crossed by a public sewers with their approximate positions being marked on the attached Statutory Public Sewer Record. In accordance with the Water Industry Act 1991, Dwr Cymru Welsh Water requires access to its apparatus at all times in order to carry out maintenance and repairs. No part of any building will be permitted within the protection zone of the public sewer measured 3 metres either side of the centrelines. Our strong recommendation is that your site layout takes into account the location of the assets crossing the site and should be referred to in any master-planning exercises or site layout plans submitted as part of any subsequent planning application. Further information regarding Asset Protection is provided in the attached Advice & Guidance note.

You are also advised that some public sewers and lateral drains may not be recorded on our maps of public sewers because they were originally privately owned and were transferred into public ownership by nature of the Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011. The presence of such assets may affect the proposal. In order to assist you may contact Dwr Cymru Welsh Water on 0800 085 3968 to establish the location and status of the apparatus in and around your site. Please be mindful that under the Water Industry Act 1991 Dwr Cymru Welsh Water has rights of access to its apparatus at all times.

Surface Water Drainage

As of 7th January 2019, this proposed development is subject to Schedule 3 of the Flood and Water Management Act 2010. The development therefore requires approval of Sustainable Drainage Systems (SuDS) features, in accordance with the 'Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems'. As highlighted in these standards, the developer is required to explore and fully exhaust all surface water drainage options in accordance with a hierarchy which states that discharge to a combined sewer shall only be made as a last resort. Disposal should be made through the hierarchical approach, preferring infiltration and, where infiltration is not possible, disposal to a surface water drainage body in liaison with the Land Drainage Authority and/or Natural Resources Wales.

It is therefore recommended that the developer consult with Monmouthshire Council, as the determining SuDS Approval Body (SAB), in relation to their proposals for SuDS features. Please note, DCWW is a statutory consultee to the SAB application process and will provide comments to any SuDS proposals by response to SAB consultation. Please refer to further detailed advice relating to surface water management included in our attached Advice & Guidance note.

In addition, please note that no highway or land drainage run-off will be permitted to discharge directly or indirectly into the public sewerage system.

Foul Water Drainage – Sewerage Network

We have considered the impact of foul flows generated by the proposed development and concluded that flows can be accommodated within the public sewerage system. We advise that the flows should be connected to the foul sewer at or downstream of manhole ST48991002 and located grassland to the South.

Should a planning application be submitted for this development we will seek to control these points of communication via appropriate planning conditions and therefore recommend that any drainage layout or strategy submitted as part of your application takes this into account. However, should you wish for an alternative connection point to be considered please provide further information to us in the form of a drainage strategy, preferably in advance of a planning application being submitted.

You may need to apply to Dwr Cymru Welsh Water for any connection to the public sewer under Section 106 of the Water industry Act 1991. However, if the connection to the public sewer network is either via a lateral drain (i.e. a drain which extends beyond the connecting property boundary) or via a new sewer (i.e. serves more than one property), it is now a mandatory requirement to first enter into a Section 104 Adoption Agreement (Water Industry Act 1991). The design of the sewers and lateral drains must also conform to the Welsh Ministers Standards for Foul Sewers and Lateral Drains, and conform with the publication "Sewers for Adoption"- 7th Edition. Further information can be obtained via the Developer Services pages of www.dwrcymru.com.

If the development will give rise to a new discharge (or alter an existing discharge) of trade effluent, directly or indirectly to the public sewerage system, then a Discharge Consent under Section 118 of the Water Industry Act 1991 is required from Dwr Cymru / Welsh Water. Please note that the issuing of a Discharge Consent is independent of the planning process and a consent may be refused although planning permission is granted.

SEWAGE TREATMENT

No problems are envisaged with the Waste Water Treatment Works for the treatment of domestic discharges from this site.

WATER SUPPLY

A water supply can be made available to service this proposed development. Initial indications are that a connection can be made from the 100mm diameter DICL watermain along Churchfields. The cost of providing new on-site watermains can be calculated upon the receipt of detailed site layout plans which should be sent to the above address.

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

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

Please quote our reference number in all communications and correspondence.

Yours faithfully,

Owain George
Planning Liaison Manager
Developer Services

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

Appendix E Calculations and Constraints Plan

Return to text

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.300
Area (ha)	0.660	Urban	0.000
SAAR (mm)	1077	Region Number	Region 9

Results l/s

QBAR Rural	2.0
QBAR Urban	2.0
Q100 years	4.3
Q1 year	1.8
Q30 years	3.5
Q100 years	4.3

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	230.107	0.607	1.6	145.6	O K
30 min Summer	230.246	0.746	1.6	200.3	O K
60 min Summer	230.382	0.882	1.6	262.6	O K
120 min Summer	230.508	1.008	1.7	329.6	O K
180 min Summer	230.574	1.074	1.8	368.1	O K
240 min Summer	230.616	1.116	1.8	393.9	O K
360 min Summer	230.674	1.174	1.9	431.7	O K
480 min Summer	230.712	1.212	1.9	457.5	Flood Risk
600 min Summer	230.739	1.239	1.9	476.2	Flood Risk
720 min Summer	230.759	1.259	1.9	490.2	Flood Risk
960 min Summer	230.785	1.285	1.9	509.1	Flood Risk
1440 min Summer	230.806	1.306	1.9	525.2	Flood Risk
2160 min Summer	230.803	1.303	1.9	522.5	Flood Risk
2880 min Summer	230.787	1.287	1.9	510.9	Flood Risk
4320 min Summer	230.755	1.255	1.9	487.7	Flood Risk
5760 min Summer	230.730	1.230	1.9	469.7	Flood Risk
7200 min Summer	230.705	1.205	1.9	452.6	Flood Risk
8640 min Summer	230.680	1.180	1.9	435.8	O K
10080 min Summer	230.656	1.156	1.8	419.5	O K
15 min Winter	230.155	0.655	1.6	163.3	O K
30 min Winter	230.302	0.802	1.6	224.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	119.449	0.0	122.0	27
30 min Summer	82.425	0.0	121.7	42
60 min Summer	54.368	0.0	255.5	72
120 min Summer	34.544	0.0	263.2	130
180 min Summer	26.016	0.0	274.2	190
240 min Summer	21.119	0.0	281.6	250
360 min Summer	15.756	0.0	291.2	368
480 min Summer	12.773	0.0	297.0	488
600 min Summer	10.843	0.0	300.9	608
720 min Summer	9.478	0.0	303.5	726
960 min Summer	7.656	0.0	306.4	966
1440 min Summer	5.653	0.0	306.9	1442
2160 min Summer	4.162	0.0	590.5	2096
2880 min Summer	3.343	0.0	593.1	2416
4320 min Summer	2.452	0.0	576.5	3160
5760 min Summer	1.971	0.0	936.4	3984
7200 min Summer	1.664	0.0	988.5	4824
8640 min Summer	1.449	0.0	1005.0	5624
10080 min Summer	1.290	0.0	968.6	6456
15 min Winter	119.449	0.0	120.7	27
30 min Winter	82.425	0.0	125.8	41

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	230.445	0.945	1.7	294.9	O K
120 min Winter	230.578	1.078	1.8	370.8	O K
180 min Winter	230.648	1.148	1.8	414.6	O K
240 min Winter	230.693	1.193	1.9	444.4	O K
360 min Winter	230.756	1.256	1.9	488.2	Flood Risk
480 min Winter	230.798	1.298	1.9	518.6	Flood Risk
600 min Winter	230.828	1.328	2.0	541.1	Flood Risk
720 min Winter	230.850	1.350	2.0	558.4	Flood Risk
960 min Winter	230.881	1.381	2.0	582.6	Flood Risk
1440 min Winter	230.911	1.411	2.0	607.3	Flood Risk
2160 min Winter	230.920	1.420	2.0	614.6	Flood Risk
2880 min Winter	230.908	1.408	2.0	604.9	Flood Risk
4320 min Winter	230.871	1.371	2.0	575.1	Flood Risk
5760 min Winter	230.836	1.336	2.0	547.4	Flood Risk
7200 min Winter	230.802	1.302	1.9	521.7	Flood Risk
8640 min Winter	230.766	1.266	1.9	495.8	Flood Risk
10080 min Winter	230.730	1.230	1.9	469.8	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	54.368	0.0	257.9	70
120 min Winter	34.544	0.0	273.8	128
180 min Winter	26.016	0.0	285.3	188
240 min Winter	21.119	0.0	292.3	246
360 min Winter	15.756	0.0	301.5	364
480 min Winter	12.773	0.0	306.9	480
600 min Winter	10.843	0.0	310.4	598
720 min Winter	9.478	0.0	312.7	714
960 min Winter	7.656	0.0	314.9	946
1440 min Winter	5.653	0.0	314.0	1404
2160 min Winter	4.162	0.0	612.7	2076
2880 min Winter	3.343	0.0	612.6	2708
4320 min Winter	2.452	0.0	595.6	3376
5760 min Winter	1.971	0.0	1048.8	4320
7200 min Winter	1.664	0.0	1088.3	5200
8640 min Winter	1.449	0.0	1060.6	6136
10080 min Winter	1.290	0.0	1032.8	7056

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)	19.200	Shortest Storm (mins)	15
Ratio R	0.300	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.660

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.220	4	8	0.220	8	12	0.220

Model Details

Storage is Online Cover Level (m) 231.000

Tank or Pond Structure

Invert Level (m) 229.500

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	137.0	1.500	881.0

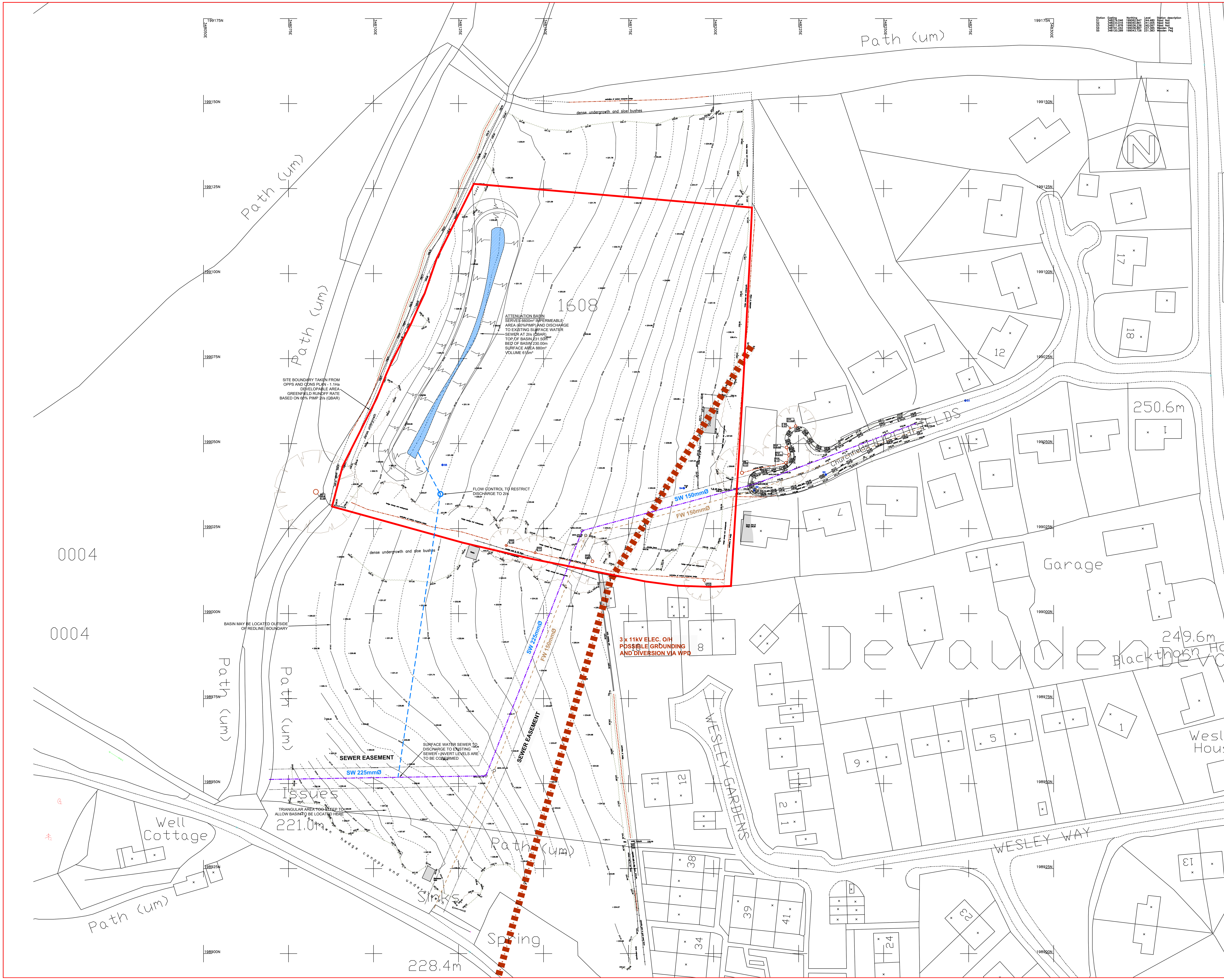
Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0061-2000-1500-2000
Design Head (m)	1.500
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	61
Invert Level (m)	229.400
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	2.0
Flush-Flo™	0.269	1.6
Kick-Flo®	0.545	1.3
Mean Flow over Head Range	-	1.5

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.3	1.200	1.8	3.000	2.7	7.000	4.1
0.200	1.5	1.400	1.9	3.500	3.0	7.500	4.2
0.300	1.6	1.600	2.1	4.000	3.1	8.000	4.3
0.400	1.5	1.800	2.2	4.500	3.3	8.500	4.5
0.500	1.4	2.000	2.3	5.000	3.5	9.000	4.6
0.600	1.3	2.200	2.4	5.500	3.6	9.500	4.7
0.800	1.5	2.400	2.5	6.000	3.8		
1.000	1.7	2.600	2.6	6.500	3.9		



Rev:	Date	Details	By.	Chk.
A	15/07/21	Issued for Information	TOR	SJD

Amendments

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Project:

Monmouthshire HA
Churchfields
Devauden

Drawing title:

Constraints Plan

Drawn:	Chk:	Status:	Scale:
SJD		Information	1:500 @ A1

Date:	Job No.	Drg. No.	Rev.
July-21	2203	500	A