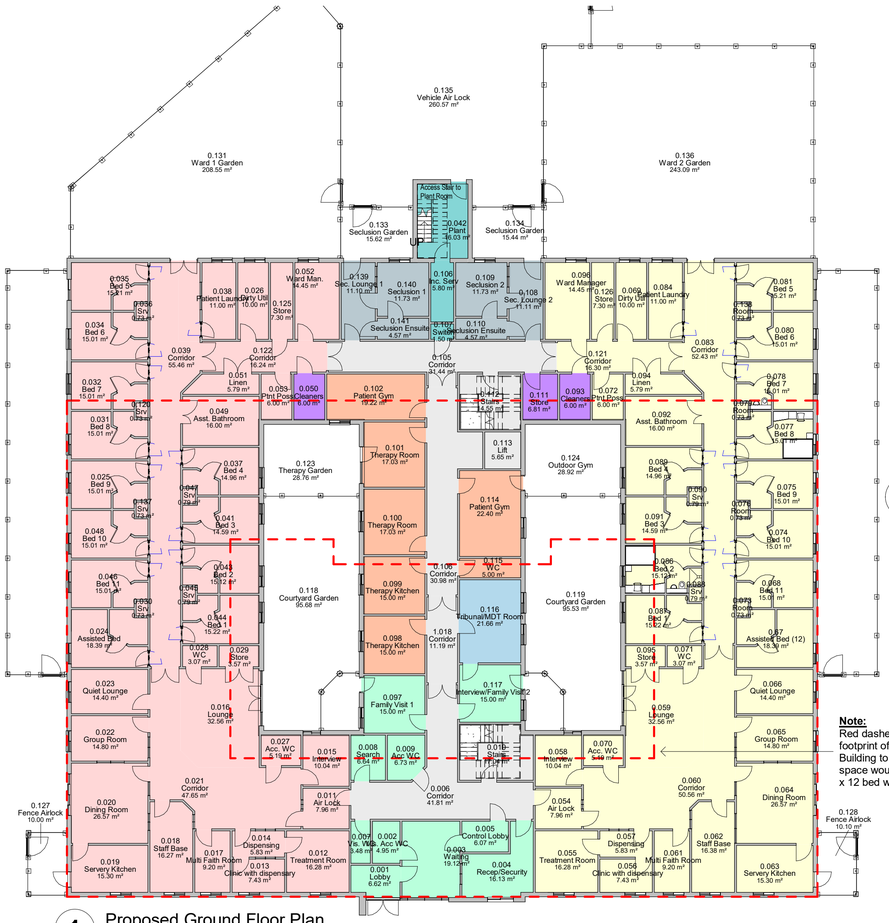
2 Proposed First Floor Plan

1 : 200 Ref Sheet: 2220



1 Proposed Ground Floor Plan

1 : 200 Ref Sheet: 2220

Note:
Red dashed line denotes existing footprint of recently razed Treowen Building to identify where additional space would be required to achieve 2 x 12 bed wards

Schedule of Accommodation

Number	Name	Area
Ground		
Ancillary		
0.050	Cleaners	6.00 m²
0.093	Cleaners	6.00 m²
0.111	Store	6.81 m²
Ancillary: 3		18.81 m²
Circulation		
0.006	Corridor	41.81 m²
0.010	Stairs	17.04 m²
0.105	Corridor	31.44 m²
0.106	Corridor	30.98 m²
0.112	Stairs	14.55 m²
0.113	Lift	5.65 m²
1.018	Corridor	11.19 m²
Circulation: 7		152.66 m²
Entrance and Reception		
0.001	Lobby	6.62 m²
0.002	Vis. Acc WC	4.95 m²
0.003	Waiting	19.12 m²
0.004	Recep/Security	16.13 m²
0.005	Control Lobby	6.07 m²
0.007	Vis. WC	3.48 m²
0.008	Search	6.64 m²
0.009	Acc WC	6.73 m²
0.097	Family Visit 1	15.00 m²
0.117	Interview/Family Visit 2	15.00 m²
Entrance and Reception: 10		99.74 m²
Plant		
0.042	Plant	16.03 m²
0.106	Inc. Serv	5.80 m²
0.107	Switch	1.50 m²
Plant: 3		23.32 m²
Seclusion		
0.108	Sec. Lounge 2	11.11 m²
0.109	Seclusion 2	11.73 m²
0.110	Seclusion Ensuite	4.57 m²
0.139	Sec. Lounge 1	11.10 m²
0.140	Seclusion 1	11.73 m²
0.141	Seclusion Ensuite	4.57 m²
Seclusion: 6		54.80 m²
Therapy		
0.098	Therapy Kitchen	15.00 m²
0.099	Therapy Kitchen	15.00 m²
0.100	Therapy Room	17.03 m²
0.101	Therapy Room	17.03 m²
0.102	Patient Gym	19.22 m²
0.114	Patient Gym	22.40 m²
Therapy: 7		110.67 m²
Tribunal		
0.116	Tribunal/MDT Room	21.66 m²
Tribunal: 1		21.66 m²
Ward 1		
0.011	Air Lock	7.96 m²
0.012	Treatment Room	16.28 m²
0.013	Clinic with dispensary	7.43 m²
0.014	Dispensing	5.83 m²
0.015	Interview	10.04 m²

Schedule of Accommodation

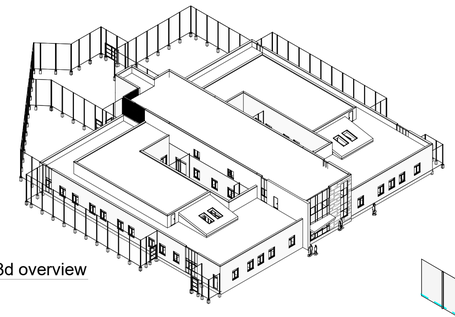
Number	Name	Area
0.016	Lounge	32.56 m²
0.017	Multi Faith Room	9.20 m²
0.018	Staff Base	16.27 m²
0.019	Servery Kitchen	15.30 m²
0.020	Dining Room	26.57 m²
0.021	Corridor	47.65 m²
0.022	Group Room	14.80 m²
0.023	Quiet Lounge	14.40 m²
0.024	Assisted Bed	18.39 m²
0.025	Bed 9	15.01 m²
0.026	Dirty Util	10.00 m²
0.027	Acc. WC	5.19 m²
0.028	WC	3.07 m²
0.029	Store	3.57 m²
0.030	Srv	0.73 m²
0.031	Bed 8	15.01 m²
0.032	Bed 7	15.01 m²
0.034	Bed 6	15.01 m²
0.035	Bed 5	15.21 m²
0.036	Srv	0.73 m²
0.037	Bed 4	14.96 m²
0.038	Patient Laundry	11.00 m²
0.039	Corridor	55.46 m²
0.040	Staff Base	7.19 m²
0.041	Bed 3	14.59 m²
0.043	Bed 2	15.12 m²
0.044	Bed 1	15.22 m²
0.045	Srv	0.79 m²
0.046	Bed 11	15.01 m²
0.047	Srv	0.79 m²
0.048	Bed 10	15.01 m²
0.049	Asst. Bathroom	16.00 m²
0.051	Linen	5.79 m²
0.052	Ward Man.	14.45 m²
0.053	Ptnt Poss.	6.00 m²
0.120	Srv	0.73 m²
0.122	Corridor	16.24 m²
0.125	Store	7.30 m²
0.137	Srv	0.73 m²
Ward 1: 44		573.61 m²
Ward 2		
0.054	Air Lock	7.96 m²
0.055	Treatment Room	16.28 m²
0.056	Clinic with dispensary	7.43 m²
0.057	Dispensing	5.83 m²
0.058	Interview	10.04 m²
0.059	Lounge	32.56 m²
0.060	Corridor	50.56 m²
0.061	Multi Faith Room	9.20 m²

Schedule of Accommodation

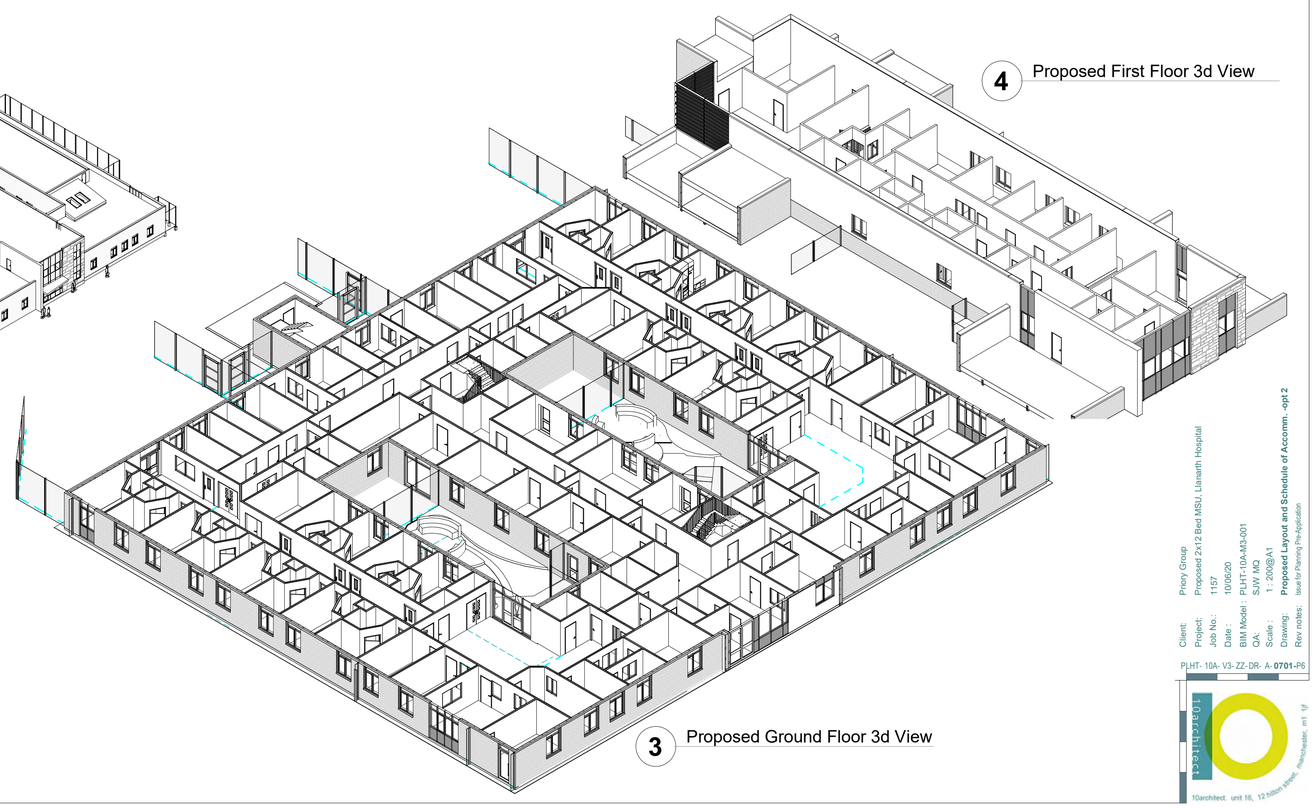
Number	Name	Area
0.062	Staff Base	16.38 m²
0.063	Servery Kitchen	15.30 m²
0.064	Dining Room	26.57 m²
0.065	Group Room	14.80 m²
0.066	Quiet Lounge	14.40 m²
0.67	Assisted Bed (12)	18.39 m²
0.068	Bed 11	15.01 m²
0.069	Dirty Util	10.00 m²
0.070	Acc. WC	5.19 m²
0.071	WC	3.07 m²
0.072	Ptnt Poss.	6.00 m²
0.073	Room	0.73 m²
0.074	Bed 10	15.01 m²
0.075	Bed 9	15.01 m²
0.076	Room	0.73 m²
0.077	Bed 8	15.01 m²
0.078	Bed 7	15.01 m²
0.079	Room	0.73 m²
0.080	Bed 6	15.01 m²
0.081	Bed 5	15.21 m²
0.082	Staff Base	7.19 m²
0.083	Corridor	52.43 m²
0.084	Patient Laundry	11.00 m²
0.086	Bed 2	15.12 m²
0.087	Bed 1	15.22 m²
0.088	Srv	0.79 m²
0.089	Bed 4	14.96 m²
0.090	Srv	0.79 m²
0.091	Bed 3	14.59 m²
0.092	Asst. Bathroom	16.00 m²
0.094	Linen	5.79 m²
0.095	Store	3.57 m²
0.096	Ward Manager	14.45 m²
0.121	Corridor	16.30 m²
0.126	Store	7.30 m²
0.138	Room	0.73 m²
Ward 2: 44		573.65 m²
Ground: 125		1628.93 m²
First		
Ancillary		
1.005	Cleaners	7.22 m²
1.025	Patient Poss. St.	8.52 m²
Ancillary: 2		15.74 m²
Circulation		
0.129	Corridor	35.35 m²

Schedule of Accommodation

Number	Name	Area
0.130	Corridor	11.55 m²
1.019	Stairs	19.60 m²
1.020	Lift	5.65 m²
1.026	Stair	21.43 m²
1.028	Corridor	8.64 m²
Circulation: 6		102.21 m²
Office		
1.001	Office	20.05 m²
1.002	Records Store	7.50 m²
1.004	MDT Room	23.99 m²
1.022	Meeting Room	15.00 m²
1.023	Consultant Office	10.00 m²
1.024	Consultant Office	10.00 m²
1.029	Training Room	30.90 m²
Office: 7		117.44 m²
Plant		
1.003	Lobby	6.11 m²
1.015	Plant Room	62.54 m²
1.016	Tank Room	17.14 m²
1.017	Server Room	12.92 m²
Plant: 4		98.70 m²
Staff Facilities		
1.008	F Staff Change/Loc	12.00 m²
1.009	F Staff Shwr	6.54 m²
1.010	WC	3.13 m²
1.011	Acc WC	5.49 m²
1.012	WC	3.13 m²
1.013	M Staff Shwr	6.54 m²
1.014	M Staff Change/Loc	12.00 m²
1.021	Staff Room	20.00 m²
Staff Facilities: 8		68.82 m²
First: 27		402.92 m²
Grand total		2031.85 m²



5 3d overview



4 Proposed First Floor 3d View

3 Proposed Ground Floor 3d View

Designs referencing and based on:

- WHBN 03-01 - Adult Acute Mental Units - NHS Wales
- Environmental Design Guide: Adult Medium Secure Services - Department of Health
- Best Practice Guideance - Specification for adult medium secure services - Department of Health
- Standards for Forensic Mental Health Services: Low and Medium Secure Care - Royal College of Psychiatrists
- **Confirmation from Priory that sprinkler or similar fire fighting equipment would be required for any future development on this site**
- **Proposal looks to re-use as much footprint of the recently razed Treowen building as possible, while achieving current space standards and visibility for 2 x 12 bed wards.**

Comparison

Existing Treowen areas:	
18 Beds	
Ground Floor:	1160m2
First Floor:	240m2
Total:	**1400m2**
Difference:	**613m2**
Rooms causing significant increase in area (inc associated circulation allowance):	
- 6 x bedrooms:	120m2
- Duplication of Lounges, kitchen Dining room, Staff Offices, Clinic, visitor facilities	230m2
- Tribunal Suite:	80m2
- Additional Seclusion:	35m2
- More Prescriptive 'front of house'	100m2
- Increase in Plant space for sprinklers tanks, etc.	40m2
Total additional areas causing increase:	**605m2**

Rev	Revision Notes
P4	First Floor updated
P5	Amendments to layout
P6	Issue for Planning Pre-Application

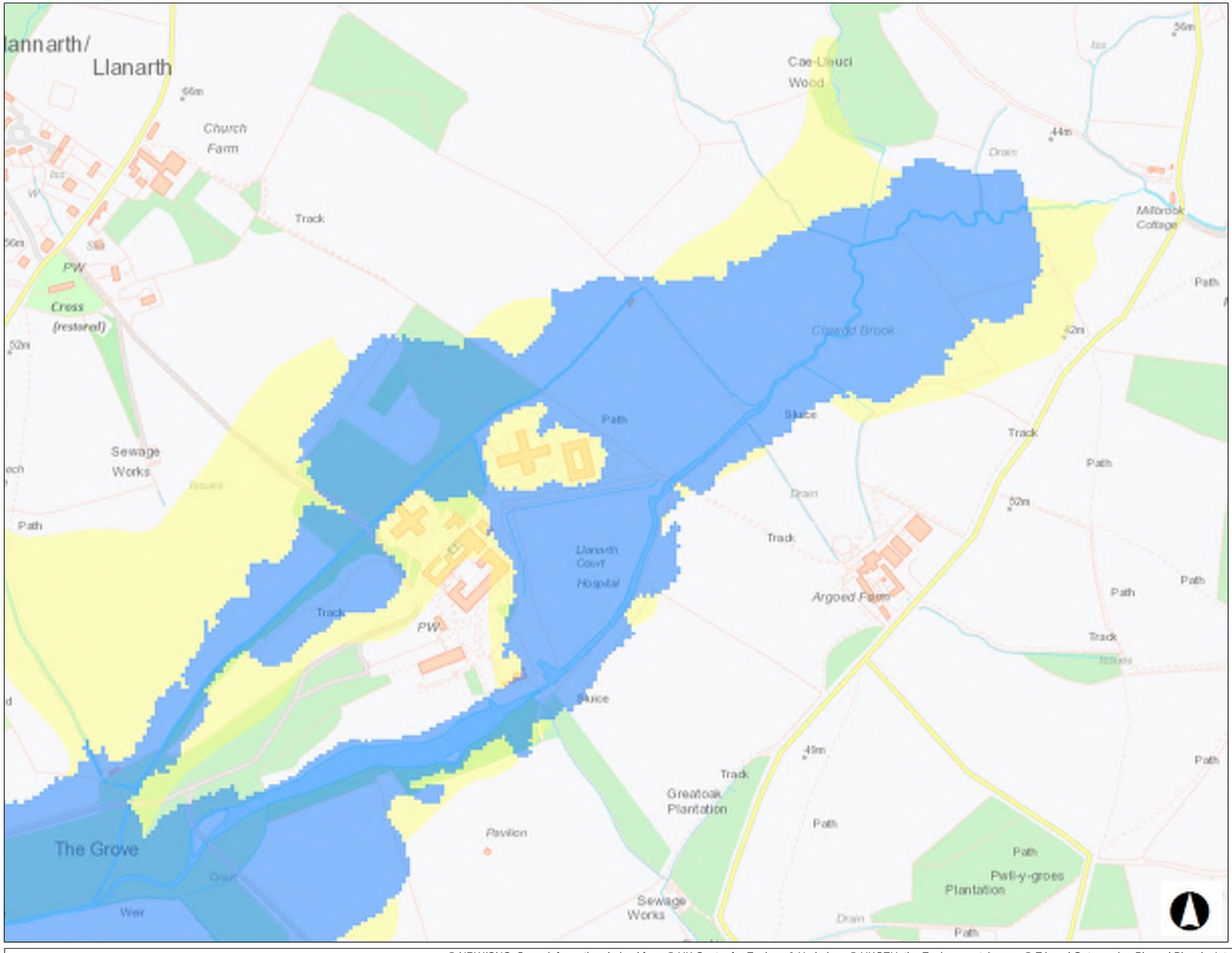
PLHT- 10A- V3- ZZ- DR- A- 0701- P6

Client: Priory Group
Project: Proposed 2x12 Bed MSU, Llanarth Hospital
Job No.: 1157
Date: 10/06/20
BIM Model: PLHT-10A-M3-001
QA:
Scale: 1 : 200@A1
Drawing: **Proposed Layout and Schedule of Accomm. -opt 2**
Rev notes: Issue for Planning Pre-Application

PLHT- 10A- V3- ZZ- DR- A- **0701**- P6

10architect unit 16, 12 hilton street, manchester, m1 1jf

APPENDIX D – DEVELOPMENT ADVICE MAP



Cyfoeth Naturiol Cymru
Natural Resources Wales

Map Perygl Llifogydd / Flood Risk Map -

Allwedd / Map Key

- Zone C1
- Zone C2
- Zone B
- Zone A

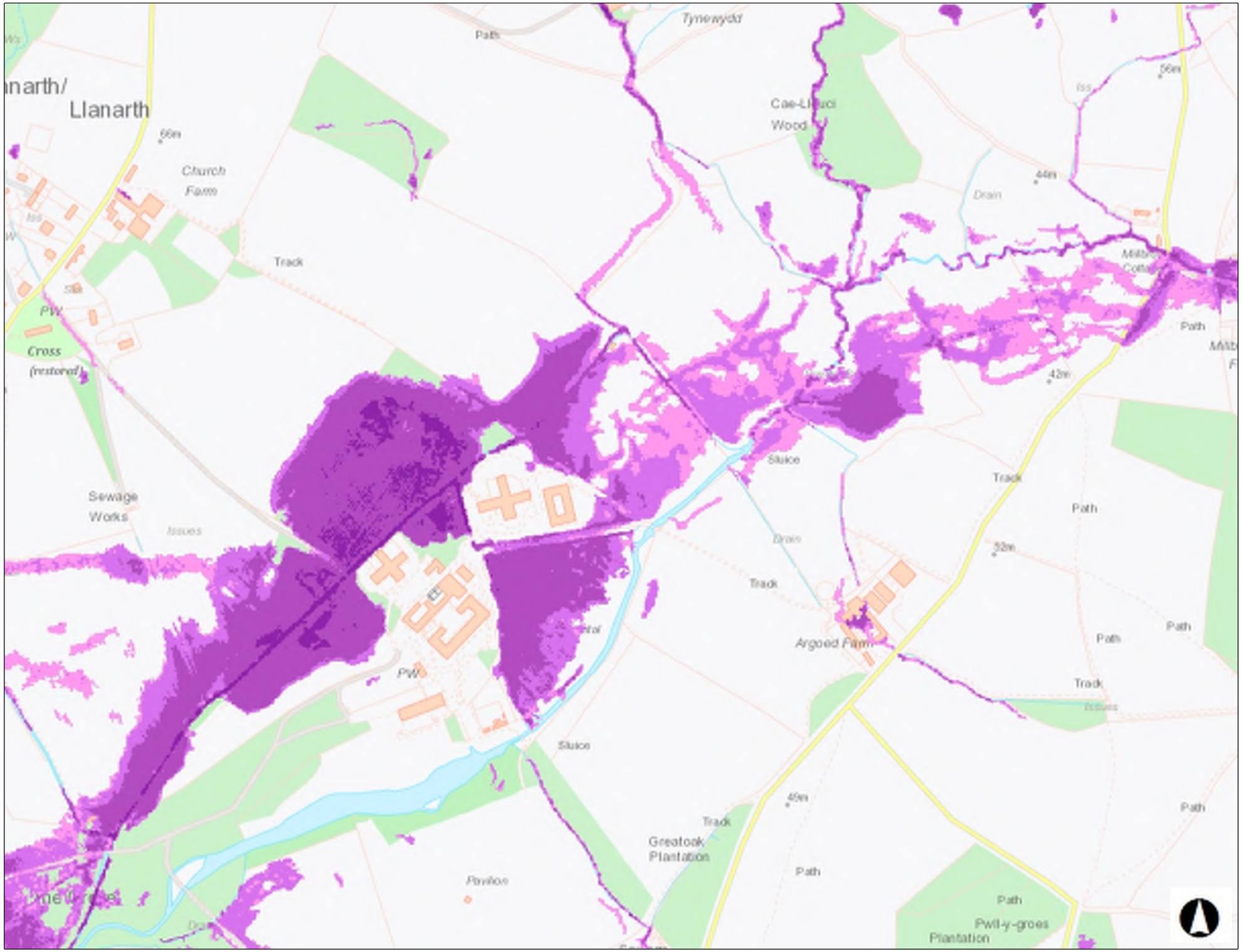
Graddfa / Scale at A3 1: 5,000

Dyddiad / Date
27/01/2021

0.3 0 0.13 0.3

British_National_Grid Kilometers

APPENDIX E – NATIONAL FLOOD RISK PLUVIAL FLOOD MAPS



Cyfoeth Naturiol Cymru
Natural Resources Wales

Map Perygl Llifogydd / Flood Risk Map - Pluvial Low Risk Depth

Allwedd / Map Key

Surface Water and Small Watercourses Depth - Low Risk

- Less than 0.15m
- 0.15 - 0.30m
- 0.30 - 0.90m
- Greater than 0.9m

Graddfa / Scale at A3 1: 5,000

Dyddiad / Date
20/01/2021

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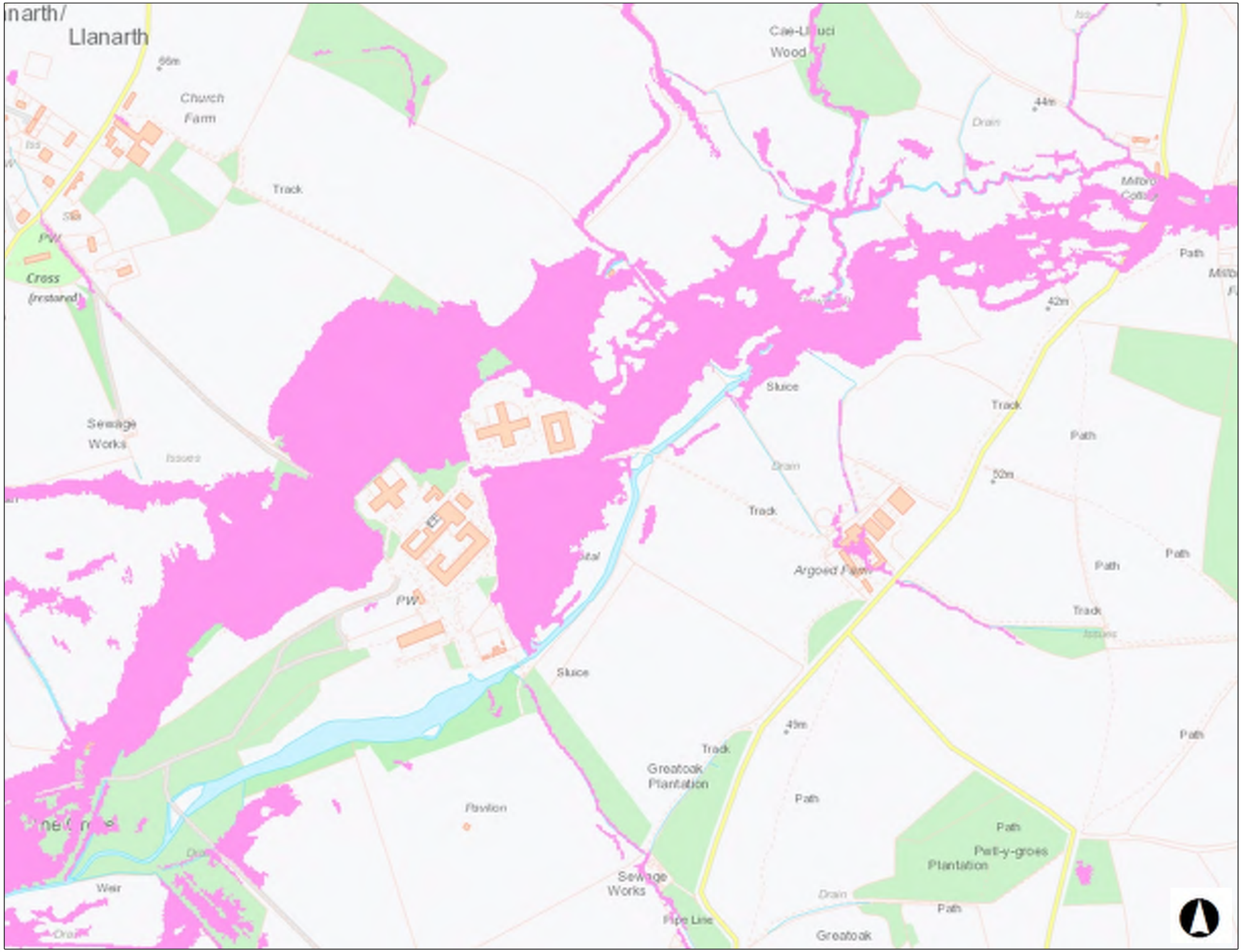
British_National_Grid Kilometers



Cyfoeth Naturiol Cymru
Natural Resources Wales

Map Perygl Llifogydd / Flood Risk Map - Pluvial Low Risk Extent

Allwedd / Map Key

Flood Risk Areas

- Cardiff
- Flintshire
- Gwynedd Coast
- Monmouthshire
- Newport
- North Wales Coast
- South Wales Valleys
- Swansea Bay
- Wrexham

Surface Water and Small Watercourses Extent - Low Risk

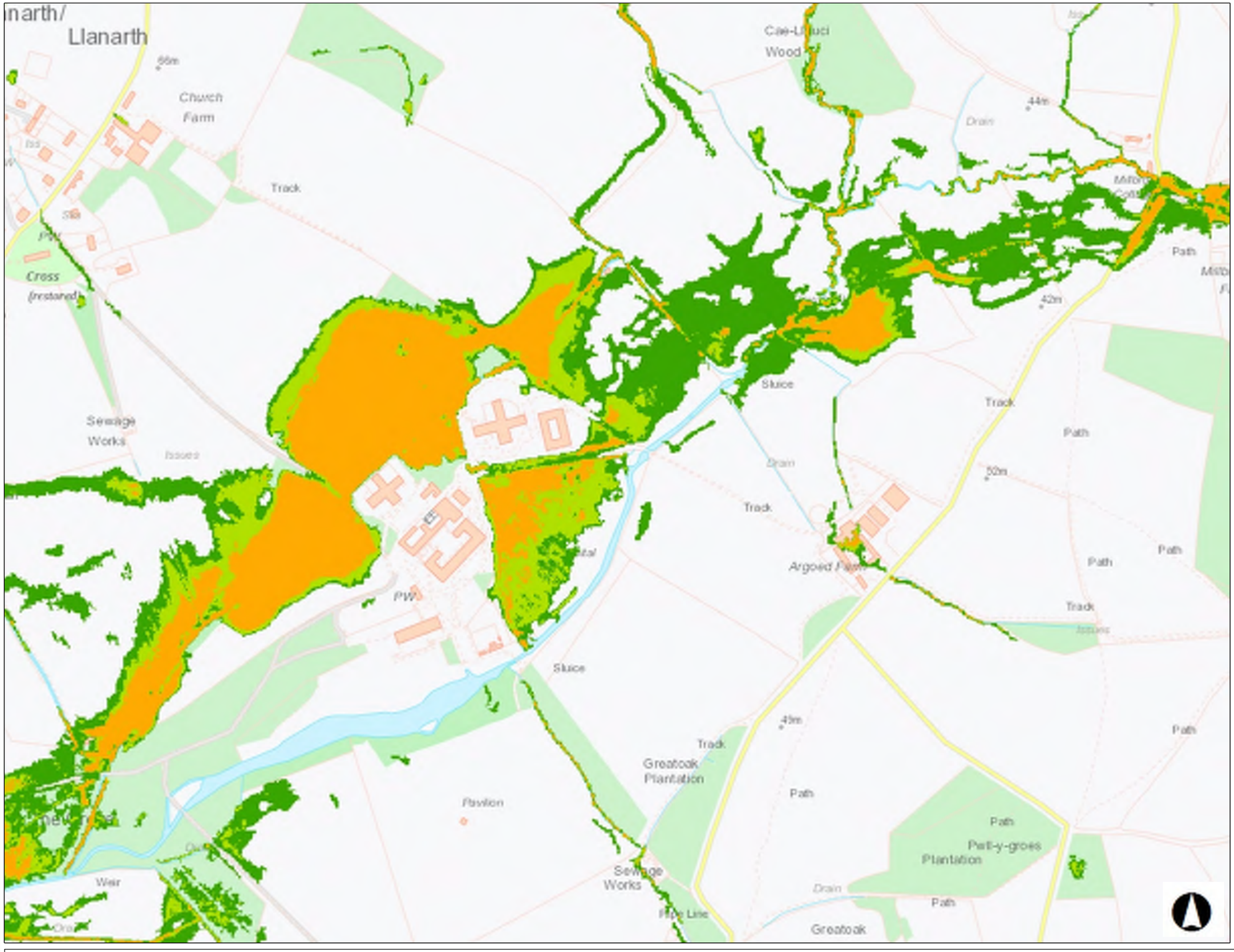
- Low Extent

Graddfa / Scale at A3 1: 5,000

Dyddiad / Date
21/01/2021

0.3 0 0.13 0.3

British_National_Grid Kilometers



Cyfoeth Naturiol Cymru
Natural Resources Wales

Map Perygl Llifogydd / Flood Risk Map - Pluvial Low Risk Hazard

Allwedd / Map Key

Flood Risk Areas

- Cardiff
- Flintshire
- Gwynedd Coast
- Monmouthshire
- Newport
- North Wales Coast
- South Wales Valleys
- Swansea Bay
- Wrexham

Surface Water and Small Watercourses Hazard - Low Risk

- Low
- Danger for Some
- Danger for Most
- Danger for All

Graddfa / Scale at A3 1: 5,000

Dyddiad / Date
21/01/2021

0.3 0 0.13 0.3

British_National_Grid Kilometers

Cyfoeth Naturiol Cymru
Natural Resources Wales

Map Perygl Llifogydd / Flood Risk Map - Pluvial Low Risk Velocity

Allwedd / Map Key

Surface Water and Small Watercourses Velocity - Low Risk

- Less than 1m/s
- 1 - 2m/s
- 2 - 3m/s
- Greater than 3m/s

Surface Water and Small Watercourses Flow Direction - Low Risk

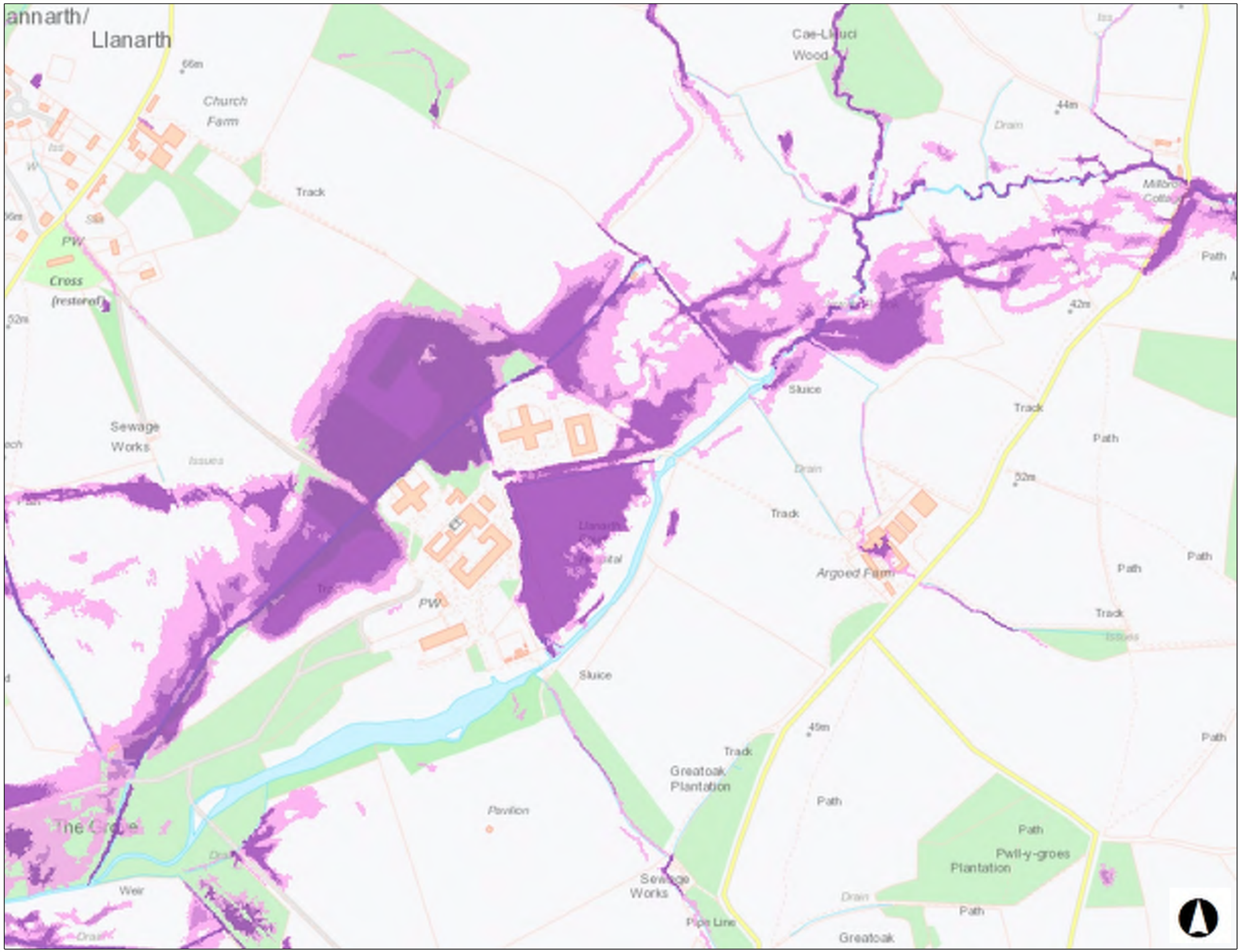
- Flow Direction

Graddfa / Scale at A3 1: 5,000

Dyddiad / Date
20/01/2021

0.3 0 0.13 0.3

British_National_Grid Kilometers



Cyfoeth Naturiol Cymru
Natural Resources Wales

Map Perygl Llifogydd / Flood Risk Map - Pluvial

Allwedd / Map Key

Flood Risk from Surface Water & Small Watercourses - Extent

- High
- Medium
- Low

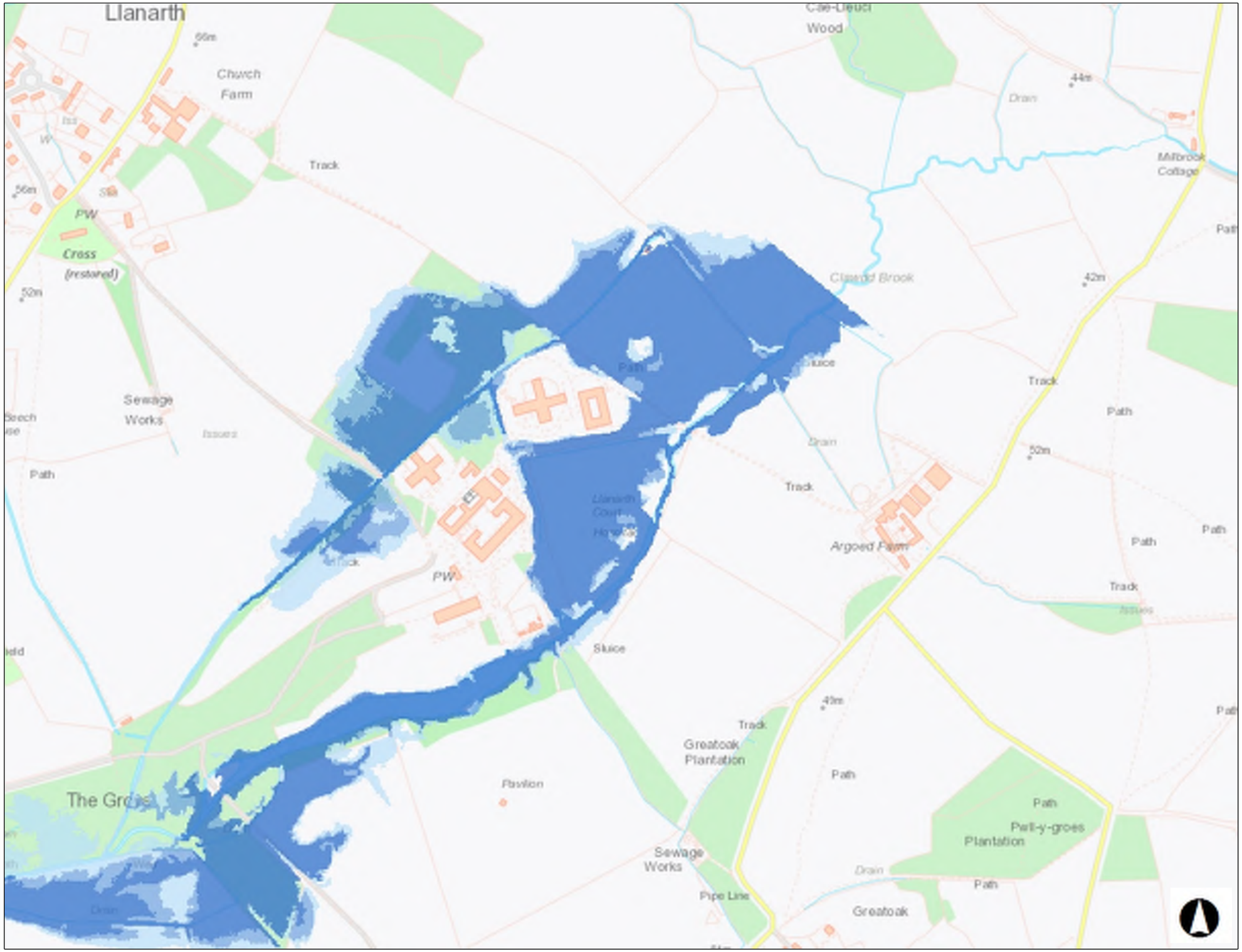
Graddfa / Scale at A3 1: 5,000

Dyddiad / Date
20/01/2021

0.3 0 0.13 0.3

British_National_Grid Kilometers

APPENDIX F – NATIONAL FLOOD RISK FLUVIAL FLOOD MAPS



Cyfoeth Naturiol Cymru
Natural Resources Wales

Map Perygl Llifogydd / Flood Risk Map - Fluvial

Allwedd / Map Key

Flood Risk from Rivers - Extent
- High
- Medium
- Low

Flood Risk from the Sea
- High
- Medium
- Low

Graddfa / Scale at A3 1: 5,000

Dyddiad / Date
20/01/2021

0.3 0 0.13 0.3

British_National_Grid Kilometers

Cyfoeth Naturiol Cymru
Natural Resources Wales

Map Perygl Llifogydd / Flood Risk Map - Fluvial Low Risk Depth

Allwedd / Map Key

Rivers Depth - Low Risk

- Less than 0.15m
- 0.15 - 0.30m
- 0.30 - 0.90m
- Greater than 0.9m

Graddfa / Scale at A3 1: 5,000

Dyddiad / Date
20/01/2021

0.3 0 0.13 0.3

British_National_Grid Kilometers

Cyfoeth Naturiol Cymru
Natural Resources Wales

Map Perygl Llifogydd / Flood Risk Map - Fluvial Low Risk Extent

Allwedd / Map Key

Rivers Extent - Low Risk

Low Extent

Graddfa / Scale at A3 1: 5,000

Dyddiad / Date
20/01/2021

0.3 0 0.13 0.3

British_National_Grid Kilometers

Cyfoeth Naturiol Cymru
Natural Resources Wales

Map Perygl Llifogydd / Flood Risk Map - Fluvial Low Risk Hazard

Allwedd / Map Key

Rivers Hazard - Low Risk

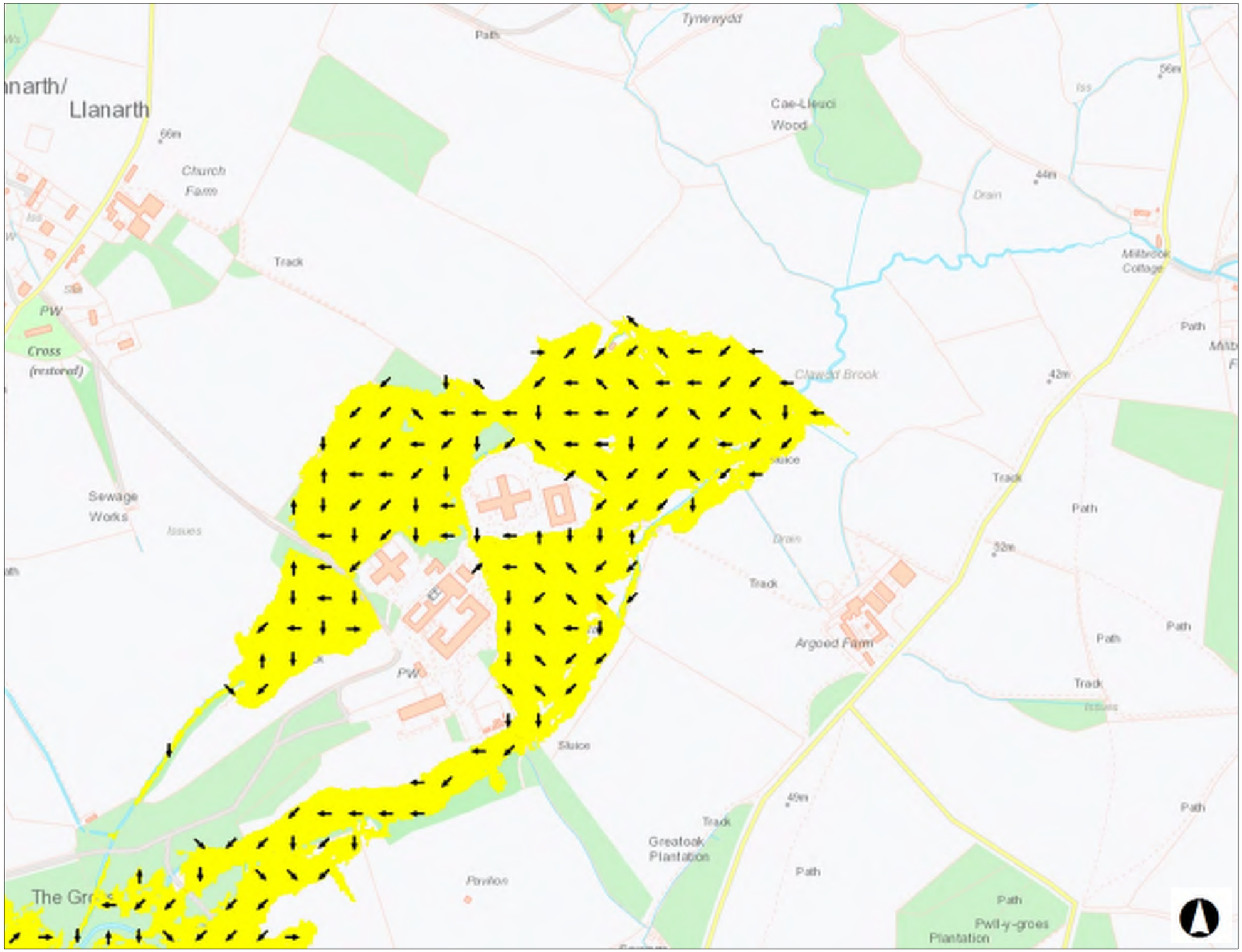
- Low
- Danger for Some
- Danger for Most
- Danger for All

Graddfa / Scale at A3 1: 5,000

Dyddiad / Date
20/01/2021

0.3 0 0.13 0.3

British_National_Grid Kilometers



Cyfoeth Naturiol Cymru
Natural Resources Wales

Map Perygl Llifogydd / Flood Risk Map - Fluvial Low Risk Velocity

Allwedd / Map Key

Rivers Velocity - Low Risk

- Less than 1m/s
- 1 - 2m/s
- 2 - 3m/s
- Greater than 3m/s

Rivers Flow Direction - Low Risk

- Flow Direction

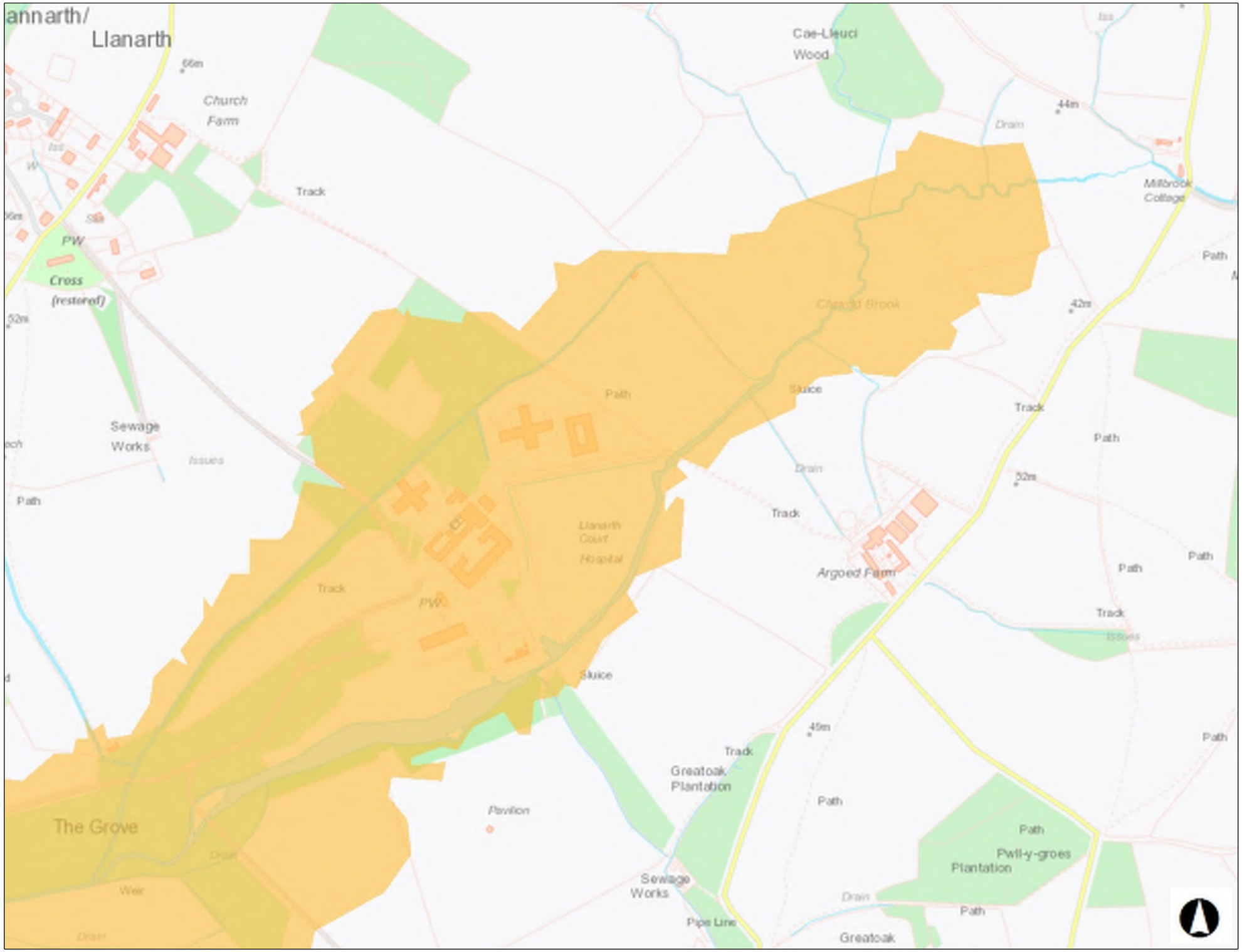
Graddfa / Scale at A3 1: 5,000

Dyddiad / Date
20/01/2021

0.3 0 0.13 0.3

British_National_Grid Kilometers

APPENDIX G – FLOOD ALERT MAP



Cyfoeth Naturiol Cymru
Natural Resources Wales

Map Perygl Llifogydd / Flood Risk Map - Flood Alert

Allwedd / Map Key

- Flood Alert Area

Graddfa / Scale at A3 1: 5,000

Dyddiad / Date
20/01/2021

0.3 0 0.13 0.3

British_National_Grid Kilometers

APPENDIX H – DRAINAGE STRATEGY REPORT

Egerton House
2 Tower Road
Birkenhead
Wirral
CH41 1FN

Priory Llanarth Court, Monmouthshire

Drainage Strategy Report

24/01/2020

Document Owner(s)	Project/Organization Role
Vince Williams	Civil Engineer

Project Report Control

Version	Date	Author	Change Description
P1		V Williams	Original Issue

Contents

1.0 INTRODUCTION

Following a devastating accidental fire on 28th April 2020 which completely destroyed the existing secure mental hospital building, the Hospital Trust are proposing to reconstruct a new unit on the site OF the former unit, whilst updating the facilities to provide care for the residents.

2.0 COMPETENCY OF DESIGNER

MDA, Wirral LTD is a long established multi-discipline Consultancy, which provides design solutions for a range of site drainage and Flood Risk Assessments for developers in the UK. MDA liaise regularly with the Environment Agency, LLFA's and Water Authorities to ensure the designs comply with current statutory and regulatory requirements.

3.0 SITE LOCATION AND DESCRIPTION

The site is located 0.7km to the South-East of Llanarth Town Centre and 25km North-East of Newport Town Centre

The fire damaged building is located within the grounds of the Llanarth Court Hospital, made up of a number of existing hospital building's access, parking and landscaping.
This report relates only to the re-development area within the wider site confines.

Following the devastating fire, the site has retained the original building foundation and floor slab with demolition rubble still present on site. An existing gravel path, macadam surfaced access road is still present with the remainder given over to grass.

Reference (NGR) for the approximate center of the site is 338242E, 210732N. The site location plan is included in Appendix A.

The total site development zone covers an area of approximately 0.644ha.

The sites boundaries are flanked by open fields east, existing hospital units to the west and woodland to the north and south

Historically the earliest map of 1881 show the main site as a stately home with the re-development area of the site as undeveloped farmland until it was developed between 1985 & 2004

The British Geological Society (BGS) maps indicate the site geology as:

- Superficial deposits of Alluvium – Clay, Silt, Sand and Gravel
- Bedrock geology of St Maughans formation - Argillaceous rocks and subequal/subordinate sandstone, interbedded
- The nearest BH log located approximately 1.6km to the SE indicates a mixture of sandstone and marl bands to a depth of 60m (end of BH). Water was struck at 5m level with the 'at rest' level 15m below ground level.
- A series of BH's relating to the A4 construction works 1.2km to the south indicate stiff sandy clays with some gravel and sandstone fragments to 3.5m depth.

- Sandstone was present at 4.5m depth with overlying superficial deposits to the North East of the site, similarly sandy clays of 5m depth overlying sandstones, marl and mudstone to the North-West.
- In the absence of site borehole logs it is assessed that the site will have approx. 4m depth of sandy silty clays overlying bands of marl and sandstone to depth.

4.0 POTENTIAL FLOOD RISK

Natural Resources Wales flood map indicates the site lies within a Flood Zone B (area known to have previously flooded), however, looking at the detailed floor risk maps from rivers, surface water and small watercourses indicates only the surrounding area of the development is at risk of less than 150mm depth, whilst the actual development site shows no risk of flooding.

The Flood Risk Maps have been examined and are included in Appendix B.

5.0 EXISTING SITE DRAINAGE

The on-site drainage is classed as Private and thus maintained by the Hospital Trust's maintenance team.

The development site Foul Drainage network connected the building down the eastern and western sides before joining at the southern gable side of the building. The Foul Drainage then connects via a 150mm diameter pipe to the wider site drainage system to the east of the development boundary, with connections from the remaining on-site buildings prior to discharging to either of two storage tanks located to the South-West area of the wider site. The use of an air ram injector station then passes the site wide foul flows to the off-site Dwr Cymru / Welsh Water Treatment Works located to the north of the hospital site.

The roof drainage is collected on the north, east and west building façade before interconnecting at the south-west corner of the building before it outfalls in a southerly direction into a French drain located along the southern boundary of the site. This has been laid so it falls in both an easterly and westerly direction.

The drain exits at the eastern corner of the site via a piped system into a catchpit, which also connects an open ditch south of and outside of the site boundary limits. From the catchpit the outflow enters the Clawdd Brook flowing in a south-westerly direction.

The westerly exit point of the French drain is into an open ditch where it crosses under the track via a pipeline, exiting into an open ditch again connecting into the Clawdd Brook.

There are a number of additional outfalls from the wider site discharging into the Clawdd Brook, which opens into a wider 'pond' at the south-western edge of the wider site. This outflow from this pond is controlled by a weir gate, with the outflow continuing south-weterly until it discharges into the River Usk.

6.0 DRAINAGE COMPLIANCE STANDARDS

The development shall be in accordance with all current codes of practice and legislation. Hydraulic design of all sewers will be carried out using industry standard software Causeway Flow.

The Building Regulations - Approved Document H (2002) details a hierarchy of potential methods for disposing of surface water as shown below in order of preference:

- Discharge via infiltration
- Discharge to watercourse
- Discharge to sewer

Schedule 3 of the Flood and Water Management Act (FWMA) 2010 requires surface water drainage for new developments to comply with mandatory National Standards for sustainable drainage (SuDS).
Surface water drainage systems must be designed and built in accordance with these mandatory standards for sustainable drainage published by Welsh Ministers. These systems must be approved by the local authority acting in its Sustainable Drainage Systems (SuDS) Approving Body (SAB) role before construction work begins.

In line with Sewers for Adoption (7th Edition), the requirements for the design of a new surface water drainage systems are as follows:

- Below ground piped drainage to be sized to accommodate the 1 in 2-year (50% AEP) design storm without surcharge.
- System to be designed not to flood any part of the site in a 1 in 30-year (3% AEP) design storm.
- For events in exceedance of the 1 in 30-year design storm and up to and including the 1 in 100-year event, site drainage and topography should be designed where practicable to route surface water run-off away from buildings to safe above-ground storage areas on site, thereby preventing this run-off from leaving the site and increasing flood risk elsewhere.

For each design case described above, the design storm is the critical storm duration for the site conditions. For the 1 in 100-year design case, a 30% increase in the peak rainfall intensity is applied to allow for the estimated worst case impacts of climate change. This is in accordance with Table 5 of the Technical Guidance to the National Planning Policy Framework.

Suitable systems of below ground drainage will be required to contain as a minimum requirement, the 1 in 30-year event. Additionally, surface water run-off from events that exceed the design capacity of the new drainage system, up to and including the 1 in 100-year (+30%) event, will be retained on site to prevent any flood risk to the proposed development or any areas surrounding the site.

Therefore, the surface water drainage systems are to be designed to restrict the discharge to the required rate, up to and including a 1 in 100 year return period design storm (+30% climate change allowance).

Foul water drainage disposal is set out in Part H of the Building Regulations in order of priority the preferred methods are:

1. Public sewer

2. Septic tank

3. Cesspool.

The foul water system shall be designed in accordance with;

- BS EN 752:2008 (Drain and sewer systems outside buildings)
- Sewers for Adoption (7th Edition)
- Technical Guidance to the National Planning Policy Framework document (Department for Communities and Local Government, March 2012)
- BS EN 12056-2:2000 (Drainage systems inside buildings)
- Building Regulations Approved Document H, Drainage and waste disposal. (Office of the Deputy Prime Minister, December 2010)

7.0 ASSESSMENT OF EXISTING AND PROPOSED RUN-OFF

As detailed in section 3.0 above, the existing site has a total area of 0.644Ha, of which the existing impermeable areas affected by the re-development zone have been measured as 1821m2 and the proposed impermeable areas being 2322m2. This will result in a 27% increase in impermeable areas.

The proposed surface water discharge rates will be assessed against the following conditions:

- 1 in 1-year storm event
- 1 in 30-year storm event
- 1 in 100-year storm event plus an allowance of 30% for climate change

8.0 DRAINAGE STRATEGY

The drainage networks have been designed to suit the proposed site layout and topography, with the aim to provide an effective and efficient design, mimicking the existing drainage as far as practicably possible
All site drainage will remain the responsibility of the Hospital Trust as it will form an extension of the current on-site drainage systems.

7.1 Surface Water

As indicated in Section 6, there is a requirement for the mandatory use of SUDS techniques. At present the BRE 365 percolation tests have yet to be completed and as such the drainage calculations have used generic permeability figures associated with sandy silty clays and will be adjusted at a later date to reflect the actual on-site results. Based on these results it is unlikely that effective infiltration solutions will be viable on their own in providing the design solutions.

This is born-out by the existing site drainage utilizing the Brook for the outflow. The Hospital Trust's maintenance manager has further confirmed the site is generally wet hence the wider site containing numerous open water courses etc.

The nearest suitable water course within close proximity to the proposed development site is the Clawdd Brook located slightly to the south of the proposed site

The scheme is to be designed to achieve a discharge rate of no greater than 70% of the current brownfield site for the 2-year critical storm event, plus the greenfield run-off rate.

The current brownfield element for 2-year storm events have been calculated as 17.1 l/sec.
Therefore, the surface water drainage systems are to be designed to restrict the discharge to the required rate of no more than (70% of 17.1) 12 l/sec, up to and including a 1 in 100 (+CC) return period design storm.

The intention is to collect the roof drainage and discharge this into a new attenuation pond located at the SW corner of the development area with a controlled outflow limiting the discharge rate to 12 l/sec maximum, with the outfall connected into the existing outfall into the existing French drain and thus to the existing brook. The outfall from the new pond will be set at a level that ensures the available free volume, from dry weather water level to the top of embankment, provides adequate storage capacity for all storm durations upto and including the 1:30 events. The proposed access road will be designed such that the surface water runs off to the south and east kerb channels where they will be directed to a new stone filter drain running alongside, this will remove the risk of any pollution entering the pond and affecting the likely eco system which it assumed will take advantage of the new pond habitat, whilst mimicking the existing site access drainage.

As the discharge rate will be less than the existing rates it is assessed that this will result in additional downstream storage being available providing additional on-site benefits with regards to future storm flooding events.

For the 1:100 storm duration events it has been calculated that an exceedance volume will result of circa 3m3 of on-site flooding. As the pond is located at the lowest part of the site with the ground levels generally falling away to the south any flood exceedance water will exit into the woods and thence onto the brook ensuring no on-site flooding of new or existing building can occur.
The same would apply should a catastrophic failure of the network occur, the flood route would be away from any buildings and to the south.

Storm event	Existing discharge rate (l/sec)	Proposed discharge rate (l/sec)
1:1	13.5	
1:2	17.1	
1:30	28.7	
1:100	33.7	

7.2 Foul Water

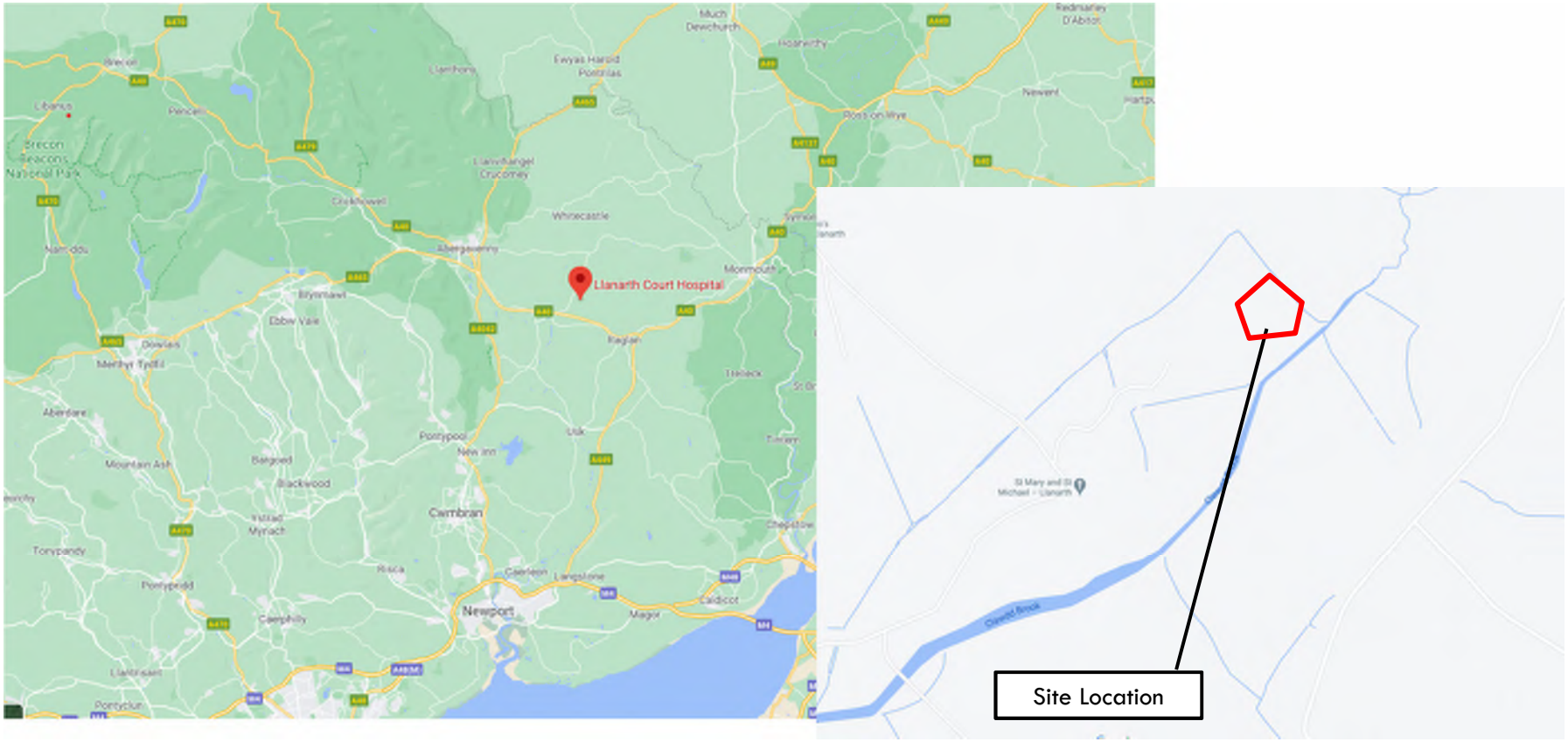
The intention for the development is to collect all of the required foul water discharge from the proposed development and discharge these via a gravity system to the on-site sewer which will remain a private system

It has been estimated that the original foul discharge rate would have been approximately 7.1 l/sec and the proposed development will generate approximately 7.3 l/sec. As such there is a very small increase in flow and is therefore assessed as not having any detrimental impact on the existing site drainage.

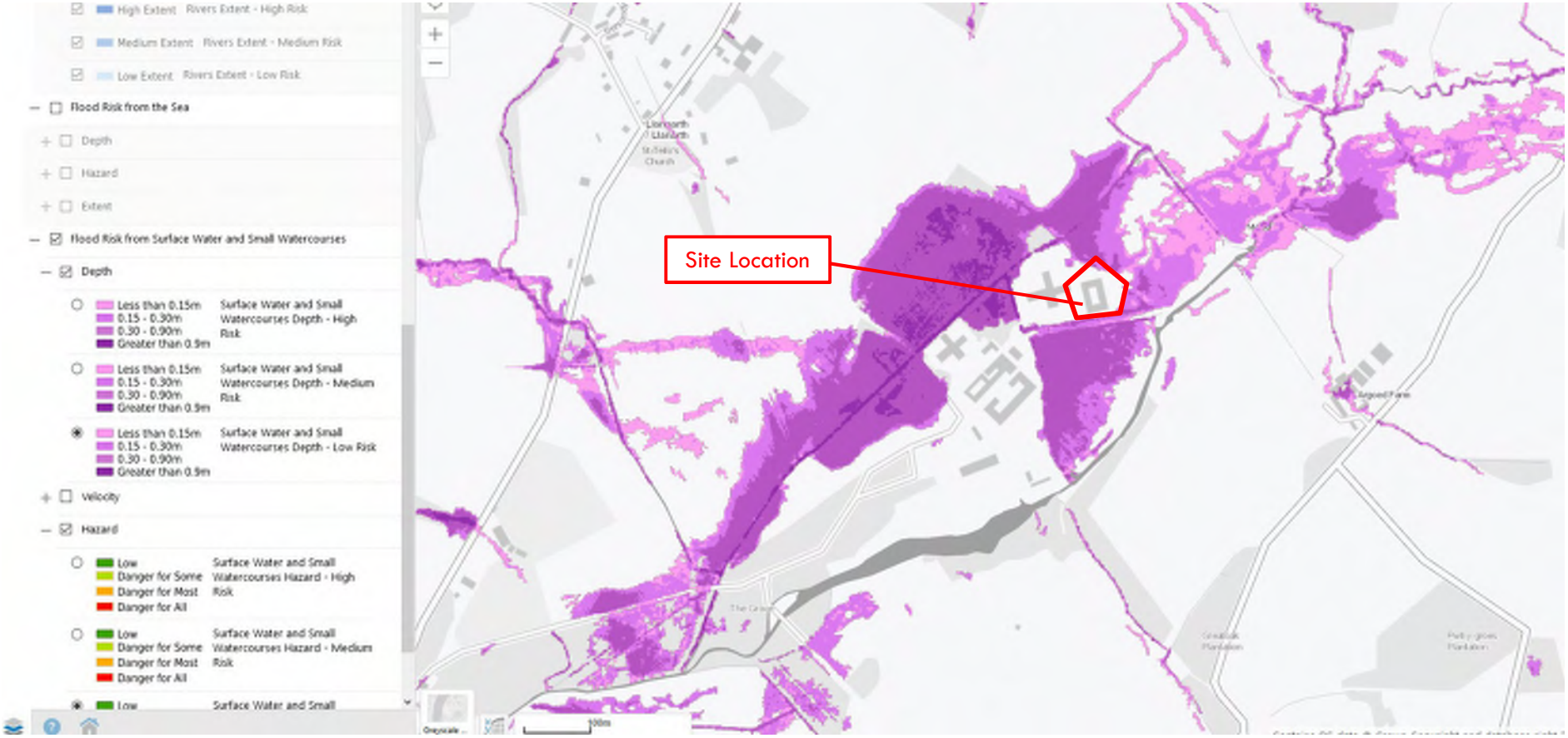
9.0 CONCLUSIONS

- The site is located within Flood Zone B, with a low probability of flooding.
- It is a legal requirement to utilise SuDS for all new schemes
- A suitable water course for direct discharge exists within the site which has an existing outfall which will be utilised where possible.
- The flow of surface water estimated from the proposed development is to be restricted to 12 l/sec, discharging to the on-site sewer after passing through a detention/percolation pond.
- Foul water drainage is required to serve the proposed development and will discharge to the on-site sewer network. As the estimated flow rate is only marginally greater than the existing rates it is determined that there is no requirement to approach the local water authority to obtain consent for this development.

Appendix A - Site Location Plan



Appendix B - Flood Map

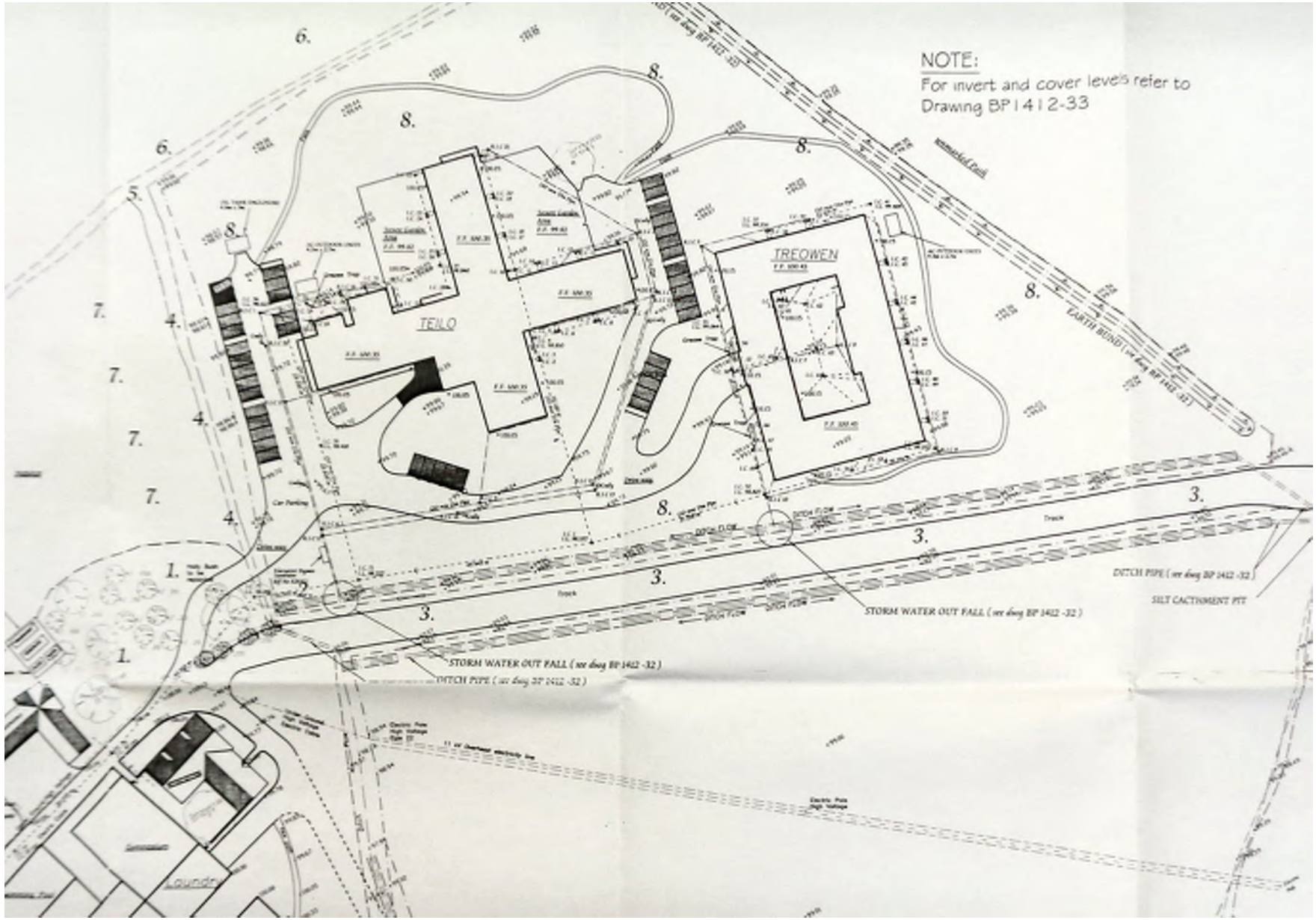


Appendix C - Existing Site Layout

Appendix D - Proposed Site Layout

Appendix E - Drainage Layout Plan

Existing



Proposed

Appendix F - Surface Water Calculations

Existing Drainage

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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)	14.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.200	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)
S1	0.091	5.00	36.800	1200	338265.847	210767.289	1.300
S2			36.500	1200	338277.778	210716.756	1.515
S3			36.700	1200	338226.824	210705.472	2.233
S4	0.091	5.00	37.100	1200	338216.053	210753.808	1.600
OUTFALL			36.700	1200	338216.022	210705.966	2.341

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)
S1.0	S1	S2	51.922	0.600	35.500	34.985	0.515	100.8	150	5.86	32.6
S1.1	S2	S3	52.188	0.600	34.985	34.467	0.518	100.7	150	6.73	31.1
S2.0	S4	S3	49.522	0.600	35.500	35.009	0.491	100.9	150	5.83	32.7
S1.2	S3	OUTFALL	10.813	0.600	34.467	34.359	0.108	100.1	150	6.91	30.8

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)
S1.0	1.000	17.7	8.0	1.150	1.365	0.091	0.0	71	0.978
S1.1	1.001	17.7	7.7	1.365	2.083	0.091	0.0	69	0.964
S2.0	1.000	17.7	8.1	1.450	1.541	0.091	0.0	71	0.978
S1.2	1.004	17.7	15.2	2.083	2.191	0.182	0.0	107	1.126

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)
S1.0	51.922	100.8	150	Circular	36.800	35.500	1.150	36.500	34.985	1.365
S1.1	52.188	100.7	150	Circular	36.500	34.985	1.365	36.700	34.467	2.083
S2.0	49.522	100.9	150	Circular	37.100	35.500	1.450	36.700	35.009	1.541
S1.2	10.813	100.1	150	Circular	36.700	34.467	2.083	36.700	34.359	2.191

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
S1.0	S1	1200	Manhole	Adoptable	S2	1200	Manhole	Adoptable
S1.1	S2	1200	Manhole	Adoptable	S3	1200	Manhole	Adoptable
S2.0	S4	1200	Manhole	Adoptable	S3	1200	Manhole	Adoptable
S1.2	S3	1200	Manhole	Adoptable	OUTFALL	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S1	338265.847	210767.289	36.800	1.300	1200	0	S1.0	35.500	150
S2	338277.778	210716.756	36.500	1.515	1200	1	S1.0	34.985	150
						0	S1.1	34.985	150
S3	338226.824	210705.472	36.700	2.233	1200	1	S2.0	35.009	150
						2	S1.1	34.467	150
						0	S1.2	34.467	150
S4	338216.053	210753.808	37.100	1.600	1200	0	S2.0	35.500	150
OUTFALL	338216.022	210705.966	36.700	2.341	1200	1	S1.2	34.359	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	14.000	Drain Down Time (mins)	240
Ratio-R	0.200	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

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
2	0	0	0
30	0	0	0
100	0	0	0

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Results for 2 year Critical Storm Duration. Lowest mass balance: 99.54%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	35.578	0.078	9.2	0.1965	0.0000	OK
15 minute winter	S2	11	35.060	0.075	9.0	0.0844	0.0000	OK
15 minute winter	S3	12	34.602	0.135	17.7	0.1530	0.0000	OK
15 minute winter	S4	11	35.576	0.076	9.2	0.1726	0.0000	OK
15 minute winter	OUTFALL	12	34.480	0.121	17.1	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	S1.0	S2	9.0	1.027	0.508	0.4624	
15 minute winter	S2	S1.1	S3	8.8	0.691	0.498	0.6597	
15 minute winter	S3	S1.2	OUTFALL	17.1	1.092	0.965	0.1726	8.5
15 minute winter	S4	S2.0	S3	8.8	0.998	0.501	0.4393	

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.54%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	35.567	0.067	7.2	0.1702	0.0000	OK
15 minute winter	S2	11	35.050	0.065	7.0	0.0730	0.0000	OK
15 minute winter	S3	12	34.573	0.106	13.7	0.1199	0.0000	OK
15 minute winter	S4	11	35.566	0.066	7.2	0.1493	0.0000	OK
15 minute winter	OUTFALL	12	34.456	0.097	13.5	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	S1.0	S2	7.0	0.969	0.398	0.3841	
15 minute winter	S2	S1.1	S3	6.8	0.665	0.387	0.5339	
15 minute winter	S3	S1.2	OUTFALL	13.5	1.061	0.761	0.1375	6.6
15 minute winter	S4	S2.0	S3	6.9	0.937	0.390	0.3647	

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Results for 100 year Critical Storm Duration. Lowest mass balance: 99.54%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	S1	20	35.883	0.383	20.9	0.9685	0.0000	SURCHARGED
30 minute summer	S2	20	35.431	0.446	18.7	0.5039	0.0000	SURCHARGED
30 minute summer	S3	20	34.997	0.530	33.7	0.5989	0.0000	SURCHARGED
30 minute summer	S4	19	35.688	0.188	20.9	0.4270	0.0000	SURCHARGED
15 minute summer	OUTFALL	10	34.501	0.142	32.5	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	S1	S1.0	S2	18.7	1.169	1.057	0.9141	
30 minute summer	S2	S1.1	S3	16.2	0.919	0.914	0.9188	
30 minute summer	S3	S1.2	OUTFALL	33.7	1.916	1.901	0.1884	26.4
30 minute summer	S4	S2.0	S3	19.0	1.146	1.074	0.8282	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.54%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	35.619	0.119	17.0	0.3011	0.0000	OK
15 minute winter	S2	12	35.194	0.209	16.9	0.2367	0.0000	SURCHARGED
15 minute winter	S3	11	34.863	0.396	29.7	0.4475	0.0000	SURCHARGED
15 minute winter	S4	11	35.617	0.117	17.0	0.2647	0.0000	OK
15 minute summer	OUTFALL	12	34.501	0.142	28.1	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	S1.0	S2	16.9	1.151	0.954	0.8179	
15 minute winter	S2	S1.1	S3	14.8	0.848	0.835	0.9188	
15 minute winter	S3	S1.2	OUTFALL	28.7	1.633	1.620	0.1884	15.7
15 minute winter	S4	S2.0	S3	16.3	1.126	0.921	0.7164	

Proposed Drainage

Appendix G – Maintenance Strategy Report

1.0 INTRODUCTION

This maintenance strategy report has been prepared in connection with a planning application for the redevelopment of a secure mental health unit at the existing Priory Llanarth Court hospital to provide state-of-the-art care for residents and is to be read in conjunction with all manufacturer's recommendations and the Drainage Strategy Report

2.0 FUTURE MAINTENANCE

The proposed drainage solution uses SUDS techniques in accordance with the CIRIA SUDS Manual C753. The surface water run-off is restricted using a flow control device and the attenuated run-off stored using a detention pond, positioned upstream of the flow control.

The Surface water system within the development has been designed to accommodate upto the 30 year storm events as part of an on-line attenuation system, with the discharge being controlled utilising a flow control system, excess flows during a 100 year event will surcharge and overflow south into the wooded area, into the existing ditches and onto the Brook.

It is proposed that the plot drainage and attenuation pond will remain private at present.

The maintenance of the private systems as specified within this report will be detailed within the developments Operation and Maintenance Manual (O&M) which will be transferred to the Hospital Trust and form part of the inspection, maintenance and repair regime by their in-house maintenance team. The wider hospital site already has a number of open water courses and a large pond and as such the Hospital's maintenance team are familiar with the ongoing maintenance requirements associated with the proposed detention pond.

During the construction phase and defects liability period pre-handover of properties; the contractor, or his maintenance contractor, will be responsible for ensuring the ongoing inspection, maintenance and repairs of any drainage and SuDS systems as a minimum requirement identified within the report.

The works as detailed below are detailed in accordance with the CIRIA SuDS Manual C753 as per the operation and maintenance table 21.3 (modified) where relevant with additional information provided for systems not covered within the SuDS manual.

Table 21.3 (modified) : Operation and maintenance requirements for

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter and debris	Monthly
	Cut grass – meadow grass in and around ba	Half yearly (spring – before nesting season, and autumn)
	Manage other vegetation and remove nuisance plants	Monthly (at start,then as required)
	Inspect inlets, outlets and overflows for blockages,and clear if required	Monthly
	Inspect bank sides, structures, pipework etc for evidence of physical damage	Monthly

	Remove sediment from inlets and outlet	Annually or as required
Remedial Action	Repair erosion or other damage by reseeding or re-turfing	As required
Monitoring	Inspect / check all inletsand outlets ensure they are in good condition and operating as designed	Annually

The attenuation system has been provided with catchpit chambers The flow controller is to be maintained by the Hospital Trust's existing maintenance team.