

YSGOL YR HAFOD

JOHNSTOWN

Drainage Strategy Report

HAF-JPS-XX-XX-RP-C-0002

Rev: P02 Status: S1

August 2021

Document History

Job Number: I0039		Document Ref: I0039-RP-D-0002		
P02	Revised for Planning Conditions	RH	JP	16.11.21
P01	Drainage Strategy	RH	JP	26.08.21
Revision	Purpose Description	Originated	Authorised	Date

Document History

Job Number: I0039		Document Ref: I0039-RP-D-0002		
P02	Revised for Planning Conditions	RH	JP	16.11.21
P01	Drainage Strategy	RH	JP	26.08.21
Revision	Purpose Description	Originated	Authorised	Date

Contents

	Page
I Introduction	3
1.1 Commission	3
1.2 Existing Site	3
1.3 Existing Drainage	3
1.4 Existing Flood Design	3
1.5 Proposed Development	3
2 Drainage Proposals	4
2.1 Foul Drainage	4
2.2 Surface Water Drainage	4
3 Conclusions	5
3.1 Conclusions	5
4 Appendices	6
Appendix A – Site Information	7
Appendix B – Public Sewer Records	8
Appendix C – Existing Site Drainage	9
Appendix D – Proposed Drainage Drawing	10
Appendix E – Surface Water Calculations	11
Appendix F – Welsh Water Correspondence	12
Appendix G – SAB Application	13
Appendix H – SAB Approval	14
Appendix I – GI Extract	15
Appendix J – O&M Manuals	16

1 Introduction

1.1 Commission

In April 2021 Wynne Construction, on behalf of Wrexham County Borough Council appointed JP Structural Design (JPS) to undertake this Drainage Strategy Report in support of a Full Detailed Planning Application for the construction of an extension and improvement scheme at the existing Ysgol Yr Hafod, Johnstown, Wrexham.

1.2 Existing Site

The existing school site and adjacent school house covers an area adjacent to Bangor Road of approximately 1.45 Ha as shown on the SABs information drawing in Appendix A. The site currently comprises circa 4,590m² of impermeable area.

1.3 Existing Drainage

On-site investigations suggest that the site is served by a combined drainage system which ultimately discharges to Welsh Waters 375mm diameter combined public sewer system located within Bangor Road.

There are known sewers crossing the site in the vicinity of the southern pedestrian access. These are believed to serve the former industrial unit adjacent to the site which is currently being redeveloped as a residential project. To confirm no works are to be undertaken in the vicinity of these sewers.

Appendix B contains a copy of the public sewer record drawing and Appendix C a sketch of the existing site drainage systems.

1.4 Existing Flood Design

As stated above, the site covers an area of approximately 1.45 Ha. In accordance with the NRW Developers Advice Maps (shown in Appendix A,) the site is located within Flood Zone A – Land having less than 1 in 1000 annual probability of river or sea flooding. The NRW Flood Risk Map is also shown and has confirmed the site to be free from any flood concerns.

Due to the topography of the area, the risk of flooding from adjoining properties or roads is considered minimal, and therefore, the management of the surface water run-off generated by the post development site will be the principal flood risk associated with this scheme.

1.5 Proposed Development

The scheme consists of the construction of an extension to the rear of the existing school and redevelopment of the school house as nursery facilities with associated new car parking as well as playground, MUGA facilities and pedestrian access improvements.

Based upon the latest development plans for the final impermeable area generated by the proposals will be approximately 7,745m² as shown on the impermeable area plan. The drainage proposals drawings are contained in Appendix D and surface water drainage calculations are contained in Appendix E.

2 Drainage Proposals

2.1 Foul Drainage

The foul drainage volume and peak discharge will increase following completion of the scheme with the increase in pupil numbers from circa 210 to approximately 410. That said the impacts to the public sewer network will be minimised by the decommissioning of the existing infants site approximately 300m away.

Foul flows currently discharge to the 375mm public combined sewer in Bangor Road, correspondence from DCWW (Appendix F) states that; 'The foul flows only from the proposed development can be accommodated within the public sewerage system. We advise that the flows should be communicated with the foul water only sewer, downstream of manhole ref SJ30461151 located in the highway to the north Ysgol Yr Hafod, Johnstown. However, it is noted that the public foul sewer drains to the public combined sewer approximately 140m east of the site.

For the foul design proposals, we would therefore advocate a new separate foul drainage system is designed to serve the proposed extension connecting to the existing foul network serving the school and maintaining the connection to the public sewer network.

2.2 Surface Water Drainage

In accordance with the Welsh Assembly Government's implementation of Schedule 3, the Surface Water Drainage strategy adheres to the principles of;

- Reducing Flood Risk
- Improving Water Quality
- Protecting and Improving the Environment
- Ensuring the Stability & Durability of Drainage Systems

The site will be subject to a SAB application and the detailed Pre-Application Advice form is therefore contained in Appendix G. The subsequent Approval notice from the SAB is contained in Appendix H.

Further to this, a pre-development enquiry request was submitted to DCWW in August 2019. In their response (Appendix F), DCWW have stated: 'The foul flows only from the proposed development can be accommodated within the public sewerage system. Following further investigation, it has been established that there is no feasible destination for surface water discharge from the school extension (building). Further consultation with DCWW with regards to connecting surface water from the building extension to the public combined sewer in Bangor Road states: 'We apply at least [a]sic 30% betterment rate, we would be happy with proposed discharge rate of 15 l/s [to the combined sewer] based on a 1 in 2 year event.... I can confirm that we will accept an attenuated maximum discharge rate of 15 l/s [from]sic for surface water generated from existing school and proposed extension into combined sewer within Bangor Road.'

The SAB application and preliminary proposals have therefore been developed on the strategy of providing a new separate surface water system to serve the whole estate prior to a restricted discharge of 15 l/s.

3 Conclusions

3.1 Conclusions

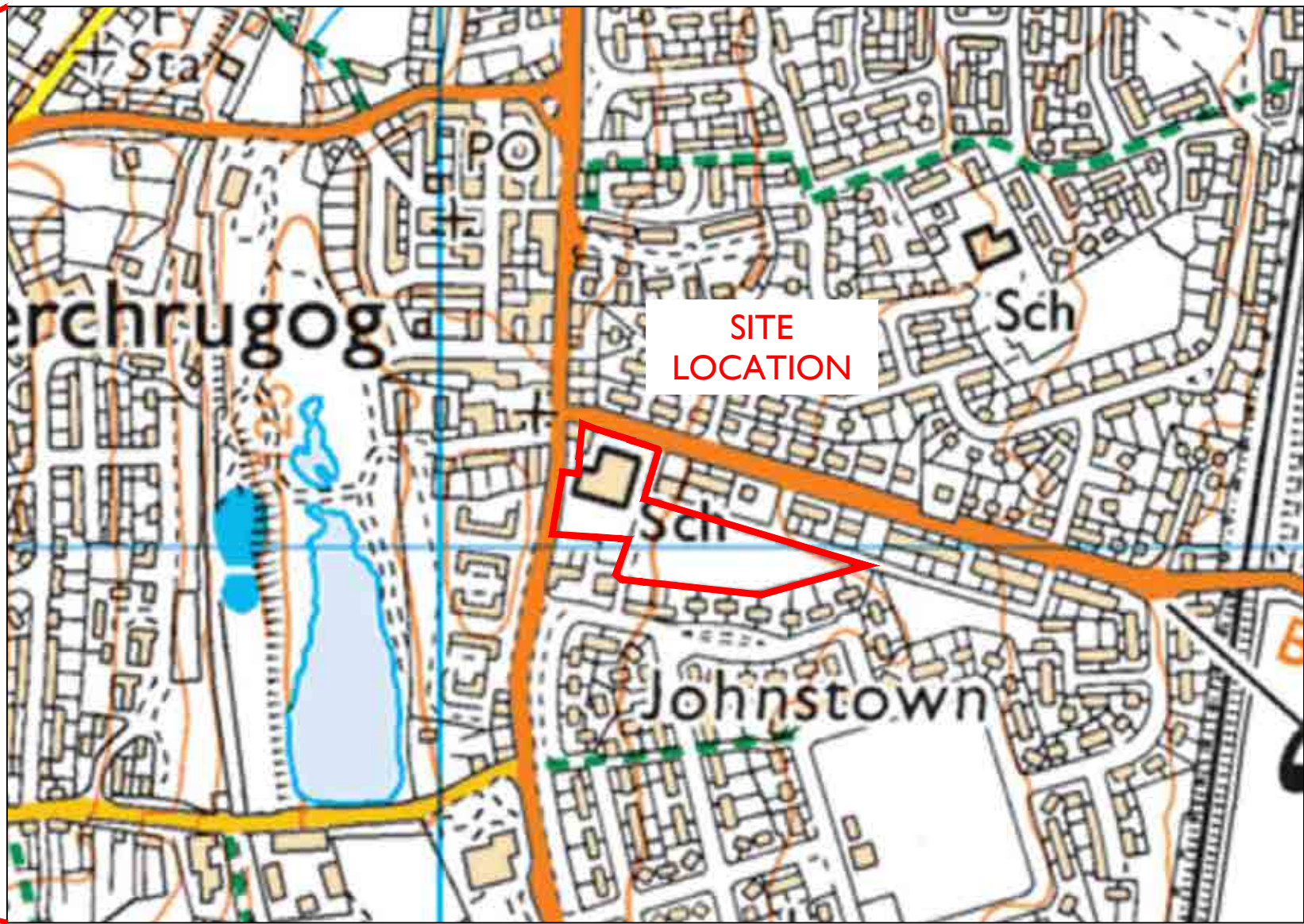
The proposed site is free from any existing flood risk and there are suitable points of connection for the disposal of the foul effluent and surface water run-off generated by the proposed development. We would expect the proposed development to be free from general objections in respect to draining the site but anticipate that the use of infiltration techniques will not be possible. There will also be suitable conditions imposed to ensure that the drainage proposals are designed and constructed in accordance with relevant statutory requirements.

4 Appendices

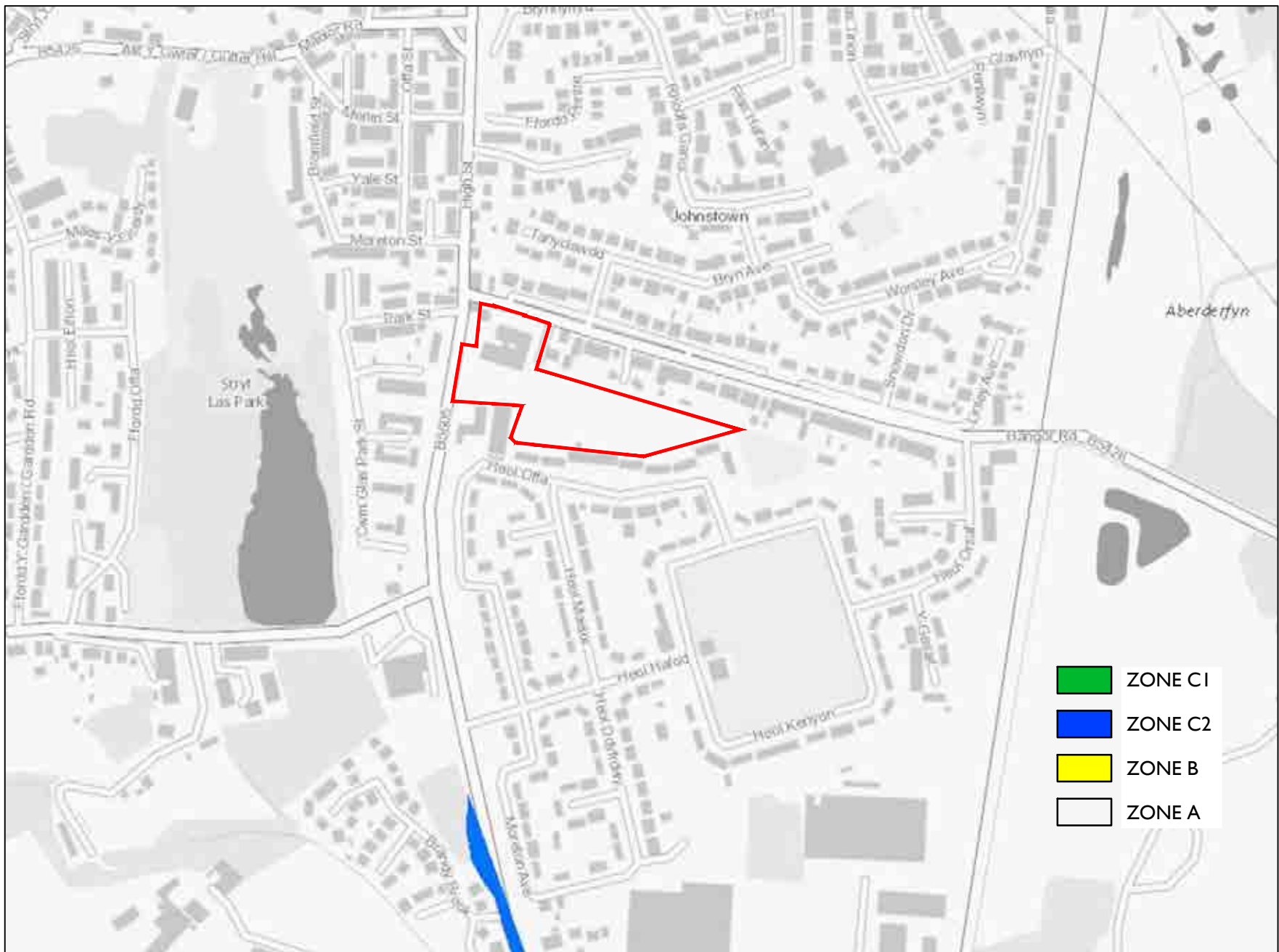
Appendix A – Site Information



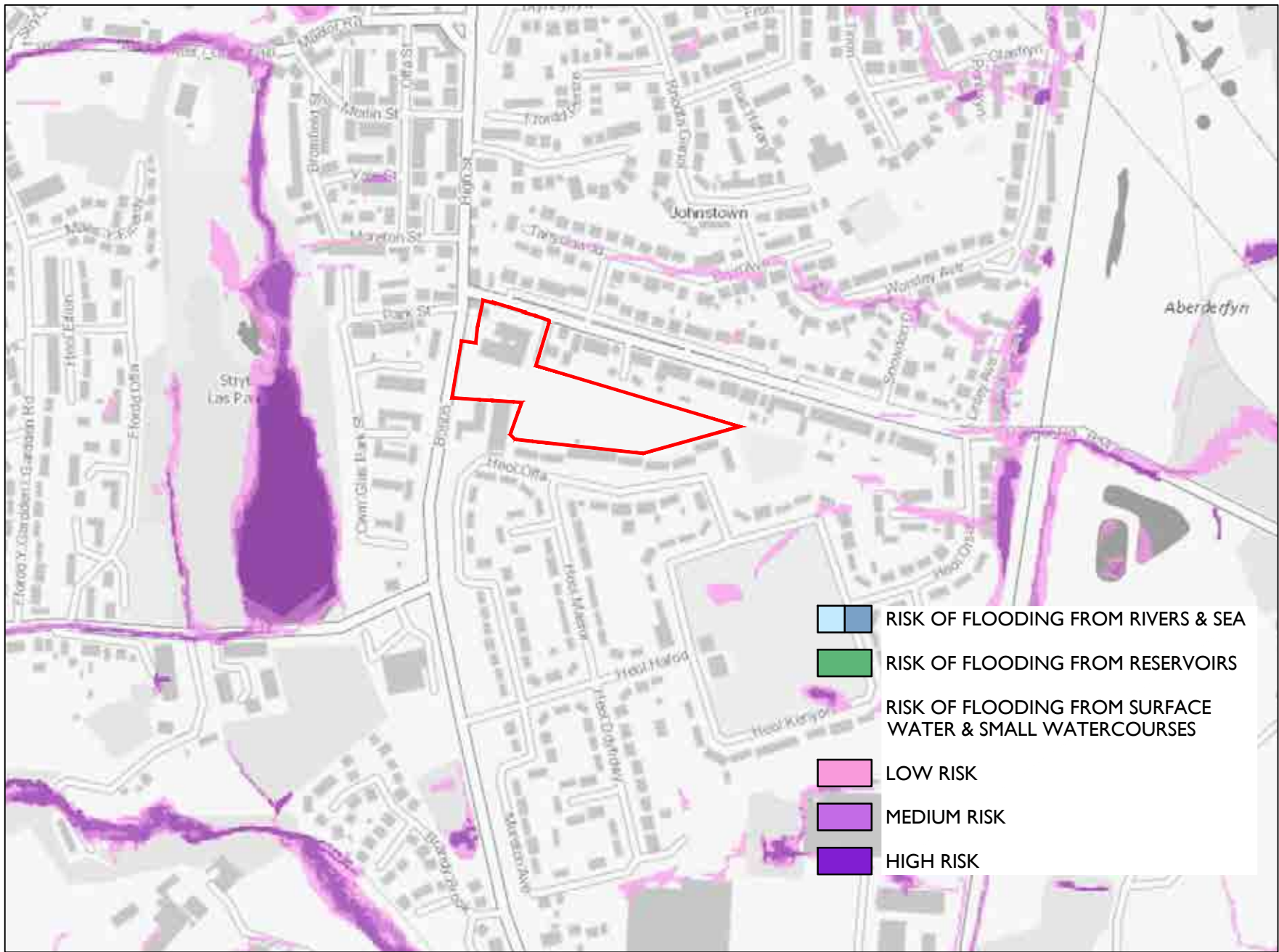
APPROX SCALE 1:50,000



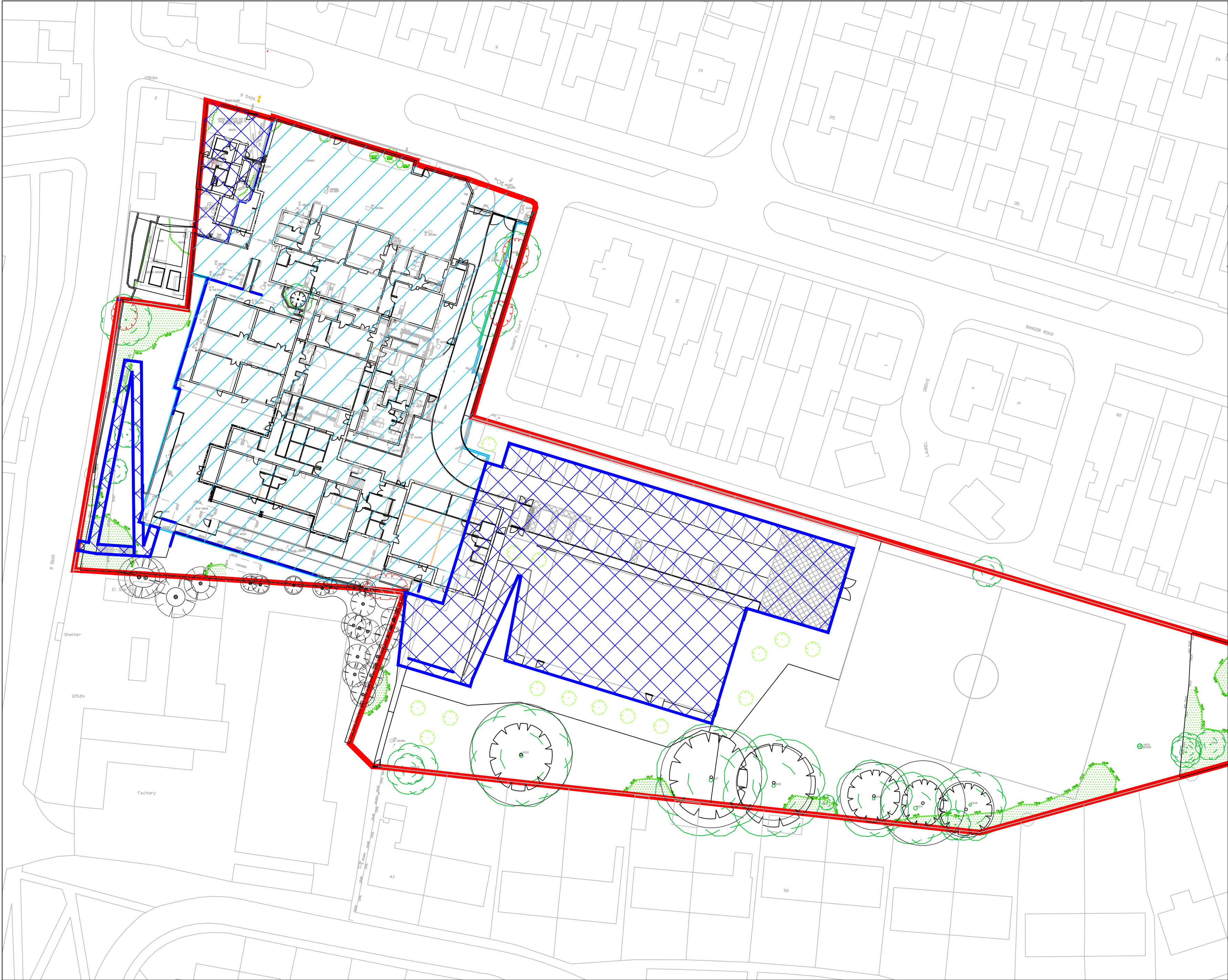
APPROX SCALE 1:5,000



DEVELOPMENT ADVICE MAP
APPROX SCALE 1:5,000



FLOOD RISK MAP
APPROX SCALE 1:5,000



PROPOSED / EXISTING IMPERMEABLE AREA
APPROX SCALE 1:500



EXISTING SATELLITE IMAGE
APPROX SCALE 1:2,500

SITE CO-ORDINATES

OS X (Eastings) 330124
OS Y (Northings) 346018
Nearest Post Code LL14 2SY
Nat Grid SJ301460 / SJ3012446018



AREAS

SITE BOUNDARY
14,565 SQ M

EXISTING IMPERMEABLE AREA
4,590 SQ M

ADDITIONAL IMPERMEABLE AREA
3,155 SQ M

TOTAL CATCHMENT AREA AFTER DEVELOPMENT
7,745 sq m

ZONE C1
ZONE C2
ZONE B
ZONE A

PO2	UPDATED AS PER LATEST LAYOUT	RH	MM	JP	-
REV	DESCRIPTION	BY	CHK	APR	DATE



PURPOSE OF ISSUE	PRELIMINARY	STATUS	S1
PROJECT	YSGOL YR HAFOD JOHNSTOWN		
TITLE	DRAINAGE SCHEME SITE INFORMATION		
CLIENT	WYNNE		
DRAWN BY	RH	CHECKED BY	MM
DATE	30.07.2021	APPROVED BY	JP
	SCALE (@ A1)	PROJECT NUMBER	94001
DRAWING NUMBER	HAF-JPS-XX-XX-DR-C-0500	REV	P02

Appendix B – Public Sewer Records

Ysgol Yr Hafod, Bangor Road



LEGEND(Representative of most common features)

Waste network:			
Foul chamber	Surface water chamber	Outfall	Lamphole
Combined chamber	Combined sewer overflow	Storm Overflow	Rising main
Special purpose chamber	Private sewer	Private sewer subject to Sect. 104 adoption agreement	Private Sewer Transfer
Treatment works	Pumping station	Lateral Drain	Inspection Chamber
NB: Sewer symbol colour indicates the type:			
RED - Combined			
GREEN - Surface Water			
BROWN - Foul			
Purple - Former S24 sewers (for indicative purposes only)			

Notes:

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

Dŵr 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. The onus of locating apparatus before carrying out any excavations rests entirely on you. The information which is supplied by the Company, is done so in accordance with statutory requirements of sections 198 and 199 of the Water Industry Act 1991 which is 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 water main, service pipe, sewer, lateral drain or disposal main and any associated apparatus 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.

Service pipes are not generally shown but their presence should be anticipated.

**EXACT LOCATIONS OF ALL APPARATUS
TO BE DETERMINED ON SITE.**

Reproduced by permission of the Ordnance Survey on behalf of
HMSO. © Crown copyright and database right 2017.
All rights reserved.
Ordnance Survey Licence number 100019534

Map Ref: 330143,346069
Map scale: 1:1250
Printed by: Emma John
Printed on: 18 May 2021

Appendix C – Existing Site Drainage



EXISTING DRAINAGE NOTES

THE LOCATION LINE & LEVEL OF ALL KNOWN EXISTING DRAINAGE PIPEWORK INDICATED ON THIS DRAWING IS APPROXIMATE AND FOR GUIDANCE PURPOSES ONLY.

IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THEIR EXACT LINE AND LEVEL, BY WAY OF HAND EXCAVATED TRIAL PITS, PRIOR TO THE COMMENCEMENT OF ANY EXCAVATION WORKS ON SITE. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS AND MAINTAIN THE STRUCTURAL INTEGRITY OF ALL ABOVE AND BELOW GROUND SERVICE INSTALLATIONS.

KEY

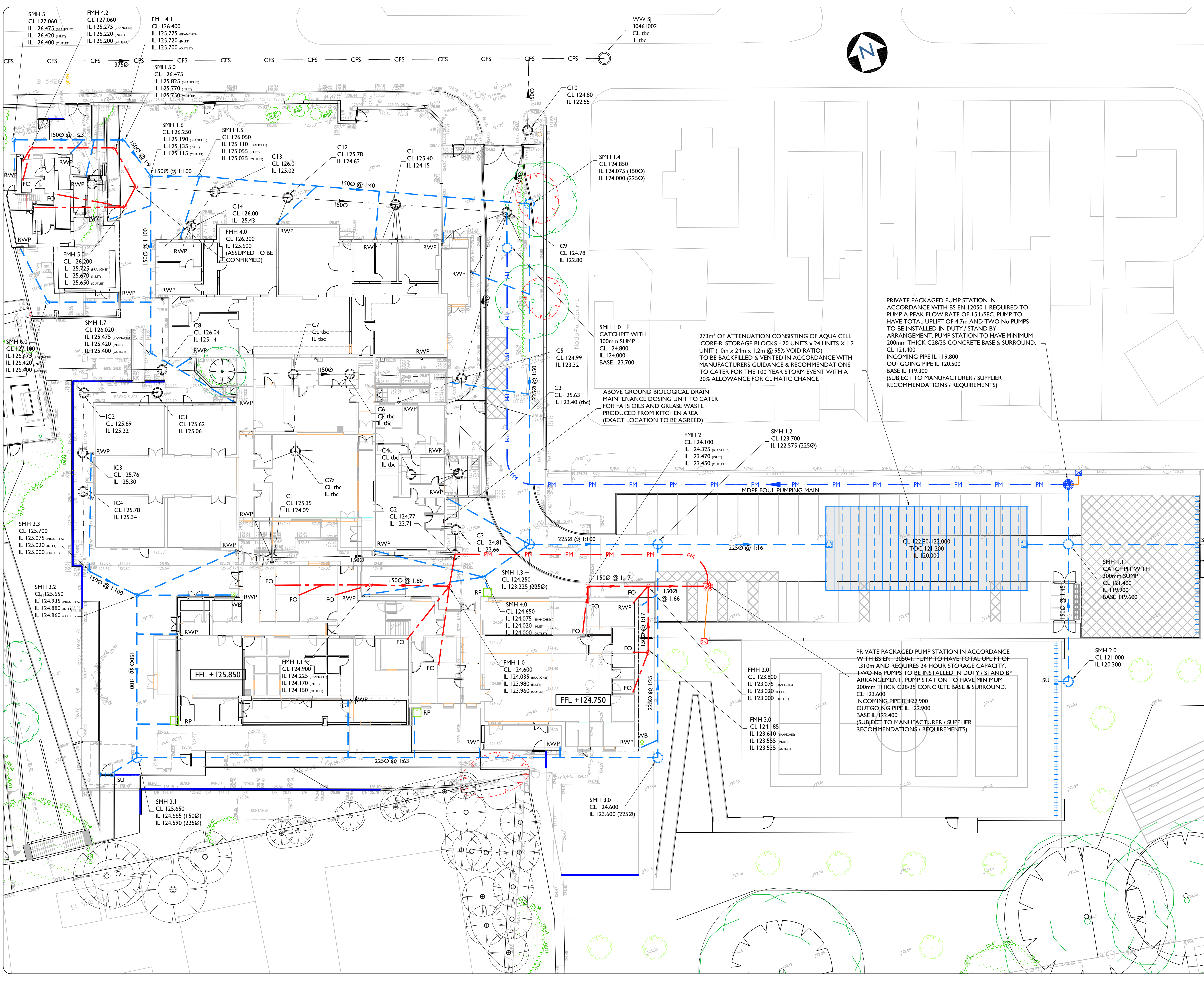
	FWS		EXISTING FOUL WATER SEWER
	SWS		EXISTING SW SEWER
	CFS		EXISTING COMBINED SEWER
	HD		EXISTING HIGHWAY DRAIN
			EXISTING FOUL DRAIN
			EXISTING SW DRAIN
			EXISTING COMBINED FLOW DRAIN

P02	EXTRACT SHOWN	RH	MM	JP	16.11.2021
P01	ISSUED FOR APPROVAL	RH	MM	JP	27.08.2021
REV	DESCRIPTION	BY	CHK	APR	DATE

JPS CIVIL + STRUCTURAL ENGINEERS
+44 (0)1244 893430 | www.jpsstructural.co.uk | info@jpsstructural.co.uk

PURPOSE OF ISSUE	FOR APPROVAL	STATUS	S4	
PROJECT	YSGOL YR HAFOD JOHNSTOWN			
TITLE	DRAINAGE SCHEME EXISTING LAYOUT			
CLIENT	WYNNE CONSTRUCTION			
DRAWN BY	RH	CHECKED BY	MM	
DATE	27.08.2021	SCALE (@ A1)	1:200	
DRAWING NUMBER	HAF-JPS-XX-XX-DR-C-0501		PROJECT NUMBER	94001
			REV	P02

Appendix D – Proposed Drainage Drawing



- NOTES**
1. THE WORKS SHALL BE IN ACCORDANCE WITH THE FOLLOWING SPECIFICATIONS, NATIONAL BUILDING SPECIFICATION (NBS) AND SEWERS FOR ADOPTION, 7TH EDITION.
 2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS DRAWINGS, ARCHITECTS DRAWINGS, MECHANICAL AND ELECTRICAL DRAWINGS AND SPECIFICATIONS.
 3. THE LOCATION, LINE & LEVEL OF ALL KNOWN EXISTING BURIED SERVICE MAINS AND DRAINAGE PIPEWORK INDICATED ON THE DRAWINGS ARE APPROXIMATE AND FOR GUIDANCE PURPOSES ONLY. IT IS THE CONTRACTORS RESPONSIBILITY TO DETERMINE THEIR EXACT LINE & LEVEL BY WAY OF HAND EXCAVATED TRIAL PITS. PRIOR TO THE COMMENCEMENT OF ANY EXCAVATION WORKS ON SITE. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO MAINTAIN THE STRUCTURAL INTEGRITY OF ALL ABOVE AND BELOW GROUND SERVICE MAINS / DRAINAGE INSTALLATIONS.
 4. THE CONTRACTOR MUST COMPLY WITH ALL CURRENT LEGISLATION RELATING TO HEALTH & SAFETY.
 5. THE MAIN CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF ALL TEMPORARY WORKS, AND IS ALSO RESPONSIBLE FOR THE SAFE MAINTENANCE AND STABILITY OF EXISTING BUILDINGS AT ALL TIMES.
 6. THE MAIN CONTRACTOR IS RESPONSIBLE FOR THE MITIGATION OF ALL OCCURRENCES OF GROUND WATER DURING THE CONSTRUCTION PERIOD.
 7. THE CONTRACTOR SHALL MAKE ALLOWANCE FOR RAISING / LOWERING ALL EXISTING ACCESS COVERS & FRAMES TO SUIT NEW FINISHED LEVELS.
 8. ALL SOFT / HARD PAVED AREAS AFFECTED BY THE WORKS SHALL BE FULLY REINSTATED UPON COMPLETION OF THE WORKS. ALL SURFACE MARKINGS DAMAGED BY THE WORKS SHALL BE FULLY REINSTATED.
 9. ALL SURPLUS EXCAVATED MATERIAL SHALL BE DISPOSED OF OFF SITE.
 10. ALL LEVELS ARE TO ORDNANCE DATUM

- KEY**
- CFS
 - EXISTING COMBINED FLOW SEWER
 - EXISTING COMBINED DRAIN
 - PROPOSED FOUL SEWER
 - PROPOSED SW SEWER
 - PROPOSED ATTENUATION CRATES
 - LINEAR DRAINAGE CHANNEL (SU - UNIVERSAL SUMP UNIT WITH AIR TRAP)
 - PROPOSED FOUL OUTLET
 - PROPOSED RAIN WATER DOWN PIPE
 - PROPOSED WATER BUTT
 - PROPOSED RAINWATER PLANTER

P03	MINOR UPDATES	RH	MM	JP	16.11.2021
P02	UPDATED AS PER LATEST LAYOUT	RH	MM	JP	26.08.2021
P01	PRELIMINARY ISSUE	RH	MM	JP	30.07.2021
REV	DESCRIPTION	BY	CHK	APR	DATE

JPS CIVIL + STRUCTURAL ENGINEERS
+44 (0)1244 893430 | www.jpsstructural.co.uk | info@jpsstructural.co.uk

PURPOSE OF ISSUE		STATUS	
FOR APPROVAL		S4	
PROJECT YSGOL YR HAFOD JOHNSTOWN			
TITLE DRAINAGE SCHEME PROPOSED LAYOUT			
CLIENT 			
DRAWN BY RH	CHECKED BY MM	APPROVED BY JP	
DATE 30.07.2021	SCALE (@ A1) 1:200	PROJECT NUMBER 94001	
DRAWING NUMBER HAF-JPS-XX-XX-DR-C-0502		REV P03	

Appendix E – Surface Water Calculations

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	30	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.300	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
Depth/Area 1	0.775	4.00	122.000		0.849	68.287	2.000
1			122.000	1200	14.211	68.398	2.413
2			122.000	1200	14.214	78.995	2.700

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	Depth/Area 1	1	13.362	0.600	120.000	119.587	0.413	32.4	300	4.08	50.0
1.001	1	2	10.597	0.600	119.587	119.300	0.287	36.9	300	4.15	50.0

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	2.773	196.0	136.5	1.700	2.113	0.775	0.0	185	2.989
1.001	2.595	183.4	136.5	2.113	2.400	0.775	0.0	194	2.835

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	13.362	32.4	300	Circular	122.000	120.000	1.700	122.000	119.587	2.113
1.001	10.597	36.9	300	Circular	122.000	119.587	2.113	122.000	119.300	2.400

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	Depth/Area 1		Junction		1	1200	Manhole	Adoptable
1.001	1	1200	Manhole	Adoptable	2	1200	Manhole	Adoptable

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	17.000	Drain Down Time (mins)	240
Ratio-R	0.300	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 %)
100	20	0	0

Node 1 Online Pump Control

Flap Valve	x	Invert Level (m)	119.587	Switch on depth (m)	0.600
Downstream Link	1.001	Design Depth (m)	0.250	Switch off depth (m)	0.500
Replaces Downstream Link	✓	Design Flow (l/s)	15.0		

Depth (m)	Flow (l/s)
0.250	15.000

Node Depth/Area 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	120.000
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	184

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	230.0	0.0	1.200	230.0	0.0	1.201	0.0	0.0

Other (defaults)

Entry Loss (manhole)	0.250	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.250	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Results for 100 year +20% CC Critical Storm Duration. Lowest mass balance: 99.83%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	Depth/Area 1	168	121.346	1.346	91.3	272.7428	0.0000	SURCHARGED
180 minute winter	1	168	121.343	1.756	15.5	1.9862	0.0000	SURCHARGED
15 minute summer	2	1	119.300	0.000	15.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
180 minute winter	Depth/Area 1	1.000	1	15.5	0.449	0.079	0.9409	
180 minute winter	1	Pump	2	15.0				333.0

Appendix F – Welsh Water Correspondence
