

Conwy County Borough Council

**Gofer Waste Transfer Site  
Scheme I**

Drainage Strategy

GWS-JPS-XX-XX-RP-D-0001

Rev: P01

April 2023

## Document History

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P01	Drainage Strategy	JR	RAH	09/05/2023
Revision	Purpose Description	Originated	Authorised	Date

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This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

# 1 Introduction

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## 1.1 Commission

JP Structural Design were appointed by Conwy County Borough Council (CCBC) to carry out a Drainage Strategy (DS) in support of improvement works referred to as Scheme I to comply with Natural Resources Wales's 'Fire Prevention & Mitigation Plan (FPMP) Guidance for Waste Management' at Gofer Waste Transfer Site, Abergele, LL22 9SE.

## 1.2 Limitations

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The findings of this Strategy have been based on data available at the time of the study and on the review of available information that has been undertaken to date. They relate to the current development proposals as outlined in **Appendix A**. Should the proposed end use of the site change after the completion of this assessment, then the findings of this report will need to be reviewed and updated accordingly.

## 2 Existing Site and Proposed Development

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### 2.1 Site Location

The proposed development is located approximately 3.0km to the east of Abergele town centre. The site is at Ordnance Survey National Grid Reference SJ 970 775.

### 2.2 Site Description

The proposed site covers an area of 1.996ha as shown on the site information drawing in **Appendix A**.

The site is an existing bulking station operated by CCBC, it is bounded to the west and south by open fields. The northern boundary of the site is formed by Bodoryn Cut. The eastern boundary of the site is formed by the access road off the A547 Rhuddlan Road.

A review of the topographical survey shows that the working section of the site is typically comprised of concrete / macadam surfacing and existing units. The unused areas of the site are comprised of landscaped / vegetated areas. The survey indicates that the site has a high point of 5.000m (Above Ordnance Datum) AOD located in the southeast of the site. The low point of the site is in the northwest of the site at 3.410m AOD. The site has levels of 4.030m AOD and 3.760m AOD in the southwest and northeast respectively. The survey also indicates 3m high external reception bays within and a pond in the northwest corner of the site. The existing topographic survey is provided within **Appendix B**.

Access to the site is provided from the east by an access road off the A547 Rhuddlan Road.

### 2.3 Existing Drainage

Public sewer records were obtained from Dŵr Cymru Welsh Water (DCWW) and are provided in **Appendix C**. The records indicate that there are no public sewers within the immediate vicinity of the site.

A Site Drainage Plan was provided by CCBC in the appendices within the document Gofer Bulking Station – Environmental Management System 2020 (refer to **Appendix D**). The drawing indicates the following:

- A surface water drain of unconfirmed diameter situated to the north of the site as indicated on the existing drainage layout in **Appendix E**. Surface water runoff from Area A appears to discharge to the pond in the northwest corner via a petrol interceptor. The petrol interceptor is assumed to be suitably sized to treat the runoff from Area A. Flows then discharge from the pond to Bodoryn Cut to the north of the site.
- A surface water drain of unconfirmed diameter situated in the south of the site as indicated on the existing drainage layout in **Appendix E**. Surface water runoff from the roof of the Transfer Station Building (Area B) appears to discharge via this network to the pond in the northwest corner. Flows then discharge from the pond to Bodoryn Cut to the north of the site.
- A network of combined drains of unconfirmed diameter situated to the southeast of the site. Flows from the welfare facilities appear to discharge to the existing treatment tank in the southeast corner. The treatment tank is assumed to be suitably sized to treat foul flows from the welfare facilities in Area C. Flows then discharge from the treatment tank to Bodoryn Cut via a drainage network within the access road to the east of the site.

A CCTV drainage survey was undertaken by MetroRod on the 30.03.2023 the findings of which are shown on the existing drainage plan in **Appendix E**. The drawing confirmed the following:

- The surface water drain of unconfirmed diameter to the north of the site was established to be 450mm in diameter. It was confirmed surface water from Area A discharges to the pond via a petrol interceptor.
- The surface water drain of unconfirmed diameter situated in the south of the site was found to be full of water, therefore it was not possible to confirm details of this network.
- The network of combined drains of unconfirmed diameter situated to the southeast of the site were established to be 150mm / 225mm in diameter. The network appears to serve Area C as indicated on the existing drainage layout in **Appendix E**. It was confirmed surface water runoff from vehicle surfaces and other pollutant generating areas within Area C and foul flows from the welfare facilities discharge to the existing treatment tank in the southeast corner.

## 2.4 Existing Waterbodies

The site lies immediately south of Bodoryn Cut which is classed as a Main River. Bodoryn Cut is part of the network of open ditches /watercourses that serve the surrounding area. It flows in an eastern direction approximately 2.0km east where it discharges via pump station and flood control sluice to the Afon Gele. The Bodoryn Cut pumping station is operated and maintained by Natural Resources Wales.

The site lies approximately 1.8km south of the sea.

There are no canals or reservoirs within the vicinity of the site.

## 2.5 Ground Conditions

The surface geology of the site has been reviewed from the British Geological Survey (BGS) online geology maps. The geology map indicates that the site is superficially underlain by “Tidal Flat Deposits - Clay, silt and sand. Sedimentary superficial deposit formed between 11.8 thousand years ago and the present during the Quaternary period.” The bedrock geology is described as “Warwickshire Group - Mudstone, siltstone and sandstone. Sedimentary bedrock formed between 318 and 272.3 million years ago during the Carboniferous and Permian periods”.

According to the Soilscales soils dataset (<http://www.landis.org.uk/soilscales/>), soil conditions at the site and within the surrounding area are loamy and clayey soils of coastal flats with naturally high groundwater.

## 2.6 Existing Flood Risk

Figure 1 of TAN15 defines three development advice zones as follows:

- Zone A: Considered to be of little or no risk of fluvial or tidal/coastal flooding.
- Zone B: Areas known to have been flooded in the past evidenced by sedimentary deposits.
- Zone C: Based on (the Natural Resources Wales) flood outline, equal to or greater than 0.1% (river, tidal or coastal). Zone C is subdivided into the following two zones:
  - Zone C1: Areas of the floodplain which are developed and served by significant infrastructure, including flood defenced.
  - Zone C2: Areas of the floodplain without significant flood defence infrastructure.

The development advice zones are shown on the Development Advice Map and are defined by the predicted extent of the 1 in 1,000 (rivers and sea) annual exceedance probability (AEP) event (Zone C) and British Geological Survey drift data (Zone B).

The Development Advice Map is shown on the site information drawing in **Appendix A** and indicates that the site is in Zone CI.

## 2.7 Proposed Development

The scheme consists of improvement works to comply with Natural Resources Wales's 'Fire Prevention & Mitigation Plan (FPMP) Guidance for Waste Management'.

The total impermeable area of the site will be 0.876ha following the improvement works, however based upon the latest development plans the site has been split into the following impermeable areas (refer to **Appendix A**):

- Existing
  - Area A: 0.542ha\* (External hard standing area)
  - Area B: 0.130ha (Transfer Station Building roof area)
  - Area C: 0.152ha (Pollutant generating areas and foul flows from the welfare facilities)
- Proposed
  - Area D: 0.167ha\* (New external hard standing area)

(\* a compensatory existing area in the west of the site has been added to Area D to account for the proposed area in the northeast of the site which has been added to Area A)

**Appendix F** contains the site proposals, **Appendix G** the preliminary drainage layout and **Appendix H** the surface water calculations.

## 3 Drainage Proposals

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### 3.1 Foul Drainage

It is anticipated that the proposed improvement works will not increase staff numbers at the site. Therefore, the foul drainage peak discharge from the welfare facilities will not increase following completion of the development.

It is proposed to continue to use the existing combined drainage that currently serves the welfare facilities as indicated on the preliminary drainage layout presented in **Appendix G**. At present foul flows from the welfare facilities appear to discharge to the existing treatment tank in the southeast corner. The treatment tank is assumed to be suitably sized to treat foul flows from the site. It is assumed flows then discharge from the treatment tank to Bodoryn Cut via a drainage network within the access road to the east of the site.

As part of the development proposals a new vehicle wash facility is proposed in the northeast of the site. It is proposed that runoff from this vehicle wash facility will discharge to the adjacent existing 450mm diameter surface water drain. The proposed silt trap, class 2 full retention petrol interceptor and treatment plant are deemed to be sufficient to remove the suspended sediments and treat the runoff from Area D prior to discharge to the 450mm diameter surface water drain. This is indicated on the preliminary drainage layout presented in **Appendix G**.

### 3.2 Surface Water Drainage

#### 3.2.1 Surface Water Drainage Guidance and Policy

The aim of the surface water drainage strategy is to mimic the natural catchment processes as closely as possible and adopt the principles of water management scheme as stated in section 2 of the “Statutory National Standards for Sustainable Drainage Systems (Wales)” (SNSSUDS) document 2018.

From the 7th January 2019 Schedule 3 of the Flood and Water Management Act has been implemented by the Welsh Government which requires any development of more than 1 unit or where the construction area is greater than 100m<sup>2</sup> to comply with the SuDS Approval Bodies (SAB’s) design guidance and minister’s standards which will require all sites to adopt SuDs in their design. The standards are listed below;

S1 – Surface Water Runoff Destination

S2 – Surface Water Runoff Hydraulic Control

S3 – Water Quality

S4 – Amenity

S5 – Biodiversity

S6 – Design of Drainage for Construction, Operation and Maintenance

The Standards listed will need to be met by the design in order to comply with the SNSSUDS. S1 is a hierarchy standard with standards S2-S6 being fixed.



### 3.2.2 SI – Surface Water Runoff Destination

In accordance with Welsh Government guidance, surface water runoff should be disposed of according to the following hierarchy:

- a) Rainwater collected for use;
- b) Infiltrated to ground;
- c) To a surface water body;
- d) To a surface water sewer, highway drain or another drainage system;
- e) To a combined sewer.

It is necessary to identify the most appropriate method of controlling and discharging surface water. The design should seek to improve the local run-off profile by using systems that can either attenuate run-off and reduce peak flow rates or positively impact on the existing flood profile.

#### 3.2.2.1 Rainwater Collected for Use

Due to the nature of the development as an educational facility, it is considered impracticable for grey water harvesting type solutions to be considered.

#### 3.2.2.2 Infiltrated to Ground

As detailed in Section 2 the site is underlain by soils with impeded drainage. Additionally, the existing drainage present on site discharge to Bodoryn Cut immediately north of the site. On this basis it is reasonable to conclude that the disposal of surface water by infiltration is unlikely to be feasible.

#### 3.2.2.3 To a Surface Water Body

It is proposed to discharge surface water runoff from the new area (Area D) to the existing 450mm diameter surface water drain in the northwest of the site as indicated on the preliminary drainage layout presented in **Appendix G**.

### 3.2.3 S2 - Surface Water Runoff Hydraulic Control

This standard requires surface water to be managed to prevent as far as possible any discharge from the development for rainfall events of less than 5mm and that the surface water runoff rate and volume for up to a 1 in 100-year return period should be managed to protect people, properties and the receiving water body. Consideration is also required to the risk associated with runoff from events greater than 1 in 100-year return period with mitigating proposals developed for the scheme.

#### 3.2.3.1 Interception of Runoff

Due to the nature of the site, we would not advocate the inclusion of soft SUDS features or a permeable paving system within the new hard standing external area.

#### 3.2.3.2 Hydraulic Control

The greenfield runoff rate for the existing area have been calculated using the “Pre-development discharge” function of Causeway Flow. The following parameters were used in the calculation.

- Areas A, B and C comprise areas of 0.542ha, 0.130ha, and 0.152ha respectively (refer to **Appendix A**), These areas will continue to drain as existing.

- Area D has a total area of 0.167ha (refer to **Appendix A**).
- SAAR (Standard Annual Average Rainfall) = 735mm, Soil Index = 3, SPR (Surface Precipitation Rate) = 0.40, Region = 9

The peak discharges of surface runoff from impermeable areas of the existing site are shown in the table 1 below:

Above Exceedance Probability of rainfall event	Existing Greenfield Runoff Rate (l/s)
1:1	0.5
QBAR	0.6
1:30	1.1
1:100	1.3

**Table 1.0 – Peak Runoff Rate –Area D**

It is proposed to restrict runoff from the impermeable surfaces of Area D to as close as is practicably possible to the existing greenfield QBAR rate of 0.6 l/s. However, to achieve this rate would require an outlet control device with an orifice of less than 50mm diameter, which would be at an unacceptable risk of blockage and flooding. Accordingly, the proposed surface water discharge rate is 1.3l/s.

Attenuation storage will be provided to restrict surface water runoff generated across roofs and hardstanding. The attenuation storage facility has been modelled using Causeway Flow (refer to **Appendix H**). In accordance with statutory guidelines, the development of this site should not increase flood risk elsewhere and as such, all runoff from Area D should be contained within the site boundary for up to and including a 1 in 100-year design period storm, plus 30% climate change.

Based on a peak discharge rate of 1.3l/s, a total storage volume of 92.7m<sup>3</sup> would be required. It is proposed that this storage is provided in an offline attenuation basin with a base area of 25m<sup>2</sup>, a top of bank area of 152m<sup>2</sup>, 1:3 side slopes and a depth of 1.3m. The proposed attenuation basin is to be located to the west of Area D. Additional storage is provided in the proposed network of pipes and manholes. A preliminary surface water drainage layout is provided in **Appendix G**.

### 3.2.3.3 Exceedance Flows and Flood Pathways

The proposed improvement works will include the installation of half battered kerbs around the perimeter of the site to contain surface water runoff within the hard standing areas.

Where flows exceed the capacity of the storage, flows will overtop the system and be contained within these hard standing areas. The design of which shall be such to contain flows to the preferential areas to the south and west of the site.

### 3.2.3.4 Flood Risks to People

As mentioned above the level design of the external areas will seek to contain flows within the hard standing external areas and direct flows away from the buildings,.

## 3.2.4 S3 – Water Quality

This standard requires treatment of surface water runoff to prevent negative impacts on the receiving water quality and/or protect downstream drainage systems including sewers.

The external areas of Area D have a high hazard level. The proposed catch pits, sumps within road gullies and linear channels and the use of a class I full retention petrol interceptor are deemed to be sufficient to remove the suspended sediments from Area D prior to discharge to the 450mm diameter surface water drain.

The scope of works envisaged to enable compliance with FPMP guidance states that:

*“all firewater must be contained on site to prevent a pollution incident.”*

Therefore, the use of proprietary isolation valves is proposed in the following locations (refer to **Appendix G**).

- Area A - On line of existing 450mm diameter surface water drain at the location of SMH 1.4 upstream of discharge to pond to prevent contaminated fire water discharging to pond from Area A.
- Area C - In the location of EX MH 16 downstream of treatment tank to prevent contaminated fire water discharging to Bodoryn Cut from Area C.
- Area D – In the location of SMH 1.2 upstream of discharge to pond to prevent contaminated fire water discharging to new attenuation pond and downstream 450mm diameter surface water drain from Area D.

### 3.2.5 S4 – Amenity

This standard requires that the design of the surface water management system should maximise amenity benefits.

It is proposed that the attenuation basin could incorporate diverse plants, wetland planted areas and wildflower mixes to enhance their beauty and amenity contribution to the site.

However, it should be noted that as these proposals are for improvement works to an existing waste site which is “closed off” from the public, it will not be possible to add further amenity benefits enjoyable by the public within the confines of the proposed development.

Additionally, due to the nature of the development in relation to the existing site and the constraints of the topography, there is limited available space for additional SuDS features within Area D itself to provide additional amenity.

### 3.2.6 S5 – Biodiversity

This standard requires that the surface water management system should maximise biodiversity benefits. The SuDS scheme biodiversity strategy should revolve around the creation of significant and varied habitat to increase the overall biodiversity of the site and ecological value.

The attenuation basin could include a variety of structurally diverse planting that will help make a positive contribution to biodiversity – providing habitat and food for invertebrates and birds.

However, as previously stated, there is limited available space for additional SuDS features within Area D itself to provide additional biodiversity.

The attenuated discharge can help reduce the impact of heavy flows on the downstream system and this can help facilitate biodiversity delivery in those areas.

### 3.2.7 **S6 – Design of Drainage for Construction, Operation and Maintenance and Structural Integrity**

The proposed system will not be required for adoption as it does not serve more than one property. However, it will still be designed to the standards set out in CIRIA C753.

The construction of most of the surface water drainage will only require the use of standard civil engineering and landscaping operations, e.g. excavation, filling, grading, pipe-laying, chamber construction, topsoiling, seeding and planting, which a competent contractor would be expected to be able to undertake. Specific method statements may be required for the installation of proprietary drainage products such as attenuation tank, rainwater butts and porous paving as workers may not be aware of the specific installation requirements, to ensure the structural integrity of the features.

Due to the site's function as a care home, maintenance can and will be carried out by the existing on site staff as part of their regular duties. Exact details of the maintenance regime will be determined through workshops with the client at detailed design stage.

Inspections of the SuDS features will be required during construction phase at frequent intervals to ensure correct installation. Regular inspections of SuDS features will need to be undertaken upon construction completion to ensure amenity, water quantity and water quality standards and a maintenance plan to do so will be required upon handover of the site to client. The surface water drainage proposals for this site should include the following maintenance measures:

- Cleaning and maintenance of road gullies and linear drainage to maintain effective drainage.
- Cleaning and maintenance of pipe network and manholes / catchpits to maintain effective drainage.
- Cleaning and maintenance of attenuation basin to maintain effective drainage.
- Cleaning and maintenance of flow control device and its sump to maintain effective drainage.

## 4 Conclusions

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### 4.1 Recommendations

The drainage associated with existing manholes 4 – 8 was found to be full of water by the CCTV survey undertaken by MetroRod on the 30.03.2023. It is recommended that the cause of this is determined, and remedial works undertaken to ensure the performance of this drainage network.

At this stage details of the existing petrol interceptor and treatment tank are yet to be established. It is assumed these are suitably sized and in working order to treat the runoff from their respective areas. Details of these will need to be provided to confirm that they have been suitably sized and in working order.

### 4.2 Conclusions

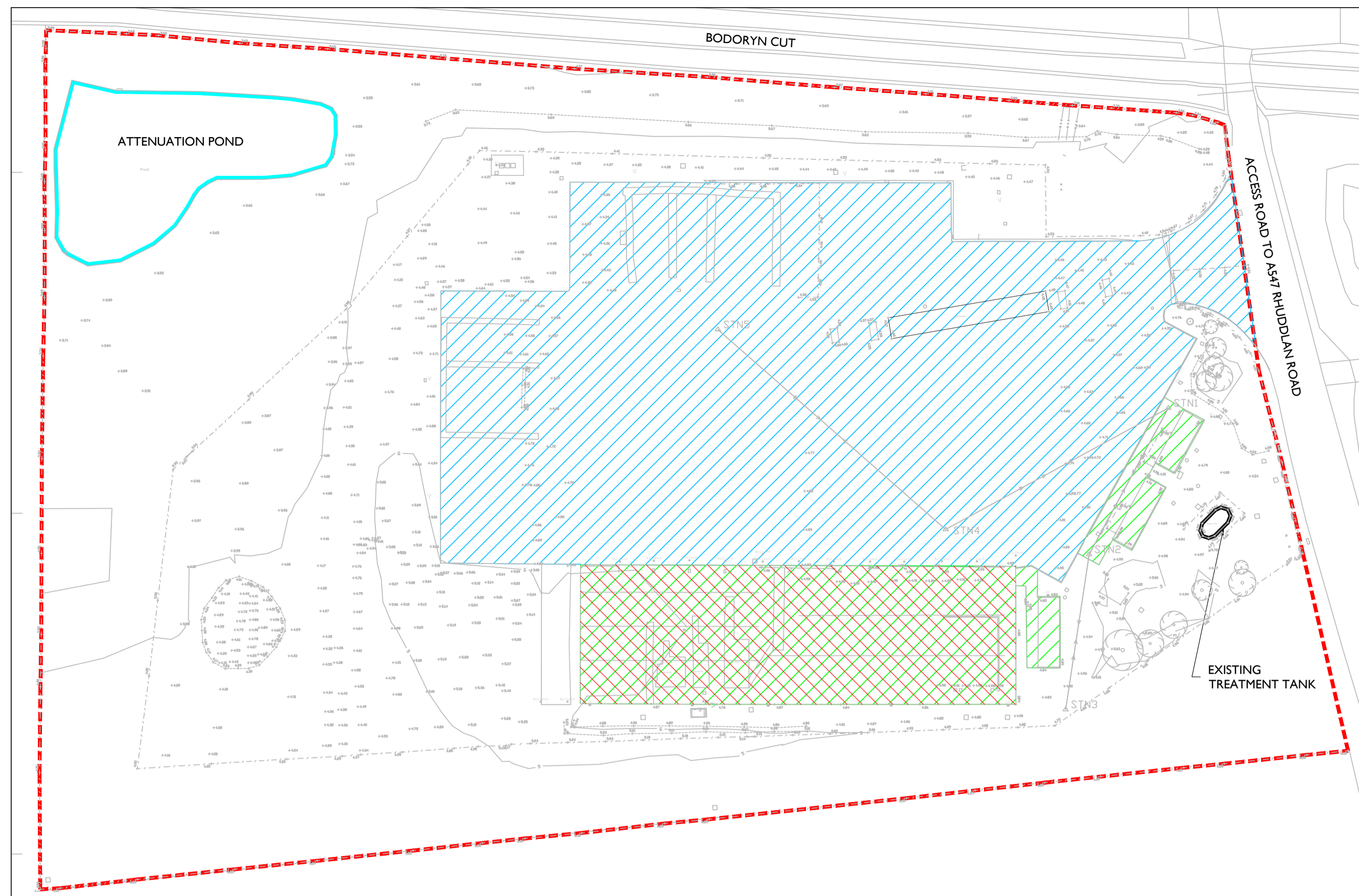
The proposed development is not expected to be affected by general objections in respect to draining the site. There will be suitable conditions imposed to ensure that the drainage proposals are designed and constructed in accordance with relevant statutory requirements, including Natural Resources Wales's 'Fire Prevention & Mitigation Plan (FPMP) Guidance for Waste Management', Building Regulations 2010 and the requirements of Conwy County Borough Council's SuDS Approving Body.

## 5 Appendices

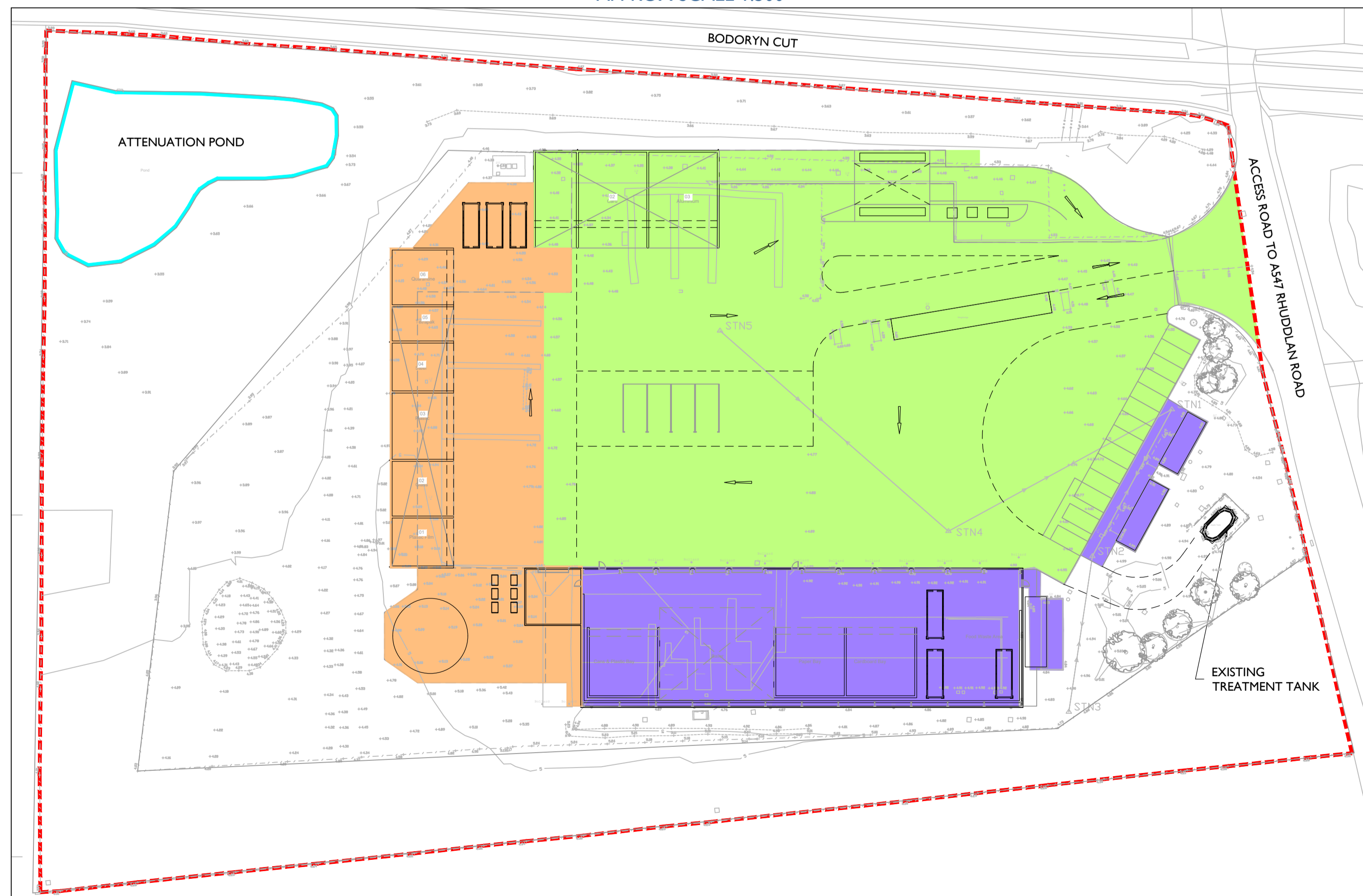
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## **Appendix A – Site Information Drawing**

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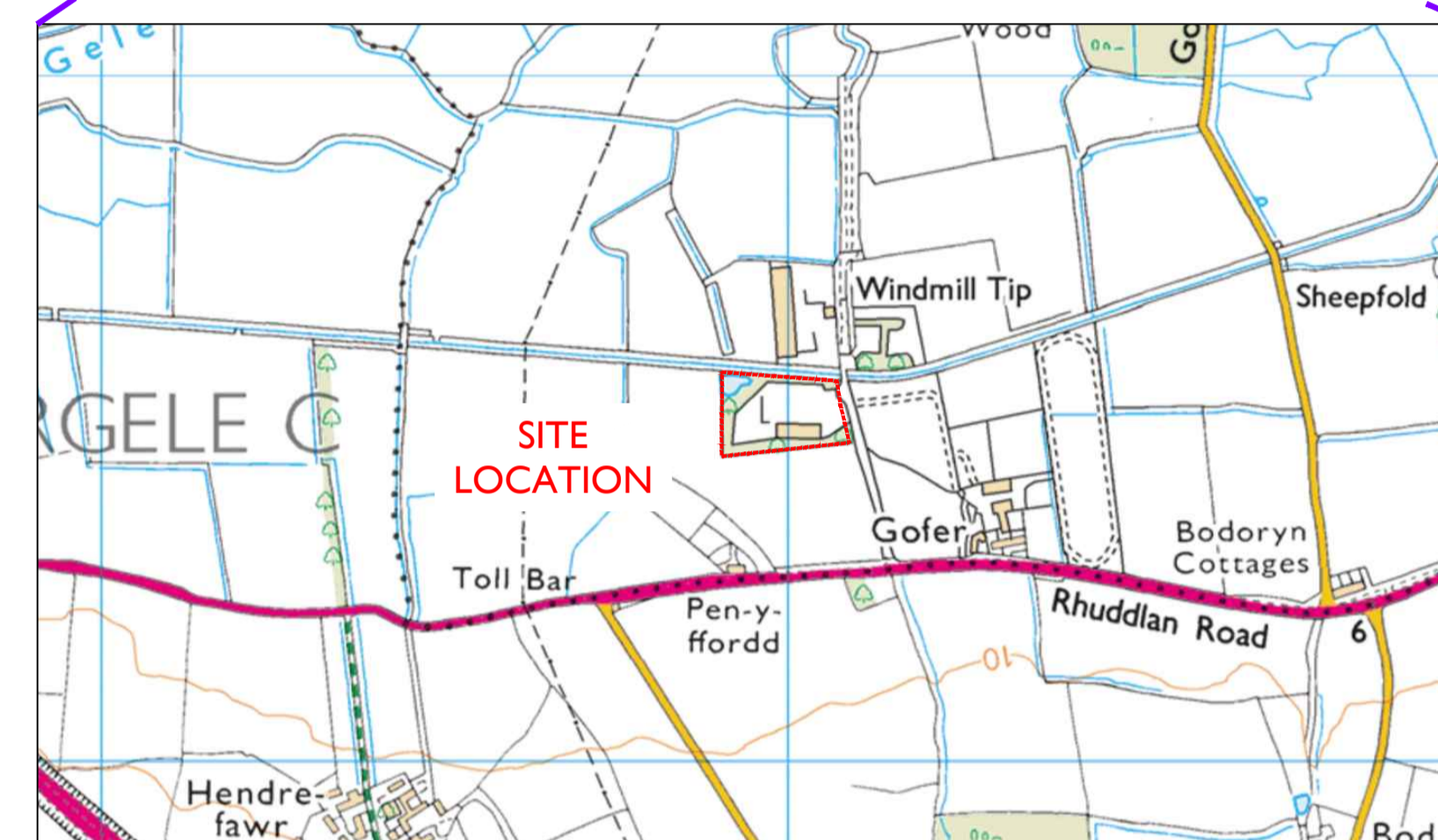
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APPROX SCALE 1:500



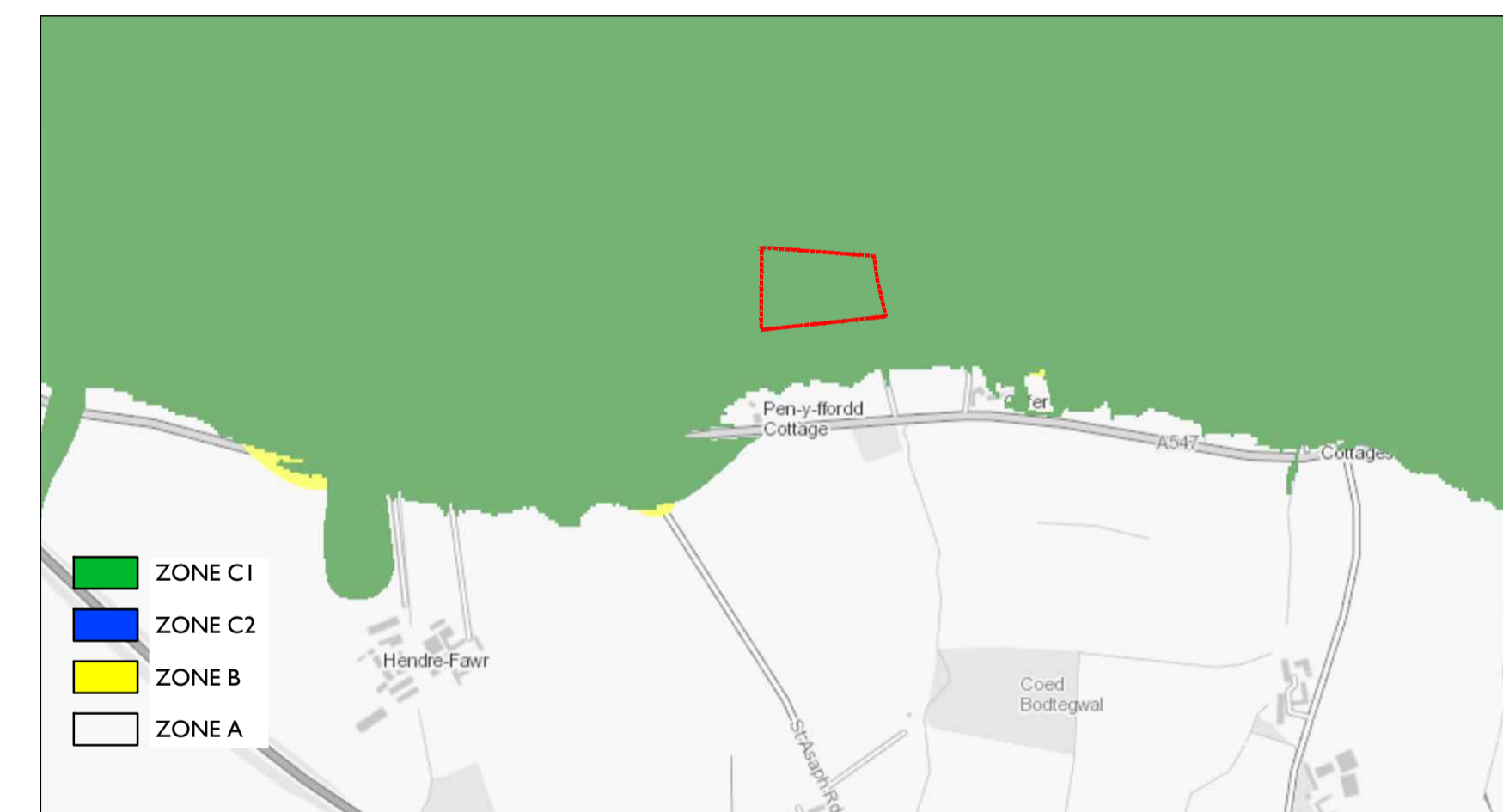
PROPOSED IMPERMEABLE AREA  
APPROX SCALE 1:500



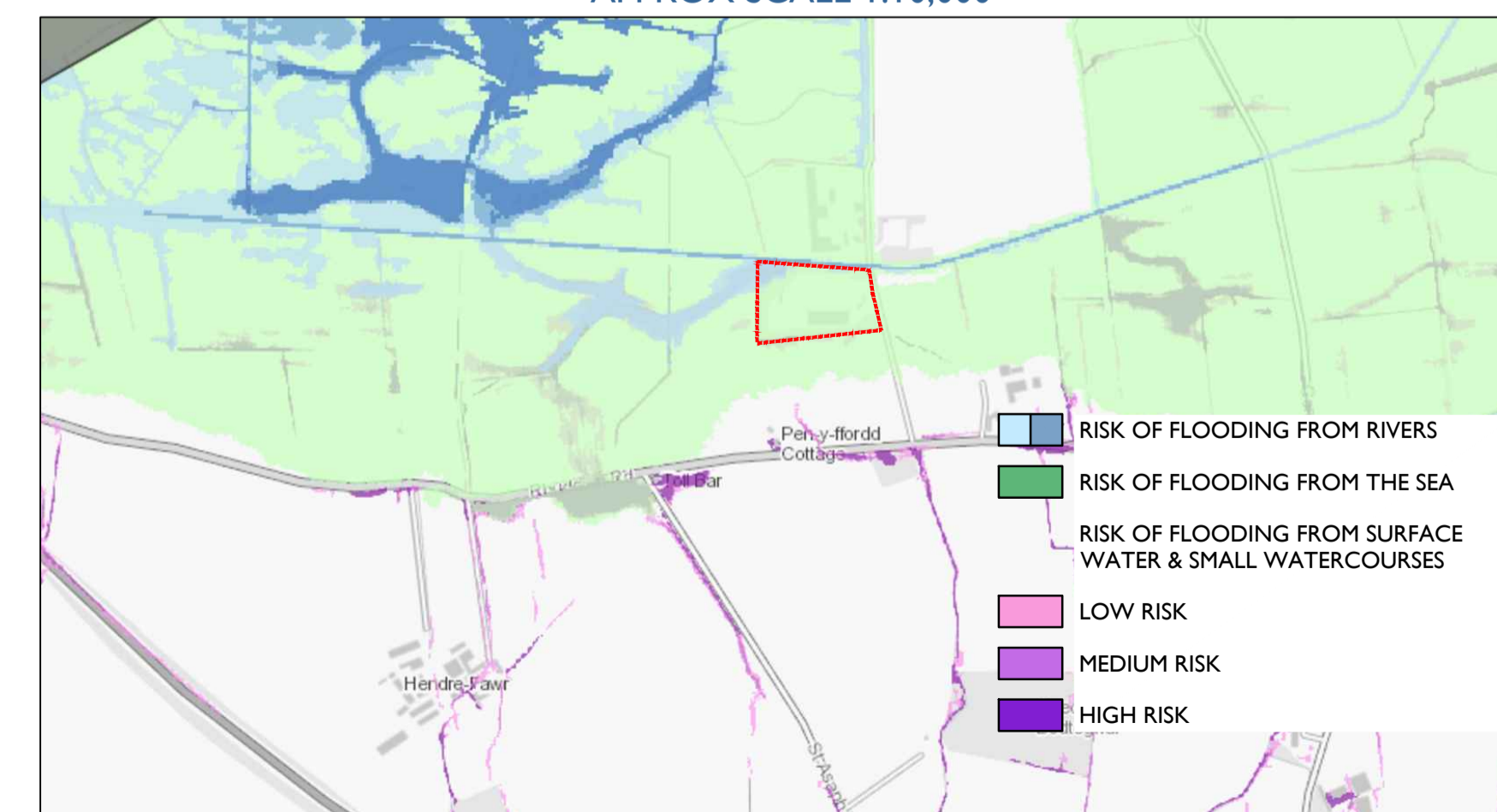
APPROX SCALE 1:125,000



APPROX SCALE 1:10,000



DEVELOPMENT ADVICE MAP  
APPROX SCALE 1:10,000



SURFACE WATER FLOOD RISK MAP  
APPROX SCALE 1:10,000

SITE CO-ORDINATES  
OS X (Eastings) 297018  
OS Y (Northings) 377518  
Nearest Post Code LL22 9SE  
Nat Grid SH970775 / SH9701877518



AREAS	
	SITE BOUNDARY 19,960m <sup>2</sup> (1.996 ha)
	EXISTING IMPERMEABLE AREA (AREA A - HARD STANDING AREA) 5,420m <sup>2</sup> (0.542 ha)
	EXISTING IMPERMEABLE AREA (AREA B - ROOF AREA) 1,300m <sup>2</sup> (0.130 ha)
	EXISTING IMPERMEABLE AREA (AREA C - HARD STANDING AREAS) 1,520m <sup>2</sup> (0.152 ha)
TOTAL CATCHMENT AREA PRE-DEVELOPMENT 6,940m <sup>2</sup> (0.694 ha)	
	IMPERMEABLE AREA (AREA A) 5,420m <sup>2</sup> (0.542 ha)
	IMPERMEABLE AREA (AREAS B & C) TO DRAIN AS EXISTING AREA B - 1,300m <sup>2</sup> (0.130 ha) AREA C - 1,520m <sup>2</sup> (0.152 ha)
	PROPOSED IMPERMEABLE AREA (AREA D) 1,670m <sup>2</sup> (0.167ha)
TOTAL CATCHMENT AREA AFTER DEVELOPMENT 8,760m <sup>2</sup> (0.876 ha)	

REV	DESCRIPTION	BY	CHK	APR	DATE

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PURPOSE OF ISSUE	PRELIMINARY	STATUS	P
PROJECT	GOFER WASTE TRANSFER SITE		
TITLE	DRAINAGE SCHEME SITE INFORMATION		
CLIENT	CONWY COUNTY BOROUGH COUNCIL		
DRAWN BY	JR	CHECKED BY	RH
DATE	09.05.2023	APPROVED BY	MM
DRAWING NUMBER	GWS-JPS-XX-XX-DR-C-1011	SCALE (@ A1)	AS SHOWN
PROJECT NUMBER	16020	REV	P01



## **Appendix B – Topographic Survey**

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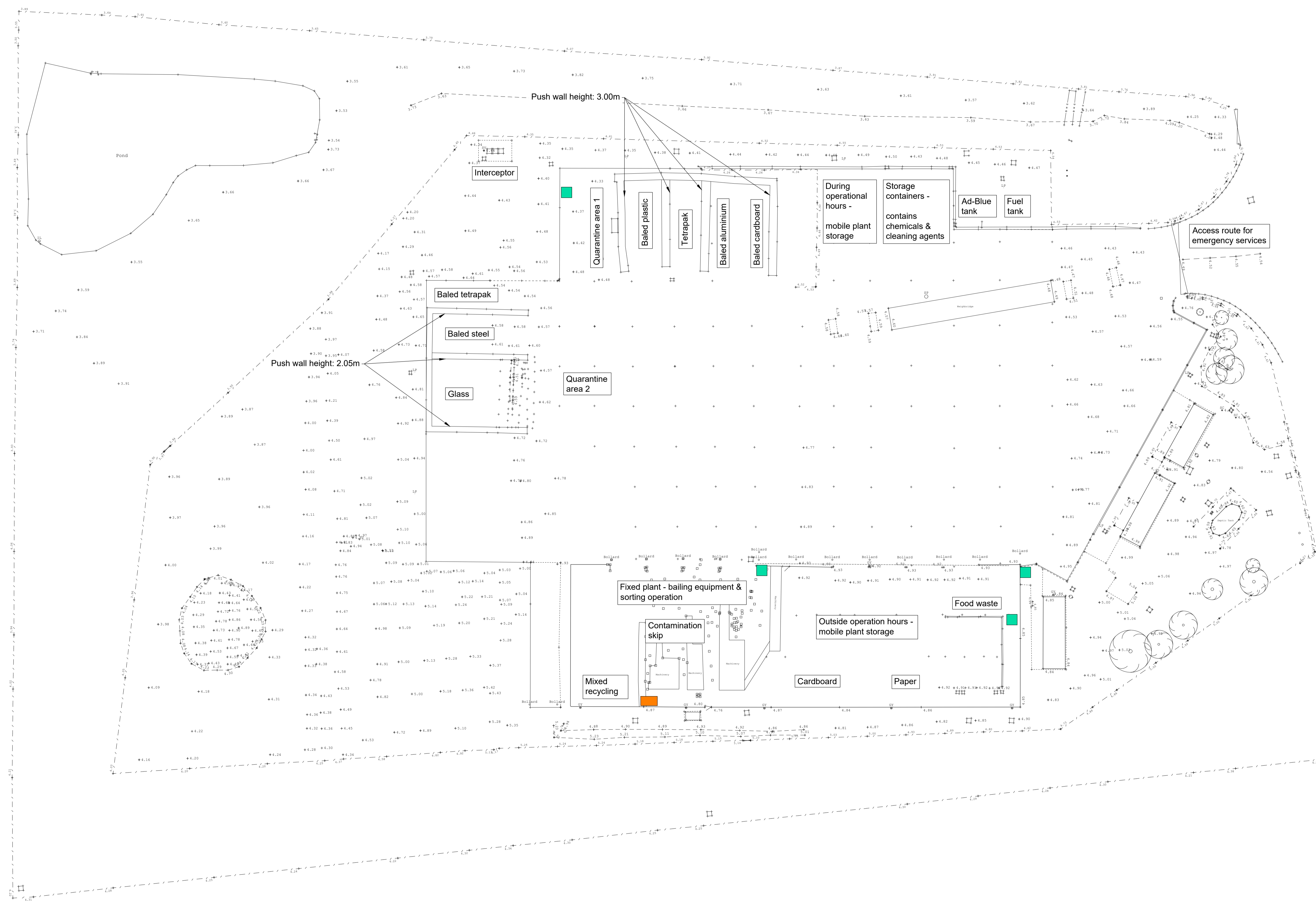
Reproduced from the Ordnance Survey Mapping with the permission of the Controller of H.M.S.O. Crown Copyright, Conwy County Borough Council, 100023380, 2020

**NOTES**

1. Bay door heights = 5.4m

**KEY**

- Water supply point
- Hazardous aerosols



REV	DETAIL	DRAWN	CHECKED	DATE

PROJECT  
**Roller Shutter Door Modifications  
 Gofer Bulking Station**

TITLE  
**Topographical Survey**

CLIENT  
**ERF  
 Waste**

SCALE @ A1:	DRAWN:	CHECKED:	APPROVED:	DWG STATUS:
NTS	TGR DATE: 2021-06-07	IAH DATE: 2021-06-07	IAH DATE: 2021-06-07	DRAFT

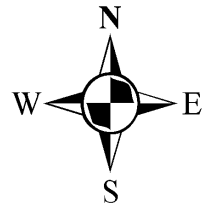
**ENVIRONMENT,  
ROADS & FACILITIES**  
 G.B. Edwards BEng (Hons) CEng FICE  
 Head of Environment, Roads & Facilities  
 Mochdre Offices, Conway Road,  
 Mochdre, LL20 5AB.  
 Tel: (01492) 576337  
 Fax: (01492) 575199

PROJECT Ref:	DRAWING No:	REV
ERWM2001S /	M001	-

CAD File Ref: ERWM2001S\_2021-06-07\_20.dwg  
 Date: 07/06/2021 10:00:00 AM

## **Appendix C – Public Sewer Records**

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**LEGEND(Representative of most common features)**

<b>Waste network:</b>			
	Foul chamber		Outfall
	Surface water chamber		Lamphole
	Combined chamber		Storm Overflow
	Combined sewer overflow		Rising main
	Special purpose chamber		Gravity sewer
	Treatment works		Private sewer
	Pumping station		Private sewer subject to Sect. 104 adoption agreement
			Private Sewer Transfer
RED	- Combined		Lateral Drain
GREEN	- Surface Water		Inspection Chamber
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.**

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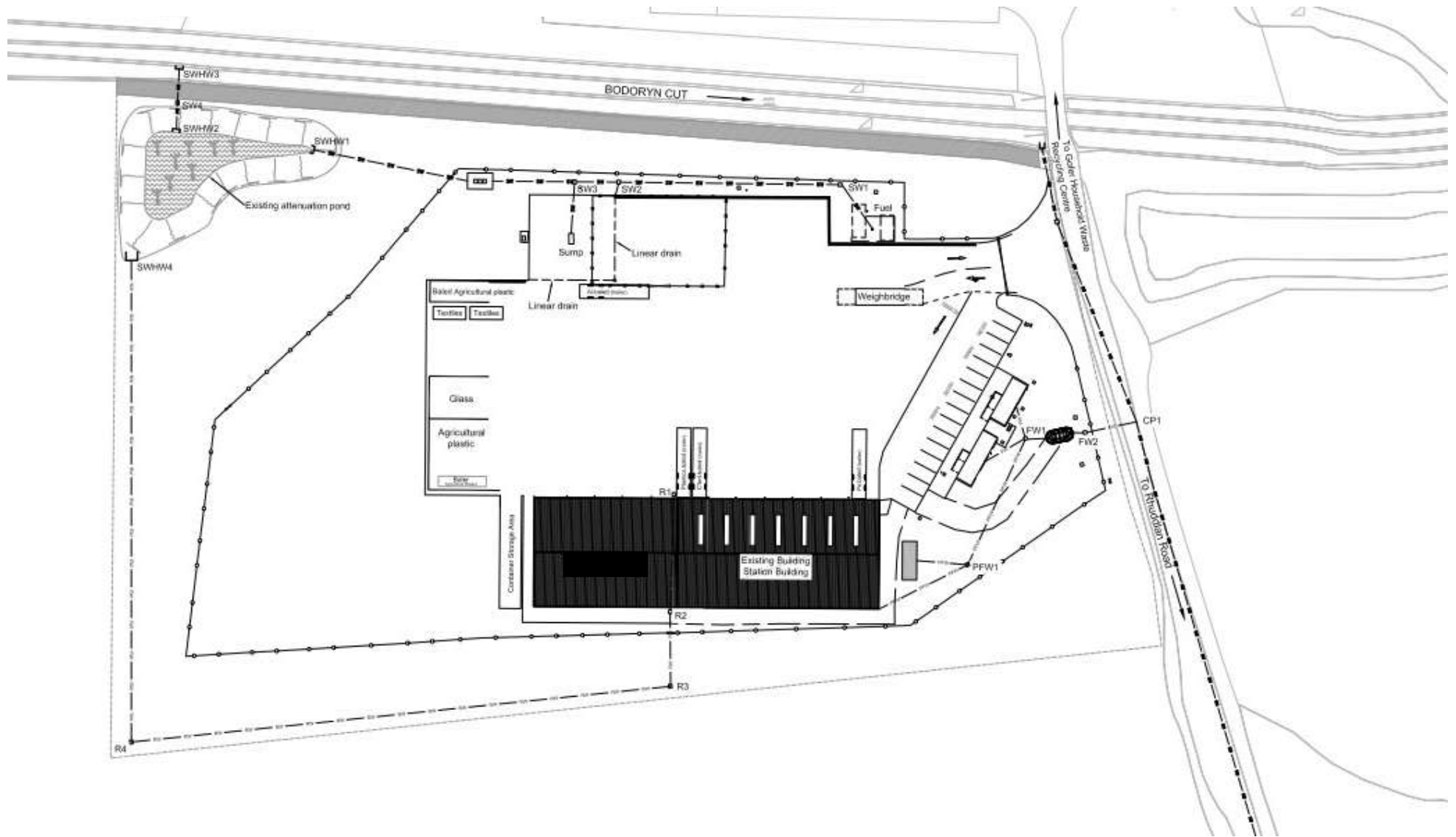
Map Ref: 297116,377212  
Map scale: 1:4950  
Printed by: Zara Howells  
Printed on: 17 Jan 2023



## **Appendix D – CCBC Site Drainage Plan**

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# APPENDIX A – Site drainage plan



## **Appendix E – Existing Drainage Layout**

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**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 CONTRACTORS RESPONSIBILITY TO DETERMINE THEIR EXACT LINE AND LEVEL BY WAY OF HAND EXCAVATED TRIALS 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**
- EXISTING COMBINED FLOW DRAIN
  - EXISTING SURFACE WATER DRAIN
  - EXISTING GULLY

**NOTE**  
THE EXISTING DRAINAGE AND CONNECTIONS AS SHOWN ARE BASED ON CCTV SURVEY UNDERTAKEN BY METROD (30.03.23) AND OTHER SOURCES AND WILL THEREFORE NEED TO BE VERIFIED ON SITE.

**NOTE**  
THE DRAINAGE ASSOCIATED WITH EXISTING MANHOLES 4-8 WAS FOUND TO BE FULL OF WATER BY THE CCTV SURVEY UNDERTAKEN BY METROD (30.03.23). IT IS RECOMMENDED THAT THE CAUSE OF THIS IS DETERMINED, AND REMEDIAL WORKS UNDERTAKEN TO ENSURE THE PERFORMANCE OF THIS DRAINAGE NETWORK.

**NOTE**  
AT THIS STAGE DETAILS OF THE EXISTING PETROL INTERCEPTOR AND TREATMENT TANK ARE YET TO BE ESTABLISHED. IT IS ASSUMED THESE ARE SUITABLY SIZED AND IN WORKING ORDER TO TREAT THE RUNOFF FROM THEIR RESPECTIVE AREAS. DETAILS OF THESE WILL NEED TO BE PROVIDED TO CONFIRM THAT THEY HAVE BEEN SUITABLY SIZED AND IN WORKING ORDER.

REV	DESCRIPTION	BY	CHK	APP	DATE



PURPOSE OF ISSUE	PRELIMINARY	STATUS	P
PROJECT	GOFER WASTE TRANSFER SITE		
TITLE	DRAINAGE SCHEME EXISTING LAYOUT		
CLIENT	CONWY COUNTY BOROUGH COUNCIL		
DRAWN BY	JR	CHECKED BY	RH
DATE	09.05.2023	APPROVED BY	JP
DRAWING NUMBER	GWS/JPS-XX-XX-DR-C-0501	SCALE (@ A0)	1:200
PROJECT NUMBER	16020	REV	P01



## **Appendix F – Development Proposals**

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- General Notes**
1. Contractor to verify all dimensions and check level datums on site
  2. All of the designs are the sole property of TACP Architects Ltd and may not be used without their written agreement
  3. All prints, specifications and their copyright are the property of TACP Architects Ltd
  4. Do not scale off drawings
  5. All dimensions shall be checked on site before commencement of shop drawings, manufacture and all discrepancies must be reported to TACP Architects Ltd

**NOTES**

Existing hard-standing surface: 3635m<sup>2</sup>  
 Proposed extra hard-standing surface: 981m<sup>2</sup>  
 Total hard-standing surface: 4616m<sup>2</sup>

**Revisions**

Rev	Date	Description	By	Check
PO1	01/03/23	Issued for Information / Comment	KA	DM
PO2	10/03/23	Updated in accordance with clients comments	DW	KA
PO3	14/03/23	Updated in accordance with clients comments	DW	KA

**Client**  
 Conwy County Council

**Project Title**  
 Gofer Waste Transfer Site

**Sheet Name**  
 Proposed Site Layout - Scheme 01

**Scale**  
 1 : 200@A0

**Date**  
 27/02/23

**Drawn By**  
 KA

**Checked By**  
 DM

**Office**  
 Wrexham

**Job Number**  
 22058

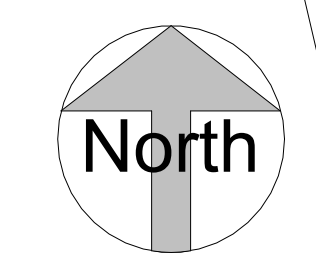
**Project/Originator/Zone/Level/Type/Role/Number**  
 GWS- TACP- PS- XX- DR- A- 7100

**Revision**  
 PO3

TACP Architects Ltd  
 Pembroke House  
 Elice Way, Wrexham Technology Park,  
 Wrexham, LL13 7YT  
 01978 291151

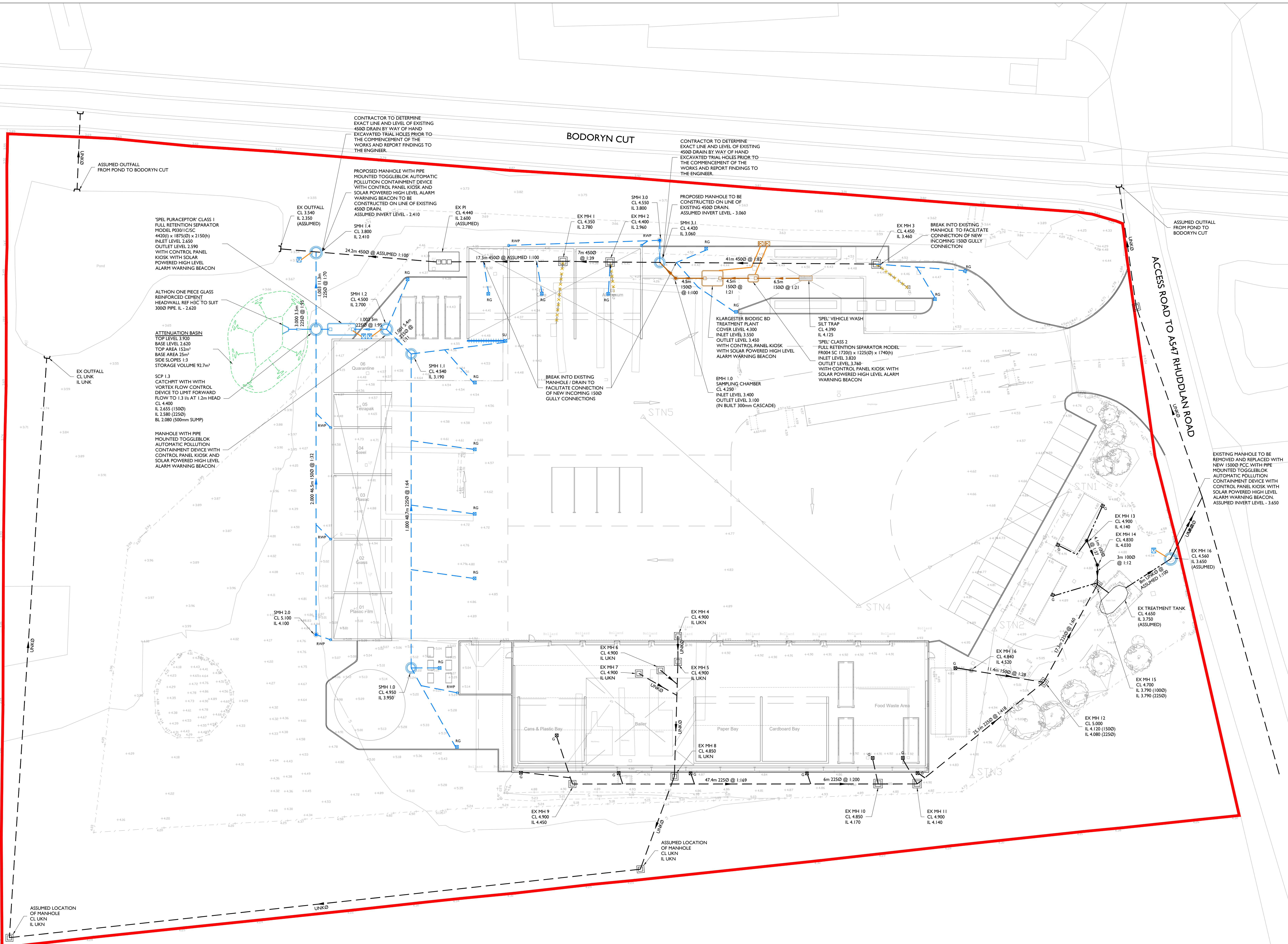
admin@tacparchitects.co.uk  
 www.tacparchitects.co.uk

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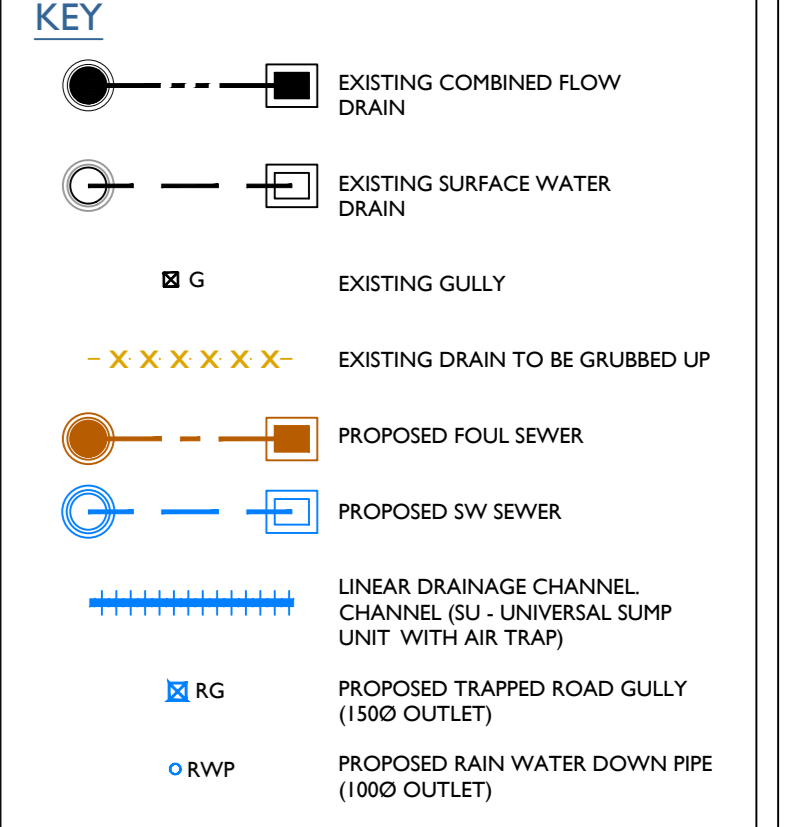


## **Appendix G – Proposed Drainage Layout**

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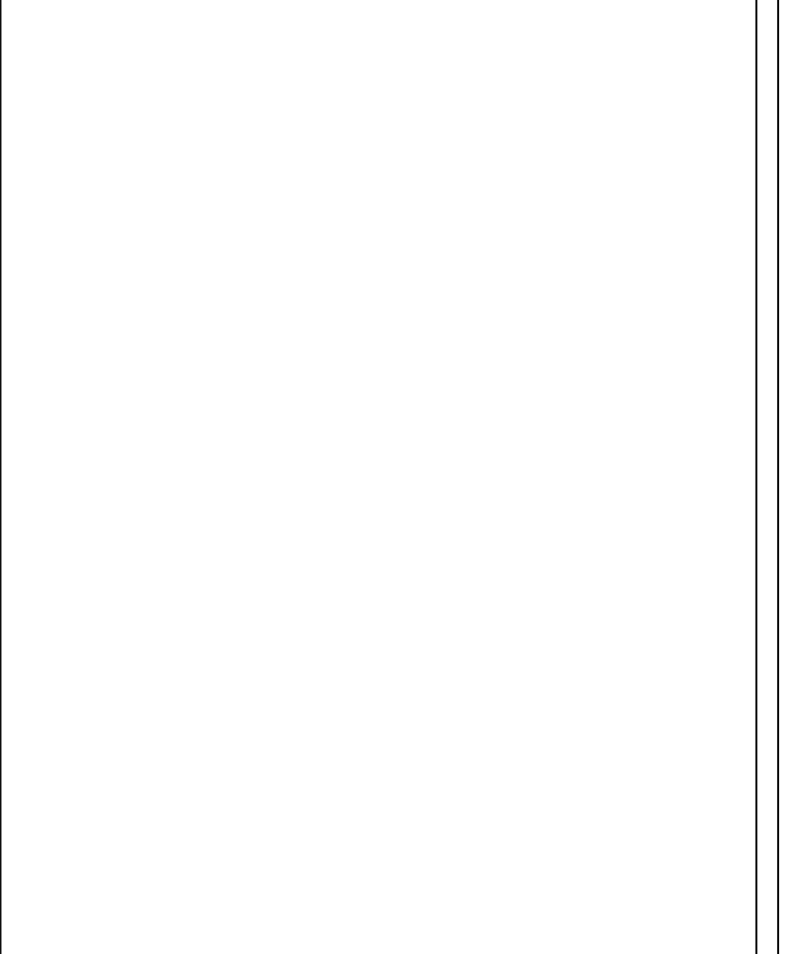
- NOTES**
1. THE WORKS SHALL BE IN ACCORDANCE WITH THE FOLLOWING SPECIFICATIONS, NATIONAL BUILDING SPECIFICATIONS (NBS) AND SEWERS FOR ADOPTION, 7TH EDITION.
  2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERING DRAWINGS, ARCHITECTURAL DRAWINGS, MECHANICAL AND ELECTRICAL DRAWINGS AND SPECIFICATIONS.
  3. THE LOCATION, LINE & LEVEL OF ALL KNOWN EXISTING BURIED SERVICE MAINS AND DRAINAGE PREVIOUSLY INDICATED ON THE DRAWINGS ARE APPROXIMATE AND FOR GUIDANCE PURPOSES ONLY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE 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.



**NOTE**  
THE EXISTING DRAINAGE AND CONNECTIONS AS SHOWN ARE BASED ON CCTV SURVEY UNDERTAKEN BY METROGOD (30.03.23) AND OTHER SOURCES AND WILL THEREFORE NEED TO BE VERIFIED ON SITE.

**NOTE**  
THE DRAINAGE ASSOCIATED WITH EXISTING MANHOLES 4-8 WAS FOUND TO BE FULL OF WATER BY THE CCTV SURVEY UNDERTAKEN BY METROGOD (30.03.23). IT IS RECOMMENDED THAT THE CAUSE OF THIS IS DETERMINED, AND REMEDIAL WORKS UNDERTAKEN TO ENSURE THE PERFORMANCE OF THIS DRAINAGE NETWORK.

**NOTE**  
AT THIS STAGE DETAILS OF THE EXISTING PETROL INTERCEPTOR AND TREATMENT TANK ARE YET TO BE ESTABLISHED. IT IS ASSUMED THESE ARE SUITABLY SIZED AND IN WORKING ORDER TO TREAT THE RUNOFF FROM THEIR RESPECTIVE AREAS. DETAILS OF THESE WILL NEED TO BE PROVIDED TO CONFIRM THAT THEY HAVE BEEN SUITABLY SIZED AND IN WORKING ORDER.



REV	DESCRIPTION	BY	CHK	APP	DATE

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PURPOSE OF ISSUE	STATUS	
PRELIMINARY	P	
PROJECT	GOFER WASTE TRANSFER SITE	
TITLE	DRAINAGE SCHEME PROPOSED LAYOUT	
CLIENT	CONWAY COUNTY BOROUGH COUNCIL	
DRAWN BY	CHECKED BY	APPROVED BY
JR	RH	JP
DATE	SCALE (IF ANY)	PROJECT NUMBER
09.05.2023	1:200	16020
DRAWING NUMBER	REV	
GWS-JPS-XX-XX-DR-C-0502	P01	

## **Appendix H – Surface Water Calculations**

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**Simulation Settings**

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	Drain Down Time (mins)	240
Ratio-R	0.300	Additional Storage (m <sup>3</sup> /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	30	0	0

**Node 1.3 Online Hydro-Brake® Control**

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	1.003	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0054-1300-1000-1300
Invert Level (m)	2.580	Min Outlet Diameter (m)	0.075
Design Depth (m)	1.000	Min Node Diameter (mm)	1200
Design Flow (l/s)	1.3		

**Node ATTENUATION BASIN Depth/Area Storage Structure**

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.620
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m <sup>2</sup> )	Inf Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf Area (m <sup>2</sup> )
0.000	25.0	0.0	1.300	152.0	0.0	1.301	0.0	0.0

**Results for 1 year Critical Storm Duration. Lowest mass balance: 98.34%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
15 minute winter	1.0	10	3.996	0.046	5.9	0.0935	0.0000	OK
15 minute winter	2.0	10	4.143	0.043	5.6	0.0452	0.0000	OK
15 minute winter	1.1	10	3.235	0.045	13.9	0.0933	0.0000	OK
240 minute winter	1.2	208	2.982	0.282	4.0	0.3593	0.0000	SURCHARGED
240 minute winter	1.3	208	2.982	0.402	5.2	0.7100	0.0000	SURCHARGED
15 minute summer	1.4	1	2.410	0.000	1.1	0.0000	0.0000	OK
240 minute winter	ATTENUATION BASIN	208	2.982	0.362	3.7	15.4382	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
15 minute winter	1.0	1.000	1.1	5.8	1.018	0.088	0.2763	
15 minute winter	2.0	2.000	1.3	5.5	1.104	0.177	0.4789	
15 minute winter	1.1	1.001	1.2	13.8	1.519	0.087	0.0640	
240 minute winter	1.2	1.002	1.3	3.8	0.242	0.069	0.4347	
240 minute winter	1.3	Hydro-Brake®	1.4	1.1				29.5
240 minute winter	ATTENUATION BASIN	3.000	1.3	-3.7	0.255	-0.067	0.1423	

**Results for 2 year Critical Storm Duration. Lowest mass balance: 98.34%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
15 minute winter	1.0	10	4.002	0.052	7.6	0.1064	0.0000	OK
15 minute winter	2.0	10	4.149	0.049	7.3	0.0518	0.0000	OK
15 minute winter	1.1	10	3.241	0.051	18.0	0.1060	0.0000	OK
360 minute winter	1.2	296	3.070	0.370	3.7	0.4722	0.0000	SURCHARGED
360 minute winter	1.3	296	3.070	0.490	4.8	0.8664	0.0000	SURCHARGED
15 minute summer	1.4	1	2.410	0.000	1.1	0.0000	0.0000	OK
360 minute winter	ATTENUATION BASIN	296	3.070	0.450	3.5	21.1643	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
15 minute winter	1.0	1.000	1.1	7.4	1.093	0.114	0.3318	
15 minute winter	2.0	2.000	1.3	7.2	1.149	0.231	0.5323	
15 minute winter	1.1	1.001	1.2	17.8	1.590	0.113	0.0941	
360 minute winter	1.2	1.002	1.3	3.5	0.215	0.065	0.4347	
360 minute winter	1.3	Hydro-Brake®	1.4	1.1				34.8
360 minute winter	ATTENUATION BASIN	3.000	1.3	-3.5	-0.087	-0.063	0.1423	



**Results for 30 year Critical Storm Duration. Lowest mass balance: 98.34%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
15 minute winter	1.0	10	4.022	0.072	14.4	0.1483	0.0000	OK
15 minute winter	2.0	10	4.169	0.069	13.8	0.0734	0.0000	OK
360 minute winter	1.1	344	3.388	0.198	5.9	0.4111	0.0000	OK
360 minute winter	1.2	344	3.388	0.688	6.6	0.8768	0.0000	SURCHARGED
360 minute winter	1.3	344	3.388	0.808	8.7	1.4271	0.0000	SURCHARGED
15 minute summer	1.4	1	2.410	0.000	1.1	0.0000	0.0000	OK
360 minute winter	ATTENUATION BASIN	344	3.388	0.768	7.4	47.9776	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
15 minute winter	1.0	1.000	1.1	14.1	1.306	0.217	0.5271	
15 minute winter	2.0	2.000	1.3	13.6	1.108	0.437	0.6054	
360 minute winter	1.1	1.001	1.2	5.9	0.820	0.037	0.2074	
360 minute winter	1.2	1.002	1.3	6.4	0.221	0.118	0.4347	
360 minute winter	1.3	Hydro-Brake®	1.4	1.2				38.6
360 minute winter	ATTENUATION BASIN	3.000	1.3	-7.4	-0.186	-0.134	0.1423	

**Results for 100 year +30% CC Critical Storm Duration. Lowest mass balance: 98.34%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
15 minute winter	1.0	10	4.044	0.094	24.3	0.1924	0.0000	OK
15 minute winter	2.0	10	4.196	0.096	23.2	0.1015	0.0000	OK
480 minute winter	1.1	464	3.781	0.591	7.9	1.2283	0.0000	SURCHARGED
480 minute winter	1.2	464	3.781	1.081	8.3	1.3780	0.0000	SURCHARGED
480 minute winter	1.3	464	3.781	1.201	11.4	2.1217	0.0000	SURCHARGED
15 minute summer	1.4	1	2.410	0.000	1.1	0.0000	0.0000	OK
480 minute winter	ATTENUATION BASIN	464	3.781	1.161	9.9	94.8336	0.0000	FLOOD RISK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
15 minute winter	1.0	1.000	1.1	23.9	1.307	0.368	1.3335	
15 minute winter	2.0	2.000	1.3	22.8	1.399	0.730	0.6987	
480 minute winter	1.1	1.001	1.2	7.4	0.767	0.047	0.2149	
480 minute winter	1.2	1.002	1.3	8.2	0.224	0.151	0.4347	
480 minute winter	1.3	Hydro-Brake®	1.4	1.4				53.6
480 minute winter	ATTENUATION BASIN	3.000	1.3	-9.9	-0.249	-0.180	0.1423	