



Llandarcy Drive-Thru Development

Drainage Strategy Report

Client: LP2 Ltd
Project Ref: CC2514
Report status: P02

CAMBRIA

Report Control Sheet

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1 Introduction

- 1.1.1 Cambria Consulting Ltd have been appointed by LP2 Ltd to develop a Drainage Strategy in support of a planning application for a new drive-thru development and EV charging station / car park on land off the B4290.
- 1.1.2 As a result of the enactment of Schedule 3 of the Flood Management Act 2010 by Welsh Government, the development will require Sustainable Urban Drainage (SuDS) approval prior to construction however, this is a separate approval process to planning and will be sought at a later date.
- 1.1.3 The objectives of this report are:
- ▶ Identify suitable outfall locations for the Surface Water and Foul Water from the proposed development.
 - ▶ Undertake hydraulic calculations to identify peak design flows or restrictions to the development and any subsequent attenuation requirements.
 - ▶ Provide a schematic layout of the proposed foul and surface water drainage proposals.
 - ▶ Demonstrate that a drainage design, compliant to the National SuDS standards, is achievable within the proposed planning layout and that effective management of surface water run-off has been considered.

2 Site Description

2.1 Site Location

2.1.1 The site location is as follows:

- ▶ Address: A3 Unit, Llandarcy, Skewen, Neath
- ▶ Postcode: SA10 6GZ
- ▶ Grid Reference: SS 71961 95732
- ▶ Grid Reference (6 digit): SS719957
- ▶ Easting (X): 271961
- ▶ Northing (Y): 195732

2.1.2 The planning boundary is approximately 4,852m² and is irregular in shape.

2.1.3 The site is bound to the west and north by an existing unnamed road, to the east by the B4290 and to the south by Llandarcy Park and facilities associated with NPTC Group of Colleges Llandarcy Academy of Sport.

2.1.4 Access is to be provided off the B4290 to the east of the development site.



Figure 1: Site Location Plan

2.2 Topography

2.2.1 In broad terms, the site falls from the north west, to the south east.

2.2.2 A significant portion of the proposed development area is located upon an area formerly used as a tennis court and is therefore a relatively flat plateau with levels in the order of 35.15 to 34.75m AOD. However, beyond the tennis court area, the levels rise significantly to the north

and west with a steep embankment forming the western boundary with levels of approximately 41m AOD.

- 2.2.3 The proposed access junction is to be located to the north-east of the drive-thru facility unit and is proposed to tie-in to the existing highway at a level of approximately 35.70m AOD.

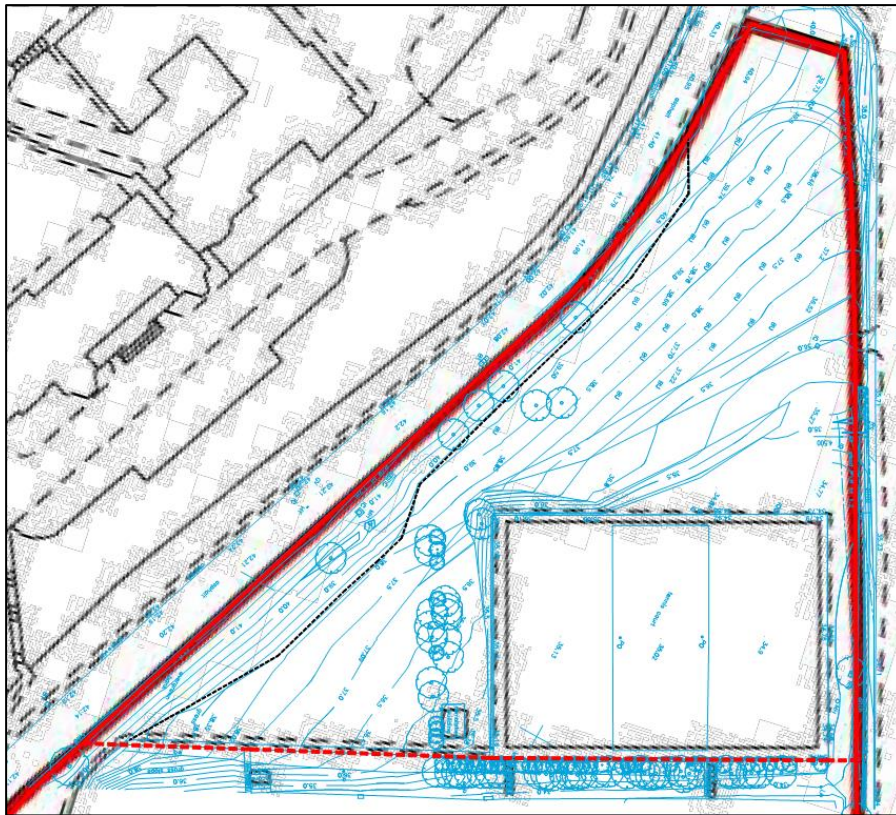


Figure 2: – Extract of Topographical Survey with Contour Lines

- 2.2.4 There is an existing ditch running north-south, parallel to the existing B4290 on the eastern boundary which is assumed to service the existing highway and provide land drainage to the existing site.

2.3 Ground Conditions

- 2.3.1 Archive geological mapping indicates that the underlain ground conditions are loamy and clayey floodplain soils with naturally high groundwater. It is therefore anticipated that the ground will not be receptive or suitable for infiltration / soakaway solutions.
- 2.3.2 Numerous Geotechnical / Site Investigative Reports for the nearby Llandarcy Training Centre, Social and Sports Club area have been made available for reference and support this position, although no development specific investigation has been undertaken at this time.

2.4 Flood Risk

- 2.4.1 The site is wholly located within Flood Zone A considered to be at little or no risk of fluvial or coastal / tidal flooding and therefore does not need to be considered further from a planning policy perspective.
- 2.4.2 Furthermore, supplementary Flood Risk Assessment Wales mapping shows there to be no risk of flooding posed by surface water sources and no indication of any existing overland flow paths which would require consideration through detailed design.

3.1.1 The scope of the redevelopment includes:

-
- The site plan illustrates the proposed development at 1000 West 10th Street. The plan includes the following features and annotations:
- Unit 1:** A large rectangular building footprint is labeled "Unit 1".
 - Pedestrian Crossings:** Two pedestrian crossings are marked with zebra stripes and labeled "PEDESTRIAN CROSSING".
 - Bus Shelter:** An existing bus shelter is located on the right side of the plan, labeled "EXISTING BUS SHELTER". A new bus shelter is indicated by a red rectangle and labeled "BUS SHELTER TO BE RE-LOCATED".
 - Road Markings:**
 - New Road Markings to be into Existing:** Indicated by blue lines along the western and northern boundaries of the site.
 - New 2.0m Wide Footway Line:** A new footway line is shown on the right side of the site.
 - New Road Markings to be into Existing:** Indicated by red lines along the eastern and southern boundaries of the site.
 - Other Features:**
 - NEW KERB LINE TO BE INTO EXISTING:** Indicated by a red line along the southern boundary.
 - NEW UNCONTROLLED PEDESTRIAN CROSSING WITH CENTRAL REFUGE:** Located on the right side of the plan.
 - EXISTING KERB LINE OF EAST SIDE UNDRIDGE:** Located on the right side of the plan.
 - NEW ROAD MARKINGS TO BE INTO EXISTING:** Located on the right side of the plan.

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5 Proposed Foul Drainage

- 5.1.1 As discussed in Section 4, it is anticipated that the existing DCWW 300mm diameter combined sewer will require diversion to facilitate the proposed development.
- 5.1.2 The proposed sewer diversion will replace an existing circa 54m length of pipework with a 63m diversion subject to there being sufficient fall on the existing network to facilitate this longer pipe run, without a detrimental reduction in capacity on the system. Further drainage investigation and CCTV survey will be required to inform the detailed design take forward the S185 agreement with DCWW.
- 5.1.3 With reference to Cambria Transport Assessment (ref CC2514-CAM-ZZ-XX-RP-TR-0001-P02), the proposed development is anticipated to attract up to 70 vehicle movements during its busiest hour and a daily total of 622 movements.
- 5.1.4 Based on Foul Sewer Design Flows (British Water, Flows and Loads 4) the above trip rates could generate a peak foul flow rate in the order of 1.43l/s – full calculations available within Appendix A. Consultation with DCWW will be required to confirm the existing network has sufficient spare capacity to receive the anticipated development flows.
- 5.1.5 A new gravity connection will be sought to the existing DCWW 300mm dia combined sewer crossing the site, albeit on the proposed diverted length between manholes SS71959701 and SS72950701.
- 5.1.6 Serving a single premise and connecting on the existing DCWW network within Developer owned land means that the proposed foul drainage system can remain private and does not require adoption under S104 agreement. A S106 agreement will be required prior to making connection to the existing adopted infrastructure / communicating any flows.

6 Proposed Surface Water Drainage

6.1.1 In October 2018, Welsh Government published the 'Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining Surface Water Drainage Systems'. This standard is now mandatory for new developments with either a construction area greater than 100m² or more than 1 dwelling.

6.1.2 The principles that underpin the design of surface water management schemes to meet the standards area as follows;

SuDS schemes should aim to:

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

6.1.3 Whilst no formal SAB pre-app consultation has been undertaken, the design has made with due consideration for compliance, with a conservative approach to ensure some degree of flexibility within the planning layout to accommodate SUDs features.

6.1.4 An illustrative proposed drainage layout showing the concept drainage strategy indicative of design intent is available within the drawings provided in Appendix C.

6.2 Standard S1 – Surface Water Runoff Destination

- 6.2.1 This standard reviews the disposal routes for surface water run-off. The destinations are split into 5 levels with level 1 being the most preferential and level 5 being the least preferred and only used in exceptional circumstances.

Priority Level 1: Surface water runoff is collected for use

- 6.2.2 It is proposed to direct rainwater downpipes and hardstanding areas through a mixture of SUDs features including raingardens and swales and run-off will therefore be used to irrigate these landscaping features.
- 6.2.3 With no perceived water supply concerns, rainwater harvesting systems are not considered a cost effective solution for this development, particularly as these systems are not suitable to serve highway / external hardstanding areas, and a Level 2+ priority disposal method must be considered.

Priority Level 2: Surface water runoff is infiltrated to ground

- 6.2.4 Nearby intrusive site investigation reports and archive geological mapping, suggests that infiltration is unlikely to be supported at this location. Soakaway testing to BRE Digest 365 will be required to validate this position however, in the interest of ensuring the site can be responsibly drained, lower order disposal methods have been considered.
- 6.2.5 Should soakaway testing prove viable, the design should revert to this solution.

Priority Level 3: Surface water runoff is discharged to a surface water body

- 6.2.6 The nearest surface water body is an ordinary watercourse located approximately 200m south of the proposed development site which appears to in turn connect to the Tennant Canal system.
- 6.2.7 It is assumed that the existing ditch on the eastern boundary connects to this system and therefore by discharging to the highway ditch would mean that an indirect communication is made to a surface water body.

Priority Level 4: Surface water runoff is discharged to a surface water sewer, highway drain or other drainage

- 6.2.8 The B4290 has a combination of traditional kerb / gully drainage and combined kerb drainage systems along the existing carriageway. The presence of the existing ditch at the back of the existing footpath / carriageway between the development site, suggests that this feature conveys highway run-off and received land drainage from the development site. Connection to this location is therefore assumed to mimic the existing drainage regime of the site and therefore provides catchment continuity.
- 6.2.9 Further investigation is required to ascertain where the existing ditch connects downstream / outfalls.

Priority Level 5: Discharge to a Combined Sewer

- 6.2.10 There is an existing DCWW combined sewer crossing the site however, this is the least favourable disposal method and can only be sought if all higher level disposal methods have been exhausted.

6.3 Standard S2 – Surface Water Hydraulic Control

- 6.3.1 In the interest of providing a robust design response, and as no existing baseline has yet been established to reflect the existing brownfield nature of the site and its drainage regime, the preliminary design assessment assumes a full return to pre-development, site specific greenfield run-off rates.
- 6.3.2 With reference to the calculations contained within Appendix B, a greenfield rate of 6.7l/s/ha has been determined and based on a total hardstanding area of 2,787m² equates to a proposed development restricted discharge rate of 1.9l/s.
- 6.3.3 The respective new surface water drainage systems will be sized to cater for the 1 in 100 year storm event with a +40% allowance for climate change. Quick storage estimates suggest that storage volumes in the range of 243 – 431m³ will be required to provide adequate attenuation in this extreme storm event. Below ground attenuation crates may be utilised to supplement storage volume within the SUDs features and the carrier system of the proposed surface water drainage network.
- 6.3.4 Urban creep is not considered appropriate in this instance given any future extensions would be regulated through the planning process.

6.4 Standard S3 - Surface Water Quality

- 6.4.1 SUDs features / components are located in pockets across the site responding 'at source' wherever possible. The system will be designed to operate sequentially, in a SUDs management / treatment train, in order to treat the surface water runoff discharging from the site.
- 6.4.2 It is proposed to integrate a mixture of features including; bioretention / raingardens, swales, filter / trench drains.
- 6.4.3 The Simple Index Approach method will be adopted to ensure sufficient treatment measures are met. This will be provided within the Full SAB application.
- 6.4.4 Detailed calculations will be provided in the Full SAB application demonstrating interception criteria and the retention of the first 5mm of rainfall is met.

6.5 Standard S4 – Amenity

- 6.5.1 A variety of 'soft' green SUDs features are to be integrated at surface level into the external landscaping proposals, to provide attractive amenity spaces, promoting dual functionality.

6.6 Standard S5 – Biodiversity

- 6.6.1 A variety of SUDs features are proposed from swales, bioretention / raingarden pockets, filter drains including a mixture of full drain-down and wetland profile features to promote enhanced biodiversity range.
- 6.6.2 The drainage design maximises the use of above ground, soft, SuDS features which will create habitats that are self-sustaining and resilient to climate change and link with the local natural and semi-natural species and habitats.
- 6.6.3 Plantings in and around the SuDS features will also benefit the existing vegetation regime. These additional plantings create a more resilient ecosystem which allows natural re-colonisation of the feature should damage due to pollution occur.
- 6.6.4 Plants for pollinators will be prioritised, along with native species.

- 6.6.5 Consideration has been given to protect the existing mature treeline and its respective root protection zone on the southern boundary.

6.7 Standard S6 - Design of drainage for Construction, Operation and Maintenance and Structural Integrity

- 6.7.1 All SUDS features will be designed and constructed in accordance with CIRIA C753 The SUDS Manual and C768 Guidance on the Construction of SUDS.
- 6.7.2 The surface water drainage system and its SUDs features are designed to operate without human intervention.
- 6.7.3 Access for maintenance has been considered and integrated into the design and positions adjacent to hardstanding areas, at surface / shallow depth for ease of access. Likewise, DCWW sewer easement requirements have been considered and SUDs features located outside of these areas.
- 6.7.4 Overflows are to be integrated into all SUDs features as a safeguard and for completeness, infrastructure failure / exceedance events will be considered for a Q200+40% climate change events to ensure any vulnerable areas of the network are identified and potential overland flow paths considered.
- 6.7.5 As a single premises under single land ownership all SUDs features will be retained under private ownership to be maintained by the end user / management contractor and will not be offered to the SAB to adopt.
- 6.7.6 A Management and Maintenance schedule will be prepared to support the Full SAB Application.
- 6.7.7 The SuDS solution will be designed in accordance with the SuDS manual and the site is generally served by shallow SuDS features, reducing the capital cost and long-term maintenance costs of the scheme.
- 6.7.8 Full maintenance and management plans / proposals will be prepared to support the development's Full SAB Application and any residual risks highlighted within the designer's risk assessment.

7 Conclusions

- 7.1.1 The development's foul drainage is proposed to make a gravity connection to the existing public combined sewer crossing the site subject to S106 agreement with DCWW. A section of the existing combined sewer will require diversion under S185 agreement to facilitate the proposed development.
- 7.1.2 It is proposed to mimic the existing drainage regime and discharge run-off to the existing open ditch located on the site's eastern boundary. The respective system will be restricted to appropriate greenfield discharge rate (1.9l/s) and will be designed to cater for storms up to and including the 1 in 100 year +40% climate change storm event.
- 7.1.3 Whilst the proposals remain subject to detailed design, SAB approval and formal agreements, this drainage strategy demonstrates that drainage aspects can be responsibly and effectively managed, following the principles of a SAB compliant scheme, with sufficient robustness to support the development's planning application.

Appendix A: Foul Calculations

CONTRACT - Llandarcy Drive Thru

JOB NO - CC2514

622 Daily Vehicle Movements

CAMBRIA

Sheet No 1 of 1
Designed By LKJ
Checked By LKJ
Date 28/07/2023
Rev P2

Foul Sewer Design Flow British Water, Flows and Loads - 4

DATA				OUTPUT		
	Flow	BOD	Amonia	No.	Flow	Flow
Per person / activity /day (unless otherwise specified)	(Litres)	(Grams)	as N		Rate	Rate
			(Grams)		l/day	l/s
DOMESTIC DWELLINGS						
Standard residential	150	60	8	0	0	0.000
Mobile home type caravans with full service	150	90	8	0	0	0.000
INDUSTRIAL						
Office / Factory without canteen	50	25	5	0	0	0.000
Office / Factory with canteen	100	38	5	0	0	0.000
Open industrial site, eg construction, quarry, without canteen	60	25	5	0	0	0.000
*Full-time Staff	90	38	5	0	0	0.000
*Part-time Staff (4 hr shift)	45	25	3	0	0	0.000
SCHOOLS						
Non-residential with canteen cooking on site	90	38	5	0	0	0.000
Non-residential without a canteen	50	25	5	225	11250	0.130
Boarding school: (i) residents	200	75	10	0	0	0.000
(ii) day staff (inc. Mid-day meal)	90	38	5	0	0	0.000
HOTELS, PUBS & CLUBS						
Hotel Guest (Prestige hotels)	300	105	12	0	0	0.000
Hotel Guests (3* & 4* hotels)	250	94	10	0	0	0.000
Guests (Bedroom only - no meals)	80	50	6	0	0	0.000
Residential Training / Conference Guest (inclusive all meals)	350	150	15	0	0	0.000
Non residential Conference Guest	60	25	2.5	0	0	0.000
Drinkers	12	15	5	0	0	0.000
Holiday camp chalet resident	227	94	10	0	0	0.000
Resident Staff	180	75	10	0	0	0.000
Restaurants: - Full Meals: - luxury catering	30	38	4	0	0	0.000
- pre-prepared catering	25	30	2.5	0	0	0.000
- Snack Bars & bar meals	15	19	2.5	0	0	0.000
- Function Rooms including buffets	15	19	2.5	0	0	0.000
- Fast Food i.e. (roadside restaurants)	12	12	2.5	622	7464	0.086
- Fast Food Meal (burger chain and similar)	12	15	4	0	0	0.000
Students (Accommodations only)	100	56	5	0	0	0.000
AMENITY SITES						
Toilet Blocks (per use)	10	12	2.5	0	0	0.000
Toilet (EC) (per use)	10	12	2.5	0	0	0.000
Toilet (Urinal) (per use)	5	12	2.5	0	0	0.000
Toilet Blocks in Long Stay car parks / lorry parks (per use)	10	19	4	0	0	0.000
Shower (per use)	40	19	2	0	0	0.000
Golf Club	20	19	5	0	0	0.000
Local community sports club, e.g. Squash, rugby & football	40	25	6	0	0	0.000
Swimming (where a separate pool exists without an associated sports centre)	10	12	2.5	0	0	0.000
Health Club / Sports centre	50	19	4	0	0	0.000
Tent Sites	75	44	8	0	0	0.000
Caravan Sites (i) Touring not serviced	100	44	8	0	0	0.000
(ii) static not serviced	100	44	8	0	0	0.000
(iii) Static fully serviced	180	75	8	0	0	0.000
HOSPITALS & RESIDENTIAL CARE HOMES						
Residential old people / nursing	350	110	13	0	0	0.000
Small Hospitals	450	140	Access	0	0	0.000
Large Hospitals	Access individually					

RESULTS	
Total Average Flow =	18714.00 l/day
Total Average Flow =	0.22 l/s
Total Peak Flow =	DWF x 6 +10%
Total Peak Flow =	1.43 l/s

Appendix B: Surface Water Calculations

Description	Return period (yrs)	As-rural peak flow (m ³ /s)	Greenfield (l/s/ha)	As-rural direct runoff (ML)
1 year	1	0.005767071	5.77	0.037077051
2 year	2	0.006444772	6.44	0.041869586
5 year	5	0.008667553	8.67	0.057630354
10 year	10	0.010233454	10.23	0.068768477
30 year	30	0.012841411	12.84	0.087340854
50 year	50	0.014162789	14.16	0.096756117
75 year	75	0.015303434	15.30	0.104891781
100 year	100	0.01618217	16.18	0.111164228
200 year	200	0.018670703	18.67	0.128948697
1000 year	1000	0.02931572	29.32	0.20530944

Greenfield Rate

Development

Contributing Area (m²)

10000

Q1

5.77

Q2

6.44

Q5

8.67

Q30

12.84

Q100

16.18

QBAR
(approx Q2.3)

6.67

l/s/ha

Restricted Discharge Rate - System 1

Development

Contributing Area (m²)

2787

Q1

1.61

Q2

1.80

Q5

2.42

Q30

3.58

Q100

4.51

QBAR
(approx Q2.3)

1.86

l/s

Contributing Area, Interception & Storage Volumes

System 1	Contributing Area			Proposed Receiving SUDS feature						
	Actual / Measured Area	10% urban creep	Total		SUDS	Area	Depth	Void Ratio	Volume	Interception Ratio (1:xx)
Access Junction	360	36	396	772.2	Swale (SW1)	62.16	0.3	0.3	5.59	12.42
Parking	342	34.2	376.2							
Access road bend	128	12.8	140.8	140.8	Raingarden (RG-1)	10.2	0.3	0.3	0.92	13.80
Car Park (west)	496	49.6	545.6	601.37	Swale (SW2)	36.3	0.3	0.3	3.27	16.57
External Paths	50.7	5.07	55.77							
Car Park (disabled)	112	11.2	123.2	257.4	Raingarden (RG-2)	34.8	0.3	0.3	3.13	7.40
External Paths	122	12.2	134.2							
Roof	247.5	24.75	272.25	272.25	Raingarden (RG-3)	39.2	0.3	0.3	3.53	6.95
Delivery Bay	194	19.4	213.4	213.4	Filter Drain (FD3)	16.4	0.3	0.3	1.48	13.01
Drive Thru	215	21.5	236.5	236.5	Main Swale	170	0.3	0.3	15.30	1.39
EV Car Park	420	42	462	462	Swale (SW3)	40.5	0.3	0.3	3.65	11.41

2687.2

2955.9

36.86

xxx <5 Default criteria met
xxx 5-20 detailed calculation required
xxx >20 deferred treatment required

Quick Storage Estimate

Input

Input Type

User Input

Area (ha)

0.296

Volumetric Runoff Coefficient

1.000

Discharge Rate (L/s)

1.9

Infiltration Rate (m/hr)

0.0

Safety Factor

2.0

Quick

Calculate

Create New

From Library

All

FEH

FEH (1)

Method

FEH

Number of Storms

38

Max. Run Time (mins)

20160

Quick Storage Estimate

Results

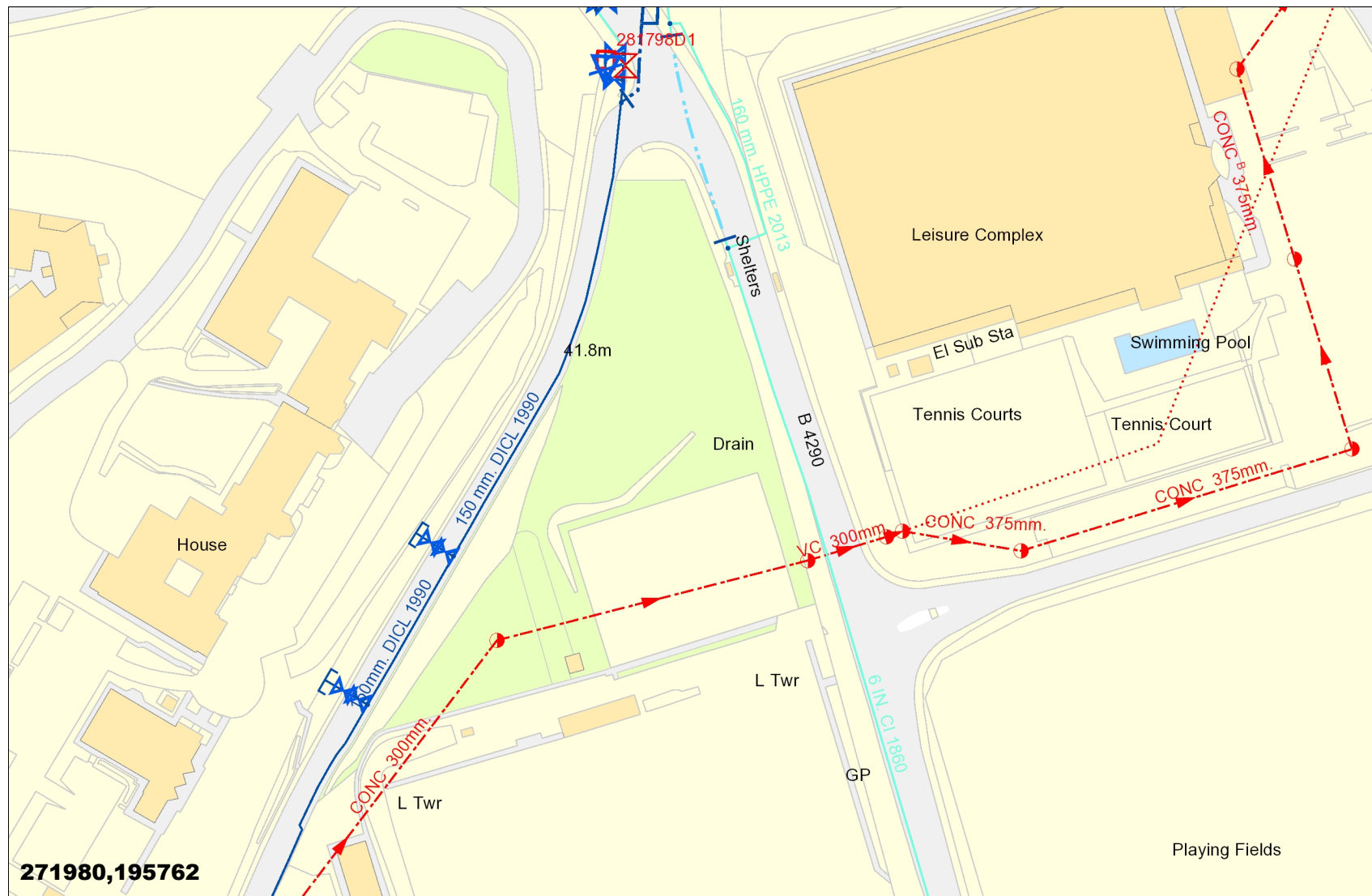
Quick Storage Estimate variables require approximate storage of between 243m³ - 431m³.

These values are estimates only and should not be used for final design purposes.

Appendix C: Drawings



Scale: 1: 1500



LEGEND

Clean Water

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

Sewerage External

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

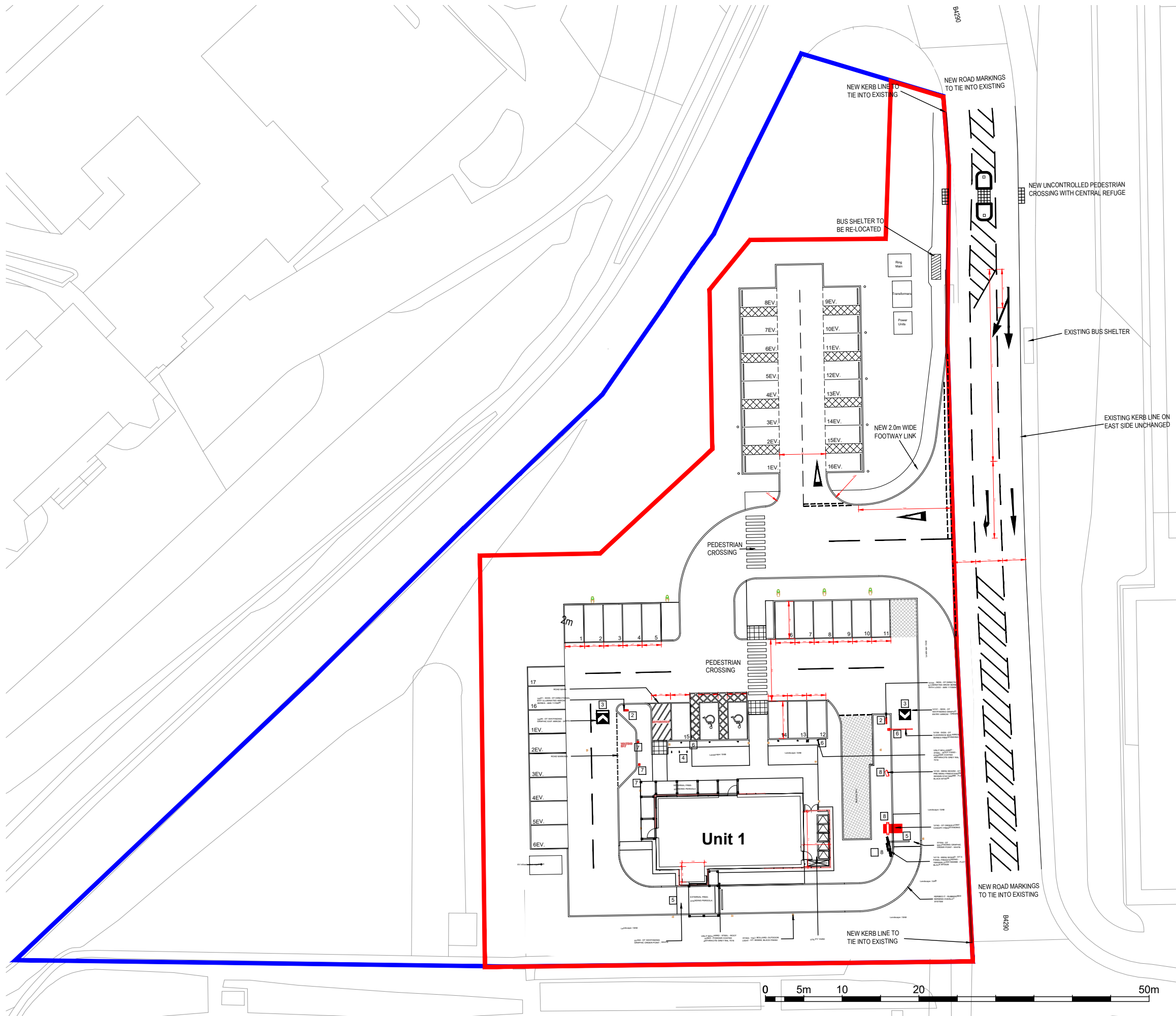
271980,195762

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 and any onus of locating the apparatus before carrying out any excavations rests entirely on you. The information which is supplied hereby the company, is done so in accordance with statutory requirements of sections 198 and 199 of the water industry Act 1991 based upon the best information available and in particular, but without prejudice to the generality of the foregoing, it should be noted that the records that are available to the Company may not disclose the existence of a drain sewer or disposal main laid before 1 September 1989, or if they do, the particulars thereof including their position underground may not be accurate. It must be understood that the furnishing of this information is entirely without prejudice to the provision of the New Roads and Street Works Act 1991 and the company's right to be compensated for any damage to its apparatus.

**EXACT LOCATION OF
ALL APPARATUS TO
BE DETERMINED ON
SITE**

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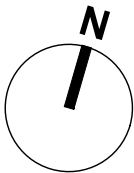
Whilst every reasonable effort has been taken to correctly record the pipe material of DCWW assets, there is a possibility that in some cases pipe material (other than Asbestos Cement or Pitch Fibre) may be found to be Asbestos Cement (AC) or Pitch Fibre (PF). It is therefore advisable that the possible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



NOTE:

Site extents as title plan number
WA7769 - 04321346

Site layout is subject to design
development and input from engineers,
SAB, Landscape, highways and the local
planning authority.



GIA
Unit 1 1800ft²

Total 1800ft²

Car parking

Total 41 spaces (Inc. 2 x accessible
spaces & 16 accessible EV spaces)

P03	19.07.23	AP	Addition of 16 x EV changing bays and associated road.
P02	07.06.23	AP	Site boundary extended 5m on the western side.
P01	14.03.23	AP	Addition of right turn lane into site and associated notes.
-	10.03.23	AP	FIRST ISSUE
Rev	Date	Check	Description

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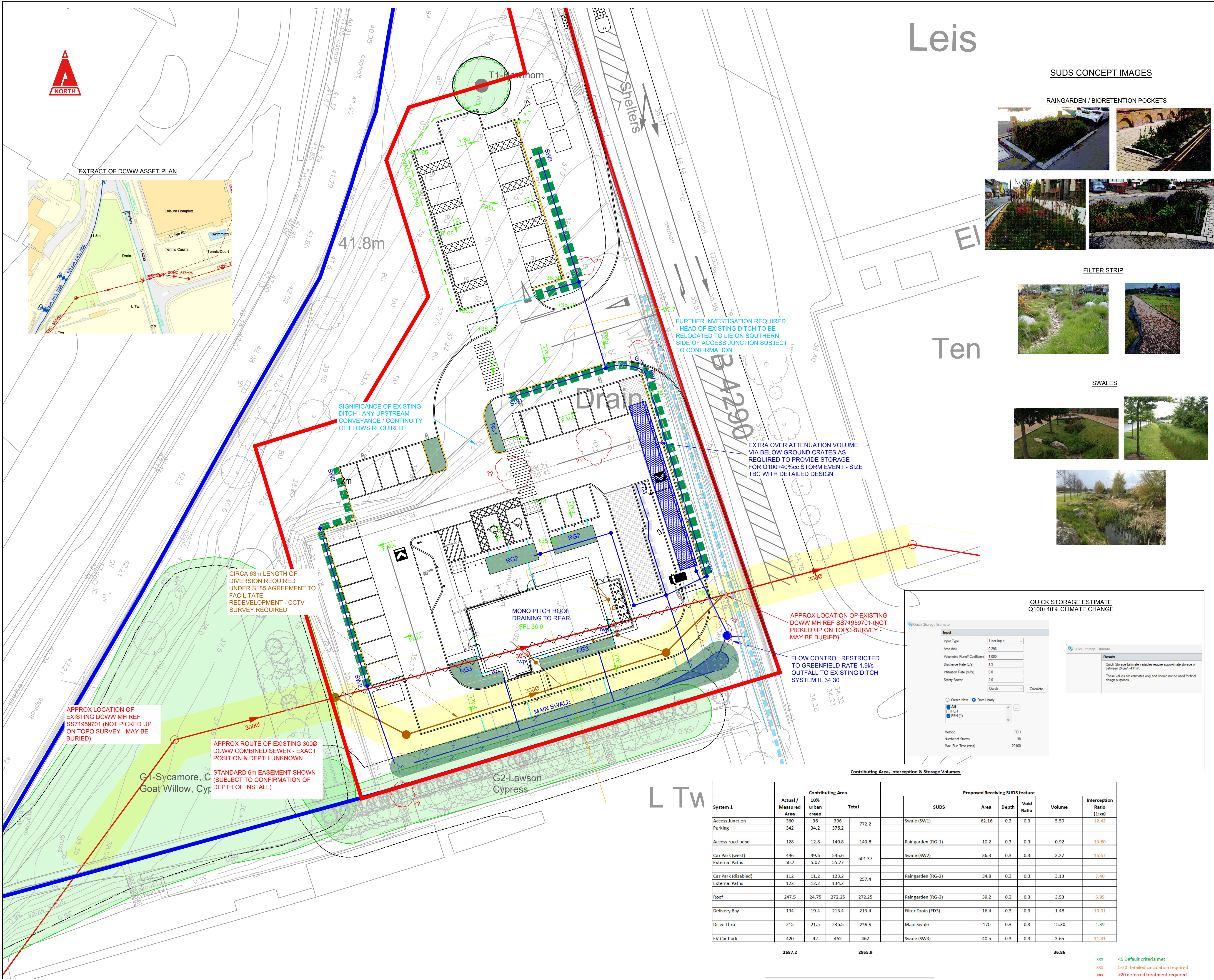
Project
A3 Unit, Llandarcy
Llandarcy
LP2 Ltd.

Title
Proposed Site Plan

Status **Sketch** Scale at A3 **1:500**

Job No	Zone	Sheet No	Rev
4733		A-90-003	P03

ISO 14001 : 2004 ISO 9001 : 2000 RIBA Chartered Practice
Please consider the environment before printing this document
Refer to dimensions where provided - do not scale from this drawing



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Ten

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SUDS CONCEPT IMAGES



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DO NOT SCALE FROM THIS DRAWING.

CONTRACTORS MUST CHECK ALL DIMENSIONS ON SITE. ONLY FIGURED DIMENSIONS ARE TO BE WORKED FROM. DISCREPANCIES MUST BE REPORTED IMMEDIATELY TO CAMBRIA CONSULTING LIMITED BEFORE PROCEEDING.

THE CONTRACTOR IS TO REFER TO THE SPECIFICATION, FULL SCHEDULE OF RESIDUAL RISKS IN THE CONTRACT DOCUMENTATION AND ALSO TO INFORMATION FROM OTHER DESIGNERS, IN PARTICULAR THE M&E CONSULTANT REGARDING EXISTING LIVE SERVICES.

! THIS SYMBOL IS USED TO HIGHLIGHT INSTANCES OF RISK WITHIN THE CONSTRUCTION PROCESS. ALWAYS CHECK FOR LATER REVISIONS OF THIS DRAWING.

- KEY:**
- EXISTING SURFACE WATER SEWER
 - EXISTING DCWW COMBINED SEWER
 - EXISTING TO BE MADE REDUNDANT
 - PROPOSED FOUL (PRIVATE)
 - EASEMENT
 - PROPOSED SURFACE WATER - SURFACE LEVEL CONVEYANCE (LINEAR DRAIN / DISHED CHANNEL OR SIMILAR)
 - HB2 UPSTAND KERB WITH GAPS / INLETS TO ALLOW THROUGH FLOW
 - PROPOSED SURFACE WATER - UNDERDRAIN
 - PROPOSED SURFACE WATER SEWER
 - PROPOSED SWALE
 - PROPOSED FILTER STRIP

- NOTES**
- PRELIMINARY PROPOSAL INDICATIVE OF DESIGN INTENT ONLY AND REMAINS SUBJECT TO DETAILED DESIGN & FEEDBACK FROM SAB TEAM.
 - STRATEGY ASSUMES SOAKAWAY TESTING FAILS (SUBJECT TO TESTING TO BRE DIGEST 365 TO CONFIRM) AND CONVEYANCE MADE TO DISCHARGE TO EXISTING DITCH NETWORK
 - DIVERSION OF EXISTING 3000 DCWW COMBINED SEWER TO FACILITATE DEVELOPMENT SUBJECT TO APPROVAL & FORMAL S185 APPLICATION. CCTV SURVEY REQUIRED

QUICK STORAGE ESTIMATE
Q100+40% CLIMATE CHANGE

Quick Storage Estimate

Input

Input Type: User Input

Area (ha): 0.296

Volumetric Runoff Coefficient: 1.000

Discharge Rate (L/s): 1.9

Infiltration Rate (in/hr): 0.0

Safety Factor: 2.0

Method: FEH

Number of Storms: 38

Max. Run Time (mins): 20160

Calculate

Quick Storage Estimate

Results

Quick Storage Estimate variables require approximate storage of between 32m³ - 43m³

These values are estimates only and should not be used for final design purposes

System 1	Contributing Area				Proposed Receiving SUDS feature					
	Actual / Measured Area	100% urban creep	Total		SUDS	Area	Depth	Void Ratio	Volume	Interception Ratio (1:xx)
Access Junction	360	36	396	772.2	Swale (SW1)	62.16	0.3	0.3	5.59	12.42
Parking	342	34.2	376.2							
Access road bend	128	12.8	140.8	140.8	Raingarden (RG-1)	10.2	0.3	0.3	0.92	15.80
Car Park (west)	496	49.6	545.6	601.37	Swale (SW2)	36.3	0.3	0.3	3.27	16.57
External Paths	50.7	5.07	55.77							
Car Park (disabled)	112	11.2	123.2	257.4	Raingarden (RG-2)	34.8	0.3	0.3	3.13	7.40
External Paths	122	12.2	134.2							
Roof	247.5	24.75	272.25	272.25	Raingarden (RG-3)	39.2	0.3	0.3	3.53	6.95
Delivery Bay	194	19.4	213.4	213.4	Filter Drain (FD3)	16.4	0.3	0.3	1.48	13.01
Drive Thru	215	21.5	236.5	236.5	Main Swale	170	0.3	0.3	15.30	1.39
EV Car Park	420	42	462	462	Swale (SW3)	40.5	0.3	0.3	3.65	11.41
	2687.2		2955.9						36.86	

xxx <5 Default criteria met
xxx 5-20 detailed calculation required
xxx >20 deferred treatment required

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Constructive Thinking

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