DATRYS

HOUSING DEVELOPMENT AT TYDDYN FLETCHER, LAND ADJ. LLANBERIS ROAD, CAERNARFON

Flood Consequence Assessment RevP2
May 2025

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Report Status:	FINAL
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Date:	May 2025
Revised By: Date	Cadi Bracegirdle May 2025

Contents

1.0 INTRODUCTION

1.1 Datrys have been instructed by Adra (Tai) to carry out a Flood Consequence Assessment (FCA) in connection with the proposed development at land adjacent Llanberis Road, Caernarfon; National Grid Reference SH 492 628 **(Figure 1 & Appendix A)**.

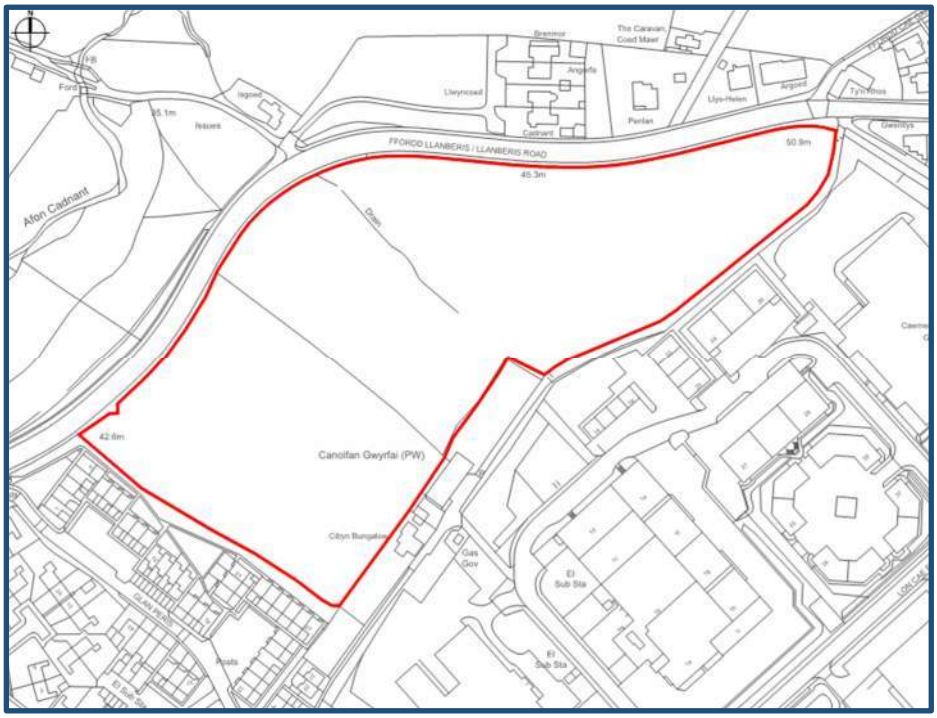

Figure 1. Location of development site (Red outline)

1.2 This report is produced in response to that instruction from the client and is based on Natural Resources Wales (NRW) Development Advice Map (DAM) and Flood Map for Planning (FMfP). This report will demonstrate that the required criteria have been met to satisfy the requirements of BREEAM Pol 03; Surface water run-off.

1.3 The Natural Resources Wales (NRW) Development Advice Maps (DAM) are used for planning purposes associated with the use of TAN 15. According to the latest Flood Zone Map for this area **(Figure 2 & Appendix B)**, the proposed development lies within Zone A. TAN 15 indicates that highly vulnerable

developments within Flood Zone A have no constraints relating to river or coastal flooding, other than to avoid increasing risk elsewhere. This FCA has been prepared in accordance with the guidance given in TAN 15 to satisfy that there is no increase to flood risk elsewhere as a result of the proposed development.

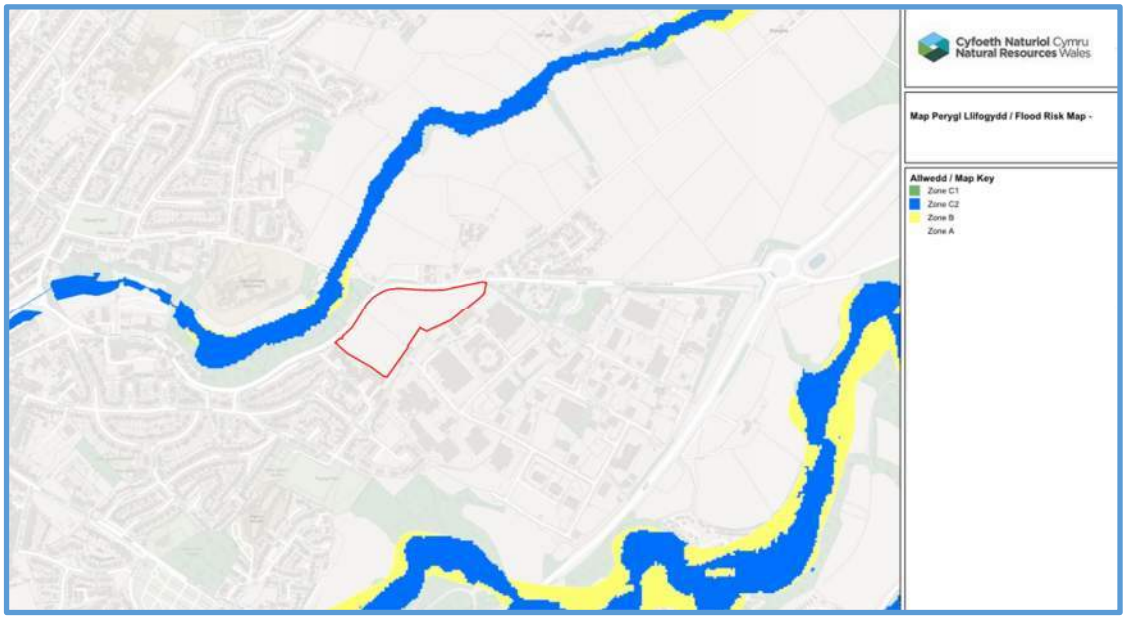

Figure 2. Site within Zone A of the Development Advice Map (DAM)

1.4 The requirements of Pol 03, BREEAM state that an FCA should consider all current and future sources of flooding including the effects of climate change. The Natural Resources Wales (NRW) Flood Map for Planning (FMfP) – Rivers and Sea **(Figure 3, Appendix C)** shows that the site is located outside of Flood Zones 2 and 3, meaning the annual probability of flooding from rivers and sea is less than 0.1%, including the effects of climate change.

1.5 The NRW Flood Map for Planning - Surface Water and Small Watercourses **(Figure 3, Appendix C)** shows that the majority of the site is at very low risk of surface water flooding, meaning it has a less than 0.1% annual probability of flooding, including the effects of climate change. A minimal extent of the site is shown within Surface Water Flood Zone 2, with between a 1% and 0.1% annual probability of flooding, including the effects of climate change. The Flood Zone 2 extent is associated with an existing ditch which crosses the centre of the site

flowing north-west. The ditch is a culverted under the A4086 and joins Afon Cadnant approximately 120m north-west of the site.

Figure 3. Site (Red outline) on the Flood Map for Planning (FMfP)

2.0 BACKGROUND DATA

Location and Proposals

2.1 The proposed development is located off A4086 Llanberis Road, Caernarfon, and is approx. 85m south of river Cadnant at its nearest point. The site is in an area of land that sits between Llanberis Road to the north and Cibyn Industrial Estate to the south. The site currently comprises agricultural land. There are no existing structures on site other that stone boundary walls.

2.2 Phase 1 proposal consists of erecting 36 housing units with associated parking bays, amenity space, play space and an onsite substation **(Figure 4, Appendix D)**. Access to the site will be from Llanberis Road.

Figure 4. Site Layout of the development

Topography

2.3 A topographical survey of the site was undertaken by Curvasure on behalf of the Client to ascertain the existing ground levels of the site and surrounding landscape **(Appendix E)**. The survey shows that the site slopes from 51.2m Above Ordnance Datum (m AOD) in the east to 42.9m AOD at its lowest point in the north.

3.0 SOURCES OF FLOOD RISK

3.1 The NRW Flood Map for Planning (FMfP) and the Development Advice Map (DAM) shows that the proposed development site is not at risk of flooding from rivers (Fluvial) as it lies within Zone A (DAM) and outside of Flood Zone 2 and 3 extents on the FMfP **(Appendix B & C)**.

3.2 The site is situated at a minimum of 42.9m AOD and is significantly above sea level. As such, there is no risk of tidal flooding.

3.3 The NRW Flood Map for Planning - Surface Water and Small Watercourses (**Figure 3, Appendix C)** shows that the majority of the site is at very low risk of surface water flooding, meaning it has a less than 0.1% annual probability of flooding, including the effects of climate change. A minimal extent of the site is shown within Surface Water Flood Zone 2, with between a 1% and 0.1% annual probability of flooding, including the effects of climate change. The Flood Zone 2 extent is associated with an existing ditch which crosses the centre of the site flowing north-west. There are no historic recorded flood events for the development site. No out of channel flooding from the ditch is shown on NRW mapping.

3.4 Groundwater flooding has been investigated and is not thought to pose a significant risk to the proposed development. There are no records of groundwater flooding affecting the site

Proposed Surface Water Drainage

3.5 Run-off calculations have been compiled and show's that the existing QBar for the site is 3.4 l/s, with the existing 1 in 1 year greenfield runoff rate as 2.9 l/s and 1 in 100 year greenfield runoff rate as 8.5 l/s. Surface water runoff from the site will be restricted to 3.4 l/s (based on QBar) during all events up to and including the 1 in 100 year +30% climate change +10% urban creep event. Run-off rates will be reduced by 60% during the 1 in 100 year event, thus decreasing flood risk to the site and elsewhere. **(Appendix F)**

3.6 As the site design threshold event (1 in 100 year +30% climate change +10% urban creep event) will be contained on site through provision of attenuation storage, an extreme event (exceedance event) which surpasses the designed event will surcharge above ground. Raising finished floor levels a minimum 150mm above the surrounding ground levels will minimise the risk from a drainage system exceedance event.

4.0 CONCLUSIONS

4.1 This FCA has investigated the flood risk associated with the proposed development at land adjacent Llanberis Road, Caernarfon.

4.2 The site is located within Zone A according to the Development Advice Map (DAM). This FCA has determined the potential sources, nature and severity of any flood risk. It has been demonstrated that the risk of flooding to the development from all sources is very low.

4.3 This report concludes that failure of any local drainage systems will not cause an inherent risk of flooding to the development.

4.4 Run-off calculations have been compiled and show that the proposed restricted run-off rate will be reduced by 60% during the 1 in 100 year event, thus decreasing flood risk to the site and elsewhere.

APPENDICES

APPENDIX A

Site Location Plan

N

FB

Ford

Isgoed

35.1m

Issues

Afon Cadnant

Brenmor

The Caravan,
Coed Mawr

Angorfa

Llwyncoed

Cadnant

Penlan

Llys-Helen

Argoed

FFORDD CAE GAF

Ty'n Rhos

Gwenllys

FFORDD LLANBERIS / LLANBERIS ROAD

50.9m

45.3m

Drain

42.6m

Canolfan Gwyrfai (PW)

Cibyn Bungalow

P

Gas
Gov

El
Sub Sta

El
Sub Sta

El Sub Sta

Posts

GLAN PERIS

LON CAE F

Caernea
Gl

sts

1
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12
21
24
15
43
18
27
6
2
37
33
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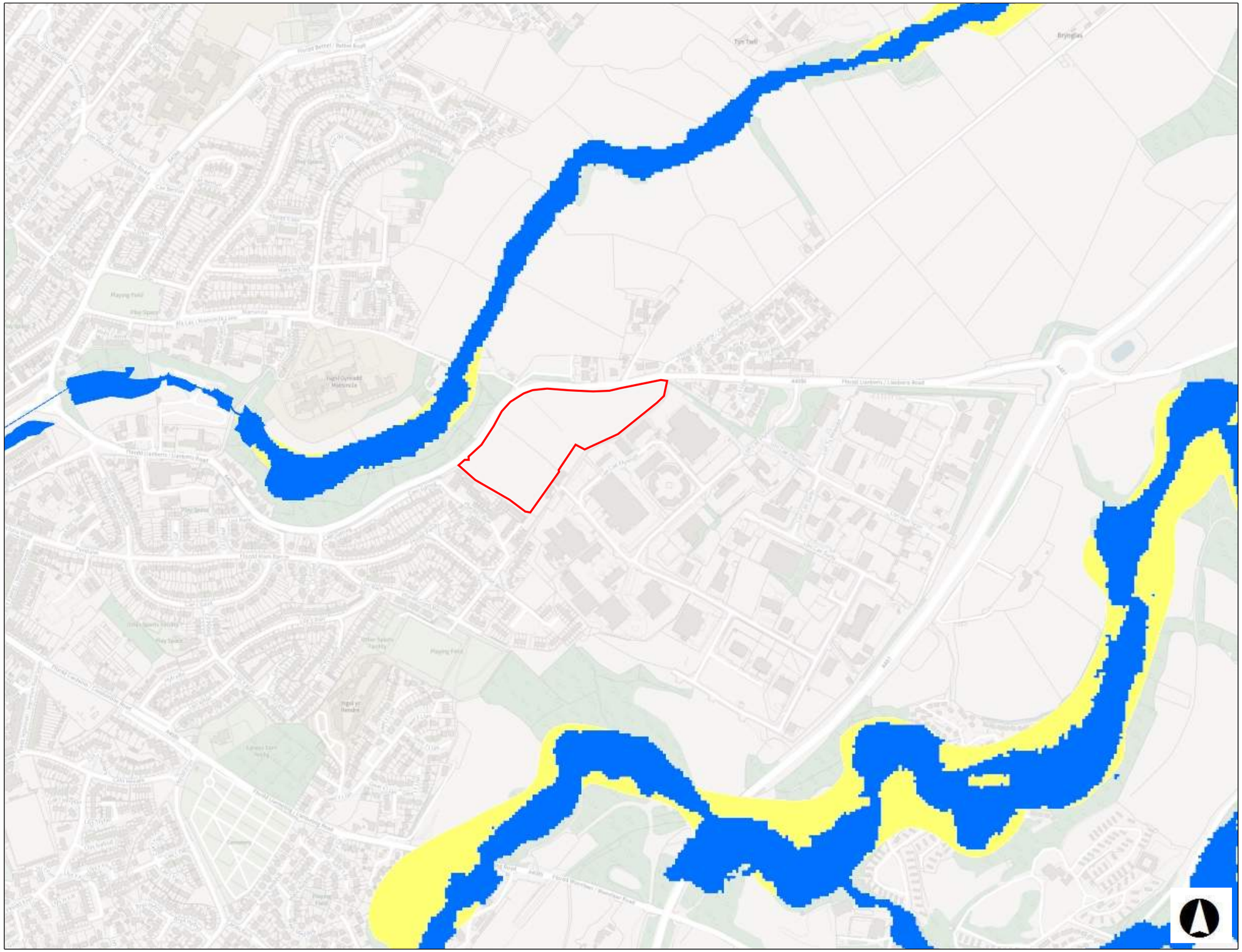
37
1a
1b
1c
1d
1e
1f
1g
1h
1i

APPENDIX B

Development advice Map (DAM)



Cyfoeth Naturiol Cymru
Natural Resources Wales

Map Perygl Llifogydd / Flood Risk Map -

Allwedd / Map Key

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

Graddfa / Scale at A3 1: 6,614

Dyddiad / Date
20/11/2024

0.3 0 0.17 0.3

British_National_Grid Kilometers

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APPENDIX C

Flood Map for Planning (FMfP)

Cyfoeth Naturiol Cymru
Natural Resources Wales

)ORRG 0DS IRU 3ODQQLQ
(QWHU WLWOH PD[˘ FKDUD

/HJHQG

7$1 ˘ 'HIHQGHG =RQHV

5LYHUV

6HD

5LYHUV DQG 6HD

5LYHUV

)ORRG =RQH

)ORRG =RQH

6HD

)ORRG =RQH

)ORRG =RQH

6XUIDFH :DWHU DQG 6PDOO :DWHUF

)ORRG =RQH

)ORRG =RQH

5HFRUGHG)ORRG ([WHQWV

)ORRG 5LVN IURP 5HVHUYRLUV

Heulog
Cae Llwyfo
A4086
Rhosfair
Bryn Rhos
Llain Fawr
Ffordd Llanbedr / Llanbedr Rd
Caer Garreg
Ffordd Pandy
Lon Bach
Ffordd Coed Marion
Ffordd Cibyn
Ffordd Wern
Lon Cae Flynnon
Ffordd Penrallt

k

&RQWDLQV 26 GDWD „ &URZQ &RS\ULJKW DQG GDWDEDVH ULJKW˘

6FDOH DW $ ˘

'DWH¸

˘

NP

%ULWLVK 1DWLRQDO *ULG

'LVFODLPHU

KWWSV¸ QDWXUDOUHVRXUFHV ZDOHV IORRGLQJ GLVFODLPHU IRU RXU IORRG FRDVWDO HURVLRQ ULVN PDSV "ODQJ HQ

‰ 15: &1& 6RPH LQIRUPDWLRQ GHULYHG IURP ‰ 8. &HQ
8&&+ WKH (QYLURQPHQW $JHQF\ ‰ ($ DQG *HWPDSSLQJ
/LPLWHG 'HIUD ‰ 0HW 2IILFH DQG '$5' 5LYHUV $JHQF\ ‰
+XWWRQ ,QVWLWXWH ‰ 2UGQDQFH 6XUYH\ ‰ /DQG 3UR

APPENDIX D

Development Site Layout (Architect's Plan)

MATURE OAK TREE TO BE RETAINED

POSITION OF OVERHEAD CABLES

FARM GATE FOR ACCESS TO ADJACENT LAND

OVERHEAD CABLES DIVERTED UNDERGROUND

EXISTING POSITION OF OVERHEAD CABLES

SUBSTATION

DETENTION BASIN

AREA SET ASIDE FOR EQUIPPED PLAY SPACE 232m²

AMENITY SPACE 632m²

WILDLIFE CORRIDOR

CAERNARFON PENTECOSTAL CHURCH

3m ACTIVE TRAVEL PATH

AMENITY SPACE 1526m²

AMENITY SPACE 210m²

Bungalow

INDICATIVE VISIBILITY SPLAY

NEW SITE ENTRANCE

INDICATIVE VISIBILITY SPLAY

OPTIONAL BUS STOP

LINK

LINE OF WATERMAIN

LLANBERIS ROAD

SUDS

PLANTING STRIP

RG

0m 5m 10m 15m 20m 25m

VISUAL SCALE 1:250 @ A1

N

REV	DESCRIPTION	DATE	BY
K	MORE GREEN AREAS SHOWN & AMENITY SPACE FOR FLATS	30/04/25	GT
J	SECTIONS OF HIGHWAY SHOWN IN 'BROWN' COLOUR ADJUSTED TO LIGHT GREY INFRONT OF HOUSES	29/04/25	GT
H	FLATS 15-20 MOVED UP AND ONE 4P2B HOUSE MOVED DOWN, ADJACENT TO PLOT 26. PLAY AREA MOVED OUT OF THE WATER MAIN EASEMENT	28/04/25	GT
G	WATERMAIN POSITION ADJUSTED	24/04/25	IO
F	AMENDED TEXT ANNOTATION OF ADJACENT LAND	16/04/25	GT
E	FARM GATE ADDED FOR ACCESS TO PHASE 2 LAND WITH STOCK PROOF FENCE EITHER SIDE OF GATE AND ALONG MAIN ROAD. 2.1M FENCE ADDED TO BOUNDARY WITH CIBYN INDUSTRIAL ESTATE.	16/04/25	GT
D	BINS & SHEDS ADDED, 1.2m LANDING DEPTH TO FRONT DOORS	11/04/25	GT
C	PLOT 12 & 13 SWITCHED, SUBSTATION PUSHED BACK, RAIN GARDEN REMOVED ADJACENT PLOT 8	27/03/25	GT
B	AMENDMENTS TO SITE LAYOUT FOLLOWING ADRA'S PREFERRED HOUSING MIX	03/03/25	GT
A	FOR WELSH GOVERNMENT SUBMISSION	09/12/24	GT

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PROJECT

LLANBERIS ROAD, CAERNARFON for ADRA

DRAWING TITLE

PROPOSED SITE LAYOUT

SCALE	DATE	DRAWN	CHECKED
1 : 250 @A1	17/10/24	GT	SV

DRAWING STATUS: PLANNING

JOB No	DRAWING No	REVISION
C1139	015	K

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APPENDIX E

Topographical Survey

SPEED LIMIT SIGNS

Legend

Symbols

- Bollard
- Survey Station
- Electricity Pole
- Fire Hydrant
- Gas Tap
- Gate
- Gully
- Lamp Post
- Manhole/Inspection Chamber
- Manhole/Inspection Chamber
- Manhole/Inspection Chamber
- Utilities Marker Post
- Osbm
- Rain Water Gully
- Road Sign
- Shrubs
- Slope
- Stop Tap
- Stop Valve
- Telegraph Pole
- Tree (Spread to scale)
- Tree Stump

Abbreviations

A.V	Air Valve
BED	Flower Bed
BH	Bore Hole
BOL	Bollard
BT	British Telecom Inspection Chamber
BT	Telegraph Pole
BS	Bus Stop
CCTV	Closed Circuit Television Furniture
CEB	Control Electricity Box (Above ground)
DK	Drop Kerb
ER	Earth Rod
EP	Electricity Pole
FH	Fire Hydrant
GU	Gully
IC	Inspection Chamber
LP	Lamp Post
LB	Letter Box
MP	Utilities Marker Post
MH	Manhole
P	Post
RS	Road Sign
RE	Rodding Eye
RWG	Rain Water Gully
SOP	Setting Out Point
ST	Stop Tap
SV	Stop Valve
TCB	Telephone Call Box
TL	Traffic Light
WM	Water Meter

Boundary Abbreviations

B/W	Barbed Wire Fence
C/B	Close Boarded Fence
C/Br	Crash Barrier
C/L	Chain Link Fence
C/P	Chestnut Paling
C/I	Corrugated Iron Fence
I/R	Iron Railing
L/L	Larchlap Fence Panel
P/W	Post & Wire Fence
P/C	Post & Chain
RTW	Retaining Wall
S/PAL	Steel Palisade Fence
S/P	Stock Proof Fence
W/M	Wire Mesh Fence

Title:

TOPOGRAPHIC SURVEY
LAND OFF LLANBERIS ROAD
CAERNARFON

Client:

NOTES:
1. Grid = tied into OS grid using OSGB 36
2. Datum = tied into OS datum using OSGB 36
3. Survey orientated to grid north
4. Contour vertical interval - Minor = 0.5m Major = 5m

SCALE: 1:500@A0 DATE: 31/07/24 CHECKED: SR DWG NO. 24111/01

Survey data and drawings produced by,

CURVASURE
PROFESSIONAL CONSTRUCTION

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APPENDIX F

Surface Water Calculations

Causeway Flow Existing Run Off Calculations

Pre-development discharge

Site Makeup	Greenfield
Greenfield Method	IH124
Positively Drained Area (ha)	0.990
SAAR (mm)	1210
Soil Index	3
SPR	0.30
Region	1
Betterment (%)	0
	Calc
QBar (l/s)	3.4

Return Period (years)	Growth Factor	Q (l/s)
1	0.85	2.9
2	0.90	3.1
10	1.45	5.0
30	1.95	6.7
100	2.48	8.5