



Report Title: **Drainage Strategy Report**

Address: **Tyn Y Caeau, Margam**

Client: **RPM Ltd**

Project Reference: **1374**

Our Reference: **1374-DSR-001**

Date of Issue	06 May 2020	08 May 2020	
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1.0 INTRODUCTION

HCE Ltd has been instructed to prepare a Drainage Strategy Report in respect of the construction of a new commercial truck stop development on a brownfield area of land at Tyn y Caeau, Margam

This report has been prepared on behalf of RPM Ltd who are the Applicant and Developer of the proposed development. The Report is intended to support the planning application process and SAB Pre-Application Consultation only to inform Planning Condition scope and SAB relating to proposed drainage solutions.

The purpose of this report is to describe the existing site and associated drainage infrastructure and to identify a sustainable solution for the proposed foul and surface water drainage to serve the new development.

The National Grid Reference of the approximate centre point of the proposed development site is SS 79260 86392, Easting 279260, Northing 186392.

This document relies upon site infiltration testing undertaken by HCE Ltd on behalf of the client.

This Drainage Strategy Report is purely for information only and outlines the proposals to ensure all foul and surface water drainage design and management is carried out in accordance with current best practice and statutory guidelines and inform the detailed drainage design stage.

2.0 SITE CONDITIONS AND TOPOGRAPHY

The site is located adjacent to junction 38 of the M4 motorway approximately 1km South from the village of Margam. The site is currently used as a farmhouse residence which has been unoccupied for several years. The site is surrounded by new industrial areas to the North and West. To the immediate south is farmland and beyond within a few hundred metres in Eglwys Nynudd reservoir. The A48 dual carriageway and M4 Motorway run parallel to the eastern boundary.

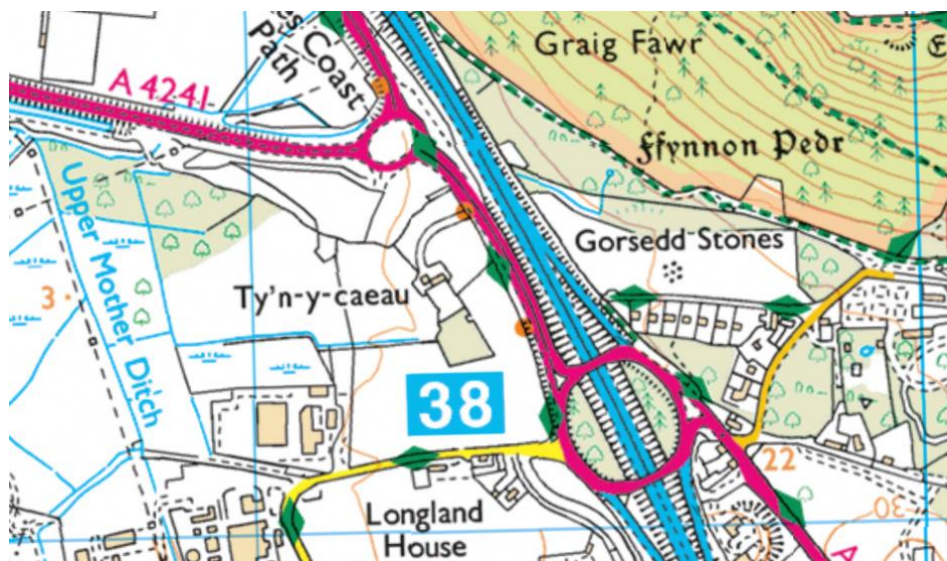


Figure 1: Site Location

The total site area is approximately 1.4214 hectares.

A copy of the site location plan is shown in Figure 1 above.

The ground profile of the land is such that the centre of site is domed where the land falls away in all direction. However, there is a constant crossfall from South to North where the land generally slopes downwards in a North Easterly direction. The site survey, to Ordnance Survey Datum, shows a maximum level difference of $(16.3-11.5) = 4.8$ m over an approximate distance of 127 m.

A copy of the topographical site survey and Architectural Site Layout is included in Appendix A.

3.0 FLOOD RISK

The proposed use of the site being for a commercial development will classify the risk as being a 'Less Vulnerable Development' (TAN 15, Figure 2). Review of the Natural Resources Wales Flood and Welsh Government TAN 15 Development Advice Maps shows that the site is located within an area designated being in Flood Zone A.

A copy of the proposed architectural site plan is included in Appendix A. In accordance with guidance contained within TAN 15, Figure 1, further flood risks and justification tests are not required to sites located within Zone A and sound drainage design incorporating aspects of Sustainable Urban Drainage Systems (SuDS) is applicable to the development.

National Resources Wales Flood Risk Map and Welsh Government TAN 15 Development Advice Map are included in Appendix C. Planning Policy and Technical Advice Note (TAN) 15 lists six sources of flooding which need to be considered in the assessment of flood risk and the probability of flooding at the Site Location.

Flooding from Rivers or Fluvial

NRW surface water flood risk maps indicate that the site does not suffer from river or fluvial flooding.

Flooding from the Sea or Tidal Flooding

NRW surface water flood risk maps indicate that the site does not suffer from sea or tidal flooding.

Flooding from Land

NRW surface water flood risk maps indicate that the site does not suffer from surface water flooding.

Flooding from Groundwater

No groundwater shallower than 3 m depth was observed during the investigations by HCE Ltd.

Flooding from Sewers

Not applicable due to foul and surface water management within drainage design.

Flooding from Reservoirs, Canals and Other Artificial Sources

NRW surface water flood risk maps indicate that the site does not suffer from reservoir, canal or other artificial sources of flooding.

4.0 EXISTING DRAINAGE AND SITE INVESTIGATIONS

Foul Water Drainage

Written pre-planning consultation has not yet been sought from Dwr Cymru Welsh Water (DCWW) for the commercial development proposals. Review of the DCWW sewer map confirms that a large 450mm diameter vitrified clay combined gravity sewer crosses the site from South to North along the Eastern side of the site.

The existing foul/combined drainage serving the existing farmhouse property and ancillary buildings is located in the driveway fronting the building. A CCTV survey will be undertaken to confirm the condition and discharge outfall of the existing building drainage.

A copy of DCWW Sewer Plan is included in Appendix C of this Report.

Surface Water Drainage

It is understood that the existing storm water system serving the existing buildings is a combination of being connected to the existing building's drainage system and discharging to the ground locally where it is assumed infiltration occurs.

Geotechnical site investigations were undertaken by HCE Ltd in April 2020 which confirmed that infiltration at shallow depths up to 3.0m below site is possible (Appendix D). The test results confirm that the permeability of the underlying strata does vary across site and so soakaways and infiltration devices will be located to maximise infiltration, such that Priority Level 2 (source control) can be realised.

5.0 PROPOSED DRAINAGE STRATEGY AND SUMMARY

The site will be served by new separate foul and surface water drainage systems discharging as follows based on existing drainage and site investigations outlined above (Refer to appendix E for Proposed Drainage Strategy Engineering Site Plan).

Foul Water Drainage

Since the existing farmhouse building will be refurbished for the proposed change of use (hotel and restaurant) it is currently anticipated that the existing building drainage system will be utilised.

It is proposed that any storm water connections be disconnected from the drainage system serving the building and be re-directed into the new SUDs drainage system proposed for the new car/truck parking areas. This will likely result in a betterment of the existing system and reduce peak flow. This will be demonstrated in detailed design.

Surface Water Drainage

Due to the proposed access road and parking areas being used primarily for HGV class vehicles, it is envisaged that an impermeable dense tarmacadam surfacing and road construction will be utilised to ensure sufficient robustness is achieved for the anticipated loading.

Infiltration testing has confirmed that source control is achievable over the majority of the site.

The SUDs management train will be utilised to capture, treat and control surface water run-off prior to infiltration and ground water recharge.

Hydraulic control of the storm water run-off will be managed through a combination of multiple SUDs devices such as swales, rainwater gardens, filter strips, attenuation pond and permeable paving. Attenuation and infiltration will be designed to accommodate flows from 1:100 year return period critical storm with an allowance of +30% for climate change.

Exceedance will be assessed during detailed design.

Water quality will be improved through bio-remediation by using a combination of multiple SUDs devices such as swales, rainwater gardens, filter strips, attenuation pond and permeable paving to treat surface water run-off from hard-landscaped areas and trap pollutants, silt and grit etc .

Rainwater gardens will be used to capture surface water run-off from impermeable parking areas to both trap and treat pollutants and attenuate the first 5mm of run-off. The rainwater gardens will then direct water below ground to soakways where ground water re-charge will occur. The rainwater gardens offer an attractive aesthetic setting which will enhance the amenity space and improve bio-diversity of flora and fauna on site by attracting insect and invertebrates.

The main access road run-off will be dealt with via a grassed swale running the majority of the length. The shallow swale will capture run-off pollutants and convey water down towards the attenuation pond located in the North East corner of the site. The exact location will be confirmed once the utility locations and depths are known. An infiltration filter strip will be

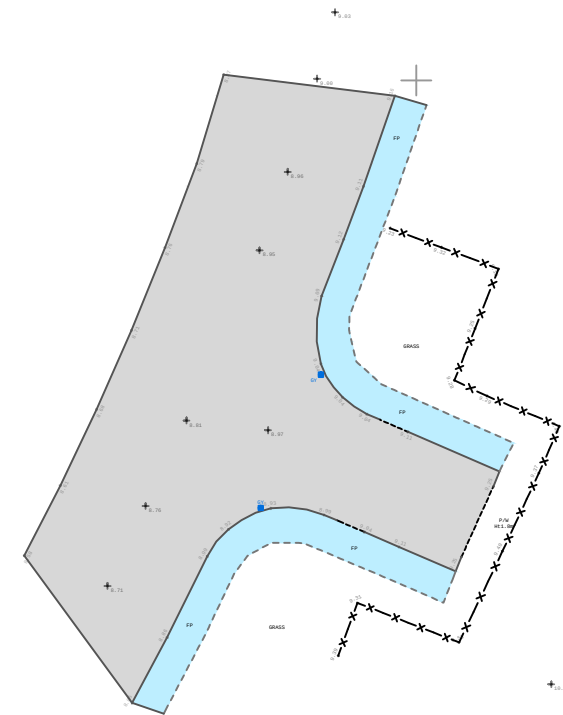
incorporated beneath the shallow swale which will help improve water quality due to further treatment occurring prior to infiltration. Any exceedance will drain to the attenuation pond where further treatment will occur.

The attenuation pond located in the North East corner of the site will take any exceedance flow from the filter strip/swale and rainwater gardens serving the eastern parking areas. The pond will provide further treatment of any surface water run-off again improving the water quality. The pond also offers a very good opportunity to significantly improve amenity and biodiversity by providing a suitable wetland habitat and refuge for insects, invertebrates, small mammals and birds. Any exceedance from the pond will be discharged to a soakaway for infiltration.

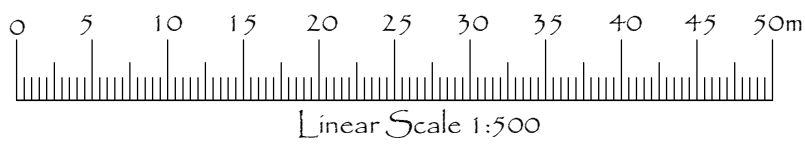
Permeable block paving will be utilised immediately around the building as shown on the proposed plan. The permeable paving will be used to both attenuate surface water and to improve water quality by trapping pollutants, silt and grit etc. Further water quality improvement for the development is proposed by the inclusion of a rainwater gardens adjacent to the building prior to infiltration.

It is considered that the site follows the guidelines of the CIRIA SUDS Manual C753 and achieves all four pillars of the SUDS design principles.

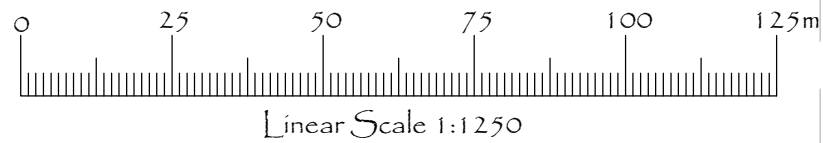
Appendix A Topographical Survey & Proposed Architectural Site Plan



Site Block Plan 1:500

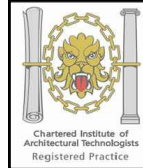


Site Plan 1:1250



THOMAS LOGIN ARCHITECTURE

Survey · Design · Planning · Building Regulations · Project Management · Inspection Warranty
RESIDENTIAL · COMMERCIAL · AGRICULTURAL



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www.ThomasLogin.com
Plas y Berllan, Frostrasol, Llandysul, Ceredigion, SA44 4TE



No:	Amendment:	Date:

Drawing Detail:
Site Block & Location Plan

Scales:	☐ 1:1	☐ 1:10	☐ 1:100	☐ 1:1000
	☐ 1:2	☐ 1:20	☐ 1:200	☐ 1:1250
	☐ 1:5	☐ 1:50	☐ 1:500	☐ 1:2500
Others:				

Date: 5th February 2020
Drawn By: Robert D. Thomas

Client:
Mr. Richard Banks c/o JCR Planning

Job Title:
Tyn Y Caeau
Margam Road
Margam
Fort Talbot
SA13 2NW

Drawing No:
1120-01A

Sketch Scheme Drawing

The property of this drawing & design is vested in Robert D. Thomas of THOMAS LOGIN ARCHITECTURE and must not be copied or reproduced in any way without written consent of Robert D. Thomas of THOMAS LOGIN ARCHITECTURE.
It is the contractor's responsibility to verify all dimensions on site prior to proceeding with works. Figured metric dimensions to be worked to wherever given. Imperial dimensions are approximate only and must not be relied upon. All dimensions, unless expressly noted otherwise, are structural, and due to allowance should be made for plaster, finishes etc.
It is the contractor's responsibility to confirm all levels on site prior to commencement of any work. Levels shown on this drawing are for indication purpose only, except where specifically dimensioned.
It is the contractor's responsibility to fully familiarize himself with the works before proceeding.

**Appendix B Natural Resources Wales Flood Risk Map and Welsh Government TAN 15
Development Advice Map**

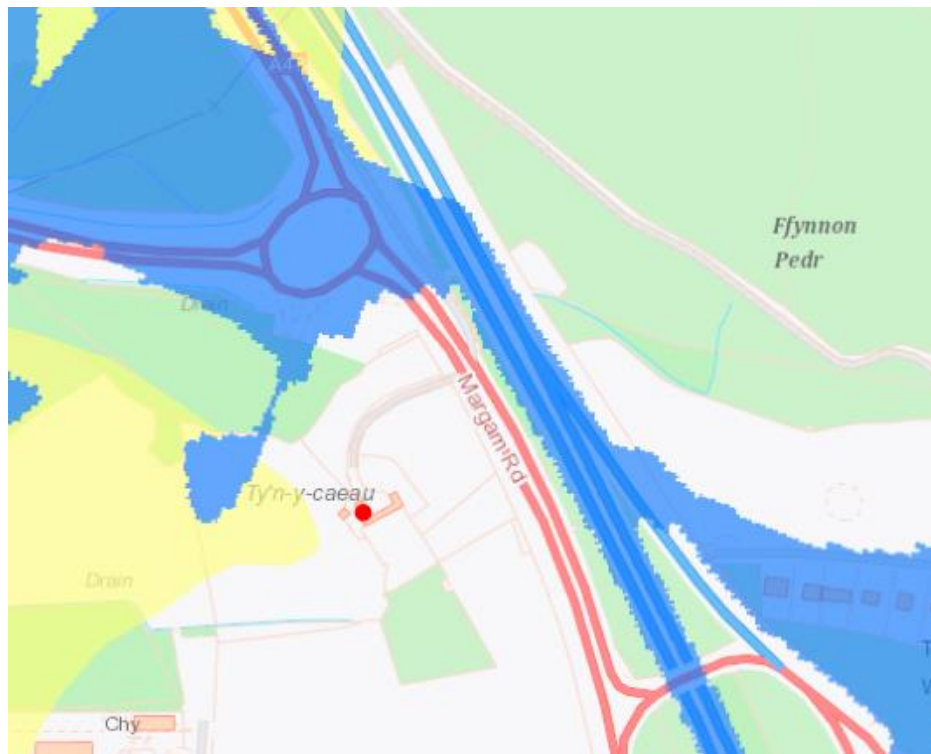


Figure 2: TAN 15 – Development Map

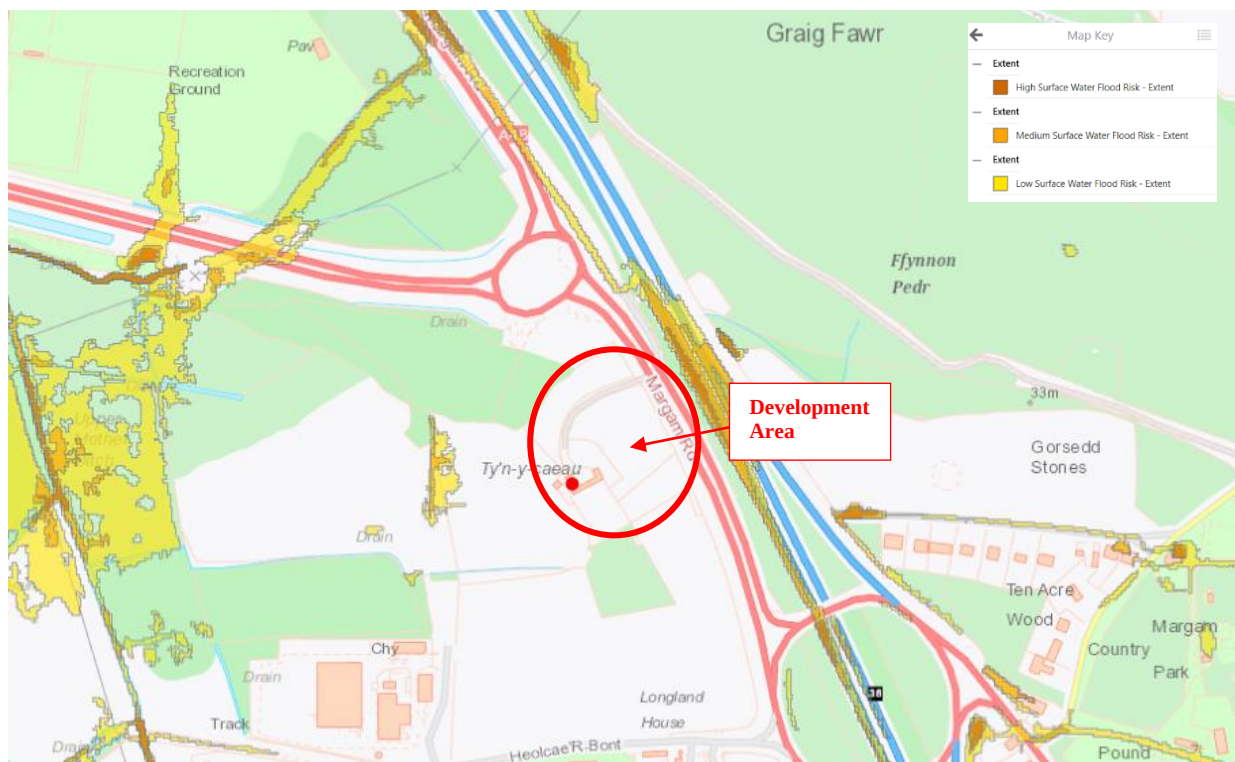


Figure 3: NRW – Surface Water Flood Risk Map

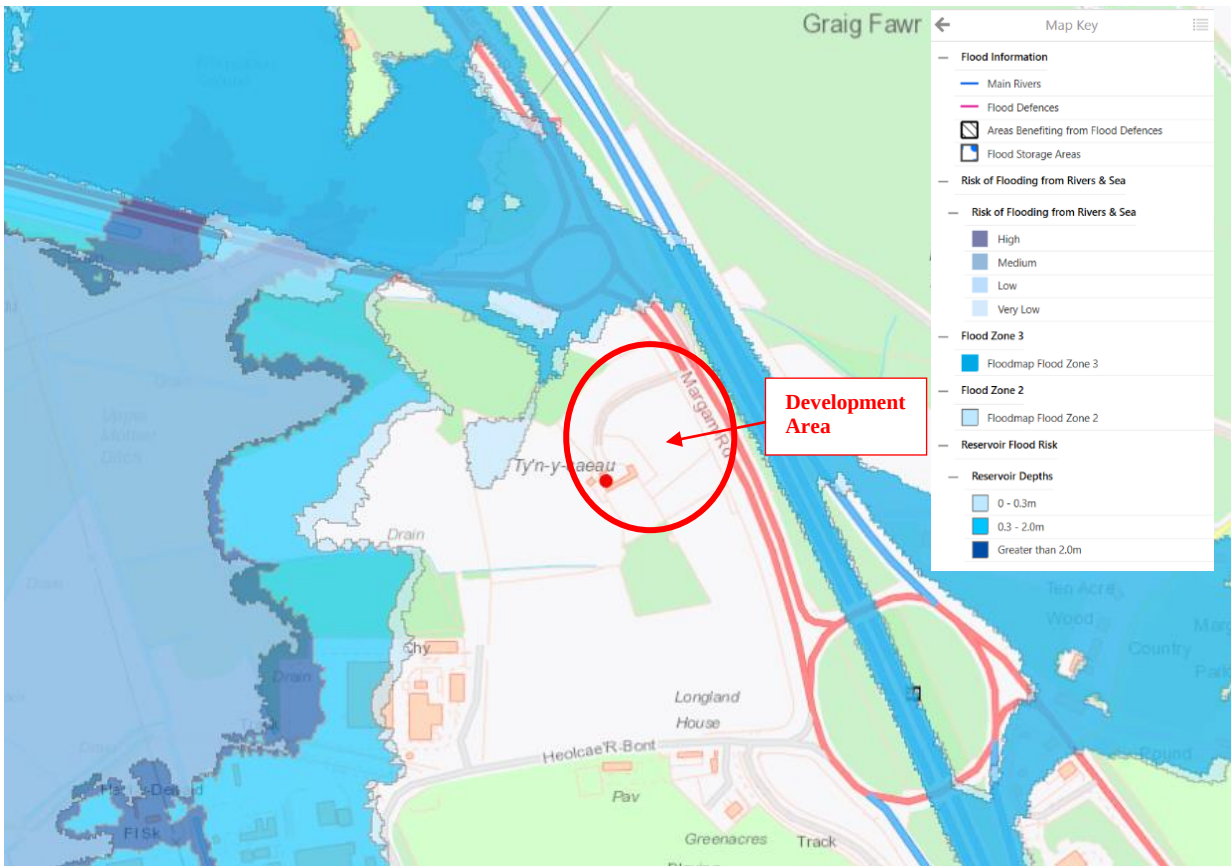


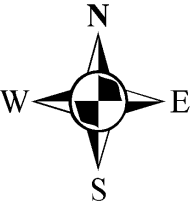
Figure 4: NRW – Sea, Rivers & Reservoir Flood Risk Map

Appendix C Dwr Cymru Welsh Water Sewer Maps



Dŵr Cymru
Welsh Water

Tyn y Caeau Development



LEGEND(Representative of most common features)

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

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: 279326,186422
Map scale: 1:1500
Printed by: John Emma
Printed on: 27 Apr 2020

Appendix D Soakaway Test Results

HCE LTD

SOIL INFILTRATION TEST

in accordance with BRE Digest 365 (1991 with amendments in 2003 and 2007)

Job Location: Tyn Y Caeau, Margam Road, Margam

Job Number: 1374

Client: Mr. G. Griffiths

Test Pit No.

TP01

Date:

02-Apr-20

Engineer: J Angelone

Time To Fill Pit (Mins)

3

Start Time:

09:59

Pit Dimensions (m)

Length	2.3
Width	0.9
Depth	1.8
Water Depth	0.7
Height of Pipe above ground level (if applicable)	N/A

Start % For Calculations

75%

End % For Calculations

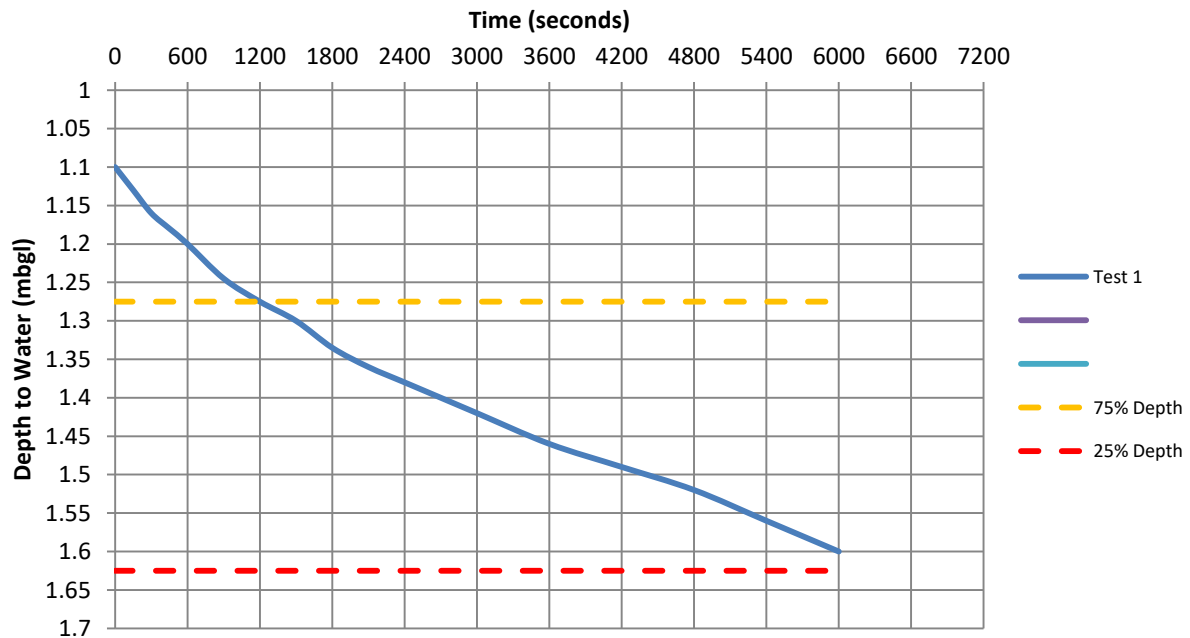
25%

Soil Infiltration Rate (f)

4.29E-05

m/s

Note: Test completed between 75% full and 25% full in accordance with BRE Digest 365



NOTES

- 1 Water bowser used to rapidly fill trial pit as per BRE 365 requirements.
- 2 Water level decreased at a very slow steady constant rate for all tests conducted. Infiltration rate noticed to remain constant as depth of water decreased.
- 3 Sides of trial pit remained stable throughout test. Trial pit backfilled post test completion.
- 4 Ground was observed to be very permeable & test was conducted in warm dry weather.

HCE LTD

SOIL INFILTRATION TEST

in accordance with BRE Digest 365 (1991 with amendments in 2003 and 2007)

Job Location: Tyn Y Caeau, Margam Road,
Margam

Job Number: 1374

Client: Mr. G. Griffiths

Test Pit No.

TP02

Date:

02-Apr-20

Engineer: J Angelone

Time To Fill Pit (Mins)

6.5

Start Time:

10:20

Pit Dimensions (m)

Length	1.8
Width	0.9
Depth	1.2
Water Depth	0.52
Height of Pipe above ground level (if applicable)	N/A

Start % For Calculations

75%

End % For Calculations

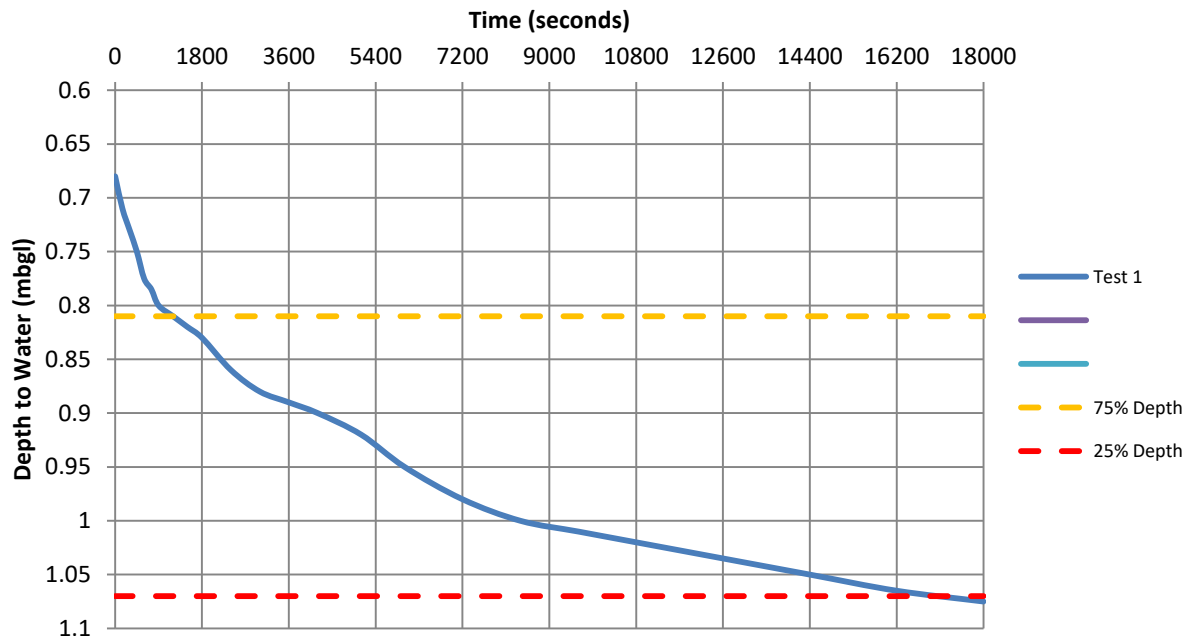
25%

Soil Infiltration Rate (f)

1.14E-05

m/s

Note: Test completed between 75% full and 25% full in accordance with BRE Digest 365



NOTES

- 1 Water bowser used to rapidly fill trial pit as per BRE 365 requirements.
- 2 Water level decreased at a very slow steady constant rate for all tests conducted. Infiltration rate noticed to remain constant as depth of water decreased.
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- 4 Ground was observed to be very permeable & test was conducted in warm dry weather.

HCE LTD

SOIL INFILTRATION TEST

in accordance with BRE Digest 365 (1991 with amendments in 2003 and 2007)

Job Location: Tyn Y Caeau, Margam Road,
Margam

Job Number: 1374

Client: Mr. G. Griffiths

Test Pit No.

TP03

Date:

02-Apr-20

Engineer: J Angelone

Time To Fill Pit (Mins)

3

Start Time:

12:14

Pit Dimensions (m)

Length	1.6
Width	0.9
Depth	1.5
Water Depth	0.25
Height of Pipe above ground level (if applicable)	N/A

Start % For Calculations

75%

End % For Calculations

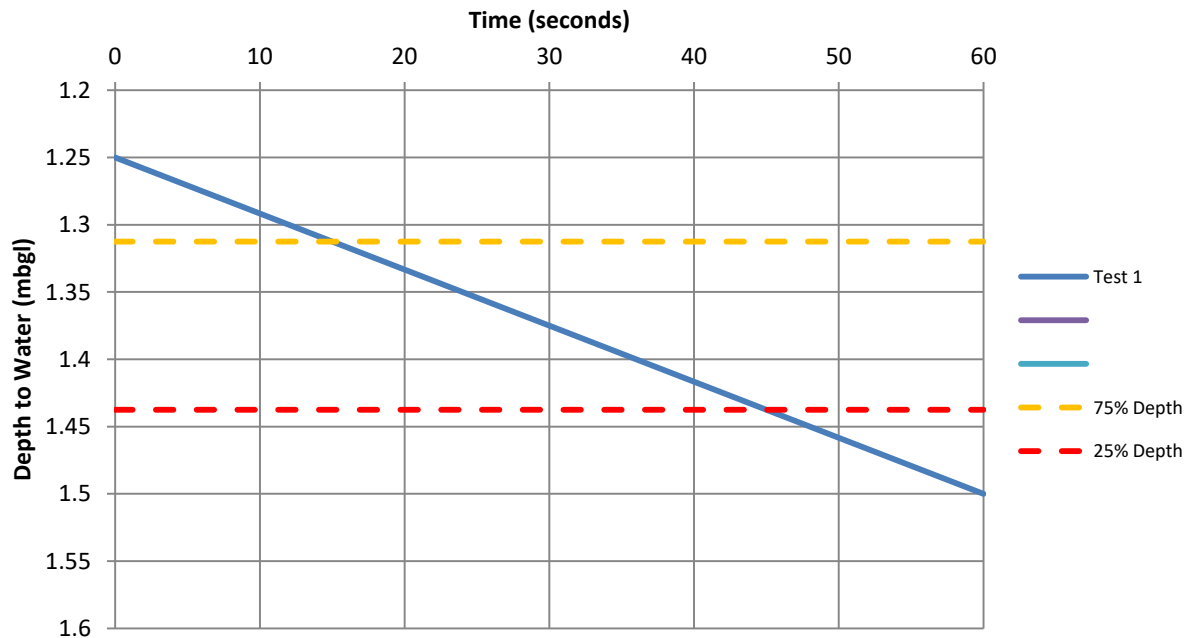
25%

Soil Infiltration Rate (f)

1.72E-03

m/s

Note: Test completed between 75% full and 25% full in accordance with BRE Digest 365



NOTES

- 1 Water bowser used to rapidly fill trial pit as per BRE 365 requirements.
- 2 Water level decreased at a very slow steady constant rate for all tests conducted. Infiltration rate noticed to remain constant as depth of water decreased.
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- 4 Ground was observed to be very permeable & test was conducted in warm dry weather.

HCE LTD

SOIL INFILTRATION TEST

in accordance with BRE Digest 365 (1991 with amendments in 2003 and 2007)

Job Location: Tyn Y Caeau, Margam Road, Margam

Job Number: 1374

Client: Mr. G. Griffiths

Test Pit No.

TP04

Date:

02-Apr-20

Engineer: J Angelone

Time To Fill Pit (Mins)

3

Start Time:

12:32

Pit Dimensions (m)

Length	1.5
Width	0.9
Depth	1.4
Water Depth	0.85
Height of Pipe above ground level (if applicable)	N/A

Start % For Calculations

75%

End % For Calculations

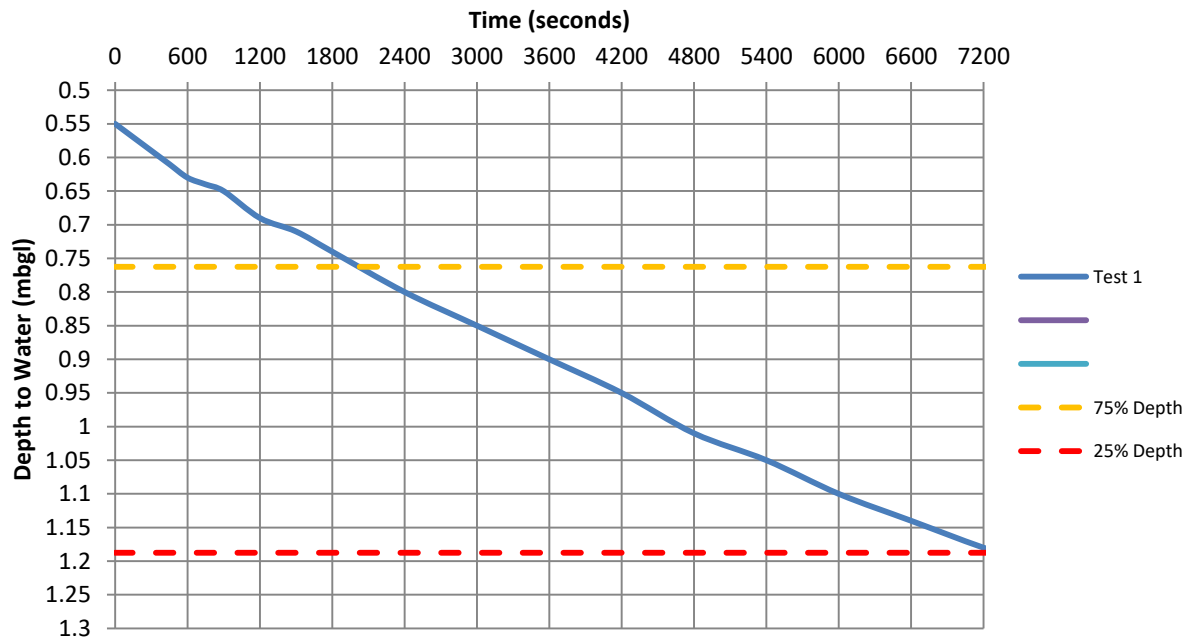
25%

Soil Infiltration Rate (f)

4.56E-05

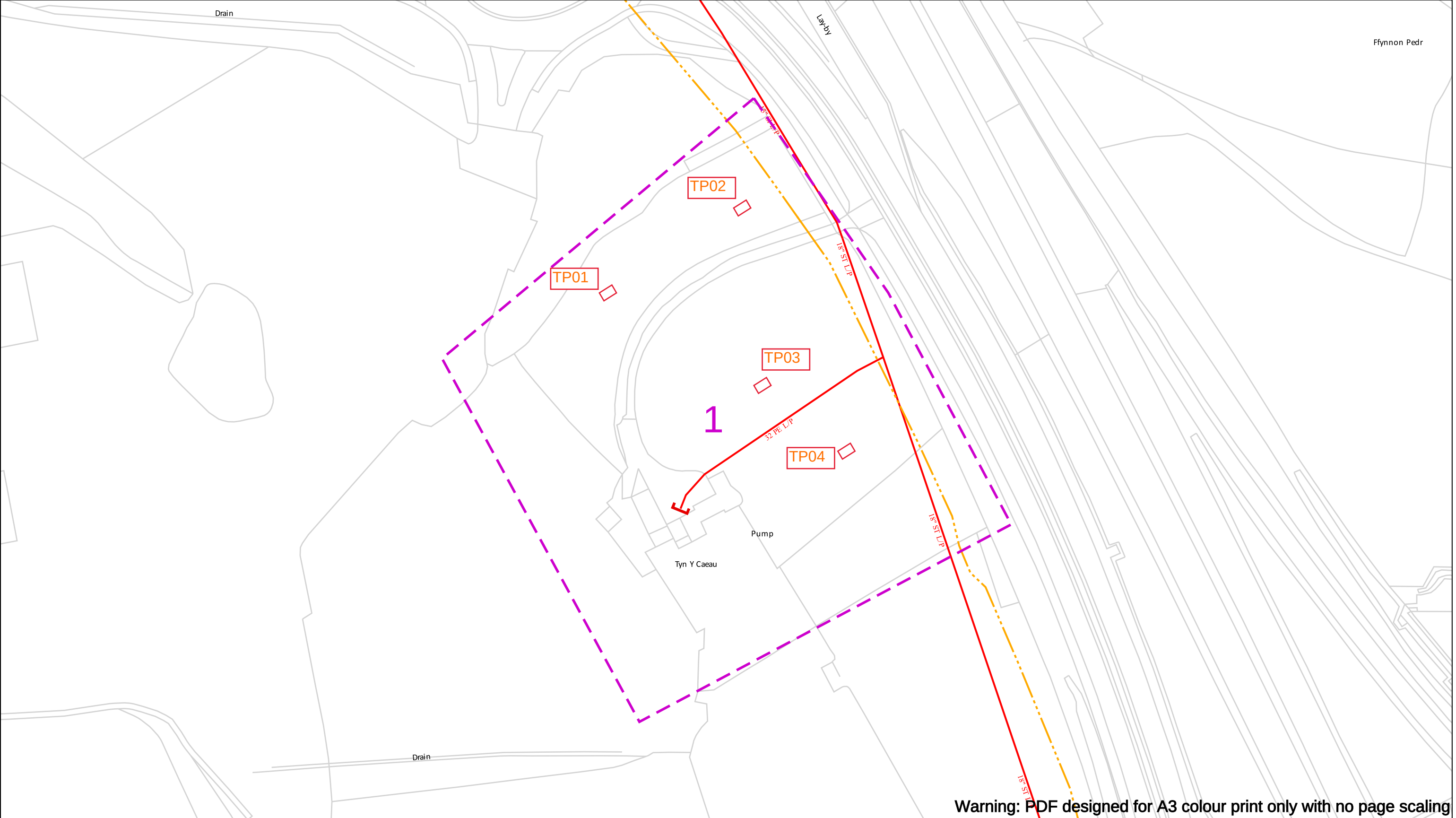
m/s

Note: Test completed between 75% full and 25% full in accordance with BRE Digest 365



NOTES

- 1 Water bowser used to rapidly fill trial pit as per BRE 365 requirements.
- 2 Water level decreased at a very slow steady constant rate for all tests conducted. Infiltration rate noticed to remain constant as depth of water decreased.
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- 4 Ground was observed to be very permeable & test was conducted in warm dry weather.



Contact Us

Mapping Enquiries: 02920 278 912

General Enquiries: 0800 912 2999

Date Requested: 06/04/2020

Job Reference: 18124673

Site Location: sa13 2nw

Requested by: Mr Joseph Angelone

Your Scheme/Reference: 1374

Scale: 1:1250 (When plotted at A3)

EXTREME CAUTION. Major Accident Hazard Pipeline in Vicinity

RISK OF DEATH OR SERIOUS INJURY

Prior to excavation starting you must contact the plant protection team on 02920 278912

IMPORTANT NOTICES

- This information is given as a guide only and its accuracy cannot be guaranteed
- The plan only shows those pipes owned by Wales & West Utilities (WWU) as its role as a licensed Gas Transporter
- Service pipes, valves, syphons, stub connections etc. may not be shown but their presence should be anticipated
- You must use safe digging practices in accordance with HS(G)47 to establish the actual position of mains, services and other apparatus before any mechanical excavation is used
- It is your responsibility to ensure this information is provided to all persons working near our plant
- If in doubt call the WWU dig team on 02920 278912

In case of an emergency call 0800 111 999

100m

Dig Sites

Area:

Line:

Low Pressure (LP) 21mbar – 75mbar

Medium Pressure (MP) 350mbar – 2bar

Intermediate Pressure (IP) 2bar – 7bar

High Pressure (HP) >7bar

Line/Fire Valve

Governor Station

Change of Diameter

End Cap

Depth of cover

WALES&WEST

UTILITIES

Dial before you dig

We need 10 days' notice

Smell gas?
Call the Gas Emergency Service on 0800 111 999.

Dial
Call 029 2027 8912 before you start work.

Investigate
Before you dig, make sure you know what's below.

Go ahead
Done your research? Now you can dig safely.

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Appendix E Proposed Drainage Strategy Site Plan

