Foul Discharge Design For:

Ynystawe Lodge at
Park Road, Ynystawe,
Swansea,
SA6 5AP.

Prepared for:

M&D Care

REF: 20548 – FDSR r04

Vale Consultancy
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Document Control

Project	**Ynystawe Lodge, Park Road, Ynystawe, Swansea, SA6 5AP**
Client	**M&D Care**
Vale Consultancy Ref:	**20548_FDSR_r04**

Issue	Prepared by	Approved by	Date	Status
01	Akeem Amin	Paul Graham	08/11/2024	First issue
02	Akeem Amin	Paul Graham	21/01/2025	Updated to Suit the Latest Site Layout
03	Akeem Amin	Paul Graham	06/06/2025	Updated to include Flow and Load Calc
04	Hannah Thomas	Paul Graham	13/03/2026	Updated to include perforated pipe

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CONTENTS

1.0 INTRODUCTION

1.1 Scope

Vale Consultancy have been instructed by M&D Care (*the Client*) to produce a foul discharge design in support of a planning application for the development at Ynystawe House, Park Road, Parc Gwernfadog, Morriston, Ynystawe, Swansea, SA6 5AP.

The foul design report provides proposals for the management of foul discharge from the proposed development within the spatial, topographical, and structural constraints of the development site.

1.2 Site Description

The site is located between Ynystawe Park to the north of the site and Ynystawe Cricket and Football Club to the south and is situated in the northern part of Swansea. The M4 is situated approximately 555m to the south of the site.

National Grid Reference **NGR: 268330, 199870.**

Refer to Site Location Plan: **Appendix A.**

Figure 1 - Site Aerial View

1.3 Proposed Development

The proposal is to upgrading the current foul system drainage system that serves the specialist adult residential care home development which is located at Ynystawe House.

The residential care home is currently served by an existing septic tank, which requires frequent emptying and replacing the system with a newly constructed foul drainage system.

1.4 Topography and Features

A topographical survey was undertaken in August 2024. The site is predominantly level, with the central area of the site depressed slightly at the level of the boundaries towards to south-east.

The surrounding area is comprised of existing residential development and green space park area. The River Tawe is approximately 150m to the northeast of the site and flows from the north to the south.

1.5 Existing Geology

Local searches from the British Geological Survey (BGS) online records show the site to have the following superficial soils and bedrock:

Bedrock geology: *Grovesend Formation - Mudstone, siltstone and sandstone. Sedimentary bedrock formed between 309.5 and 308 million years ago during the Carboniferous period.*
Superficial deposits: *Alluvium - Clay, silt, sand and gravel. Sedimentary superficial deposit formed between 11.8 thousand years ago and the present during the Quaternary period.*

Infiltration testing was undertaken by Gibbs Geo Technical in October 2024 to examine the existing ground conditions for infiltration. One test was undertaken to BRE365 and two percolation tests were undertaken to BS 6297:2007 standards.

Soils encountered and the drainage test results are summarised below:

Foul pit 1 – F1
Topsoil: *0-0.3m - Compacted MOT1/gravel*
Superficial soils: *0.3-0.6m - Made ground*
Free draining (after 1000 litres, equivalent to 30x+ fills)

Foul pit 2 – F2
Topsoil: *0-0.1m - Compacted MOT1/gravel*
Superficial soils: *0.1-0.6m - Made ground*
Vp = 2.4s/mm

SW1 – BRE365 test pit
Topsoil: *0-0.25m - Compacted MOT1/gravel*
Superficial soils: *0.25-0.65m - Clay*
N/A – Test pit did not drain to 25% in the timeframe allowed

Refer to Gibbs Geotechnical Infiltration Testing Results: Appendix C.

2 FOUL DRAINAGE SYSTEMS

2.1 Existing Foul Drainage

The foul waste from the residential care home currently discharges to a cesspit/septic tank, which requires regular emptying and maintenance.

No other private or public foul/combined drainage systems are recorded within the site boundary or in close proximity to the site to enable a practicable point of discharge. DCWW asset mapping shows a 675mm diameter combined public sewer located approximately 275m northwest of the site.

Refer to DCWW Apparatus Plan: Appendix B.

2.2 Proposed Foul Drainage Assessment

2.2.1 Foul Drainage Discharge Destination

As noted in section 2.1, there are no foul or combined drainage assets in the vicinity of the site that are viable point of connection to discharge foul waste from the proposed development. The nearest recirded public sewer is a 675mm diameter combined DCWW sewer located approximately 275m northwest of the site. Any route of connection would require crossing the A4067 and a pumped solution would be required as levels ascend towards the DCWW asset from the site.

As such, foul discharge from the property can be managed by two practical alternative methods:

- A below-ground cesspit, positioned at a suitable location within the site, which would require emptying and maintaining on a regular basis. A cesspit would also require a design capacity of circa 106,400 litres (106.4m³) to comply with *Building Regulations Approved Document H – Drainage and Water Disposal.*

- A package foul treatment plant, that would treat the effluent to the required statutory standard, prior to discharge. The discharge from the package foul treatment plant would then either be to a water course or a foul drainage field.

The site is currently served by two cesspits. However, the site owner wishes to update their drainage system to a more sustainable methodology. It is proposed that a new drainage regime will include a private package treatment plant.

It is proposed that where viable existing drainage connections are re-used on site and new drainage is laid to make the connection to the proposed package treatment works.

2.2.2 Treatment Plant Discharge Destination

The River Tawe is located to the east of the site boundary, which travels south before discharging into Swansea Bay. The route of a connection to the River Tawe would be approximately 170m, with pipework required within a third-party land, including crossing an unnamed adopted highway, making this option unviable.

An existing culvert is located within the site boundary, towards the north-east of the site. The existing culvert is flows to a drainage ditch northwest under Park Road and through highway / third-party land to the Ynystawe

Cricket and Football Club. The culvert ultimately discharges to the watercourse southeast of the site, which is a tributary of the River Tawe.

As noted in section 1.5, percolation testing was undertaken by Gibbs Geo Technical in October 2024 to BS 6297:2007 standards. Percolation tests have found that the underlying ground has a very high permeability. However, the trial pits have found that there is a high water table. The site is also located within a C1 flood zone.

Based on the flood zone and high ground water it is deemed a drainage field is not viable. It is proposed that the most viable option for foul water disposal is via treated effluent to the culvert, the treated foul will then discharge to the watercourse via the existing 600mm diameter culvert on site. It is proposed that in dry conditions when the drainage ditch is dry, the ground will also be unsaturated, in these conditions the treated effluent will discharge to ground via a perforated pipe.

These proposal are subject to permit to discharge with Natural Resources Wales (NRW).

Refer to soakaway tests: Appendix C.

3.0 FOUL DRAINAGE DESIGN

3.1 Discharge Volumes to Watercourse

The total flows per day to the watercourse were calculated according to British Water Code of Practice: 'Flows and Loads'.

Table of Loading for Sewage Treatment Systems from British Water Code of Practice: 'Flows and Loads'			
Per person/ activity/ day	Flow (litres)	BOD (grams)	Ammonia (N)
Resident Staff	180	75	10
22 No. Resident Staff	3960	1650	220
Residential old people /nursing	350	110	13
10 No. Residential old people/ nursing	3500	1100	130
Total	7460	2750	350

As per the British Water Code, the total flows with maximum occupancy are 7460 litres per day (7.46m³ per day) into the culverted watercourse. This is excluding any discounts for discharging into the watercourse from the proposed perforated pipe.

Refer to The British Water Code 'Flows and Loads': Appendix D

The proposed packaged treatment plant is to be a Marsh Ensign 30PE with pumped outlet (or similar approved). The product specification for the treated foul discharge pump chamber and rising main between the package foul treatment plant and the outfall are to be confirmed by manufacturer/ supplier.

4.0 SUMMARY

The proposed location of both the package treatment plant and drainage mound are set out in Building Regulations Approved Document H – *Drainage and Water Disposal*.

Based on the flood zone and high ground water it is deemed a drainage field is not viable. It is proposed that the most viable option for foul water disposal is via treated effluent to the culvert, the treated foul will then discharge to the watercourse via the existing 600mm diameter culvert on site. It is proposed that in dry conditions when the drainage ditch is dry, the ground will also be unsaturated, in these conditions the treated effluent will discharge to ground via a perforated pipe.

Refer to the layout shown on the proposed foul drawing 20548_520.

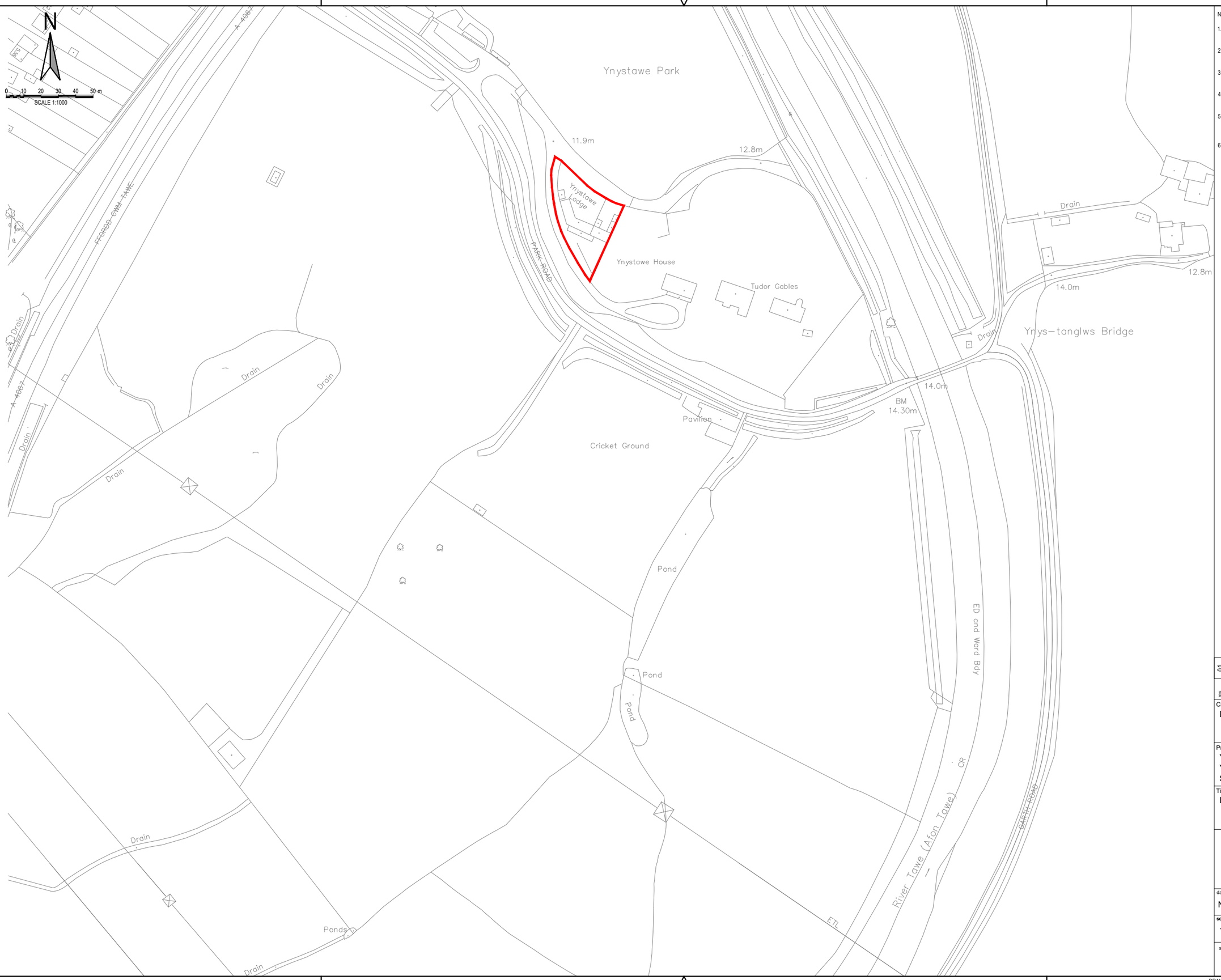
The proposed packaged treatment plant is to be a Marsh Ensign 30PE with pumped outlet (or similar approved). The product specification for the treated foul discharge pump chamber and rising main between the package foul treatment plant and the outfall are to be confirmed by manufacturer/ supplier.

These proposal are subject to permit to discharge with Natural Resources Wales (NRW).

Refer to Foul Drainage Layout & Details drawing: Appendix E

APPENDIX A: Site Location

Sheet ACAD - A1 rev. C



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE SHOWN IN METRES UNLESS NOTED OTHERWISE.
3. DO NOT SCALE FROM THE DRAWING. USE FIGURED DIMENSIONS ONLY.
4. ANY DISCREPANCIES TO BE REPORTED IMMEDIATELY TO THE ENGINEER.
5. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS, SUBCONTRACTORS AND SPECIALISTS DRAWINGS AND SPECIFICATIONS.
6. EXISTING SERVICES HAVE NOT BEEN SHOWN BUT ARE PRESENT - THE CONTRACTOR IS TO LIAISE WITH ALL STATUTORY AUTHORITIES PRIOR TO THE COMMENCEMENT OF ANY WORKS.

BOUNDARY LEGEND

SITE BOUNDARY

PRELIMINARY

rev.	drawn	chkd	apprvd.	date	description
01	AA	PG	PG	04.11.24	PRELIMINARY ISSUE

Client
M&D CARE

Project
YNYSTAWE LODGE,
YNYSTAWE, SWANSEA
SA6 5AP

Title
LOCATION PLAN

Vale Consultancy
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29 Bocam Park, Old Field Road, Pencoed, Bridgend CF35 5LJ.
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date	drawn	checked	approved
NOV 2024	AA	PG	PG

scale @ A1	project no.
1:1000	20548

status	drg. no.	rev.
P	20548_100	01

DRAWING STATUS
A - Approval, AB - As-Built, C - Construction, D - Draft, P - Preliminary, T - Tender

ORIGINAL DRAWING SIZE 841 x 594

10 0 10 20 50 100mm NATURAL SCALE

A1

APPENDIX B: DCWW Apparatus Record Plans

Dŵr Cymru
Welsh Water

20548 DCWW SEWER MAP

07/11/2024

Scale: 1: 2097

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

Dwr 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 f 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 disclosure 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 us 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

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

APPENDIX C: Soakaway Test Location Plans & Results

Infiltration Testing For:

Ynystawe House,
Park Road,
Parc Gwernfadog,
Morriston,
Ynystawe,
Swansea,
SA6 5AP

Prepared for: Vale Consultancy

REF: Ynystawe House #643

DATE: 05.10.2024

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Document Control

Project	**Ynystawe House**
Client	**Vale Consultancy**
Ref:	**Ynystawe House #643**

Document Checking:

Prepared By: **Oliver Gibbs** **Signed:** 

Issue	Date	Status
01	**05/10/2024**	**Written and submitted**
02		
03		

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1 Introduction

1.1 Brief

Gibbs Geotechnical has been instructed by the Vale Consultancy (the Client) to undertake 1 soil infiltration tests to BRE365 standard and 2x tests to BS6297 standard at Ynystawe House, Park Road, Parc Gwernfadog, Morriston, Ynystawe, Swansea, SA6 5AP.

National Grid Reference: SS683999 – Easting 268315, Northing 199900

Latitude, Longitude: 51.682374, -3.906163

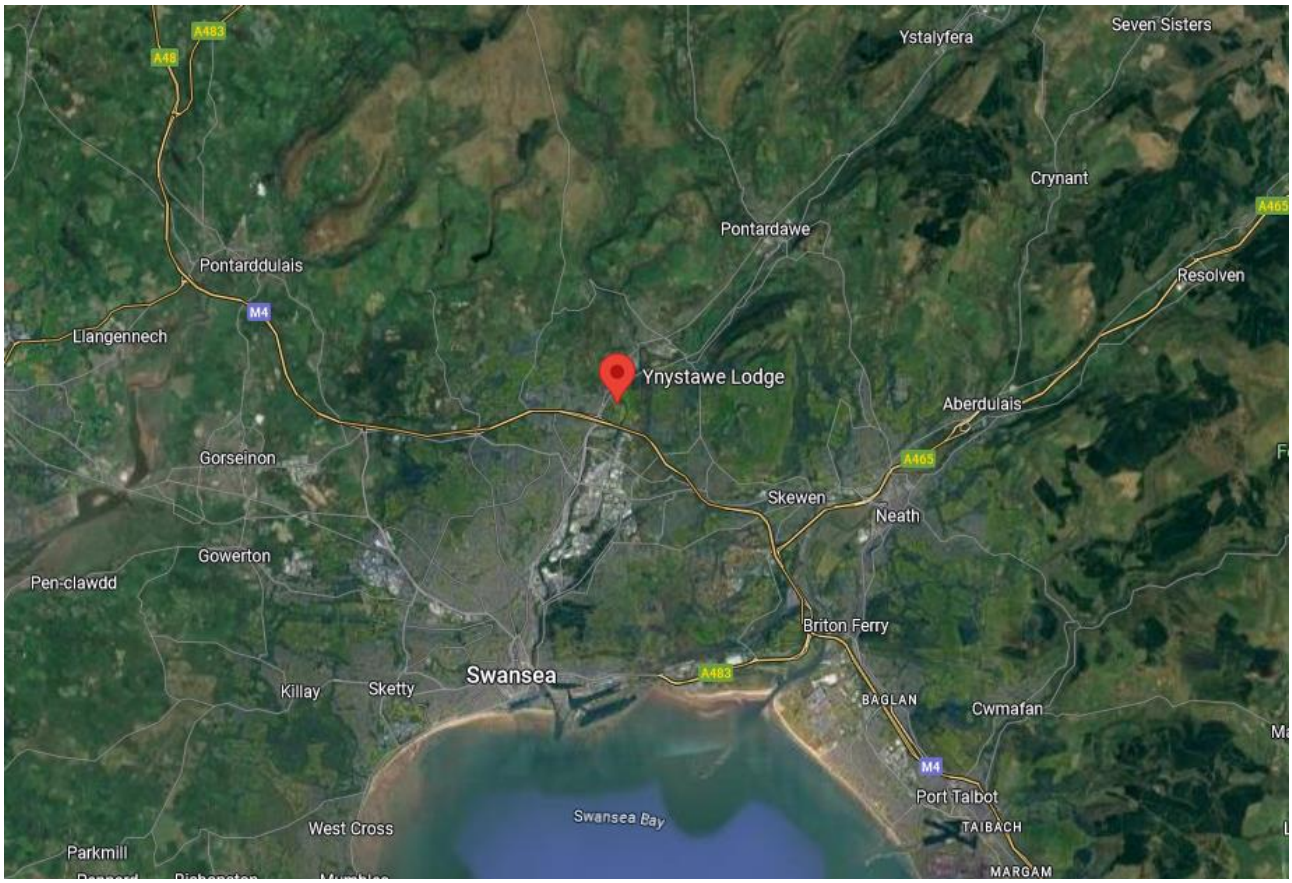

Figure 1 - Site location

One BRE365 infiltration test has been proposed to determine the local geology and permeation rates on site, in addition to a further 2.0m deep groundwater investigation test pit. This BRE365 test pit will be 0.5x1x0.5m minimum and tested a maximum of 3 times or as many as possible in the timeframe allowed. Refer to **Appendix A** – Site Test Plans

Two percolation tests have also been proposed to determine the local geology and permeation rates on site to suit the BS 6297:2007 standards which state following testing procedure:

- *"Excavate at least two holes 300mm square to a depth at least 300mm below the proposed invest level (bottom of pipe) of the infiltration pipe, spacing them along the proposed lone of the subsurface irrigation system. While digging the hole, note and record the changes in soil characteristics at measured depths and the position of the water table if reached.*
- *Saturate the local soil by filling each hole with water to a depth of at least 300mm and allow this to seep away completely*
- *If the water drains rapidly (within 10 mins) the hole should be refilled up to a maximum of 10 times. If the water continues to drain away rapidly the ground is unsuitable.*
- *If water has not soaked away within 6 hours the area is not suitable.*
- *Determine the percolation rate by refilling each hole with water to a depth of at least 300mm and observe the time in seconds for the water to seep away from 75% full to 25% full (i.e a depth of 150 mm).*
- *Divide this time in seconds by 150. This gives the average time in seconds required for the water to drop 1mm.*
- *Repeat the test at least three times in each hole in the location of the proposed trench(es).*
- *Take the average figure from the tests to produce the percolation value Vp (in seconds)."*

The tests will be repeated a maximum of 10 times or as many as possible in the timeframe allowed.

1.2 Site Investigations

The tests were performed by Gabriel Usher (of Gibbs Geotechnical) on the 2nd of October 2024. Refer to Appendix B – Site photos

2 Site findings

The following tests were performed to the best of the ability of those involved, subject to site constraints and weather conditions. The pits were successfully excavated to 1.0m depth, shown in the location on Appendix A. Groundwater was initially discovered at a depth of 0.7m at location shown as GW on Fig 1, and thus all subsequent test pits were excavated to a depth of 0.6m where no groundwater was present.

2.1 British Geological Records

Local searches from the British Geological Survey (BGS) online records show the site to have the following superficial soils and bedrock:

Bedrock: Grovesend Formation - Mudstone, siltstone and sandstone. Sedimentary bedrock formed between 309.5 and 308 million years ago during the Carboniferous period.

Superficial soils Alluvium - Clay, silt, sand and gravel. Sedimentary superficial deposit formed between 11.8 thousand years ago and the present during the Quaternary period.

Refer to **Appendix C** for BGS records http://mapapps.bgs.ac.uk/geologyofbritain3d/

2.2 Trial pit soil conditions

Soils encountered were logged at the following approximate depths:

Foul pit 1 – F1

Topsoil: *0-0.3m - Compacted MOT1/gravel*
Superficial soils: *0.3-0.6m - Made ground*

Foul pit 2 – F2

Topsoil: *0-0.1m - Compacted MOT1/gravel*
Superficial soils: *0.1-0.6m - Made ground*

SW1 – BRE365 test pit

Topsoil: *0-0.25m - Compacted MOT1/gravel*
Superficial soils: *0.25-0.65m - Clay*

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Results

Foul test pit 1 – filled 30x over a period of 15 minutes, water level did not reach more than 0.07m deep at any point – free draining.

Foul test pit 2 -

Hole No.	Test No.	Seconds to 75% full	Seconds to 25% full	Elapsed time 75% - 25%	Drop in mm	Vp (s/mm)
F2	1	10	240	*230*	150	1.53
	2	12	260	*248*	150	1.65
	3	20	300	*280*	150	1.87
	4	20	350	330	150	2.20
	5	35	380	345	150	2.30
	6	45	400	355	150	2.37
	7	70	420	350	150	2.33
	8	95	450	355	150	2.37
	9	110	460	350	150	2.33
	10	120	480	360	150	2.40

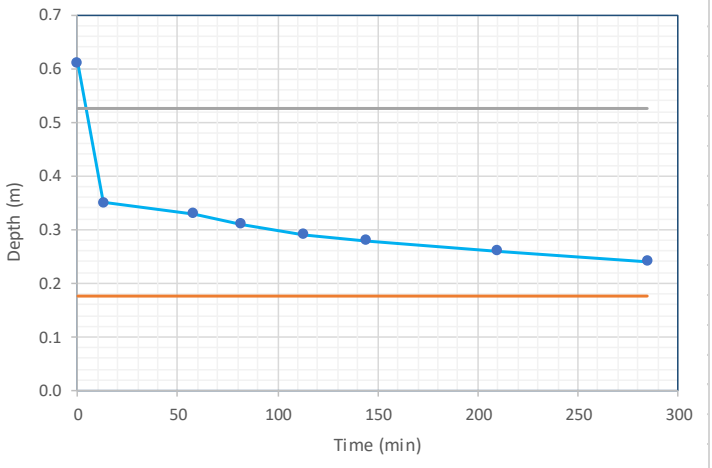
Soakaway Test Results - BRE 365 Digest standards

Site: Ynystawe House
Client: Vale Consultancy

Trial Pit	**1**	**Date:**	02/10/2024
		Performed by:	Oliver Gibbs
Dimensions	(m)	**Weather:**	Sunny
Width	1	**Topsoil:**	Compacted MOT1/gravel
Length	0.5	**Superficial soil:**	Clay
Effective depth	0.7	**Comments:**	
Total depth of hole	0.7		

GibbsGeoTechnical

Test No.	Time (min)	Depth (m)			
1	0	0.61	**time 75% =**	4	
	13	0.35	**time 25% =**	N/A	
	58	0.33	**Area =**	0.5	
	82	0.31	**Vp 75% =**	0.525	
	113	0.29	**Vp 25% =**	0.175	
	144	0.28			
	210	0.26			
	285	0.24			
			Vp75-25 =	0.175	m
			As50 =	1.55	m²
			tp75-25 =	N/A	s
			f =	**N/A**	**m/s**



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3 Conclusions

The tests which could be performed in the timeframe allowed found infiltration results of:

Test Pit F1: Free draining (after 1000 litres, equivalent to 30x+ fills)
Test Pit F2: Vp = 2.4s/mm
Test Pit 3: N/A – Test pit did not drain to 25% in the timeframe allowed

APPENDIX A: Site Test Plans

Figure 1- Test pit locations

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APPENDIX B: Site Photos

Figure 2 - Test pit F1 during excavation

Figure 3 – Test pit F2

Figure 4 - Test pit SW1

Figure 5 - Test pit remediation

Figure 6 - Test pit remediation

(More pictures available upon request)

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APPENDIX C: BGS Records

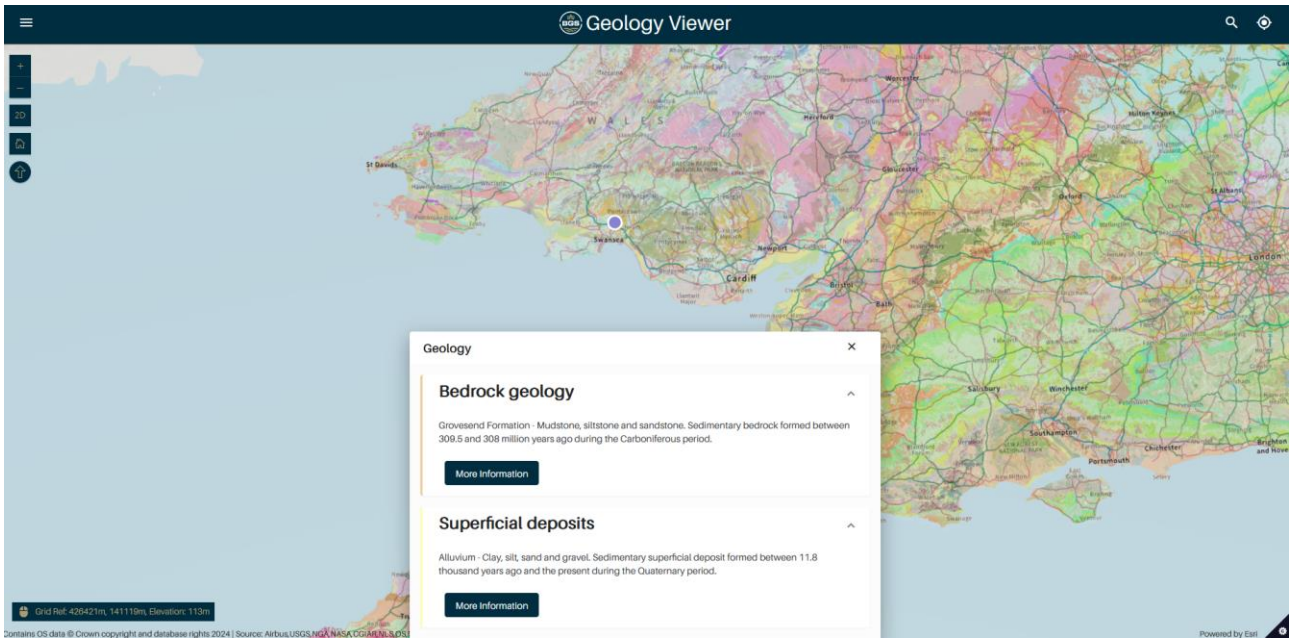


Figure 7 - Royal Geological survey records of the site

APPENDIX D: The British Water Code 'Flows and Loads'

BRITISH WATER
expertise worldwide

SEPA Scottish Environment Protection Agency

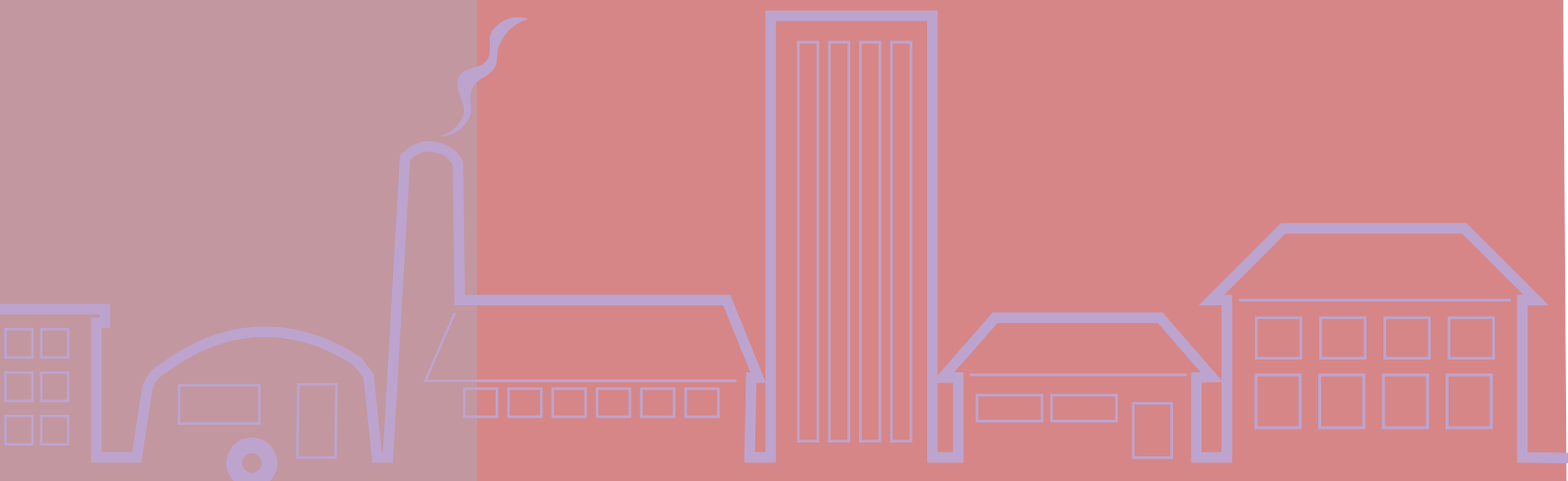
Environment Agency

NIEA Northern Ireland Environment Agency

Code of Practice

Flows and Loads – 4

Sizing Criteria, Treatment Capacity for Sewage Treatment Systems



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BW COP: 18.11/13

ISBN 978-1-903481-10-3

BRITISH WATER
expertise worldwide

Code of Practice

Flows and Loads – Sizing Criteria, Treatment Capacity for Sewage Treatment Systems

This code of practice was prepared by the British Water Package Sewage Treatment Plant Focus Group comprising manufacturers, suppliers and service companies of all types of small wastewater treatment systems.

The Environment Agency, the Northern Ireland Environment Agency and the Scottish Environment Protection Agency support the use of this code of practice, but the Agencies do not specifically endorse any particular manufacturer's product.

This code of practice provides a table of loadings which allows the total daily sewage load from properties to be calculated and it is recommended that all designers should use this table when sizing and designing non-mains sewage treatment systems. The flows and loads values given represent current best knowledge within the UK but may change with time in line with per capita water use.

Where proposed alternative usage rates or methods of sizing might be more appropriate for a particular application this should be supported by the collection of data or additional site specific evidence to validate the proposal. Professional judgment is required and may be used to compare alternatives especially when assessing sewage strengths and treatability.

Guidance is provided to assist the user to identify the various sources of sewage, to consider the nature of the sewage to be treated and to make users aware of issues which may affect treatability and system performance. Each manufacturer is aware of the capabilities of their own systems with respect to different situations.

The table of loadings may be used to design all sizes of sewage treatment systems serving up to 1000 population.

Use of this code of practice by all UK manufacturers and system designers will:

- help to clearly define site activity and sewage sources
- promote a consistent approach to collecting accurate and complete loading information
- provide consistent information about problem effluents and treatability, and
- promote the design and installation of appropriate treatment systems and so reduce the problem of undersized systems causing environmental contamination.

The loadings in this code of practice are more comprehensive than in previously published guidance, they are generally higher and include values for ammonia.

1 Scope

The purpose of this code of practice is to provide an appropriate table of loadings (volumes and loads) to allow the total daily load entering a treatment system to be calculated.

2 Regulations

Early contact with the Regulator to discuss the proposed discharge of sewage effluent is advisable.

- Planning requirements, eg *DETR Circular 3/99, site survey, etc.*
- Building regulations, eg part H *DTLR England & Wales, part M Scotland, Water (Northern Ireland) Order 1999 and Northern Ireland building regulations.*
- A Permit, Authorisation or Consent to discharge will be required from the environmental regulators (the Agencies).
- Planning permission (Local Authority Planning Guidance).

3 Definitions of terms

- **Population (P)** – number of people the system will serve.
- **Biochemical oxygen demand (BOD_5)** – Mass concentration of dissolved oxygen consumed under specified conditions (5 days at 20° C with nitrification inhibition) by the biological oxidation of organic and/or inorganic matter in water.
- **Ammonia expressed as mg/l N** – Ammonia is NH_3, Ammonium is NH_4OH. In wastewater we frequently refer to and use the word/symbol, ammonia/NH_3. The term ammonia usually includes ammonium as well.

4 Selection considerations – all applications

- Values and conditions required by any regulatory permit or consent.
- Loading figures for each specified load are given for Flow, BOD and NH_3.
- The user/purchaser of the system must declare **ALL ACTIVITIES** to enable all loads entering the treatment system to be identified and evaluated. The user/purchaser should be made aware that there is a risk of poor performance from the equipment if loads are understated. The accuracy of the declared loads is of paramount importance.
- Guidance points given under each category suggest questions to enable the specifier to recognise variable or unusual loads, particular to that site, to improve correct system selection and design.
- Total daily loadings are calculated based on the anticipated final maximum capacity of the site. New sites initially may have a reduced business level but the system suggested should reflect the full business potential, e.g. a system suggested for a hotel or caravan site or any other application, with an average 80% occupancy rate should be designed to handle 100% occupancy. The equipment selected by the specifier should reflect the maximum potential of the site. Where a specifier is instructed to use lower occupancy rates, this should be recorded. Flow balancing should be considered where appropriate
- Excess disinfectants, chemicals, etc can affect the biological processes as can specific toxic substances from site activities e.g. photographic chemicals, weed killers, motor oils. It is assumed that these substances are excluded from the wastes to be treated.
- Some water treatment equipment effluents eg softeners, chlorinated backwashes may not be acceptable; system designers should specifically accept or exclude their use. Many treatment system designs will accept regenerants into their units, however this must be checked and agreed.
- Water saving devices affect sewage strength, the impact of their installation should be identified.
- Laundries affect sewage strength and treatability; their proportion should be identified.
- Surface/storm water is not permitted as part of the wastewater stream and must be excluded.
- It is assumed, unless stated, that waste disposal units (WDU) are not in use.
- Undersizing of equipment is to be avoided as it is always better to have a plant slightly oversized, rather than on the limit or undersized.

The owner of the treatment system holds the permit, consent or authorisation to discharge and should be aware that he is responsible for the effluent quality discharged. Thus all sources of discharge into the system must be declared. It is an offence if the effluent fails to comply with the regulators requirements.

(continued on page 4)

Table of Loadings for Sewage Treatment Systems

Per person / activity / day (unless otherwise specified)	FLOW (Litres)	BOD (Grams)	Ammonia as N (Grams)
DOMESTIC DWELLINGS			
Standard residential	150	60	8
Mobile home type caravans with full services	150	60	8
INDUSTRIAL			
Office / Factory without canteen	50	25	5
Office / Factory with canteen	100	38	5
Open industrial site, e.g. construction, quarry, without canteen	60	25	5
*Full-time Day Staff	90	38	5
*Part-time Staff (4 hr shift)	45	25	3
SCHOOLS			
Non-residential with canteen cooking on site	90	38	5
Non-residential without a canteen	50	25	5
Boarding school (i) residents	175	60	8
(ii) day staff (inc. mid-day meal)	90	38	5
HOTELS, PUBS & CLUBS			
Hotel Guests (Prestige hotels)	300	105	12
Hotel Guests (3^H & 4^H hotels)	250	94	10
Guests (Bedroom only – no meals)	80	50	6
Residential Training/Conference Guest (inclusive all meals)	350	150	15
Non residential Conference Guest	60	25	2.5
Drinkers	12	15	5
Holiday camp chalet resident	227	94	10
Resident Staff	180	75	10
Restaurants - Full Meals - luxury catering	30	38	4
- pre-prepared catering	25	30	2.5
- Snack Bars & bar meals	15	19	2.5
- Function Rooms including buffets	15	19	2.5
- Fast Food i.e. (roadside restaurants)	12	12	2.5
- Fast Food Meal (burger chain and similar)	12	15	4
Students (Accommodation only)	100	60	8
AMENITY SITES			
Toilet Blocks (per use)	10	12	2.5
Toilet (WC) (per use)	10	12	2.5
Toilet (Urinal) (per use)	5	12	2.5
Toilet Blocks in long stay car parks/lorry parks (per use)	10	19	4
Shower (per use)	40	19	2
Golf Club	20	19	5
Local community sports club, e.g. squash, rugby & football	40	25	6
Swimming (where a separate pool exists without an associated sports centre)	10	12	2.5
Health Club/Sports Centre	50	19	4
Tent sites	75	44	8
Caravan Sites - (i) Touring not serviced	100	44	8
(ii) Static not serviced	100	44	8
(iii) Static fully serviced	150	60	8
HOSPITALS & RESIDENTIAL CARE HOMES			
Residential old people / nursing	350	110	13
Small hospitals	450	140	Assess
Large hospitals	Assess individually		

*Staff figures also apply to other applications

- *After installation, if the system is overloaded, due to activities that were not previously identified by the owner/ purchaser of the system, then the manufacturer may not be able to assist with meeting the legal obligations of the permit provided by the regulator. The regulator has the right to review permits and change them if necessary.*
- *All sewage treatment system should be maintained according to the manufacturer's instructions by a certified engineer trained in accordance with the British Water Maintenance and Service Code of Practice.*

5 Domestic housing

- A treatment system for a single house with **up to and including 3 bedrooms** shall be designed for a minimum population (P) of 5 people.
- The size of a treatment system for a single house with more than 3 bedrooms shall be designed by **adding 1 P** for **each additional bedroom** to the **minimum single house value of 5 P,** eg:
  - house with 3 bedrooms = **minimum 5 P system**
  - house with 4 bedrooms = **minimum 6 P system (5+1)**
  - house with 6 bedrooms = **minimum 8 P system (5+3).**
- For groups of small 1 and 2 bedroom houses or flats
  - flat with 1 bedroom = **allow 3 P**
  - flat with 2 bedrooms = **allow 4 P**
- A treatment system serving a group of houses shall be designed by adding together the P values for each house calculated independently, eg:
  - for a group of two houses (3 and 4 bedrooms, respectively) the system shall be for a minimum of 11 P (5+6)
- **If the calculated total P for a group of houses exceeds 12 P then some reduction may be made** to allow for the balancing effects on daily flow of a group of houses (round UP not down)
  - **Where the total is 13-25 P** multiply the total by 0.9 to give an adjusted P value, e.g. if there are four four-bedroom houses the total P will be 24 P (4 x 6) and the adjusted P will be 22 P (24 x 0.9 = 21.6)
  - **Where the total is 26-50 P** multiply the total by 0.8 to give an adjusted P value, e.g. if there are four three-bedroom houses and three four-bedroom houses the total P will be 38 P (4 x 5 and 3 x 6) and the adjusted P will be 31 P (38 x 0.8 = 30.4)
- Where there are larger groups of houses, the P should be estimated using both the expected total load and the flow, considering both peak and total flow
- These are minimum recommended population (P) loads, they should not be modified downwards, upward modification may be necessary because of particular characteristics of each property or groups of properties.
- The above assessments of population (P) should be used for both existing and new properties

- *Larger luxurious houses tend to have greater loads and increased water consumption with variability.*
- *Holiday homes tend to have higher occupancies, with perhaps, lounges also acting as bedrooms. Holiday lets and second homes may be used intermittently*
- *Check for unusual water uses such as spa baths, home brewing or home photo processing.*
- *Waste disposal units increase biological load.*
- *Laundry chemicals and toxic substances will affect the performance. (See below) It is assumed that laundry is not brought in, i.e. Team strips.*

6 Commercial Premises

- Identify **ALL** the sources of waste.
- Identify final maximum site usage/business expectations.
- The individual values provided for each function within the table assume that 100% of every application and load is quantified. **DO NOT** reduce values based on reduced expectations.
- All catering applications require the installation of adequately sized grease separators, removal or retention systems up-stream of the biological treatment equipment.

7 Catering premises

- Establish maximum (and minimum) daily load based on a 24 hour cycle.
- Check period of operation.
- Identify dates of maximum loads, e.g. Mothering Sunday, Easter, Bank holidays, Fridays etc.
- Identify load peaks, usually at lunch or evening.

- *Flow balancing may provide an appropriate solution.*
- *Where WDU and potato peelers are to be used calculate/document the load.*
- *Identify the nature(s) of the catering in order to select the correct loading, eg*

Bar snacks	- ploughmans, sandwiches, basket meals, etc.
Pre-prepared catering	- frozen and chilled meals (not prepared on site).
Home cooked meals	- fresh soups, fresh vegetables, casseroles, etc.
Luxury catering	- fully prepared on site with cream sauces, home made desserts.
Takeaways	- Indian, Chinese, fish and chips, etc.
Fast food	- roadside restaurants, burger chains, etc.
Function room catering	- Establish "normal" style, may be sandwiches, or full buffet, home cooked meals, conference, wedding banquets, etc.

- *The biological unit must be protected from grease and fats. Modern cooking uses light oils, which may not separate. The collection and containment of all forms of grease prior to the biological equipment is vital. Operate any grease system in full accordance with the manufacturer's instructions.*
- *Individual kitchen practices affect loads, i.e. leftovers on plates may be scraped into bins, or wet rinsed into system, the former to be encouraged, the latter should be discouraged or factored into the treatment plant design.*
- *Premises serving beers may produce toxic caustic effluents due to the hygiene and cleaning regimes.*
- *The proportion of wastes from some sources can produce an effluent, which is difficult to treat, e.g. some Drive Through Fast Food establishments can have an effluent with a low organic content.*

8 Hotels & Residential Centres

- Establish "style and type" of hotel e.g. Prestige (5^{M}), Bedroom only accommodation, Conference Centres, Resort Hotels with Sports and Spas, Treatment Centres, etc.
- Calculate total loading based on occupancy of at least 2 people per room.

- *Some hotels regularly have 4 occupants per room.*

- Consider and add other hotel activities and waste functions.

The volume/BOD figures are based on an expectation that guests have an evening meal, drink and breakfast and that good kitchen practices are in place.

- Add all other loads, considering non-resident uses, ie Lunches, Functions, Visiting Drinkers, Diners, etc.
- Consider periodicity of loads.
- Ensure residential and training centre loadings reflect the complete meal plan, i.e. allow for lunch and afternoon tea, sports, etc.
- Special Events. Check provision of temporary facilities, e.g. summer marquees and allow for appropriate loading.
- Consider any loads from outside catering.

9 Laundries

- Excepting domestic premises, it is assumed that all laundry functions are additional.
- For each premises, identify which laundry items are done in house or sent off site.
- Calculate the laundry load on the basis of the number of machines and the period of use.
- Sites with laundries must fit and maintain lint filters.

The chemical load (detergents) inhibits biological treatment, the laundry waste percentage of the normal maximum Flow usually needs to be less than 30% of the total load.

Where the laundry percentage >30%, manufacturers select equipment on a different basis.

As a guide, where the hydraulic load from laundries is between 1-10%, system size increases by 10%, 11-20% increases by 20%, 21-30% increases by 30%.

Excess/surplus detergents (above the recommended quantities) can affect the biological process.

Discharge quality may be improved if operators use low/zero phosphate detergents.

10 Toilet Blocks

- Figures can also be assessed according to the sanitary equipment and control system installed.

Automatically flushed urinals use 10 litres per hour; a single flush should not use more than 1.5 litres.

Consider ladies and gents toilet facilities separately.

11 Sports Clubs

- Calculate loadings on 100% usage for the sporting facility. The figure provided includes showering and toilet use by the sports person.
- Consider also the non-sporting uses, i.e. spectators' toilet use.
- Add drinkers, social members and staff.
- Add values for catering facilities.
- Check normal and exceptional catering provisions.
- A swimming pool with no associated sports centre may be calculated using the number of swimmers, assume a toilet use per person, and by adding values for showers and spectators. Check duration of visits and modify for extended use.

Consider separate treatment or disposal of backwash waters from ancillary equipment, such as types of filtration and disinfectant removal in swimming pools.

12 Golf Clubs

- The values within the data table allow for light snacks and toilet use.
- Calculate additional allowances for showers.
- Add values for other catering facilities (if other than light snacks).

13 Hospitals

- The nature of the facility affects the design values. Some nursing homes have very high hydraulic loads as a result of the use of bedpans and their sanitation. Consider any disinfection equipment installed.
- With drugs and hygiene requirements of hospitals adjust the equipment size to compensate for treatability factors.

Disposal of unused/waste medicines is not permitted via the treatment facility.

14 Caravan Sites

- Establish nature of communal blocks, i.e. toilet, shower usage, laundry, etc.
- Where laundry equipment is installed, count the number of machines on site and period of use. Where possible, identify specific commercial machine details for volume and wash cycle duration.

Hydraulic loads of 100 litres per hour for 12 hours are not unusual.

- Loading figures quoted assume that wastes from chemical toilets do not enter the system as they must not be allowed to enter into the treatment plant.

A cesspool may be installed to receive chemical toilet waste for separate disposal.

15 Installation

The following may affect which equipment is offered.

- The site.
- Location of treatment plant within the site.
- Invert depth of installation (where possible, locate to permit gravity flow into and out of the system).
- Pumping equipment.
- Installation requirements.

Refer to manufacturer's specifications and installation manual.

- Access for maintenance and servicing.

Refer to manufacturer's specifications and maintenance instructions.

- The need for a sample chamber.
- Discharge point.
- Soil percolation area or other tertiary treatment.

16 Documentation

Records of the loads used to select and recommend the type and size of treatment systems should be maintained by the specifier and the customer. A typical example follows.

Treatment system enquiry sizing sheet

Our Ref. 123456 **Date** 10th August 2003 **Site** ABC Hotel 3* Hotel **Client** New Architects & Consultants

SOURCE OF WASTE				FLOW LITRE / DAY		BOD GRAMS / DAY		NH_3	
Description	**No of rooms**	**Occupancy**	**No**	**Per Head**	**TOTAL**	**Per Head**	**TOTAL**	**Per Head**	**TOTAL**
Rooms	80	2	160	250	40000	94	15040	10	1600
Bar drinkers			120	12	1440	15	1800	5	600
Non resident luxury meals			150	30	4500	38	5700	4	600
Staff, full-time day staff			30	90	2700	38	1140	5	150
Staff, part-time			20	45	900	25	500	3	60
Laundry – all sent off site Domestic washing machine for tea towels only				800					
Total load(s)					**50340**		**24180**		**3010**
Effluent quality requested					**20 mg/l BOD**		**30 mg/l SS**		**20 mg/l NH_3 N**

Suggested type of plant: XYZ. **Invert:** 1.0m. **Power:** 3-phase. **Surface water:** all to be excluded from foul sewer. **Consent to discharge:** to be obtained from the Regulator. **Waste Disposal Units:** assumed that none are fitted.
Grease trap: required size "125".

Notes

Swimming pool – present, used for guests only, all backwash wastes to be excluded. No function rooms or catering

Further information and guidance can be obtained from the British Water website – **www.britishwater.co.uk**

First edition published 2004; revised 2005, amended 2008, revised 2009, revised 2013
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APPENDIX E: Foul Drainage Layout & Details Drawing

Sheet ACAD - A1 rev. C

N

0 1000 2000 3000 4000 5000 mm

SCALE 1:100

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE SHOWN IN METRES UNLESS NOTED OTHERWISE.
3. DO NOT SCALE FROM THE DRAWING. USE FIGURED DIMENSIONS ONLY.
4. ANY DISCREPANCIES TO BE REPORTED IMMEDIATELY TO THE ENGINEER.
5. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS, SUBCONTRACTORS AND SPECIALISTS DRAWINGS AND SPECIFICATIONS.
6. EXISTING SERVICES HAVE NOT BEEN SHOWN BUT ARE PRESENT - THE CONTRACTOR IS TO LIAISE WITH ALL STATUTORY AUTHORITIES PRIOR TO THE COMMENCEMENT OF ANY WORKS.

DRAINAGE LEGEND

- ASSUMED EXISTING FOUL DRAINAGE. EXACT LOCATION TBC.
- EXISTING FOUL DRAINAGE TO BE ABANDONED. EXACT LOCATION TBC.
- PROPOSED FOUL WATER DRAINAGE
- PROPOSED RISING MAIN
- PROPOSED PERFORATED PIPE
- 15m OFFSET FROM BUILDING

PROPOSED Y-BRANCH CONNECTION TO EXISTING 600Ø CULVERT WILL REQUIRE NRW PERMIT

Culvert 600mm Pipe IL 11.41

600Ø

F8 CL:11.900 IL:11.320

100Ø @ 1:8 PERFORATED PIPE

F7 - SAMPLE POINT CL:12.500 IL:12.000

EXISTING GRAVEL INFORMAL HARDSTANDING TO BE LINED FOR STAFF/ VISITOR CAR PARKING

PACKAGED TREATMENT PLANT MARSH ENSIGN 30PE WITH PUMPED OUTLET CL: 12.190 INLET IL: 10.700 BASE IL: 9.906

F5 CL:12.300 IL:10.725

F4 CL:12.280 IL:10.785

100Ø 1:80

F2 CL:12.390 IL:10.765

EXISTING SEPTIC TANK/ CESSPOOL ACCESS CHAMBER COVER. EXACT SIZE OF TANK AND EXISTING DRAINAGE CONNECTIONS TO BE CONFIRMED. SEPTIC TANK/ CESSPOOL TO BE REMOVED AND GROUND AND EXCAVATIONS TO BE MADE GOOD.

R15.000

F1 CL:12.100 IL:10.910 (TBC)

PROPOSED CHAMBER TO BUILT ON EXISTING FOUL WATER RUN AND DIVERTED TO PROPOSED FOUL DRAINAGE SYSTEM. EXISTING INVERT LEVEL TO BE CONFIRMED ON PRIOR CONSTRUCTION

F3 CL:12.320 IL:11.010 (TBC)

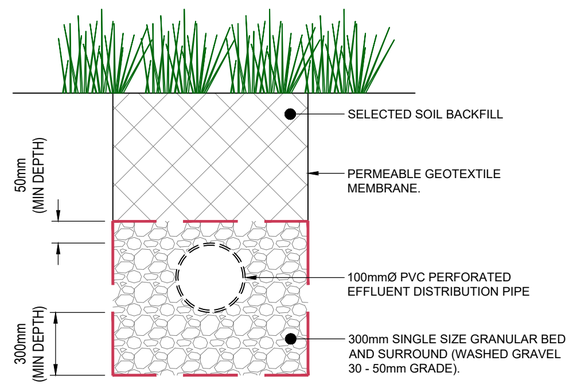
PROPOSED CHAMBER TO PICK UP EXISTING SEPTIC TANK CONNECTIONS AND TO BE DIVERTED TO PROPOSED FOUL DRAINAGE SYSTEM. EXISTING INVERT LEVELS TO BE CONFIRMED ON PRIOR CONSTRUCTION

EXISTING SEPTIC TANK/ CESSPOOL ACCESS CHAMBER COVER. EXACT SIZE OF TANK AND EXISTING DRAINAGE CONNECTIONS TO BE CONFIRMED. SEPTIC TANK/ CESSPOOL TO BE REMOVED AND GROUND AND EXCAVATIONS TO BE MADE GOOD.

PRELIMINARY

ADDITIONAL DRAINAGE SURVEY WORKS RECOMMENDED. EXACT LOCATION, LEVELS, CONDITION OF EXISTING ON-SITE DRAINAGE AND DESTINATION OF EXISTING CULVERT TO BE CONFIRMED PRIOR TO WORKS COMMENCING ON SITE.

ANY WORKS COMMENCING ON SITE PRIOR TO DRAINAGE APPROVALS BEING GRANTED IS UNDERTAKEN IS AT THE DEVELOPER'S OWN RISK.



PERFORATED EFFLUENT DISTRIBUTION PIPE DETAIL

SCALE 1:10

rev.	drawn	chkd.	apprvd.	date	description
04	HT	PG	PG	12.03.26	AMENDED TO SHOW UPDATED OUTFALL
03	AA	PG	PG	27.03.25	ADDITIONAL FOUL DRAINAGE ADDED TO CLIENT COMMENTS
02	AA	PG	PG	23.01.25	UPDATED TO NEW LAYOUT
01	AA	PG	PG	04.11.24	PRELIMINARY ISSUE

Client: M&D CARE

Project: YNYSTAWE LODGE, YNYSTAWE, SWANSEA SA6 5AP

Title: FOUL DRAINAGE LAYOUT

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date	drawn	checked	approved
NOV 24	AA	PG	PG

scale @ A1	project no.
1:100 1:10	20548

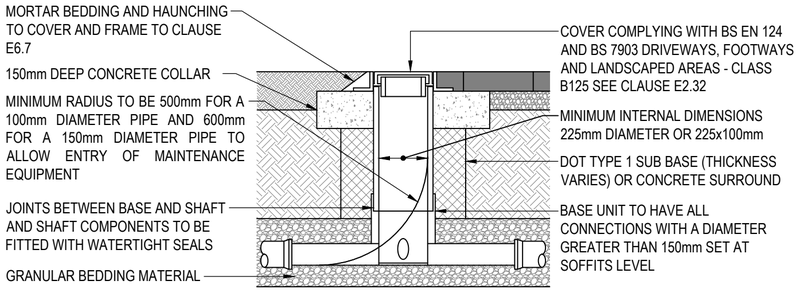
status	drg. no.	rev.
P	20548_520	04

DRAWING STATUS
A - Approval, AB - As-Built, C - Construction, D - Draft, P - Preliminary, T - Tender

10 0 10 20 50 100mm NATURAL SCALE

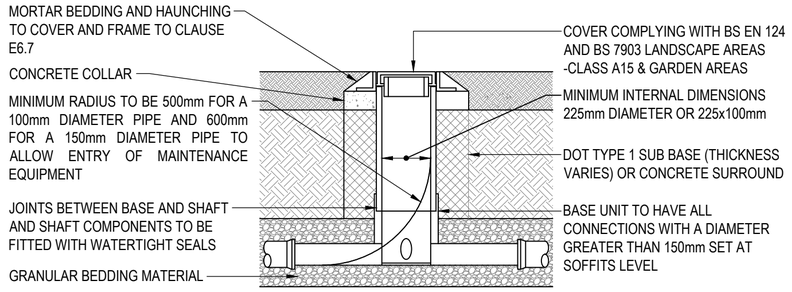
ORIGINAL DRAWING SIZE 841 x 594

A1



TYPICAL INSPECTION CHAMBER DETAIL - TYPE 4A WITHIN PAVED AREAS

(REFER TO FIG. B.21 OF SEWERS FOR ADOPTION 7th ED) - SITED IN DRIVEWAYS/PAVED AREAS
(FLEXIBLE MATERIAL DETAIL)
SCALE 1:20



TYPICAL INSPECTION CHAMBER DETAIL - TYPE 4B WITHIN LANDSCAPE AREAS

(REFER TO FIG. B.21 OF SEWERS FOR ADOPTION 7th ED) SITED IN DOMESTIC GARDENS
(FLEXIBLE MATERIAL DETAIL)
SCALE 1:20

MAXIMUM DEPTH FROM COVER LEVEL TO SOFFIT OF PIPE 2m, NON-ENTRY PLASTIC CHAMBERS AND RINGS SHALL COMPLY WITH BS EN 13598-1 AND BS EN 13598-2 OR HAVE EQUIVALENT INDEPENDENT APPROVAL

NOTES:

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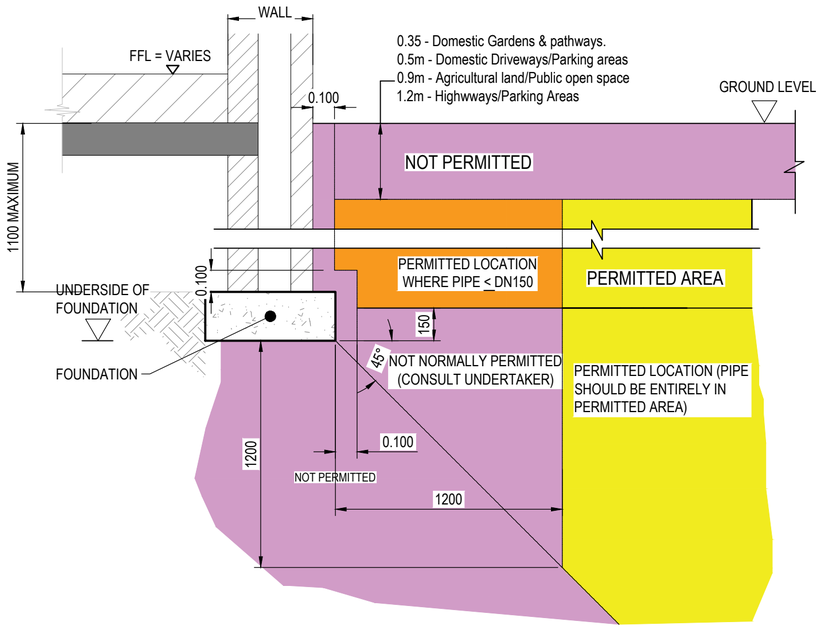
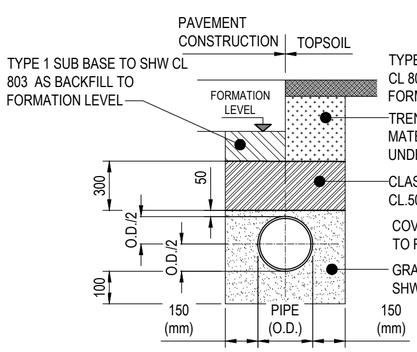
PRELIMINARY



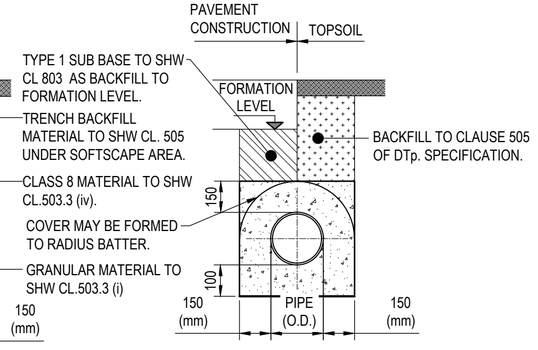
TYPICAL DRAINAGE DETAIL IN CLOSE PROXIMITY OF FOUNDATIONS (DETAIL IN ACCORDANCE WITH SFA FIGURE B1)



TYPE S BEDDING

GRANULAR BED AND SURROUND UNDER ROAD
(BEDDING FACTION = 2.2)
SCALE 1:20

NOTES:
1. REFER TO SHW TABLE 5/3 AND SHW TABLE 6/1
2. BEDDING BENEATH AND AT SIDES OF THE PIPE TO BE WELL COMPACTED IN ACCORDANCE WITH CL 505.
3. CONCRETE CRADLES AND ARCHES MAY BE EXTENDED TO THE SIDES OF THE TRENCH.
4. GEOTEXTILES MAY BE USED WHERE DIRECTED OR APPROVED BY THE ENGINEER TO CONTAIN BEDDING MATERIAL IN CERTAIN SOILS EG. RUNNING SAND.
5. IN VERY WET CONDITIONS, WHERE DIRECTED OR APPROVED BY THE ENGINEER A TEMPORARY LAND DRAIN MAY BE LAID WITHIN THE GRANULAR BED.



TYPE Z BEDDING

CONCRETE BED AND SURROUND
(BEDDING FACTION = 2.6)
SCALE 1:20

NOTES: (TYPE Z ONLY)
6. WHERE PIPES WITH FLEXIBLE JOINTS ARE USED, THE CONCRETE PROTECTION IS TO BE INTERRUPTED OVER ITS FULL CROSS SECTION AT INTERVALS NOT EXCEEDING 5 METRES (OR AS DIRECTED BY THE ENGINEER) BY A SHAPED FORMER OF BITUMEN IMPREGNATED COMPRESSIBLE FILLER. THESE INTERRUPTIONS SHALL COINCIDE WITH PIPE JOINTS. SEE DIMENSIONS FOR PIPE BEDDING TABLE FOR THICKNESS OF COMPRESSIBLE FILLER.
7. CONCRETE TO BE GRADE GEN 3. WHERE FLEXIBLE PIPES ARE USED. CARE MUST BE TAKEN
8. TO PREVENT THE PIPES FROM FLOATING.

BEDDING DETAILS

SCALE 1:20

rev.	drawn	chkd.	apprvd.	date	description
01	AA	-	PG	27.03.25	PRELIMINARY ISSUE

Client
M&D CARE

Project
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date	drawn	checked		approved	
MAR 25	AA	PG		PG	

scale @ A2	project no.
1:100	20548

status	drg. no.	rev.
P	20548_525	01

DRAWING STATUS
A - Approval, AB - As-Built, C - Construction, D - Draft, P - Preliminary, T - Tender

ENSIGN®

Package sewage treatment plants

MARSH

Intensive biological processing for off-mains wastewater

Overview

The Marsh Ensign is widely regarded as one of the most efficient, reliable and economical sewage treatment plants on the market.

The standard Ensign has been adapted to improve reliability and the Ensign:Ultra now brings unique enhancements to further improve noise level, treatment efficiency and final effluent quality.

Class leading performance

Tested and approved to BSEN12566-3/A1:2009 all Ensign units provide treatment well within national consent requirements. Published test results of 11.5:19.2:8.4mg/ltr (BOD:suspended solids:ammonia), with influent concentrations on test higher than those chosen by most competitor plants, effectively equates to 97% pollutant removal.

Unrivalled choice

Ranging in size from 4 to 50 PE in Ultra, Standard and Shallow versions of each, and with a wide range of ancillaries, almost all site, consent and budget requirements can be met by units from the range.

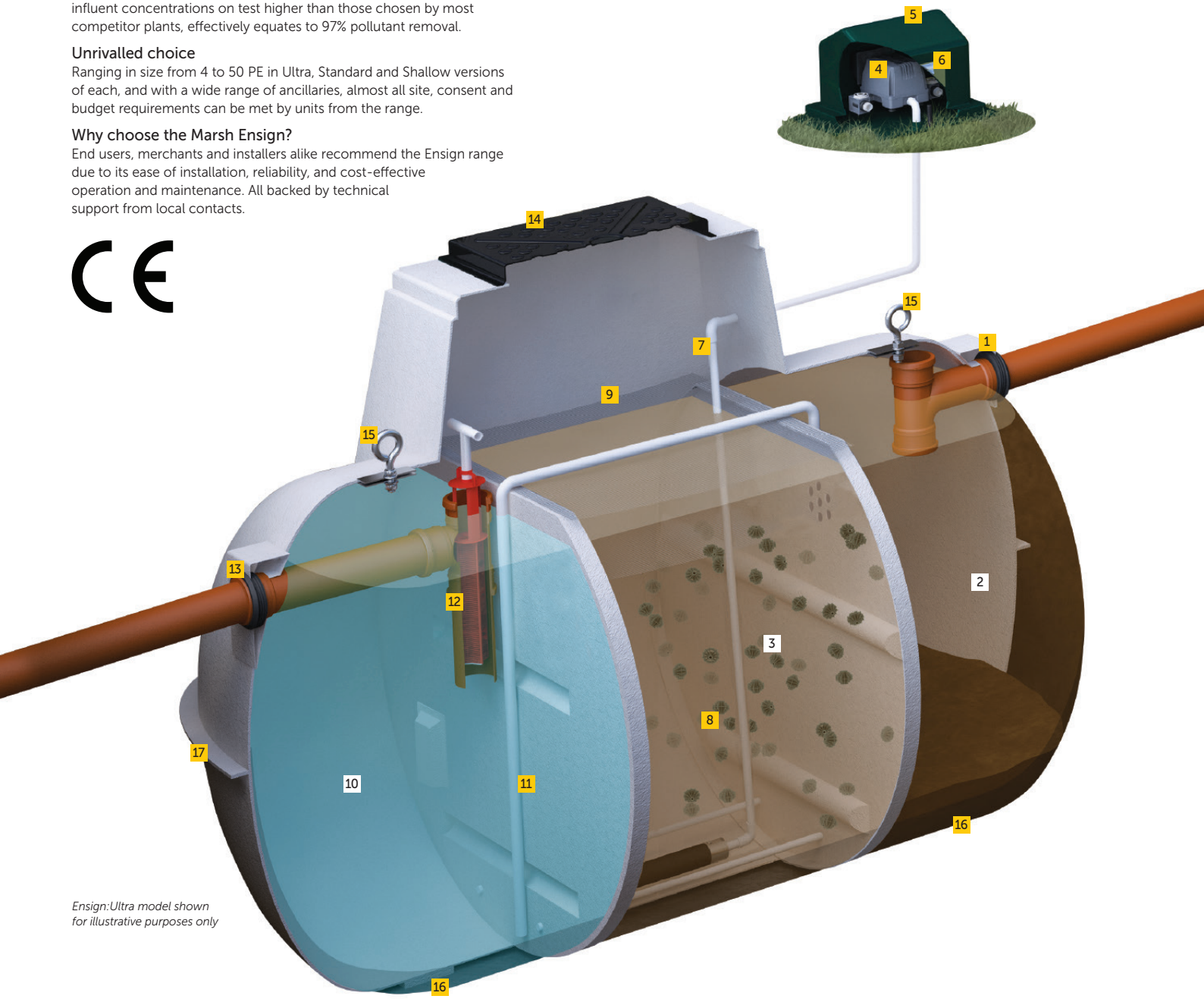
Why choose the Marsh Ensign?

End users, merchants and installers alike recommend the Ensign range due to its ease of installation, reliability, and cost-effective operation and maintenance. All backed by technical support from local contacts.

CE

Operating principle

In addition to anaerobic digestion taking place in the primary settlement chamber [2] the Ensign:Ultra unit allows the clarified water to pass into a second 'aeration' chamber [3] where it is treated to remove the dissolved constituents. Here aerobic bacteria, supported by diffused air and mobile media, ensures full treatment is achieved before the treated effluent and 'sloughed off' bacteria flows to a final settlement chamber [10]. The final effluent is then discharged to the drainage field or watercourse via a Polylok filter.



Ensign:Ultra model shown for illustrative purposes only

> The Marsh Ensign is widely regarded as one of the most efficient, reliable and economical sewage treatment plants on the market

Benefits

1 **Inlet with 'Forsheda seal'**
Forsheda seal provides flexibility in the joint for easier installation.
Optional risers to increase invert depth are available.

2 **Primary settlement chamber**

3 **Aeration chamber**

4 **Advanced compressor with alarm (Ensign:Ultra units only)**
Near silent compressor ensures minimal running, maintenance and servicing costs. Integral alarm detects low pressure in air line. (Regular Low-energy compressor on Ensign:Standard models).

5 **Compressor housing - internal or external options available**
The compressor can be housed internally or externally with no difference in cost.
External recommended to increase compressor life, and supplied as standard on 4PE, shallow and pumped outlet versions.

6 **RCD/Electrical connection (Ensign:Ultra units only)**
The RCD box provides easier installation and proveds a higher degree of safety. (Regular plug/socket connection on Ensign:Standard models).

7 **PVC pressure pipe/diffuser(s)**
Provides a protective conduit for the air diffuser line. Can be easily removed for maintenance and cleaning.

8 **Bio-media**
High specification bio-media (310m^3 per m^2) and membrane diffusers ensure even circulation to eliminate 'dead spots'. The bio-media is contained by a stainless steel securing mesh to ensure no migration during handling or potential flooding.

9 **Stainless steel mesh (Ensign:Ultra units only)**
Retains media in aeration chamber during transportation and handling, and in the event of flooding.

10 **Final settlement chamber**

11 **32mm sludge return**
Larger diameter sludge return prevents the possibility of blockages and improves system circulation. Provides higher effluent quality whilst balancing flow over a 24 hour period or periods of intermittent use.

12 **Unique Polylok tertiary filter (Ensign:Ultra units only)**
The Polylok tertiary filter reduces suspended solids and BOD by a further 40% helping to extend drainage field life.

13 **Outlet with 'Forsheda seal'**
Forsheda seal provides flexibility in the joint for easier installation.
Optional pumped outlets are available.

14 **Impermeable lid (Ensign:Ultra units only)**
Heavy duty lid/frame improves strength and durability whilst blending into the surrounding environment. (Regular lid on Ensign:Standard models).

15 **Integral lifting eyes**
For safe and secure on-site handling.

16 **Stabilising feet**
Stabilising feet prevents the tank from rolling and allows safe and steady transportation and installation.

17 **Unique 'keying-in' lip**
Assists anchoring into granular or concrete surrounds.

Guidance notes

Package Sewage Treatment Plant's (or PSTP's) are often a suitable option where groundwater in the surrounding environment is vulnerable, drainage field percolation values are restrictive, or direct discharge to a water course or surface water sewer is the prefered discharge method.

- *PSTP's should be sized using the latest version of British Water Flows & Loads which provides detailed information on sewage production figures and sizing calculations*
- *Regulatory authorities for the control of pollution in the UK normally require treatment plants conforming to BSEN12566:3 to be demonstrated as capable of producing a minimum effluent discharge quality of 20:30:20 (Biochemical Oxygen Demand;Suspended Solids: Ammoniacal Nitrogen in mg/ltr), although in certain areas more stringent site-specific qualities may be required*
- *No surface water should enter the system as this can reduce the system's capacity and cause solids to be flushed out which may prematurely block drainage field or cause pollution*
- *As with septic tanks sludge should be removed annually or in line with manufacturers instructions*

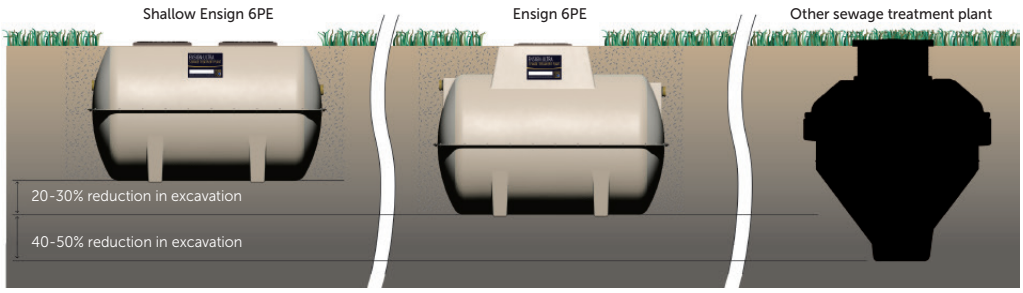
Many domestic sewage treatment plants offered by "internet resellers" claim to hold EN12566-3 compliance. This does not necessarily mean compliance with the UK National Forward, May 2007.

These plants may have been tested in their country of origin but not tested to the same criteria as Marsh Industries, where we strictly adhere to the UK National Forward. Contact contracts@marshindustries.co.uk for more information.

Shallow units

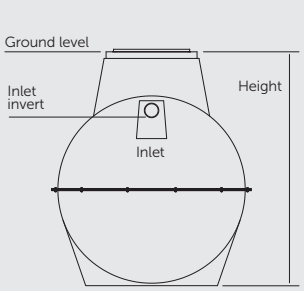
Common sewage treatment plants on the market often exceed 2.3m high. Marsh Industries offer a range of shallow plants from 4-35PE that are only 1.6m in height, meaning installation is not only possible*, but easier and safer too.

**Shallow Ensign's are often favoured when hard rock site conditions mean deeper alternatives, involving costly and time-consuming excavation.*

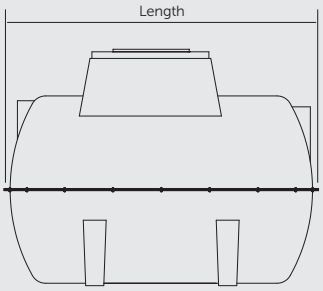


Specifications

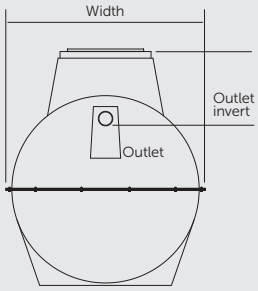
Ensign:Ultra and Ensign:Standard



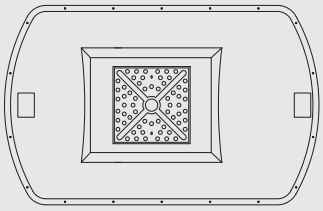
View on inlet end



Typical side elevation

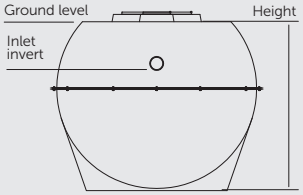


View on outlet end

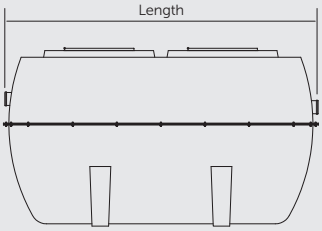


Typical plan view

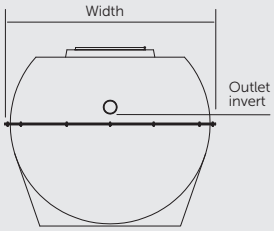
Shallow Ensign:Ultra and Shallow Ensign:Standard



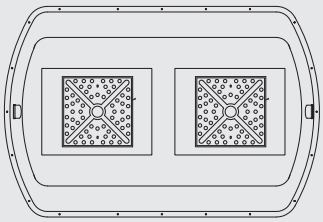
View on inlet end



Typical side elevation



View on outlet end



Typical plan view

Ensign:Ultra and Ensign:Standard

Model	Length	Width	Height	Inlet		Outlet	
(Pop)	+/-50mm	+/-50mm	+/-50mm	Invert	Ø	Invert	Ø
4	1600	1332	1575	540	110	600	110
6	2602	1650	1935	550	110	625	110
8	2602	1650	1935	550	110	625	110
10	2602	1650	1935	550	110	625	110
12	2860	1912	2139	550	110	625	110
16	2860	1912	2284	720	110	800	110
20	3650	1912	2284	720	160	800	160
25	3650	1912	2284	770	160	850	160
30	4200	1912	2284	770	160	850	160
35	4200	1912	2284	770	160	850	160
40	5200	1912	2284	770	160	850	160
45	5200	1912	2284	770	160	850	160
50	5200	1912	2284	770	160	850	160

Shallow Ensign:Ultra and Shallow Ensign:Standard

Model	Length	Width	Height	Inlet		Outlet	
(Pop)	+/-50mm	+/-50mm	+/-50mm	Invert	Ø	Invert	Ø
6	2860	1912	1600	500	110	575	110
8	2860	1912	1600	500	110	575	110
10	2860	1912	1600	500	110	575	110
12	2860	1912	1600	500	110	575	110
16	3400	1912	1600	500	110	575	110
20	4200	1912	1600	500	160	575	160
25	4200	1912	1600	500	160	575	160
30	5200	1912	1600	500	160	575	160
35	5200	1912	1600	500	160	575	160

Notes:

> *Larger population sewage treatment plants may be supplied as multiple tank configurations.*
> *For precise tank sizes and configurations, please contact Marsh Industries*
> *All dimensions in mm*

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