Tpw Systems Ltd

Total Wastewater/Sewage Solutions

- Site Assessment, Design, Supply & Installation
- Septic Tank, Sewage & Wastewater Treatment Systems
- Percolation Area and Wetland Systems

www.TPW.ie

Ballyheige, Screen
Enniscorthy, Co. Wexford
053/9137650 087/2600438
E: npquaid@gmail.com

Client - SSE Great Island, New Ross, Co Wexford
Main Contractor – David Flynn Ltd, Co. Waterford

Ref; Supply and installation of wastewater Treatment system, Contractors Compound.

Dear Sir Madam

I can confirm that we have supplied and fitted ;-

Treatment System
Eurotank P11 plant EN12566/3 SR66 certified as per attached site specific proposal and specifications, loadings and drawings provided.

The soil polishing filter
150m2 pipe network on 200m2 infiltration area bed with integrated pump discharge pipe network as originally specified, Attached site specific, low pressure pipe network design.

Storage Tank
Molloy precast 25m3 single tank as per attached drawing.

The system is fully fitted, commissioned and ready for use.

Images of Installation

Percolation area

Treatment System

Storage Tank

Please find attached

- Site specific report and Treatment System certification
- Low pressure pipe network design
- Maintenance agreement
- Owners Manual.
- User Do`s Dont`s
- Installation certification.

Kind Regards

Nigel Quaid, Tpw Systems Ltd.
087/2600438

Tpw Systems Ltd
Total Wastewater/Sewage Solutions

Ballyheige , Screen
Enniscorthy
Co. Wexford
Y21 W656
CRO 523683

PHONE 00353 87 2600438 EMAIL npquaid@gmail.com WEB www.TPW.ie

EuroTank

Wastewater Treatment Systems

Mr Joseph Dempsey
DFL Ltd.
Waterford

Date 12/2/20

REF: Site Specific Proposal for EuroTank Wastewater Treatment System

- Sizing and Specification
- Drawings/Configurations
- En12566/3 SR66 Certification
- Important Notes
- Specification for Ground Disposal, Percolation area, Tertiary Treatment System Options,
  - Gravity Discharge Percolation Trenches ☐
  - Pumped Discharge ☑
  - Sand Polishing Filter, Tertiary Treatment ☐

For Your Client;
Client Name, **SSE Power St.**
Site Address;. **New Ross, Co. Wexford**

Our Ref; DFL sse LP SSR

Dear Joseph

Thank you for your enquiry re upgrade Wastewater Treatment System for your Clients SSE Great Island

We have examined all the documents you sent and noted that the specification is for Secondary wastewater Treatment System, polishing filter and Storage for peak flow.

The following is our proposal to supply and install the entire plant.

Storage

The original specification was for storage tanks of **25m3** to cater for peak season staff off-side from the treatment plant.
The storage we propose is in 1 Tank.

Treatment System and polishing Filter

The original specification was for P10 treatment plant with 150M2 soil polishing filter.
We are proposing our P11 plant This will be sufficient for 25 staff calculated as per Table 3 Epa Code of practice as follows.
Plant is designed for Hydraulic loading of 1650lts
The soil polishing filter is a 150m2 pipe network on 200m2 infiltration area bed with integrated pump discharge pipe network as originally specified.

Certification

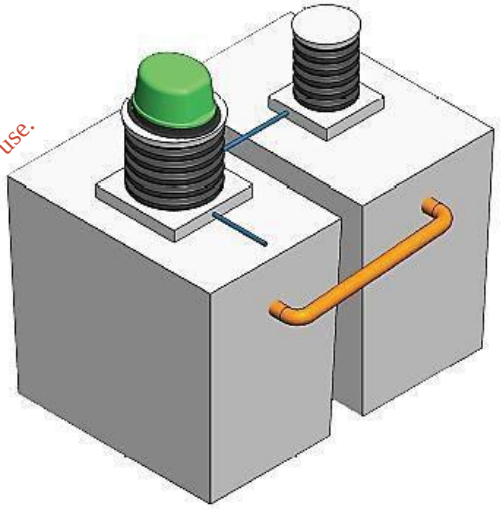
We can offer a full cert of compliance with Epa Code of Practice for the entire built system

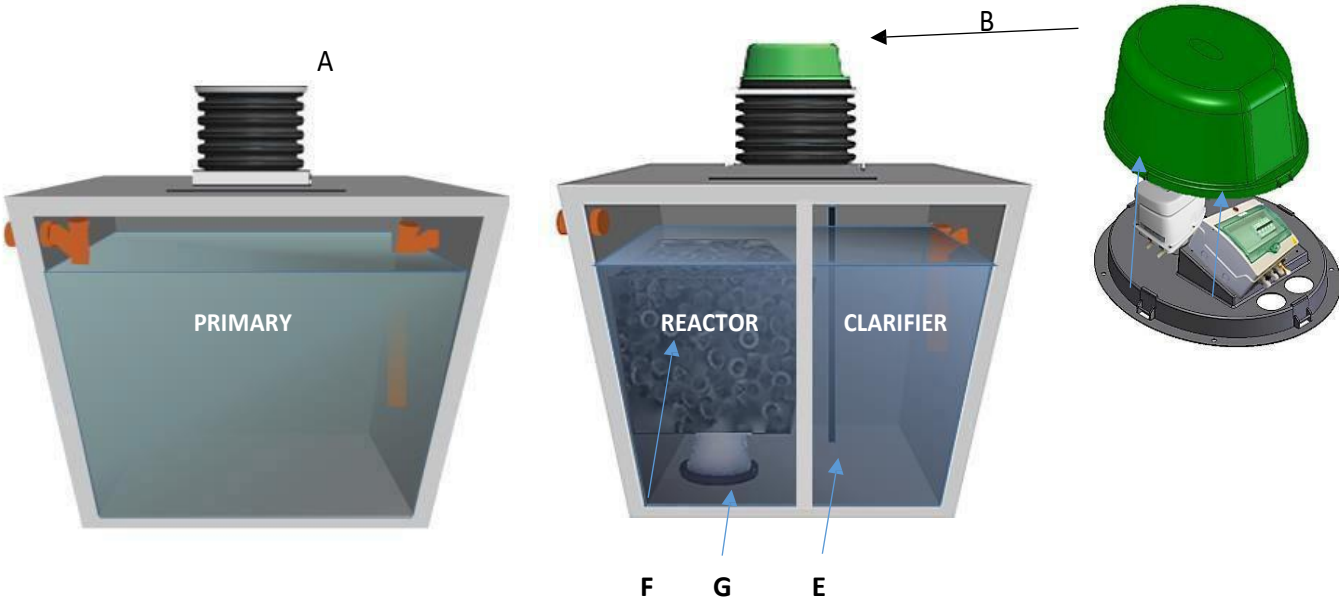
We have examined the information sent to us by you and noted the following;

Tvalue 38.22	Pvalue 34.44
Bedrock shale @ none m Below Ground Level	Watertable/Mottling/ingress @ nom below Ground Level
Population Equivalent PE 11	Industrial with Hydraulic loading 1500
Specification for Secondary Wastewater treatment system with pump discharge soil polishing filter semi raised **150m2 pipe network on 200m2 inmfiltration area.**	
PROPOSAL We propose our **EuroTank BAF P11** Secondary Wastewater Treatment plant as alternative with no change to infiltration via soil Polishing Filter **150m2 on 200m2 infiltration area.**	

Population Equivalent PE	PE11
Certification	By Pia Gmbh To En12566/3 SR66 as listed for Irish use. (ATTACHED)
Effluent Quality As per Pia Test	BOD_5 - **12 mg/lt** *<20mg/l required* SS - **15 mg/lt** *<30mg/l required* NH_4-N - **0.3 mg/lt** *<20mg/l required* Exceeding Irish Requirement
Electrical- Consumption - *Cable -* Protection *Not Included	0.62 kwH/D c €167/Year 2.5mm2 x 3 core SWA (up to 100m run) RCD 16 amp,230v ,30ma ,Bs 4293 standard
Concrete	45N, Fibre reinforced
Alarm	Audible for pump failure
Outlet	Gravity or Pumped
Optional Extra`s	Risers – 600mm Dbl wall Coripipe Pump stations Integrated pumped distribution piping

ExampleP6 EUROTANK BAF 2A2





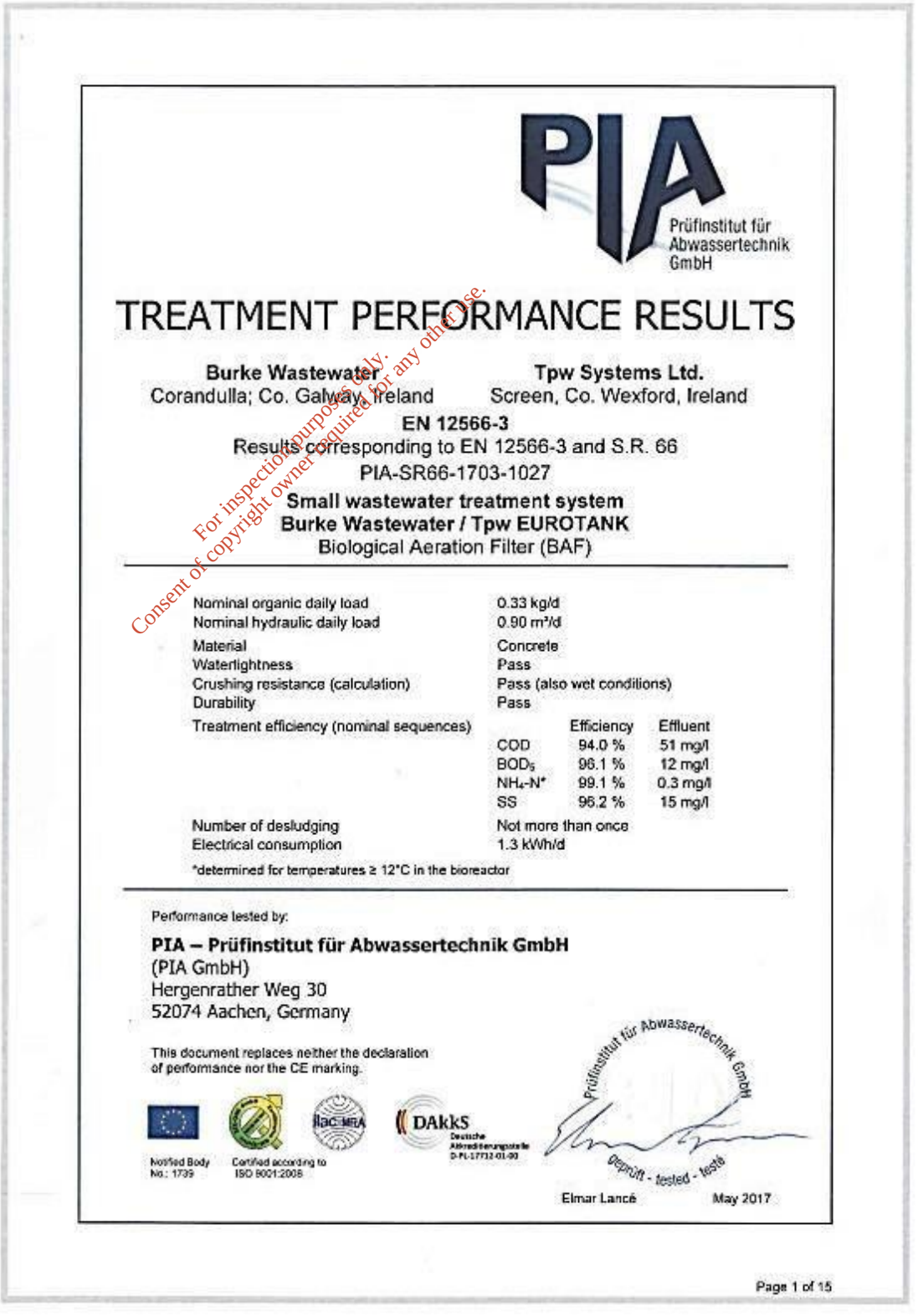
A Pvc Risers, sealed no leaks, Ground Adjustable
B: Blower, Aesthetic control unit housing
C: ECO Blower unit
D: Control unit with built in Mcb`s & alarm
E: Sludge return, solids removal & activated sludge
F: Media Bed G: Aeration Diffuser

Internal Treatment Process & Chamber Layout

The unit consists of 3 chambers housed in 2 Tanks

CHAMBER 1 – Primary settlement tank/chamber, receives & settles raw sewage
CHAMBER 2 – Reactor Chamber, Biological treatment by use of aeration and high specification media
CHAMBER 3 – Clarifier, Any remaining suspended solids are allowed to settle & are transferred by airlift to primary chamber to aid denitrification.
Final effluent leaves chamber 3 via gravity or optional effluent pump.

EN12566/3
SR66 CERTIFICATION



PIA
Prüfinstitut für Abwassertechnik GmbH

TREATMENT PERFORMANCE RESULTS

Burke Wastewater
Corandulla; Co. Galway, Ireland

Tpw Systems Ltd.
Screen, Co. Wexford, Ireland

EN 12566-3
Results corresponding to EN 12566-3 and S.R. 66
PIA-SR66-1703-1027

Small wastewater treatment system
Burke Wastewater / Tpw EUROTANK
Biological Aeration Filter (BAF)

Nominal organic daily load	0.33 kg/d
Nominal hydraulic daily load	0.90 m³/d
Material	Concrete
Watertightness	Pass
Crushing resistance (calculation)	Pass (also wet conditions)
Durability	Pass

Treatment efficiency (nominal sequences)

	Efficiency	Effluent
COD	94.0 %	51 mg/l
BOD_5	96.1 %	12 mg/l
NH_4-N*	99.1 %	0.3 mg/l
SS	96.2 %	15 mg/l

Number of desludging	Not more than once
Electrical consumption	1.3 kWh/d

*determined for temperatures ≥ 12°C in the bioreactor

Performance tested by:

PIA – Prüfinstitut für Abwassertechnik GmbH
(PIA GmbH)
Hergenrather Weg 30
52074 Aachen, Germany

This document replaces neither the declaration of performance nor the CE marking.

Notified Body No.: 1739
Certified according to ISO 9001:2008
DAkkS Deutsche Akkreditierungsstelle D-PL-17712-01-00

Prüfinstitut für Abwassertechnik GmbH
Geprüft - tested - testé

Elmar Lancé May 2017

Page 1 of 15

Infiltration Area/Percolation

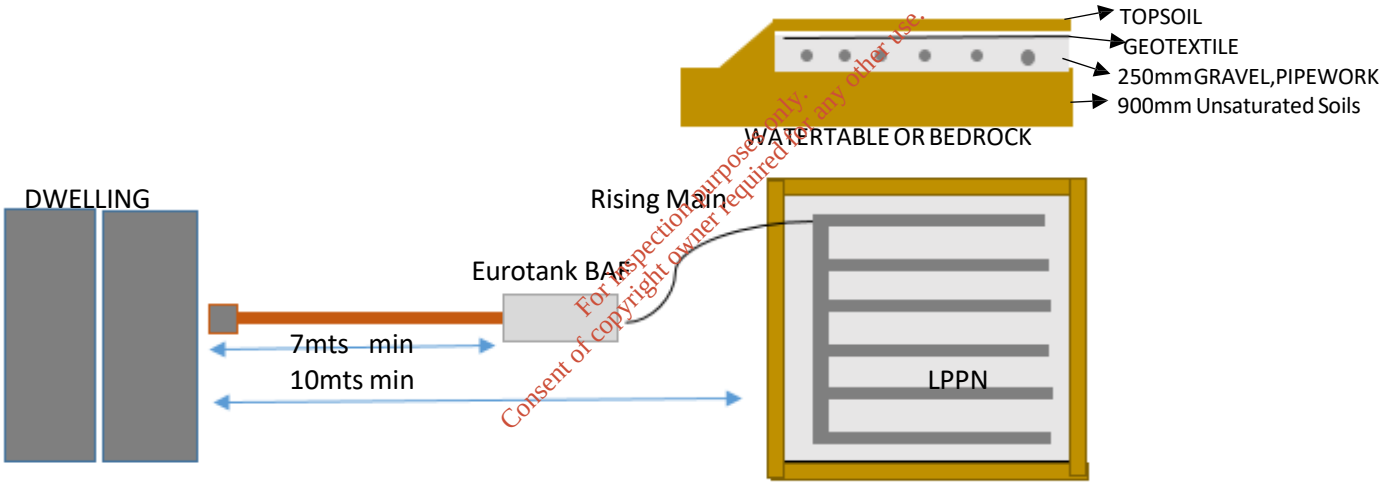
The following is a typical specification and layout for an infiltration suitable for this application and site

Sized in accordance with *Option 2 Section 10.1 & Table 10.1 Epa Code Of Practice. And subsequent clarifications NOV 2012.*

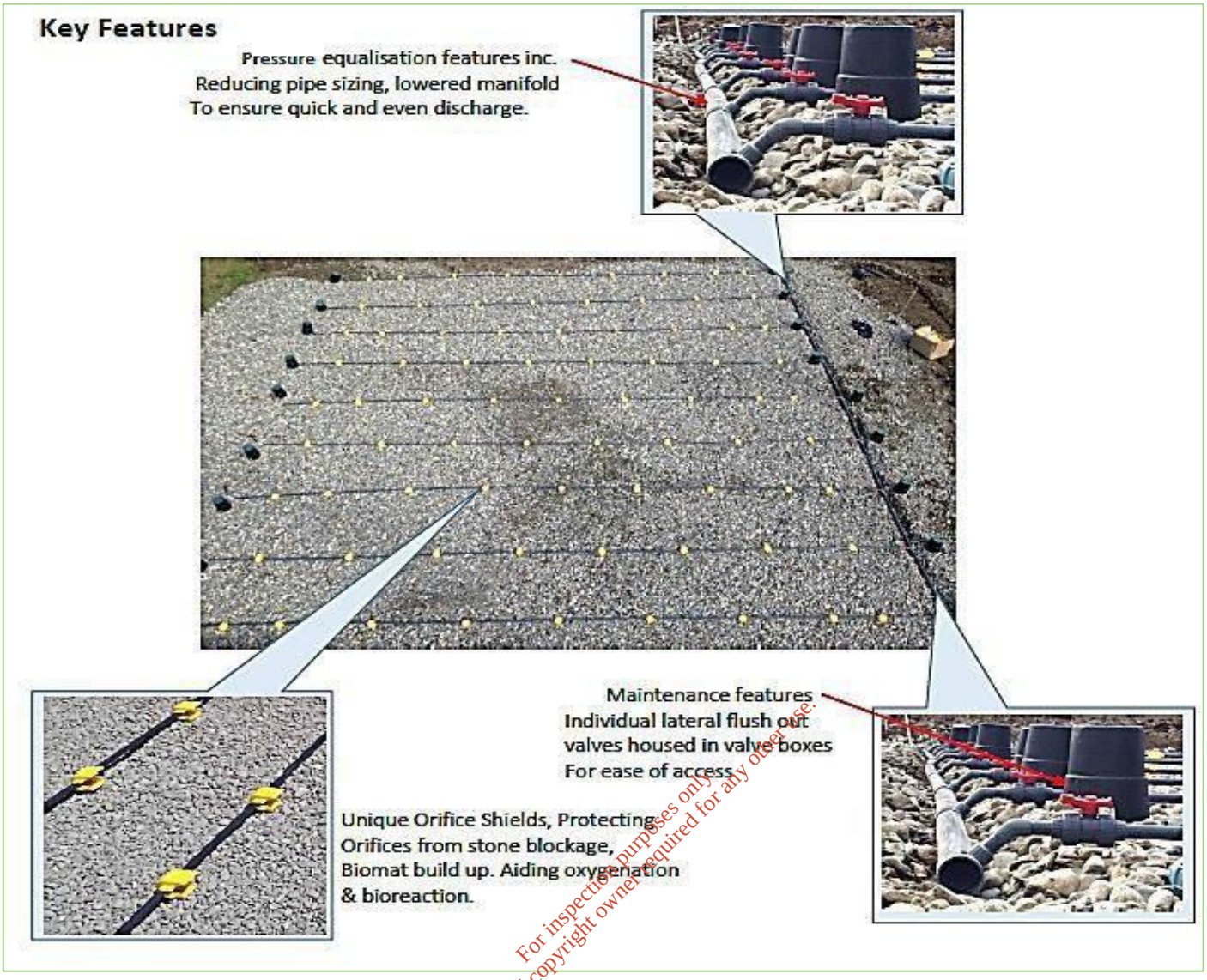
For T value of 34 and PE of 10 = **report recommends soil polishing filter of 150m2**

Additional information on site specifically designed integrated pump discharge pipe network;-
Description
Treated wastewater or effluent from the proposed EuroTank BAF is pumped to the infiltration area via a rising main pipe to the main manifold of the Low pressure pipe network LPPN, which evenly distributes the effluent over the entire area in a bed of stone. The soil polishing filter may be at ground level or raised depending on the findings of the percolation test **but must have a minimum of 900mm of un-saturated free draining soil.**
Distribution gravel must be, 25mm clean crushed or pebble with a minimum of 250mm depth.

Schematic layout



*The pump system in Our EuroTank BAF and LPPN will be matched as an integrated system, with all site specific parameters, such as elevations, rising main length etc. calculated before installation. Full design report Available on request.



Important Notes

- This proposal is based on information from the site characterisation form supplied by the client for this site only.

- Final specification should be passed by Site Engineer before installation. Installation should also be supervised by suitably qualified Engineer and in accordance with installation instructions supplied with the unit.

- Installation should be in compliance with Epa Code of Practice 2009 guidelines with particular attention to separation distances to wells etc, with DoEHLG Building Regulations Part H and Planning Permission Conditions.

- Maintenance agreement is available after commissioning of the unit.

Tpw Systems Ltd Offer a Full Supply & Installation Service.

Please be assured of our full co – operation in the project and please let me know if you need more information

Kind Regards

Nigel Quaid, Tpw Systems Ltd 087 2600438

Email npquaid@gmail.com Web www.TPW.ie

ME
MUNSTER
ENVIRONMENTAL

Design of 150m² Low Pressure Pipe Distribution Network

Client **SSE Great Island**

For **Tpw Systems Ltd**

Munster Environmental
27 Oldcourt
Greenfields
Killumney Rd
Co. Cork

Contact:
Tim Clifford
info@munsterenvironmental.com
087-9903697

Design solution for 150sq.m Low Pressure Pipe Distribution Network.

The design of the low pressure pipe network is based on the *US EPA Wastewater Design Manual Onsite Wastewater Treatment and Disposal Systems, EPA 625/1-80-012*. The IRL Code of Practice makes reference to this design manual on page 103 of the CoP.

In the event of any future installation I will be in a position to supply, deliver and/or install, the Low Pressure Pipe Distribution Network.

Once the installation has been completed and pressure tested I will provide a commissioning certificate which can be submitted as part of the compliance certificate for the local authority.

Kind regards,

Tim Clifford

Tim Clifford, BSc.
Munster Environmental
087-9903697

Contents

Introduction:

The EPA COP Manual states on page 44 Section 10.1.1. Pumped discharge "The detailed design should conform to best practice as outlined in the design manuals".

Margaret Keegan, Inspector, Office of Environmental Enforcement, EPA in correspondence with Tim Clifford of Munster Environmental confirmed that the COP is not a complete design manual and one of the design manuals that the EPA would refer to is the US EPA design manual. (Correspondence between EPA & Munster Environmental pg.5)

The IRL Code of Practice makes reference to this design manual on page 103 of the CoP.

The design here within is based on the following docs:-

- US EPA design manual, US EPA (2002) Onsite Wastewater Treatment Systems Manual. No. PA/625/R-00/008.
- Design of Pressure Distribution Networks for Septic Tank- Soil Absorption Systems" by Otis, 1981.
- Pressure Distribution Component Manual for Private Onsite Wastewater Treatment Systems" by the State of Wisconsin, Department of Commerce, 1999.
- IRL EPA Code of Practice
- Submitted Site Characterisation Report
- Mound Component Manual for Private Onsite Wastewater Treatment Systems (v2.0) 2001

Design Calculations:

Calculations and designs within the USA EPA Manual are based on Imperial measurements. i.e. Feet/inches and gallons.

Calculations within this proposal are based on both imperial and metric. i.e. Where pipe sizes have been calculated and expressed in imperial measurements these sizes have been converted to metric.

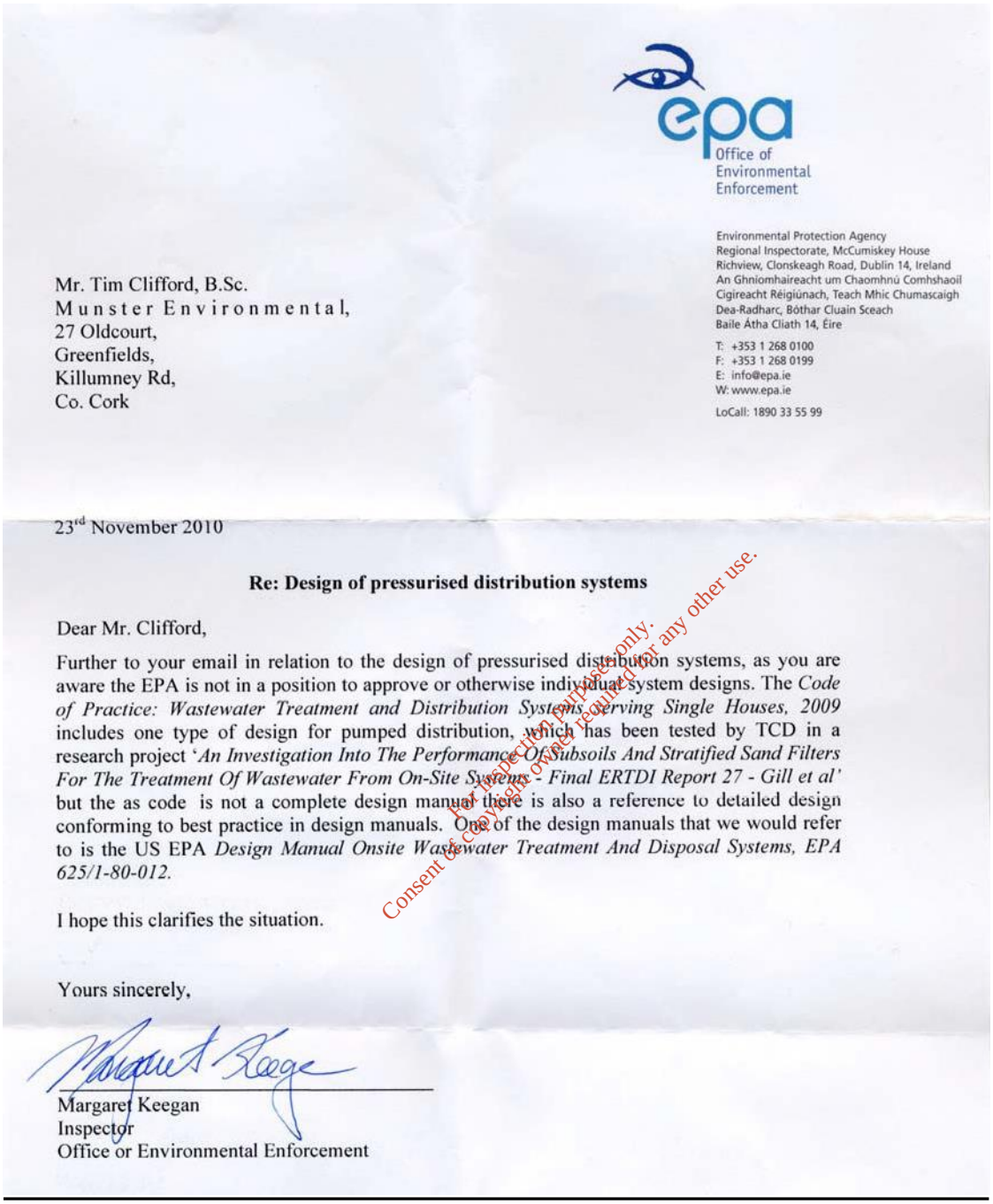
Technical Manuals from manufacturers have been used to cross reference the imperial pipe sizing with the equivalent metric sizing.

Pipe & Fittings:

PVC (polyvinyl chloride) pipe and fittings within the soil polishing filter are manufactured in accordance with Metric DIN 8061-2, KIWA 49 (rev 1) and Metric ISO 727, EN 1492, KIWA 54 respectively. The pipe and cement are UK Water Regulations Advisory Scheme Approved and Listed under licence no. 9902025. The PVC- Pressure pipe is rated at 10 bar and tested to 20° C.

Note: Under NO circumstances is "white" waste pipe to be used in any part of the Soil Polishing filter unless the product has the site specific pressure testing certification.

Correspondence Munster Environmental/EPA



epa
Office of
Environmental
Enforcement

Environmental Protection Agency
Regional Inspectorate, McCumiskey House
Richview, Clonskeagh Road, Dublin 14, Ireland
An Ghníomhaireacht um Chaomhnú Comhshaoil
Cigireacht Réigiúnach, Teach Mhic Chumascaigh
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T: +353 1 268 0100
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E: info@epa.ie
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LoCall: 1890 33 55 99

Mr. Tim Clifford, B.Sc.
Munster Environmental,
27 Oldcourt,
Greenfields,
Killumney Rd,
Co. Cork

23rd November 2010

Re: Design of pressurised distribution systems

Dear Mr. Clifford,

Further to your email in relation to the design of pressurised distribution systems, as you are aware the EPA is not in a position to approve or otherwise individual system designs. The *Code of Practice: Wastewater Treatment and Distribution Systems serving Single Houses, 2009* includes one type of design for pumped distribution, which has been tested by TCD in a research project '*An Investigation Into The Performance Of Subsoils And Stratified Sand Filters For The Treatment Of Wastewater From On-Site Systems - Final ERTDI Report 27 - Gill et al*' but the as code is not a complete design manual there is also a reference to detailed design conforming to best practice in design manuals. One of the design manuals that we would refer to is the US EPA *Design Manual Onsite Wastewater Treatment And Disposal Systems, EPA 625/1-80-012.*

I hope this clarifies the situation.

Yours sincerely,

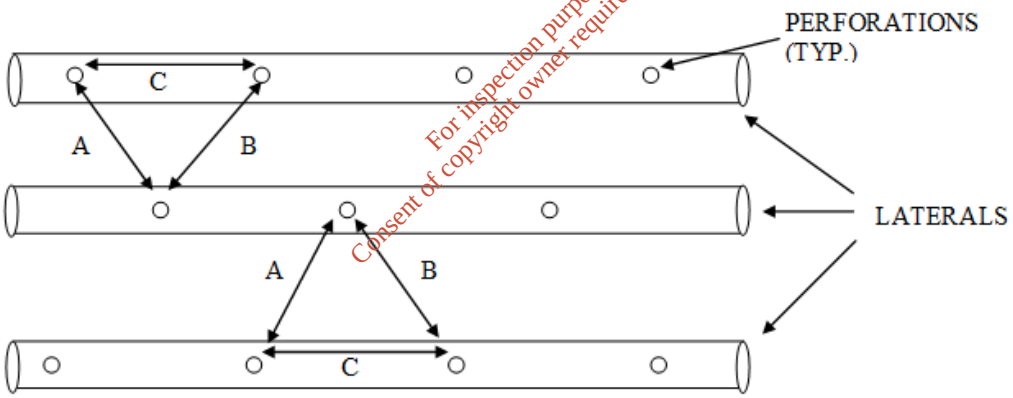
Margaret Keegan
Inspector
Office or Environmental Enforcement

Step 1: Design Parameters

FLOWS AND LOADS	
Area required (m²) based on Total Daily Hydraulic Loading (l) and Hydraulic Loading Rate (l/m²/d)	150 (min)
Volume of a single dose to Soil Filter	≥5 times the void volume of the lateral(s) and ≤ 20% of the Design Wastewater Flow
Head pressure at distal end of lateral(s)	≥ 2.5 ft
Flow velocity in force main and manifold	≥ 2 ft/sec and ≤ 10 ft/sec

Step 2: Select Perforation Size and Spacing

Uniform distribution can best be achieved by providing as many uniformly spaced perforations as is practical. The perforations between any two laterals are staggered so that they lie on the vertices of isosceles triangles. In this case, the number of perforations in each lateral may differ. All discharge calculations account for all perforations.



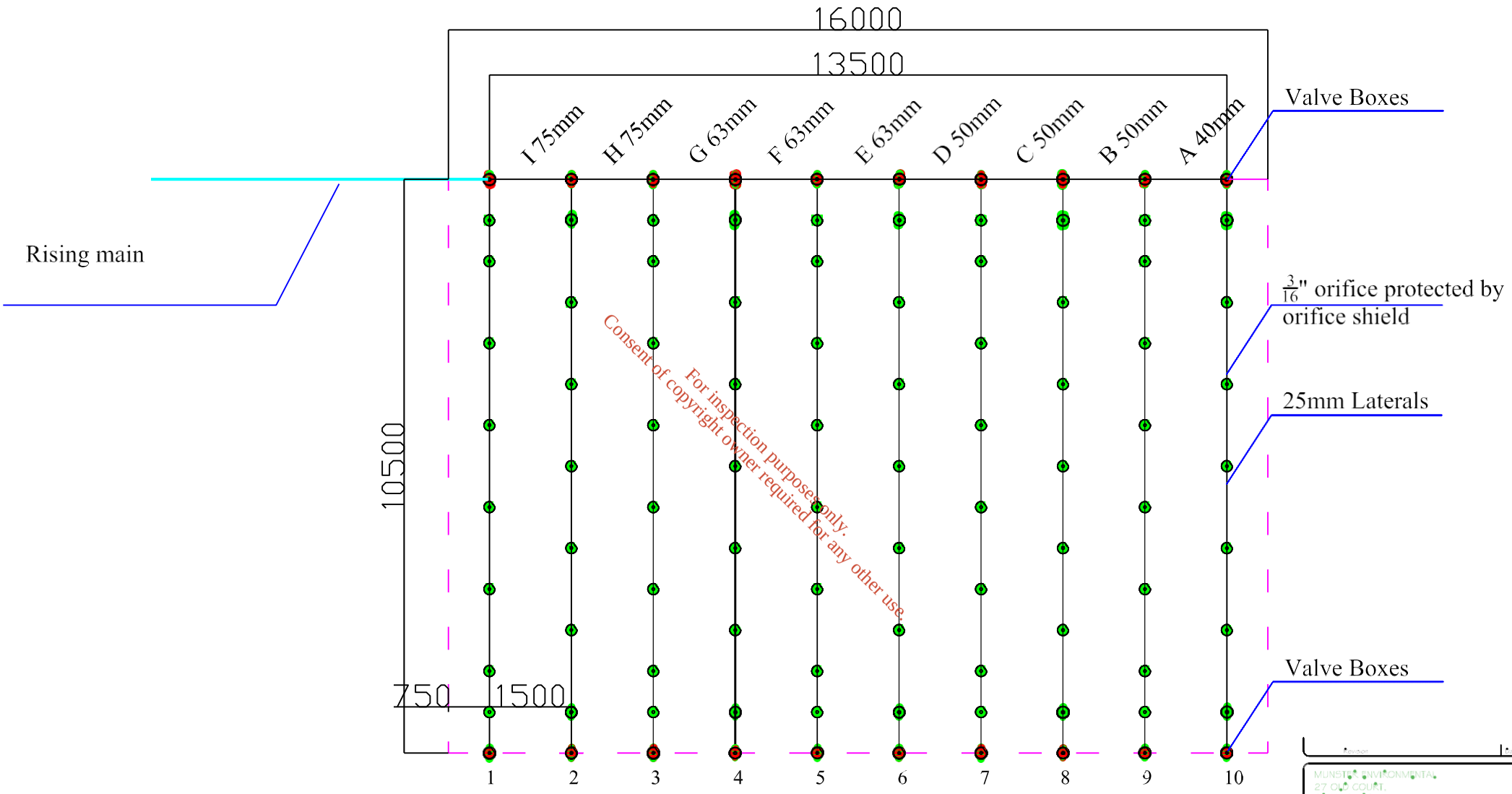
ISOSCELES LATERAL PERFORATION LAYOUTS

This design has perforation of $^{3}/_{16}$ inch with a maximum spacing between orifices of 1.50m (X=5ft.). For even distribution throughout the entire soil polishing filter the spacing between laterals is exactly the same as spacing between the orifices. i.e. 1.50m (5ft).

Munster Environmental
27 Oldcourt
Greenfields
Killumney Rd
Co. Cork

Contact:
Tim Clifford
info@munsterenvironmental.com
087-9903697

150Sq.m Low Pressure Pipe Network



Lateral No. 1,3,5,7,9 = 8 orifices Lateral No. 2,4,6,8,10= 7 orifices
Total No.= 75 orifices

ZONE 1 & 2 identical layout. Each zone controlled by an indexing valve.

Notes

No.	Date

MUNSTER ENVIRONMENTAL
27 OLD COURT,
GREENFIELDS,
CORK.
Mob: 087 9903697
email: info@munster-environmental.com

SCALE: 1:100
DATE: Aug 15

TITLE: 150sq.m Soil Polishing Filter

DRAWING NO.:

SIZE AND ORIENTATION	
Area Required (m²)	150 (actual size on plan 157.5)
Layout of Soil Polishing Filter (SPF) (m)	15 X 10.5
Manifold Configuration	End
Distance from 1st & last orifice to edge of SPF (m)	0.75 (1/2 the distance between laterals)
Distance from manifold to edge of SPF (m)	13.5 (44.3')
Manifold Length (m)	10.50 (34.5')
Lateral Length (m)	1.50
Distance between laterals (m)	150 (actual size on plan 157.5)

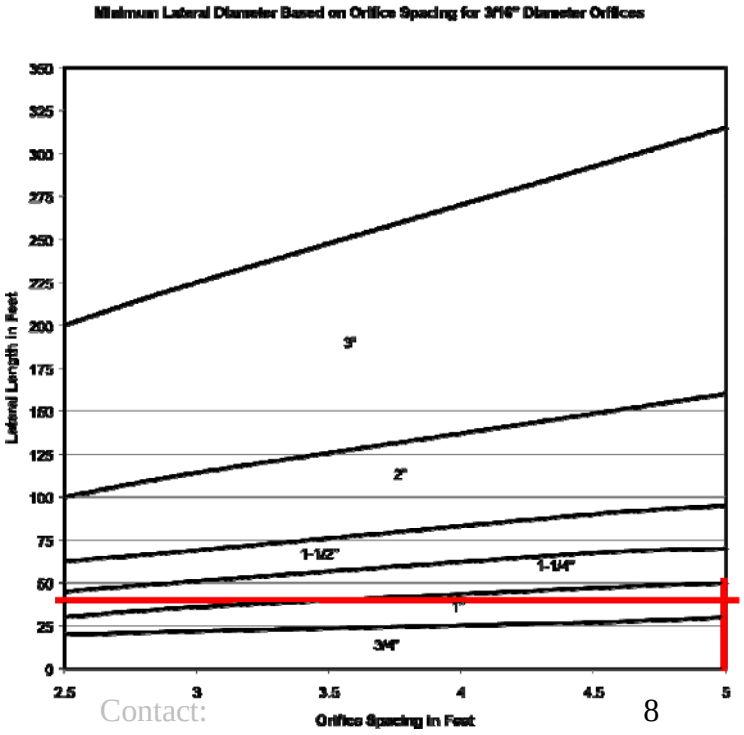
Step 3: Select Lateral Diameter

To ensure uniform effluent application over the entire length of the lateral trench, the first and last perforations in the lateral will be located one-half the perforation spacing from either end of the lateral i.e. 0.625m. However, to ensure even distribution throughout the soil polishing filter the first and last perforation will be located approx one-half the perforation spacing from either end of the perimeter of the soil polishing filter. i.e. 0.625m

3. LATERAL SIZING	
Diameter of lateral (from Graph 6)	1" or 25.4mm
Diameter of lateral in metric	22mm ID 25mm OD **closest metric sizing**
Diameter of discharge orifice (inches)	3/16"
Total Lateral Length (m)	10 (32.8')

From Graph: Minimum diameter for a 10.5m (34.5 ft) lateral with 1.50m (5 ft) spacing's is 1". In metric the closest pipe sizing is 22mm Internal Diameter and 25mm External Diameter.

Graph 6



Step 4: Calculate the Lateral Discharge Rate

From equation: $q = 11.79 d^2 h_d^{0.5}$

Perforation diameter inches $3/16$

Inline Pressure in feet 2.50

Dimesionlist Coffecient 11.79

A $3/16$ perforation will have a discharge rate = 0.66 gpm

VIII. TABLES

Table 4
Discharge Rates in Gallons per Minute from Orifices[a]

Pressure in feet	Orifice Diameter			
	1/8	5/32	3/16	1/4
2.5	NP	NP	0.66	1.17
3	NP	NP	0.72	1.28
3.5	NP	0.54	0.78	1.38
4	NP	0.58	0.83	1.47
4.5	NP	0.61	0.88	1.56
5	0.41	0.64	0.93	1.65
5.5	0.43	0.68	0.97	1.73
6	0.45	0.71	1.02	1.80
6.5	0.47	0.73	1.06	1.88
7	0.49	0.76	1.10	1.95
7.5	0.50	0.79	1.14	2.02
8	0.52	0.81	1.17	2.08
8.5	0.54	0.84	1.21	2.15
9	0.55	0.86	1.24	2.21
9.5	0.57	0.89	1.28	2.27
10	0.58	0.91	1.31	2.33

Note a: Table is based on - Discharge in GPM = 11.79 x Orifice Diameter^2 in inches x (Pressure in Feet)$^{1/2}$
NP means not permitted

Step 4: Lateral Discharge Rate

LATERAL DISCHARGE RATE	
Discharge Rate per perforation (gpm)	0.66
Laterals No. 1,3,5,7,9	08 no. perforations each
Laterals No. 2,4,6,8,10	09 no. perforations each
Total No. perforations	85
Min Discharge Rate (gpm)	56.1

Step 5: Calculate the Manifold Size

Manifold Length 9 X 1.50m= 13.5m **(44.3ft)**

In order to save costs and improve performance, a telescoping manifold allowing smaller diameter pipe downstream can be designed. In this design, the value for **f** would be equally divided among all the segments and would be calculated as $0.1/9$

The following formula was used to calculate the diameter of the various segments.

$$F_i = (9.8\times10^{-4})Q_i^{1.85}$$

$$D_m = \left[\frac{\sum_{i=1}^{M} L_i F_i}{f\, h_d}\right]^{0.21}$$

Li	Length of the Segment (ft)	5
Hd	Inline Pressure in (ft)	2.50
f	must be less than or equal to	0.1
Fi		from above

Segment No	Qi	Fi	Sum Fi	Dia (Inch)	Dia Metric (mm)	Nearest Pipe sizing in Metric (mm) OD
A	5.28	0.021	0.021	1.32	33.53	40
B	9.9	0.068	0.089	1.55	39.37	50
C	15.18	0.150	0.240	1.75	44.45	50
D	19.8	0.246	0.485	1.91	48.51	50
E	25.08	0.380	0.865	2.06	52.32	63
F	29.7	0.520	1.385	2.19	55.63	63
G	34.98	0.704	2.089	2.31	58.67	63
H	39.6	0.885	2.974	2.42	61.47	75
I	44.88	1.116	4.089	2.52	64.01	75

Thus, manifold segments:
A 40mm segment
B-C-D 50mm segments
E-F-G 63mm segments
H-I 75mm segments

Please note: As this is a telescoping manifold the start of the manifold will consist of 3.0m of 75mm pipe, 4.5m of 63mm pipe, 4.5m of 50mm pipe and 1.5m of 40mm pipe. Total Length of manifold is 13.5m.

MANIFOLD SIZING	
No. Segments	9
Manifold Segments	1.25
Manifold Length (m)	11.25
Manifold Diameter	A 40mm segment B-C-D 50mm segments E-F-G 63mm segments H-I 75mm segments

Step 6: Determine the Dose volume

DETERMINE DOSE VOLUME	
Crown elevation of the manifold is located below the lateral invert elevation.	
Manifold does not drain back to the pump chamber.	
Minimum dose volume is based on the lateral pipe volume only.	
Minimum dose volume is 5 times the total lateral volume.	
Number of Laterals	10
Diameter of Laterals	25mm OD 22mm ID **closest metric sizing**
Total Volume of Laterals L	40
Total Dose Volume L	**200**

Step 7. Calculate Friction Loss within the LPPN.

7(a) Network Losses = 1.31 h_d = 1.31 x 2.5 ft = 3.28ft

7(b) Losses due to Fittings = 3.6ft:

Section	No.	Component (mm)	Ext Dia (mm)	Int Dia (mm)	K, fitting Constant	Equivalent Length per Component (m)	Total Equivalent Length (m)	Total Equivalent Length (ft)	Max Flow rate (gpm)
Segment H-I	3	75 T	89	75	0.012	0.90	2.70		
	1	75 X 63 Bush	75	63	0.015	0.95	0.95		
						Total	3.65	**11.66**	49.50
Segment E-F-G	3	63 T	75	63	0.012	0.76	2.27		
	1	63 X 50 Bush	63	50	0.015	0.75	0.75		
						Total	3.02	**9.90**	49.50

Segment B-C	3	50 T	61	50	0.012	0.6	1.8		
	1	50 X 4 Bush	50	40	0.015	0.6	0.6		
						Total	2.40	**7.87**	49.50
Segment A	1	40 X 90°	51	40	0.03	1.20	1.20		
						Total	1.2	**3.94**	49.50
Laterals									
1-10	10	25 45°	25	22	0.014	0.31	3.08		
	3	75 X 50 Bush	75	50	0.014	0.70	2.10		
	9	50 X 25 Bush	50	25	0.014	0.35	3.15		
	3	63 X 50 Bush	63	50	0.014	0.70	2.10		
	1	40 X 25 Busher	40	25	0.014	0.35	0.35		
						Total	10.78	**35.36**	*5.28

- Odd No. Laterals have a discharge rate of 5.28gpm, Even No. Laterals have a discharge rate 4.62gpm. For the purposes of calculations the higher of the two rates was applied i.e. 5.28gpm.

Friction Losses Using Hazen-Williams Equation

Component	Equivalent Length (m)	Equivalent Length (ft)	Discharge Rate (gpm)	Friction Loss (ft)
H-I	3.65	11.97	49.50	0.127
E-F-G	3.02	9.91	49.50	0.246
B-C	2.4	7.87	49.50	0.67
A	1.2	3.94	49.50	.99
Laterals	10.78	35.36	5.28	1.57
			Total	**3.603**

Orifice Shields

A shield is required for any perforations located between the 10:00 o'clock and 2:00 o'clock positions and for any perforations located at the 6:00 o'clock position to reduce scouring of the soil above or below the laterals. An orifice shield is to be used over every orifice.

Summary.

- The required discharge rate for the filter is: 223 litres/min.
- The friction losses within the filter is 2.00 meters.
- The minimum discharge volume required is 200 litres per pump cycle.