



Mace Engineering Services

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6 Lennon Street
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ON-SITE WASTEWATER MANAGEMENT REPORT

BUILDER/AGENT: Astute Building

OWNER: X. Doorenbosch

SITE: Guest Accommodation
2794 South Coast Road, Foul Bay

JOB NO: 14247

DATE: 8/08/2024

RECOMMENDED SYSTEM: 3000L septic tank with outlet filter and 20m of
1200mm wide x 700mm deep soakage trench with
400mm high plastic soakage tunnel.

ENCLOSURES: SITE AND SOIL CHARACTERISTICS
SYSTEM REQUIREMENTS
CALCULATIONS SEPTIC TANK AND SOAKAGE SIZING
RECOMMENDED WASTE-WATER MANAGEMENT SYSTEM
SETBACK DISTANCES
DESCRIPTION OF INVESTIGATIVE TECHNIQUES
GENERAL NOTES
SAFETY IN DESIGN
APPENDIX A
BOREHOLE LOCATION PLAN
SURFACE SOIL BORELOG
SURFACE SOIL BORELOG - EXPLANATORY NOTES
SITE PLAN

1. SITE CHARACTERISTICS

Site Location:	2794 South Coast Road, Foul Bay
Land Use:	Primary Production
Area of Allotment:	Approximately 37.5Ha
Land Slope:	Approximately level
Distance to Watercourse:	Greater than 50m
Distance to Wells / Dams / Bores:	Greater than 50m
Surface Drainage:	Average
Flooding / Floodplain:	No
Distance to Coast High Water Mark:	Greater than 100m away
Climate / Rainfall:	442 mm/year
Evaporation:	1606 mm/year
Rocks / Rocky Outcrops:	No
Erosion Potential:	Minor
Vegetation Type:	Pasture, Isolated trees

2. SOIL CHARACTERISTICS **Refer to Surface Soil Borelogs**

Soil Classification:	SM, SP, SW
Depth to Water Table:	Greater than 3.0 metres
Depth to Refusal:	Greater than 3.0 metres
Soil Type:	Non plastic silty sand topsoil overlaying non plastic sands
Permeability Classification	
Effluent Percolation Rate:	EPR = 15 L/m ² /day

3. WASTEWATER SYSTEM DESIGN REQUIREMENTS

Wastewater system loadings taken from SA Health On-Site Wastewater Systems Code, Appendix E “Hotels, Motels and Live in Conference Centres – Accommodation”, based on usage figures provided by Mr G. Henderson of Astute Building

Average Number of Persons Using System P1= 2

Peak Number of Persons Using System P2 = 4

Water Supply = Roof Catchment and Storage

Sludge / Scum Accumulation Rate S = 48L/person/year

Daily Flow Rate DF = 100L/person/day

Other Fixtures: N/A

4. SEPTIC TANK SIZING CALCULATIONS

$$\begin{aligned}\text{Minimum Effective Capacity (L)} &= (S \times P1 \times Y) + (P2 \times DF) \\ &= (48 \times 2 \times 4) + (4 \times 100) \\ &= 784\text{L}\end{aligned}$$

ADOPT: 3000L septic tank with outlet filter

Desludging Frequency: 4 years

5. LAND APPLICATION AREA CALCULATIONS

$$\begin{aligned}\text{Required Soakage Contact Area (m}^2\text{)} &= (P2 \times DF) \div EPR \\ &= (4 \times 100) \div 15 \\ &= 27\text{m}^2\end{aligned}$$

6. RECOMMENDED SOAKAGE SYSTEM

Based on this assessment of system loading and percolation rate of the site soil, the following effluent disposal system is recommended for this site:

- **3000L septic tank with outlet filter – various manufacturers may be used providing minimum capacity is met.**
- **20 metres of plastic tunnel soakage trench, 1200mm wide x 700mm deep with 400mm high plastic soakage tunnel, providing 40m² soakage contact area**

The soakage trench should be located within the dark grey sand layer at approximately 700mm deep.

A reserve area of 40m² shall be provided for future expansion or resting of land application system, if required.

Setback Distances

Septic tank:-

- 2.5 m from any buildings or property boundary
- 10 m from water courses, wells, bores and dams

Soakage trench:-

- 2.5 m from septic tank, pump sump, property boundary

- 3.0 m down slope from building or swimming pool
- 6.0 m upslope from building or swimming pool
- 50 m from any watercourse, well, bore or dam.

7. DESCRIPTION OF INVESTIGATIVE TECHNIQUES

The field work for the geotechnical assessment was carried out on the 20th June 2024 and comprised of a site inspection and soil sampling of three sites located within and adjacent to the proposed wastewater disposal area by the push tube method to a depth of 3.0 metres. This results in a relatively undisturbed sample.

Specific site features were noted and an understanding of the adjacent land was gained. Particular note was made of the fall of the land, current drainage paths and the proximity of any water sources. A summary of the site specific features can be seen on page 2 of this report.

The field work was conducted under the direction of a Geotechnical Engineer from MES who was responsible for positioning the test sites and logging the subsurface profile encountered. The subsurface profile encountered in the boreholes is described on the attached surface soil borelogs. The logs are preceded by explanation sheets that outline the terms and symbols used in their preparation.

Further research was undertaken in the office to establish previously known information about the site, with a particular interest in soil testing results on near-by sites to compare and review the soil profiles. Aerial photographs have also been reviewed to identify any features that were not obvious at the site inspection.

8. GENERAL NOTES

The estimated percolation rate and soakage trench details are based on the soil profile shown in the attached borelogs. If the soil profile or site characteristics vary in any way, installation shall cease and this office shall be contacted to undertake further assessment of the current design and its suitability for use.

The septic tank and waste water disposal system shall be installed in accordance with SA Health 'On-Site Waste Water Systems Code'

All drain, waste and vent pipes shall be installed in accordance with AS3500-2018.

The site has been classified as "S/P (Collapsing)" therefore flexible plumbing fittings will be required.

Alternative wastewater management systems have been considered for this site, and the detailed system is considered the most appropriate. Further information regarding alternative systems can be provided on request.

9. SAFETY IN DESIGN:

Mace Engineering Services has a strong focus on Work Health and Safety (WH&S), including Safety in Design. Safety in Design, is the consideration of the health and safety of all users of the infrastructure, from construction, operation, demolition and decommissioning has been considered in this design, in accordance with the Work Health and Safety Act 2012 (SA). Eliminating hazards improves Work Health and Safety outcomes and potentially reduces the long-term cost implications of remediating design oversights.

The construction of residential on-site wastewater treatment systems, if undertaken by a licensed contractor and to 'industry standard' techniques, is considered to be a low risk operation, and the subject site does not pose any unusual hazards. Shoring, benching or other excavation stability measures shall be used where excavation depths exceed 1500mm.

It is recommended that the contractor is licensed and experienced in on-site wastewater system construction to further minimize construction hazards. Further advice should be sought during construction on any aspects of the wastewater management report if required.

Considering the above, and providing all other parties associated with the design and construction undertake their duties in accordance with WH&S and other legislative requirements, to a professional and industry standard level, we cannot foresee any significant WH&S implications or hazards that can be avoided by design.

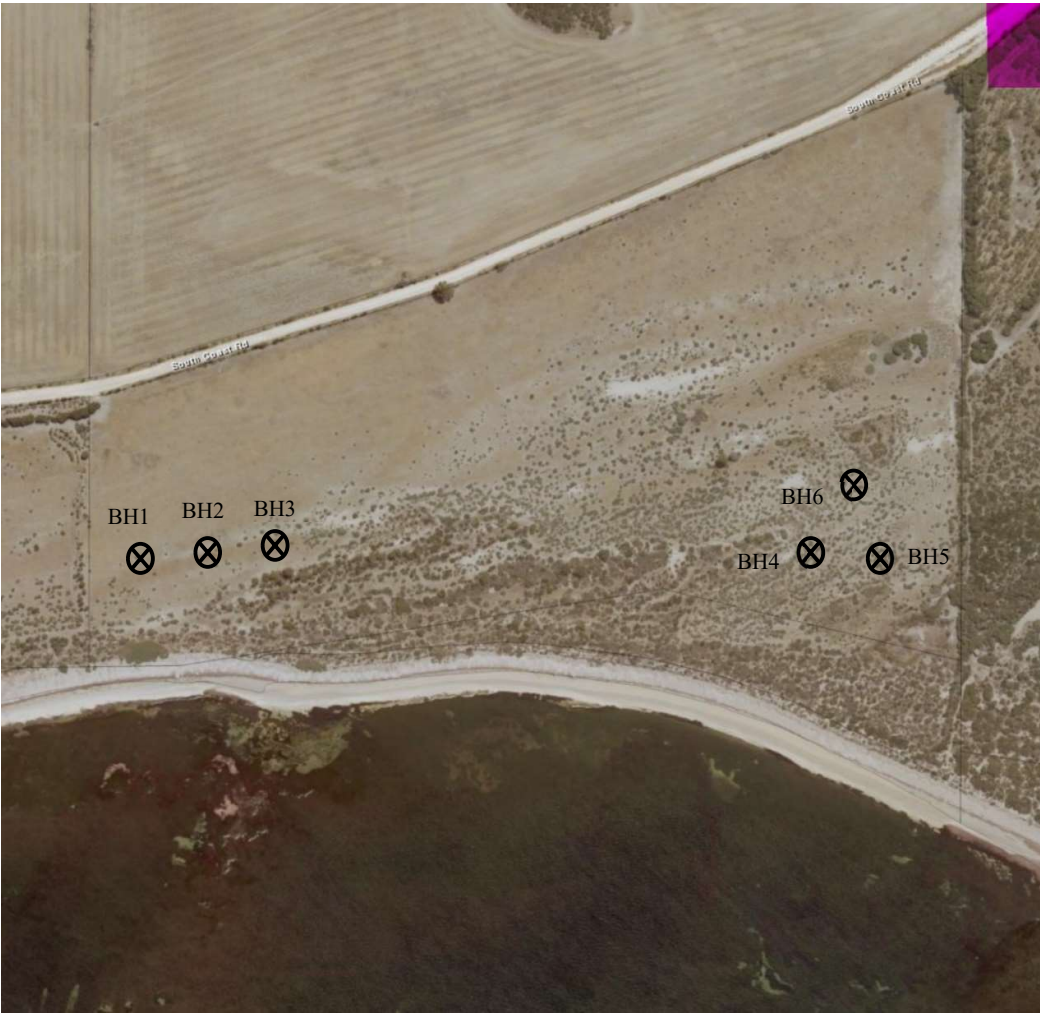


Michelle C Verco
DIRECTOR

FIEAust, CPEng, NER

APPENDIX A

MACE ENGINEERING SERVICES	6 Lennon Street CLARE 5453 Tel. (08) 88 421242 ABN 89 615 046 930	DATE: 8/08/2024	BD 1 OF 1
		JOB NO: 14247	
		<u>BOREHOLE LOCATION PLAN</u> 2794 SOUTH COAST ROAD, FOUL BAY	



NOTES:

1. CORE DEPTHS

BH1	2.1m	BH4	1.7m
BH2	2.2m	BH5	2.1m
BH3	1.8m	BH6	3.0m

2. APPROX FALL OF SITE

				✓
1:10	1:15	1:20	1:25	Approx. Level

FALL OF SITE SHOWN IS APPROX.
AND MUST NOT BE USED FOR
COSTING PURPOSES.

3. SURFACE

	✓				✓	
DRY	MOIST	WET	SOFT	FIRM	LOOSE	HARD

	✓			✓
GRAVEL	GRASS	TREES	PAVED	EARTH

4. RESISTANCE (AVE.)

	✓	
LOW	MEDIUM	HIGH

5. DATE DRILLED 20/06/2024

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SURFACE SOIL BORE LOG

DATE DRILLED: 20/06/2024

SITE: 2794 SOUTH COAST ROAD, FOUL BAY

DATE: 8/08/2024

JOB NO: 14247

THIS SHEET TO BE READ IN CONJUNCTION WITH SSB1-2 & SSB2-2.

CR2

1 OF 3

DEPTH IN METRES		VISUAL ASSESSMENT OF PROPERTIES						LAB. ASSESS.
BORE 1	BORE 2	COLOUR	CONSISTENCY, TEXTURE AND STRUCTURE	SOIL DESCRIPTION	U.S.C.	MOIST	BEARING	Ipt (Ave)
0 -0.30		Dark brown	Loose, layer	TOPSOIL, silty sand, non-plastic	SM	N	L	-
0.30 – 1.00		Dark grey	Dense, layer	SAND, poorly graded, non-plastic	SP	B	L-M	-
1.00 – 2.10		Light grey	Very dense, layer	SAND, well graded, non-plastic	SW	B	M	-
	0 – 0.30	Dark brown	Loose, layer	TOPSOIL, silty sand, non-plastic	SM	N	L	-
	0.30 – 1.00	Dark grey	Dense, layer	SAND, poorly graded, non-plastic	SP	B	L-M	-
	1.00 – 2.20	Light grey	Very dense, layer	SAND, well graded, non-plastic	SW	B	M	-

REMARKS: 1. The soil profile possesses some reactive clays with a potential of active movement (swelling and shrinking due to soil moisture variations).
2. Soil sampled for the purpose of on-site wastewater assessment and borelogs are not suitable for use for footing design due to limited sample depth.

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SURFACE SOIL BORE LOG	DATE: 8/08/2024 JOB NO: 14247	CR2 2 OF 3
DATE DRILLED: 20/06/2024	THIS SHEET TO BE READ IN CONJUNCTION WITH SSB1-2 & SSB2-2.	
SITE: 2794 SOUTH COAST ROAD, FOUL BAY		

DEPTH IN METRES		VISUAL ASSESSMENT OF PROPERTIES						LAB. ASSESS.
BORE 3	BORE 4	COLOUR	CONSISTENCY, TEXTURE AND STRUCTURE	SOIL DESCRIPTION	U.S.C.	MOIST	BEAR ING	Ipt (Ave)
0 – 0.30		Dark brown	Loose, layer	TOPSOIL, silty sand, non-plastic	SM	N	L	-
0.30 – 1.00		Dark grey	Dense, layer	SAND, poorly graded, non-plastic	SP	B	L-M	-
1.00 – 1.80		Light grey	Very dense, layer	SAND, well graded, non-plastic	SW	B	M	-
	0 – 0.40	Dark brown	Loose, layer	TOPSOIL, silty sand, non-plastic	SM	N	L	-
	0.40 – 1.00	Dark grey	Dense, layer	SAND, poorly graded, non-plastic	SP	B	L-M	-
	1.00 – 3.00	Light grey	Very dense, layer	SAND, well graded, non-plastic	SW	B	M	-

REMARKS:

1. The soil profile possesses some reactive clays with a potential of active movement (swelling and shrinking due to soil moisture variations).
2. The non-plastic sand present have collapsing potential. It is recommended that the footings be designed for collapsing soils, in accordance with the recommendations in Engineers Australia’s document “Special Provisions for the design of residential slabs and footings for South Australian conditions”.

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SURFACE SOIL BORE LOG	DATE: 8/08/2024 JOB NO: 14247	CR2 3 OF 3
DATE DRILLED: 20/06/2024	THIS SHEET TO BE READ IN CONJUNCTION WITH SSB1-2 & SSB2-2.	
SITE: 2794 SOUTH COAST ROAD, FOUL BAY		

DEPTH IN METRES		VISUAL ASSESSMENT OF PROPERTIES						LAB. ASSESS.
BORE 5	BORE 6	COLOUR	CONSISTENCY, TEXTURE AND STRUCTURE	SOIL DESCRIPTION	U.S.C.	MOIST	BEARING	Ipt (Ave)
0 – 0.40		Dark brown	Loose, layer	TOPSOIL, silty sand, non-plastic	SM	N	L	-
0.40 – 1.00		Dark grey	Dense, layer	SAND, poorly graded, non-plastic	SP	B	L-M	-
1.00 – 2.10		Light grey	Very dense, layer	SAND, well graded, non-plastic	SW	B	M	-
	0 – 0.40	Dark brown	Loose, layer	TOPSOIL, silty sand, non-plastic	SM	N	L	-
	0.40 – 1.00	Dark grey	Dense, layer	SAND, poorly graded, non-plastic	SP	B	L-M	-
	1.00 – 3.00	Light grey	Very dense, layer	SAND, well graded, non-plastic	SW	B	M	-

REMARKS: 1. The soil profile possesses some reactive clays with a potential of active movement (swelling and shrinking due to soil moisture variations).
2. The non-plastic sand present have collapsing potential. It is recommended that the footings be designed for collapsing soils, in accordance with the recommendations in Engineers Australia’s document “Special Provisions for the design of residential slabs and footings for South Australian conditions”

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SSB 1 OF 3**SURFACE SOIL BORELOG
EXPLANATORY NOTES****1. GENERAL**

The surface soil borelog is based on visual-tactile logging of the drilled core. Unless specifically reported the characteristics are estimated and are not measured by a specific test.

One must not place sole reliance on the surface soil borelogs as a means of being an absolute representation of all sub-surface features existing on the site.

The soil borelogs are usually based upon 40mm diameter continuous core samples in one or more locations on the site in accordance with AS 2870 - 2011. It is not possible by this means to detect all surface features which may exist and the Owner is advised to seek information from Local Council, Department of Health and other statutory Authorities regarding any unnatural features (eg wells, mineshafts, filled areas etc) land use (eg toxic waste, waste disposal etc), or other features typical to the area (eg landslip, springs etc).

This office uses not only the borelog information but may take into account such matters as the known geology of the area taken from published soil maps, the known performance of existing structures in the general area and engineering judgement to make an assessment of soil classification for design purposes. Therefore this borelog shall not be used to produce a footing construction report without written permission.

2. UNIFIED SOILS CLASSIFICATIONS (U.S.C.)

- | | |
|---------------|--|
| GW - Gravel : | well graded. |
| GP - Gravel : | poorly graded; gravel sand mixtures, little or no fines. |
| GM - Gravel : | excess silty fines, poorly graded gravel-sand-silt mixtures. |
| GC - Gravel : | excess clayey fines; poorly graded gravel-sand-clay mixtures. |
| SW - Sand : | well graded. |
| SP - Sand : | poorly graded; poorly graded sands, gravelly sands, little or no fines. |
| SM - Sand : | excess silty fines; poorly graded sand-silt mixtures. |
| SC - Sand : | excess clayey fines; poorly graded sand-clay mixtures. |
| ML - Silt : | low plasticity; inorganic silts and very fine silty or clayey sands
rock flour. |

CL - Clay :	low plasticity; inorganic clays of low to medium plasticity, gravelly clay, sand, clays, silty clays, lean clays.
OL - Organic:	low plasticity; organic silts and silt clays of low plasticity.
MH - Silt :	high plasticity, inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
CI - Clay	Medium plasticity; inorganic clays of medium to high plasticity.
CH - Clay :	high plasticity; inorganic clays of high plasticity, fat clays.
OH - Organic:	high plasticity; organic clays of medium to high plasticity.

3. **MOISTURE CONTENT**

Relative to the Plastic Limit (P.L.) of the soil for cohesive soils or relative to the optimum moisture content of the soil (O.M.C.) of the soil for cohesionless soils ie. non plastic.

W.B. Well Below - B. Below - N. Near - A. Above - W.A. Well Above

4. **BEARING STRENGTH**

The descriptive term used relates to the in-situ strength at the time of logging.

It must be noted that site works and changes in soil moisture may significantly affect the bearing strength. It must also be noted that as the soils are disturbed in the drilling and sampling process the bearing strength in-situ may be different from that logged.

<u>Term</u>	<u>Description</u>	<u>Bearing Capacity (kPa)</u>
VL	Very low (loose granular material or soft, possibly collapsing soil)	Less than 50
L	Low (Firm)	50 – 100
M	Medium (Stiff)	100 – 200
H	High (Very stiff to hard)	Greater than 200

Sites with very low or low bearing strength in the founding soil strata may be classified as 'P' problem site.

5. **PLASTICITY**

NP, LP, MP, HP refers to non, low, medium and high plasticity respectively.

6. **CONSISTENCY**

VS – Very Soft	VL – Very Loose
S – Soft	L – Loose
F – Firm	MD – Medium Dense
St – Stiff	D – Dense
VS – Very Stiff	VD – Very Dense
H – Hard	

7. REACTIVITY

The reactivity of the soil is defined as the potential for undergoing changes in volume with changes in the soil moisture content.

The reactivity is measured in terms of Instability Index. This term does not apply to sands.

<u>Term</u>	<u>Description</u>	<u>Instability Index (Ipt.)</u>
L	Low	1% or less
M	Medium	2%
H	High	3% or greater

8. SOIL CLASSIFICATION

	CHARACTER	CLASS
Sand and rock Silt and some clay	Stable	A S
Moderately reactive clay Highly reactive clay Extremely reactive clay	Reactive	M, M-D H1, H2, H1-D, H2-D E, E-D
Sand Material other than sand	Controlled fill	A A to P
Mine subsidence Uncontrolled fill Landslip Soft Collapsing Soils	Problem	P

<u>Class</u>	<u>Surface Movement</u>
S	$Y_s < 20\text{mm}$
M, M-D	$20\text{mm} < Y_s < 40\text{mm}$
H1, H1-D	$40\text{mm} < Y_s < 60\text{mm}$
H2, H2-D	$60\text{mm} < Y_s < 75\text{mm}$
E, E-D	$Y_s > 75\text{mm}$

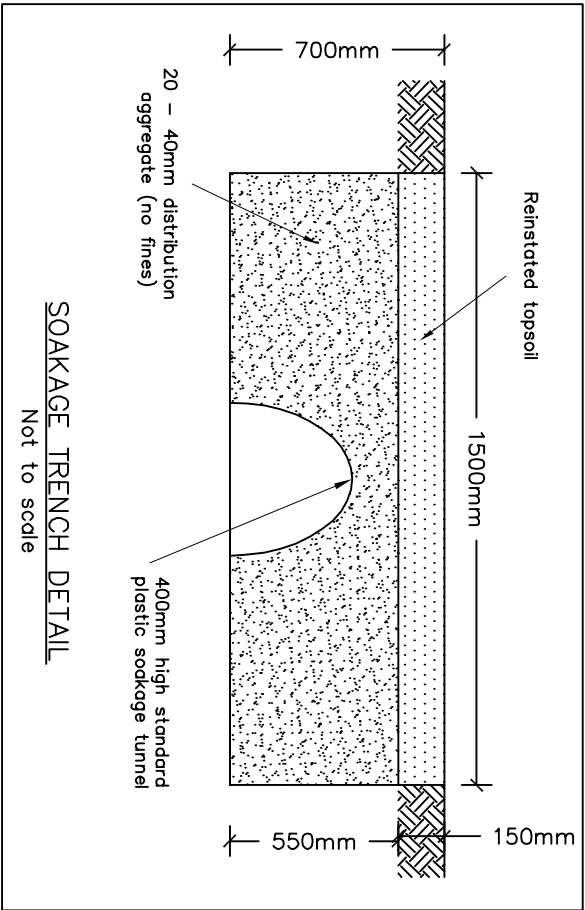
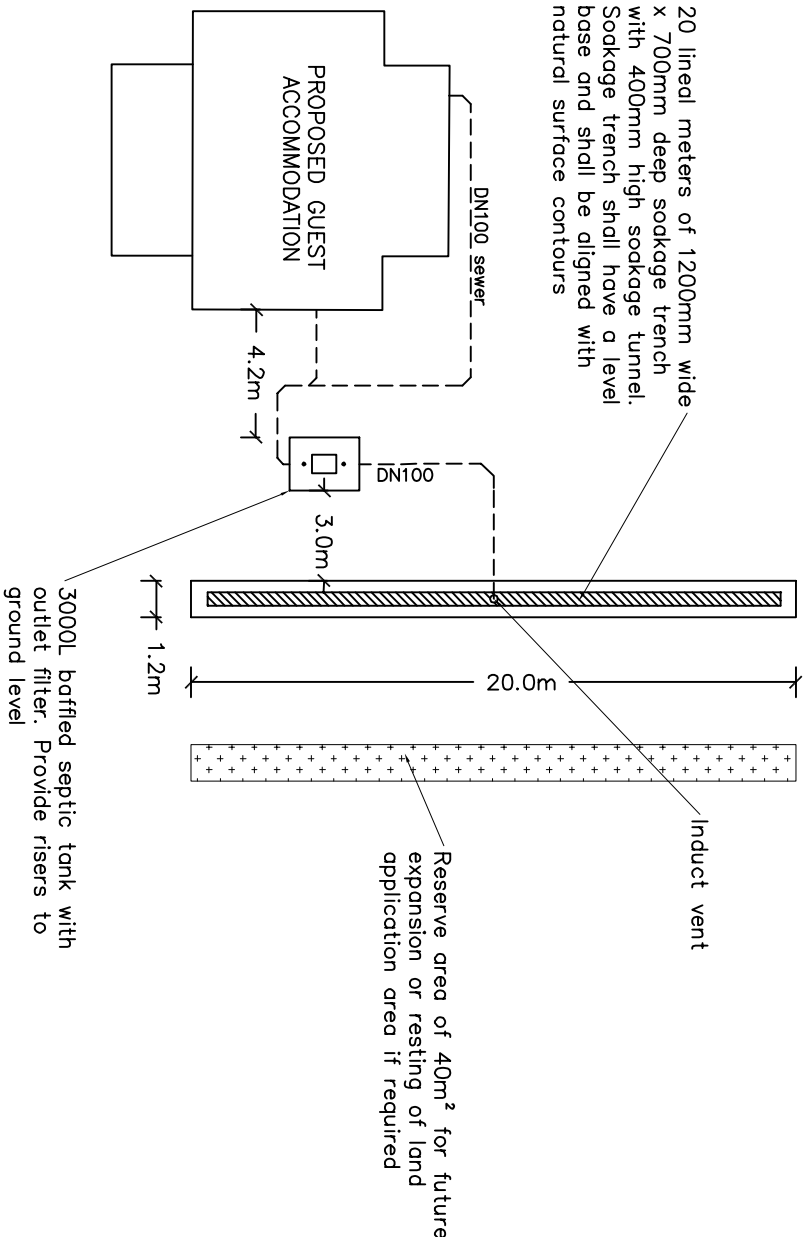
Note: M-D, H1-D, H2-D and E-D are classifications for sites where deep moisture change occurs.

Further site investigation may be required for a Class E or Class P site.

FLEXIBLE FITTINGS FOR PLUMBING CONNECTIONS WILL BE REQUIRED, REFER TO PLUMBING JOINT MANUFACTURER, SUCH AS STORM PLASTICS FOR APPROPRIATE FITTING



TO SOUTH
COAST ROAD



NOTES:

- REFER TO ARCHITECTURAL PLAN FOR EXACT LOCATION OF BUILDING
- SEPTIC TANK SHOULD BE SET BACK 2.5m FROM ANY BUILDINGS AND PROPERTY BOUNDARY
- SOAKAGE TRENCH SHOULD BE SET BACK 2.5m FROM SEPTIC TANK AND PROPERTY BOUNDARY. 3.0m FROM BUILDING OR SWIMMING POOL IF TRENCH IS LOCATED DOWNSLOPE OF BUILDING OR SWIMMING POOL, AND 6.0m IF UPSLOPE
- LAYOUT OF PLUMBING IS SCHEMATIC ONLY. PLUMBER TO CHECK ON-SITE AND MODIFY ACCORDINGLY. PLUMBING TO BE IN ACCORDANCE WITH AS3500-2018
- SITE PLAN IS TO BE READ IN CONJUNCTION WITH ON-SITE WASTEWATER MANAGEMENT REPORT
- PLUMBER SHALL BE RESPONSIBLE FOR DIAL BEFORE YOU DIG AND SERVICE LOCATION PRIOR TO CONSTRUCTION
- SOAKAGE BEDS SHALL BE CONSTRUCTED IN ACCORDANCE WITH SA HEALTH ON-SITE WASTEWATER SYSTEM CODE FIGURE A8

MACE ENGINEERING SERVICES	6 LENNON STREET CLARE 5453 A.B.N. 89 615 046 930 TEL. (08) 88 421242	TITLE: ON-SITE WASTEWATER MANAGEMENT SITE PLAN	DATE AUG 2024
	2794 SOUTH COAST ROAD, FOUL BAY	SITE: SCALE 1:500 @ A3	
	X. DOORENBOSCH	CLIENT:	DWG No. 14247 - 02