BIOLYTIX

Biolytix® Filter BF6 Specification

Model:	**Biolytix® Filter Model BF6** (or "Deluxe Model") On-site wastewater treatment system. Treats domestic wastewater to a high secondary standard.
Manufacturer:	Biolytix Technologies An Biolytix Information pack may be downloaded from: http://www.biolytix.com/docs/biolytixinfokit.pdf
Versions	Pumped or Gravity discharge Standard tanks available to suit sewer invert levels of 0.4, 0.6 & 1.0m or retrofit kits to suit existing septic tanks.
Bed Configuration:	Central pump well with sealed lid (pumped version only). Base level sump of bagged open plastic structural support material to a depth of 250mm. Filter bed of three layers each consisting of a geotextile support cloth under bagged structurally supported hums/peat layer 250mm deep below a 200mm layer of bagged open plastic support material. Refer Figure 1 for typical cross of filter (pumped discharge version).

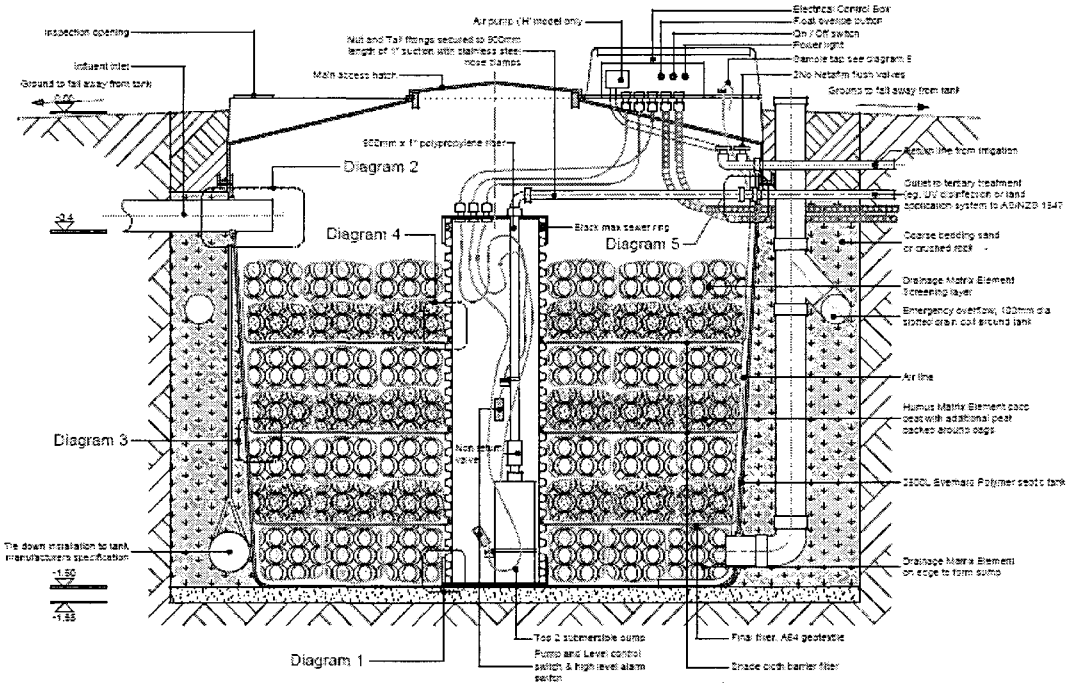


Figure 1: Cross Section of Biolytix Filter BF6 – Pumped Version

Certification:	Pumped version passed independent testing (SAI Global) to AS/NZS 1546.3 for alternative aerated treatment systems, including operational options: 1. UV disinfection at a dose rate of 88mWs/cm^2 2. Influent loaded with 2.4kg/day of putrescible food waste passed through an in-sink food waste disposal unit. Gravity filter has same bed configuration as pumped systems. Copies of SAI Global reports (include effluent quality data) for two separate testing trials may be obtained from: http://docs.biolytix.com/products/record/PR_BF6ApprovalWithUV.doc http://docs.biolytix.com/products/record/PR_BF6JASANZReport.pdf		
	Filter Operation Approvals – BF6 filter with no disinfection **Approval Authority & Reference/ webpage link to document copy**		
NT	Dept of Health: Ref DF2005/862 http://biolytix.com/biol2/docs/NT_BF6_Approval		
NSW	Dept. of Health: WCT 023, 3/9/2003 http://biolytix.com/biol2/docs/NSW_BF6_Approval		
QLD	Dept. of Natural Resources & Mines: Model Approval No. 107, 29/8/03. http://biolytix.com/biol2/docs/Qld_BF6_Approval		
SA	Dept. of Human Services: WCS 01586, 16/12/2003 http://biolytix.com/biol2/docs/SA_BF6_Approval		
Tas	DIER: Interim approval BSR 0438/2003, 1/12/2003 http://biolytix.com/biol2/docs/TAS_BF6_Approval		
Vic	EPA Victoria:CA90/04, 6 July 2004 http://www.biolytix.com/docs/vic_epa_approval.pdf		
WA	WA Health: Approval No 169, 27/4/2004 http://biolytix.com/biol2/docs/WA_BF6_Approval		
	Filter Operation Approvals – BF6 filter with UV Disinfection		
NT	Project specific approval by NT Dept. of Health required.		
NSW	Dept. of Health: BF-002, 3/12/2004 http://biolytix.com/biol2/docs/NSW_BF6_Approval		
QLD	Dept. Local Gov. Planning, Sport & Recreation: Model Approval No. 114, 21/12/05 http://biolytix.com/biol2/docs/Qld_BF6_Approval		
SA	Application pending		
Tas	Application pending		
Vic	Project specific approval by Council required. Supplementary fittings or attachments (e.g. UV disinfection) to certified systems do not require EPA approval.		
WA	Application pending		
Effluent quality: 90 percentile data from AS1546.3 independent tests		Standard	Putrescible food waste
	Biochemical Oxygen Demand -BOD_5	≤ 12mg/L	≤ 17mg/L
	Total suspended solids	≤ 9mg/L	≤ 11mg/L
	Thermotolerant Coliforms	<10cfu/100mL	< 10cfu/100mL
	Thermotolerant Coliforms only applicable with UV disinfection		
On-site dispersal:	Subsurface drip irrigation or trenches installed to AS/NZS 1547 if effluent is not disinfected with UV. Subsurface drip irrigation guidelines document may be downloaded from: http://docs.biolytix.com/products/procedure/PP_BiolytixDripIrrigationGuidelines.pdf Surface or subsurface irrigation installed to AS/NZS 1547 with UV disinfection at a dose rate not less than 88mWs/cm^2.		
Hydraulic loading:	**Standard filter bed** – Filter bed volume 1.6m^3 Long Term Acceptance Rate (LTAR) 1600 l/day. 4-day peak capacity 2150 l/day **Concrete or Non-standard tank** – Requires 1 m^3 of bed volume per kilolitre of influent per day or 660 mm/day internal surface, whichever is the lesser. Peak loading rate is 880 mm internal surface area/day.		

<table>
<tr><td>Tank Details:
Standard Tanks & Existing Tank Retrofit Kits</td><td colspan="4">Standard: The standard Biolytix Filter is installed in an Everhard polymer septic tank (refer www.everhard.com.au). The filter may also be supplied in other tanks (e.g. concrete) certified to AS/NZS 1546.1. A drawing of BF6-2500PAT filter may be downloaded at:
http://www.biolytix.com/docs/bf6drawing.pdf
<table><tr><td>Everhard Tank (size)</td><td>2500</td><td>3000</td><td>3900</td></tr><tr><td>Inlet Sewer Invert Depth (m)</td><td>0.4</td><td>0.6</td><td>1.0</td></tr><tr><td>Mass: Dry (kg)</td><td>386</td><td></td><td></td></tr><tr><td>Wet (kg)</td><td>960</td><td></td><td></td></tr></table>Retrofit: The Biolytix Filter bed may be retrofitted into an existing Australian Standard compliant septic. Typically the tank should be vertical cylindrical with a central access hatch although it may be possible to retrofit into other tank shapes. Biolytix provide retrofit kits for various circular tank diameters. A minimum of 1.1m tank depth is required below inlet sewer to provide sufficient depth for installation of filter bed.
<table><tr><td>Retrofit Kit Size</td><td>R1820</td><td>R2022</td><td>R2224</td></tr><tr><td>Suitable for Tank Dia (m)</td><td>1.6 to 2.0</td><td>2.0 to 2.2</td><td>2.2 to 2.4</td></tr></table></td></tr>
<tr><td>Level Control:</td><td colspan="4">Standard float switch with swivel mount
Open circuit typical setting: 60mm represents 120 l left in storage
Closed circuit typical setting: 170mm 340 l in storage.</td></tr>
<tr><td>Alarm:</td><td colspan="4">Event Monita (or equivalent) phone line telemetry alarm direct to service provider or if no phone line then a standard AS 1546.3 compliant audible and visual alarm.
Operates on any analogue telephone system and is certified for operation with the ACA on the Australian Telephone Network.</td></tr>
<tr><td>Electrical control box:</td><td colspan="4">IP56 polycarbonate weatherproof control box and isolation switch.
All components to AS3000:2000.</td></tr>
<tr><td>Typical pump cycle:</td><td colspan="4">Adjustable range 160-220 litres.</td></tr>
<tr><td>Pump specifications:
(Pump discharge filter only)</td><td colspan="4">Complete pump specification details may be downloaded from:
http://www.biolytix.com/db/pdfs/h2O_On_Demand_specification.pdf
The standard pump supplied is a Pedrollo Sumo 2/5, however a Pedrollo Sumo 2/7 or other suitable borehole type pump may be installed to suit required duty.
<table><tr><td>Manufacturer:</td><td colspan="2">Pedrollo Spa</td></tr><tr><td>Model:</td><td>Sumo 2/5</td><td>Sumo 2/7</td></tr><tr><td>Voltage/Phase:</td><td colspan="2">240 volts AC/ Single</td></tr><tr><td>Thermal protection:</td><td colspan="2">Yes</td></tr><tr><td>Seals:</td><td colspan="2">Double oil lubricated mechanical</td></tr><tr><td>Submersion depth (max)</td><td colspan="2">20m</td></tr><tr><td>Operating head (max)</td><td>36m</td><td>60m</td></tr><tr><td>Duty 1</td><td>10 l/min @ 35m</td><td>10 l/min @ 58m</td></tr><tr><td>Duty 2</td><td>80 l/min @14m</td><td>80 l/min @ 18m</td></tr><tr><td>Run time/ kl</td><td>1.67h @35m</td><td>1.67h @ 58m</td></tr><tr><td>Run time/ kl</td><td>0.21h @ 14m</td><td>0.21h @ 14m</td></tr><tr><td>Power:</td><td>0.52kW @ 35m</td><td>0.86kW @ 58m</td></tr><tr><td>Power:</td><td>0.63kW @ 14m</td><td>0.81kW @ 18m</td></tr><tr><td>Power consumed</td><td>0.87 kWh/kl @ 35m</td><td>1.44kW/kl @ 58m</td></tr><tr><td>Power consumed</td><td>0.13 kWh/kl @ 14m</td><td>0.17kW/kl @ 18m</td></tr><tr><td>Estimated life expectancy:</td><td colspan="2">10,000 hours</td></tr></table></td></tr>
<tr><td>Air Pump Specifications</td><td colspan="4">Refer Schego website for futher details:
http://www.schego.de/english/home.htm
<table><tr><td>Manufacturer:</td><td>Schego</td></tr><tr><td>Model:</td><td>M2K3 (membrane pump)</td></tr><tr><td>Voltage/phase/power:</td><td>220-240 V/50Hz/single 5 watt</td></tr><tr><td>Maximum delivery head:</td><td>3m</td></tr><tr><td>Flow rate:</td><td>350 l/hr</td></tr><tr><td>Estimated life:</td><td>Diaphragm = 4 years/ Coil = 20 years</td></tr></table></td></tr>
</table>

UV Disinfection Unit (Optional)		
	Models:	Various, selected to provide a minimum dose rate of 88mWs/cm^2 at the design flow rate for the land application system.
	Chamber Material:	316SS
	Peak Flow (BF6 effluent):	Selected to suit UV dose.
	UV Lamp Wattage:	75 Watt minimum at 12L/min.
	UV Rated Lamp Life	Selected at 9000 hrs minimum (1 year)
	Voltage:	220/240 VAC, 50Hz
	Protection Class:	IP21
	Installation	Mounted in accordance with manufacturer's installation instructions, either on top of Biolytix Filter or remote from filter, subject to site requirements.
Maximum Noise	< 40 dB(A) @1m fast response	
Serviceable Life:	Equal to the tank life – typically 20+ years	
Operating conditions:	Operates under normal temperature and humidity conditions experienced in Australia and New Zealand (if winter temperatures regularly drop below – 8°C then site ground temperature, soil conditions and hydrology assessment is required to determine if thermal ground insulation is warranted).	
Emergency storage capacity:	1340 litres above high level float cut in level (this is the storage volume within the tank – the overflow drain can provide for significantly higher emergency capacity than this because of soil infiltration).	
Emergency response time:	More than 2 days at design hydraulic loading rate and more than 7 days at typical loading rate of 600 l/day.	
Installation	The filter is designed typically for inground installation. If the filter is to be installed above ground, the external walls of the tank are to be UV protected. A detailed copy of installation manuals (pump/ gravity units) may be downloaded from: http://docs.biolytix.com/installation/procedure/IP_BF62500PSerInstallMan.pdf http://docs.biolytix.com/installation/procedure/IP_BF22500GInstallManual.pdf Retrofit kits are to be installed by a trained Biolytix Installer.	
Servicing Requirements:	Annual inspection and system check includes: • Monitoring and maintenance of humus levels; • Testing effluent quality compliance; • Integrity check for pump, switches, alarm; • Checking biology of the filter bed; • Flushing irrigation lines and irrigation filter; • Reporting on system performance. UV Lamp (if installed) • Quartz sleeve cleaned 6 monthly. • UV lamp replaced every 12 months. The filter service manual may be downloaded from: http://www.biolytix.com/db/pdfs/bf6_manualService.pdf	
Operators Manual	A copy of the operators manual may be downloaded from: http://www.biolytix.com/db/pdfs/bf6_manualOperator.pdf	
Warranty:	System performance and all components are warranted for the life of the Biolytix service contract – optional for 15 or 20 years. A copy of comprehensive service contract may be downloaded from: http://www.biolytix.com/db/pdfs/comprehensive_service_plan_specification.pdf	

Product Specification Details	The standard Biolytix Filter BF6 is specified using the following code: BF6X-(X)XXXX-XXX

Model	Tank Size	Pump/ Gravity Discharge	Air Pump	Telemetry or Audio/Visual Alarm
BF6-	2500-	P	A	T
	3000-	G		V
	3900-			
	R1820-			
	R2022-			
	R2224-			

Note:

1. Alternative pump to Sumo 2/5 pump to be ordered as a specific product upgrade variation.
2. Standard tank supply is an Everhard Polymer Septic tank. If an alternative tank is required a specific product upgrade variation is to be requested.

Examples:

BF6-2500-PAT: BF6 filter with 2500 litre Everhard tank, sumo 2/5 pump discharge, schego air pump and phone line telemetry alarm.

BF6-3900-GAV: BF6 filter with 3900 litre Everhard tank, gravity discharge, schego air pump and audio visual alarm system.

BF6-R2022-PAV: BF6 filter retrofit kit suitable for existing vertical cyclindrical circular tank with diameter between 2.0 and 2.2m, with sumo 2/5 pump, schego air pump and audio visual alarm system.

Document Status

Rev	Status	Author	Reviewer		Approved for Issue		
			Name	Signature	Name	Signature	Date
R-1	On-site disposal method edited	DOC	Dean Cameron				4/9/03
R-2	Alarm option for conventional audio/ visual included.	DOC	Dean Cameron				19/9/03
R-3	UV disinfection option included	GRI	Dean Cameron		Jill Jordan		30/8/04
R-4	Major update	GRI	Gary Ingram		Dean Cameron		

DavidsonPartnersLtd

Structural Engineering
Civil Engineering
Building Design
Project Management

Practising in association with Ayson and Partners, Registered Surveyors

Our Ref: 23212

12 May 2005

L J RYAN
ON SITE WASTEWATER MANAGEMENT
LOT 6 D.P. 4112, TE RUA BAY, TORY CHANNEL

1. INTRODUCTION

Mrs Ryan proposes a new accommodation building on her Tory Channel property. The narrow coastal area of the site is zoned Sounds Residential with a much larger area of Rural zoned land behind.

The purpose of this report is to provide sufficient detail for Resource Consent processing with regard to suitable treatment and distribution systems. Full construction information will be required at the future Building Consent stage.

Davidson Partners Ltd was engaged to design an appropriate wastewater management system for the proposed development. We have carried out a site inspection and soil assessment, reviewed other Davidson Partners Ltd designs in similar conditions, and herein recommend suitable measures for the sustainable management of domestic wastewater.

2. INVESTIGATION

A site investigation was carried out in accordance with AS/NZS 1547:2000 'On Site Domestic Wastewater Management', the site notes of which are attached to this report.

The flat coastal area of the site is too small, low lying and near the sea for an effluent field. The only option is for pumped distribution to the hillside behind, well above the steep bank at its toe. The hillside has very high exposure and coverage of mature manuka trees and pines. It is also elevated well clear of the stream to the west.

The soils are best described as tan, dry, very hard, silty clay. The ribbon length is approximately 50 mm. The soil has therefore been assessed as category 5 for design purposes.

ACENZ

Davidson Ayson House, 4 Nelson Street,
P.O. Box 256, Blenheim, New Zealand
Telephone 03 578 7029 Fax 03 578 7028
Email: service@DavidsonPartners.co.nz

Principals
Ross Davis, BE, CPEng, MIPENZ
Stephen Sheat, BE, CPEng, MIPENZ
Leigh McGlynn, BE, CPEng, MIPENZ

3. ASSESSMENT

We consider that primary treatment by septic tank with effluent filter, followed by secondary treatment and land application using shallow subsurface dripper lines is the most appropriate system for this site. We have nominated a constructed subsurface flow wetland to perform the secondary treatment at this site as shown on the drawing, although there are other suitable passive systems that could be applied.

The distribution system proposed should consist of dose loaded dripline dug into the upper soil within the nominated land application area. The principle of the system is irrigation into the topsoil for uptake by established vegetation and future plantings.

We consider a conservative application rate of 3.0 mm per day to be appropriate for the category 5 soil.

4. DESIGN LOADING

For the proposed dwelling with a design occupancy of six people, using a wastewater allowance of 180 litres / person / day, the design daily load equates to 1,080 litres.

5. RECOMMENDATIONS

We recommend the following.

(a) Septic Tank

A single septic tank is appropriate for this site. Using the design flow of 1,080 litres, the minimum tank size should be 4,500 litres. We recommend the septic tank outlet be fitted with an approved effluent filter to the manufacturer's / supplier's recommendations as per modern practise.

(b) Dosing Chamber

The wetland bed requires pressure loading for distribution across the length of the inlet manifold. Allowing for a 300 litre dose volume plus 24 hours reserve storage, a chamber size of 1,400 litres (minimum) is required, with a high level alarm and audio and visual signals set just above normal operating level. Refer to sheet C3 for typical details.

(c) Secondary Treatment System

Our design method requires a minimum of 4 m^2 per person to achieve suitable treatment from a constructed subsurface flow wetland, and a length to width ratio of approximately 4. This can be provided with a base size of 10 m by 2.5 m and 500 mm depth of gravel media, with a strong and durable liner and planting with wetland species at 4 to 5 plants per m^2.

Proprietary packaged passive secondary treatment systems could also be used as an alternative to the wetland.

(d) Final Pump Chamber

The final pump chamber requires only enough capacity for the storage of one dose, being 300 litres, to the distribution system. The depth of this chamber is however governed by the outlet from the wetland. The pump duty required should be set by the supplier of the disc filter and dripline to suit their requirements. Control floats are again required, with the alarm float to also cut power to the first pump.

(e) Distribution

For an average design flow of 1,080 litres / day, and using an irrigation rate of 3.0 mm / day, the minimum total irrigation area required is 360 m^2.

For effective distribution over the irrigation field area, we recommend the use of pressure-compensating dripline with low flow emitters (eg. 1.6 litres / hour) at 0.5 m centres along the pipework and 1.0 m maximum lateral spacing. The dripline should be laid so that emitters on adjacent lines are offset. The specification and installation, including the use of flushing and air release valves, should in any case be in accordance with the manufacturer's / supplier's instructions.

The septic tank treatment system proposed will not meet the standards in the Proposed Marlborough Sounds Resource Management Plan in the following areas:

(i) Septic Tank Compartments (2 minimum)

The recently released New Zealand Standard for Septic Tanks (AS/NZS 1546:1998) specifically allows single chamber tanks (Clause 3.4.2).

(ii) Quality

We consider that the quality limits in the Plan are too stringent and that septic tanks in good operation are unlikely to better the BOD and SS limits (100 and 60 g/m^3 respectively) and will certainly not achieve the faecal coliform limit (less than 10^3) per 100 ml.

However, with an effluent filter to the outlet of the tank, as we have specified, the effluent quality will be below the BOD/SS limits, but not the faecal coliform limit (probably 10^3-10^4).

To reduce the faecal coliform content to less than 10^3 per 100 ml will likely require tertiary treatment such as ultra violet, ozone or chlorination treatment.

We therefore consider that the Plan has set a faecal coliform limit which in practical terms, for development in the Sounds, can not be met.

6. ADDITIONAL WORK

Davidson Partner Ltd has carried out a site investigation and design in accordance with current codes and modern practice. However, the treatment and distribution system is a biological (living) process and modifications may have to be undertaken to the treatment or distribution system in some circumstances, such as when there is / are:

(a) An increase in design load
(b) Disposal of inappropriate substances into the septic system
(c) Poor maintenance
(d) Poor workmanship or departure from construction drawings

7. SUMMARY

This on-site wastewater management system detailed herein consists of;

(a) A 4,500 litre (minimum) septic tank with an approved effluent filter on the outlet.

(b) A 1,400 litre (minimum) first dosing tank to provide 300 litre doses to the wetland. A high level alarm is required set just above normal operating level with audio and visual warnings within the dwelling.

(c) A 10 m by 2.5 m base area subsurface flow wetland with liner containing 500 mm depth of gravel with suitable wetland species, or other passive secondary treatment system.

(d) A 300 litre (minimum) final dosing tank with a float control to dose the effluent field at the required pressure. A high level alarm is required with audio and visual warnings within the dwelling which also cuts power to the first pump.

(e) 375 m^2 (minimum) pressure compensating dripline effluent field with disc filter, water meter and fittings all installed in accordance with the supplier's / manufacturer's requirements.

8. REFERENCES

8.1 AS/NZS 1547:2000 'On Site Domestic Wastewater Management'.

8.2 AS/NZS 1546:1998 'On Site Domestic Wastewater Treatment Units, Part 1 : Septic Tanks'.

8.3 ARC Environment, Technical Paper No. 58, Second Edition 'On Site Wastewater Disposal from Households and Institutions'.

8.4 Crites, R and Tchobanoglous, A (1998). 'Small and Decentralized Wastewater Management Systems'.

8.5 Marlborough Sounds Resource Management Plan.

DAVIDSON PARTNERS LTD

R W Davis

RWD:JEN

APPENDIX

A1. On Site Wastewater Management Details

A1.1 Field Assessment Report
A1.2 Land Application System Design

A2. Plan 23174 sheets;

C1 Plan

A3. Davidson Partners Ltd – 'How to Get the Best from you On-Site Wastewater Management System'.

A4. Davidson Partners Ltd – 'Guidelines for Installers of On-Site Domestic Wastewater Management Systems'.

DAVIDSON PARTNERS LTD

ON SITE WASTEWATER MANAGEMENT
FIELD ASSESSMENT REPORT

JOB NAME:	Ryan	**JOB NO.**	23212
LOCATION:	Te Rua Bay, Tory Channel	**DATE:**	30.01.05

REFERENCE: 1. ARC TP#58
2. AS/NZS 1547:2000 'On Site Domestic Wastewater Management'

1.	Percolation Rate (if available).		-
2.	Site Exposure	- to sun	High
		- to wind	High
3.	Topsoil Depth – grey dry.		150-200 mm
4.	Soil Description (colour, moisture, firmness, type).		Yellow-brown, dry, hard, clayey silt
5.	Soil Category (1 - 6)		5
6.	Coarse Fragments	- size/abundance	Hard rock fragments
7.	Ribbon Length		50 mm
8.	Soil Structure (Pedal Content)		High / Medium
9.	Performance of existing systems nearby.		Good
	- Type : composting toilet and grey water trench		
10.	Nearby water bodies.		Yes
	- Separation Distance		30 m minimum
11.	Nearby wells.		No
12.	Intended water supply.		Creek
13.	Runoff to be controlled.		No
14.	Ground water to be controlled.		No
15.	Any stability considerations, If yes, comment.		Yes
	Too steep for trenches		
16.	Depth to water table.		N/A
17.	Vegetation cover	- Existing	Yes
		- Type	Manukas
		- Proposed	Manukas & more native planting
18.	Gravity head to proposed disposal field location.		Uphill
19.	Reserve areas available?		Yes

20. Other Comments

Only option is uphill to southwest and require power for pumping.

DAVIDSON PARTNERS LTD ON-SITE WASTEWATER MANAGEMENT LOADING AND SEPTIC TANK DESIGN		JOB NO. 23212 SHEET NO 1 NAME RWD DATE 21-Apr-05
CLIENT	J Ryan	
LOCATION	Te Rua Bay, Tory Channel	

Last Updated 31.01.05

REFERENCES : 1 ARC TP # 58 Third Edition
2 AS/NZS 1547:2000 "On Site Domestic Wastewater Management"

1 LOADING

Number of bedrooms	2	
Occupancy (N)	6	
Wastewater allowance (A)	180	litres / person / day
Soil category (from field assessment)	5	

2 SEPTIC TANK DESIGN

Number of people (ex 1.3 above)	6		
Number of people for design purposes	10		
(peaking factor =	1.67)		
Daily flow	1800	litres	
Miinimum residence time required	24	hours	
Pump out interval required	5	years	
Sludge/scum accumulation(bl-50,gr-40,80)	80	litres / person / year	
Allowance for scum / sludge	2400	litres	
Minimum tank size	4200	litres	
Let tank size be	**4500**	**litres**	
Settling volume available	2100	litres	
Settling time available	28	hours	OK,> min. res. time

DAVIDSON PARTNERS LTD ON-SITE WASTEWATER MANAGEMENT IRRIGATION DESIGN		JOB NO. 23212 SHEET NO 2 NAME RWD DATE 21-Apr-05
CLIENT	J Ryan	
LOCATION	Te Rua Bay, Tory Channel	

3 IRRIGATION DESIGN

3.1 (a) DIR (Design Irrigation Rate) Indicators

INDICATOR	0	1	2	SCORE	WEIGHTING	RANKING
Slope	> 20°	10-20°	0-10°	0	2	0
Topsoil Depth	<100 mm	100-200	>200 mm	0	2	0
Exposure to Sun	low	mod	high	2	3	6
Exposure to Wind	low	mod	high	2	3	6
Vegetation	not suitable	suitable	v. suitable	1	3	3
Proximity to Water Bodies or Wells	<10 m	10-30	>30 m	2	2	4
Proximity to Water Table	<1 m	1-2	>2 m	2	3	6
Known Problems in the Area ?	yes	unsure	no	2	2	4
Nearby systems?	<20m	20-50m	>50m	1	1	1
Treatment	septic	aerated	SF/wetld	2	2	4
Distribution	trench	LPED	drip	2	3	6
Use	permanent	frequent	infrequent	2	3	6
RANKING SCORE						**46**

(b)

DIR (ex Table 4.2.A.4)	RANKING
Most Conservative = 2.5 mm/day	<25
Least Conservative = 3.25 mm/day	>50

(c) DIR considered appropriate for the site = 3.13 mm / day

Let DIR = 3 mm / day

(d) Irrigation field area, D = N * A / (DIR) = **360 m^2**

DAVIDSON PARTNERS LTD

HOW TO GET THE BEST FROM YOUR ON-SITE WASTEWATER MANAGEMENT SYSTEM

Helpful Information for Homeowners/Occupiers

1. GOOD HOUSEHOLD PRACTICES

(a) Reduce solids disposal to treatment tanks as much as possible including food scraps, fats, grease etc. Scrape all dishes before washing and do not install a waste disposal unit unless the wastewater system has been specifically designed to carry the extra load.

(b) Do not put any of the following down sinks, drains or the toilet

- **(i)** Oil/grease from e.g. a deep fryer;
- **(ii)** Stormwater and any drainage other than wastewater generated in the house;
- **(iii)** Petrol, oil and other flammable/explosive substances;
- **(iv)** Household, garden, garage and workshop chemicals (e.g. pesticides, paint cleaners, photographic chemicals, motor oil and trade waste);
- **(v)** Disposable nappies and sanitary napkins.

(c) In order to keep the bacteria working in the tank and in the land-application area:

- **(i)** Use biodegradable soaps;
- **(ii)** Use a low-phosphorus detergent;
- **(iii)** Use a low-sodium detergent in the dispersive soil areas;
- **(iv)** Use detergents in the recommended quantities;
- **(v)** Don't use powerful bleaches, whiteners, nappy soakers, spot removers and disinfectants including cold water washing products.
- **(vi)** Don't put chemicals or paint down the drain.

(d) Conserve water. Less water means a lower load on the treatment system and land application area, with ensuing improved and more reliable performance. Conservation measures include:

- **(i)** Installation of water-conservation fittings such as low water use toilets, spray taps and water-saving automatic washing machines;

(ii) Taking showers instead of baths;

(iii) Only putting the dishwasher or washing machine on where there is a full load.

(e) Space dishwasher and washing machine use out to avoid overloading the wastewater system. Try not to do a large amount of washing in one day and avoid running the washing machine and dishwasher at the same time.

(f) For the physical protection of treatment and land application systems:

(i) The treatment unit must be protected from vehicles;

(ii) Pedestrian traffic routes should not cross effluent field areas;

(iii) No vehicles or heavy stock should be allowed on trenches or beds;

(iv) Deep rooting trees or shrubs should not be grown over absorption trenches or pipework.

2. MAINTENANCE

(a) General

The appropriate maintenance of your treatment and land application systems will be the key to their effective and reliable performance. Please contact a drainlayer or Council if you are unsure about anything or require further advice.

(b) Septic Tanks

Any septic tank (primary wastewater treatment unit) will need to:

(i) Be cleaned out regularly i.e. every three to five years or when scum and sludge occupy two thirds of the volume of the tank (or first stage of a two-stage system). All scum, sludge and septage material must be disposed of in an approved manner. Pump chambers should be cleaned out at the same time if necessary;

(ii) Have grease traps cleaned out regularly;

(iii) Keep the vent and/or access cover of the septic tank exposed;

(iv) Have any outlet filter inspected and cleaned, normally at the same time as septic tank cleaning. Remove the cartridge and rinse off with a garden house, being careful to rinse all septage material back into the tank. It is not necessary that the cartridge be cleaned "spotless". The biomass growing on the filter aids in the pre-treatment process and should be left on the cartridge.

(c) Secondary Treatment Systems

Improved treatment systems, such as aerated plants or sand filters, require specialist maintenance and should be looked after under a maintenance contract. Owners should ensure that they are aware of the manufacturer's/suppliers recommended maintenance intervals and that a contract is in place for routine checks of mechanical components.

These systems will have a primary treatment stage which should be treated as in (b) above.

(d) Effluent Field

Reliable performance from your effluent field (including shallow trenches, drip irrigation field or mound) will be aided by regular attention including one or more of the following depending on the type of system:

(i) Keep the surface water diversion drains upslope of and around the land-application area clear to reduce absorption of rainwater into trenches or beds;

(ii) The baffles or valves in the distribution system should be periodically (monthly or seasonally) changed to direct treated wastewater into alternative trenches or beds, as required by the design;

(iii) Evapotranspiration and irrigation areas should have their grass mowed and plants maintained to ensure that these areas take up nutrients with maximum efficiency;

(iv) Clean disc filters or filter screens on irrigation-dosing equipment periodically by rinsing back into the primary wastewater treatment unit;

(v) Irrigation systems which dispose of wastewater that has only been treated by a septic tank and filter must be flushed through with clean water before and after any significant period of non-use.

(vi) Regular maintenance of the treatment systems (as per manufacturers recommendations), especially for aerated and sand contactor type systems.

DAVIDSON PARTNERS LTD

GUIDELINES FOR INSTALLERS OF ON-SITE DOMESTIC WASTEWATER MANAGEMENT SYSTEMS

References

A.S./N.Z.S. 1546.1:1998 'On-Site Domestic Wastewater Treatment Units, Part 1:Septic Tanks'
A.S./N.Z.S. 1546.3:2001 'On-Site Domestic Wastewater Treatment Units, Part 3 AWTS'
A.S./N.Z.S. 1547:2000 'On-Site Wastewater Management'

1. GENERAL

(a) All products and construction shall be in accordance with the relevant Standards and in general the best trade practices shall prevail. If there are any questions about any aspect of the work please contact Council in the first instance.

(b) The Contractor shall act to protect the health and safety of staff and private persons at all times.

(c) The Contractor must be aware of the inspection requirements of Council and/or the Engineer and the need to provide as-built locations of the treatment and land application systems to Council and the owner.

(d) The Contractor should also educate the owner about the functioning of their system, especially the maintenance requirements, and where appropriate put in place a maintenance contract for systems which rely on mechanical action in order to function properly.

2. LOCATION OF TREATMENT AND DISTRIBUTION SYSTEMS AND LAND APPLICATION AREAS

(a) All tanks and the land application area shall be located clear of structures to avoid the undermining of foundations. In general, a minimum clearance of 2.0 metres should be adequate but if in doubt check with Council or an Engineer. Tank vents should be located 3 metres minimum from dwellings.

(b) The Contractor must be aware of the required separation distances of tanks and/or the land application area to surface water (ponds, water courses and drainage paths), wells and/or boundaries.

(c) Treatment systems should be sited with consideration for access by desludging trucks.

3. GOOD CONSTRUCTION TECHNIQUE

(a) Treatment and Distribution Systems

(i) When working with existing systems or carrying out maintenance tasks, measures shall be in place to ensure staff are adequately protected from contact with wastewater.

(ii) All tanks located in areas where high seasonal groundwater levels are known to occur shall be weighted down or provided with anchorage in accordance with clause 10.3.3 of A.S./N.Z.S. 1546.1:1998 (copy attached).

(iii) The Contractor shall allow to carry out any treated effluent testing required by Council. Samples should be taken once the system has been in operation for approximately three months. In a holiday-home situation testing should be done in January.

(iv) All pump chambers shall be vented similar to septic tanks. The commissioning of pumped distribution systems shall consist of at least the following:

- A check of pump out and emergency storage volumes (reserve capacity equivalent to the peak daily flow should be provided).
- Three drawdown tests.
- Testing of the operation of controls and alarms.
- Checking of uniform flow throughout any pressurised distribution network prior to covering over.

(b) **Land Application Area**

The following excavation techniques shall be observed so as to minimise the risk of damage to the soil.

(i) Plan to excavate only when the weather is fine. Puddling, where washed clay settles on the base of the trench to form a relatively impermeable layer, must be avoided.

(ii) Avoid excavation when the soil has a moisture content above the plastic limit. This can be tested by seeing if the soil forms a "wire" when rolled between the palms.

(iii) During wet seasons or when construction can not be delayed until the weather becomes fine, smeared soil (smooth) surfaces should be raked to reinstate a more natural soil surface, taking care to use fine tines and only at the surface.

(iv) When excavating by machine, fit the bucket with "raker teeth" if possible, and excavate in small "bites" to minimise compaction.

(v) Avoid compaction by keeping people off the finished trench or bed floor.

In particular for trenches and beds:

(vi) If rain is forecast cover any open trenches to protect them from rain damage.

(vii) Excavate perpendicular to the line of fall or parallel to the contour levels.

(viii) Ensure that the inverts are horizontal or sloped at not more than 1 in 200.

10.3.2 *Thickness*

The thickness of the tank walls, base, access opening covers and lids shall be not less than 6 mm.

Polyolefin materials that allow a thinner component to be made shall meet the performance requirements and tests of this Standard.

10.3.3 *Anchorage*

All plastic (polyolefin) septic tanks shall be provided with a means of anchorage.

C10.3.3

Typical examples are:

(a) Hydrostatic flange

An integrally moulded flange of similar size to the anchor collar in 10.3.3 (b).

(b) Anchor collar to be affixed at the time of installation:

An L-shaped anchor collar section constructed not less than 65 mm wide and not less than 6 mm thick to be fixed to the outside circumference of the tank with durable material protected from the corrosive environment. The collar may be continuous around the circumference or may be in at least two sections each not less than 600 mm long and fixed to opposite sides of the tank.

For a vertical cylindrical tank the flange is fixed not more than 300 mm from the base, and for a horizontal cylindrical tank the flange is situated along the line of the great horizontal perimeter.

(c) Loops to be affixed at the time of installation

Each 'side' of the tank is held into the ground by a piece of pipe, typically 100 mm PVC sewer grade pipe, attached to the tank by two durable plastic ropes. These ropes are anchored in the rim of the tank and have a loop in the other end at excavation ground level. Both pipes have a length of not less than the diameter of the tank and each is passed through two loops. Backfilling then covers the pipes.

10.4 Manufacture

10.4.1 *Materials*

10.4.1.1 *Polymer*

The polymer utilised by the manufacturer shall be suitable so that the finished product meets the performance requirements as set out in this Standard.

10.4.1.2 *Fasteners*

All fasteners shall be of durable material, resistant to the corrosive environment, and be either:

(a) Stainless steel, grade 316 (see AS 1449 or NZS/BS 1449); or

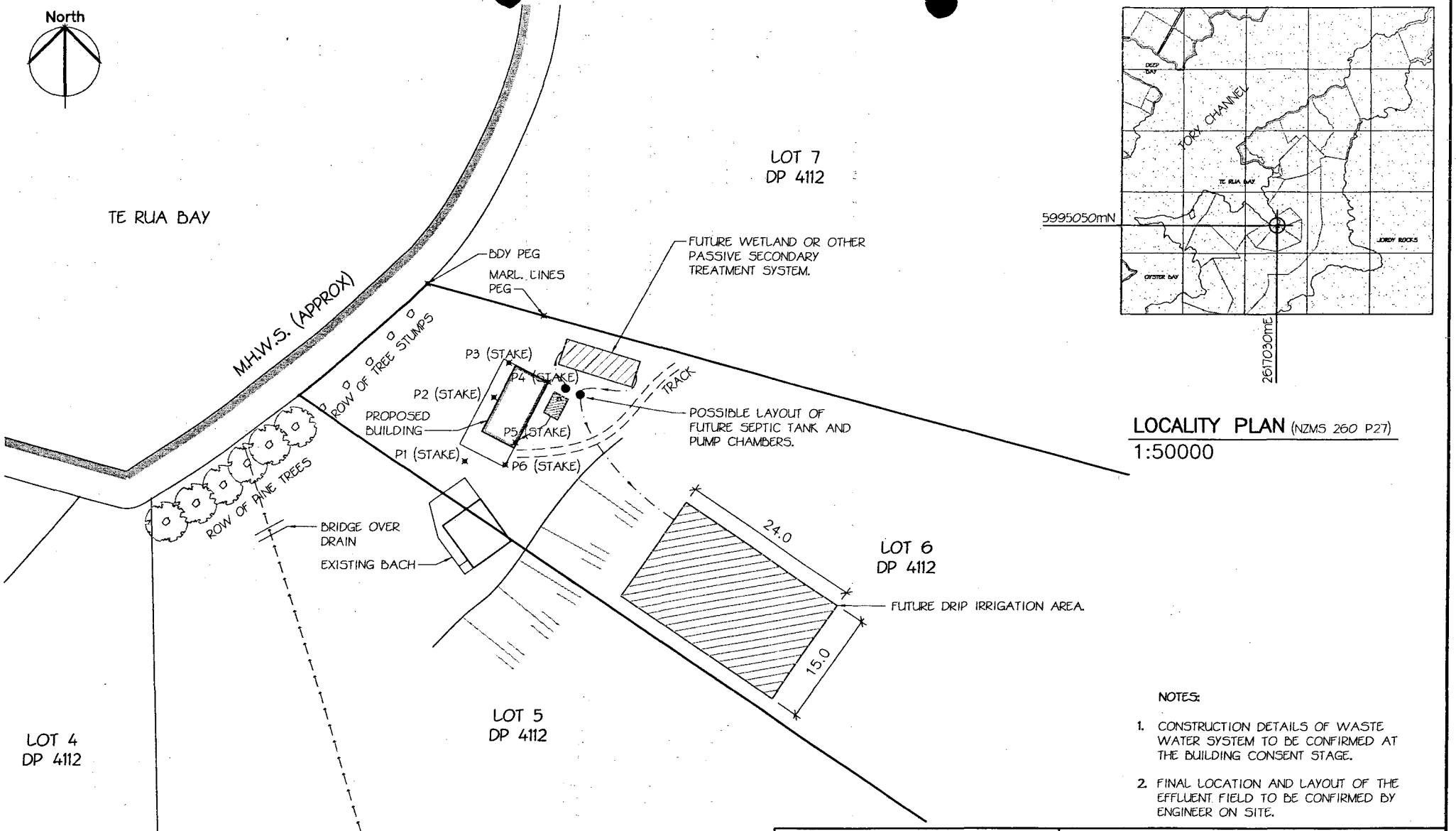
(b) Copper alloy, grade 443 (see AS 2738.2 or NZS/BS 1400); or

(c) a suitable equivalent

10.4.2 *Manufacturing process*

10.4.2.1 *General*

The manufacturing process shall be carried out in a controlled manner to produce a consistent product checked by a quality assurance process.



PLAN
1:500

LOCALITY PLAN (NZMS 260 P27)
1:50000

NOTES:

1. CONSTRUCTION DETAILS OF WASTE WATER SYSTEM TO BE CONFIRMED AT THE BUILDING CONSENT STAGE.
2. FINAL LOCATION AND LAYOUT OF THE EFFLUENT FIELD TO BE CONFIRMED BY ENGINEER ON SITE.

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L.J. RYAN
LOT 6 DP 4112, TE RUA BAY
PROPOSED BUILDING

site and locality plans

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
02/05	A3	23212	C1	B

DES RWD | DRN AC | CK | CAD \23000\23212.dwg

North

TE RUA BAY

M.H.W.S. (APPROX)

LOT 7
DP 4112

BDY PEG

MARL. LINES PEG

FUTURE WETLAND OR OTHER PASSIVE SECONDARY TREATMENT SYSTEM.

ROW OF TREE STUMPS

6.5°

7.0°

P3 (STAKE)

P4 (STAKE)

P2 (STAKE)

TRACK

PROPOSED BUILDING

P5 (STAKE)

POSSIBLE LAYOUT OF FUTURE SEPTIC TANK AND PUMP CHAMBERS.

P1 (STAKE)

P6 (STAKE)

7'11"

ROW OF PINE TREES

BRIDGE OVER DRAIN

EXISTING BACH

24.0

LOT 6
DP 4112

FUTURE DRIP IRRIGATION AREA.

15.0

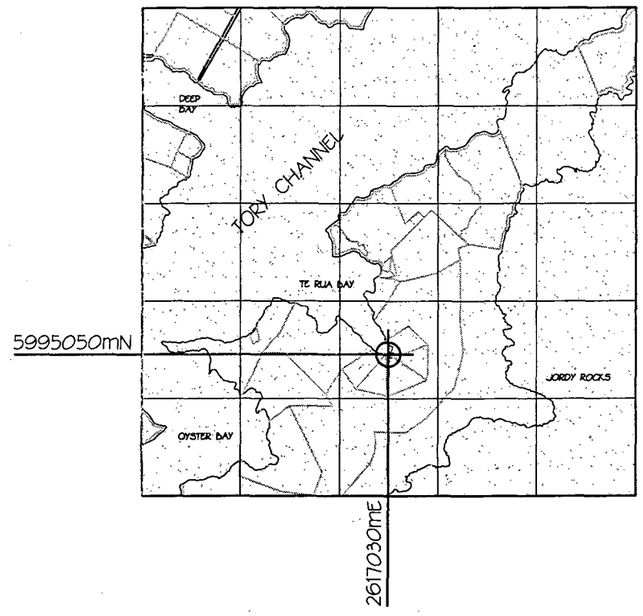
LOT 5
DP 4112

LOT 4
DP 4112

PLAN
1:500

0mm

100mm



LOCALITY PLAN (NZMS 260 P27)
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DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
02/05	A3	23212	C1	B

DES	DRN	CK	CAD
RWD	AC		\\23000\23212.dwg

050295

North

TE RUA BAY

M.H.W.S. (APPROX)

LOT 7
DP 4112

BDY PEG

MARL. LINES PEG

ROW OF TREE STUMPS

P3 (STAKE)

P4 (STAKE)

P2 (STAKE)

PROPOSED BUILDING

P5 (STAKE)

P1 (STAKE)

P6 (STAKE)

TRACK

A
R2

ROW OF PINE TREES

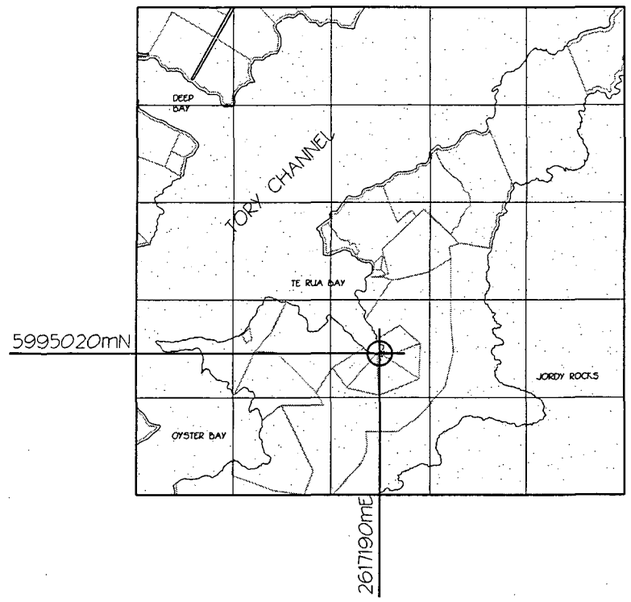
BRIDGE OVER DRAIN

EXISTING BACH

LOT 6
DP 4112

LOT 4
DP 4112

LOT 5
DP 4112



LOCALITY PLAN (NZMS 260 P27)
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PLAN
1:500

0mm 100mm

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site and locality plans

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02/05	A3	23212	C1	A

DES	DRN	CK	CAD
RWD	AC		\\23000\23212.dwg

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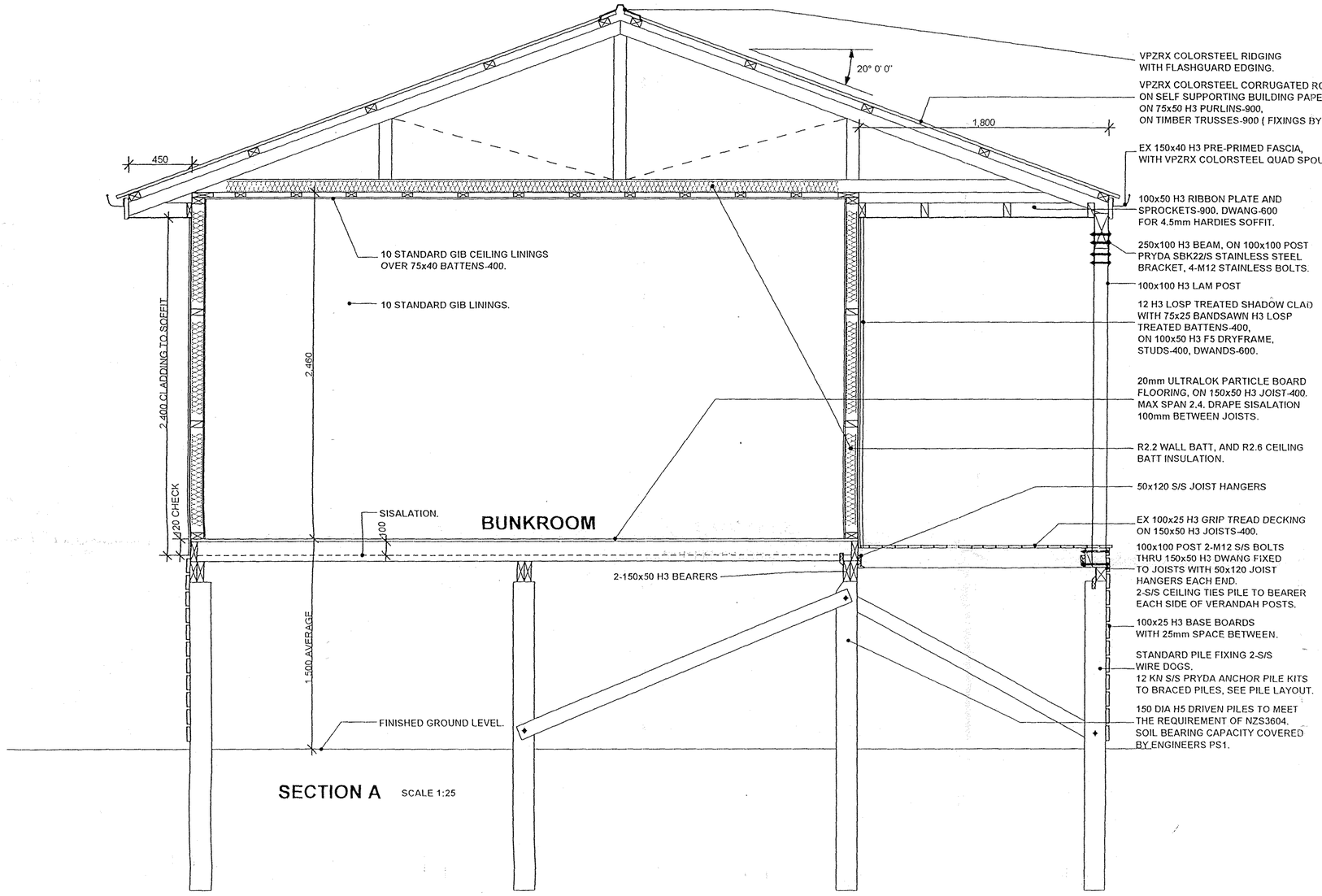

SECTION A SCALE 1:25

NOTES:
ALL CONSTRUCTION TO COMPLY WITH NZBC & MDC REGULATIONS. ALL MATERIALS TO BE FIXED IN STRICT ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS.

-THE DRAWINGS SHOW THE EXTENT OF WORK BUT THERE IS NO WARRANTEE EXPRESSED OR INFERRED THAT EACH AND EVERY DETAIL IS SHOWN.

-SHOULD THERE BE ANY OMMISSION, DOUBT OR AMBIGUITY AS TO THE MEANING OF ANY PART OF THE DRAWINGS & SPECIFICATIONS, CONTACT THE DESIGNER BEFORE CONTINUING FURTHER WORK.

GENERAL NOTES:

CORRUGATED VP ZRX COLORSTEEL ROOFING, ON GIB BLACK SELF SUPPORTING BUILDING PAPER, ON 75x50 H3 PURLINS-900 CRS MAX, ON TRUSSES MANUFACTURED TO SUPPLIERS SPECIFICATIONS.

COLORSTEEL VP ZRX QUAD SPOUTING, ON EX 150x40 H3 PRE-PRIMED FASCIA, WITH 4.5mm HARDIES SOFFIT UNDER AS SHOWN ON THE DRAWINGS.

R2.2 WALL BATT INSULATION, AND R2.6 CEILING BATT INSULATION.

90x45 F5 H3 DRYFRAME TIMBER FRAMED WALLS. STUD-400, DWANGS-600.

12mm H3 LOSP TREATED SHADOW CLAD PLY WITH 75x25 H3 LOSP TREATED BATTENS VERT-400, ON FRAMING AS SPECIFIED.

10 STANDARD GIB CEILINGS, ON 75x40 BATTENS-400(10 AQUALINE IN WET AREAS) ON ROOF FRAMING MEMBERS AT 900 CRS.

10mm STANDARD GIB LININGS TO WALLS,(10mm AQUALINE TO WET AREAS),ON FRAMING AS SPECIFIED ON THE DRAWINGS. RUN HORIZONTALLY WHERE POSSIBLE.

20mm ULTRALOK PARTICLE BOARD FLOORING, ON 150x50 H3 JOISTS-400, MAX SPAN 2.4m. DRAPE PERFORATED SISALATION FOIL 100mm BETWEEN JOISTS.

EX 100x25 H3 GRIP TREAT DECKING, ON 150x50 JOISTS-400.

NOTES	JOB TITLE	DRAWING TITLE	DATE	SHEET
CONFIRN ALL DIMENSIONS ON SITE PRIOR BEGINING CONSTRUCTION	NEW HOLIDAY HOME FOR JOHN & MARIE RYAN TE RUA BAY, TORY CHANNEL, MARLBOROUGH.	SECTION	28/03/05	4
			SCALE 1:25	JOB NO 1057

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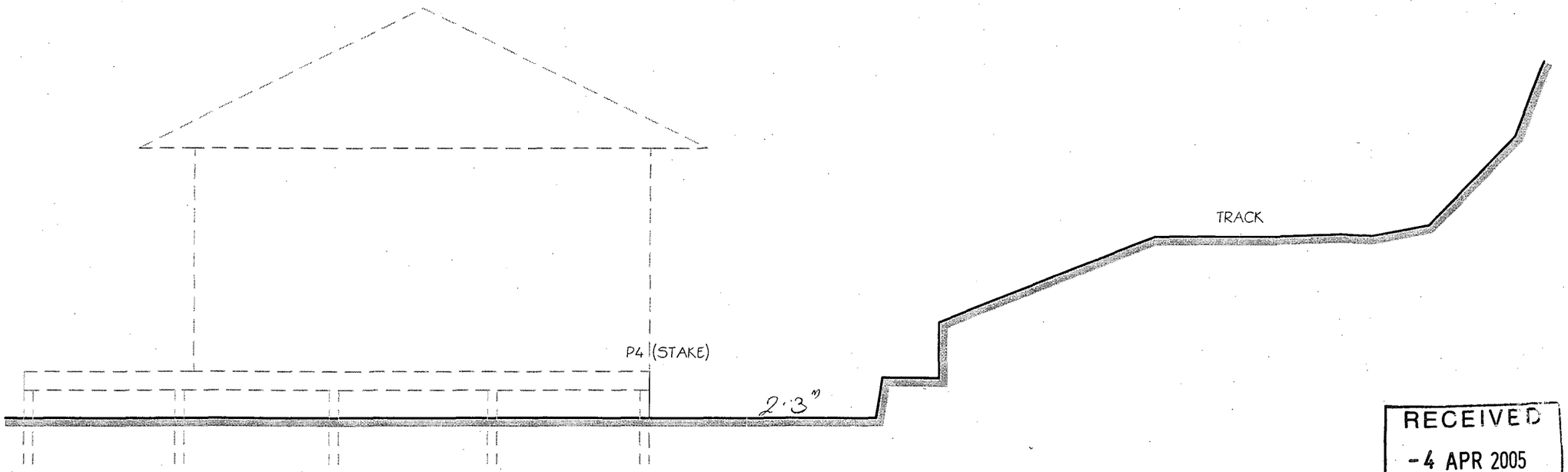

SECTION A
1:50 R1

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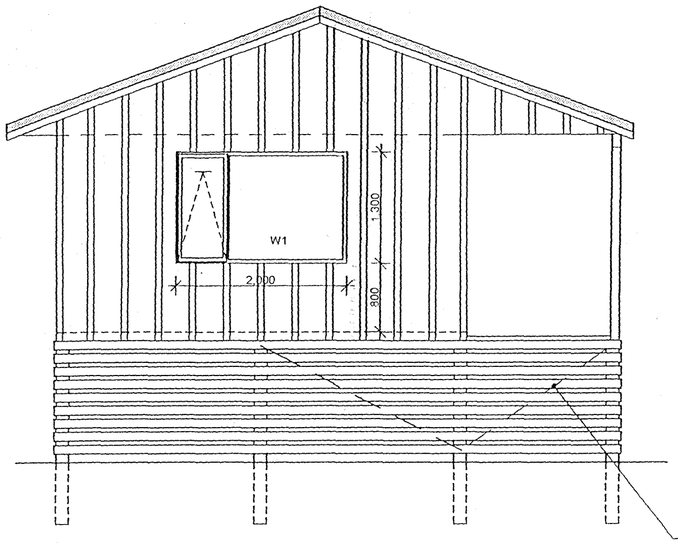
J. RYAN
LOT 6 DP 4112, TE RUA BAY
STABILITY ASSESSMENT

cross section

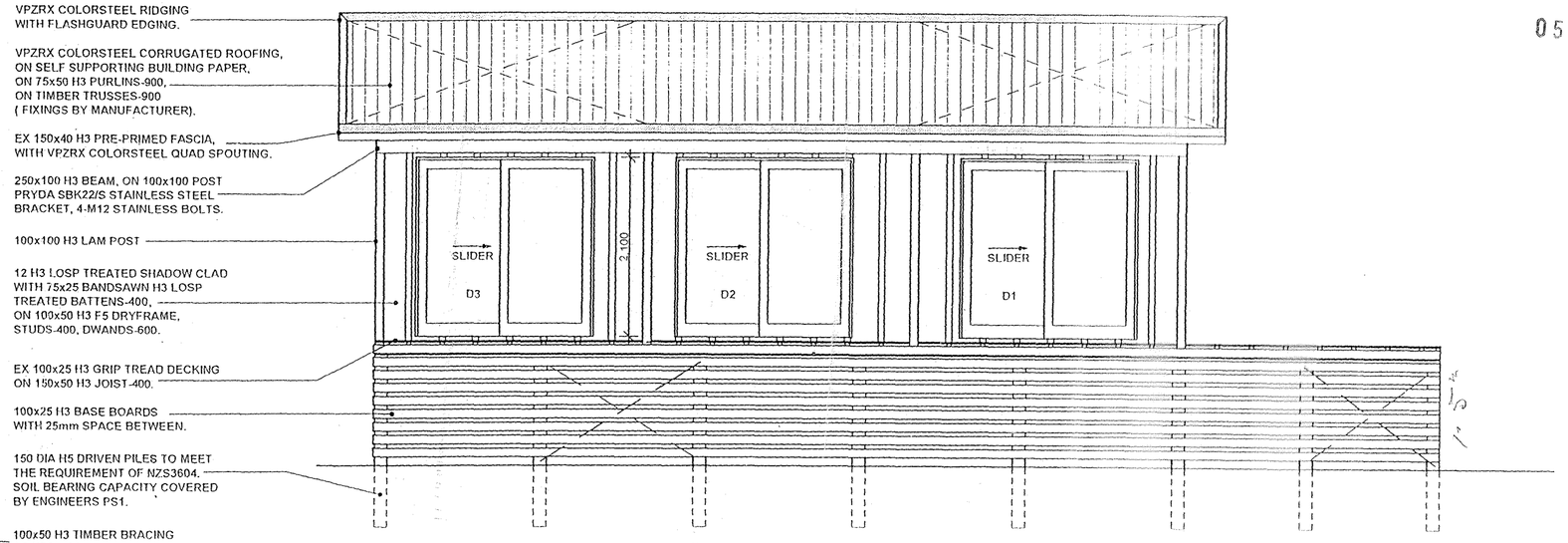
DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
02/05	A3	23212	C2	A

DES RWD | DRN AC | CK | CAD \\23000\23212.dwg

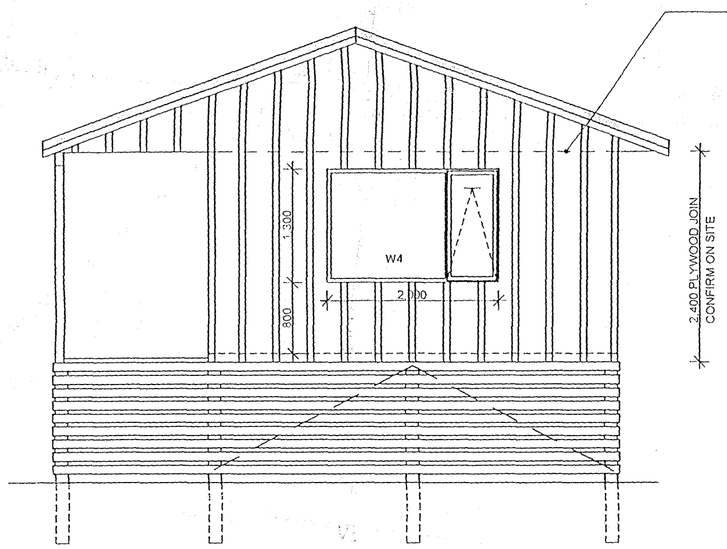
0mm 100mm



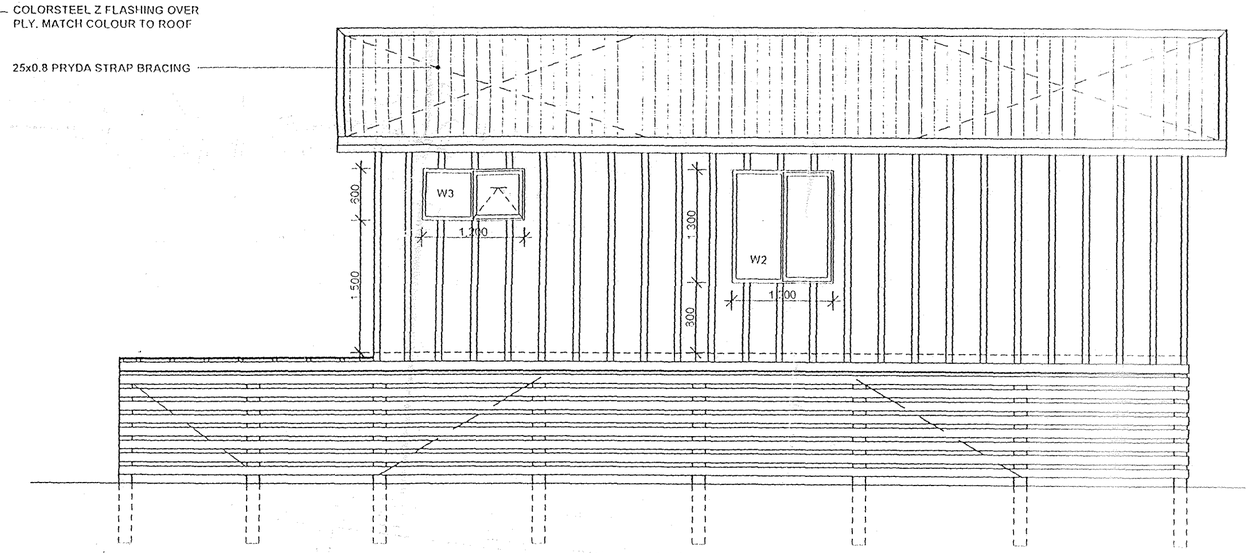
EAST ELEVATION SCALE 1:50



NORTH ELEVATION SCALE 1:50



WEST ELEVATION SCALE 1:50



SOUTH ELEVATION SCALE 1:50

NOTES:
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NOTES	JOB TITLE	DRAWING TITLE	DATE	SHEET
CONFIRM ALL DIMENSIONS ON SITE PRIOR BEGINING CONSTRUCTION	NEW HOLIDAY HOME FOR JOHN & MARIE RYAN 1E RUA BAY, TORY CHANNEL, MARLBOROUGH.	ELEVATIONS	28/03/05 SCALE 1:50	3 JOB NO 1057

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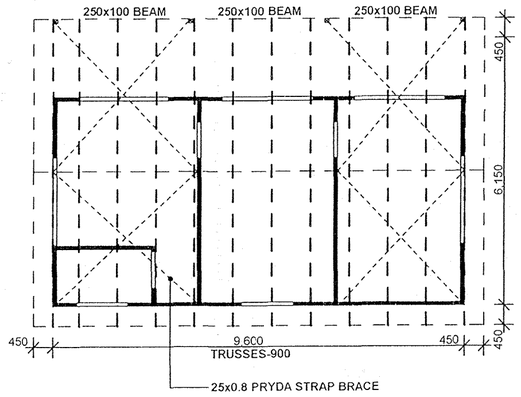
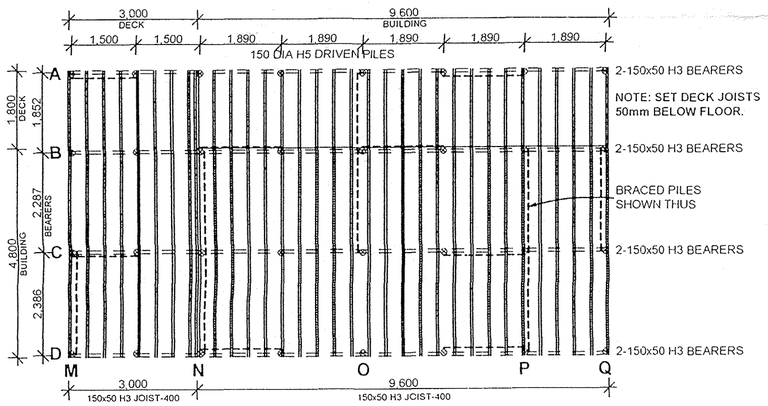
050295



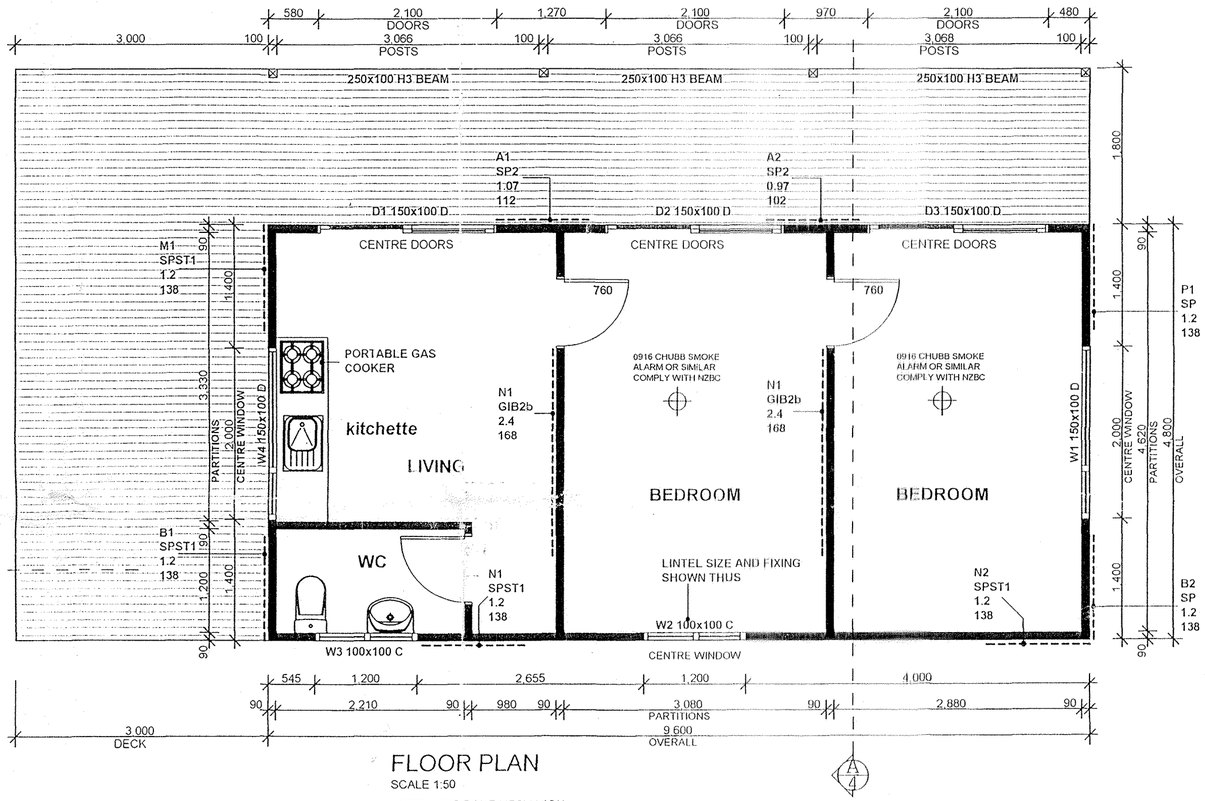
ROOF PLAN

SCALE 1:100



SUB-FLOOR PLAN

SCALE 1:100



FLOOR PLAN

SCALE 1:50

NOTE: WIND ZONE VERY HIGH.
ROOF WEIGHT: LIGHT.
WALL CLADDING: LIGHT.

EXTERIOR TOP PLATE FIXING=SN50
AS PER PRYDA WALL FIXING CHART
SEE ATTACHMENT.

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EX 100x25 H3 GRIP TREAT DECKING, ON 150x50 JOISTS-400.

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NOTES	JOB TITLE	DRAWING TITLE	DATE	SHEET
CONFIRN ALL DIMENSIONS ON SITE PRIOR BEGINING CONSTRUCTION	NEW HOLIDAY HOME FOR JOHN & MARIE RYAN TE RUA BAY, TORY CHANNEL, MARLBOROUGH.	FLOOR PLAN SUB-FLOOR PLAN ROOF PLAN	28/03/05	2
			SCALE 1:50 1:100	JOB NO 1057

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