DavidsonPartners Ltd

Structural Engineering
Civil Engineering
Building Design
Project Management

Practising in association with Ayson and Partners, Registered Surveyors

Our Ref: 23288

WASTEWATER ASSESSMENT FOR M AND P BOTHERWAY
KARAMU BAY, LOCHMARA BAY

1. Introduction

Mark and Pip Botherway own a property in Karamu Bay. Their facilities include a holiday home and a sleep-out, with the combined number of bedrooms totalling five.

The wastewater presently goes through a primary treatment system consisting of two 2,000 litre tanks and one 2,500 litre tank. This discharges to a trench system of unknown length.

The trenches are starting to fail and the Botherways now wish to upgrade their total system for the long term.

Our brief was to inspect the site, investigate possibilities and assess and recommend a suitable option.

2. Investigation

We visited the site in March 2005. Our immediate investigation focussed on a suitable land application area. We determined that the land uphill and behind the buildings would be suitable for a disposal system within a low application rate (not trenches or beds).

The land slopes at about 15 degrees and is covered in light regenerating natives and there were no stability concerns..

The soil profile consists of 200mm of topsoil lying over a light brown silty clay loam which ribboned to 50-60mm and has a soil Category of 4.

The domestic water supply is from a gully catchment and has proven reasonably reliable. The site has moderate exposure to the sun and winds.

3. Design

3.1 Loading

The Botherways have a low pressure water supply, dual flush toilets and a water conserving automatic clothes washing machine. We therefore consider that the appropriate waste water allowance is 145 litres per person per day.

For five bedrooms, the equivalent number of persons under current rules is ten, giving a total daily load of 1,450 litres.

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3.2 Land Application System

The proposed land application area is not used for recreational purposes. The area would suit a low pressure effluent distribution system (LPED) using primary treated wastewater.

Using a design irrigation rate of 3.7mm per day and a wetted width of one metre, a minimum application area of 392m² is required. This equates to 392m of LPED lines.

For a dose volume of 300 litres, the field has to be split into four sectors, each consisting of 4 x 24.5 lengths, centre-fed from a four port sequencing valve.

The LPED system consists of a small diameter perforated pipe which is pressurised and discharges into a larger pipe from which it seeps into the topsoil. We recommend a 20 nominal diameter (23.85 internal diameter), pipe with 3mm holes at 1.6 metre centres nested within a Novaflow pipe to evenly distribute the treated wastewater.

3.3 Treatment

Presently, the black water is treated via 2 x 2,000 litre septic tanks which discharge to a grey water tank of 2,500 litres, before entering the trenches.

It is still proposed to separate out the grey and black waters as much as possible. The grey and black water from the proposed upgraded sleep-out (refer plan sheet C1) will feed into the 4,000 septic tank system (2 x 2,000 litre), while all the grey water from the existing bach (shower and laundry) will continue to go into the 2,500 litre grey water tank. Both tanks will discharge to a small 500 litre "polishing" tank (within an effluent filter) before discharging to the pump chamber.

There is ample capacity in this system using the existing tanks. A 2,000 litre pump chamber will provide for a 300 litre dose volume in addition to a 28 hour emergency capacity at full occupancy in case of pump breakdown or extended power outage.

The pump should be sized for a gravity head from the pump chamber to the sequencing valve plus 7m to allow for friction loss in the 50 diameter supply pipe, the activation of the sequencing valve and 1.5 metre head required at the end of each line. A pump flow of about 100 litres per minute should be allowed for.

4. Assessment of Environmental Effects

The land application field is not within 30 metres of a water body and is on a moderate, stable slope covered in regenerating natives. The design application rate is also relatively low (3.7 mm per day) but with the line spacing increased to 1.5m, the effective application rate reduces to under 3mm/day.

It is our opinion that there will be no adverse effects on the environment.

5. Summary

5.1 It is proposed to apply treated wastewater to a low pressure effluent distribution system covering an area of over 500m².

5.2 The field is split into four sectors, each of 98 metres, with each sector controlled by a four port sequencing valve.

5.3 The primary treatment system consists of black water septic tanks (2 x 2,000 litre tanks) and a grey water tank (2,500 litre) in addition to an effluent filter in a "polishing" tank.

5.4 The submersible pump in the pump chamber will be set to provide a dose volume to the land application field of 300 litres. An emergency float set just above the "pump on" level will activate an alarm and provide a further 28 hour capacity at full flow.

5.5 The effects on the environment are considered less than minor.

6. References

6.1 A/NZS 15447:2000, "*Onsite Domestic Wastewater Management*".

6.2 Marlborough District Council, July 2005,
"Guidelines for New Onsite Wastewater Management Systems".

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W L McGlynn

LM:KR

APPENDIX

1. Field assessment Report
2. Loading and Septic Tank Design
3. LPED Design for Owner and Installer Guidelines
5. Drawings

	DAVIDSON PARTNERS LTD **WASTEWATER MANAGEMENT** FIELD ASSESSMENT REPORT		**JOB NO.** 23288 **SHEET NO** 1 **NAME** lm **DATE** 11.03.05
CLIENT LOCATION	BOTHERWAY KARAMU BAY		

Last Updated 16.12.02

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

1	Percolation Rate (if available)		na
2	Site Exposure to	- sun - wind	good good
3	Topsoil Depth		200 mm
4	Soil Description (colour, moisture, firmness, type)		light brown, silty clay loam
5	Soil Category (1 - 6)		4
6	Coarse Fragments (size / abundance)		
7	Ribbon Length		50 - 60 mm
8	Soil Structure (Pedal Content)		high
9	Performance of Existing Systems Nearby		poor
10	Nearby Water Bodies ? - Separation Distance ?		no na
11	Nearby Wells ? - Separation Distance ?		no na
12	Intended Water Supply		creek
13	Runoff To Be Controlled ?		no
14	Ground Water To Be Controlled ?		no
15	Any Stability Considerations ?		no
16	Depth to Water Table		> 2m
17	Vegetation Cover	- Existing ? - Proposed ?	regen natives regen natives
18	Gravity Head to Proposed Disposal Field		nil (need pump)
19	Reserve Area Available ?		yes
20	Other Comments ?		pump to LPED?

DAVIDSON PARTNERS LTD WASTEWATER MANAGEMENT LOADING AND SEPTIC TANK DESIGN		JOB NO. 23288 SHEET NO 1 NAME lm DATE 21-Jul-05
CLIENT	BOTHERWAY	
LOCATION	KARAMU BAY	

Last Updated 31.01.05

REFERENCES : 1 ARC TP # 58 Third Edition
2 AS/NZS 1547:2000 "On Site Domestic Wastewater Management"
(LOADING TO BLACKWATER TANK DETERMINED AS 93 l/p/d)

1 LOADING

Number of bedrooms	5	
Occupancy (N)	10	
Wastewater allowance (A)	93	litres / person / day
Soil category (from field assessment)	4	

2 SEPTIC TANK DESIGN

Number of people (ex 1.3 above)	10		
Number of people for design purposes	10		
(peaking factor =	1)		
Daily flow	930	litres	
Miinimum residence time required	24	hours	
Pump out interval required	5	years	
Sludge/scum accumulation(bl-50,gr-40,80)	40	litres / person / year	
Allowance for scum / sludge	2000	litres	
Minimum tank size	2930	litres	
Let tank size be	**4000**	**litres**	
Settling volume available	2000	litres	
Settling time available	52	hours	OK,> min. res. time

DAVIDSON PARTNERS LTD WASTEWATER MANAGEMENT LOADING AND SEPTIC TANK DESIGN		JOB NO. 23288 SHEET NO 1 NAME lm DATE 21-Jul-05
CLIENT	BOTHERWAY	
LOCATION	KARAMU BAY	

Last Updated 31.01.05

REFERENCES : 1 ARC TP # 58 Third Edition
2 AS/NZS 1547:2000 "On Site Domestic Wastewater Management"
(LOADING TO GREYWATER TANK DETERMINED AS 52 l/p/d)

1 LOADING

Number of bedrooms	5	
Occupancy (N)	10	
Wastewater allowance (A)	52	litres / person / day
Soil category (from field assessment)	4	

2 SEPTIC TANK DESIGN

Number of people (ex 1.3 above)	10		
Number of people for design purposes	10		
(peaking factor =	1)		
Daily flow	520	litres	
Miinimum residence time required	24	hours	
Pump out interval required	5	years	
Sludge/scum accumulation(bl-50,gr-40,80)	40	litres / person / year	
Allowance for scum / sludge	2000	litres	
Minimum tank size	2520	litres	
Let tank size be	**2500**	**litres**	
Settling volume available	500	litres	
Settling time available	23	hours	NG,< than min.res. time

alt.

DAVIDSON PARTNERS LTD ON-SITE WASTEWATER MANAGEMENT LPED DESIGN		JOB NO. 23288 SHEET NO 3 NAME RWD DATE 8/07/2005
CLIENT	MA and PJ Botherway	
LOCATION	Karamu Bay, Lochmara Bay	

1	Preliminary	number of people			10	
		wastewater flow per person			145	l / p /d
		therefore, total load, Q			1450	litres/day
		soil cat.			4	
2	Design Basis					
	2.1	LPED in Trench	Y/N		N	
		Storage has been allowed for in the 'Trench Storage Design' and the length (L) determined.	L	=	n/a	m
	2.2	LPED on / in topsoil	Y/N		y	
		Storage has not been allowed for. A peaking factor (PF) should be applied.	PF	=	1	
		design irrigation rate (DIR)			3.70	mm/day
		Actual DIR = DIR/PF			3.70	mm/day
		minimum land application area (A)= Q/DIR			391.9	m^2
		if let wetted width (WW) =			1	m
		then, total length of LPED required (L) = A/WW			391.9	m
	2.3	Length		=	391.9	m
3	Design	LPED pipe diam.			23.85	mm
		volume of network (V) = pipe area x L			0.175	m^3
					175	litres
		total dose volume if 1 field = 10 x V			1,751	litres
		ideal dose vol = daily load / 3			483	litres
		let no of subfeilds be			4	
		length per subfield = total length / no. of fields			98.0	m
		dose vol / subfield = 10 x vol/subfield =			438	litres
		let dose vol =			300	litres
		no. of doses per day			4.83333333	
4	Pump flows	let pump running time be			3	minutes
		flow per subfield = (load per subfield / running time)			100	litres/min.
					1.7	litres/sec.
5	**Subfield 1**	(top or highest elevation)				
		let hole diameter =				mm
		let hole spacing =				mm
		no. of holes = length/spacing				
		Let no. of holes =				
		flow / hole = (flow/subfeild)/(no. of holes)				litres/min.
		head req'd = $0.128*(Q/A)^2$				m
		(Q=	m^3/sec			
		A=	m^2)			
6	**Subfield 2**	let hole diameter =				mm
		Area of hole				m^2
		drop in elevation (increase in head) =				m
		head at previous field up =				m
		total head available at this location (H)				m
		flow per hole = $0.63*A*(19.62*H)^{0.5}$				litres/min.
		no. of holes = flow per subfield/flow per hole				
		centres of holes = subfield length/no. of holes				mm
		let centres =				mm

Davidson Partners Ltd REGISTERED ENGINEERS	botherway karamu bay **LPED LOSSES**	Job Number 23288 Sheet Number 1 Name lm Date 29.06.05

Lateral Length	24	m
Spacing	1.600	m
No.of Holes	15	
Hole Ø	3	mm
Área	7.07E-06	m²
Pipe Ø (I.D)	23.85	mm
υ	1.31E-06	m²/s
Head at end of LPED	1.50	m

Total Head Loss	0.36	m
Flow Variation	0.15	l/min
Flow Variation	9.3%	
Maximum Flow	22.4	l/min

Hole	Chainage (m)	Head (m)	Q_{HOLE} (l/min)	Q_{PIPE} (l/min)	V*=Q/A (m/s)	I (m/m)	Hl (m)	Cummulative Hl(m)	Reynolds No.	Flow
15	23.20	1.50	1.45							
14	21.60	1.50	1.45	1.45	0.05	0.0004	0.0006	0.0006	985	Laminar
13	20.00	1.50	1.45	2.90	0.11	0.0008	0.0012	0.0018	1969	Laminar
12	18.40	1.51	1.45	4.35	0.16	0.0023	0.0037	0.0055	2954	Transitional
11	16.80	1.51	1.46	5.80	0.22	0.0038	0.0062	0.0117	3941	Transitional
10	15.20	1.52	1.46	7.26	0.27	0.0057	0.0092	0.0208	4929	Transitional
9	13.60	1.53	1.47	8.72	0.33	0.0079	0.0127	0.0335	5920	Transitional
8	12.00	1.55	1.47	10.18	0.38	0.0104	0.0167	0.0502	6916	Transitional
7	10.40	1.57	1.48	11.66	0.43	0.0133	0.0212	0.0714	7917	Transitional
6	8.8	1.60	1.50	13.14	0.49	0.0164	0.0262	0.0976	8924	Transitional
5	7.2	1.63	1.51	14.64	0.55	0.0198	0.0317	0.1293	9940	Transitional
4	5.6	1.67	1.53	16.15	0.60	0.0236	0.0378	0.1671	10966	Transitional
3	4.0	1.71	1.55	17.67	0.66	0.0277	0.0443	0.2115	12004	Transitional

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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.

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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.

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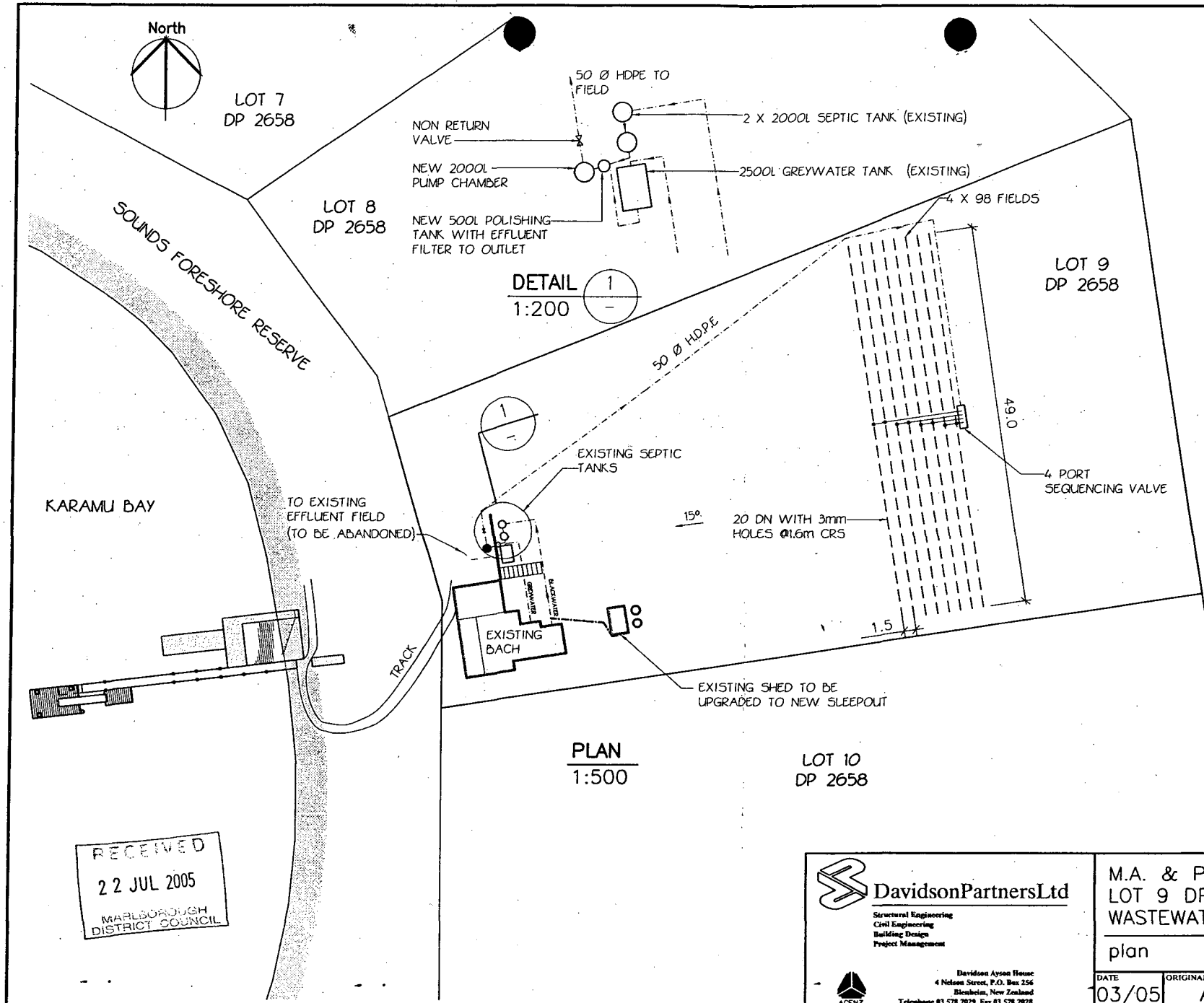

NOTES:

1.) LOCATION OF FEATURES RELATIVE TO BOUNDARIES ARE APPROXIMATE ONLY.

2.) MATERIALS AND INSTALLATION OF SEPTIC TANK AND DISTRIBUTION SYSTEM TO BE IN ACCORDANCE WITH AS/NZS 1546.1:1998, AS/NZS 1547:2000 AND THE MANUFACTURERS SPECIFICATIONS.

3.) LAYOUT OF EFFLUENT FIELD MAY BE VARIED WITH ENGINEERS APPROVAL.

4.) OPERATION OF DISTRIBUTION SYSTEM TO BE FULLY TESTED PRIOR TO COVERAGE OF PIPEWORK. ENGINEER TO BE PRESENT.

5.) BALL VALVES CAN BE FITTED ON EACH LINE TO EQUALISE HEAD AT ENDS (1.5m MIN).

6.) EFFLUENT FIELD TO BE FLUSHED WITH DOSES OF CLEAN WATER WHEN VACATING THE SITE FOR AN EXTENDED PERIOD.

7.) FIT EFFLUENT FILTER TO OUTLET ON NEW 500L TANK.

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22 JUL 2005
MARLBOROUGH DISTRICT COUNCIL

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MARLBOROUGH DISTRICT COUNCIL

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M.A. & P.J.K. BOTHERWAY
LOT 9 DP 2568, KARAMU BAY
WASTEWATER ASSESSMENT

plan

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
03/05	A3	23288	C1	A

DES RWD DRN AC CK CAD \\23000\23288.dwg

0mm 100mm

NOTES:

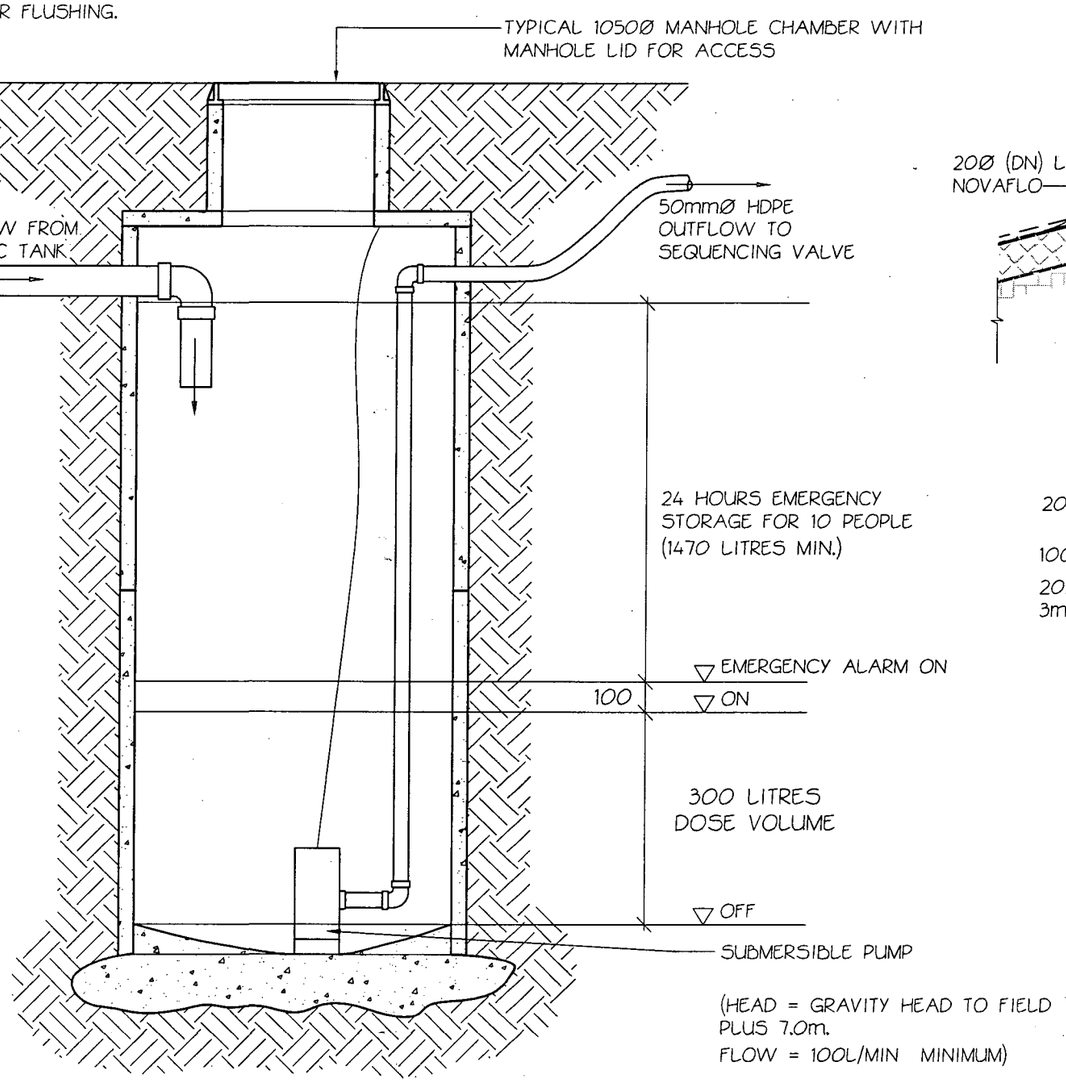
1.) MATERIALS AND INSTALLATION OF WASTEWATER SYSTEM TO BE IN ACCORDANCE WITH AS/NZS 1546.1:1998, AS/NZS 1547:2000 AND MANUFACTURERS SPECIFICATION.

2.) PUMP CHAMBER TO BE FITTED WITH A HIGH LEVEL FLOAT SET JUST ABOVE NORMAL OPERATING LEVEL. WIRED TO AUDIO AND VISUAL ALARMS.

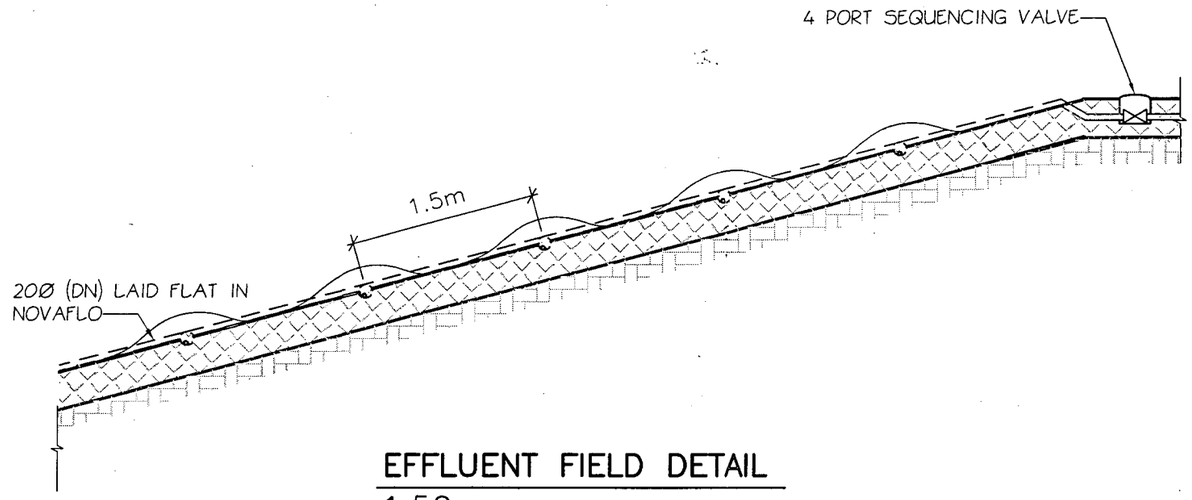
3.) PUMP CHAMBER SHOWN IS AN EXAMPLE ONLY. OTHER TYPES COULD BE APPROVED, E.G. MODIFIED SEPTIC TANK.

4.) OPERATION OF DISTRIBUTION SYSTEM TO BE FULLY TESTED PRIOR TO COVERAGE OF PIPEWORK. ENGINEER TO BE PRESENT.

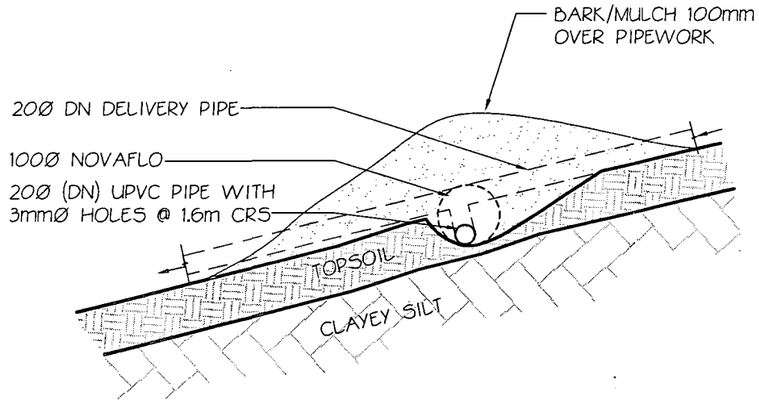
5.) FIT SCREW CAP AT ENDS OF 20Ø LPED FOR FLUSHING.



PUMP CHAMBER
1:20



EFFLUENT FIELD DETAIL
1:50



DISTRIBUTION LINE DETAIL
1:10

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M.A. & P.J.K. BOTHERWAY
LOT 9 DP 2568, KARAMU BAY
WASTEWATER ASSESSMENT

typical pump chamber

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
03/05	A3	23288	C2	A

DES RWD | DRN AC | CK | CAD \\23000\23288.dwg

0mm 100mm

NOTES:

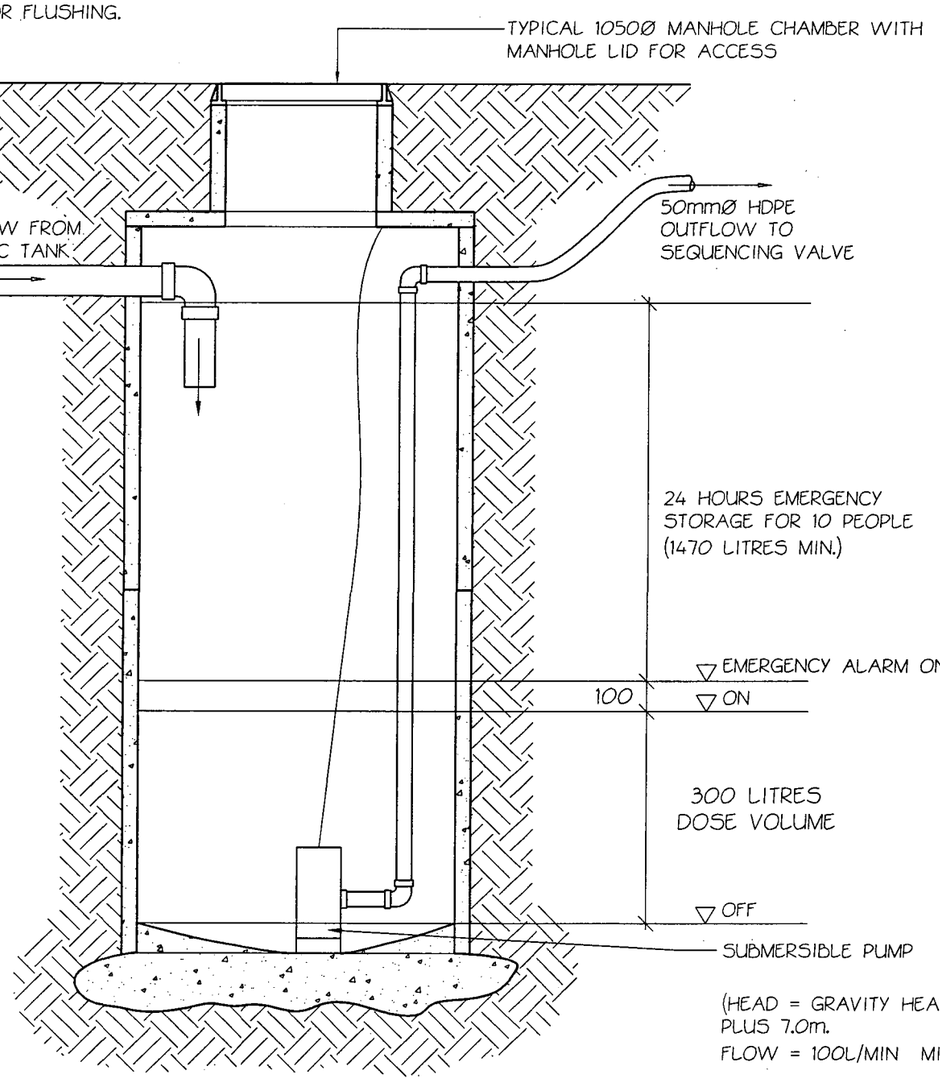
1.) MATERIALS AND INSTALLATION OF WASTEWATER SYSTEM TO BE IN ACCORDANCE WITH AS/NZS 1546.1:1998, AS/NZS 1547:2000 AND MANUFACTURERS SPECIFICATION.

2.) PUMP CHAMBER TO BE FITTED WITH A HIGH LEVEL FLOAT SET JUST ABOVE NORMAL OPERATING LEVEL. WIRED TO AUDIO AND VISUAL ALARMS.

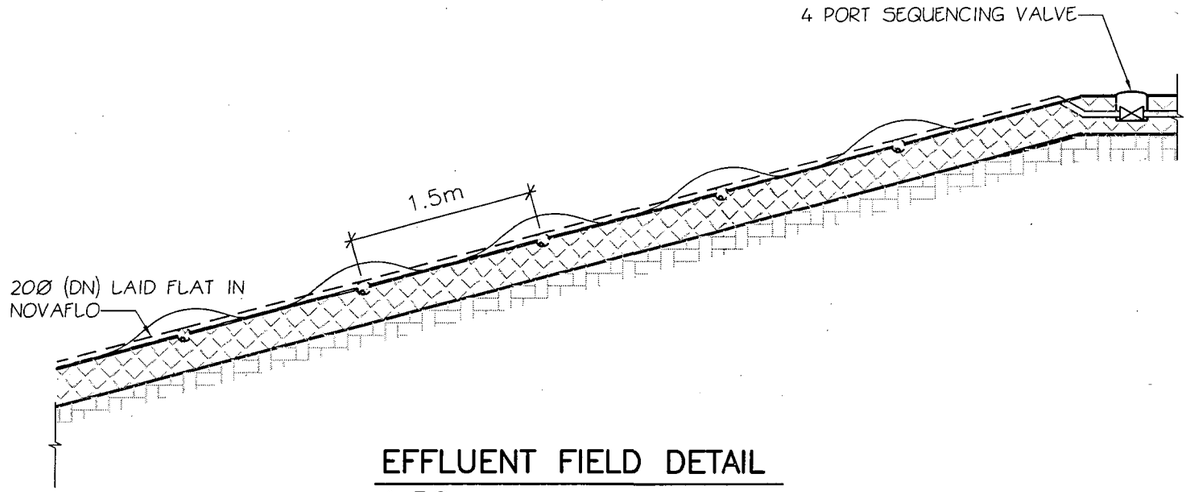
3.) PUMP CHAMBER SHOWN IS AN EXAMPLE ONLY. OTHER TYPES COULD BE APPROVED, E.G. MODIFIED SEPTIC TANK.

4.) OPERATION OF DISTRIBUTION SYSTEM TO BE FULLY TESTED PRIOR TO COVERAGE OF PIPEWORK. ENGINEER TO BE PRESENT.

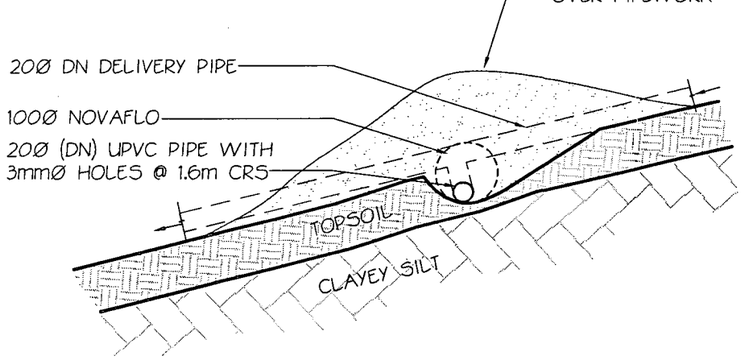
5.) FIT SCREW CAP AT ENDS OF 20Ø LPED FOR FLUSHING.



PUMP CHAMBER
1:20



EFFLUENT FIELD DETAIL
1:50



DISTRIBUTION LINE DETAIL
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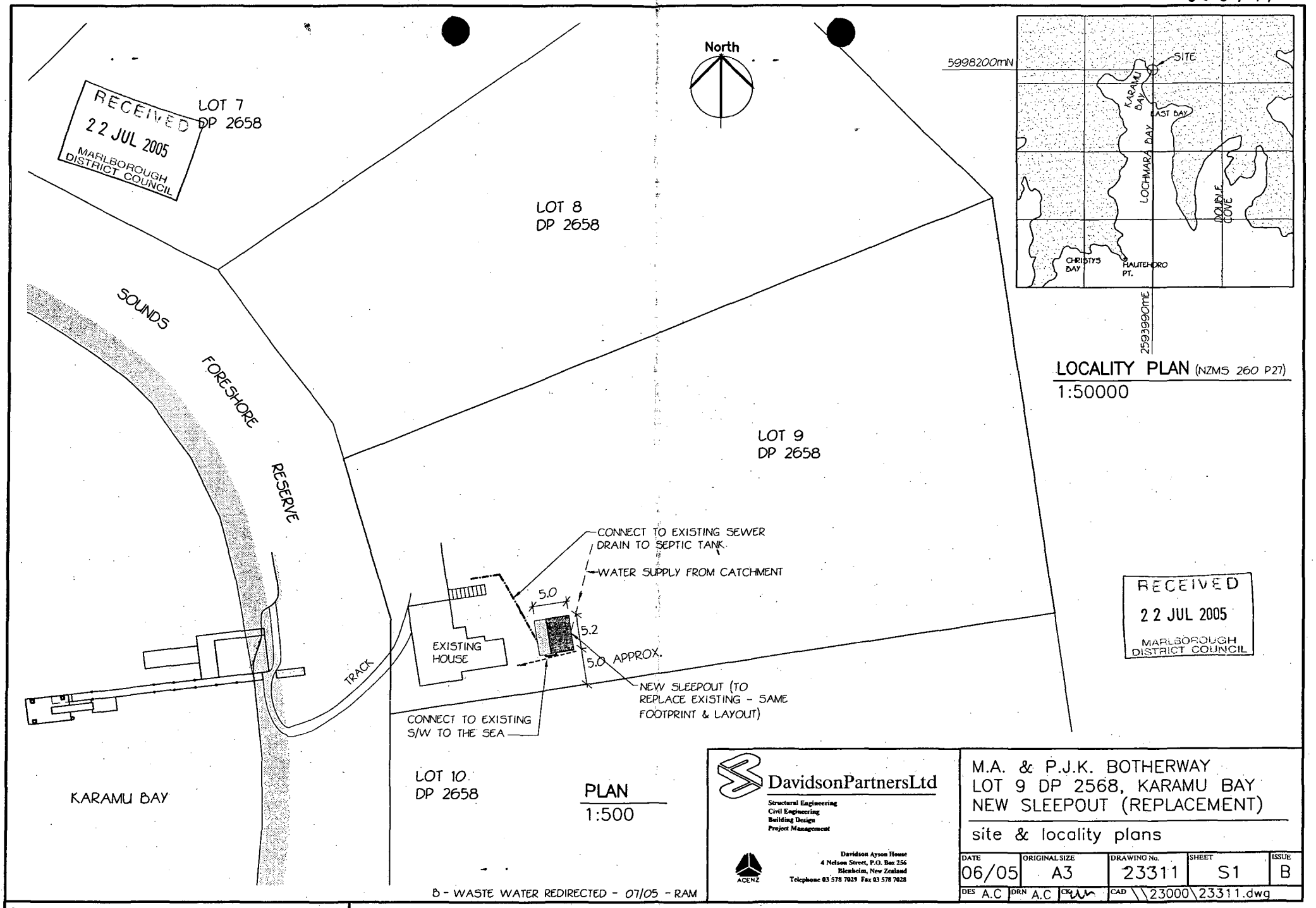
typical pump chamber

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
03/05	A3	23288	C2	A

DES	DRN	CK	CAD
RWD	AC		\\23000\23288.dwg

0mm 100mm

050717



LOCALITY PLAN (NZMS 260 P27)
1:50000

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PLAN
1:500

B - WASTE WATER REDIRECTED - 07/05 - RAM

0mm 100mm

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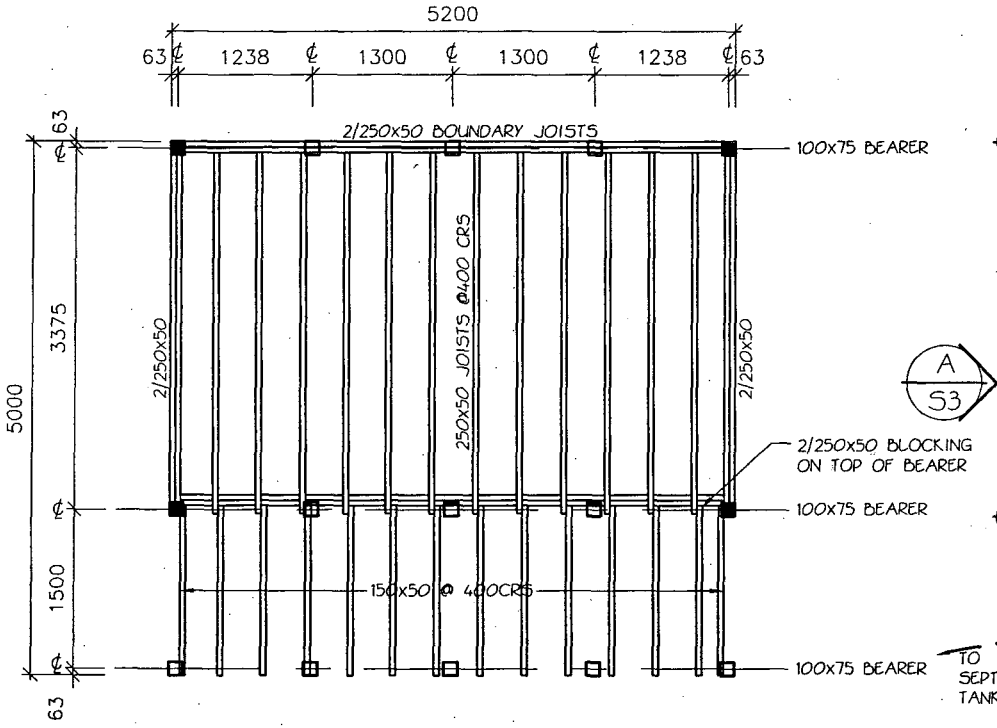
NEW SLEEPOUT (REPLACEMENT)

site & locality plans

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
06/05	A3	23311	S1	B

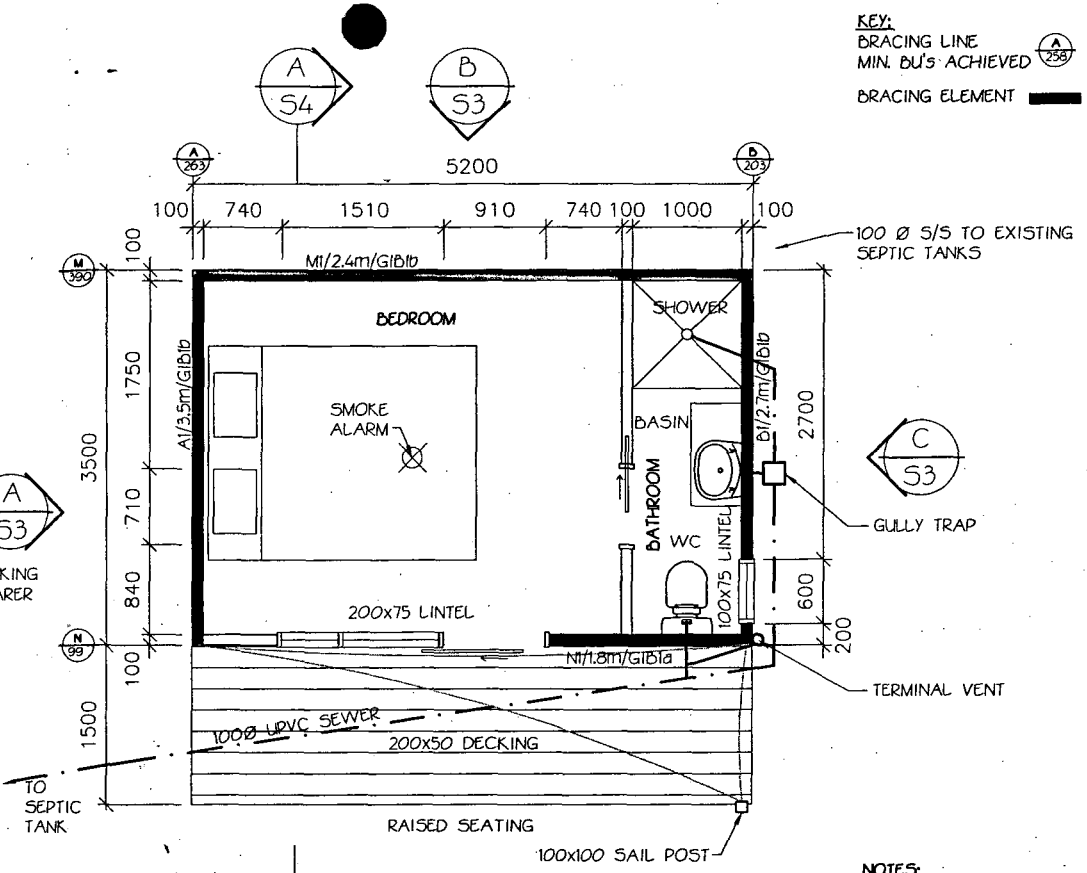
DES A.C DRN A.C CK CAD \\23000\23311.dwg

050717



SUBFLOOR PLAN
1:50

KEY:
- □ 125x125 H5 TIMBER "ORDINARY" PILES
- ■ 125x125 H5 TIMBER "ANCHOR" PILES (USING LUMBERLOK 12KN CONNECTION)



BRACING PLAN
1:50

KEY:
BRACING LINE
MIN. BU's ACHIEVED (A 258)
BRACING ELEMENT

NOTES:
1.) ALL BRACING PANELS ARE TO BE FIXED IN ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS AND TO COMPLY WITH NZS 3604:1999
2.) THIS PLAN MUST BE READ IN CONJUCTION WITH THE BRACING SCHEDULE

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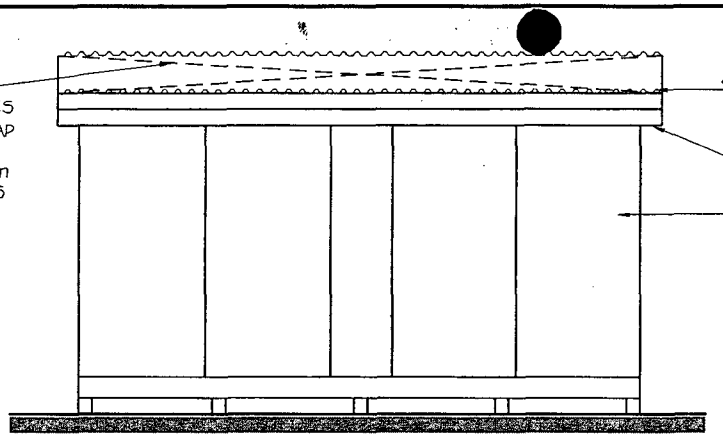
M.A. & P.J.K. BOTHERWAY
LOT 9 DP 2568, KARAMU BAY
NEW SLEEPOUT (REPLACEMENT)
plans

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
06/05	A3	23311	S2	B

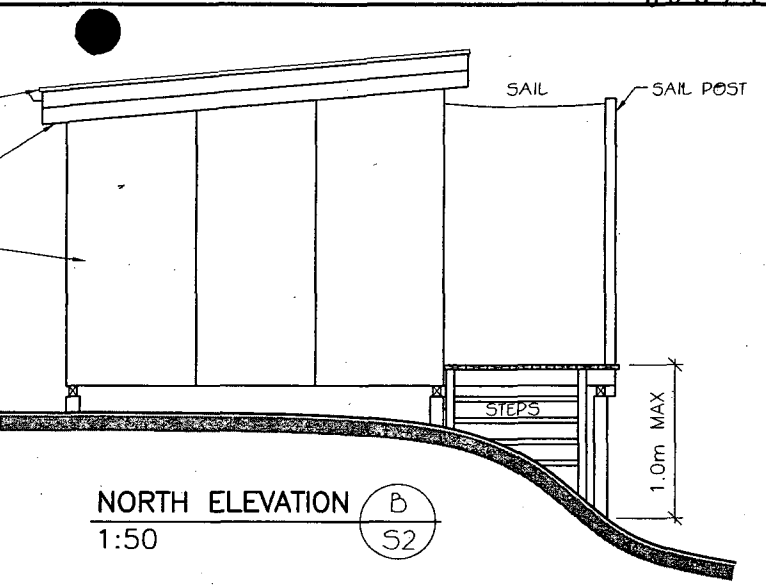
DES A.C | DRN A.C | CK | CAD \\23000\23311.dwg

0mm 100mm

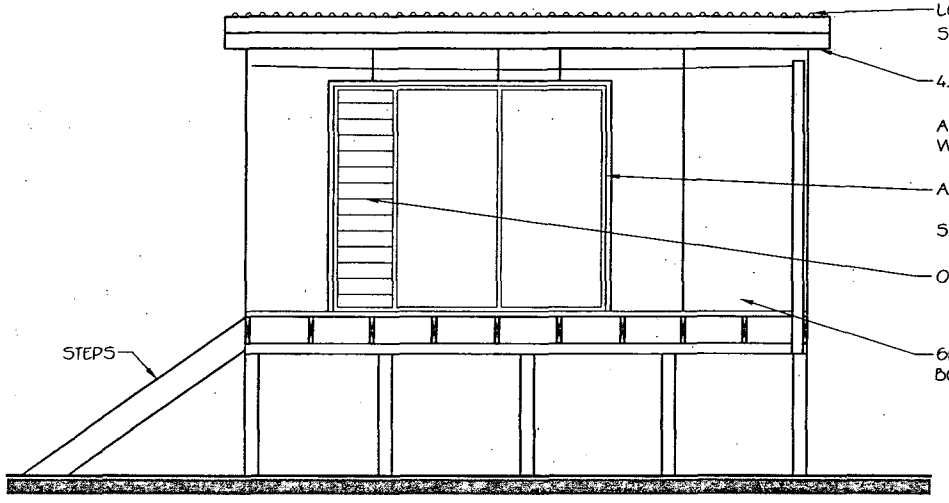
050717



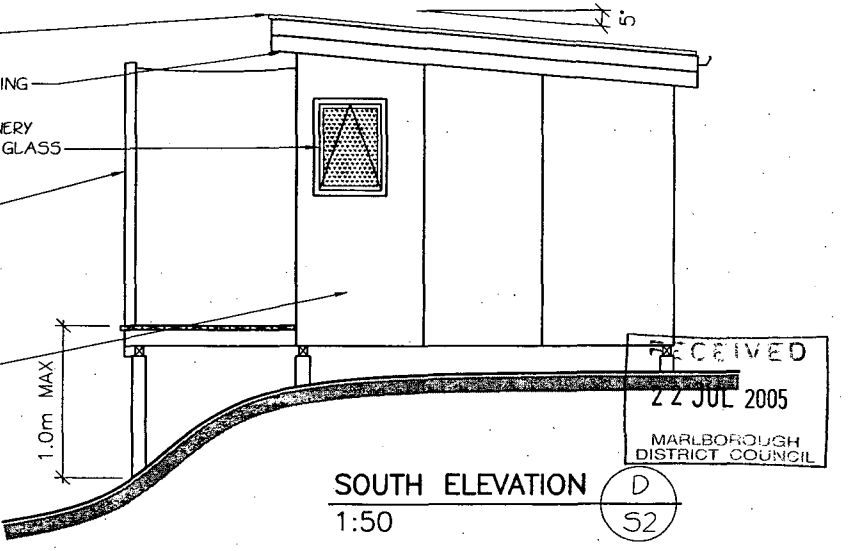
EAST ELEVATION A S2
1:50



NORTH ELEVATION B S2
1:50



WEST ELEVATION C S2
1:50



SOUTH ELEVATION D S2
1:50

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NEW SLEEPOUT (REPLACEMENT)

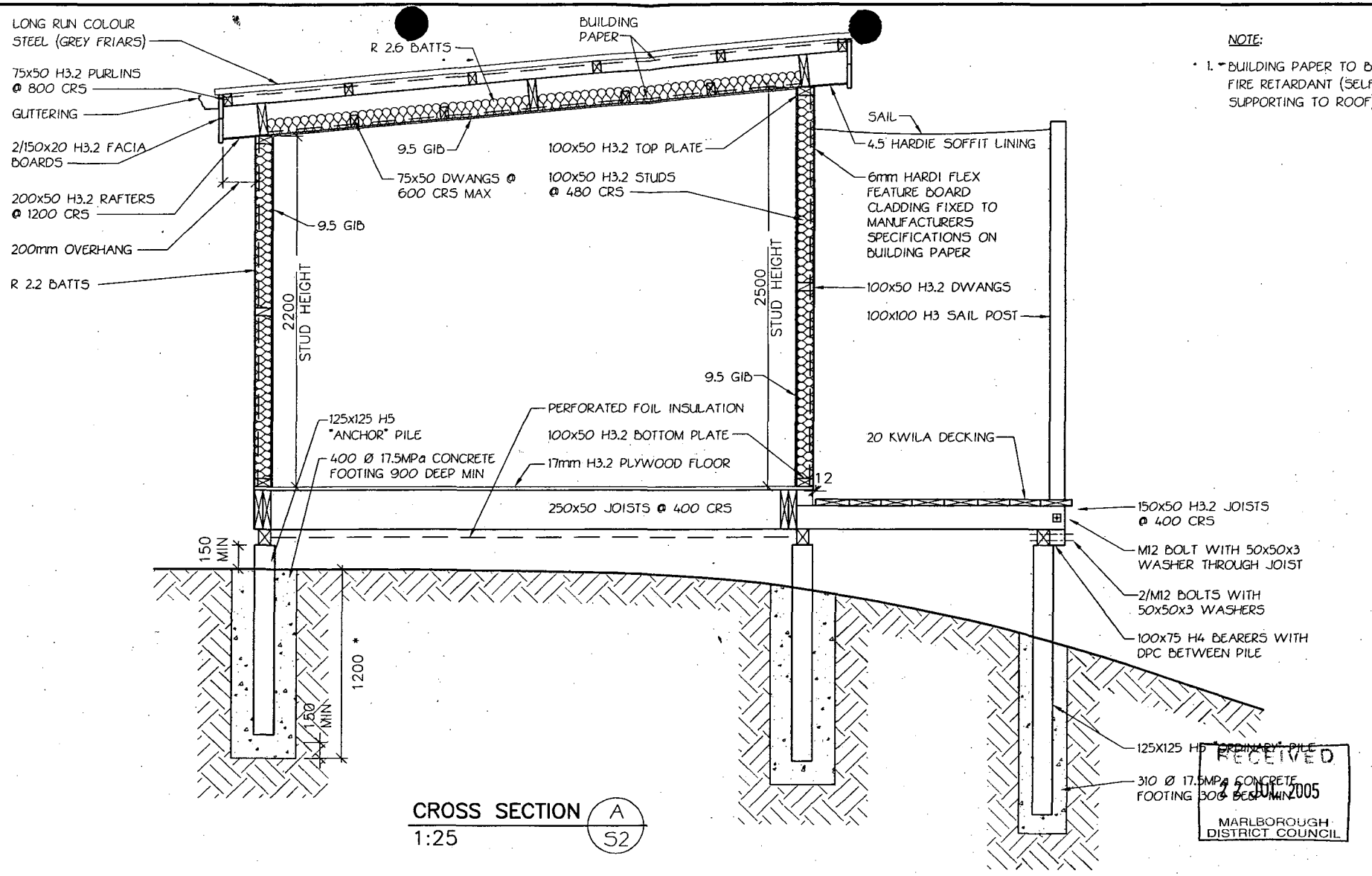
elevations

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
06/05	A3	23311	S3	B

DES A.C DRN A.C CK CAD \\23000\23311.dwg

0mm 100mm

050717



NOTE:

1. BUILDING PAPER TO BE FIRE RETARDANT (SELF SUPPORTING TO ROOF)

CROSS SECTION A
1:25 S2

* TO BE CONFIRMED BY ENGINEER

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NEW SLEEPOUT (REPLACEMENT)

section

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
06/05	A3	23311	S4	B

DES A.C DRN A.C CK CAD \\23000\23311.dwg

0mm 100mm

050717

FIXING SCHEDULE

WIND ZONE : VERY HIGH (BY SPECIFIC ENGINEERING DESIGN)

1.) PURLINS @ 900 CRS TO RAFTERS @ 1200 CRS
2/100x3.75mm SKEWED NAILS AND 1 WIRE DOG

2.) RAFTERS @ 1200 CRS TO TOP PLATE
2/100x3.75mm SKEWED NAILS AND 1 WIRE DOG

3.) TOP & BOTTOM PLATE TO STUD
2/100x3.75mm SKEWED NAILS AND 2 WIRE DOGS

4.) BOTTOM PLATE TO FLOORING / FLOOR FRAMING
2/100x3.75mm SKEWED NAILS @ 600 CRS

5.) LINTEL TO WALL FRAMING
EITHER:
2/100x3.75mm NAILS END FIXED
OR:
4/75x3.15mm NAILS SKEWED FIXED

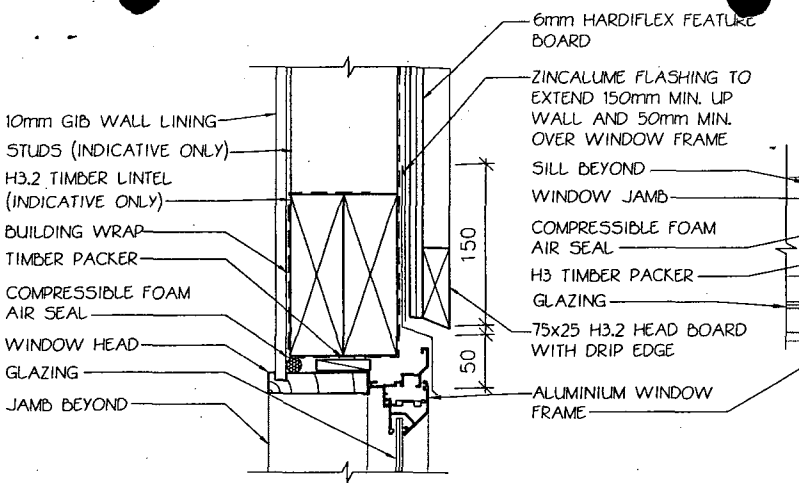
NOTE: LINTEL FIXING TO PREVENT UPLIFT (SEE SHEET XX) IS ADDITIONAL TO THIS AND SHALL BE PROVIDED TO ALL WALLS

6.) JOIST TO BEARERS
2/100x3.75mm SKEWED NAILS

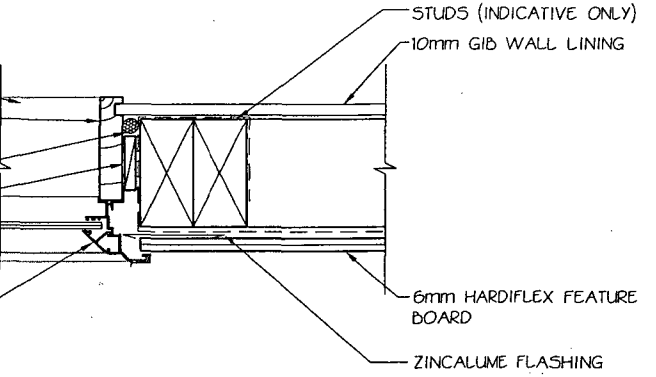
7.) JOIST TO BEARERS OVER ANCHOR PILES ONLY
REFER TO LUMBERLOK 12KN PILE FIXING

8.) BEARERS TO "ORDINARY" PILES
EITHER:
2/100x3.75mm SKEWED NAILS AND 2 4.9mm WIRE DOGS
OR:
4/100x3.75mm SKEWED NAILS

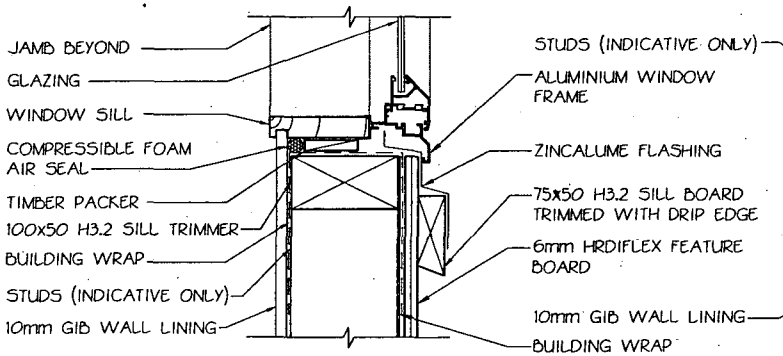
9.) BEARERS TO "ANCHOR" PILES
LUMBERLOK 12KN PILE FIXING



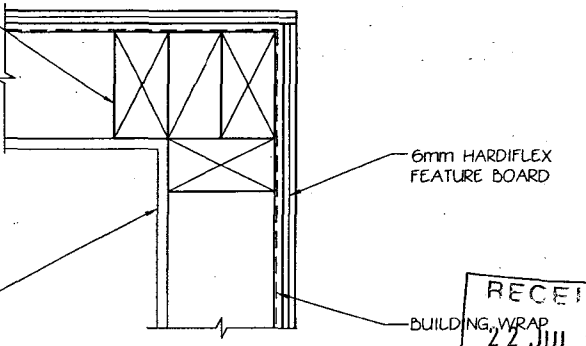
TYPICAL HEAD DETAIL 1
1:5 (SECTION)



TYPICAL JAMB DETAIL 3
1:5 (PLAN VIEW)



TYPICAL SILL DETAIL 2
1:5 (SECTION)



TYPICAL EXTERNAL CORNER 4
1:5 (PLAN VIEW)

NOTES:
1.) BUILDER TO CONFIRM ALL DIMENSIONS ON SITE PRIOR TO THE COMMENCEMENT OF ANY WORK.
2.) ALL TIMBER IS TO BE H3.2 TREATED MIN. (L.O.S.P. TREATMENT IS NOT ACCEPTABLE)

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LOT 9 DP 2568, KARAMU BAY
NEW SLEEPOUT (REPLACEMENT)

details

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
06/05	A3	23311	S5	A

DES A.C DRN A.C CHK CAD \\23000\2331.dwg

0mm 100mm

050717

SPECIFICATIONS

1. ALL WORK SHALL BE CARRIED OUT IN STRICT ACCORDANCE WITH THE N.Z. BUILDING CODE, THE T.A'S REQUIREMENTS AND THE MANUFACTURER'S INSTRUCTIONS
2. ALL CONSTRUCTION IS TO BE IN ACCORDANCE WITH THIS SPECIFICATION, THE TECHNICAL STANDARDS ASSOCIATED WITH THAT WORK, THE MANUFACTURERS LITERATURE, AND GENERALLY ACCEPTED GOOD TRADE PRACTICES.
3. THE ENGINEER RESERVES THE RIGHT TO REJECT ANY WORK OR MATERIALS WHICH DO NOT MEET WITH HIS APPROVAL AND THE CONTRACTOR SHALL BE LIABLE TO RECTIFY SUCH ITEMS TO THE ENGINEER'S SATISFACTION AT NO EXTRA COST TO THE PRINCIPAL.
4. THE CONTRACTOR IS TO VERIFY ALL DETAILS AND DIMENSIONS ON SITE PRIOR TO COMMENCING ANY WORK
5. ALL CONCRETE WORK SHALL COMPLY WITH NZS 3109:1997, 'CONCRETE CONSTRUCTION'.
6. ALL CONCRETE SHALL BE HIGH GRADE WITH A COMPRESSIVE STRENGTH OF NOT LESS THAN 17.5MPa AT 28 DAYS.
7. ALL WORK INCLUDING FIXINGS, CONNECTIONS, AND SIZES SHALL BE CARRIED OUT IN STRICT ACCORDANCE WITH NZS 3604:1999, AS APPROPRIATE.
8. TIMBER SHALL BE:
   STUDS - 100x50 H3.2 PINUS RADIATA @ 480 CRS MAX. TO SIDE (LOAD BEARING) WALLS

   ALL TIMBER IS TO BE H3.2 TREATED MIN. UNLESS OTHERWISE STATED (L.O.S.P. TREATMENT IS NOT ACCEPTABLE).
9. EXTERIOR CLADDING SHALL BE 6mm HARDIFLEX FEATURE BOARD
10. INTERIOR LININGS SHALL BE 10mm STANDARD GIB FIXED AND STOPPED TO THE MANUFACTUERS INSTRUCTIONS
11. PROVIDE A CONTINUOUS LAYER OF GREENWRAP BUILDING PAPER BEHIND ALL EXTERIOR LININGS
12. INSTALL WINDOWS AND DOORS AS SELECTED BY OWNER TO MANUFACTURES INSTRUCTIONS
13. ALL METAL FIXINGS INCLUDING BOLTS, NUTS, AND WASHERS SHALL BE TYPE 304 OR 316 STAINLESS STELL UNLESS NOTED OTHERWISE ON THE DRAWINGS. THREADED ROD MAY BE SUBSTITUTED FOR BOLTS AT THE ENGINEERS DESCRETION.
14. SURFACES EXPOSED AFTER TREATMENT SHALL BE PROTECTED BY A LIBRAL BRUSH APPLICATION OF 'METALEX', 'ENSELE', TANALITH', OR 'CREOSOTE'. SEAL ALL PILE CUT OFFS WITH TAR PITCH OR SIMILAR BITUMINOUS SEALERS FOLLOWING THE ABOVE SWAB TREATMENT.
15. FLOOR INSULATION SHALL BE IN ACCORDANCE WITH NZS 3604:1999

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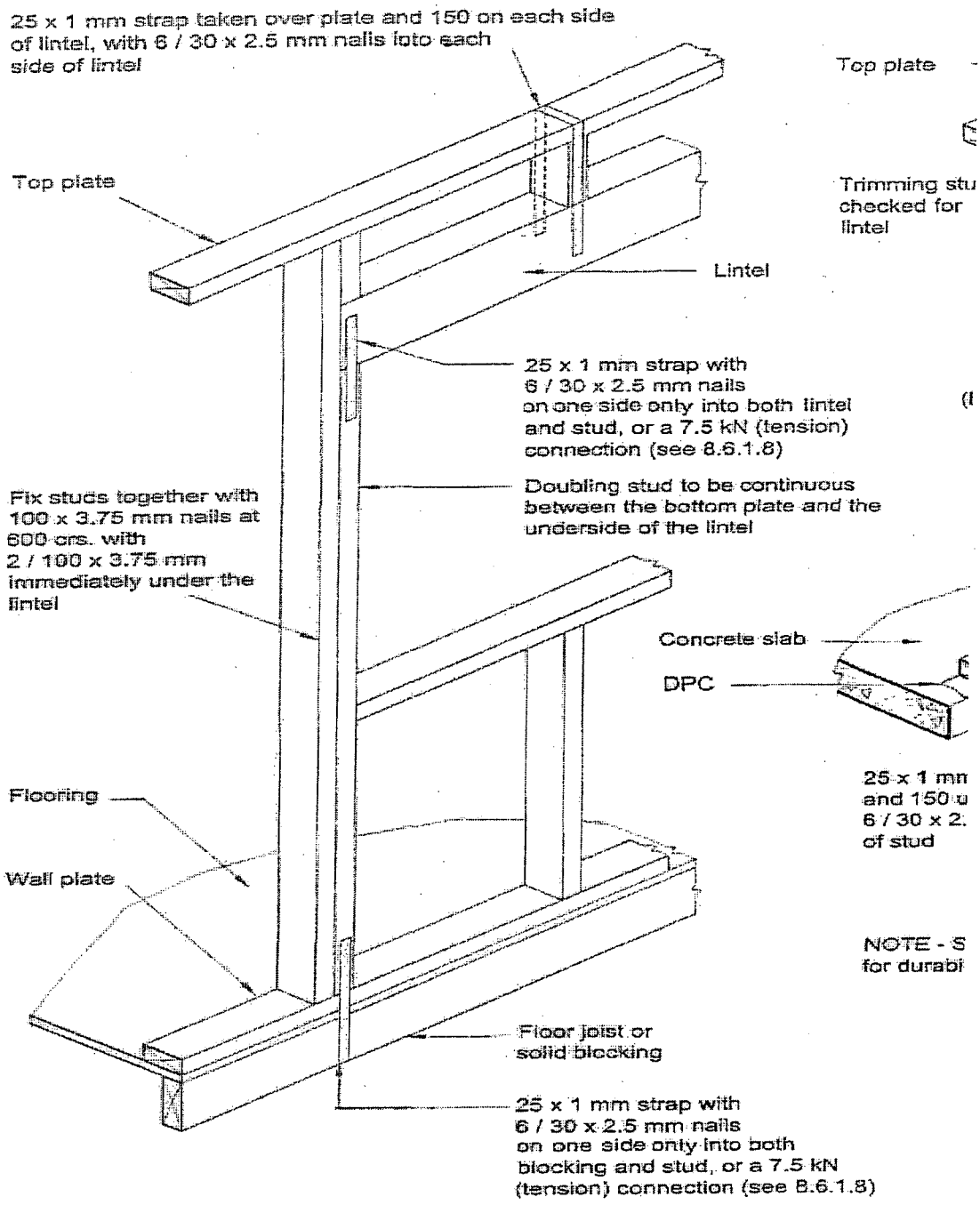
LOT 9 DP 2568, KARAMU BAY
NEW SLEEPOUT (REPLACEMENT)

specifications

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
06/05	A3	23311	S6	A

DES A.C DRN A.C CK [illegible] CAD \\23000\23311.dwg

0mm 100mm



(A) DOUBLING STUD

EXTRACTED FROM NZS 3604:1999 FIGURE 8.12

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NEW SLEEPOUT (RELACEMENT)

lintel fixing to prevent uplift

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
06/05	A4	23318	S7	A

DES	DRN	CK	CAD
A.C	A.C		S:\FILES\Stddwgs\3604

0mm 100mm

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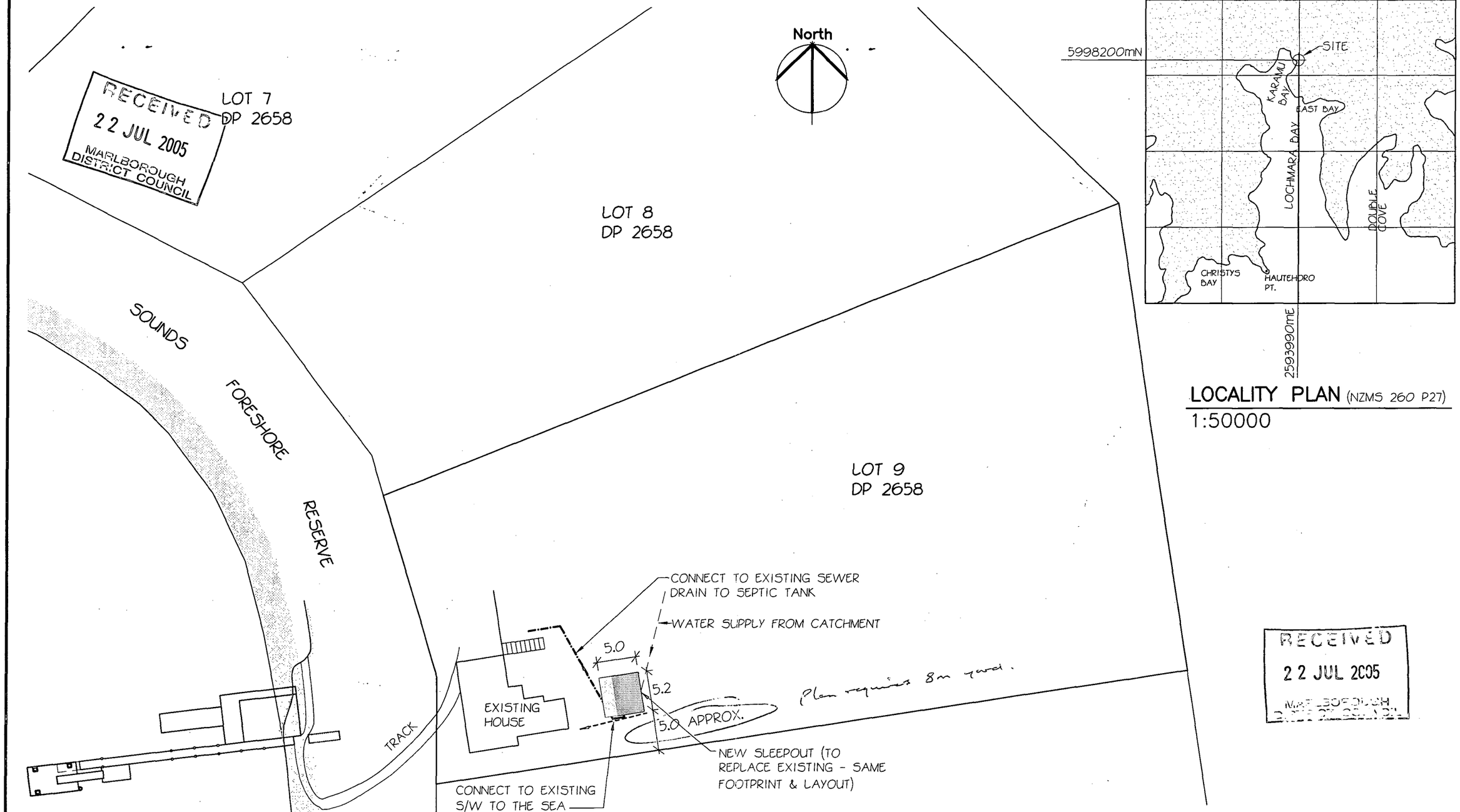

PLAN
1:500

LOCALITY PLAN (NZMS 260 P27)
1:50000

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B - WASTE WATER REDIRECTED - 07/05 - RAM

0mm 100mm

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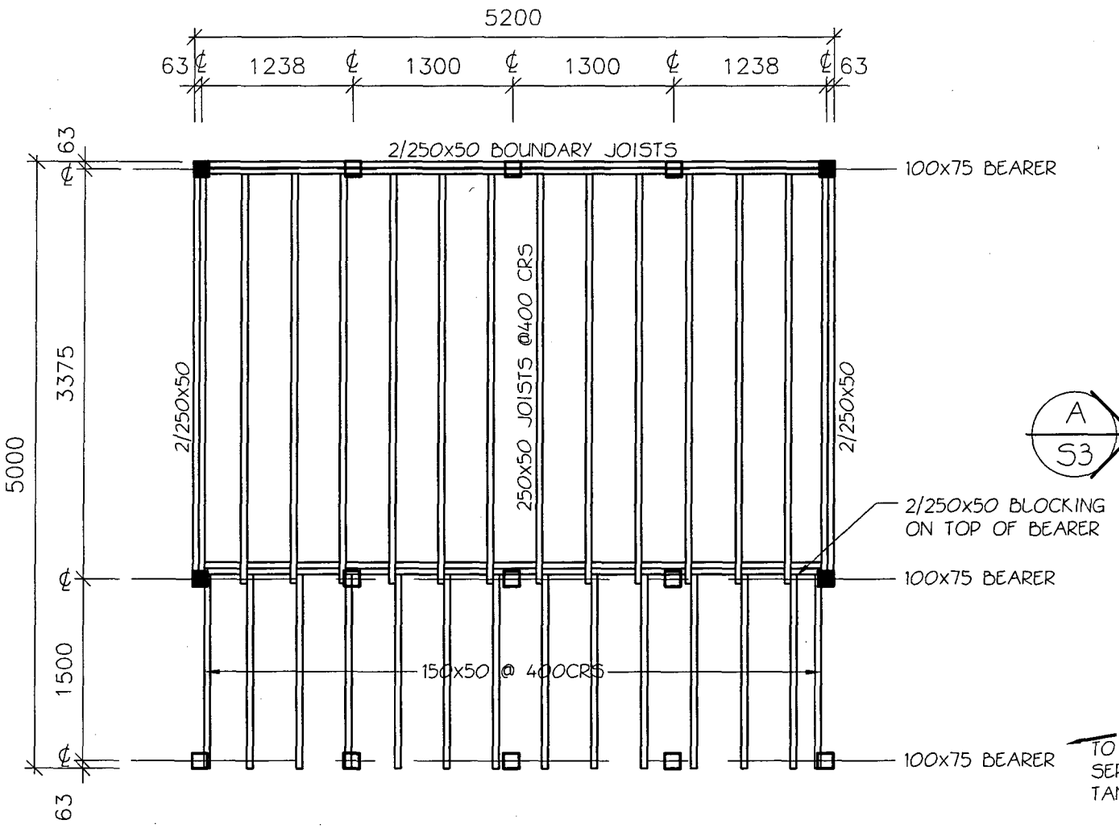
NEW SLEEPOUT (REPLACEMENT)

site & locality plans

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
06/05	A3	23311	S1	B

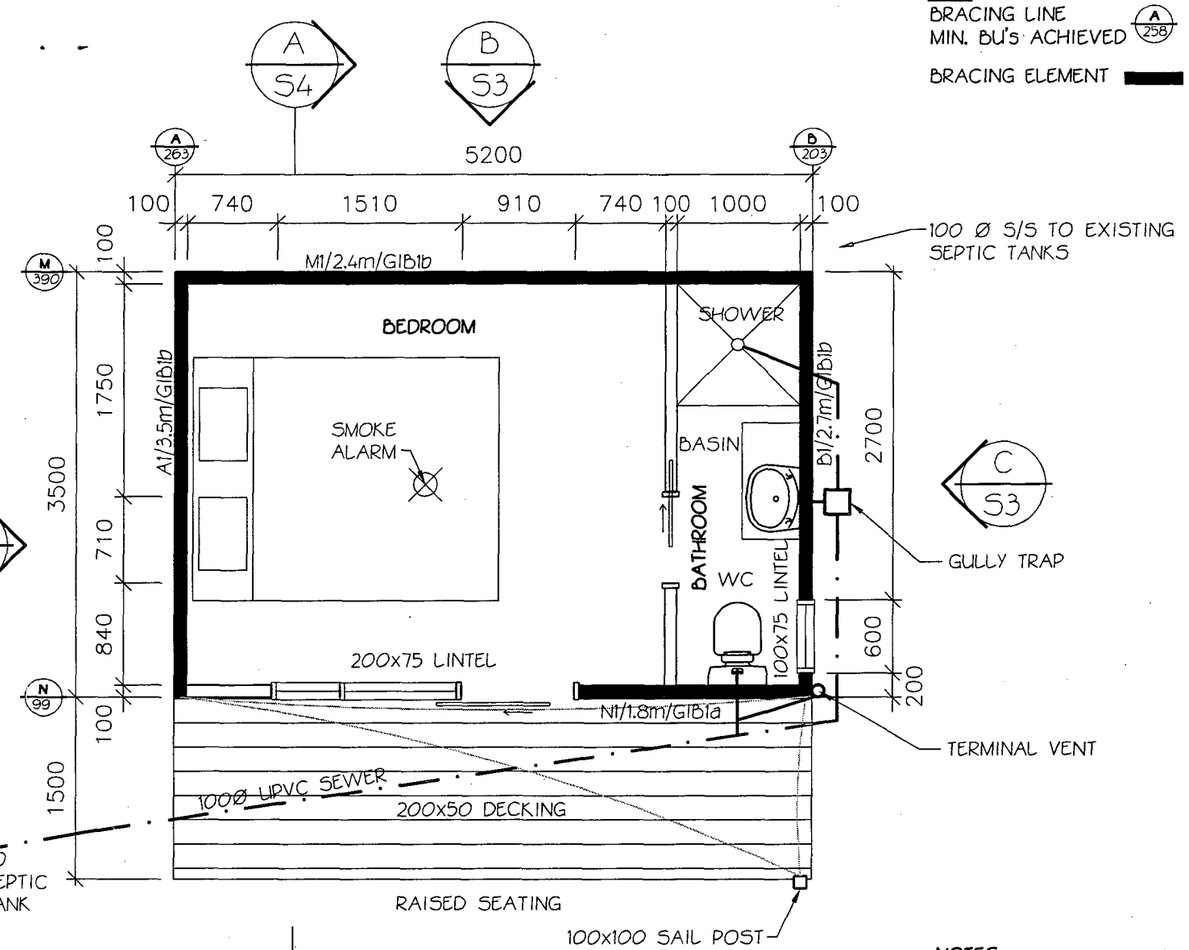
DES A.C DRN A.C CK CAD \\23000\23311.dwg

050717



SUBFLOOR PLAN
1:50

KEY:
- 125x125 H5 TIMBER "ORDINARY" PILES
- 125x125 H5 TIMBER "ANCHOR" PILES (USING LUMBERLOK 12KN CONNECTION)



BRACING PLAN
1:50

NOTES:
1.) ALL BRACING PANELS ARE TO BE FIXED IN ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS AND TO COMPLY WITH NZS 3604:1999
2.) THIS PLAN MUST BE READ IN CONJUCTION WITH THE BRACING SCHEDULE

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NEW SLEEPOUT (REPLACEMENT)

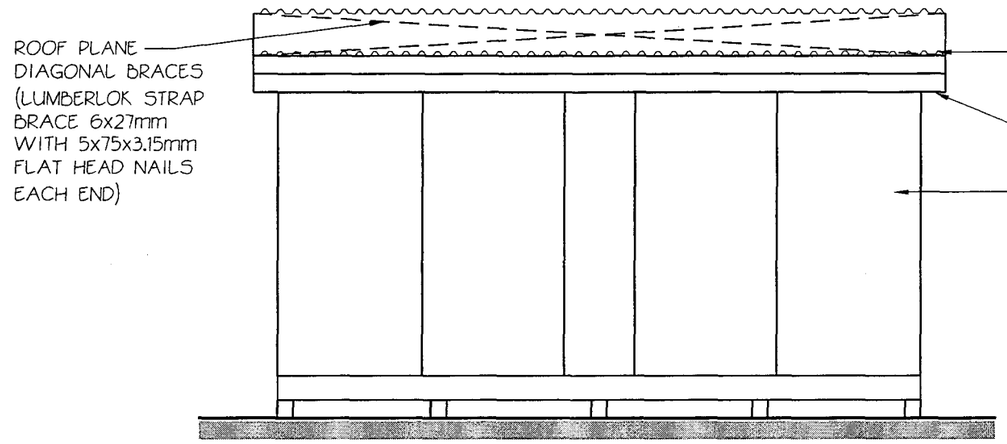
plans

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
06/05	A3	23311	S2	B

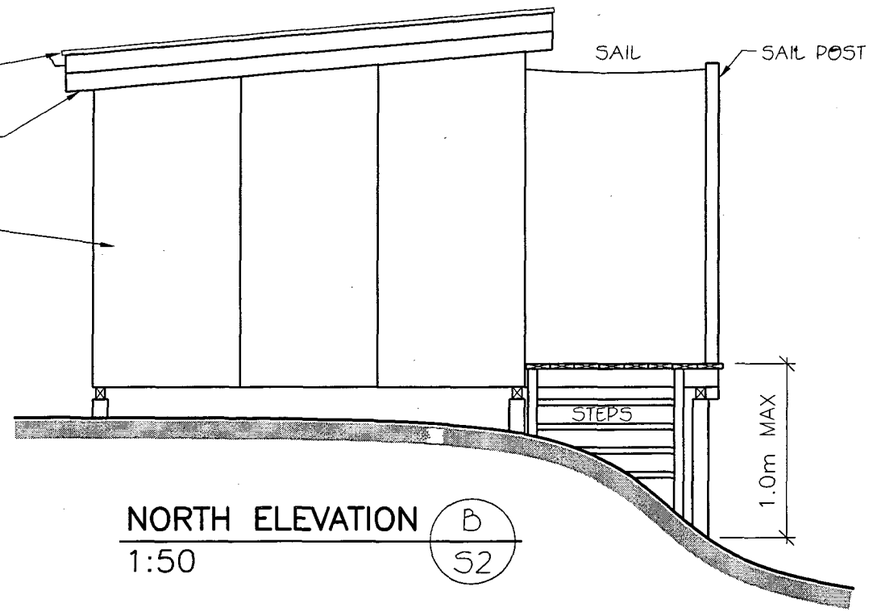
DES A.C | DRN A.C | CK | CAD \\23000\23311.dwg

0mm 100mm

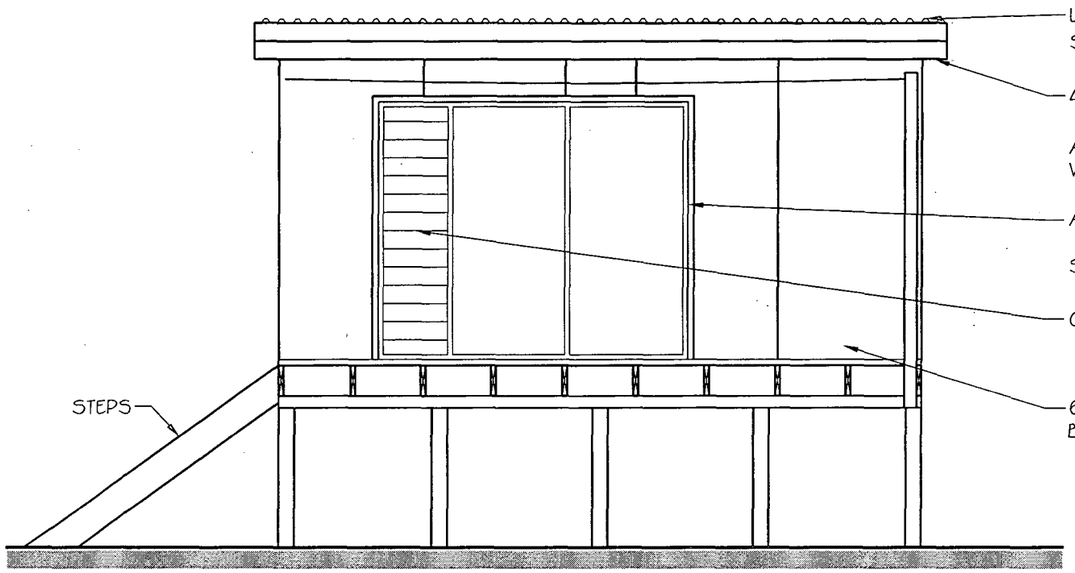
050717



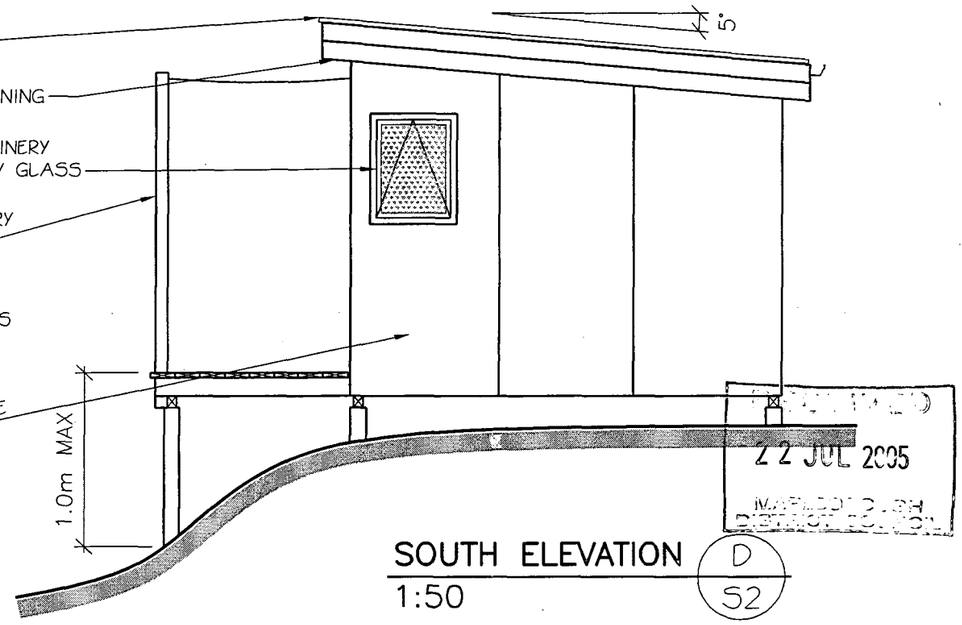
EAST ELEVATION A
1:50 S2



NORTH ELEVATION B
1:50 S2



WEST ELEVATION C
1:50 S2



SOUTH ELEVATION D
1:50 S2

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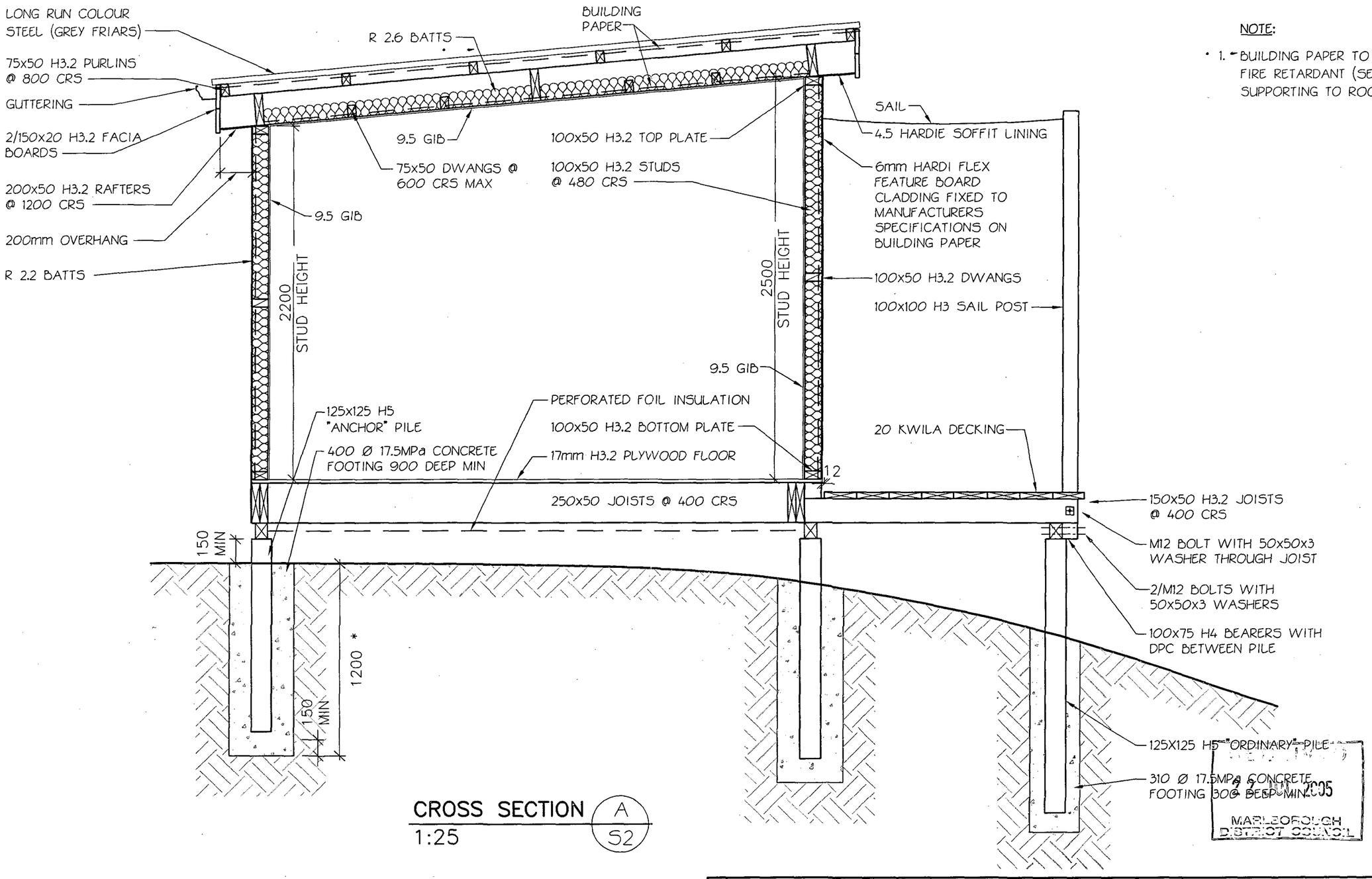
elevations

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
06/05	A3	23311	S3	B

DES A.C | DRN A.C | CK | CAD \\23000\23311.dwg

0mm 100mm

050717



NOTE:

1. BUILDING PAPER TO BE FIRE RETARDANT (SELF SUPPORTING TO ROOF)

CROSS SECTION A
1:25 S2

* TO BE CONFIRMED BY ENGINEER

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M.A. & P.J.K. BOTHERWAY
LOT 9 DP 2568, KARAMU BAY
NEW SLEEPOUT (REPLACEMENT)

section

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
06/05	A3	23311	S4	B

DES A.C | DRN A.C | CK | CAD \\23000\23311.dwg

0mm 100mm

050717

FIXING SCHEDULE

WIND ZONE : VERY HIGH (BY SPECIFIC ENGINEERING DESIGN)

1.) PURLINS @ 900 CRS TO RAFTERS @ 1200 CRS
2/100x3.75mm SKEWED NAILS AND 1 WIRE DOG

2.) RAFTERS @ 1200 CRS TO TOP PLATE
2/100x3.75mm SKEWED NAILS AND 1 WIRE DOG

3.) TOP & BOTTOM PLATE TO STUD
2/100x3.75mm SKEWED NAILS AND 2 WIRE DOGS

4.) BOTTOM PLATE TO FLOORING / FLOOR FRAMING
2/100x3.75mm SKEWED NAILS @ 600 CRS

5.) LINTEL TO WALL FRAMING
EITHER:
2/100x3.75mm NAILS END FIXED
OR:
4/75x3.15mm NAILS SKEWED FIXED

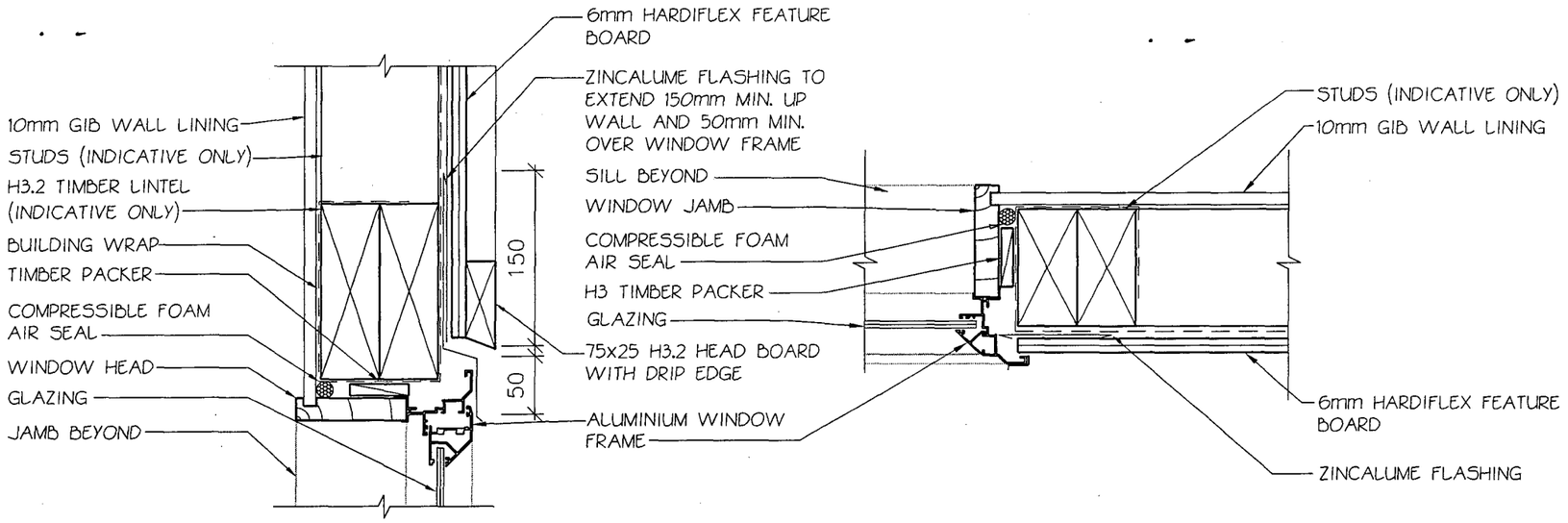
NOTE: LINTEL FIXING TO PREVENT UPLIFT (SEE SHEET XX) IS ADDITIONAL TO THIS AND SHALL BE PROVIDED TO ALL WALLS

6.) JOIST TO BEARERS
2/100x3.75mm SKEWED NAILS

7.) JOIST TO BEARERS OVER ANCHOR PILES ONLY
REFER TO LUMBERLOK 12KN PILE FIXING

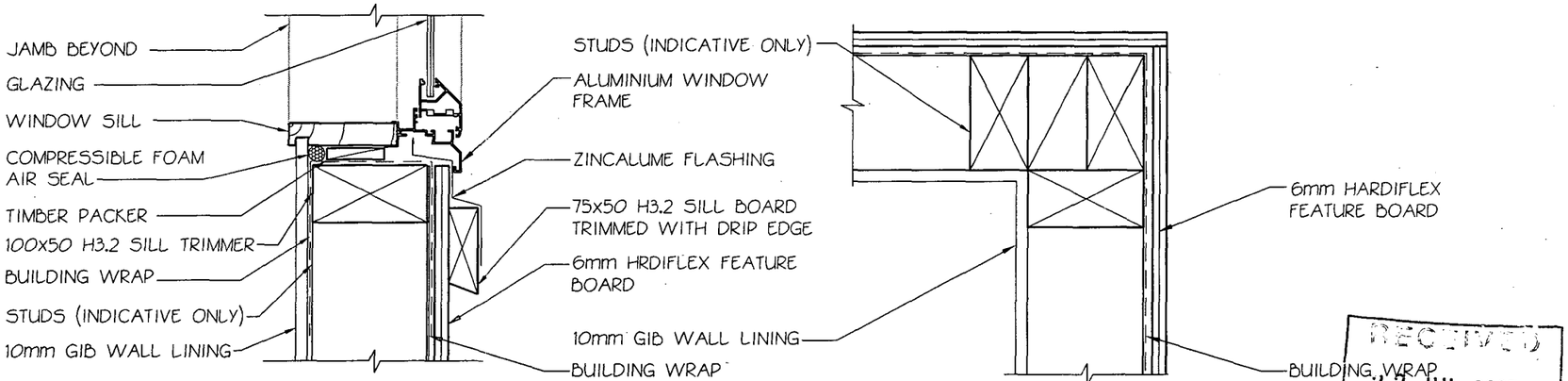
8.) BEARERS TO "ORDINARY" PILES
EITHER:
2/100x3.75mm SKEWED NAILS AND 2 4.9mm WIRE DOGS
OR:
4/100x3.75mm SKEWED NAILS

9.) BEARERS TO "ANCHOR" PILES
LUMBERLOK 12KN PILE FIXING



TYPICAL HEAD DETAIL 1
1:5 (SECTION)

TYPICAL JAMB DETAIL 3
1:5 (PLAN VIEW)



TYPICAL SILL DETAIL 2
1:5 (SECTION)

TYPICAL EXTERNAL CORNER 4
1:5 (PLAN VIEW)

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NOTES:
1.) BUILDER TO CONFIRM ALL DIMENSIONS ON SITE PRIOR TO THE COMMENCEMENT OF ANY WORK.
2.) ALL TIMBER IS TO BE H3.2 TREATED MIN. (L.O.S.P. TREATMENT IS NOT ACCEPTABLE)

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NEW SLEEPOUT (REPLACEMENT)

details

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
06/05	A3	23311	S5	A

DES A.C | DRN A.C | CHK | CAD \23000\23311.dwg

0mm 100mm

050717

SPECIFICATIONS

1. ALL WORK SHALL BE CARRIED OUT IN STRICT ACCORDANCE WITH THE N.Z. BUILDING CODE, THE T.A's REQUIREMENTS AND THE MANUFACTURER'S INSTRUCTIONS
2. ALL CONSTRUCTION IS TO BE IN ACCORDANCE WITH THIS SPECIFICATION, THE TECHNICAL STANDARDS ASSOCIATED WITH THAT WORK, THE MANUFACTURERS LITERATURE, AND GENERALLY ACCEPTED GOOD TRADE PRACTICES.
3. THE ENGINEER RESERVES THE RIGHT TO REJECT ANY WORK OR MATERIALS WHICH DO NOT MEET WITH HIS APPROVAL AND THE CONTRACTOR SHALL BE LIABLE TO RECTIFY SUCH ITEMS TO THE ENGINEER'S SATISFACTION AT NO EXTRA COST TO THE PRINCIPAL.
4. THE CONTRACTOR IS TO VERIFY ALL DETAILS AND DIMENSIONS ON SITE PRIOR TO COMMENCING ANY WORK
5. ALL CONCRETE WORK SHALL COMPLY WITH NZS 3109:1997, 'CONCRETE CONSTRUCTION'.
6. ALL CONCRETE SHALL BE HIGH GRADE WITH A COMPRESSIVE STRENGTH OF NOT LESS THAN 17.5MPa AT 28 DAYS.
7. ALL WORK INCLUDING FIXINGS, CONNECTIONS, AND SIZES SHALL BE CARRIED OUT IN STRICT ACCORDANCE WITH NZS 3604:1999, AS APPROPRIATE.
8. TIMBER SHALL BE:
   STUDS - 100x50 H3.2 PINUS RADIATA @ 480 CRS MAX. TO SIDE (LOAD BEARING) WALLS

   ALL TIMBER IS TO BE H3.2 TREATED MIN. UNLESS OTHERWISE STATED (L.O.S.P. TREATMENT IS NOT ACCEPTABLE).
9. EXTERIOR CLADDING SHALL BE 6mm HARDIFLEX FEATURE BOARD
10. INTERIOR LININGS SHALL BE 10mm STANDARD GIB FIXED AND STOPPED TO THE MANUFACTUERS INSTRUCTIONS
11. PROVIDE A CONTINUOUS LAYER OF GREENWRAP BUILDING PAPER BEHIND ALL EXTERIOR LININGS
12. INSTALL WINDOWS AND DOORS AS SELECTED BY OWNER TO MANUFACTURES INSTRUCTIONS
13. ALL METAL FIXINGS INCLUDING BOLTS, NUTS, AND WASHERS SHALL BE TYPE 304 OR 316 STAINLESS STELL UNLESS NOTED OTHERWISE ON THE DRAWINGS. THREADED ROD MAY BE SUBSTITUTED FOR BOLTS AT THE ENGINEERS DESCRETION.
14. SURFACES EXPOSED AFTER TREATMENT SHALL BE PROTECTED BY A LIBRAL BRUSH APPLICATION OF 'METALEX', 'ENSELE', TANALITH', OR 'CREOSOTE'. SEAL ALL PILE CUT OFFS WITH TAR PITCH OR SIMILAR BITUMINOUS SEALERS FOLLOWING THE ABOVE SWAB TREATMENT.
15. FLOOR INSULATION SHALL BE IN ACCORDANCE WITH NZS 3604:1999

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M.A. & P.J.K. BOTHERWAY
LOT 9 DP 2568, KARAMU BAY
NEW SLEEPOUT (REPLACEMENT)

specifications

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
06/05	A3	23311	S6	A

DES A.C | DRN A.C | CK | CAD \\23000\23311.dwg

0mm 100mm

050717

North

LOT 7
DP 2658

LOT 8
DP 2658

LOT 9
DP 2658

SOUNDS FORESHORE RESERVE

KARAMU BAY

50 Ø HDPE TO FIELD

NON RETURN VALVE

NEW 2000l PUMP CHAMBER

NEW 500l POLISHING TANK WITH EFFLUENT FILTER TO OUTLET

2 X 2000l SEPTIC TANK (EXISTING)

2500l GREYWATER TANK (EXISTING)

DETAIL 1/– 1:200

50 Ø H.D.P.E

4 X 98 FIELDS

49.0

4 PORT SEQUENCING VALVE

1/–

EXISTING SEPTIC TANKS

15°

20 DN WITH 3mm HOLES @1.6m CRS

1.5

TO EXISTING EFFLUENT FIELD (TO BE ABANDONED)

GREYWATER

BLACKWATER

EXISTING BACH

TRACK

EXISTING SHED TO BE UPGRADED TO NEW SLEEPOUT

PLAN 1:500

LOT 10
DP 2658

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NOTES:

1.) LOCATION OF FEATURES RELATIVE TO BOUNDARIES ARE APPROXIMATE ONLY.

2.) MATERIALS AND INSTALLATION OF SEPTIC TANK AND DISTRIBUTION SYSTEM TO BE IN ACCORDANCE WITH AS/NZS 1546.1:1998, AS/NZS 1547:2000 AND THE MANUFACTURERS SPECIFICATIONS.

3.) LAYOUT OF EFFLUENT FIELD MAY BE VARIED WITH ENGINEERS APPROVAL.

4.) OPERATION OF DISTRIBUTION SYSTEM TO BE FULLY TESTED PRIOR TO COVERAGE OF PIPEWORK. ENGINEER TO BE PRESENT.

5.) BALL VALVES CAN BE FITTED ON EACH LINE TO EQUALISE HEAD AT ENDS (1.5m MIN).

6.) EFFLUENT FIELD TO BE FLUSHED WITH DOSES OF CLEAN WATER WHEN VACATING THE SITE FOR AN EXTENDED PERIOD.

7.) FIT EFFLUENT FILTER TO OUTLET ON NEW 500l TANK.

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M.A. & P.J.K. BOTHERWAY
LOT 9 DP 2568, KARAMU BAY
WASTEWATER ASSESSMENT

plan

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
03/05	A3	23288	C1	A

DES RWD | DRN AC | CK | CAD \\23000\23288.dwg

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