DavidsonPartners Ltd

Structural Engineering
Civil Engineering
Building Design
Project Management

Practising in association with Ayson and Partners, Registered Surveyors

Our Ref: 22793

12 June 2003

Marlborough District Council
P O Box 443
BLENHEIM

ATTENTION: Jenny Folster

re: **TURBITT WASTEWATER SYSTEM, OCEAN BAY (BC: 030910)**

1. Background

We have been engaged to investigate, assess and design a suitable wastewater system for the proposed development on Lot 2 DP 11341, Ocean Bay, Port Underwood.

2. Investigation

We visited the site on 10 June 2003 and assessed the site in accordance with AS/NZS 1547:2000 'On Site Domestic Wastewater Management'.

The soil consists of 300 mm of topsoil over soft, firm, light brown sandy loam which ribboned to less than 10 mm. The soil category was assessed as 2.

The site had medium exposure to the sun and high exposure to the wind and is presently grassed. The grass is proposed to remain in the wastewater disposal field area.

The proposed disposal field location will be approximately 25 m from the sea and 30 m to the nearest existing wastewater field to the northeast.

The field will be more than 30 m from the stream running to the west.

The sloping disposal field location is less than 5°.

The proposed house has three bedrooms and the water supply is from a creek catchment.

ACENZ

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Principals Stephen Sheat, BE, M.IPENZ, REGD
Leigh McGlynn, BE, M.IPENZ, REGD
Ross Davis, BE, M.IPENZ, REGD
Ron Melton, BE, M.IPENZ, REGD

3. Assessment

3.1 Environmental Effects

The Marlborough Sounds Resource Management Plan, in the Sounds Residential Zone, requires subsoil disposal fields to be no closer than 50 m from each other (30.1.9.2.13) and also that the discharge shall not be within 30 m of any surface waterbody (30.1.9.2.8).

Other mitigating circumstances include;

(a) Further treatment in the soils. The soil is silty with some sand (sandy loam) and this type of soil has considerable capacity to remove bacteria in relatively short distances, that is less than 1.0 m soil depth. (Ref. 'On Site Wastewater Systems and Bacterial Reduction in Subsoil Disposal Areas' – A review prepared by Ian Gunn.)

(b) The nearest disposal field to the northeast is across slope and there will be no cumulative effect.

(c) There is no domestic water supply sourced from the area downhill or towards the sea from the proposed disposal field.

It is our opinion that a properly designed and maintained treatment and disposal system will have no detrimental effect on the environment.

3.2 Design Flow

A three bedroom house is equal to five permanent residents for design purposes. Using standard water reduction fixtures within the house including dual flush water cisterns, shower flow restrictors, aerator taps and water conserving automatic washing machines, the wastewater flow allowance considered appropriate is 115 litres/person/day.

The total design load is 115 x 5 = 575 litres/day.

3.3 Primary Treatment

Assuming a full time occupancy and five year interval between pumpouts, a 3,000 litre septic tank will be sufficient. (See attached notes.)

We also recommend the use of an effluent filter at the outlet to the septic tank to guard against solid carryover to the disposal field.

3.4 Land Disposal

The design loading rate (DLR) for a category 2 type soil varies between 20-35 mm/day. For the characteristics at this location, we consider that a DLR of 29 mm/day is appropriate.

Using a 400 mm wide trench and 350 m deep, a 50 m long total trench length is required. (See attached notes.)

For gravity feeding this should be split into 4 x 13 m long trenches each fed independently from a distribution box. Refer to the marked up plan prepared by Plans & Quotes, sheet 01 for details.

Trench construction should follow normal practise and include 20-40 mm gravel at the bottom of the trench and filter fabric below the topsoil layer.

4. Additional Work

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

(a) *Unusual soil characteristics not normally tested for*

(b) An increase in design load

(c) Disposal of inappropriate substances to the septic system

(d) Poor maintenance

(e) Poor workmanship or departure from construction drawings

(f) Severe site constraints (e.g. limited room)

We strongly recommend that the homeowner and installer read and note the information attached and shown on the drawings to ensure ongoing good practice and maintenance.

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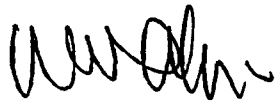


W L McGlynn

LM:RLF

	DAVIDSON PARTNERS LTD **WASTEWATER MANAGEMENT** LOADING AND SEPTIC TANK DESIGN	**JOB NO.**	22793
		SHEET NO	1
		NAME	LM
CLIENT	TURBITT	**DATE**	12-Jun-03
LOCATION	OCEAN BAY		

Last Updated 10.09.02

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

1 LOADING

1.1	Annual rainfall		mm
1.2	Number of bedrooms	3	
1.3	Occupancy (N)	5	
1.4	Wastewater allowance (A)	115	litres / person / day
1.5	Soil category (from field assessment)	2	

2 SEPTIC TANK DESIGN

	Number of people (ex 1.3 above)	5	
	Number of people for design purposes	5	
	(peaking factor =	1)	
	Daily flow	575	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	2000	litres
	Minimum tank size	2575	litres
	Let tank size be	**3000**	**litres**
	Settling volume available	1000	litres
	Settling time available	42	hours OK,> min. res. time

DAVIDSON PARTNERS LTD WASTEWATER MANAGEMENT TRENCH DESIGN		JOB NO. 22793 SHEET NO 2 NAME LM DATE 12-Jun-03
CLIENT	TURBITT	
LOCATION	OCEAN BAY	

3 TRENCH DESIGN

3.1 (a) DLR (Design Loading Rate) Indicators

INDICATOR	0	1	2	SCORE	WEIGHTING	RANKING
Slope	> 20°	10-20°	0-10°	2	3	6
Topsoil Depth	<100 mm	100-200	>200 mm	2	2	4
Exposure to Sun	low	mod	high	1	2	2
Exposure to Wind	low	mod	high	2	2	4
Vegetation	not suitable	suitable	v. suitable	1	2	2
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	1	3	3
Known Problems in the Area ?	yes	unsure	no	1	2	2
Trench Width	>400 mm	300-400	<300 mm	1	1	1
Trench Sizing	bott & sides	sides only	bott only	2	3	6
Trench Loading	gravity	dose	LPED/drip	0	3	0
Use	permanent	frequent	infrequent	2	3	6
RANKING SCORE						**40**

(b)

DLR (ex Table 4.2.A.1)		RANKING
Most Conservative =	20 mm/day	<25
Least Conservative =	35 mm/day	>50

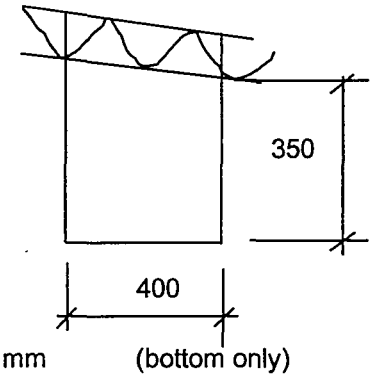
(c) DLR considered appropriate for the site = 29 mm / day

Let DLR = 29 mm / day

3.2 Trench Dimensions Proposed

width = 400 mm

depth = 350 mm (below topsoil layer)



3.3 Trench Width for Design, W = 400 mm (bottom only)

3.4 Trench Length , L (min.) = (N x A)/(DLR x W)

= **49.57** m

Let trench length = 50 m OK, adequate storage available

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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

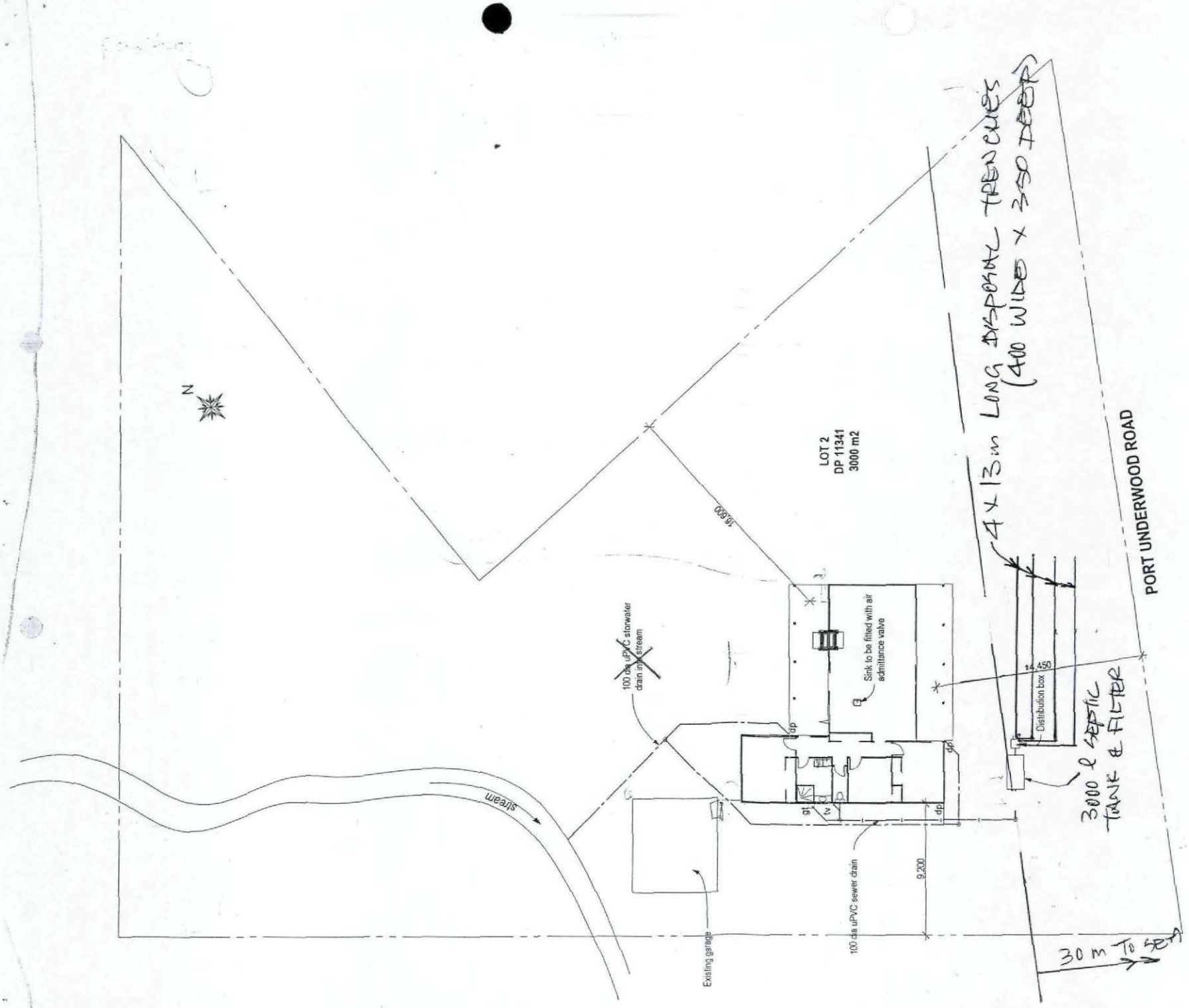
(b) Copper alloy, grade 443 (see AS 2738.2 or NZS/BS 1400); or

(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.



Project:

TURBITT BACH

Project Location:
Ocean Bay
Port Underwood

Sheet Title:
Site & Services Plan

Revisions:

No.	Date	Revision Details	By

030611

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13 JUN 2003
MARLBOROUGH
DISTRICT COUNCIL

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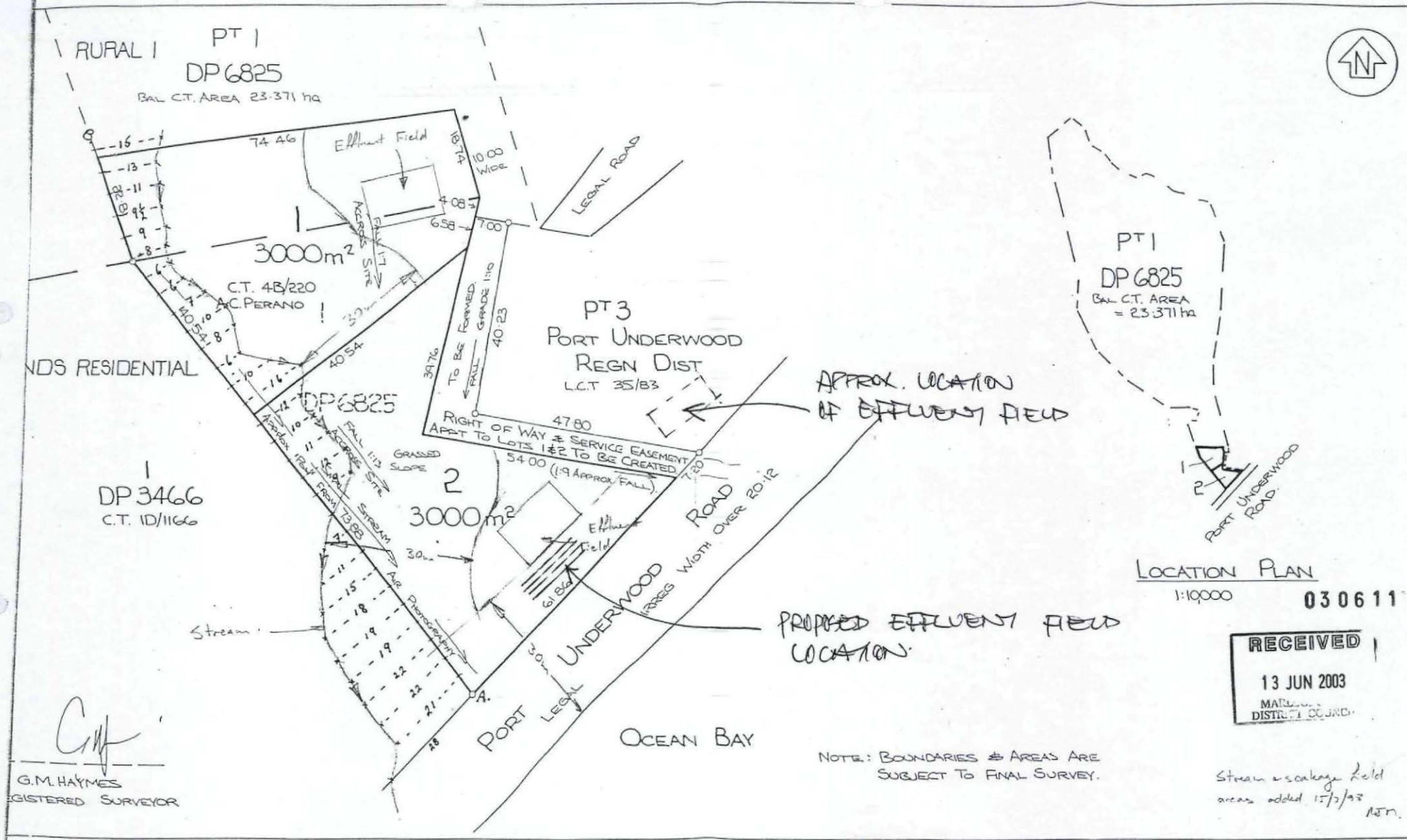
Project No.:

Sheet No:
01
of: 11



G.M. HAYMES
REGISTERED SURVEYOR

XV, ARAPAWA S.D.
BOROUGH LAND DISTRICT
BOROUGH DISTRICT CL

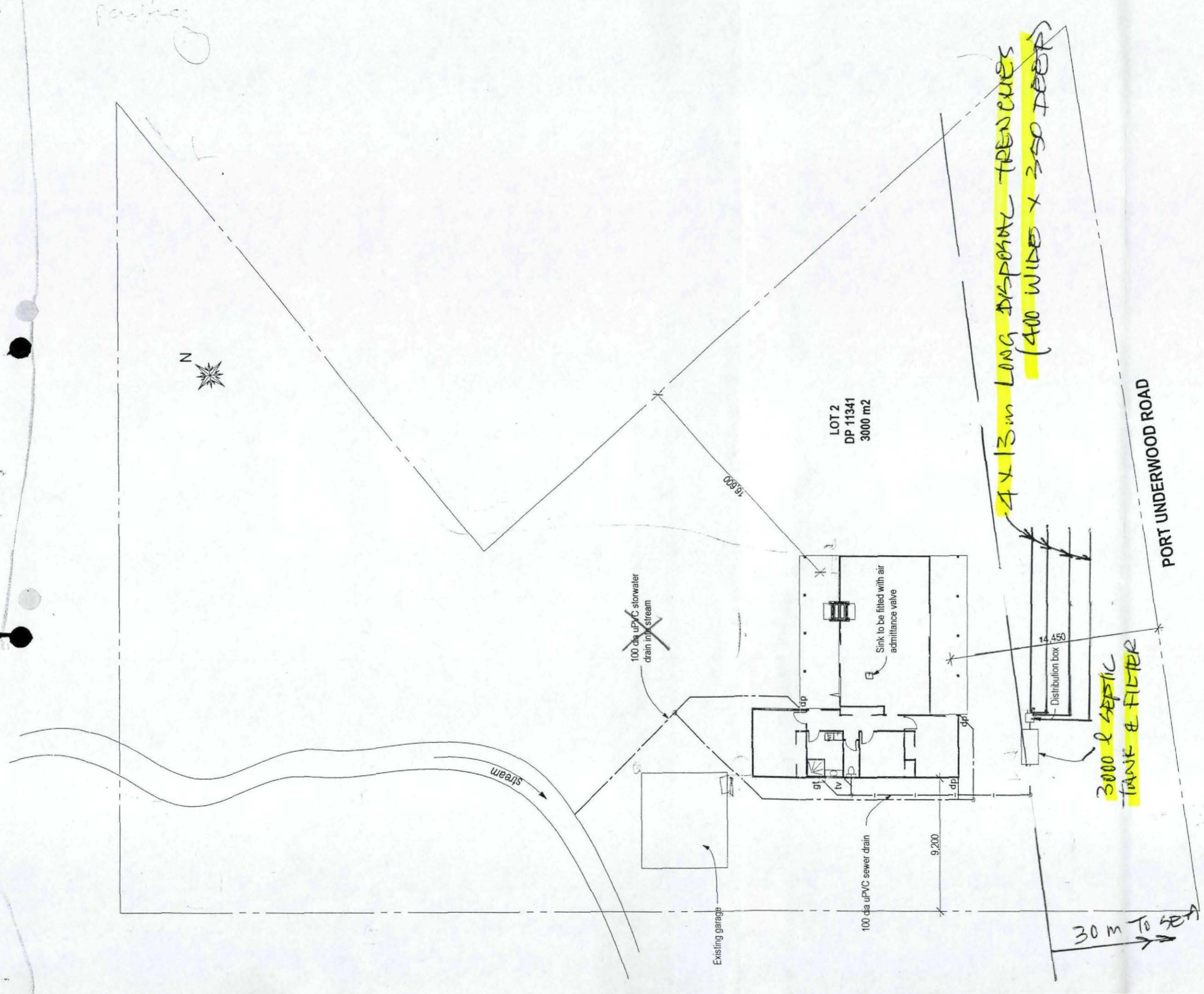
PROPOSED SBDN OF LOT 1 DP 6825

PREPARED BY GILBERT, HAYMES & ASSOCIATES, REGISTERED SURVEYORS
P.O.BOX 380 - 14 QUEEN STREET - BLENHEIM
PHONE (03) 5787984 - FAX (03) 5787709

SCALE 1: 750

DATE 26 MAY 1997

JOB REF 3706/1



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MARLBOROUGH DISTRICT COUNCIL

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Scales:	1:250
Project No.:	

Sheet No:

01

of: 11

RURAL 1

PT 1
DP 6825
BAL C.T. AREA 23.371 ha

NDS RESIDENTIAL

1
DP 3466
C.T. ID/1166

DP 6825

1
3000m²
C.T. 48/220
A.C. PERANO

2
3000m²

PT 3
PORT UNDERWOOD
REGN DIST
L.C.T 35/83

Effluent Field

ACROSS SITE FALL 1:11

TO BE FORMED GRADE 1:10 FALL

RIGHT OF WAY & SERVICE EASEMENT APPT TO LOTS 1 & 2 TO BE CREATED

54.00 (1:9 APPROX FALL).

GRASSED SLOPE

ACROSS SITE FALL 1:13

STREAM FROM 73.88

AIR PHOTOGRAPHY

Stream

61.86

LEGAL ROAD

10.00 WIDE

PORT UNDERWOOD ROAD IRREG WIDTH OVER 20.12

PORT LEGAL

OCEAN BAY

APPROX. LOCATION OF EFFLUENT FIELD

PROPOSED EFFLUENT FIELD LOCATION.

PT 1
DP 6825
BAL C.T. AREA
= 23.371 ha

1
2
PORT UNDERWOOD ROAD

LOCATION PLAN
1:10000

030611

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13 JUN 2003
MARLBOROUGH DISTRICT COUNCIL

Stream + soakage field areas added 17/9/98 NSM.

G.M. HAYMES
REGISTERED SURVEYOR

NOTE: BOUNDARIES & AREAS ARE SUBJECT TO FINAL SURVEY.

XV, ARAPAWA S.D.
BOROUGH LAND DISTRICT
LBOROUGH DISTRICT CL

PROPOSED SBDN OF LOT 1 DP 6825

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