DavidsonPartnersLtd

RC

Structural Engineering
Civil Engineering
Building Design
Project Management

Practising in association with Ayson and Partners, Registered Surveyors

Our Ref: 23060

18 June 2004

WASTEWATER MANAGEMENT
G SMITH
LOT 2 DP 11573, MORGANS ROAD, BLENHEIM

1. Introduction

G Smith operates a backpackers style accommodation on his Morgans Road property in the Lower Wairau area.

The facilities currently accommodate up to 30 people. It is proposed to upgrade to cater for up to 120 people.

Davidson Partners Ltd have been engaged to design an appropriate upgrade for the wastewater management system for the proposed development.

We were involved in the design of the original wastewater management system which was commissioned in December 1996, for the previous owners.

We have reviewed the design and recommend appropriate measures for the sustainable management of domestic wastewater to meet the requirements of modern standards.

2. Existing System

The existing wastewater management system was designed for the now abandoned Riveria Craft Village. The system consisted of a 5,000 litre and two 2,700 litre septic tanks for primary settling, followed by land application by way of flood dose loading to raised beds, due to high perched water tables.

The original system was designed for daytime visitors to the craft village which was to be equipped with minimal toilet and washroom facilities.

The design included six raised beds of which only one was constructed before the craft village was abandoned.

Each bed was designed for a load of 1,400 litres/day. The existing bed is currently used by the backpacker accommodation.

However, given the increased loading regime from daytime visitors to residing guests, the existing system is insufficient to conform to the requirements of modern standards.

ACENZ

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

3. Investigation

The site investigation at the time of the initial design found the depth to the perched water table to be at approximately 1.0 m. However, soil mottling was found up to depths of 200 mm, indicating periodic water logged conditions in the upper soil profile.

The soil is best described as 100 mm of topsoil over brown, mottled clay loams to a depth of 600 mm, over moist loamy soils. The soil has been assessed at category 4 as per AS/NZS 1547:2000 'On Site Domestic Wastewater Management'.

Suitable areas for the land application of treated wastewater are readily available on the grassed flat plains, which have good exposure to sun and wind.

A domestic well is located in the southeast corner of the property. A 50 m clearance is therefore required from the well to any land application areas, as per the Wairau/Awatere Resource Management Plan.

The nearest waterway is Roses overflow drain and a small tributary to the northeast, both of which are more than 30 m away from the land application areas.

4. Assessment

We consider that primary treatment by septic tanks with effluent filter followed by land application by way of dose loading to raised beds would be suitable on this site and have no adverse effect on the environment.

The mottling in the soil is most likely due to the low permeable confining layer over the water bearing gravels of the Early Rapaura Formation (Water and Soil Resources of the Wairau, 1998).

We have adopted the use of the raised beds due to the limited soakage of the underlying soils, which may give rise to waterlogged conditions at times.

The principle of the system is for evapotranspiration of the treated wastewater by the grassed beds. A conservative application rate of 2.5 mm/day has been applied to account for the limited soakage of the soil.

The effluent field will be split into six zones by way of sequencing valves. Each zone will be dosed sequentially to provide periodic rest for the remaining fields.

The existing septic tank system needs to be upgraded to account for the additional wastewater load expected from the proposed development.

A suitable pump is also required to deliver the untreated wastewater into the septic tank system, due to the depth of the existing sewer line from the dwellings.

5. Design Loading

The proposed development will cater for 120 people. Using a wastewater allowance of 150 l/p/day (Crites and Tchobanoglous, 1998), the design daily load equates to 18,000 litres.

The existing septic tank system consisting of a total capacity of 10,400 litres allows for an adequate settling time for a design occupancy of up to 33 people, with a pump out interval of two years.

The proposed development therefore requires the septic tank system to be upgraded for an additional 87 people, or 13,050 litres (87 people at 150 l/day).

6. Recommendations

We recommend the following;

(a) Primary Settling

An additional 27,000 litres (minimum) of primary settling is required for the expected increase in wastewater load to cater for up to 120 residents.

This can be provided with a single or combination of septic tanks in series. The outlet of the tanks needs to be fitted with an effluent filter to the suppliers recommendations, to protect the raised beds from the carry over of solids.

The septic tanks should be periodically pumped out every two years to maintain adequate settling volume.

(b) Pump Chamber

Two pump chambers are required. The first chamber will require a suitable pump to deliver the untreated waste to the settling tank.

The second pump chamber is required for the dose loading of the raised beds. The pump is to be activated at a dose volume of 600 litres.

A lower dose volume could be used during the early stage of the development when occupancies are consistently lower. Such adjustments should be confirmed by an Engineer.

Both pump chambers should be fitted with high level alarms with audio and visual signals within the dwelling.

(c) Land Application

The land application system consists of distribution pipes bedded in a continuous layer of gravel, over a 300 mm layer of imported silty soil to form the raised bed.

The raised beds will be constructed to form a continuous structure, but will be internally split into zones.

Using a conservative DIR of 2.5 mm/day and a design load of 18,000 litres/day, the minimum land application area required is 7,200 m^2.

This can be provided with six zones of twenty 30 m distribution pipes at 2.0 m centres, as shown on plan 23060 sheets C2 and C3.

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

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

8. Summary

The on site upgrade for the wastewater management system detailed herein consists of;

(a) A 27,000 litre (minimum) primary settling tank with effluent filter on the outlet, to the suppliers recommendations.

(b) Two pump chambers. First pump chamber to deliver the untreated waste to the settling tank. The second chamber to dose the land application area at a dose volume of 500 litres.

Both pumps to be fitted with a high level alarm. Fault to be indicated by prominent audio and visual signals within the dwelling.

(c) An effluent field split into six zones consisting of distribution lines spaced at 2.0 m centre laid within a continuous layer of gravel as detailed on sheets C2 and C3 issue B.

9. References

9.1 AS/NZS 1547:2000 'On-Site Wastewater Management'.

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

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

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

9.5 Wairau/Awatere Resource Management Plan (Proposed).

9.6 New Zealand Geological Survey (1981). 'Water Well Data Northern Marlborough'. NZGS Report 93, L J Brown.

9.7 Marlborough Catchment and Regional Water Board (1988). 'Water and Soil Resources of the Wairau'.

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W L McGlynn

KRP:RLM

APPENDIX

A1. On Site Wastewater Management Details

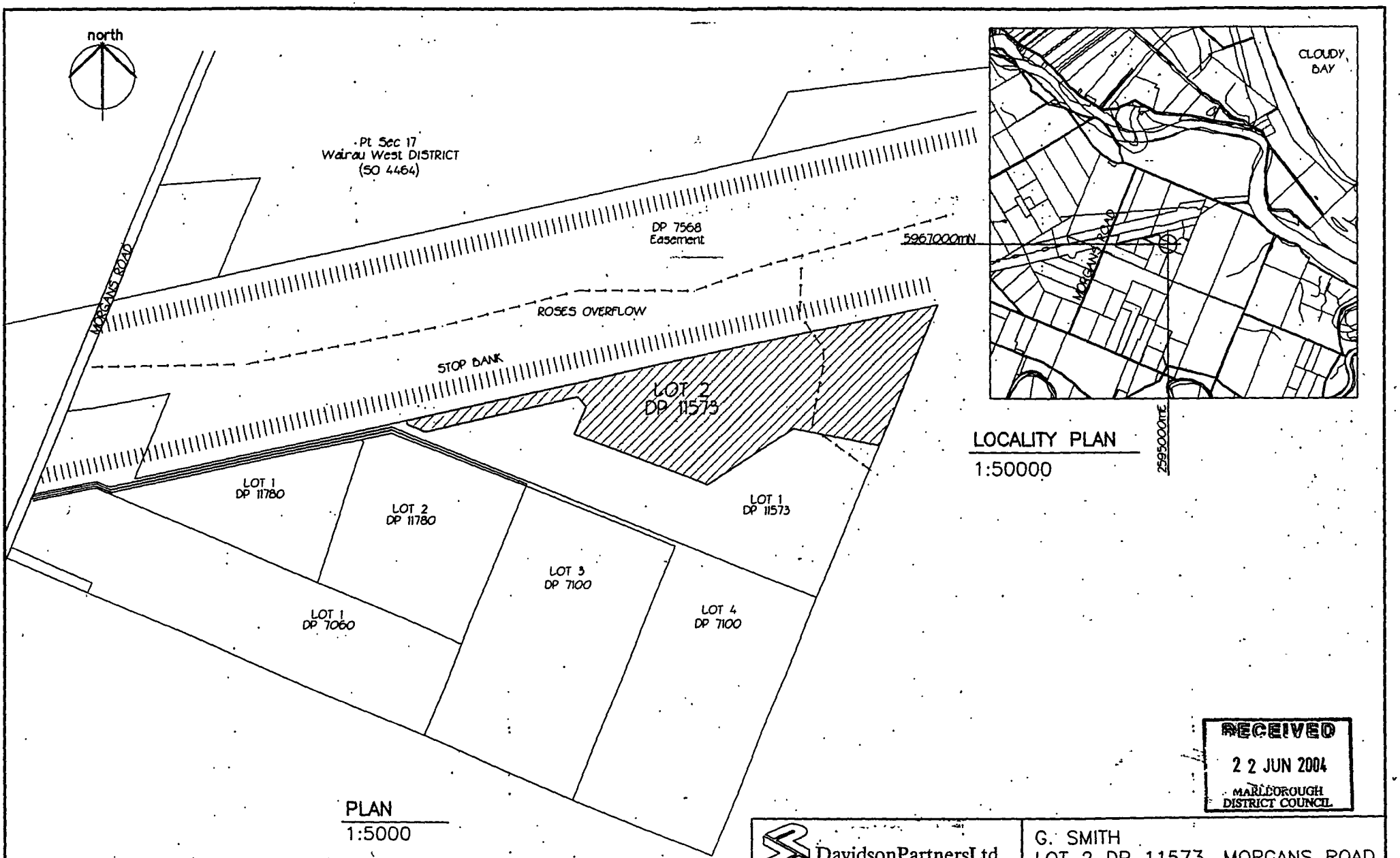
- **A1.1** Field Assessment Report
- **A1.2** Land Application System Design

A2. Plan 23060 sheets;

- C1 Locality Plan – issue A
- C2 Plan – issue B
- C3 Distribution Details – issue B
- C4 Raised Bed Details – issue A

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

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



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Telephone

G. SMITH
LOT 2 DP 11573, MORGANS ROAD
WASTEWATER UPGRADE

locality plan

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
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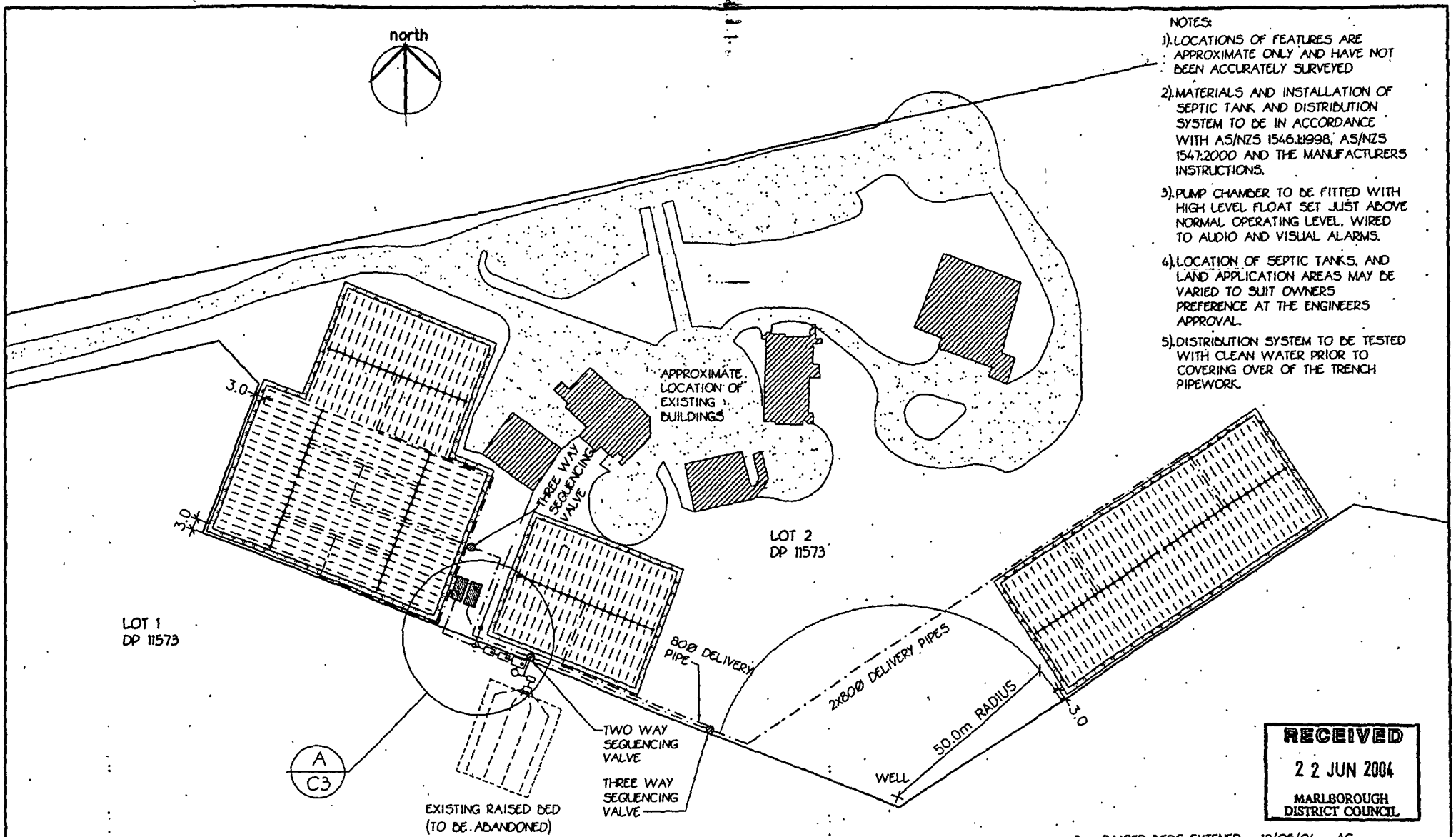

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plan

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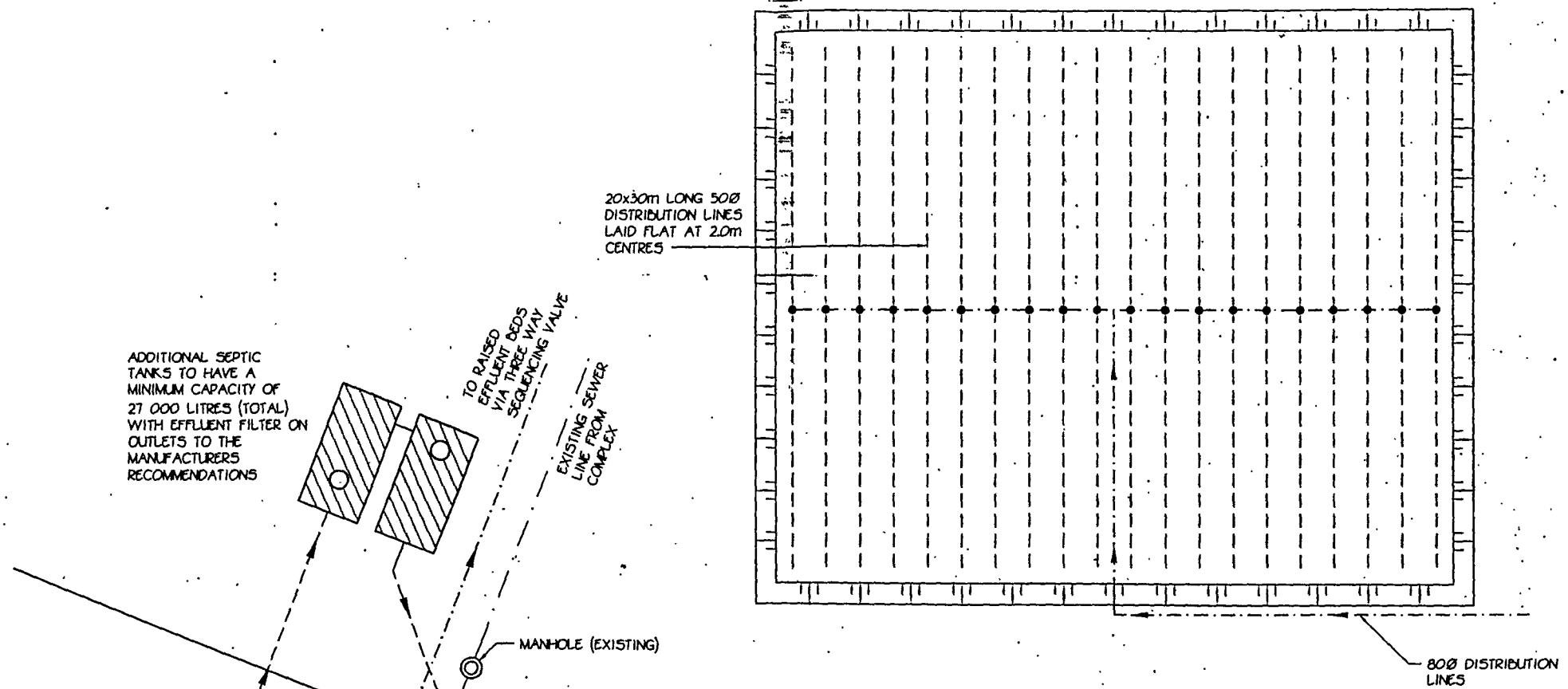
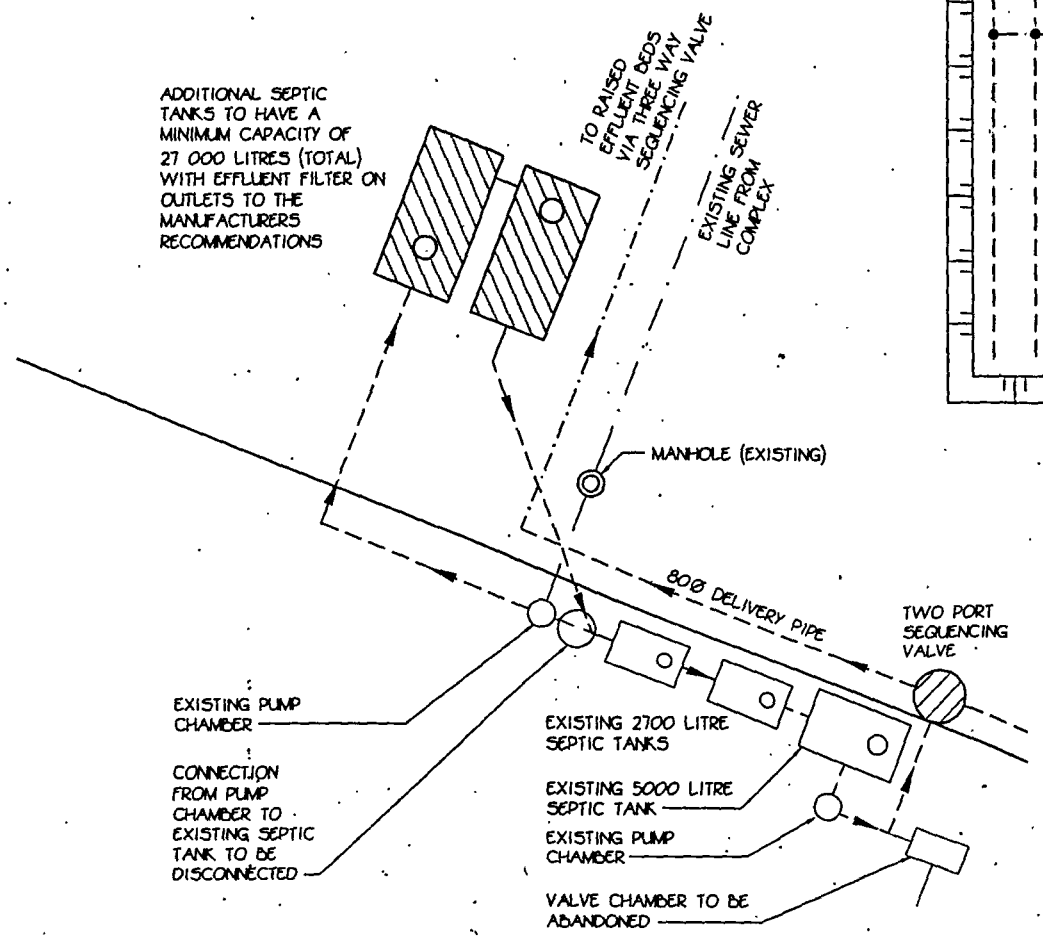


TYPICAL RAISED BED PLAN
1:250



DETAIL A
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B - RAISED BEDS EXTENED - 18/06/04 - AC

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G. SMITH
LOT 2 DP 11573, MORGANS ROAD
WASTEWATER UPGRADE

distribution details

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
05/04	A3	23060	C3	B

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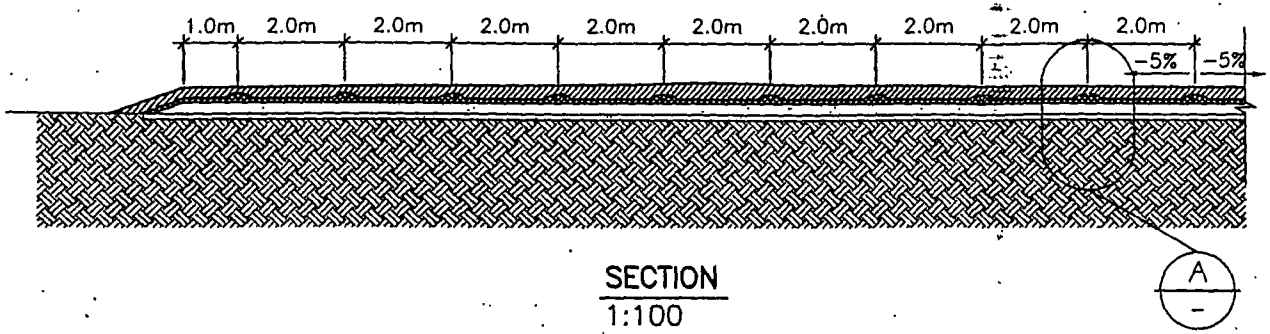
NOTES:

1.) ENGINEER TO INSPECT TEST PUMPING OF DISTRIBUTION SYSTEM PRIOR TO THE COVERING OF THE PIPEWORK.

2.) DISTRIBUTION LINES TO BE 50Ø MIN & LAID FLAT

3.) ANIMALS & VEHICLES TO BE KEPT OFF THE RAISED BED AREA



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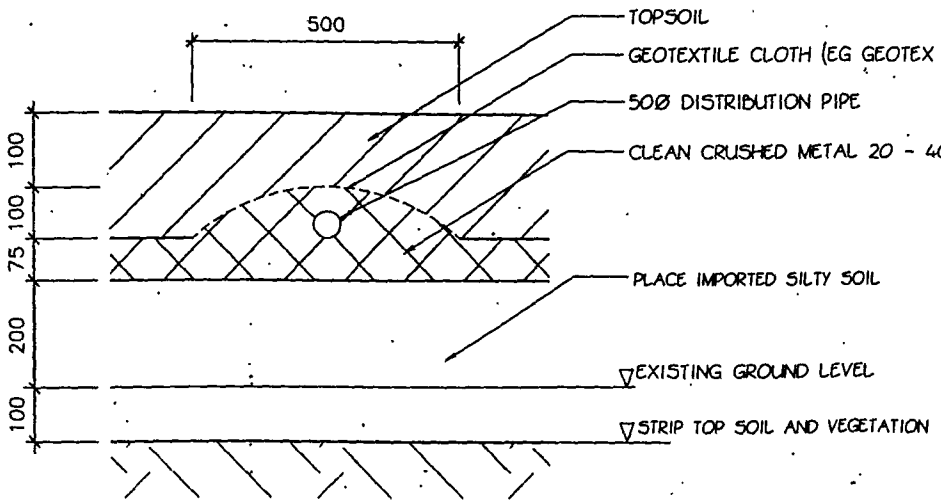

DETAIL A
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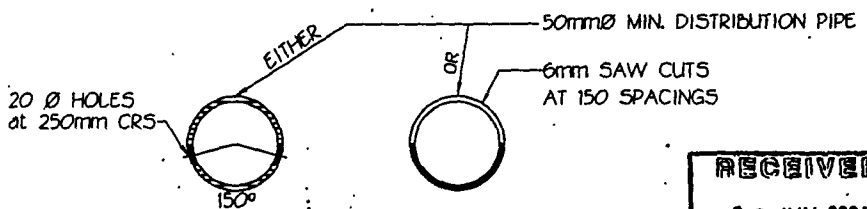

DISTRIBUTION DRAINS
N.T.S

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LOT 2 DP 11573; MORGANS ROAD
WASTEWATER UPGRADE

raised bed detail

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
05/04	A3	23060	C4	A

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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 solid 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.
- **(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 disposal areas;

(iii) No vehicles or 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) Disposal Field

Reliable performance from your disposal 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.

north

Pt Sec 17
Wairau West DISTRICT
(SO 4464)

DP 7568
Easement

MORGANS ROAD

ROSES OVERFLOW

STOP BANK

LOT 2
DP 11573

LOT 1
DP 11780

LOT 2
DP 11780

LOT 1
DP 11573

LOT 3
DP 7100

LOT 4
DP 7100

LOT 1
DP 7060

PLAN
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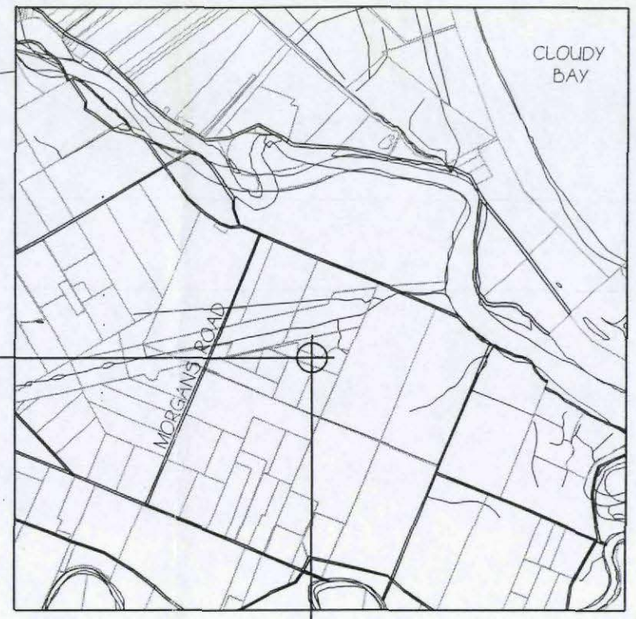

LOCALITY PLAN
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G. SMITH
LOT 2 DP 11573, MORGANS ROAD
WASTEWATER UPGRADE

locality plan

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
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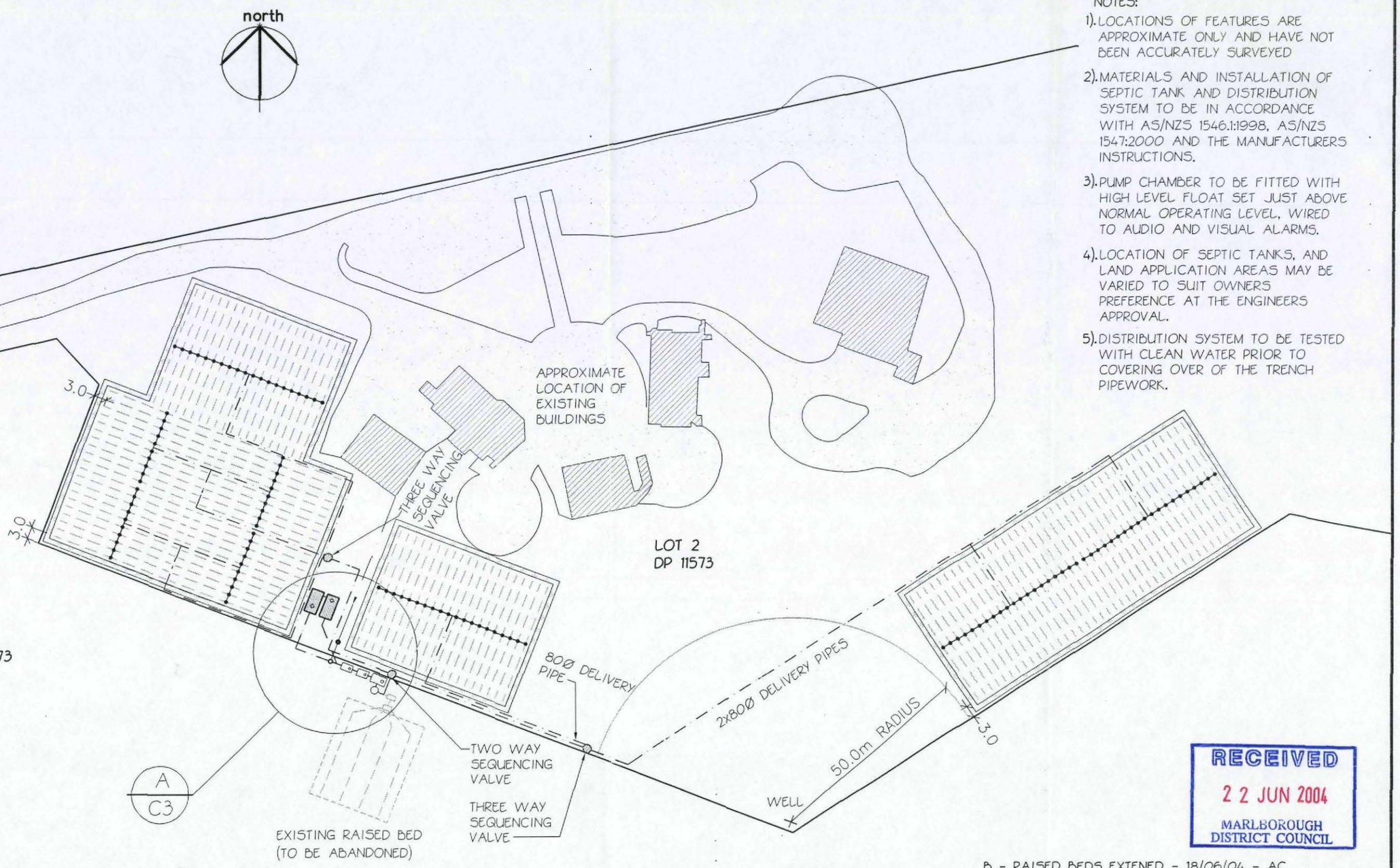

NOTES:

1). LOCATIONS OF FEATURES ARE APPROXIMATE ONLY AND HAVE NOT BEEN ACCURATELY SURVEYED

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 INSTRUCTIONS.

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

4). LOCATION OF SEPTIC TANKS, AND LAND APPLICATION AREAS MAY BE VARIED TO SUIT OWNERS PREFERENCE AT THE ENGINEERS APPROVAL.

5). DISTRIBUTION SYSTEM TO BE TESTED WITH CLEAN WATER PRIOR TO COVERING OVER OF THE TRENCH PIPEWORK.

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B - RAISED BEDS EXTENED - 18/06/04 - AC

PLAN
1:1000

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G. SMITH
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WASTEWATER UPGRADE

plan

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
05/04	A3	23060	C2	B

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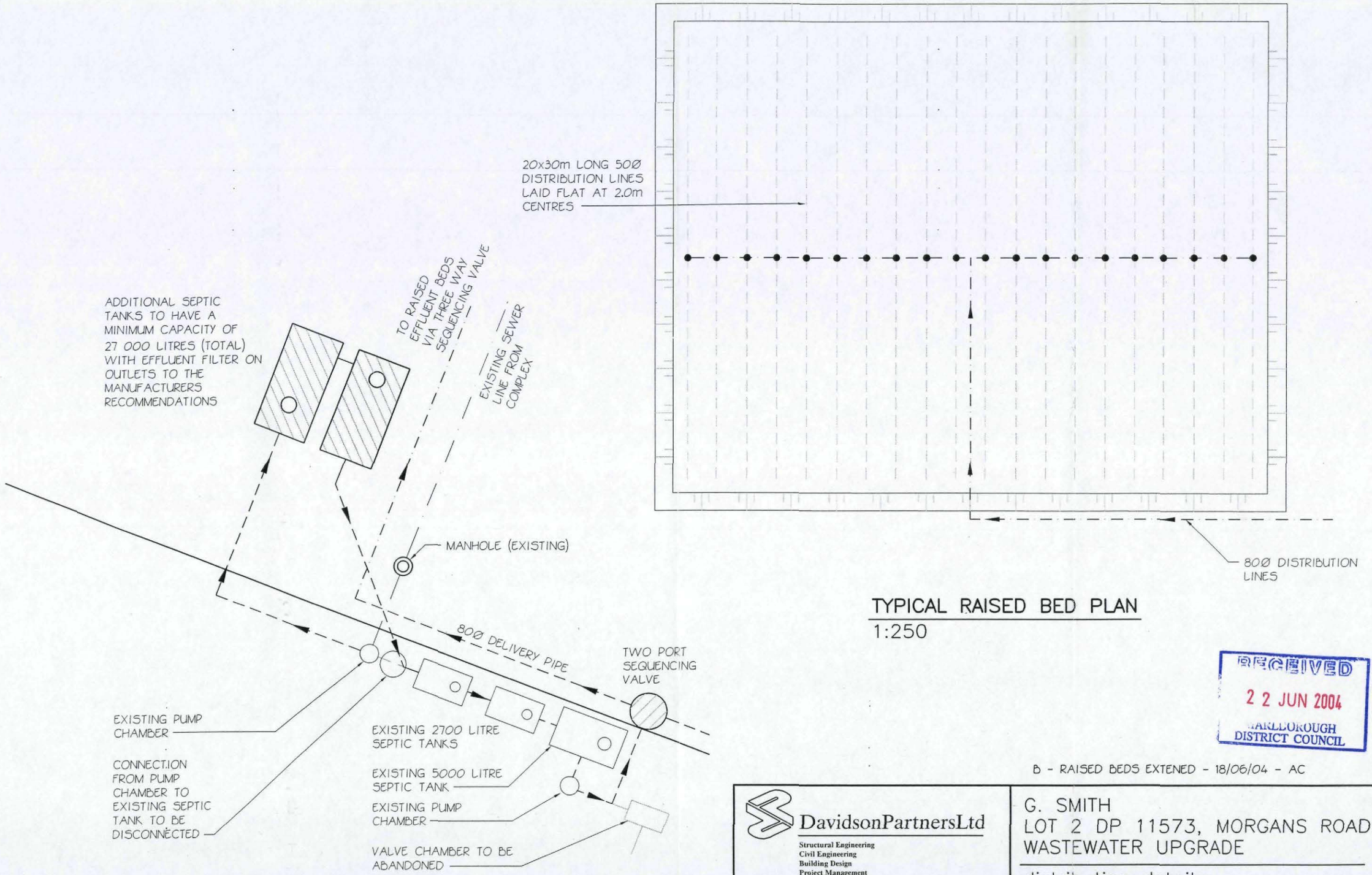

DETAIL A / C2
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TYPICAL RAISED BED PLAN
1:250

B - RAISED BEDS EXTENED - 18/06/04 - AC

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distribution details

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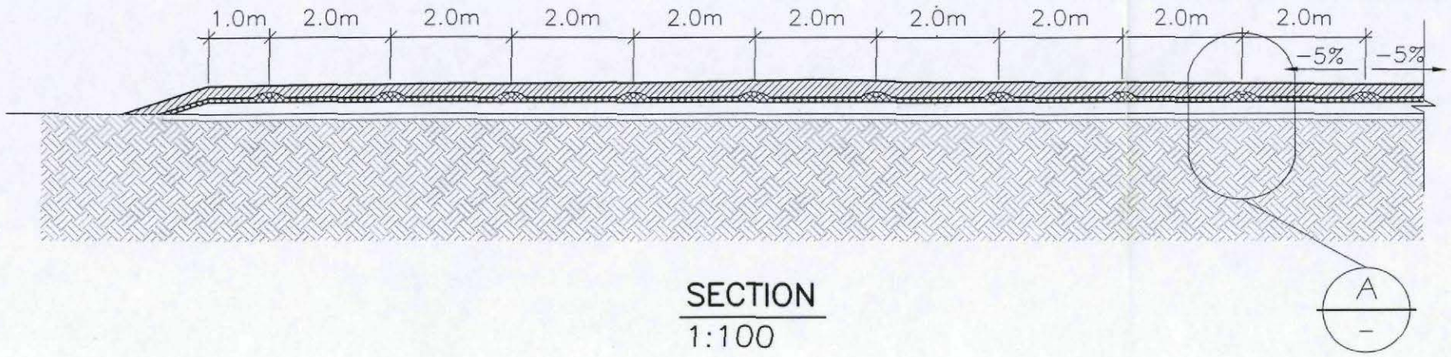

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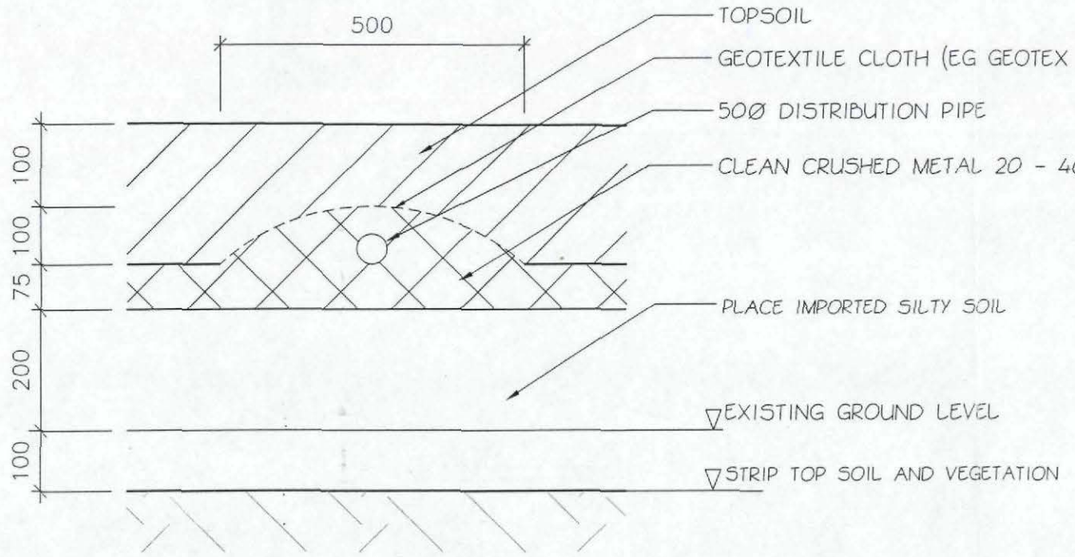

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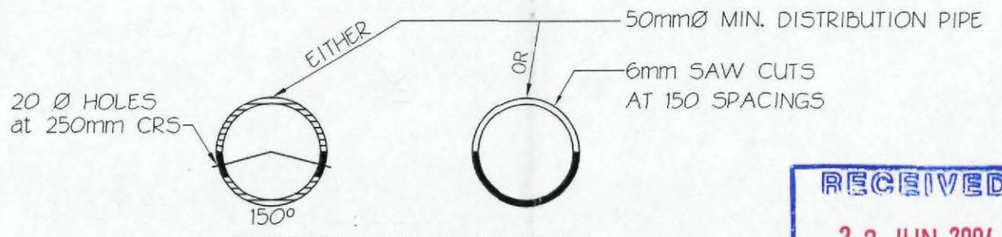

DISTRIBUTION DRAINS
N.T.S

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raised bed detail

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north

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LOT 4
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PLAN
1:5000

LOCALITY PLAN
1:50000

0mm 100mm

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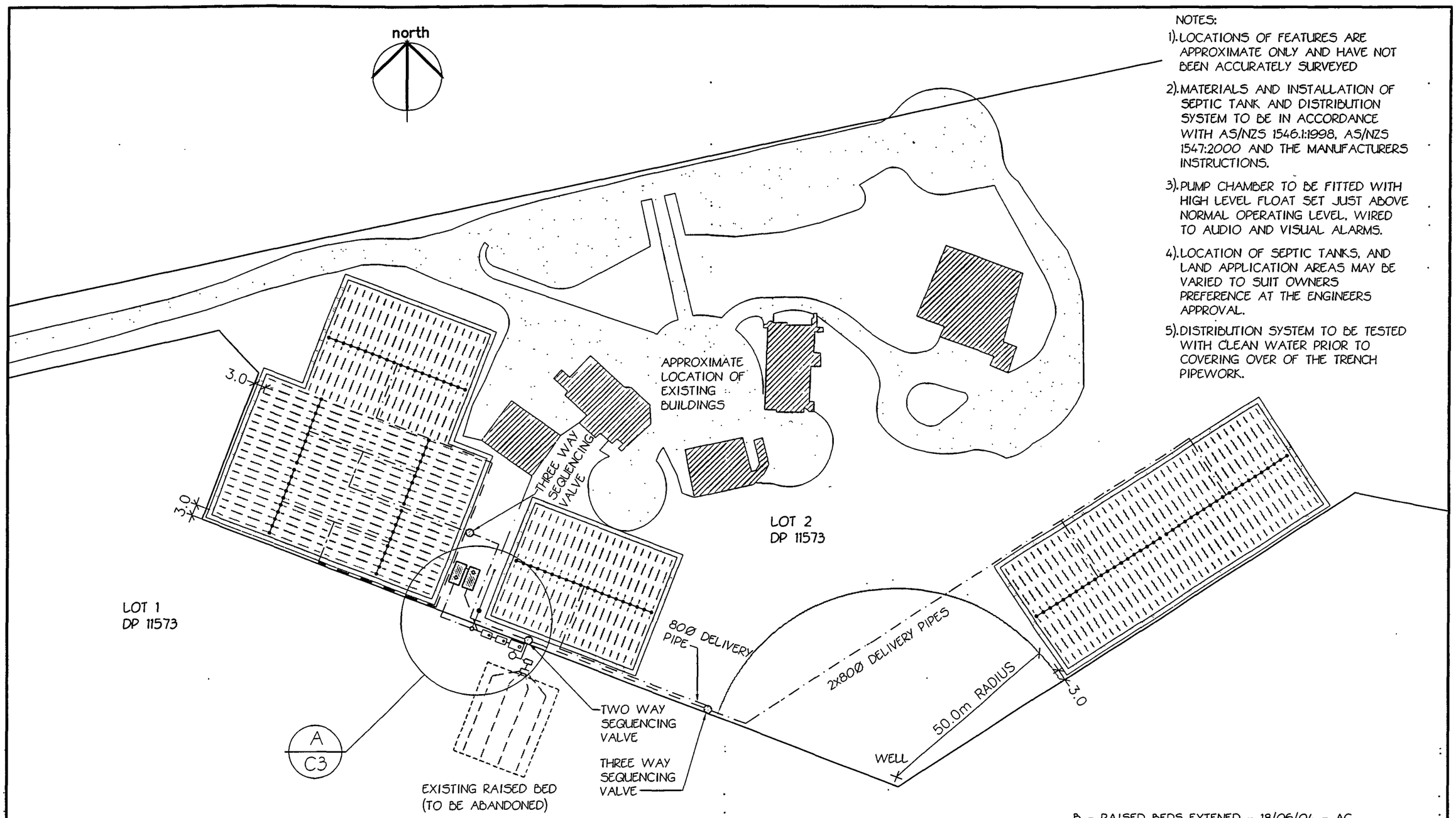

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B - RAISED BEDS EXTENED - 18/06/04 - AC

PLAN
1:1000

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DES LM | DRN AC | CK | CAD

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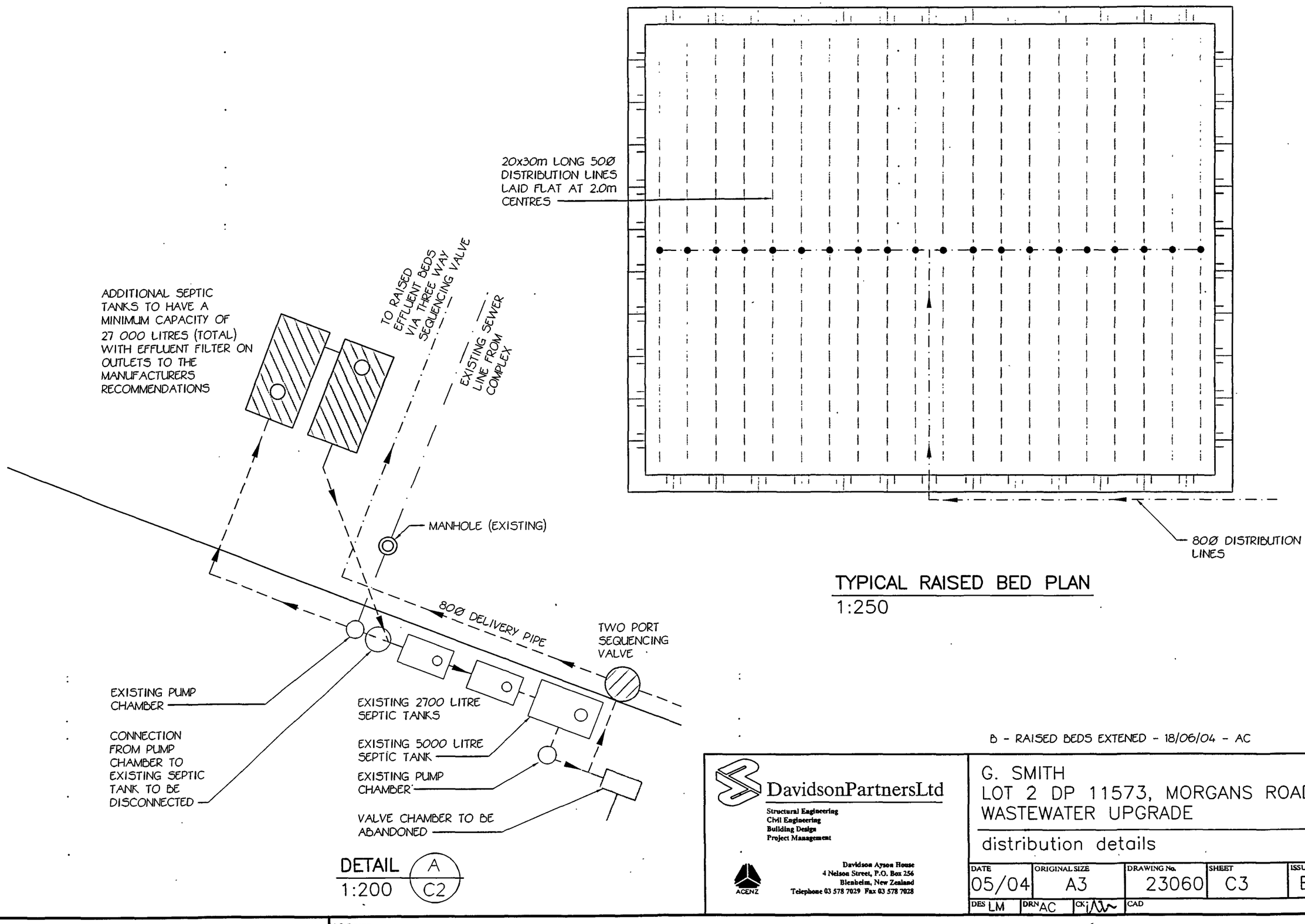

TYPICAL RAISED BED PLAN
1:250

DETAIL A/C2
1:200

0mm 100mm

B - RAISED BEDS EXTENED - 18/06/04 - AC

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Project Management
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4 Nelson Street, P.O. Box 256
Blenheim, New Zealand
Telephone 03 578 7029 Fax 03 578 7028

G. SMITH
LOT 2 DP 11573, MORGANS ROAD
WASTEWATER UPGRADE

distribution details

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
05/04	A3	23060	C3	B

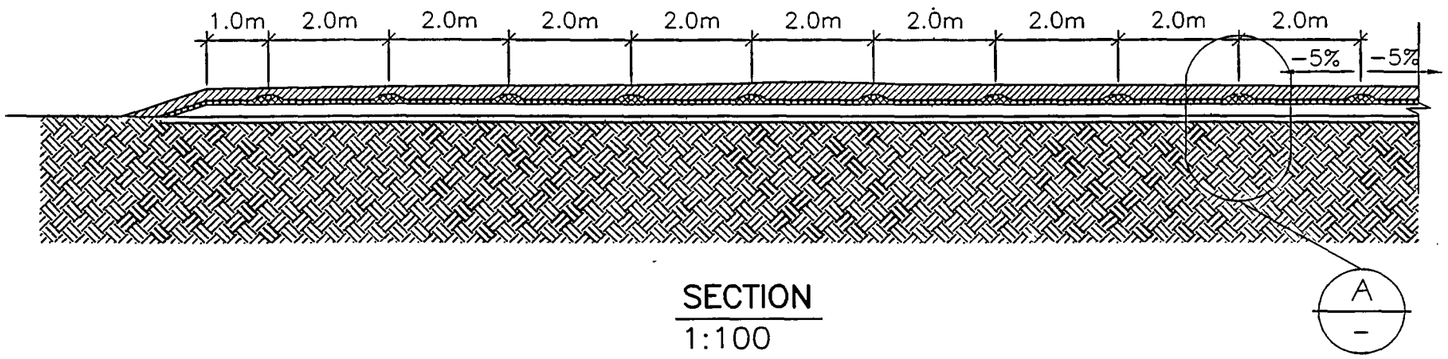
DES LM | DRN AC | CK: | CAD

NOTES:

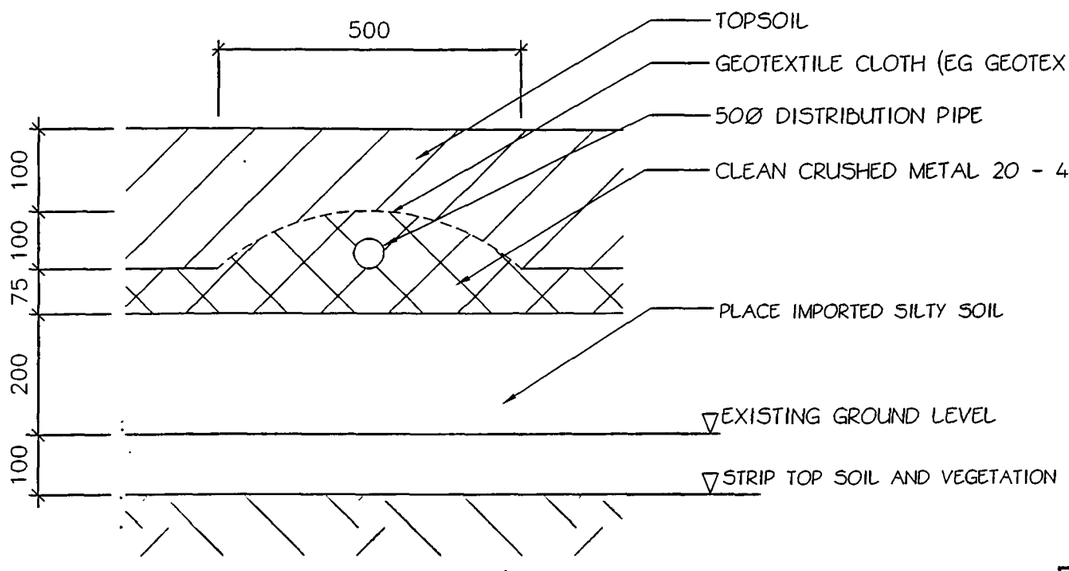
1.) ENGINEER TO INSPECT TEST PUMPING OF DISTRIBUTION SYSTEM PRIOR TO THE COVERING OF THE PIPEWORK.

2.) DISTRIBUTION LINES TO BE 50Ø MIN & LAID FLAT

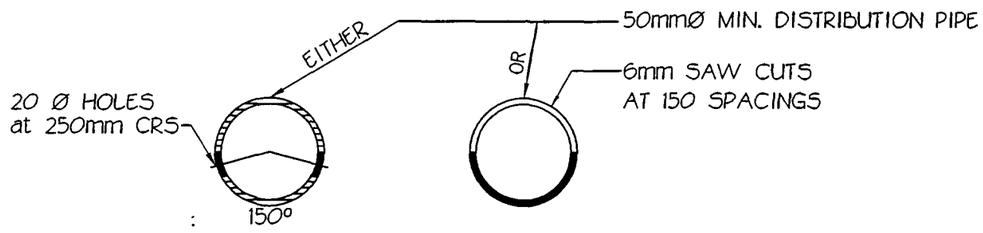
3.) ANIMALS & VEHICLES TO BE KEPT OFF THE RAISED BED AREA



SECTION
1:100



DETAIL A
1:10 -



DISTRIBUTION DRAINS
N.T.S

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G. SMITH
LOT 2 DP 11573, MORGANS ROAD
WASTEWATER UPGRADE

raised bed detail

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
05/04	A3	23060	C4	A

DES	DRN	CK	CAD
LM	AC		\\23060\23060.dwg

0mm 100mm

north

Pt Sec 17
Wairau West DISTRICT
(SO 4464)

DP 7568
Easement

MORGANS ROAD

ROSES OVERFLOW

STOP BANK

LOT 2
DP 11573

LOT 1
DP 11780

LOT 2
DP 11780

LOT 1
DP 11573

LOT 3
DP 7100

LOT 4
DP 7100

LOT 1
DP 7060

PLAN
1:5000

LOCALITY PLAN
1:50000

0mm 100mm

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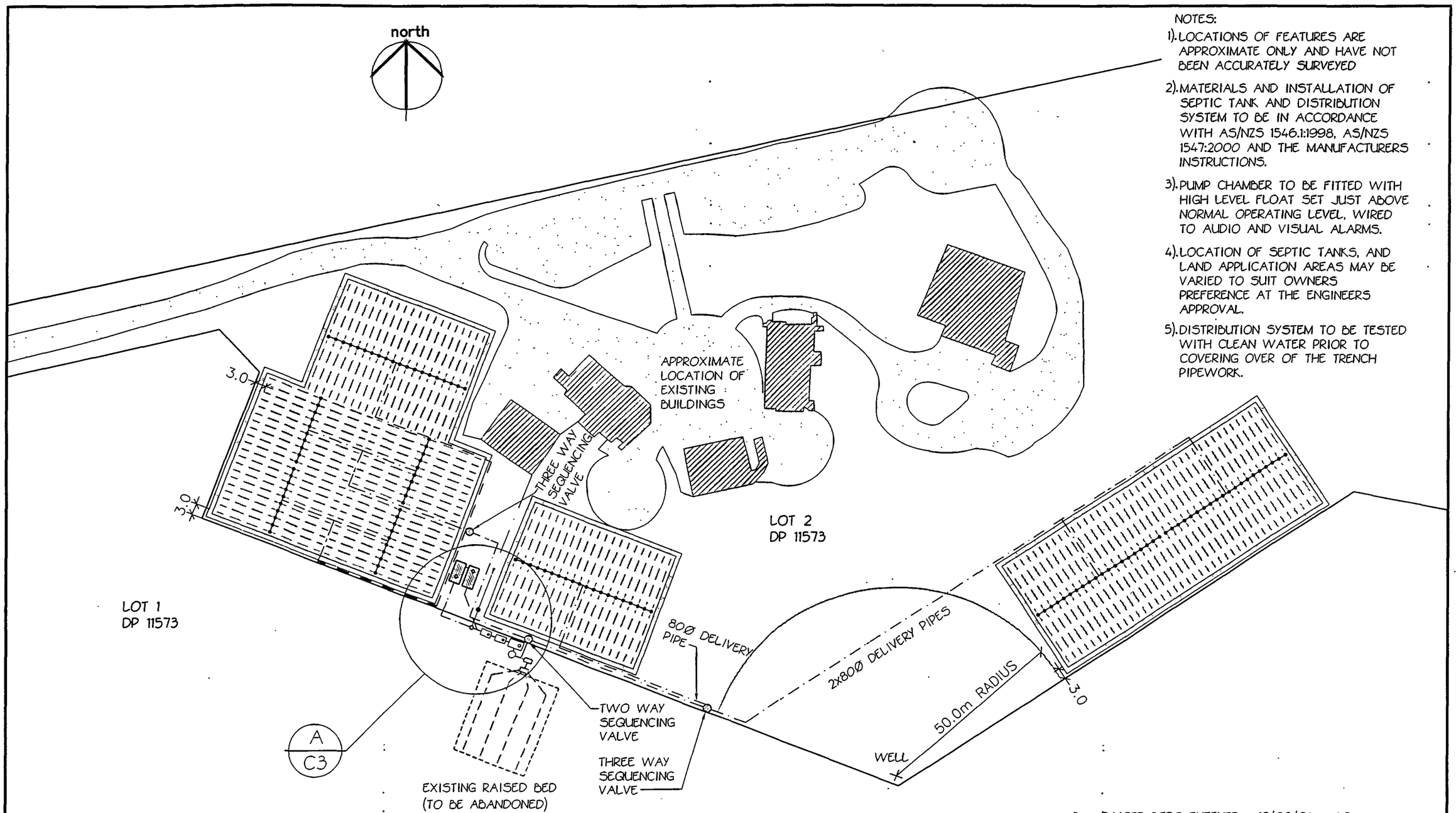
G. SMITH
LOT 2 DP 11573, MORGANS ROAD
WASTEWATER UPGRADE

locality plan

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
05/04	A3	23060	C1	A

DES LM DRN AC CK CAD \\23060\23060.dwg



NOTES:

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

4). LOCATION OF SEPTIC TANKS, AND LAND APPLICATION AREAS MAY BE VARIED TO SUIT OWNERS PREFERENCE AT THE ENGINEERS APPROVAL.

5). DISTRIBUTION SYSTEM TO BE TESTED WITH CLEAN WATER PRIOR TO COVERING OVER OF THE TRENCH PIPEWORK.

B - RAISED BEDS EXTENED - 18/06/04 - AC

PLAN
1:1000

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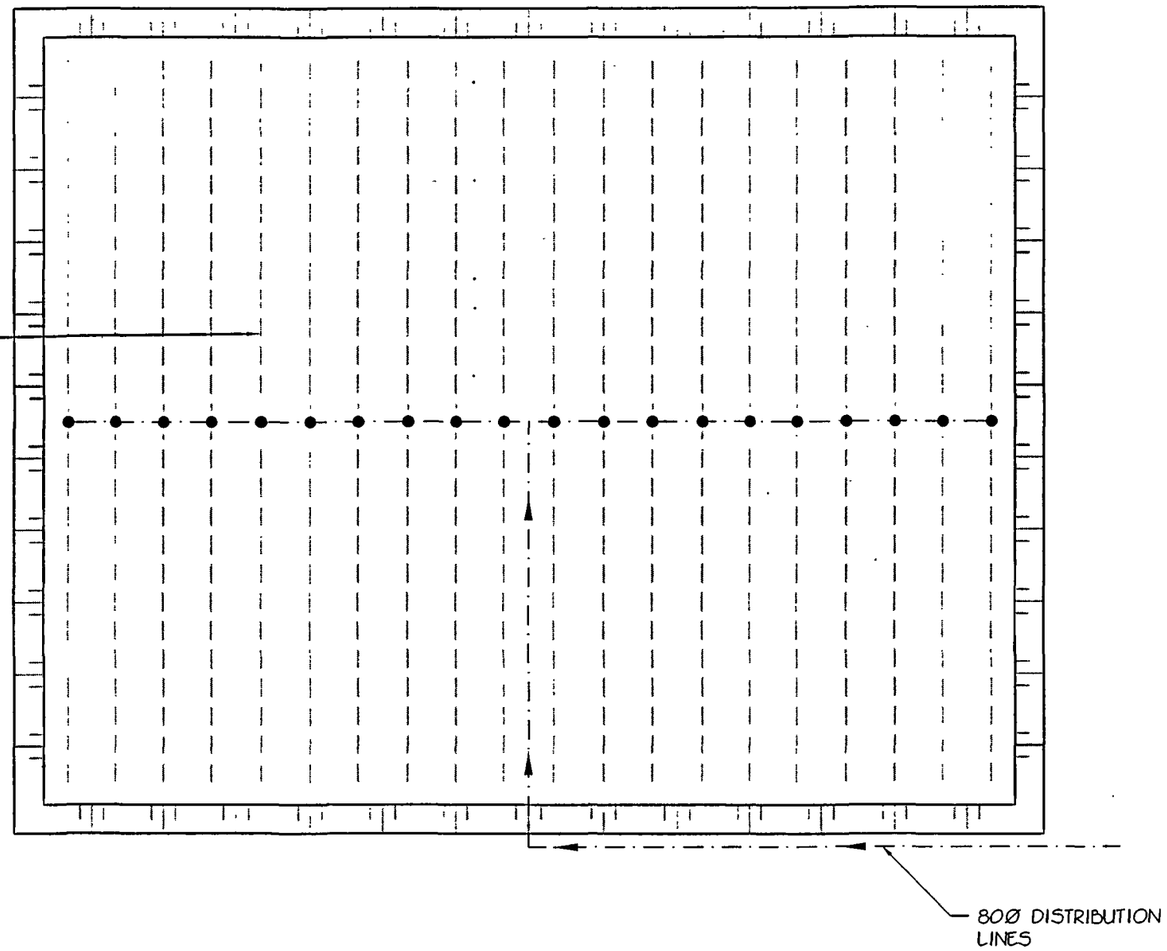
G. SMITH
LOT 2 DP 11573, MORGANS ROAD
WASTEWATER UPGRADE

plan

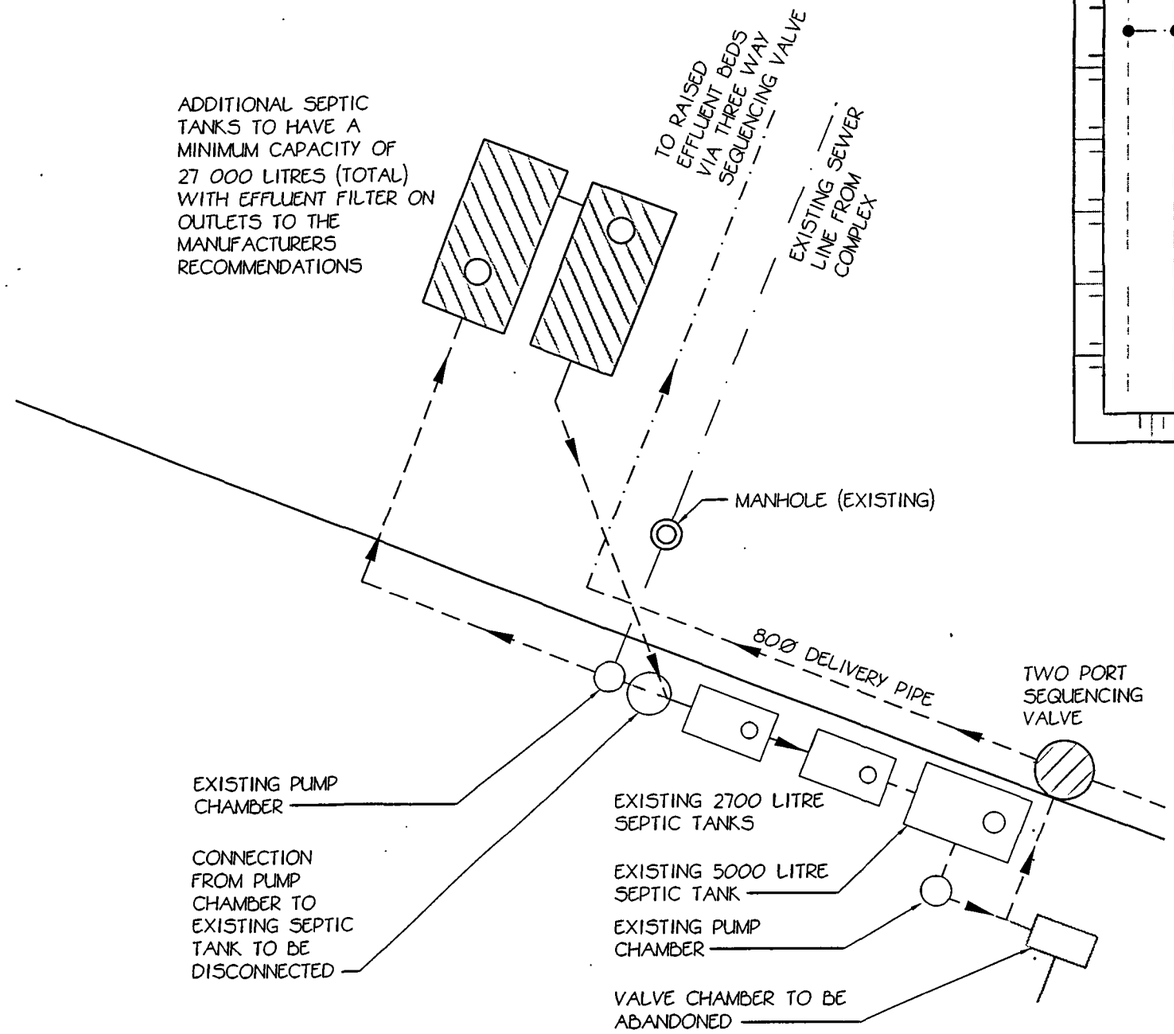
DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
05/04	A3	23060	C2	B

DES	DRN	CK	CAD
LM	AC		

0mm 100mm



TYPICAL RAISED BED PLAN
1:250



DETAIL A / C2
1:200

B - RAISED BEDS EXTENED - 18/06/04 - AC

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G. SMITH
LOT 2 DP 11573, MORGANS ROAD
WASTEWATER UPGRADE

distribution details

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
05/04	A3	23060	C3	B

DES LM | DRN AC | CK | CAD

0mm 100mm

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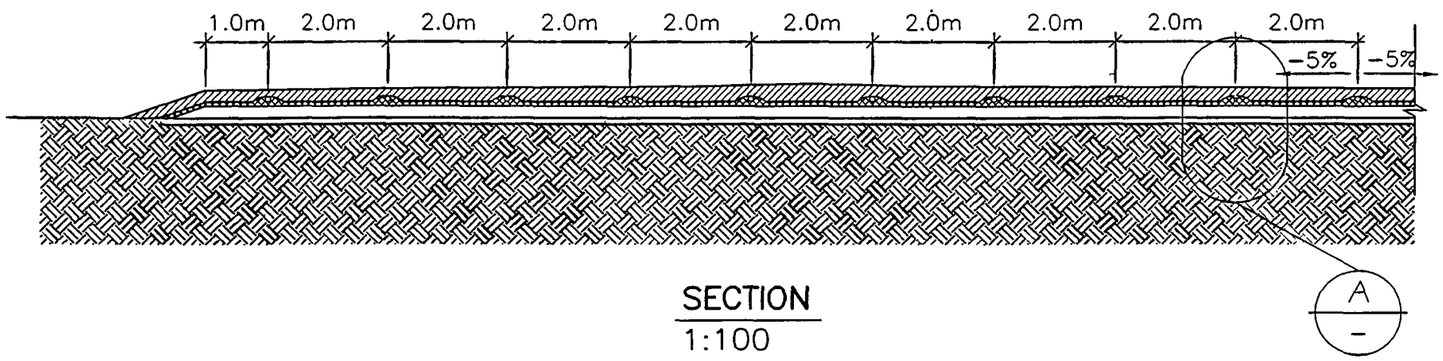
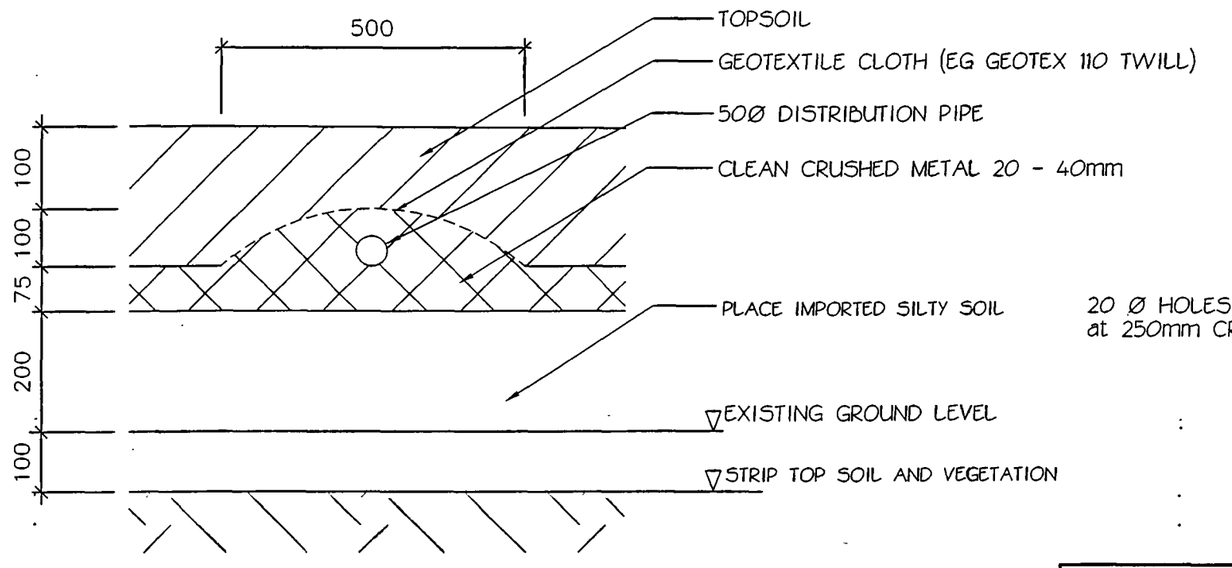
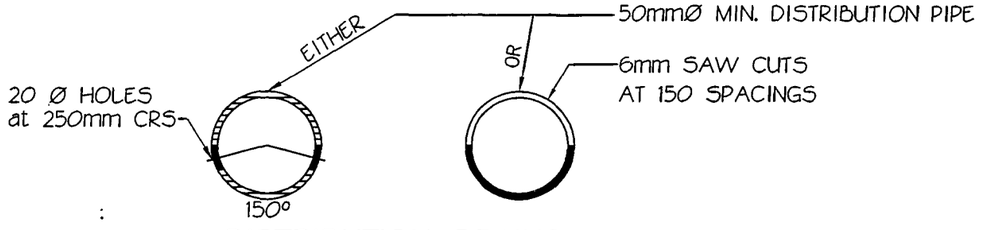


SECTION
1:100



DETAIL A / –
1:10



DISTRIBUTION DRAINS
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G. SMITH
LOT 2 DP 11573, MORGANS ROAD
WASTEWATER UPGRADE

raised bed detail

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
05/04	A3	23060	C4	A

DES LM | DRN AC | CK | CAD \\23060\23060.dwg

0mm 100mm

File Ref: U040107

Ask For: Keith Heather

1 March 2004

Mr Gary Smith
Gateway Gardens
140 Morgans Road
RD 3
BLENHEIM 7321

Dear Gary

Resource Consent - Seasonal Worker Accommodation

Thank you for meeting with me on 24 February 2004.

As you are aware, Council has received indications of concern from adjoining residents regarding the current use of the site and in particular, adverse effects in terms of traffic movements, speed and dust, and effluent disposal. In particular, I note that the effluent disposal system and fields serving Gateway Gardens is located on Mr Morrissey's property.

Although your application is to upgrade kitchen and ablution facilities to accommodate the existing 30 or so seasonal workers currently staying at the Gateway Gardens complex (this has been accommodated largely under the former consent, refer my letter 30 August 1999), it is my understanding that you would also wish to construct additional accommodation units to accommodate up to 100 persons.

On this basis I suggest that you provide the following details:

- Site plan and elevations showing existing buildings and proposed buildings.
- An updated engineer's report detailing the current effluent disposal system and such alterations and improvements as are necessary (ie; extended disposal fields) to accommodate the additional loading.
- A proposed site management and supervision strategy so as to ensure that there would be no adverse effects to adjoining properties in terms of light, noise, security etc.
- An assessment of environmental effects and suggestions as to methods by which such effects can be adequately mitigated, ie; management, landscaping, sealing etc.

Once I am in receipt of the above, I suggest that, for the sake of expediency and given the concerns already raised, the application be notified forthwith.

The application is deferred pursuant to Section 88 of the Resource Management Act 1991 in the meantime.

Yours faithfully

KEITH HEATHER
RESOURCE MANAGEMENT OFFICER

Superseded

Davidson Partners Ltd

SUPERSEDED

WASTEWATER MANAGEMENT
FOR G SMITH
LOT 2 DP 11573, MORGANS ROAD, BLENHEIM

23060
May 2004

DavidsonPartnersLtd

Structural Engineering
Civil Engineering
Building Design
Project Management

Practising in association with Ayson and Partners, Registered Surveyors

Our Ref: 23060

28 May 2004

WASTEWATER MANAGEMENT
G SMITH
LOT 2 DP 11573, MORGANS ROAD, BLENHEIM

1. Introduction

G Smith operates a backpackers style accommodation on his Morgans Road property in the Lower Wairau area.

The facilities currently accommodate up to 30 people. It is proposed to upgrade to cater for up to 100 people.

Davidson Partners Ltd have been engaged to design an appropriate upgrade for the wastewater management system for the proposed development.

We were involved in the design of the original wastewater management system which was commissioned in December 1996, for the previous owners.

We have reviewed the design and recommend appropriate measures for the sustainable management of domestic wastewater to meet the requirements of modern standards.

2. Existing System

The existing wastewater management system was designed for the now abandoned Riveria Craft Village. The system consisted of a 5,000 litre and two 2,700 litre septic tanks for primary settling, followed by land application by way of flood dose loading to raised beds, due to high perched water tables.

The original system was designed for daytime visitors to the craft village which was to be equipped with minimal toilet and washroom facilities.

The design included six raised beds of which only one was constructed before the craft village was abandoned.

Each bed was designed for a load of 1,400 litres/day. The existing bed is currently used by the backpacker accommodation.

However, given the increased loading regime from daytime visitors to residing guests, the existing system is insufficient to conform to the requirements of modern standards.

ACENZ

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P.O. Box 256, Blenheim, New Zealand
Telephone 03 578 7029 Fax 03 578 7028
Email: service@DavidsonPartners.co.nz

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

3. Investigation

The site investigation at the time of the initial design found the depth to the perched water table to be at approximately 1.0 m. However, soil mottling was found up to depths of 200 mm, indicating periodic water logged conditions in the upper soil profile.

The soil is best described as 100 mm of topsoil over brown, mottled clay loams to a depth of 600 mm, over moist loamy soils. The soil has been assessed at category 4 as per AS/NZS 1547:2000 'On Site Domestic Wastewater Management'.

Suitable areas for the land application of treated wastewater are readily available on the grassed flat plains, which have good exposure to sun and wind.

A domestic well is located in the southeast corner of the property. A 50 m clearance is therefore required from the well to any land application areas, as per the Wairau/Awatere Resource Management Plan.

The nearest waterway is Roses overflow drain and a small tributary to the northeast, both of which are more than 30 m away from the land application areas.

4. Assessment

We consider that primary treatment by septic tanks with effluent filter followed by land application by way of dose loading to raised beds would be suitable on this site and have no adverse effect on the environment.

The mottling in the soil is most likely due to the low permeable confining layer over the water bearing gravels of the Early Rapaura Formation (Water and Soil Resources of the Wairau, 1998).

We have adopted the use of the raised beds due to the limited soakage of the underlying soils, which may give rise to waterlogged conditions at times.

The principle of the system is for evapotranspiration of the treated wastewater by the grassed beds. A conservative application rate of 2.5 mm/day has been applied to account for the limited soakage of the soil.

The effluent field will be split into six zones by way of sequencing valves. Each zone will be dosed sequentially to provide periodic rest for the remaining fields.

The existing septic tank system needs to be upgraded to account for the additional wastewater load expected from the proposed development.

A suitable pump is also required to deliver the untreated wastewater into the septic tank system, due to the depth of the existing sewer line from the dwellings.

5. Design Loading

The proposed development will cater for 100 people. Using a wastewater allowance of 150 l/p/day (Crites and Tchobanoglous, 1998), the design daily load equates to 15,000 litres.

The existing septic tank system consisting of a total capacity of 10,400 litres allows for an adequate settling time for a design occupancy of up to 33 people, with a pump out interval of two years.

The proposed development therefore requires the septic tank system to be upgraded for an additional 67 people, or 10,050 litres (67 people at 150 l/day).

6. Recommendations

We recommend the following;

(a) Primary Settling

An additional 21,000 litres (minimum) of primary settling is required for the expected increase in wastewater load to cater for up to 100 residents.

This can be provided with a single or combination of septic tanks in series. The outlet of the tanks needs to be fitted with an effluent filter to the suppliers recommendations, to protect the raised beds from the carry over of solids.

The septic tanks should be periodically pumped out every two years to maintain adequate settling volume.

(b) Pump Chamber

Two pump chambers are required. The first chamber will require a suitable pump to deliver the untreated waste to the settling tank.

The second pump chamber is required for the dose loading of the raised beds. The pump is to be activated at a dose volume of 500 litres.

Both pump chambers should be fitted with high level alarms with audio and visual signals within the dwelling.

(c) Land Application

The land application system consists of distribution pipes bedded in a continuous layer of gravel, over a 300 mm layer of imported silty soil to form the raised bed.

The raised beds will be constructed to form a continuous structure, but will be internally split into zones.

Using a conservative DIR of 2.5 mm/day and a design load of 15,000 litres/day, the minimum land application area required is 6,000 m^2.

This can be provided with six zones of twenty 25 m distribution pipes at 2.0 m centres, as shown on plan 23060 sheets C2 and C3.

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

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

8. Summary

The on site upgrade for the wastewater management system detailed herein consists of;

(a) A 21,000 litre (minimum) primary settling tank with effluent filter on the outlet, to the suppliers recommendations.

(b) Two pump chambers. First pump chamber to deliver the untreated waste to the settling tank. The second chamber to dose the land application area at a dose volume of 500 litres.

Both pumps to be fitted with a high level alarm. Fault to be indicated by prominent audio and visual signals within the dwelling.

(c) An effluent field split into six zones consisting of distribution lines spaced at 2.0 m centre laid within a continuous layer of gravel as detailed on sheets C2 and C3.

9. References

9.1 AS/NZS 1547:2000 'On-Site Wastewater Management'.

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

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

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

9.5 Wairau/Awatere Resource Management Plan (Proposed).

9.6 New Zealand Geological Survey (1981). 'Water Well Data Northern Marlborough'. NZGS Report 93, L J Brown.

9.7 Marlborough Catchment and Regional Water Board (1988). 'Water and Soil Resources of the Wairau'.

DAVIDSON PARTNERS LTD

W L McGlynn

KRP:RLM

APPENDIX

A1. On Site Wastewater Management Details

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

A2. Plan 23060 sheets;

- C1 Locality Plan
- C2 Plan
- C3 Distribution Details
- C4 Raised Bed Details

A3. Davidson Partners Ltd – 'How to Get the Best from your 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: G Smith **JOB NO.** 23060

LOCATION: Morgans Road **DATE:** 26 May 2004

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.		100 mm
4.	Soil Description (colour, moisture, firmness, type).		Brown, mottled clay loam
5.	Soil Category (1 - 6)		4
6.	Coarse Fragments	- size/abundance	None
7.	Ribbon Length		NA
8.	Soil Structure (Pedal Content)		High
9.	Performance of existing systems nearby. - Type, septic and trench/pit		NA
10.	Nearby water bodies. - Separation Distance		Yes >30 m
11.	Nearby wells. - Separation Distance		Yes >50 m
12.	Intended water supply.		Well
13.	Runoff to be controlled.		No
14.	Ground water to be controlled.		No
15.	Any stability considerations, If yes, comment.		No
	.....		
16.	Depth to water table.		1.0 m
17.	Vegetation cover	- Existing	Yes
		- Type	Grass
		- Proposed	Grass
18.	Gravity head to proposed disposal field location.		-
19.	Reserve areas available?		Yes

20. Other Comments

Suit raised beds due to limited soakage of underlying soil.

DAVIDSON PARTNERS LTD

ON SITE WASTEWATER MANAGEMENT
LAND APPLICATION SYSTEM DESIGN

JOB NAME: G Smith **JOB NO.** 23060

LOCATION: Morgans Road, Lower Wairau **DATE** 26 May 2004

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

1. Parameters

1.1	Annual rainfall	-
1.2	Annual evaporation	-
1.3	Number of bedrooms (2, 3, 4)	-
1.4	Occupancy (No. of people), N (4, 5, 6)	67
1.5	Waste water allowance, A (roof 140, creek/well 180)	150 l/p/d
1.6	Soil category (from field assessment)	4

2. Septic Tank Design

2.1	Number of people	67
2.2	Daily flow (wastewater allowance x number of people)	10,050 l/day
2.3	Minimum residence time required	24 hours
2.4	Pump out interval required	2 years
2.5	Sludge/scum accumulation (black-50, grey-40, both 80)	80 l/p/yr
2.6	Allowance for scum/sludge (sludge accumulation x pump out interval x number of people)	10,720 litres
2.7	Minimum tank size (scum/sludge volume + flow during min. residence time)	20,770 litres
2.8	Choose tank size	21,000 litres
2.9	Settling volume available (tank size - scum/sludge)	10,280 litres
2.10	Settling time available (settling volume) daily flow)	25 hours

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) **<u>Land Application Area</u>**

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.

north

Pt Sec 17
Wairau West DISTRICT
(SO 4464)

DP 7568
Easement

MORGANS ROAD

ROSES OVERFLOW

STOP BANK

LOT 2
DP 11573

LOT 1
DP 11780

LOT 2
DP 11780

LOT 1
DP 11573

LOT 3
DP 7100

LOT 4
DP 7100

LOT 1
DP 7060

LOCALITY PLAN
1:50000

PLAN
1:5000

0mm 100mm

DavidsonPartnersLtd
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Blenheim, New Zealand
Telephone 03 578 7029 Fax 03 578 7028

G. SMITH
LOT 2 DP 11573, MORGANS ROAD
WASTEWATER UPGRADE

locality plan

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
05/04	A3	23060	C1	A

DES	DRN	CK	CAD
LM	AC		\\23060\23060.dwg

north

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

4). LOCATION OF SEPTIC TANKS, AND LAND APPLICATION AREAS MAY BE VARIED TO SUIT OWNERS PREFERENCE AT THE ENGINEERS APPROVAL.

5). DISTRIBUTION SYSTEM TO BE TESTED WITH CLEAN WATER PRIOR TO COVERING OVER OF THE TRENCH PIPEWORK.

APPROX. LOCATION OF EXISTING BUILDINGS

3.0

5m

THREE WAY SEQUENCING VALVE

LOT 2
DP 11573

LOT 1
DP 11573

50Ø DELIVERY PIPE

2x50Ø DELIVERY PIPES

50.0m RADIUS

WELL

TWO WAY SEQUENCING VALVE

THREE WAY SEQUENCING VALVE

A
C3

EXISTING RAISED BED
(TO BE ABANDONED)

PLAN
1:1000

DavidsonPartnersLtd
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Civil Engineering
Building Design
Project Management

ACENZ

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Blenheim, New Zealand
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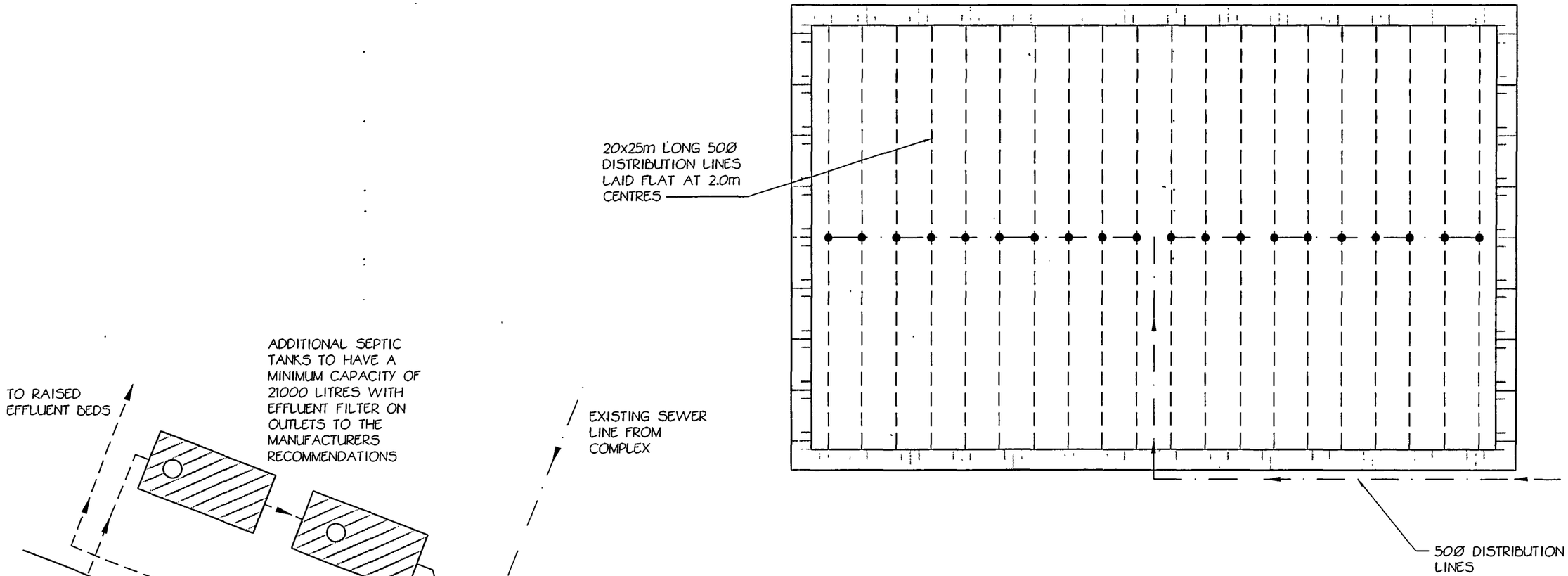
G. SMITH
LOT 2 DP 11573, MORGANS ROAD
WASTEWATER UPGRADE

plan

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
05/04	A3	23060	C2	A

DES LM | DRN AC | CK | CAD \\23060\23060.dwg

0mm 100mm



DETAIL A / C2
1:200

TYPICAL RAISED BED PLAN
1:250

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G. SMITH
LOT 2 DP 11573, MORGANS ROAD
WASTEWATER UPGRADE

distribution details

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
05/04	A3	23060	C3	A

DES LM | DRN AC | CK | CAD \\23060\23060.dwg

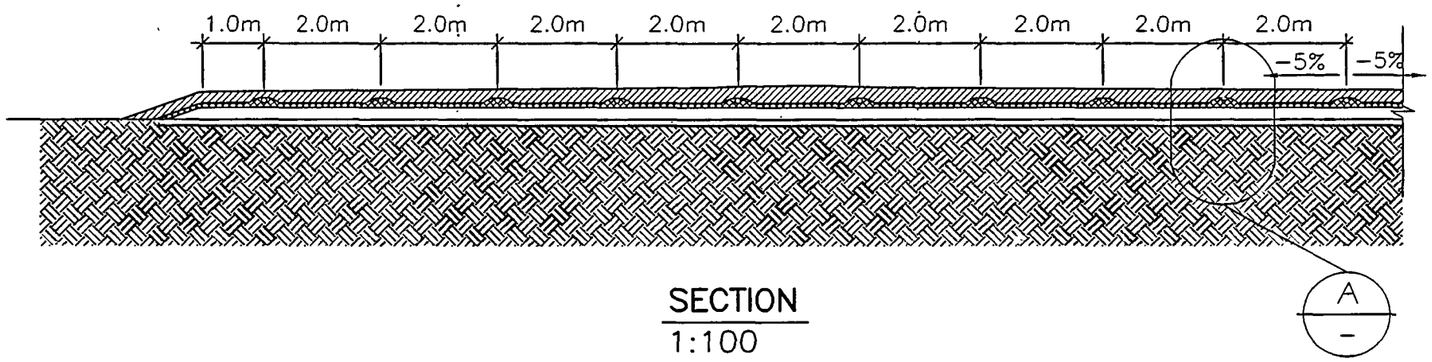
0mm 100mm

NOTES:

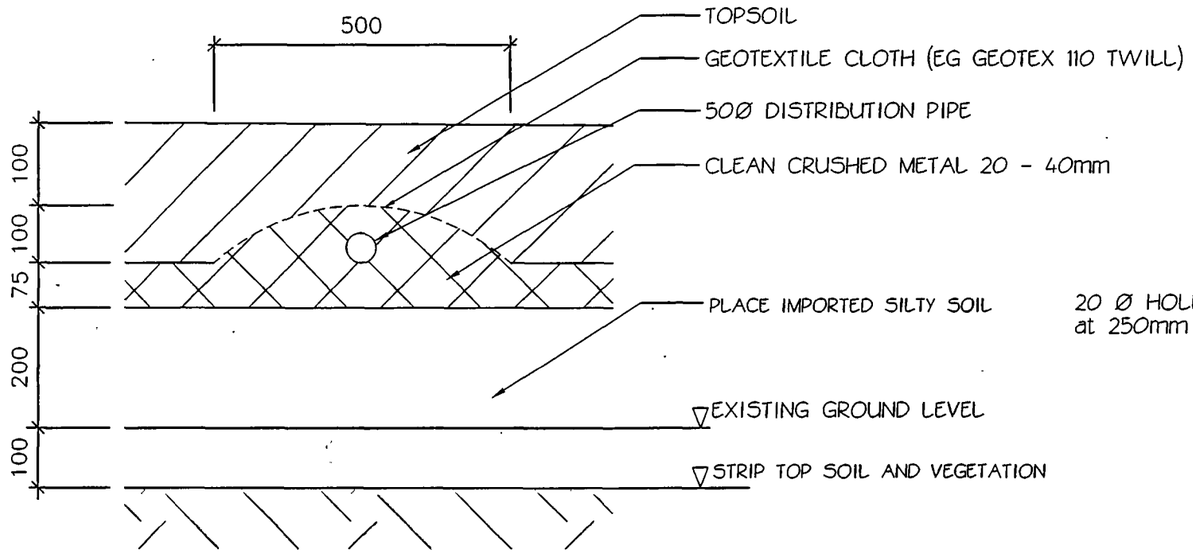
1.) ENGINEER TO INSPECT TEST PUMPING OF DISTRIBUTION SYSTEM PRIOR TO THE COVERING OF THE PIPEWORK.

2.) DISTRIBUTION LINES TO BE 50Ø MIN & LAID FLAT

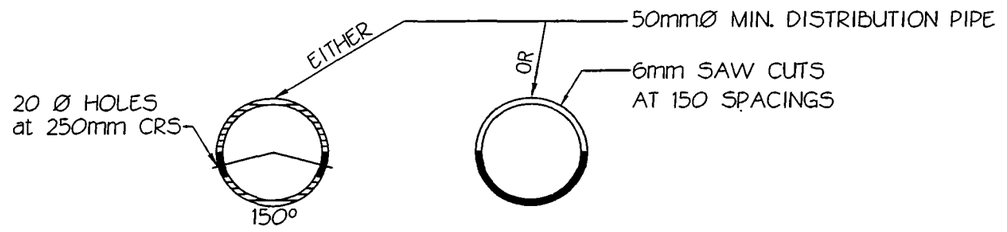
3.) ANIMALS & VEHICLES TO BE KEPT OFF THE RAISED BED AREA



SECTION
1:100



DETAIL A
1:10 -



DISTRIBUTION DRAINS
N.T.S

DavidsonPartnersLtd
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G. SMITH
LOT 2 DP 11573, MORGANS ROAD
WASTEWATER UPGRADE

raised bed detail

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
05/04	A3	23060	C4	A

DES	DRN	CK	CAD
LM	AC		\\23060\23060.dwg

0mm 100mm

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 solid 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.
- **(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 disposal areas;

(iii) No vehicles or 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) Disposal Field

Reliable performance from your disposal 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.