



Order as per draft
16 0720

In the Planning and Environment Court
Held at: Cairns

No 184 of 2019

Between:

GARETH HORNER and STEFANIE HORNER Appellants

And:

MAREEBA SHIRE COUNCIL Respondent

JUDGMENT

Before: Her Honour Judge Fantin
Date of Hearing: 16 July 2020
Date of Order: 16 July 2020

THIS MATTER having this day come on for hearing by way of an appeal from the decision of the Respondent to refuse an application by the Appellant for a development permit for material change of use for animal keeping (stables) (**Application**) in respect of land at 2 Emerald Heights Road, Mareeba described as Lot 11 on RP748324 (**Land**).

UPON HEARING the solicitors for the Appellants and the solicitors for the Respondent.

UPON READING the Notice of Appeal filed on 17 October 2019 and the affidavit of Nigel Walter Hales filed on 15 July 2020.

UPON the Court being satisfied that the change to the Application identified in the affidavit of Nigel Walter Hales is a "minor change" within the meaning of that term as it is defined in Schedule 1 of the *Planning and Environment Court Act 2016* and Schedule 2 of the *Planning Act 2016*.

IT IS ORDERED THAT:

1. The appeal be allowed; and
2. The Application be approved subject to the conditions and plans attached marked "A", comprising pages 1 to 86.

Page 1



JUDGMENT
Filed on behalf of the appellants
Form PEC-7

Miller Harris Lawyers
Level 1, Quay Central
14-16 McLeod Street, Cairns, Qld 4870
P: (07) 4036 9700
F: (07) 4031 1525
Ref: NWH:2191399

953594_1

Filed on:

Filed by:

Service address:

Phone:

Fax:

Email:

Miller Harris Lawyers

Level 1, 14-16 McLeod Street, Cairns, Qld 4870

(07) 4036 9700

(07) 4031 1525

nigelhailes@millerharris.com.au

Registrar

“A”

That in relation to the following development application:

APPLICATION		PREMISES	
APPLICANT	G & S Horner	ADDRESS	2 Emerald Heights Road, Mareeba
DATE LODGED	2 July 2019	RPD	Lot 11 on RP748324
TYPE OF APPROVAL		Development Permit	
PROPOSED DEVELOPMENT		Material Change of Use - Animal Keeping (Stables)	

and in accordance with the Planning Act 2016, the applicant be notified that the application for a development permit for the development specified in (A) is:

Approved in accordance with the approved plans/documents listed in (B), subject to assessment manager conditions in (C), assessment manager's advice in (D), relevant period in (E), further permits in (F), and further approvals from Council listed in (G).

(A) APPROVED DEVELOPMENT:

Development Permit for Material Change of Use – Animal Keeping (Stables for a maximum of 10 racehorses)

(B) APPROVED PLANS AND DOCUMENTS:

Plan/Document Number	Plan/Document Title	Prepared by	Dated
v3.2	Equine Management Plan	G & S Horner	28/06/20
M4-19(1)	Site Layout Plan (as amended in red)	U&I Town Plan	21/06/19
	Water Storage and Wastewater System Report	Ice International and Soiltest.biz	23/06/20

(C) ASSESSMENT MANAGER'S CONDITIONS (COUNCIL)

Development assessable against the Planning Scheme

1. Development in Accordance with Approved Plans and Documents

- 1.1** The development must be carried out generally in accordance with the Approved Plans and Documents listed in (B), any plans or drawing referred to therein and the facts and circumstances of the use as submitted with the application, subject to any alterations:

1.1.1 found necessary by Council's delegated officer at the time of examination of the engineering plans or during construction of the development because of particular engineering requirements; or

1.1.2 to ensure compliance with the conditions of this approval.

2. Timing of Effect

2.1 The conditions of the development permit must be complied with to the satisfaction of Council's delegated officer within three (3) months of this development permit taking effect except where specified otherwise in these conditions of approval, or except where a subsequent alternate timeframe has been agreed upon in writing by Council's delegated officer.

2.2 The applicant must notify Council when all the conditions of the development permit have been complied with, except where specified otherwise in these conditions of approval, and request that a compliance inspection be carried out by Council's delegated officer/s.

3. General

3.1 The applicant/developer is responsible for the cost of necessary alterations to existing public utility mains, services or installations required by works in relation to the development or any works required by condition(s) of this approval.

3.2 All external works must be designed, constructed and carried out in accordance with FNQROC Development Manual requirements (as amended) and to the satisfaction of Council's delegated officer.

3.3 Waste Management

3.3.1 Any on site refuse storage areas must be screened from view from adjoining properties and road reserve by a one (1) metre wide landscaped screening buffer or a 1.8m high solid fence or building.

3.3.2 Horse manure and other waste products collected from the stable floor or exercise yard including wet bedding, wood shavings, sawdust and sand are to be managed in accordance with the requirements of section 4 of the approved Equine Management Plan.

3.4 Hours of Operation

3.4.1 The hours of operation for the approved use, including horse exercising and training but excluding any horse health care activities such as feeding, and veterinarian visits shall be limited to the hours between 7:00am and 8:00pm Monday to Saturday.

3.4.2 No operations associated with the approved use are permitted on Sundays or public holidays except:

(a) feeding and veterinary horse health care activities; and

- (b) when racing is occurring on a Sunday or public holiday, transportation of horses to or from a racing venue between the hours of 8:00am to 7:00pm, a maximum of 6 times a year.

3.5 Horse Numbers

- 3.5.1. No more than 10 race horses are to be kept on the property at any one time. In addition to the 10 racehorses, 2 "pet" horses may also be kept on the property at any one time.
- 3.5.2. Horses exercised or trained on the property must be kept on the property overnight or longer.
- 3.5.3. All race horses must be registered with Racing Australia and the applicant / developer must be listed with Racing Queensland as the registered trainer of each of the race horses. The owners of the race horses kept on the property, with the exception of the applicant / developer, are not permitted to attend the property for any purpose associated with the Animal Keeping (stables) use.

3.6 Horse Containment

- 3.6.1. Racehorses must be contained within the stable building or "Horse Day Yard with diamond grid" shown on either side of the stables on the approved Proposed Development/Site Location Map in Appendix 12.1 of the approved Equine Management Plan at all times, unless being transported off-site or being exercised/trained in the exercise/training arena immediately to the south of the stable building.
- 3.6.2. No more than two (2) pet horses at any time can be grazed on the property outside the "existing fenced area for horses" shown on approved plan no. M4-19 (2) dated 31.07.19 in line with Council's Local Laws and provided the minimum standards for animal keeping contained within Council's Local Laws are maintained at all times, to the satisfaction of Council delegated officer.

3.7 Loading/Unloading of Horses

- 3.7.1. Horses transported off site for training must be loaded/unloaded onto transport vehicles within the driveway immediately adjacent to the stables only and must not be kept in transport vehicles for more than 10 minutes at any one time so as to minimise noise nuisance to surrounding residents. Transport vehicles are not to be left idling while loading/unloading of horses is taking place.
- 3.7.2. No horses are to be loaded/unloaded or kept contained in vehicles for any length of time within the Emerald Heights Road reserve.

3.8 Building Materials and Finishes

- 3.8.1. All building materials and finishes, including roofing iron/tiles, guttering, external blockwork/render and window screening structures must be made from non-reflective, modern building

materials and must be of a neutral colour, to the satisfaction of Council's delegated officer.

- 3.8.2. The stable building and wash down areas are to have a concrete floor.

3.9 Signage

- 3.9.1. No more than one (1) advertising sign for the approved development is permitted on the subject site.
- 3.9.2. The sign must not exceed a maximum sign face area of 1m² and must not move, revolve, strobe or flash.
- 3.9.3. The sign must be kept clean, in good order and safe repair for the life of the approval and must be removed when no longer required.
- 3.9.4. The erection and use of the advertisement must comply with the Building Act and all other relevant Acts, Regulations and these approval conditions.

4. Infrastructure Services and Standards

4.1 Access

The existing access crossover must be upgraded/constructed (from the edge of Emerald Heights Road to the property boundary of the subject site) in accordance with the FNQROC Development Manual, to the satisfaction of Council's delegated officer.

4.2 Stormwater Drainage/Water Quality

- 4.2.1. The applicant/developer must install the stormwater drainage shown on the Proposed Development/Site Location Map in Appendix 12.1 and the Stormwater plan in Appendix 12.4 of the approved Equine Management Plan.
- 4.2.2. The applicant/developer must take all necessary steps to ensure a non-worsening effect resulting from stormwater discharging onto neighbouring land as a consequence of the development.
- 4.2.3. All stormwater drainage must be collected from the site and discharged to an approved legal point of discharge.

4.3 Car parking/Internal Driveways

- 4.3.1. The "Access Road In road base and Diamond Grid" shown on the Proposed Development/Site Location Map in Appendix 12.1 of the approved Equine Management Plan must be constructed with Diamond Grid mesh filled with pebbles/gravel, and maintained for the life of the development, to the satisfaction of Council's delegated officer.
- 4.3.2. The Diamond Grid mesh must be installed with "Medium Base Prep" in accordance with page 15 of the manufacturer's Rural

Information & Installation Guide found in Appendix 12.6 of the approved Equine Management Plan.

- 4.3.3. The Access Road must have a minimum width of 4 metres for its entire length, to the satisfaction of Council's delegated officer.

4.4 Site-specific Equine Management Plan

- 4.4.1. The requirements of the approved site-specific Equine Management Plan must be complied with and maintained for the life of the development and any incidents of non-compliance must be reported to Council within 5 days of the non-compliance arising.

- 4.4.2. The applicant/developer must keep a written log of any complaints received in relation to the development. The log is to be made available to the Council for inspection upon request and is to include the following information:

- (a) The date of the complaint;
- (b) The name and contact details of the complainant;
- (c) The details of the complaint;
- (d) What steps were taken by the applicant/developer in response to the complaint.

4.5 Landscaping and fencing

- 4.5.1. Within three (3) months of this approval taking effect, the applicant/developer must ensure the following landscape buffer is established and growing:

- (a) A minimum 2-metre-wide landscape screening buffer along the northern property boundary extending a distance of 155 metres from the Emerald Heights Road frontage of the site;

A minimum 2-metre-wide landscape screening buffer adjacent the southern property boundary extending from the Emerald Heights Road frontage of the site down to the western end of the solid screen fencing required under condition 4.5.5. The landscaping must be planted on the outside of the fencing and not within Easement A on RP748324.

- (b) A minimum 1-metre-wide landscape screening buffer in the area shown as "Tree Line 1m spacing 2 rows" on the approved Proposed Development/Site Location Map in Appendix 12.1 of the approved Equine Management Plan.

- 4.5.2. The abovementioned landscaping must be carried out in accordance with Planning Scheme Policy 6 - Landscaping and Preferred Plant Species and must include shrubs, plants or trees that form an

effective visual buffer no less than three (3) metres in height. A minimum of 25% of plants must be provided as larger, advanced stock with a minimum height of 0.7m and the landscaping must be mulched, irrigated and maintained to the satisfaction of Council's delegated officer.

4.5.3. Within three (3) months of this approval taking effect, the applicant/developer must ensure the following is established in the paddocks and horse day yards:

(a) Diamond Grid mesh with grass grown over the top in the areas shown as "Horse Day Yard with diamond grid" on the approved Proposed Development/Site Location Map in Appendix 12.1 of the approved Equine Management Plan;

(b) A minimum 70% pasture cover in the paddocks on the property and the areas shown as "Horse Day Yard with diamond grid" on the approved Proposed Development/Site Location Map in Appendix 12.1 of the approved Equine Management Plan.

4.5.4. All landscaping must be maintained for the life of the development.

4.5.5. Within three (3) months of this approval taking effect, the applicant/developer must install two (2) metre high colorbond or overlapping timber paling fencing (of neutral colour) in the areas shown as "Color Bond Fencing" on the approved Proposed Development/Site Location Map in Appendix 12.1 of the approved Equine Management Plan. . The fencing must be kept in good order and safe repair for the life of the development, to the satisfaction of Council's delegated officer.

4.6 Lighting

4.6.1. Where outdoor lighting is required the applicant/developer shall locate, design and install lighting which prevents the potential for light spillage to cause nuisance to neighbours and must be provided in accordance with Australian Standard 1158.1 – Lighting for Roads and Public Spaces.

4.6.2. Illumination resulting from direct, reflected or other incidental light emanating from the subject land does not exceed 8 lux when measured at any point 1.5m outside the property boundary of the subject site. The lighting fixtures installed on site must meet appropriate lux levels as documented within Australian Standard 4282 – Control of the Obtrusive Effects of Outdoor Lighting.

4.7 Water

4.7.1. The applicant/developer must install, operate and maintain for the life of the development a water storage system comprising of rainwater tanks and a storage pond to ensure that the development has minimum of 641,000L total water storage capacity.

- 4.7.2. The water storage system is to be installed in accordance with the design approved by Ice International and Soiltest.biz in the report dated 23 June 2020.
- 4.7.3. Following installation the applicant/developer is to provide Council with a certification from an RPEQ or appropriately licensed installer that installation is in accordance with this design.
- 4.7.4. The applicant/developer must obtain from Sunwater, and maintain for the property and the life of the development, a 6ML per year water allocation from Cobra Creek.
- 4.7.5. The applicant/developer must install and maintain for the life of the development an additional 20,000L water tank to be used solely for firefighting purposes.

4.8 Wastewater

- 4.8.1. The applicant/developer must install, operate and maintain for the life of the development a wastewater system in accordance with the design approved by Ice International and Soiltest.biz in the report dated 23 June 2020.
- 4.8.2. The wastewater system must only accept water from the horse wash down bay.
- 4.8.3. No stormwater is to enter the wastewater system.
- 4.8.4. Following installation, the applicant/developer is to provide Council with a certification from an RPEQ or appropriately licensed installer that installation is in accordance with the design, the requirements of the Plumbing and Drainage Act 2018, Queensland Plumbing and Wastewater Code and AS/NZS 1547:2012 and conditions 4.8.2 and 4.8.3.
- 4.8.5. Treated effluent from the wastewater system is not to be used for irrigation or dust suppression.

4.9 Power supply

The applicant/developer must install and maintain for the life of the development a minimum 6.6kw solar system with a 5kw converter and battery back-up to provide power to the stable building.

(D) ASSESSMENT MANAGER'S ADVICE

- (a) An Adopted Infrastructure Charges Notice will be issued with respect to the approved development. The Adopted Infrastructure Charges Notice details the type of infrastructure charge/s, the amount of the charge/s and when the charge/s are payable.
- (b) The Adopted Infrastructure Charges Notice does not include all charges or payments that are payable with respect to the approved development. A number of other charges or payments may be payable as conditions of approval. The applicable fee is set out in Council's Fees & Charges Schedule for each respective financial year.

(c) Compliance with applicable codes/policies

The development must be carried out to ensure compliance with the provisions of Council's Local Laws, Planning Scheme Policies, Planning Scheme and Planning Scheme Codes to the extent they have not been varied by a condition of this approval.

(d) Compliance with Acts and Regulations

The erection and use of the building must comply with the Building Act and all other relevant Acts, Regulations and Laws, and these approval conditions.

(d) Environmental Protection Act 1994

In carrying out the approved use the applicant/developer must take all reasonable and practical measures to ensure that the approved use and all associated activities complies with the provisions of the Environmental Protection Act 1994 and that any breaches of the Act are reported to the Department of Environment and Science as soon as practically possible.

(e) Environmental Protection and Biodiversity Conservation Act 1999

The applicant is advised that referral may be required under the Environmental Protection and Biodiversity Conservation Act 1999 if the proposed activities are likely to have a significant impact on a matter of national environmental significance. Further information on these matters can be obtained from www.environment.gov.au.

(f) Cultural Heritage

In carrying out the activity the applicant must take all reasonable and practicable measures to ensure that no harm is done to Aboriginal cultural heritage (the "cultural heritage duty of care"). The applicant will comply with the cultural heritage duty of care if the applicant acts in accordance with gazetted cultural heritage duty of care guidelines. An assessment of the proposed activity against the duty of care guidelines will determine whether or to what extent Aboriginal cultural heritage may be harmed by the activity. Further information on cultural heritage, together with a copy of the duty of care guidelines and cultural heritage search forms, may be obtained from www.datsip.qld.gov.au.

(E) RELEVANT PERIOD

When approval lapses if development not started (Planning Act 2016 s.85)

- Material Change of Use – six (6) years (starting the day the approval takes effect);

(F) OTHER NECESSARY DEVELOPMENT PERMITS AND/OR COMPLIANCE PERMITS

- Development Permit for Building Work
- Development Permit for Operational Work – filling or excavation of more than 50m³
- Compliance Permit for Plumbing and Drainage Work

(G) OTHER APPROVALS REQUIRED FROM COUNCIL

- Access approval arising from condition number 4.1 (Please contact Planning Section to obtain application form and applicable fee)

28/06/20

Equine Management Plan v3.2

2 EMERALD HEIGHTS ROAD, MAREEBA

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1 Introduction

1.1 BACKGROUND

This report presents an Equine Management Plan (EMP) for 2 Emerald Heights Road Mareeba.

The purpose of this report is to support the planning application for the development of this site as a small thoroughbred horse racing facility.

A maximum of 10 horses will be housed in stables around which day-to-day operations will operate. Horses will have access to outdoor yards from their shelters. The horses will be transported from the property to the Mareeba Turf club for most of their training but be cared for and limited exercised here on site.

The aim of the development is to house up to 10 race horses that will be trained at the Mareeba track. We spell (rest) our horses in between racing schedules at a different location. Two horses, retired race horses we keep as pets, will have their own area.

1.2 SITE LOCATION

2 Emerald Heights Road is in the rural residential area of the Mareeba Shire Council, approximately 5 km outside side of Mareeba Township. It is located on a dead-end road with Cobra Creek running at the back of the property. A site location plan is included at Appendix 12.1

The surrounding properties are used for semi-rural pursuits such as orchards, equine activities and cattle farming.

1.3 PRE-EXISTING FEATURES OF THE PROPERTY PRIOR TO PURCHASE

Before we purchased the 9.6 acre property in March, 2018, there were already certain features in place. These included:

- Stormwater easement on the southeastern boundary.
- The House
- A swimming pool, fenced
- .05 hectares of irrigated gardens and 2 acres pony paddocks
- Two water tank
- The round yard
- The sand arena
- Washed out eroded areas due to water runoff from the neighbours on the northern property line.
- A driveway with power infrastructure access for Ergon
- A road to the western end of the property that provides access for firefighting purposes
- Barbed-wire fencing on both sides of the property

1.4 PURPOSE OF EMP

The Equine Management Plan describes how the property and horses will be managed appropriately. Appropriate management of the property will lead to better quality pastures, low level of weeds, as well as maintenance of watercourses and vegetated areas .In addition, Equine management plans reduce/negate environmental impact and support happier, healthier horses.

2 Environmental Features

2.1 TOPOGRAPHY

The site is located on a gentle downward slope. There is a flat area in the middle of the property that is drier and less prone to waterlogging. There is easement running along the eastern boundary for stormwater purposes. A natural drainage line runs along the northern side of the property starting approximately half- way down from the top, or roadside, of the property which also drains the next door neighbour's run off during the wet season. Before the property flattens there is an easement drainage line which directs the water from the top of the property into easement drainage channel.

2.2 HYDROLOGY

There are no other dams or groundwater bores on the property.

2.3 VEGETATION

A majority of the site is cleared of native vegetation, which is probably a result of historical clearing for agricultural use. It's possible that the broader area was once part of a larger farm which has since been divided into smaller lots many years ago.

The very back of the property, approximately 1 ½ acres, is in a flood zone of Cobra Creek (and most likely the historic reason why these areas were not cleared for pasture). The vegetation associated with the waterlogged area includes:

Corymbia calophylla (Marri)

E. marginata (Jarrah) sp.

E. rudis (Flooded Gum) (wet areas)

M. raphiophylla (Paperbark) (wet areas)

C. cunninghamiana (She Oak) wet and dry areas

There is a small amount of natural degradation along the banks of Cobra Creek from years of flooding, kangaroo movement and escaped cattle from neighbouring properties.

2.4 SOIL

The soil on the property is mostly free draining sandy loam. There are areas of sandy loam on clay substrate which hold water for longer periods of time.

3 Noise Management Plan

3.1 INTRODUCTION:

We have identified the following activities where noise control is to be mitigated and the control measures we will take are listed in section 3.2.

3.2 NOISE IDENTIFICATION AND CONTROL

- **Horse Float loading and unloading:**
 - Loading and unloading of horse floats must not occur before 7:00am nor after 8:00pm on any day. Loading and unloading must only take place in the area adjacent to the stables, so as to provide appropriate separation between the activity and adjoining residences.
- **Exercising in round yard or arena:**

There is very little noise associated with exercising a horse except the horse's breathing. The use of fences and native vegetation reduce noise. That is why we have installed fence lines on both sides of the property and planted native trees and shrubs. Trees will be planted around the stables as well to form a sound barrier hedge amongst other benefits mentioned earlier.
- **Shod Horse hoof noise:**

The use of crusher dust and diamond grid as a permeable base on all pathways to and around stables, yards, arena and horse pool will be put down to muffle the sound of shod horse hooves and prevent ground disturbance.
- **Horse Exercise Pool:**

There is no noise associated with the horse pool. Horses walk in, swim and walk out on a lead rope. They do not jump or splash.

4 Manure and Fly Management Plan

4.1 MANURE MANAGEMENT

1. Horse manure in yards and paddocks will be picked up twice daily and bagged, as is our current practice.
2. Bedding will be cleaned and wet bedding bagged twice daily.
3. All bedding and manure bags are to be removed from site, not composted or used as mulch.
4. Any manure that is produced whilst a horse is outside of its yard (e.g. tie up stalls, arena, round yard, in floats, walkways or wash bays) will be picked up and bagged immediately.
5. All bagged manure and bedding is to be placed on a tarp and covered by the tarp to prevent fly breeding and nutrient run off until it is transported off site in the morning and at the end of the day to:
 - the local farmer as mulch (bedding bags)
 - the Mareeba race track area designated for public pick - up of bagged manure
 - the green waste/composting material area at the refuse tip

4.2 FLY MANAGEMENT

Insect pests thrive in moist manure and warm weather. The stable fly (*Stomoxys calcitrans*) is the biggest concern. They are blood-sucking insects that feed on all short haired mammals, including humans and horses.

The breeding cycle of flies is very fast in warm, moist conditions. To prevent significant problems, their breeding cycle will be interrupted as soon as possible. Appropriate management of manure will greatly assist in the management of fly problems. In addition to this, the following actions will minimise the potential for fly breeding to occur:

- Refer to section 4.1.
- The use of animal manures or bedding as a surface dressing will not be allowed on site.
- ENVIROSAFE Fly Attractant hanging fly traps will be mounted on 3 foot posts around the outside of the stable yards to mitigate the amount of flies that enter the stables. This method has been highly successful in reducing stable fly numbers. These fly traps are safe for pets, birds, amphibians, reptiles and mammals. They will be cleaned and reset according to fly numbers and manufacture's recommendations.

5 Dust Management Plan

5.1 INTRODUCTION

It is important to ensure that dust generated as a result of activities on site is minimized and does not leave the property boundaries and affect adjoining landowners.

Dust Generation Risk

The risk of generating dust varies across the property because it depends on the soil type, the level of intensity of land use and the activities that will be carried out in different areas.

The soil type over a majority of the site is predominantly sandy loam, or sandy loam above a clay substrate below one metre in some areas.

- These areas will be kept with at least 70% ground cover to reduce the risk of dust generation across the property.
- The Stable area and walk out yards on the site, where the most intensive land use activities will take place, consists of pale deep sands which have a higher risk of dust generation. This area is expected to have a lot of hoof traffic which can increase the amount of soil disturbance and dust generation. Management plans to suppress dust are provided 5.2.

5.2 DUST CONTROL MEASURES

- We will maintain approximately 2 feet of washed river sand into the arena and round yard areas, which were only dirt when we purchased the property, to stop any dust. Tyres will be kept in place around the perimeter of these areas to stop sand washing away into the stormwater drain during the wet season.
Newly erected fencing stops the tyres from moving.
- The northern side of the property has already had a 135-meter-long colour bond fence erected. The southern side of the property has also had a colour bond fence erected just along the sand arena (approximately 70 meters) to reduce the impact of winds that generate dust by lifting dry soil.
- Particularly, but not exclusively, in dry seasons, tracks, paths, the round yard, arena, and walk-out yards will be sprayed with water in the morning to prevent dust generation. Additional spraying with water will also be

undertaken on an as needs basis at any time visible dust plumes can be seen on site during the day. An increased water supply for this purpose will be allocated.

- 470 native trees and shrubs have already been planted along both property lines to mitigate wind and dust. A further 80 native trees and shrubs will surround the stable/yards (on order for March 2020 from Yaruga nursery)
- Road access to the stable will be crusher dust, diamond mesh and pebbles/gravel to prevent dust but allow a permeable substrate for stormwater to seep into the ground instead of becoming run off.
- The road and paths will have a cover of gravel to eliminate dust which leaves only the round yard and the arena. The round yard and arena can be watered for using a fine spray that saves water. We are also investigating a new product made from soybean oil for dust suppression that permanently eliminates the use of water, is completely salt free, so environmentally safe, and eliminates dust with only one application a season. Subject to the councils satisfaction this will be used if found to be viable.
- A minimum of **70% groundcover in paddocks and stable yards** will be retained at all times. Diamond mesh will be laid down in the yards and grass grown over the top. This will prevent horses from being able to dig up ground cover.
- If there are any areas generating dust, such as tracks, they will be watered until a preventive alternative is put into place.
- Surface areas around the stables, yards and exercise areas will be hard-wearing materials (such as perforated rubber matting, diamond grid mesh, rock pebble) to reduce the amount of dust but be permeable to allow stormwater seepage into the ground. The source of this water will be from the four rainwater tanks off the stable roof.

6 Odour Management Plan

It is important to control all sources of odour not only for the sake of surrounding property owners, but for the health and well being of the horses and people who live and work here with them.

6.1 BEDDING

1. Sawdust and pine shavings will be used as bedding, which smells good and reduces dust.
2. Wet areas of stable bedding (from urine, manure or water buckets) will be removed twice daily. Lime will be spread over the wet area once it is removed to help absorb remaining moisture and to neutralize any remaining ammonia, then topped up with fresh bedding.
3. Bedding will be cleaned twice daily, wet bedding bagged and distributed to local farms who have requested it to use as mulch, as is our current practice.

6.2 HORSE MANURE

4. Refer to section 4.1

5. We considered composting but believe we are ensuring best practice policy by removing manure/bedding from site. No composting of manure will occur on site. No manure will be applied to gardens.
6. We will plant native trees and shrubs around the stables to aid in odour, wind, dust and noise control.

6.3 WASH BAY

The wash bay must be used no later than 4 pm to allow drying time before dark. After rinsing the horse, any water left on the floor must be swept out into the spill drain to prevent algae and odour.

7 Water Management

2 Emerald Heights Road falls within an area that does not receive town water.

7.1 WATER SOURCE AND HOLDING CAPACITY

Section 96 of the Water Act 2000 allows owners whose land adjoins a water source (spring, lake, watercourse)

to take water for stock and domestic purposes: Riparian rights **2 meg per year**

Sunwater water allocation metered works: 6 meg per year

In addition to sourcing water from Cobra Creek, there are currently two rain tanks off the house

One 5,000 litre tank

One 20,000 litre tank

Furthermore, there will be 3 new 47,000lt tanks installed to catch water off the stable roof.

Rain tanks alone will provide 141,000lt of holding capacity during the wet season

Holding ponds 500,000lt

See appendix 12.2 report of water requirements prepared by iCE international and Soiltest.biz

7.2 WASTEWATER:

Contaminated wastewater, such as wash-down water can contain hair, urine, sweat, manure, dirt, bedding, straw and sand. It will therefore be contained and managed in order to avoid runoff onto surface or into groundwater to prevent contamination.

Even though there may be a maximum of 10 horses in the stable, not every horse will be exercised on the property every day. Horses being taken to the Mareeba track twice daily will not be worked, or rinsed, on site. No horses are worked on Sundays or on bad weather days. Race horses are hosed at the track or at the races before returning to site. No products (such as shampoos or cleaning products) will be used when hosing horses on site. Water from wash down use will be fed into a 4000lt septic tank and land application area using an Advanced Enviro Septic pipes and sand bed.

See appendix 12.2

7.3 STORMWATER

There are three main stormwater runoff areas:

1. Water coming off the Emerald Heights Road down our asphalt driveway
2. Water coming off Emerald Heights Road that goes directly into the easement down to Cobra Creek
3. Water runoff from our neighbour's property on our northern boundary

Control Measures we have taken already:

- We have created swales in the garden and current day yards on the northern side of the property to slow the stormwater coming from the neighbour's property in order to slow down the torrent, retain some water to soak into the ground, and directed all excess stormwater flow into the natural gully that begins about 30 meters from the end of the fence line, where the natural gullies take the stormwater to the creek.
- We have dug a ditch, put in socked perforated PVC pipe along the length of the fence line and covered the ditch. This has stopped water flowing from the neighbor's property across our yard and directs the water to the easement at the end of the fenceline.
- We have diverted stormwater leading directly to the house that comes off the asphalt driveway by putting in a cement channel (swale) that leads the water away from the house and into the garden.
- We make sure the southern easement is clear of debris, mown or whipper snipped and fenced off from the horses to prevent any access.

Control measure we will take:

- We will use gutters and downpipes on the stable roof to divert rainfall away from stable areas and collect water from rooftops directly into rainwater tanks
- Holding ponds to have bund surrounding them to stop surface water spilling into and contaminating the ponds
- We will monitor and review all control measures to plan for further implementations.

8 PASTURE MANAGEMENT

Two ponies, our pets, will be in an acre paddock located beyond the stables. They will not be entirely reliant on pasture for feed. We currently give them hay (for dry roughage) and cool pellets in addition to their ability to graze pasture grass.

Race horses will not be in paddocks. They have their exercise yards with diamond grid, but we will manage their yards to maintain at least a 70% ground cover.

8.1 PASTURE MAINTENANCE

Paddock pasture will be maintained using the following controls:

- Grazing will not exceed 4 inch level at any time during the growing season. This allows a speedier paddock rest rotation, decreases parasite load, increases forage quantity and greatly increases quality.
- At the end of growing season, when seed is developing, grazing will stop to allow seed generation and maturation. Ponies will be limited to their day yards and exercised in the arena or taken for rides off site until seed dispersal is complete. They will be supplementary fed only.

8.2 EROSION CONTROL

PONY Paddock:

- The paddock will be divided into four quarter-acre blocks for rotational grazing. This allows us to mow, weed, feed (fertilise pasture if needed) and rest a block while they graze the other. This prevents bald areas, compaction and reduces the risk of erosion.
- A minimum of 70% ground cover will be maintained.
- A holding area, or yard, will be located in each paddock and treated in the same manner as the racehorse day yards off their stable. This is to ensure we can limit grazing time on each half-acre block to maintain a 70% or better ground cover, prevent "standing" ponies in a paddock that cause compaction and bare spots, provide inclement weather protection, provide an out of weather area for their supplemental feed, provide a nighttime safe enclosure and allow us a space to contain the ponies when we want to saddle them.
- Paddocks will be vegetated around the perimeter to provide windbreak to reduce the risk of erosion by wind.

Racehorse Day Yards:

- Racehorse day yards will have a diamond grid mesh below grass to provide room to stretch their legs, and nibble a bit on the grass but not have direct hoof contact to the ground. This will ensure no bare spots and maintain ground cover requirements. See appendix 12.6
- Weekly: Weeds will be controlled using hand removal in paddocks in which they are grazing, or chemically and manually controlled in paddock areas not being grazed.
- Horses will not be in day yards when raining.
- Racehorse day yards: Time in day yards will be limited to prevent overuse of the yard.
- Weeds in day yards will be hand removed on a weekly basis.
- Day yards and paddocks will not be watered during the wet season.
- Day yards and paddocks will only be watered in the dry season if soil moisture probes show a drop to 30% soil moisture.

8.3 STOCKING RATES

Stocking rates are not a concern in terms of the racehorses on site. The racehorses have day yards, not paddocks. Not every stable and yard will be occupied all the time, as some horses are sent for spelling, up to 8 weeks, which allows the day yards to rest, recover and improve. Some racehorses are only on site for a few days or a few weeks.

The ponies, only 2 of them, are easily managed using rotation grazing. In addition, during the racing season when we have less time for them, the ponies will be spelled off site. This not only gives them a change of scenery but allows the paddock to rest, recover and be improved. At no time will the number of racehorses housed in the stables exceed 10. This excludes the 2 retired horses kept as pets.

8.4 REVEGETATION:

- We have already begun planting local native species 2 metres in from eroding property edges to help mitigate further erosion caused by stormwater and flooding.
- We will undertake to clean out around Cobra Creek, removing garbage that has washed down and lodged itself along the banks, removing invasive weeds and planting (if necessary) to minimise damage and erosion caused by flooding events.
- 470 native trees and shrubs have already been planted along both property lines to mitigate wind, dust and erosion. A further 80 native trees and shrubs will surround the stable/yards (on order for March 2020 from Yaruga nursery).
- We are purposely choosing local native species because they are the best adapted to our soils, conditions and climate while providing habitat for fauna, shade, which increases soil moisture levels and for general aesthetics.

9 ENVIRONMENTAL MANAGEMENT

9.1 BEST PRACTICE ENVIRONMENTAL

Best practice environmental management aims to protect and enhance existing habitats for native plants and animals. Existing environmental features on site which require management include the protection of the drainage line and associated wet areas and existing vegetation. The Equine Management Plan also provides details on the revegetation proposed as part of the development. See section 8.4 and 9.4

Refer to section 4.1 addresses manure management.

9.2 PROTECTION OF WATER COURSE AND WET AREAS

- We will undertake to clean out around Cobra Creek, removing garbage that has washed down and lodged itself along the banks, removing invasive weeds and planting (if necessary) to minimise damage and erosion caused by flooding events.
- We have removed all barbed wire fencing running anywhere across the property. This will aid in the prevention of garbage or other material from getting stuck in the fencing and blocking water flow. This also allows free movement of kangaroos across our property without the risk of injury. The only barbed wire fencing still in place is the boundary fence to the neighbours on the northern boundary.
- The design and layout of the developemtn has taken into account measures to control stormwater and avoid the risk of contamination of runoff or significantly increasing runoff from the site. The measures incorporated into the design, together with those set out in this management plan, are likely to result in a net improvement in water quality for runoff departing the site.
- We will keep easements free and clear of rubbish.
- Refer to section 4.1 manure management
- We will not use any chemical applications of any sort that are a detrimental to waterways, fish, frogs, birds, or any other animal on site. Chemical leaks pose serious contamination risks to surface and groundwater. Storage and handling of any chemicals will be kept in a vented, concrete floored chemical shed with a spill channel to prevent any chemical seepage from coming into contact with the ground. A spill kit will be provided in the chemical shed

for immediate use of serious or incidental spillage.

9.3 VEGETATION BUFFER

- 470 native trees and shrubs have already been planted along both property lines to mitigate wind, dust, noise, odour and erosion. A further 120 native trees now surround the horse and stable area.
- Future plantings include: Increased planting around the pony paddock using the species already on site but allowing emergency vehicles room to get in and out of the area should that be necessary.
- Adding a second, possibly third line of planting along eroded property edges in a few years' time once we can see what effect the single row provides in mitigating erosion.

9.4 REVEGETATION

- We are purposely choosing local native species because they are the best adapted to our soils, conditions and climate while providing habitat for fauna, shade, which increases soil moisture levels and for general aesthetics.
- There are approximately 1 1/2 acres of flood zone along Cobra Creek leading up to the pony paddock. This vegetation buffer has been left untouched since we purchased the property. Our plans include enhancing the vegetation buffer by planting more of the same species there:

Corymbia calophylla (Marri)

E. marginata (Jarrah) sp.

E. rudis (Flooded Gum) (wet areas)

M. raphiophylla (Paperbark) (wet areas)

C. cunninghamiana (She Oak) wet and dry area

9.5 NUTRIENT MANAGEMENT

- Refer to section 4.1 manure management
- We will minimise the amount of fertiliser brought into the property and introduce legumes such a clover into paddocks to increase nutrient levels in the soil.
- The stables will be constructed on sandy soil (pale deep sand) which increases the risk that contaminants and nutrients will leach through the soil to groundwater. We will ensure floors and washdown areas are constructed with sealed, water-resistant concrete. This will prevent nutrients in the leachate from manure, urine and bedding from reaching the groundwater.
- Land slope of stable/yards site: The topography of the site is very flat and with only a change in 2 metres AHD across the entire property. The stables and yards are located on very flat land with a slope of less than 1 in 10. This will reduce the amount of excessive runoff and water erosion risks.

9.6 FIREFIGHTING REQUIREMENTS

- The holding pond on the property is available for firefighting and in conjunction with the right to pump from the creek for firefighting purposes.
- We will ensure clear passage from top to bottom of our property to ensure ease of access by firefighting authorities. No buildings or facilities are to impinge access to the back of the property and must allow access large/wide enough for firefighting or other emergency vehicles to get in and out.

10 STABLE DESIGN

10.1 LOCATION

The site location of the stables, yards and intensive work areas has been selected carefully and designed to avoid environmental and neighbourhood problems. This process has taken into consideration odour control, noise, rodent, manure and fly management, dust and water runoff.

The proposed stables will be located at the northern end of the site opposite the existing arena. This is also an area with the greatest distance above the groundwater table. There are some existing trees which will be supplemented by more vegetation planting. The sandy loam soils at the northern end of the property are more conducive to the more intense land use the horse area requires than the semi-wet soils at the southern end.

The stables will be constructed on sandy soil (pale deep sand) which increases the risk that contaminants and nutrients will leach through the soil to groundwater. This is the reason we will construct the floors and washdown areas using water-resistant sealed concrete. This will reduce the amount of nutrients in the leachate from manure, urine and bedding reaching the groundwater.

10.2 BEDDING

Stable bedding will be a mix of sawdust and pine shavings (Refer to Section 6.1 Odour Management).

10.3 WASHING OF HORSES

Horses will be washed in the wash down area attached to the proposed stables. The details relating to the shed layout are included in the appendix 12.1. The washdown area will have a concrete floor with a drain. Refer to Section 7.2 Wastewater management and see appendix 12.2

10.4 FEED

The horses will be hand fed and will not rely on pasture for food. Our horse food is custom made by TGT Mareeba in 3T lots and held on the TGT site. It is transported by car/ute on an as needed basis (once a week) and stored in the stable feed room area.

The stable feed room will be a contained, lockable room 4m x 3m with a concrete floor and according to the rules and regulations of Racing Australia (Refer to section 9.5 Nutrient Management).

10.5 RODENT CONTROL

Food storage areas attract rodents and other pests due to the availability of food because they provide good breeding and nesting areas. They spoil the feed, carry diseases and damage storage areas. Rats and mice will be controlled by ensuring that food is stored appropriately and wastes cleaned immediately.

Management control actions will include:

- Keeping all feed in a dry, sealed environment
- Ensuring that food storage areas are not surrounded by weeds or plants where rodents can hide. Remove food that is not going to be eaten immediately
- Eliminating potential rodent nesting sites
- Covering all food storage containers and waste containers
- Using live traps or snap traps to avoid poisoning our own cats and dogs in the case where rodent faeces are sited.

10.6 POWER

Power supply to the stables to operate lights, fans and pumps will be solar. It will be a 6.6kw solar system with 24 x 275w tier1 mono perc Suntech panels roof mounted, a 5kw high efficiency and a WiFi enabled converter.

11 DISEASE PREVENTION

11.1 DISEASE PREVENTION

The horses will be checked daily for signs of ill health and injury, and to ensure they are eating and drinking.

In addition, we will:

- Refer to section 4.1 manure management
- Control vermin and insects
- Ensure tack and equipment are kept clean
- Keep vaccination and worming protocols and records
- Worm any new horses before entering the property
- Make sure new horses are up to date with their vaccinations before entering property

11.2 HUMANE KILLING & EUTHANASIA

Where an animal has become so sick, diseased or injured that recovery is unlikely or undesirable on humane grounds, euthanasia must be arranged with a local Veterinarian. The Veterinarian will dispose of the body according to rules and regulations. QLD Racing must be notified asap.

12 APPENDIX

12.1 PROPOSED DEVELOPMENT/SITE LOCATION MAP

12.2 WASTE WATER / ENVIRO SEPTIC

12.3 EVAP SS



12.4 STORMWATER

12.5 SHED PLANS

12.6 DIMOND GRID SPECIFICATIONS

12.1 Proposed development site location map



 ADVANCED ENVIRO-SEPTIC™ <i>"Always The First Option"</i>			
Leader in Passive Solutions			
Site Address	2 EMERALD CREEK ROAD, MAREEBA	State	QLD
Client Name	STEFANIE & GARETH HORNER	Post Code	4880
Designers Name	PETER LENNOX	Designers Ph Number	0429 630 442
Plumber Name		Plumber Ph Number	
Council Area	MAREEBA SHIRE	Designers AES Cert Number	768
		Date	22/6/20
This Calculator is a guide only, receiving soil classification, surface water, water tables and all other site constraints addressed by the qualified designer.			
System Designers site and soil calculation data entry		IMPORTANT NOTES	
Enter AES L/m loading rate, "30" for ADV Secondary or "38" Secondary	30	>> This design is for an ADVANCED SECONDARY system	
Is this a new installation Y or N	Y	>> Minimum single vent size is 80mm or 2 x 50mm house vents	
Number of person	1	a septic tank outlet filter is NOT RECOMMENDED	
Daily Design Flow Allowance Litre/Person/Day	1600		
Number of rows required to suit site constraints	2	>>The maximum length of a single AES pipe run is 30 meters	
Infiltration surface Soil Cat as est by site/soil evaluation. CATEGORY	4	>> Catagory may require design considerations. Ref AS1547	
Design Loading Rate based on site & soil evaluation DLR (mnv/day)	20	>> Soil conditioning may be necessary. Ref AS1547 & Comments.	
Bore log depth below system Basal area	600	>>Min depth below basal area 600mm check water table/restrictive lay	
Enter System footprint Slope in % for std AES systems to calc extension	0		
Is this design a gravity system with no outlet filter? Y or N	Y	>> A House Vent & LOW VENT required on this system	
PLEASE CHECK YOU HAVE FALL FROM TANK TO AES SYSTEM PIPES			
COMMENTS :- " The outcome must be important to everyone. "			
<ul style="list-style-type: none"> - Ripping of receiving surface required in clay soil structures in Cat 4,5,6. In addition refer to AS 1547. Always excavate & rip parallel to the site slope/AES pipe. - Specialist soils advice & special design techniques will be required for clay dominated soil having dispersive or shrink/swell behaviour. Refer AS1547 			
- Plumbers are reminded that good construction techniques as per AS1547 are especilly important in these soil types. Refer AS1547 & AES installation Instructions			
AES System Calculator Outcomes		AES dimensions	
Total System load - litres / day (Q).	1600 l/d	AES System	System Extension
Min Length of AES pipe rows to treat loading	26.7 lm	Lth m : (L)	27.6
Number of FULL AES Pipe lengths per row	9 lths	Width m:(W)	1.35
Total Capacity of AES System pipe in Litres	3816 ltr.	Sand Depth :	0.75
		Area m2	37.3
USE CUT LENGTHS OF PIPE IN THIS DESIGN? (ENTER Y)			
IF YOU WISH TO USE A TRENCH EXTENSION DESIGN OPTION ENTER "Y"		Enter Custom Width in metre.	
AES INFILTRATION FOOT PRINT AREA - $L = Q / (DLR \times W)$	Length	Width	Minimum AES foot print required .
for this Basic Serial design is	27.6	x 2.90	= 80.0 m2 total
Code	AES System Bill of Materials.		Chankar Environmental Use Only
AES-PIPE	AES 3 mtr Lths required	18 lths	
AESC	AESC Couplings required	16 ea	
AESO	AESO Offset adaptors	4 ea	
AESODV	AES Oxgen demand vent	1 ea	
AES-IPB	AES 100mm Inspection point base	2 ea	
AES Equ	AES Speed Flow Equaliser	ea	
AES DESC	Double Offset Adaptors	ea	
TOTAL SYSTEM SAND REQUIRED (Guide Only)		41 m3	
PLEASE email your AES CALC and Drawings to DESIGNREVIEW@ENVIRO-SEPTIC.COM.AU		Designreview@enviro-septic.com.au	
<p>> The AES Calculator is a design aid to allow checking of the AES components and configuration and is a guide only. Site and soil conditions referencing the AS 1547 standard are calculated and designed by a Qualified Designer.</p> <p>> Chankar Environmental has no responsibility for the soil evaluation, loading calculations or DLR entered by the designer for this calculator.</p> <p>> AES pipes can be cut to length on site. They are supplied in 3 meter lths only.</p>			
AES-Design-V8.8-Calculator © Copy Right - Chankar Environmental Pty Ltd 14/3/2016			

Soiltest.biz

SEPTIC COVER SHEET

DATE 22/06/2020

JOB No: 15848

SITE 2 EMERALD HEIGHTS ROAD MAREEBA MAREEBA

CITY MAREEBA

CLIENT **STEFANIE & GARETH HORNER**

ICET

TO STEFANIE & GARETH HORNER

FAX

NO.	
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REF.	INFORMATION OR DETAILS OR DRAWINGS
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AM.

DATE _____

NO.

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AES DESIGN CERTIFICATE
WASTE WATER REQUIREMENTS
WASTE WATER MANAGEMENT MANUALS
(8PAGES EACH)
CONDITIONS OF PERMIT FORM
DESIGN CERTIFICATE
VIRAL DIE OFF CALCULATION
INSTALLERS COMPLIANCE CERTIFICATE

3

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01 SEPTIC LAYOUT & SITE PLAN

1

02	SEPTIC DETAILS
----	----------------

SEPTIC LAYOUT PLAN (AS CONSTRUCTED)



Soiltest.biz

APN 40 2781 204 450

29 Shields St.

P.O. Box 5992

Coins OLD

4870 Australia

Ph +61 7 4051 4424

Fax: +61 7 4031 1998

test@soiltest.biz

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M:\Data\Shared\Excel\SEPTIC\SOIseptic.xls



Advanced Enviro-septic Design Calculator V8.8 ©

Leader in Passive Solutions

Site Address	2 EMERALD CREEK ROAD, MAREEBA	State	QLD	Post Code	4880
Client Name	STEFANIE & GARETH HORNER	Date of Site Visit	18/6/20		
Designers Name	PETER LENNOX	Designers Ph Number	0429 630 442	Designers Lic Number	18267
Plumber		Plumber Ph Number		Plumb / Drainer Lic Number	
Council Area	MAREEBA SHIRE	Designers AES Cert Number	768	Date	22/6/20

This Calculator is a guide only, receiving soil classification, surface water, water tables and all other site constraints addressed by the qualified designer.


System Designers site and soil calculation data entry		IMPORTANT NOTES	
Enter AES L/m loading rate, "30" for ADV Secondary or "38" Secondary	30	>>	This design is for an ADVANCED SECONDARY system
Is this a new installation Y or N	Y	>>	Minimum single vent size is 80mm or 2 x 50mm house vents
Number of person	1		a septic tank outlet filter is NOT RECOMMENDED
Daily Design Flow Allowance Litre/Person/Day	1600		
Number of rows required to suit site constraints	2	>>	The maximum length of a single AES pipe run is 30 meters
Infiltration surface Soil Cat as est by site/soil evaluation, CATEGORY	4	>>	Category may require design considerations. Ref AS1547
Design Loading Rate based on site & soil evaluation DLR (mm/day)	20	>>	Soil conditioning may be necessary. Ref AS1547 & Comments.
Bore log depth below system Base area	600	>>	Min depth below base area 600mm check water table/restrictive layer
Enter System footprint Slope in % for std AES systems to calc extension	0		
Is this design a gravity system with no outlet filter? Y or N	Y	>>	A House Vent & LOW VENT required on this system
PLEASE CHECK YOU HAVE FALL FROM TANK TO AES SYSTEM PIPES			

COMMENTS :- "The outcome must be important to everyone."

- Ripping of receiving surface required in clay soil structures in Cat 4,5,6. In addition refer to AS 1547. Always excavate & rip parallel to the site slope/AES pipe.
- Specialist soils advice & special design techniques will be required for clay dominated soil having dispersive or shrink/swell behaviour. Refer AS1547

- Plumbers are reminded that good construction techniques as per AS1547 are especially important in these soil types. Refer AS1547 & AES Installation Instructions

AES System Calculated Parameters			AES Dimensions	
Total System load - litres / day (Q).	1600	l/d	AES System	System Extension
Min Length of AES pipe rows to treat loading	26.7	m	Lth m : (L)	27.6
Number of FULL AES Pipe lengths per row	9	lths	Width m:(W)	1.35
Total Capacity of AES System pipe in Litres	3816	litr.	Sand Depth :	0.15
			Area m2	37.3
				42.7
USE CUT LENGTHS OF PIPE IN THIS DESIGN? (ENTER Y)				
IF YOU WISH TO USE A TRENCH EXTENSION DESIGN OPTION ENTER "Y"			Enter Custom Width in metre	
AES INFILTRATION FOOT PRINT AREA - $L = Q / (DLR \times W)$			Minimum AES foot print required.	
for this Basic Serial design is			Length	Width
			27.6	2.90
			= 80.0 m2 total	

AES System Bill of Materials			Chankar Environmental Use Only	
AES-PIPE	AES 3 mtr Lths required	18 lths	 Digitally signed by Kane Dickson DN: cn=Kane Dickson, o=Chankar Environmental, ou=Design Review, email=designreview@enviro-septic.com.au, c=AU Date: 2020.06.24 07:46:00 +10'00' Designreview@enviro-septic.com.au	
AESC	AESC Couplings required	16 ea		
AESO	AESO Offset adaptors	4 ea		
AESODV	AES Oxygen demand vent	1 ea		
AES-IPB	AES 100mm Inspection point base	2 ea		
AES Equ	AES Speed Flow Equaliser	ea		
AES DESC	Double Offset Adaptors	ea		
TOTAL SYSTEM SAND REQUIRED (Guide Only)			41	m3
PLEASE email your AES CALC and Drawings to DESIGNREVIEW@ENVIRO-SEPTIC.COM.AU				

The AES Calculator is a design aid to allow checking of the AES components and configuration and is a guide only. Site and soil conditions referencing the AS 1547 standard are calculated and designed in a Qualified Designer.

Chankar Environmental has no responsibility for the soil evaluation, loading calculations or DLR entered by the designer for this calculator.

AES pipes can be cut to length on site. They are supplied in 3 meter lths only.

Soiltest.biz

WASTE WATER TREATMENT REQUIREMENTS IN AREAS WITHOUT SEWERAGE TREATMENT FACILITIES

DATE: 22/06/2020
JOB NO: 15848
SITE: 2 EMERALD HEIGHTS ROAD MAREEBA MAREEBA

OWNER'S NAME: STEFANIE HORNER
ADDRESS: PO BOX 5992 CAIRNS QLD

CLIENT: STEFANIE & GARETH HORNER
LOCAL GOVERNMENT AREA: MAREEBA

REAL PROPERTY DESCRIPTION:

LOT NO.	R.P. NO.	ASSESSMENT NO.	PARISH	COUNTY	

Area / length of trench

See Drawings

Soil Classification

No of bedrooms

No. of persons facility is designed for

Wastewater flow allowance

Total design flow allowance

4
N/A
N/A
N/A
1600

persons
litres/person/day
litres/day

Recommended facility type (a):

absorption trenches	
absorption beds	
evapo-transpiration-absorption systems	X
mounds	
irrigation systems	

STATEMENT

The attached report and evaluation was performed for and on behalf of Soiltest.biz and in accordance with the "Queensland plumbing and wastewater code"



Authorised Signature:

M:\Data\Shared\Excel\SEPTIC\SOIseptic.xls
I:\DWG\15600-15848\15848\20200622.xls

SITE EVALUATION

Type of Effluent:	Primary	Secondary	Advanced Secondary	X
Embankments:	NO	Slope:	1.5 DEG	Ground Cover:
				GRASS

Drainage Patterns:	waxing divergent	linear divergent	waning divergent
	waxing planar	linear planar	waning planar
	waxing convergent	linear convergent	waning convergent

Standards of trees, shrubs:	FEW			
Site History (land use):	FARMING			
Bore - potable- Drinking water:	Yes	No	X	
Bore - potable-distance to trench area:	> 50m	N/A	> 30m	N/A
Bore - non potable:	Yes	No	X	
Bore-non potable-distance to trench area:	> 15m	N/A	> 6m	N/A
Watercourses distance to trench area:	> 50m	> 10m	X	
Residence distance to trench area:	> higher 4m	> lower 2m	X	
Swimming pool distance to trench area:	> 6 m	N/A	X	
Boundary distance to trench area:	High Neighbour > 2m	Low Neighbour > 4m	X	
Flood return period 1:50 level checked:	Yes	No	X	

Type of treatment facility:	Septic Tank All Purpose	X	
	Tank size	3000 litre	4000 litre
	Sewerage Treatment Plant -	Secondary	Advanced
			X
Separation of Grey water from sewerage	Yes	No	X
Use of grease trap recommended	Yes	No	X
Sand Filter	Type		
Reserve area located (see site plan):	Yes	X	No

Ground cover requirements: See Attached - "Suitable Vegetation for Wet Soils..." AS1547-1994

Soil Type (from soil maps etc.):

Climate:	Annual Rainfall:	MAREEBA	Mean BOM values
	Annual Potential Evapotranspiration:	MAREEBA	Mean BOM values
	Annual Mean Evaporation Rate:	MAREEBA	Mean BOM values mm/day

General Comment: (rainfall intensities, seasonal variation etc.)

Intended Water Supply Source	Public supply	Rainwater collection	X
	Dam	Bore/well	
	Other		

Environmental Concerns:	(eg. Native plants intolerant of phosphorous load, high water table, swamp, waterways, etc.)
NO	

Site Stability	Is expert evaluation necessary?	YES	NO
	If NO, why not?	Flat	X
	If YES, attach stability report and give details here of:		Stable Site
	Author:		X
	Company/ Agency:		
	Date of Report:		

Drainage Controls	Depth of permanent water table: >1.5m	Winter mm	Summer mm
	NOT FOUND AT EX DEPTH	X	
Need for ground water cut-off drains? See drawings	YES	NO	X
Need for surface water collector/ cut-off drains? See drawings	YES	X	NO

SUBSOIL INVESTIGATION

Soil Profile Determination

Method:

Falling Water Test	
Pit	
Permeameter	X
Other (specify):	

Estimated Soil Category:

Soil Category

1
2
3
4
5
6

Description	Tick
Gravels and sands	
Sandy Loams	
Loams	
Clay loams	4
Light clays	
Medium to heavy clays	

Reason for placing in stated soil category: Visual and Texture test, percolation

(DIR) recommendation:

(DLR) recommendation

Secondary	N/A
Primary	N/A
Secondary	20

GENERAL COMMENTS

Need for Groundwater Quality Protection:

YES ☐

NO ☒

Evaluator's preliminary assessment of minimum Land Application Area for the site

(comprising absorption area, space between and surrounding the absorption area elements, setbacks and the reserve area).

Septic trench absorption:		See Drawings
Evapotranspiration:	X	See Drawings
Irrigation Field:		See Drawings
Mound:		See Drawings
Other		

Design Considerations

Any specific environmental constraints?

Any specific public health constraints?

Yes ☐

No ☒

Yes ☐

No ☒

Results of consultation with other interested parties (neighbours, environmental agencies, local environmental groups, etc.)

YES ☐

NO ☒

Other comments:

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DESIGN CERTIFICATE FOR ON SITE SEWERAGE FACILITIES

JOB NO. 15848
SITE 2 EMERALD HEIGHTS ROAD MAREEBA MAREEBA
DWG No. 01 & 02
DATE 22/06/2020
LOC GOV MAREEBA

We Soiltest.biz being designers of the on site sewerage system, do hereby certify that the Site & Soil Evaluation Procedures used to design the On-Site Sewerage Facility for the above property have been conducted in accordance with:

- 1) Plumbing and Drainage Act 2002
- 2) AS 1547-2000 On Site Domestic Waste Water Management
- 3) Any additional requirements of the Council as required by them at time of certification

1. We are familiar with the regulatory requirements for the site evaluation.
2. We accept professional responsibility for the interpretation of, and conclusions drawn from and recommendations made as a result of the site evaluation/report
3. The On-Site Sewerage Facility (as designed) is an appropriate facility for the allotment.

DESIGN CRITERIA

Maximum Number of bedrooms in house	N/A
Number of Equivalent Persons	N/A
Maximum designed daily flow for facility (Litres)	1600
Soil Category and/ or soil texture	4
Irrigation Design Irrigation Rate DIR	N/A
OR	
Design Loading Rate for trench/s & beds DLR (Primary)	N/A
(Secondary)	20

Soiltest.biz

ABN 49 290 204 480

29 Shields St.
P.O. Box 5992
Cairns, QLD
4870 Australia

Ph +61 7 4051 4424
Fax +61 7 4031 1998
test@soiltest.biz

Singapore, NZ, London

P. Lennox BSA 18267
Signed for SOIL TEST .BIZ

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LOCAL GOVERNMENT
AREA:

MAREEBA

COUNCIL CONDITIONS OF PERMIT FOR ON-SITE SEWERAGE FACILITIES

(To be completed by Owner at Application Stage)

WAPD

SITE ADDRESS 2 EMERALD HEIGHTS ROAD MAREEBA MAREEBA

RP/SP:

MAKE & MODEL NO. OF SEWERAGE TREATMENT FACILITY:

I/ We

being the owner/s of the above property do hereby confirm that:

i. I/We hold a **Maintenance Contract** for the servicing and maintenance of the above facility with a Council approved servicing agent and will continue to renew this contract as and when the existing contract expires;

ii. I/We have been issued with the **Operating and Maintenance Guidelines / Instructions** for the above facility;

iii. I/We realise that the Sewerage Treatment Facility and Disposal Area located at the above address has been designed to cater for a dwelling as follows:

Number of bedrooms in the house	N/A
Maximum daily flow for entire house(litres)	1600
Number of equivalent persons	N/A

iv. I/We have been made aware of any reduced flow fixtures/ facilities that must be installed (and maintained) as specified in the site evaluation report/ design.

v. I/We understand that contact with effluent can present serious health risks to frail and elderly persons, infants, persons with a history of chronic hepatitis, persons who are immunocompromised, persons with cystic fibrosis etc. I/We will take appropriate measures to restrict access to the disposal area by the above-mentioned people.

vi. I/We understand that as owner, I/we have the following obligations:

- All occupiers/ users of an on-site facility must be provided access to the manufacturers/ facility builder's operation and maintenance instructions,
- Operation and maintenance procedures are to be undertaken to a regular schedule in accordance with instructions. (On site facilities may fail if not operated and maintained correctly),
- Continuity of operation and maintenance is to be maintained throughout changes of ownership, occupancy or changes in use or development of the site,
- Paying to Council the relevant Annual Licence Fee as determined by Council (to cover the cost of maintaining records and randomly inspecting installations).

vii. Inspection reports are required to be provided to council every three (3) months unless a less frequent inspection regime is recommended in the Department of Natural Resources & Mines System Approval;

viii. All future pools, buildings, driveways, bores and the like will remain the required set back distance away from the effluent disposal area.

ix. I/We will ensure that any defective part of the on-site sewerage facility is repaired or replaced within 24 hours of written notice from Council that the facility is defective, or will have finalised any temporary arrangements to the satisfaction of the Senior Plumbing Inspector.

x. I/We understand that effluent must not come in contact with edible fruit & vegetables.

xi. I am aware that council may approve a request for dispensation (if required) for set-back distances that would allow an All-Purpose Septic Tank to be installed on this property.

Note: - If an All Purpose/ Septic Tank has been installed, Sections i), ii), vi) (d) & vii) above are not applicable

OWNER:

STEFANIE & GARETH HORNER

Owners Signature/s:

Date:

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(To be completed by the LICENCED INSTALLER of the on-site sewerage facility on completion of the installation)

**COMPLIANCE CERTIFICATE FOR
ON- SITE SEWERAGE FACILITIES
BY THE INSTALLER**

Date : 22/06/2020
JOB: 15848
SITE: 2 EMERALD HEIGHTS ROAD MAREEBA MAREEBA
OWNER: STEFANIE & GARETH HORNER

RP/SP:
PERMIT REFERENCE:
LOCAL GOVERNMENT AREA: MAREEBA

MAKE MODEL NO OF FACILITY:

I, as installing contractor certify and accept all responsibility, that the on site sewerage facility and land application area for the above property has been installed in accordance with the approved on site design and the requirements of the Plumbing and Drainage Act 2002, Queensland Plumbing and Wastewater Code and AS/NZS 1547:2000 and any additional requirements specified on the approval by the Council. The on-site sewerage facility / land application area has been installed by an appropriately qualified person in accordance with clause 3.5.6 of the AS/NZS 1547:2000 whose details are as follows

Qualified Installer Details:

Name:
Address:
Phone:
Fax:
Mobile:
Drainers licence No:
Plumbers licence No:
QBSA Licence No:

SIGNED:

NAME:

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EFFLUENT INFORMATION

4000 L SEPTIC TANK = 1600L PER DAY TREATMENT

WATER USAGE

HORSE WASH WATER = 7min X 10 X 2L/Min
(50 Kpa = 140 L PER DAY)
HORSE DRINKING = 50L / HORSE / DAY
= 500L PER DAY

TOTAL WATER USAGE

WASHING & DRINKING = 640L / DAY

ASSUME ALL IS USED AS EFFLUENT
THEREFORE 1600L / DAY FOR SEPTIC
TANK IS SUFFICIENT



INSPECTION POINTS
TO BE INSTALLED AT FURTHERST
POINT FROM INLET & ALSO IN THE
MIDDLE OF THE FIRST & SECOND
RUN OF AES PIPES

FINISH AES INSPECTION POINTS
LEVEL WITH GROUND

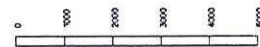
AES PIPES - 3m LENGTH
ADAPTORS @ EACH JUNCTION
END CAPS @ EACH END
INSTALLED TO MANUF. SPECS

CONSTRUCTION NOTES:

PROVIDE FALLS AS FOLLOWS:
LINES TO SEPTIC TANK = MIN 1:300
SEPTIC TANK TO PIPES = MIN 1:300

SETOUT NOTES

ALL DIMENSIONS & BEARINGS TO BE VERIFIED
ON SITE PRIOR TO ANY SETOUT AND CONSTRUCTION.
BUILDER TO ARRANGE FOR ANY MISSING BOUNDARY
PEGS TO BE REINSTATED. LOCATION OF UNITS &
SEPTIC SYSTEM ON SITE PLAN IS APPROX. ONLY.
BUILDER TO CONFIRM LOCATION ON SITE.
SOLTEST.BIZ TO BE NOTIFIED IMMEDIATELY OF ANY
DISCREPANCIES IN BOUNDARY DIMENSIONS & BEARINGS
OR SETOUT DIMENSIONS



SCALE

100 Dia. LOWER DRAINAGE PIPE
TO CREEK WITH VALVE

4000 LITRE
A/P SEPTIC
TANK

10m MIN TO CREEK

LOW VENT

PROVIDE CUT OFF
SLUCE VALVE FOR POND
TO TANK CONNECTION

SLUCE
VALVE

EXISTING
HORSE
TRAINING YARD

21m

100.25

100.50

100.75

101.00

101.25

EXIST. FENCE

101.50

EXIST. FENCE

DRAIN

PROPOSED STABLES

3 No. 47,000L
WATER TANKS

STORMWATER PIT
Approx. 600X600X600D
+ COLLECTION BASKET
& GALV. GRATED TOP

INSPECTION POINT

BUND
53m

Approx. 15m
(10m Min)

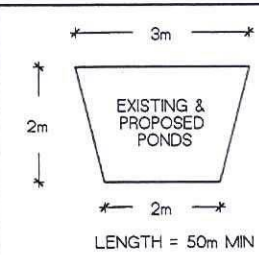
EXISTING POND
PROPOSED NEW POND
300mm HIGH BUND
300mm HIGH BUND

18m

3m

2m

3m



POND DETAIL

NTS

PONDS - EXISTING & NEW

2.5m WIDE (Average) X 50m LONG
X 2m AV DEPTH = 250m³ X 2
= 500 m³ = 500 000 LITRES

PROJECT:

STEFANIE & GARETH HORNER
#2 EMERALD CREEK ROAD
MAREEBA

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22 Templeton Street
Gardenvale QLD 4065
Australia
Ph: 0800 030 442
mob: 1 800 565 666

PI	KG	01
15848		
1:500	JUN2020	

WIND
CLASSIFICATION C2

27

TABLE 1

CERTIFIED DESIGN		
TREATMENT SYSTEM	ADVANCED ENVIRO-SEPTIC	
EFFLUENT TYPE	ADVANCED SECONDARY	
DISPOSAL TYPE	EVAPOTRANSPIRATION	
BED WIDTH M	BED LENGTH M	
2.90	27.60	

TABLE 2

DESIGN ASSUMPTIONS	
BEDROOMS	N/A
PERSONS	N/A
TOTAL DAILY FLOW	1600 LITRES
SOIL CATEGORY	4

TABLE 3

HORIZONTAL SEPARATION DISTANCE FOR EFFLUENT DISPOSAL AREAS

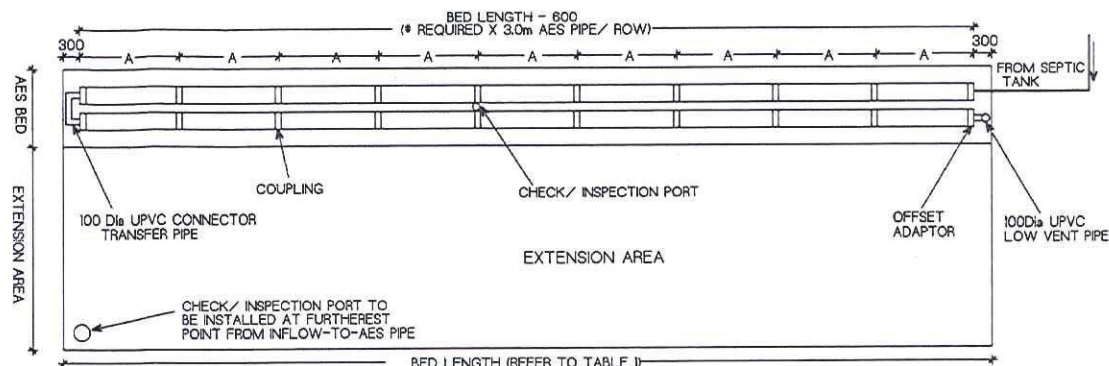
	PRIMARY EFFLUENT (SEPTIC) M	SECONDARY EFFLUENT (HTSP) M	ADVANCED SECONDARY (HTSP) M
1 TOP OF BANK WATER COURSE (RIVER STREAM LAKE DAM EASMENT BNDRY OPEN UNLINED DRAINAGE CHANNEL)	50	30	10
2 FARM DAMS INTERMITTENT WATER COURSE DRAINAGE CHANNELS	50	30	10
3 BORE OR WELL USED FOR DRINKING SUPPLY	50	30	10
4 BORE OR WELL USED FOR NON DRINKING SUPPLY	15	15	10
5 PROPERTY BOUNDARIES, PATHS, WALKWAYS, BUILDING FOOTINGS RETAINING WALLS	4 LOWER THAN DISPOSAL AREA 2 HIGHER THAN DISPOSAL AREA		
6 CHILDRENS PLAY AREAS DWELLINGS RECREATION AREAS	SUBSURFACE AS FOR 5 ABOVE NO SURFACE SPRAY PERMITTED	SUBSURFACE AS FOR 5 ABOVE 15 IF SURFACE SPRAYED	SUBSURFACE AS FOR 5 ABOVE 10 IF SURFACE SPRAYED
7 SWIMMING POOL WATER EDGE	6	6	6
8 IN GROUND POTABLE WATER TANK	15	6	6
9 UNSATURATED SOIL DEPTH TO PERMANENT WATER TABLE	1.2 VERT	0.6 VERT	0.3 VERT

NOTES:

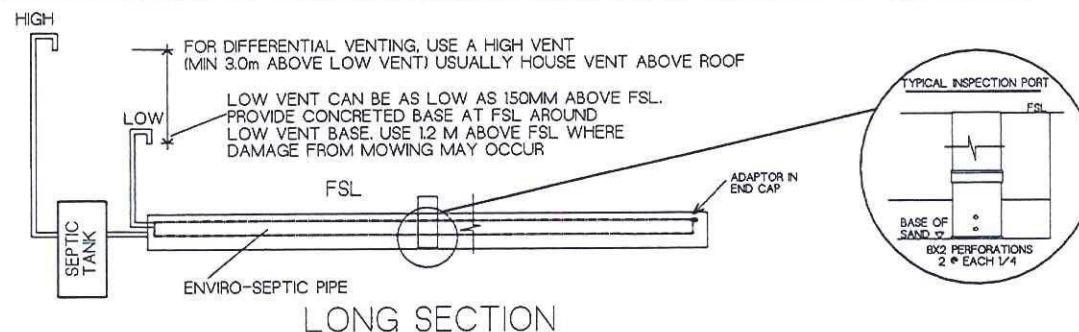
1. HSTP INSTALLED WITH MANUFACTURERS INSTRUCTIONS
2. PLUMBING AND DRAINAGE IN ACCORDANCE WITH THE ON SITE SEWERAGE CODE AND THE NATIONAL PLUMBING AND DRAINAGE CODE AS3500
3. FUTURE BORE INSTALLATIONS MUST HAVE SEPARATION DISTANCES AS PER TABLE
4. DURABLE AGGREGATE AS PER AS 27581 20MM
5. GEOFABRIC TO BE BDM A12 OR EQUIVALENT
6. ALL INSTALLATION TO BE IN ACCORDANCE WITH AS1547-2000 ON SITE DOMESTIC WASTEWATER MANAGEMENT
7. PLANT APPROPRIATE LARGE TREES (5m APART MAX) or BANANA PLANTS (1.5m APART @ 5m ROW CRS) or VETIVER GRASS (1m ROW CRS; 3 PLANTS PER m2) WHERE SHOWN ON DWG 06.

DURABLE METAL SIGNS ARE REQUIRED ON EACH SIDE OF AN IRRIGATION AREA LAA AND ARE TO READ:
"WARNING RECLAIMED EFFLUENT DO NOT DRINK"
ALL SEWERAGE DELIVERY LINES TO BE EITHER STRIPED OR COVERED WITH PURPLE SEWERAGE TAPE
SIGNAGE FOR DELIVERY LINES TP READ:
"DO NOT DIG BURIED EFFLUENT PIPES"
AND
"NO VEHICLE ACCESS"
REFER TO OWNERS MANUAL FOR ADDITIONAL NOTES

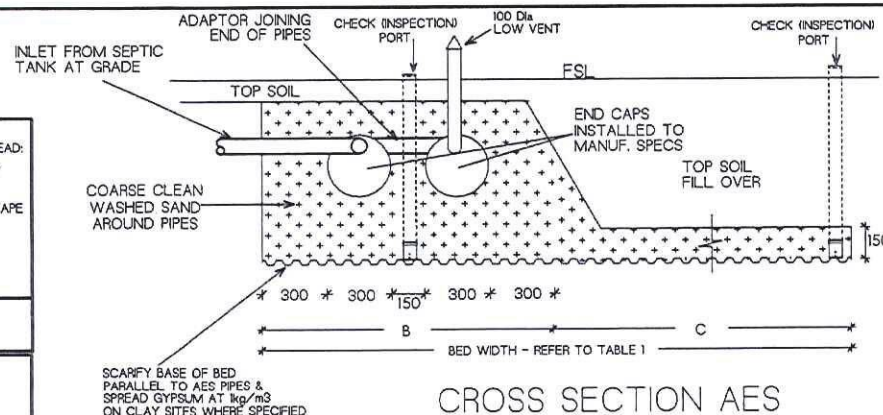
NOTE: SYSTEM HAS BEEN DESIGNED FOR THE USE OF STANDARD WATER REDUCTION FIXTURES, SUCH AS DUAL FLUSH 6/3 LTR WATER CLOSETS, SHOWER FLOW RESTRICTORS AERATOR FAUCETS (TAPS) AND WATER-CONSERVING WASHING MACHINES.
NO GARBAGE GRINDERS HAVE BEEN ALLOWED



AES SYSTEM ARRANGEMENT PLAN



LONG SECTION



CROSS SECTION AES LAA BEDDING DETAILS

CONSTRUCTION NOTES:

PROVIDE FALLS AS FOLLOWS:
RESIDENCE TO SEPTIC TANK = MIN 1:60
SEPTIC TANK TO PIPES = MIN 1:300

NOTE: SEPTIC INLET & ADAPTOR JOINERS ARE ALWAYS TO TOP OF PIPES

Soiltest.biz

22 Templeton Street
Gordonvale QLD 4005
Australia
Ph (0429) 850 442
email: info@soiltest.biz

#2 EMERALD CREEK ROAD
MAREEBA

PL	KL	02
NTS	15848	
	JUN2020	

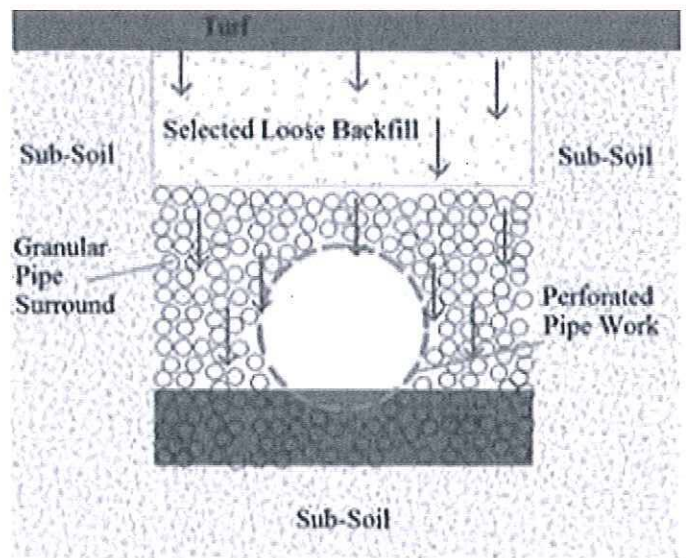
37

12.5 STORMWATER

Drainage pipes are ideally used to take excess water away from an area to prevent water logging. Draincoil® corrugate drainage pipe is of a consistent high-quality and comes in a broad range of sizes and grades. It is available slotted or u with or without a geotextile filter sock. A full range of fittings to suit a wide variety of drainage projects are available.

Applications

- Civil projects
- Land drainage
- Agricultural drainage



SITE SPECIFIC DESIGN CRITERIA ANALYSIS



Prepared for:
Gareth And Stephanie
Horner 2 Emerald Heights
Road Mareeba QLD 4880

Supplier:
Wide Span Sheds

Assessment Ref:
STX20010034UF

Issued:
05/01/2020

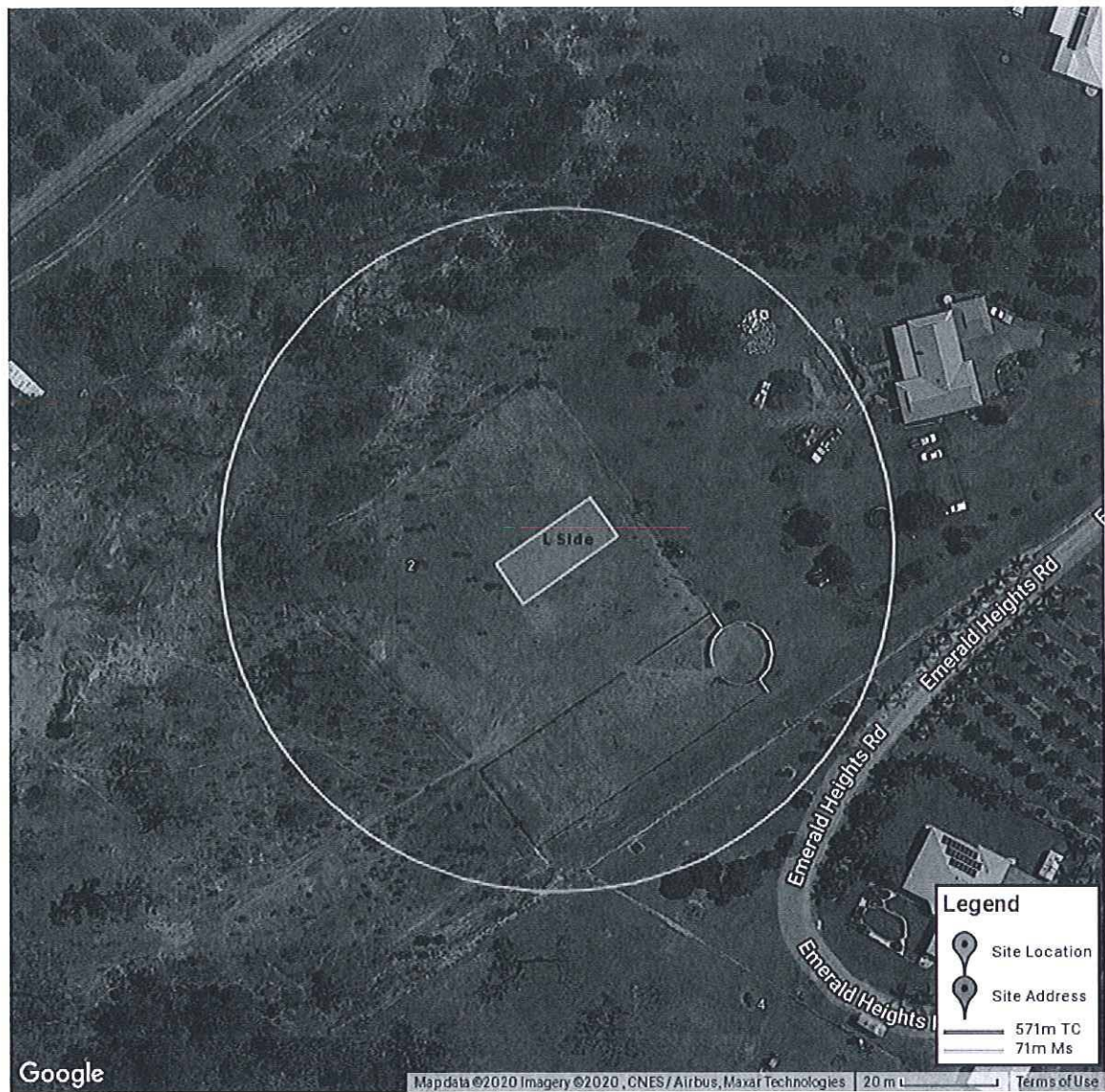
Building Details:
Span: 10
Length: 24
Avg. Height: 3.526

Certified by:



R. Nancarrow
for and on behalf of
TNC Engineering PTY LTD
(ACN 610 855 260)

Member Institution of Engineers (Aust.), CPEng (NER Structural & Civil) Regn. No. 2741240 Registered Professional Engineer (Structural & Civil) - Queensland: Regn. No. 13750 Registered Professional Engineer (Structural & Civil) - Victoria: Regn. No. EC44684 Registered Building Designer & Professional Engineer (Structural & Civil) - Tasmania: Regn. No. CC6968



Site Location:
 Geographic coordinates of
 -17.0037,145.46985
 Generally described as:
 2 Emerald Heights Road Mareeba QLD 4880

5. Building certifier reference number**Building certifier reference number**

NA

6. Competent person details

A competent person for building work, means a person who is assessed by the building certifier for the work as competent to practice in an aspect of the building and specification design, of the building work because of the individual's skill, experience and qualifications in the aspect. The competent person must also be registered or licensed under a law applying in the State to practice the aspect.

If no relevant law requires the individual to be licensed or registered to be able to give the help, the certifier must assess the individual as having appropriate experience, qualifications or skills to be able to give the help.

If the chief executive issues any guidelines for assessing a competent person, the building certifier must use the guidelines when assessing the person.

Name (in full)

Rohan Nancarrow

Company name (if applicable)TNC ENGINEERING PTY LTD
ACN 19 610 855 260**Contact person**

Rohan Nancarrow

Phone no. (business hours)

(07) 5594 2012

Mobile no.**Fax no.**

(07) 5594 2022

Email address

engineer@steelx.com.au

Postal address5004 Emerald Islands Dr
Carrara, Qld 4221**Licence or registration number (if applicable)**

RPEQ 13750

7. Signature of competent person

This certificate must be signed by the individual assessed by the building certifier as competent.

Signature**Date**

6/01/2020

The *Building Act 1975* is administered by the Department of Housing and public Works



**Queensland
Government**

Department of Housing and Public Works

Form 15 - Compliance certificate for building design or specification

Version 4 - July 2017

NOTE: This is to be used for the purposes of section 10 of the *Building Act 1975* and/or section 46 of the *Building Regulation 2006*.

RESTRICTION: A building certifier (class B) can only give a compliance certificate about whether building work complies with the BCA or a provision of the Queensland Development Code (QDC). A building certifier (Class B) can not give a certificate regarding QDC boundary clearance and site cover provisions.

1. Property description

This section need only be completed if details of street address and property description are applicable.

E.g. in the case of (standard/generic) pool design/shell manufacture and/or patio and carport systems this section may not be applicable.

The description must identify all land the subject of the application.

The lot and plan details (e.g. SP/RP) are shown on title documents or a rates notice.

If the plan is not registered by title, provide previous lot and plan details.

2. Description of component/s certified

Clearly describe the extent of work covered by this certificate, e.g. all structural aspects of the steel roof beams.

3. Basis of certification

Detail the basis for giving the certificate and the extent to which tests, specifications, rules, standards, codes of practice and other publications, were relied upon.

4. Reference documentation

Clearly identify any relevant documentation, e.g. numbered structural engineering plans.

Street address (include no., street, suburb/locality and postcode)

2 Emerald Heights Road

Mareeba, Qld 4880

Lot and plan details (attach list if necessary)

In which local government area is the land situated?

Steel framed building and foundations as described in drawings referenced Job# 193822

As per attached letter for Gareth And Stephanie Horner at 2 Emerald Heights Road, Mareeba, QLD, Australia, 4880 for job number 193822

Covering letter of certification

ShedSafe Site Specific Design Criteria Analysis

WSS193822-2 General Notes

WSS193822-3 Layout

WSS193822-4 Specification Sheet

WSS193822-5 Bracing

WSS193822-6 Concrete Piers

WSS193822-7 Connection Details

WSS193822-8 Flashing Fixing Details

LOCAL GOVERNMENT USE ONLY

Date received		Reference Number/s	
---------------	--	--------------------	--

06 January, 2020

To whom it may concern

The actual usage of the building is not able to be ascertained by the engineer. This certification is done in accordance with the purchaser of the building's advice of the building's Importance Level. Any approving authority should confirm that the Importance Level nominated is appropriate for the building's usage.

The structural design of the steel building (as detailed in drawing WSS193822, see index below) for Horner Racing to be built at the geographic coordinates of -17.0037 and 145.46985 has been carried out by me. The address of the site has been given as 2 Emerald Heights Road Mareeba QLD 4880 Australia.

The design has been done in accordance with the NCC:2019, AS/NZS 4600:2018, AS/NZS 1170.1:2002, AS/NZS 1170.2:2011, AS 4055:2012, AS 4100:1998, AS 2870:2011 and AS 3600:2018.

Design Criteria: Building Class 10, Max Design Wind Speed of 59.4m/s. Refer to ShedSafe Site Specific Design Criteria Analysis. The building class should be confirmed by the certifier. Unless nominated, the building has not been designed for any additional loads including, but not limited to, earthquake, snow, solar panels or lining with any materials.

Drawing Number	Date	Number of Pages	Description
WSS193822 - 2	06/01/2020	1	General Notes
WSS193822 - 3	06/01/2020	1	Layout
WSS193822 - 4	06/01/2020	1	Specification Sheet
WSS193822 - 5	06/01/2020	1	Bracing
WSS193822 - 6	06/01/2020	1	Concrete Piers
WSS193822 - 7	06/01/2020	5	Connection Details
WSS193822 - 8	06/01/2020	2	Flashing Fixing Details

Some drawings have multiple pages, eg. "1 of 3".

Signed



R. Nancarrow
 for and on behalf of
 TNC ENGINEERING PTY LTD
 (ACN 610 855 260)

Member Institution of Engineers (Aust.), CPEng (NER Structural & Civil) Regn. No. 2741240
Registered Professional Engineer (Structural & Civil) - Queensland: Regn. No. 13750
Registered Professional Engineer (Structural & Civil) - Victoria: Regn. No. EC44684
Registered Building Designer & Professional Engineer (Structural & Civil) - Tasmania: Regn. No. CC6968

Max Roof Run (m) for Slopes & Rainfall Intensity					
Rainfall Intensity (mm/hr)	Trimclad Roof Slope				
	1 in 30 (2°)	1 in 20 (3°)	1 in 12 (5°)	1 in 7.5 (7.5°)	1 in 6 (10°)
250	88	103	128	153	176
300	73	86	107	127	146
400	55	64	80	96	110

Fastener Specifications	
Timber	14 - 10 x 65 T17
0.75 to 1.0mm Steel	M6.5 - 12x55 roof zips
1.2 to 4mm Steel	14 - 10 x 53 Hex Head

Testing Criteria

This information is based on the **Low-High-Low testing competed by the Cyclone Testing Station (CTS)**, School of Engineering, James Cook University. The results of this testing are outlined in the test report TS716 produced by the CTS. Ultimate cyclic wind load strength tests were NATA accredited tests. Load testing carried out by James Cook University, cyclone testing station, report No. TS716. Product tested to AS4040.1, AS4040.3 and low-high-low as per BCA B1.2. Tests carried out: cyclonic airbox wind test for strength. Static testing for serviceability. Buildex report No. ELTR 1532.

Signed



R. Nancarrow
for and on behalf of
TNCENGINEERING PTY LTD
(ACN 610 855 260)

Monday, 6 January 2020

Sheeting Design Documentation

To whom it may concern,

The sheeting used for this structure has been designed as a category R2 sheeting with an imposed load of 0.25kPa and concentrated load of 1.4kN applied in accordance with NCC:2019 and AS1562.1.

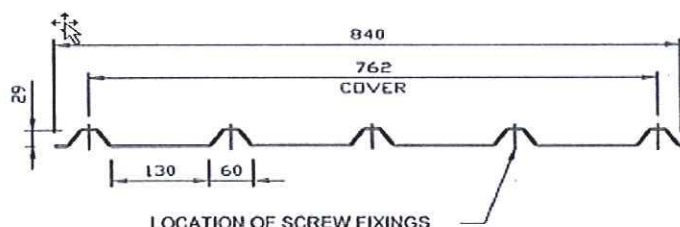
No allowance has been made for the fixing of rooftop-mounted equipment such as solar panels or air-conditioning equipment directly to the cladding.

Metroll purlins have been designed to withstand foot traffic during installation and service. The use of appropriate cradles or cherry pickers is recommended. **As a minimum, never walk on purlins without safety mesh in place.**

When walking on Trimclad roof sheeting always wear flat rubber soled shoes and only walk over areas where purlins or batten supports are installed. Walk in either pan next to the lapped edge ribs.

Profile and Dimensions of Cladding

Metroll Trimclad Steel Sheetting is Manufactured from G550 colour coated steel or zinc-aluminium alloy coated (AZ 150) steel. In some locations galvanised (Z450) may also be available.



Specification of Materials

Location	BMT (mm)	Steel Base (MPa)	Mass CB (kg/m ²)	Mass Zinc (kg/m ²)	Effective Cover	Min. Pitch	Max Spans (mm)		
							End	Internal	Overhang
Roof	0.42	G550	4.35	4.28	762	2 (1 in 30)	1300	1700	150
Roof	0.48	G550	4.93	4.81	762	2 (1 in 30)	1700	2300	150
Wall	0.35	G550	3.68	3.70	762		2900	3000	150
Wall	0.42	G550	4.35	4.28	762		3000	3000	150

Design pressures to AS/NZS1170.2

Location	Zone	Design Pressure (kPa)
Roof	Corner	-3.68
	Edge	-2.46
	General	-1.23
Wall	Corner	-4.13
	Edge	-2.75
	General	-1.38

Max Roof Run (m) for Slopes & Rainfall Intensity

Rainfall Intensity (mm/hr)	Trimclad Roof Slope				
	1 in 30 (2°)	1 in 20 (3°)	1 in 12 (5°)	1 in 7.5 (7.5°)	1 in 6 (10°)
100	220	257	320	382	439
150	146	172	214	255	293
200	110	129	160	191	220

Executive Summary - Site Specific Analysis

The design analysis of the building has not been considered for each of the 4 orthogonal directions. Hence the maximum wind speed in any of the 8 cardinal directions has been used as the design wind speed. This is a conservative approach.

Each cardinal direction has been considered and the results are summarised below

F a c t o r	N	N E	E	S E	S	S W	W	N W
Wind Region	C							
Importance level (IL)	2							
Regional Wind Speed (Vr)	69							
Terrain Category (TC)	2.49	2.49	2.5	2.43	2.2	2.11	2.22	2.36
Terrain Category Multiplier (Mz)	0.87	0.87	0.87	0.88	0.89	0.90	0.89	0.88
Shielding Multiplier (Ms)	1	0.94	1	1	1	1	1	1
Topographic Multiplier (Mt)	1	1	1	1	1	1	1	1
Wind Direction Multiplier 1 (Md1)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Site specific design wind speed (Vsite1)	57.4	53.9	57.3	57.7	58.9	59.4	58.8	58.1
Wind Direction Multiplier 2 (Md2)	1	1	1	1	1	1	1	1
Site specific design wind speed (Vsite2)	60.4	56.8	60.3	60.7	62	62.5	61.9	61.1

Design Wind Speed (Vsite1) 59.4 m/s for the resultant forces and overturning moments on the complete building and wind actions on major structural elements.

Design Wind Speed (Vsite2) 62.5 m/s for all other cases, including cladding and immediate supporting members (Purlins and Girts)

Snow Load Nil

Seismic Factor Nil

Durability Alert No

GENERAL NOTES

These documents show the general arrangement of the building and include some items not supplied (refer to the quotation for nomination of all items to be provided). All items not nominated therein shall be supplied and installed by others.

DESIGN CRITERIA

These building plans have been prepared to comply with the standards nominated in the engineer's letter. All plans are not to Scale.

The plans provided here are the latest at the time of print. Earlier plans provided may have become outdated due to engineering changes and should not be used. The plans and drawings are extensive and give all the information needed for a competent person to erect the building. The building is not designed to stand up by itself when it is partially complete. Consequently, construction bracing is critical during erection.

The owner has been requested to check off the BOM after the building delivery. You should check that you are able to locate all materials nominated in the BOM. You should also confirm that the length and size (including thickness), nominated in the BOM is what has been provided. Any missing items are the responsibility of the client once correct delivery has been confirmed as per Terms and Conditions of Sale.

The structure has been designed to allow for less than 50% of the cross-section exposed to the wind under the roof to be blocked by goods or materials in accordance with AS/NZS 1170.2:2011. Blocking more than 50% of the cross-section under the roof with goods or materials will change the loads on the structure which have not been allowed for.

ADDITIONAL DOCUMENTATION TO BE SUPPLIED BY PURCHASER/OWNER

The Purchaser/Owner is responsible for:

- * Provision of Soils Report for the site and in the building area on which the building is to be erected
- * Site/Drainage Plans
- * Any other plans not covered by these engineering plans requested by the local Council or the authority

BUILDING CONSTRUCTION REQUIREMENTS

The Purchaser/Owner is to be ensured that all building construction is carried out in accordance with the Plans, the Construction Manual and the Bill of Materials (BOM).

PIER DETAILS - GENERAL

- * The minimum size of Piers under the columns and End Wall Mullions are nominated on the Material Specifications Plan.
- * Pier Reinforcement: for any piers over 1100mm, deformed bar to within 100mm of base and minimum 75mm top cover. Minimum side cover 75mm, maximum 100mm. Rod to be caged horizontally at least twice and at a maximum of 300mm spacing. Tie with a minimum of 6mm diameter cage tie. Where pier diameter is less than 450mm diameter, use 4 N12. For diameters equal to and over 450mm, use 4 N16. * Shed design has the columns embedded into the concrete 400mm.
- * This measurement is from the top of the desired finished level of the building.
- * Footing design covers sites with a minimum of 100kPa safe bearing capacity soil classification A, S, M, H1 or H2 for a class 10 building.
- * The footing designs have been calculated with adhesion values of 0kPa, 25kPa and

50kPa for clay soils and dense sand soils only.

- * A site specific geotechnical investigation has not been performed. The builder will need to verify the soil type and conditions.
 - * Site conditions different to those specified require a modified design.
 - * Sub grade shall be excavated and compacted to a minimum of 100% standard dry density ratio and within 2% of the OMC to comply with AS2159.
 - * Designs are in accordance with AS 3600:2009
 - * All concrete to be in accordance with AS 3600:2009. Minimum 25 Mpa, with 80mm slump.
 - * Piers should be cured for 7 days before commencing construction of the building.*
- Second Pour Jointing (refer to construction manual);
1. Surface of first pour must be scabbled.
 2. All loose debris must be vacuumed from hole.
 3. Apply heavy coat of bondcrete or similar adhesive prior to second pour.
 4. Apply suitable protective coating to the embedded portion of the columns.
- * Where columns or end wall mullions have been removed, piers are not required.
 - * End wall mullion spacing may move due to location of openings or doors. Check layout and component position plan, and relocate piers as required.

BRACING NOTES

- * Refer to Connection Details.
- * Knee bracing clearance from FFL is X=Main Building: 2.069m (Left Side), 3.009m (Right Side).
- * All Cross Bracing is achieved with 1.2mm Strap G450.
- * Cross bracing is to be fixed taut and secured with 14.20 x 22 frame screws at each end, quantity as per connection details.
- * All Columns and End Wall Mullions are fixed Column in Concrete.
- * Fly bracing to be fixed to the purlins/girts on all mid portal rafters, columns and end wall mullions. Fly bracing is to be fitted to every second purlin/girt, or, on every one, where the spacing between fly braces would exceed the maximum specified below for the relevant column/rafter size:

C150 - maximum 1800mm spacing
C200, C250 - maximum 2200mm spacing
C300 - maximum 2800mm spacing
C350 - maximum 2800mm spacing
C400 - maximum 2800mm spacing

Initial measurement is from the haunch of the column/rafter, and from the rafter for any end wall mullions.

- * Open bays to have fly bracing fitted to every available girt supporting the header sheets.
- * All bracing strap ends to be located as close as practical to structural member's (columns, rafters, mullions) centerline.

BOLTS

- * Unless otherwise nominated, all bolts are grade 4.6
- * All tensioned bolts shall be tensioned using the part turn method (refer to AS4100). For the erector, full details are in the construction manual.

OTHER MATERIALS NOTES

- * All Sheeting, Flashing and framing screws are Climaseal 4.
- * All purlin material has Z350 zinc coating with minimum strength of 450MPa.

Purchaser Name: Horner Racing

Site Address: 2 Emerald Heights Road Mareeba QLD 4880 Australia

General Notes
NOT FOR CONSTRUCTION
Page 1 of 1
© Copyright Steelix IP Pty Ltd

Seller:
WideSpanShedsPtyLtd
Phone: 07 5657 8888
Fax: 07 5657 8899
Email: admin@sheds.com.au

TNC ENGINEERING PTY LTD
ACN: 610 855 260
MIE Aust. (Registered NER Structural & Civil) 2741240
QLD: RPEQ No. 13750; VIC: EC44684; TAS: CO6968; N.T.: 225521ES;
Practising Professional Structural & Civil Engineers

Signature:

R. Nancarrow

10-15

TOUGHEN YOUR TERRAIN

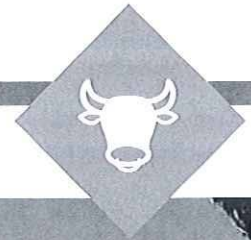


**RURAL
INFORMATION &
INSTALLATION GUIDE**



DIAMONDGRID™

FOR A SOLID SURFACE ANYWHERE



for driveways, feed & water troughs, stable floors, muddy areas, arenas, shed floors and day yards.



4



TONS/SQFT FILLED
CRUSH RESISTANCE

TONS/SQFT EMPTY
CRUSH RESISTANCE

RECYCLED
POLYPROPYLENE



"DIAMOND GRID IS AN EASY SOLUTION AND THEY SAVED US OVER \$300 PER TROUGH COMPARED TO CEMENTING THE PADS. AND IF WE EVER NEED TO MOVE A TROUGH, WE CAN PULL THE GRIDS UP AND MOVE THEM TO THE NEXT SITE."



CSIRO ANIMAL, FOOD AND
HEALTH SCIENCES, QLD

"WE'VE FOUND DIAMOND GRID TO BE GREAT UNDERFOOT FOR THE BULLS IN THE FEED PADS. WE FOUND THE BULLS DIDN'T GET SORE FEET AND IT IS BETTER UNDERFOOT THAN CONCRETE, EASY TO INSTALL AND VERY COST EFFICIENT."



ANVIL ANGUS FROM
ACHERON, VIC

APPLICATIONS

HORSE WALKER ▶

End mud and rutting problems by increasing soil stability and improving drainage. Diamond Grid stabilizes the ground to give better traction while offering superior impact resistance. Fill with wide range of materials (e.g. sand, gravel, soil and grass).

◀ SHED FLOORS

Much cheaper than concrete, Diamond Grid is a perfect solution for shed flooring. The grids are ideal for storage of equipment and vehicles. Diamond Grid's easy locking system is simple to install and can be moved if you decide to re-locate your shed.

CATTLE YARDS ▶

Diamond Grid can be used to resurface a whole cattle yard, or just the muddy corners and gateways. The most common process with cattle yards is to fill the grids with $\frac{1}{4}$ " drainage gravel and then cover with sand or saw dust.



◀ STABLE FLOORS

A self-draining stable flooring solution that reduces your ongoing bedding costs. The horses cannot dig holes in the flooring and the flooring cannot turn to mud.



FEED & WATER TROUGHS ▶

The areas around water and feed troughs are always wet and muddy and Diamond Grid solves the problem by creating a well-drained solid surface for both horse and human.



◀ CREEK CROSSINGS

Installing Diamond Grid over creek crossings stops the roadbase and gravel from eroding away, creating a permanent solution to crossing for trucks and other vehicles.



DAY YARDS ▶

Diamond Grid can be used to resurface a whole paddock or yard, or just the muddy corners and gateways. The most common process with day yards is to fill the grids with $\frac{1}{4}$ " drainage gravel and then cover with saw dust or sand.



◀ DRIVEWAYS

The unique design of Diamond Grid allows you to build attractive driveways with decorative pebbles by stabilizing the fill so that it does not migrate, even in areas subject to constant traffic or repeat wheel tracking and turning. The product is also effective in ensuring that different fills do not mix together, erode or wash away.

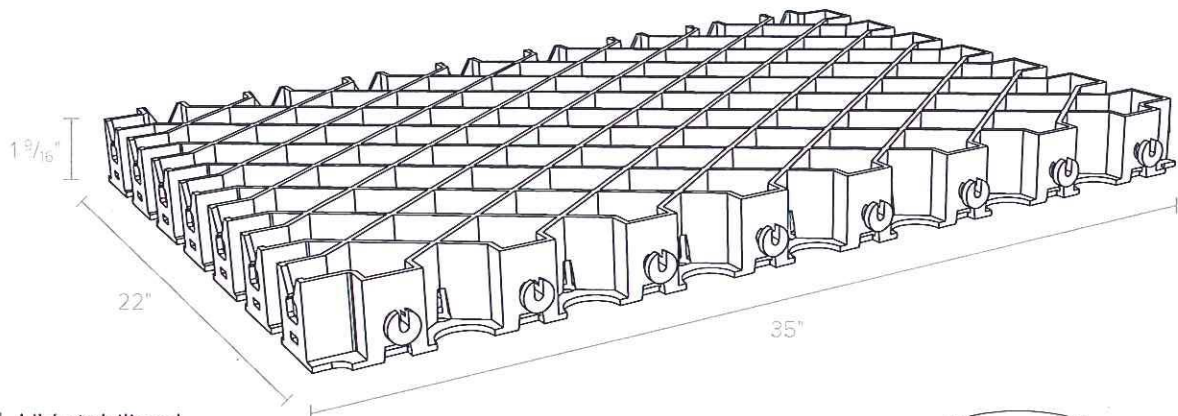


DRAINS ▶

Deep drains and trenches are protected by the grids, which support the structure of the drain and allow the water to flow through without washing away the sides of the drain. The grids are also suitable for shallow drains and trenches which are covered with grasses and small plants. The grids support the root structures while still effectively allowing the water to flow through..

SPECIFICATIONS

35" x 22" x 1 9/16"



- | UV stabilized
- | Relocatable
- | Do-It-Yourself
- | Interlocking system

Measurements	35" W x 22" L x 1 9/16" H
---------------------	---------------------------

Crush resistance (filled with gravel/ road base)	100+ tons/sq ft filled m2*
---	----------------------------

Crush resistance (empty grid)	30 tons/sq ft empty*
--	----------------------

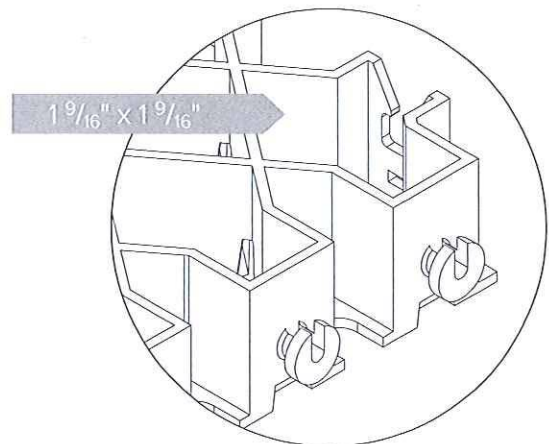
Weight per grid	7.05lbs
------------------------	---------

Fill ratio per grid	1 cubic yard of fill per 207.9 sq ft
----------------------------	--------------------------------------

Permeability	Up to 96%
---------------------	-----------

Fill	Road base, gravel, pebbles, grass, soil, concrete, asphalt
-------------	---

Installation	Visit www.diamondgrid.com
---------------------	--



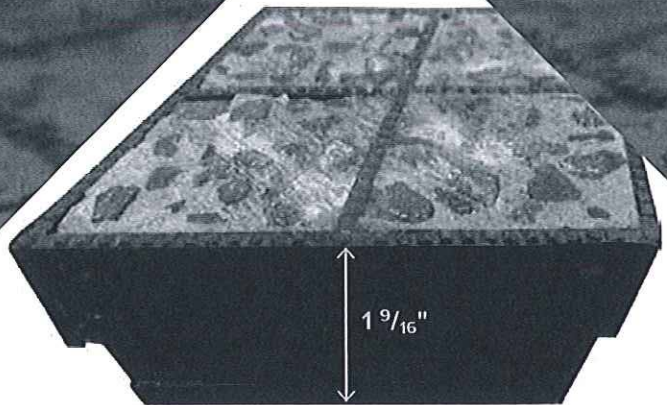
The Diamond Grid interlocking system is robust and easy to install.

Our classic grid size is suitable for most rural and domestic applications. Great for smaller surface areas that require stabilization and reinforcement. Highly recommended for feed & water troughs, stable floors, muddy areas, day yards, pathways, drains, driveways, golf cart tracks, boat ramps and anywhere needing toughening up on your property or workplace.

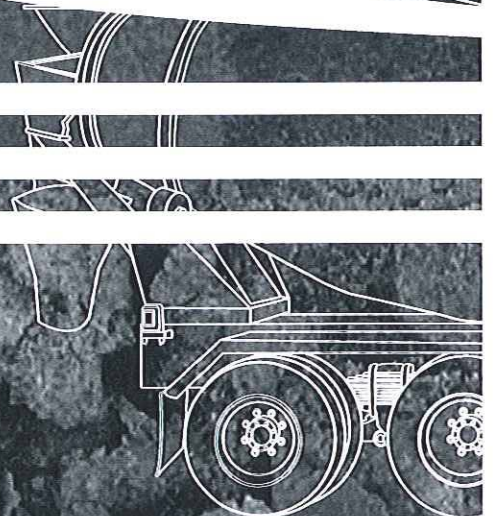


Made from 100% recycled, UV treated polypropylene, Diamond Grid is ecologically friendly and highly durable. The product has been load tested by the Facility of Engineering and Surveying Centre of Excellence in Engineered Fibre Composites, University of Southern Queensland and found to withstand loads in excess of 30 tons per square foot when empty or over 100+ tons crush resistance per square foot when grids are filled.

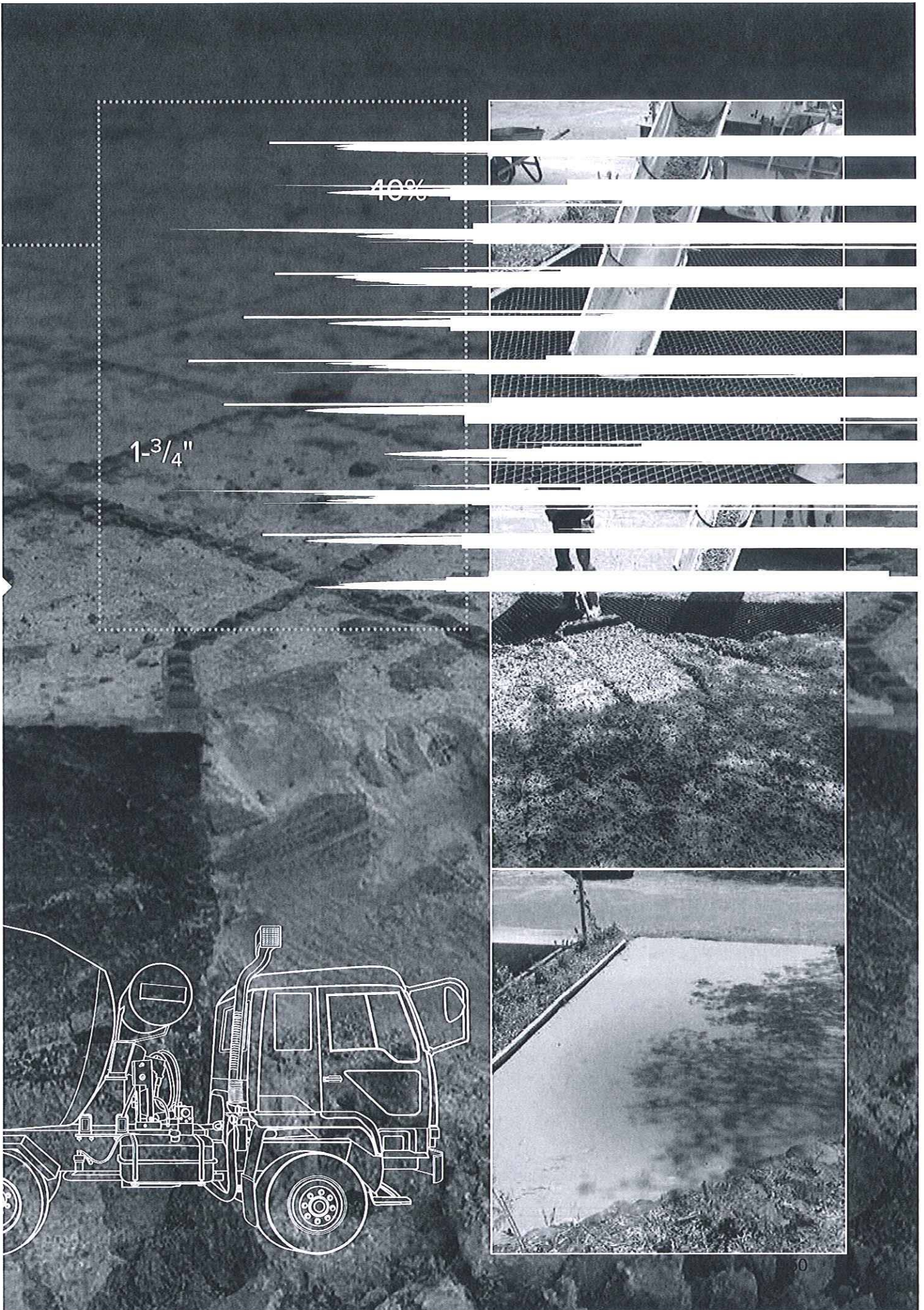
4



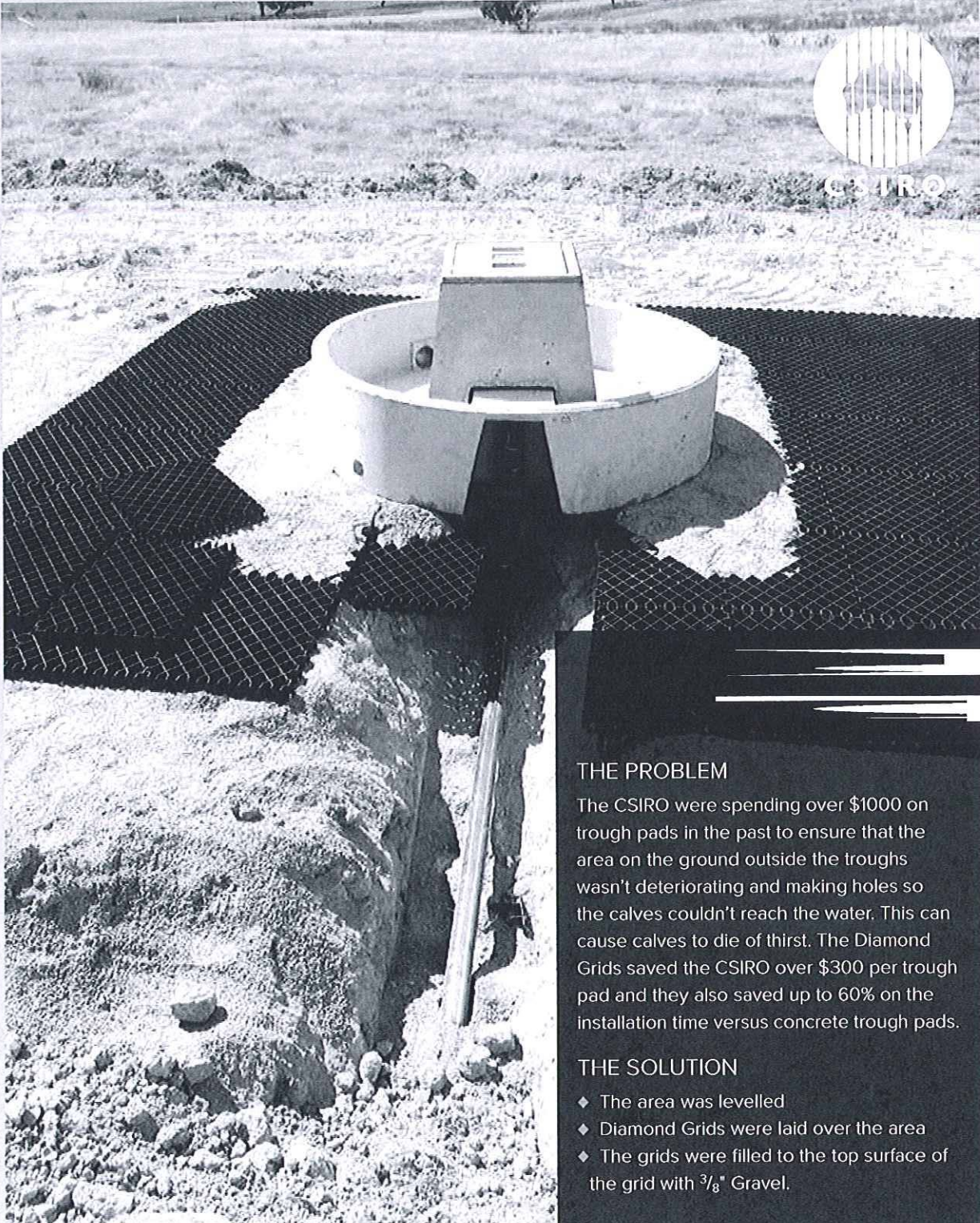
AVERAGE COMPRESSIVE
STRENGTH OF ONLY
4 GRID CELLS
3,625 PSI



49



CASE STUDIES



THE PROBLEM

The CSIRO were spending over \$1000 on trough pads in the past to ensure that the area on the ground outside the troughs wasn't deteriorating and making holes so the calves couldn't reach the water. This can cause calves to die of thirst. The Diamond Grids saved the CSIRO over \$300 per trough pad and they also saved up to 60% on the installation time versus concrete trough pads.

THE SOLUTION

- ◆ The area was levelled
- ◆ Diamond Grids were laid over the area
- ◆ The grids were filled to the top surface of the grid with $\frac{3}{8}$ " Gravel.

THE PROBLEM

The Murwillumbah RDA had some issues with their horse stables becoming very swampy from some underground springs, creating very muddy horse stables.

With the RDA being a charity, they were looking for a cost effective solution to stable flooring.

THE SOLUTION

- ◆ Geo Fabric was laid over the muddy surface
- ◆ 4" of sand was then spread over the fabric and levelled.
- ◆ Diamond Grids laid.
- ◆ Sand filled into grids and also an extra 3" over the top of the grids for the horses to stand and lay on.

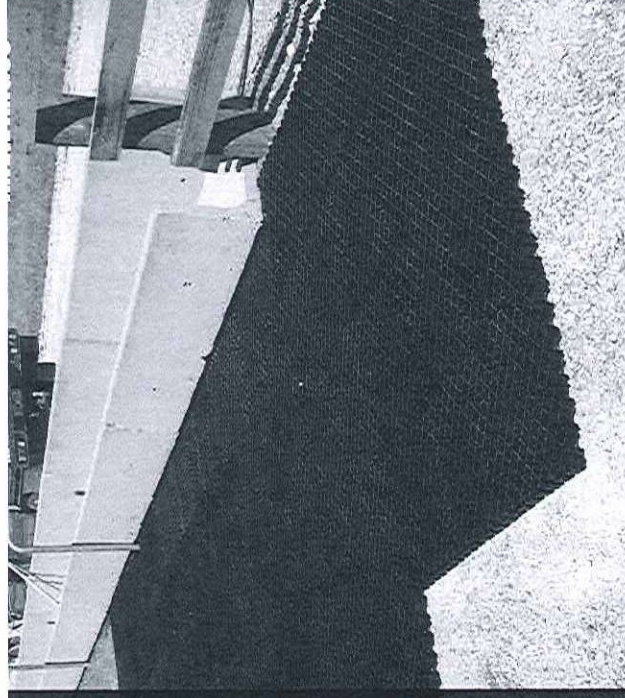


THE PROBLEM

In the past Anvil Angus have installed Feed Troughs without any pads and have spent a lot of time and money carting in soil and gravel every few months so that the calves can reach the troughs. Each time they have had to go through this process cost them 50% of the price that installing Diamond Grids as a permanent solution costs, meaning that they pay for themselves within 6 months.

THE SOLUTION

- ◆ The area was levelled
- ◆ Diamond Grids were laid over the area
- ◆ The grids were filled to the top surface of the grid with $\frac{3}{8}$ " Gravel.





THE PROBLEM

This airstrip had a very high water table and during the wet season it was not possible for aircraft to land on the airstrip due to the softness of the surface.

THE SOLUTION

Diamond Grid was installed on the airstrip and filled with local material, grass was then allowed to grow through the grids to reinforce the surface further and create an all weather airstrip.

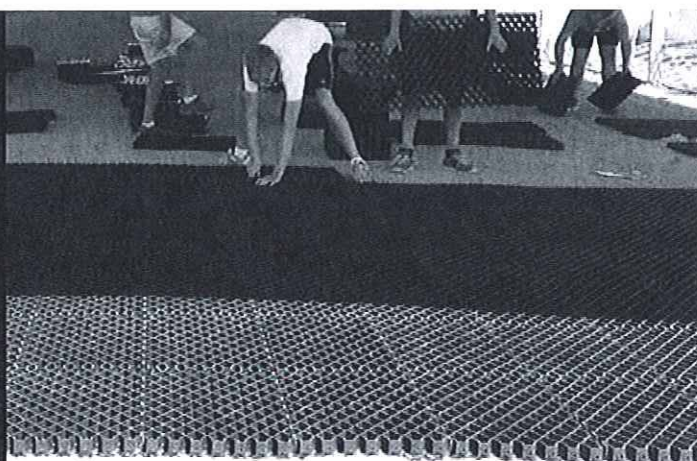


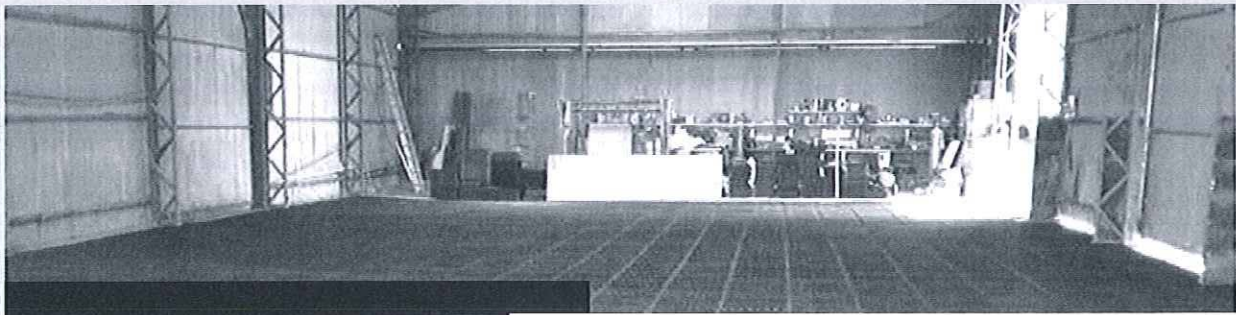
THE PROBLEM

Caboolture Showgrounds required a stable floor for their new horse stable block.

THE SOLUTION

- ◆ The area was levelled
- ◆ $\frac{1}{4}$ " gravel spread over the entire area to a depth of 2"
- ◆ Diamond Grids laid over the levelled area
- ◆ Diamond Grids filled with $\frac{1}{4}$ " gravel
- ◆ Woodshavings are spread and removed from the stable boxes every weekend for the showgrounds events



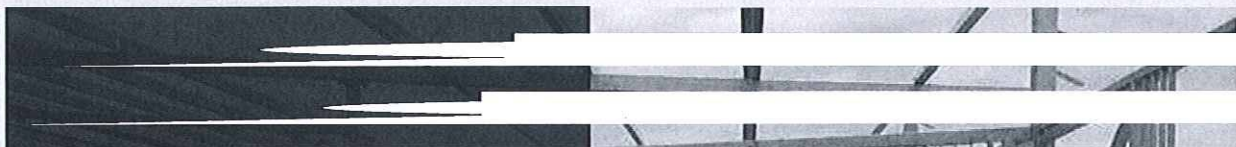
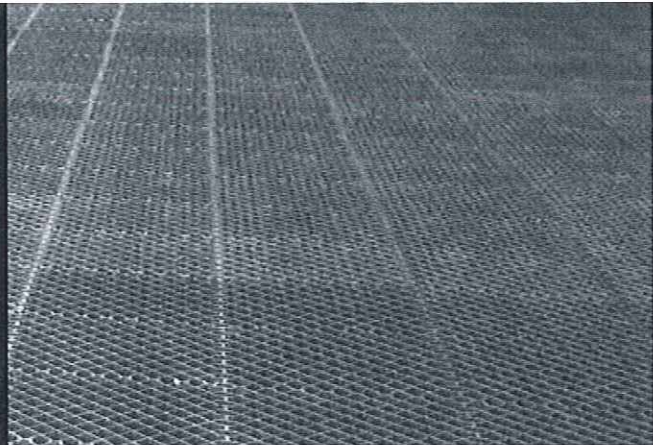


THE PROBLEM

Zocar Hay Farm was having issues with their hay and other horse feed getting wet from water rising up through the ground.

THE SOLUTION

- ◆ Floor levelled and compacted
- ◆ Diamond Grid laid
- ◆ Filled with $\frac{3}{8}$ " drainage gravel
- ◆ Sprayed with bitumen emulsion to provide a solid, draining surface.



THE PROBLEM

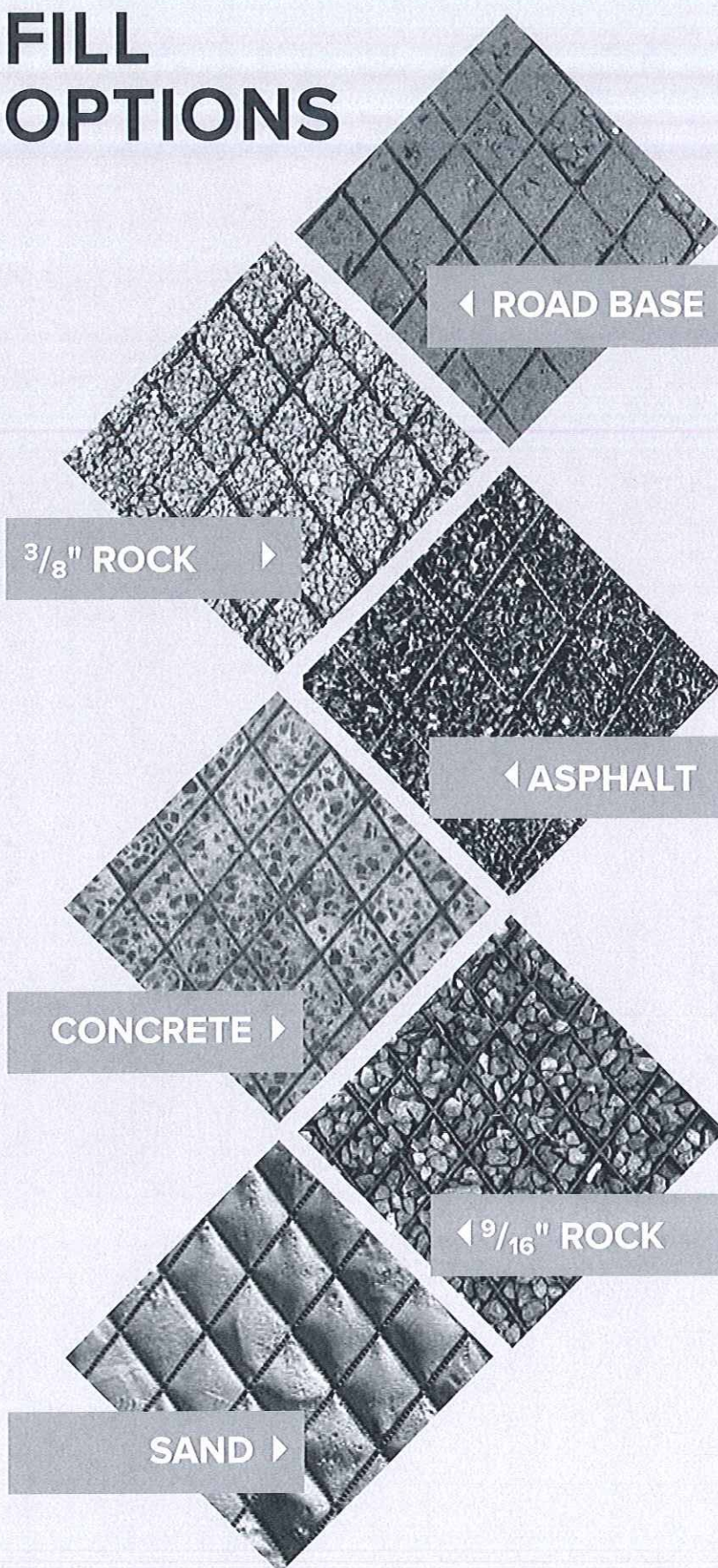
Cranbourne Racecourse were looking for a cost effective solution to install flooring in their horse stables at the new multi million dollar expansion of the Cranbourne Racecourse training facilities.

THE SOLUTION

Diamond Grid has saved the racecourse over 45% on the cost of all other alternatives. It also provides long term savings for the racehorse trainers using the stables as they will reduce their stable bedding usage by 50% or more as the urine drains through the bedding to the base under the grids, leaving the bedding dry and clean and not requiring it to be thrown out and replaced on a daily basis.



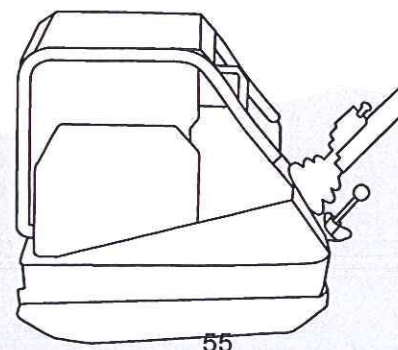
FILL OPTIONS



BASIC INSTALL GUIDE

APPLICATIONS:

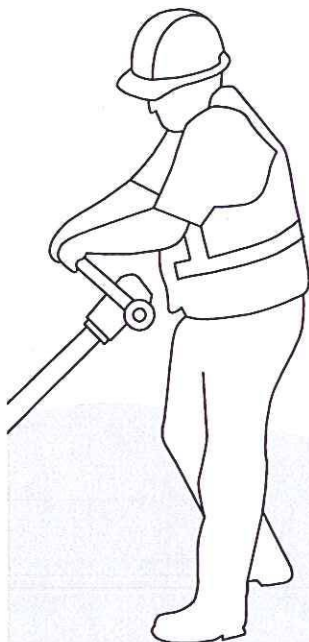
AIR STRIPS
ARENAS
BIKE TRACK
BOAT RAMPS
CAR PARKS
CATTLE YARDS
CONCRETE CAR PORT
CREEK CROSSINGS
DAIRY FARM LANEWAYS
DAY YARDS
DRAINS
DRIVEWAYS
FEED AND WATER TROUGHS
FIRE TRAILS
GOLF CART TRACKS
HARDSTANDS
HAUL ROADS
HOT HOUSE FLOORS
HELIPADS
MINE ACCESS ROADS
MINE CAMP PATHWAYS
MINE PLANT PATHS
MUDDY ROADS
PATHWAYS
PADDOCK SHELTERS
SHED FLOORS
STABLE FLOORS
WORKSHOP FLOORS



55

MINIMAL BASE PREP

- 1 USING A GRADER OR A BOBCAT AND SPREADER BAR, LEVEL THE SITE IN READINESS TO LAY YOUR DIAMOND GRID.
- 2 LAY GEO FABRIC OVER THE LEVELLED AREA.
- 3 IF THE SITE IS STILL UNEVEN, $\frac{3}{8}$ " OF CRUSHED $\frac{3}{16}$ " MINUS ROCK AND FINES CAN BE SPREAD AS A BEDDING.
- 4 LAY THE DIAMOND GRIDS STARTING IN ONE CORNER WITH THE MALE LUGS FACING OUTWARDS ON BOTH MALE SIDES.
- 5 FILL THE DIAMOND GRID WITH A BOBCAT AND SPREADER BAR OR SOMETHING SIMILAR AND YOUR CHOICE OF MATERIAL*.



MEDIUM BASE PREP

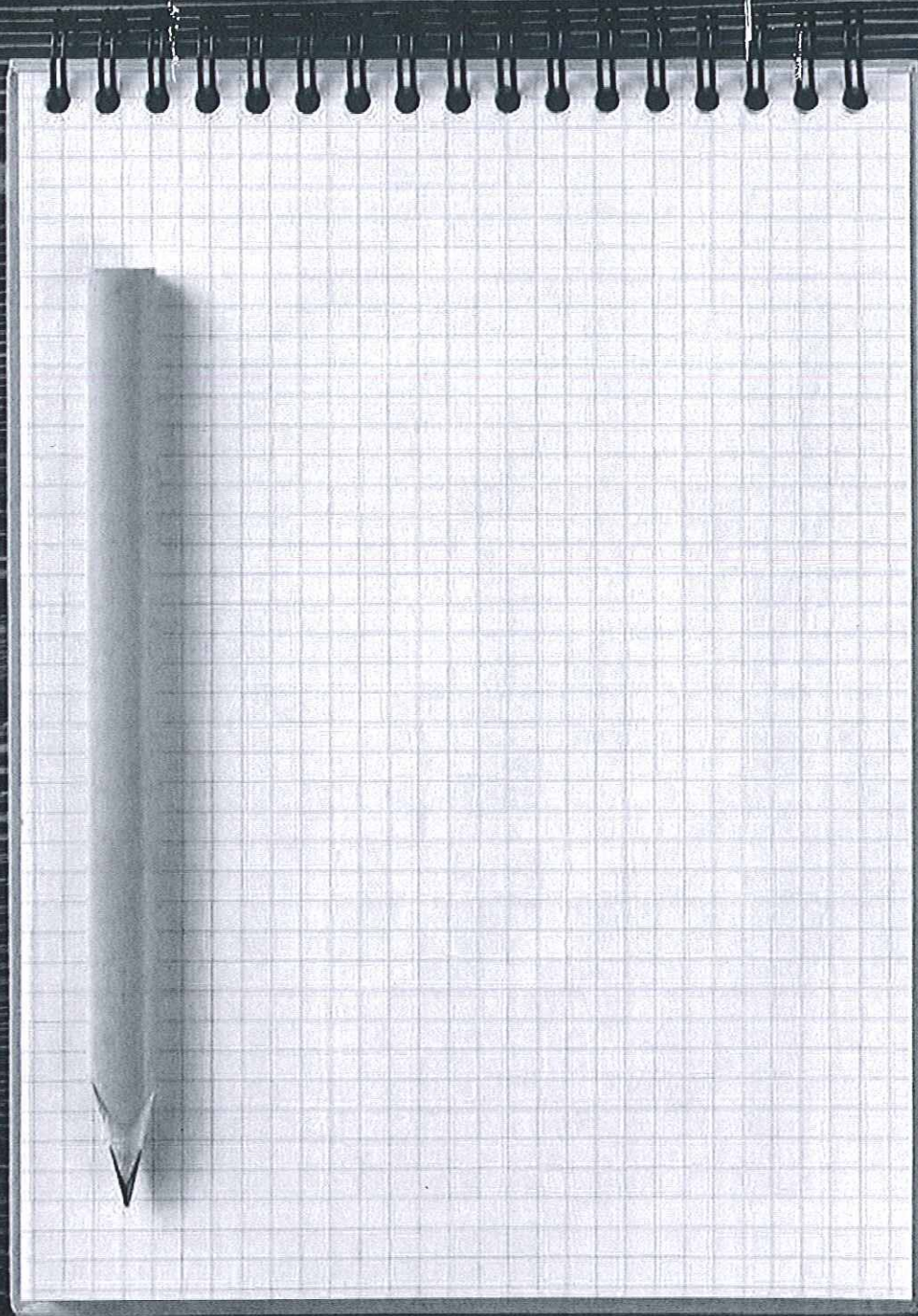
- 1 USING A GRADER OR A BOBCAT AND SPREADER BAR, LEVEL THE SITE IN READINESS TO LAY YOUR DIAMOND GRID.
- 2 LAY GEO FABRIC OVER THE AREA WHERE THE GRIDS ARE GOING TO BE LAID. COVER THE GEO FABRIC WITH ROAD BASE WITH ROLLER OR VIBRATING PLATE.
- 3 COMPACT ROAD BASE WITH ROLLER OR VIBRATING PLATE.
- 4 IF THE SITE IS STILL UNEVEN, $\frac{1}{2}$ INCH OF CRUSHED $\frac{1}{4}$ INCH MINUS ROCK AND FINES CAN BE SPREAD AS A BASE.
- 5 LAY THE DIAMOND GRIDS STARTING IN ONE CORNER WITH THE MALE LUGS FACING OUTWARDS ON BOTH SIDES.
- 6 FILL THE DIAMOND GRID WITH A BOBCAT AND SPREADER BAR OR SOMETHING SIMILAR WITH YOUR CHOICE OF MATERIAL*.

EXCAVATION AND MAJOR BASE PREP

- 1 EXCAVATE SITE TO A DEPTH OF 8-14" DEPENDING ON THE CONSISTENCY OF THE SUB GRADE.
- 2 LAY GEO FABRIC OVER THE AREA WHERE THE GRIDS ARE GOING TO BE LAID.
- 3 COVER THE GEO FABRIC WITH ROAD BASE AND COMPACT TO A LEVEL 1-1/2" BELOW FINISH HEIGHT.
- 4 COMPACT ROAD BASE WITH ROLLER OR VIBRATING PLATE.
- 5 USING A GRADER OR A BOBCAT AND SPREADER BAR, LEVEL THE SITE IN READINESS TO LAY YOUR DIAMOND GRID.
- 6 IF THE SITE IS STILL UNEVEN, $\frac{1}{2}$ INCH OF CRUSHED $\frac{1}{4}$ INCH MINUS ROCK AND FINES CAN BE SPREAD AS A BEDDING.
- 7 LAY THE DIAMOND GRIDS STARTING IN ONE CORNER WITH THE MALE LUGS FACING OUTWARDS ON BOTH MALE SIDES.
- 8 FILL THE DIAMOND GRID WITH A BOBCAT AND SPREADER BAR OR SOMETHING SIMILAR AND YOUR CHOICE OF MATERIAL*.

Diamond Grid International Pty Ltd makes no representations or warranties in respect of the suitability of the Diamond Grid product to any customers individual applications. The information in this guide is general only and customers should seek advice prior to commencing installation to ensure that the conditions of their project are catered to.

Diamond Grid International Pty Ltd accepts no liability where damage is caused to the Diamond Grid due to a failure to seek appropriate installation advice prior to commencing the project.



Quality
ISO 9001
SAI GLOBAL



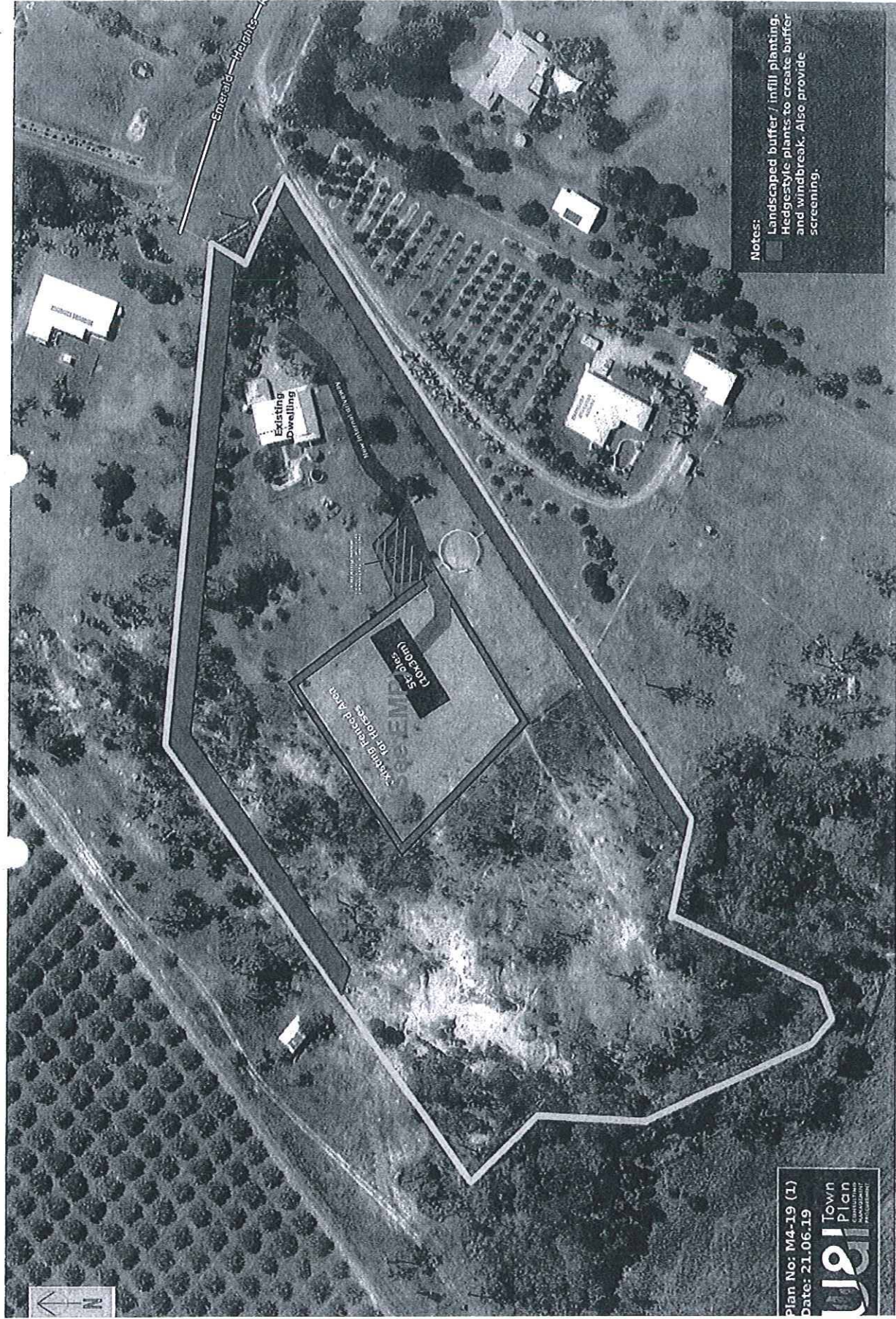
USA
HOUSTON, TX
833-422-2002
usa@diamondgrid.com



DIAMONDGRID™

Manufactured in ISO 9001:2008 Certified Manufacturing Plants. *Patent pending.

SITE LAYOUT PLAN



This plan is conceptual and for discussion purposes only. All areas, dimensions and land uses are preliminary subject to investigation, civil engineering and I Am Architects and Associates.

iCE international and Soiltest.biz

23 June 2020

REF# 15848

#2 EMERALD CREEK ROAD,

MAREEBA QLD 4880

RE: HORNER VS MAREEBA SHIRE COUNCIL

PLANNING & ENVIRONMENT COURT APPEAL NO. 184 OR 2019

ATTN: Stephanie & Gareth Horner

For your reference, our company background information is as follows:

ICE International is a consulting engineering company. RPEQ Peter Lennox #1128.

Soiltest.biz – Geotechnical & site classifiers QBCC 18267.

Each of these companies complete geotechnical, structural and civil consulting.

In relation to the letter from King & company solicitors, we make the following comments:

We have proposed that a new pond be excavated as an extension to the existing horse swimming pond. The total dimensions of both ponds will be 100m x 2.5m wide average and 2m average depth. The total volume of the ponds will be 500m³ (500,000 litres). Horse swimming ponds will have a bund surrounding them to stop surface water spilling into and contaminating the ponds.

In addition to the ponds we have suggested that rainwater from the proposed stables be collected into 3 No. 47 000 Litre water collection tanks positioned on the eastern end of the stables. Total Stored water capacity = 641, 000 Litres, which is in excess of Council requirements of 459,000 Litres.

Attached is a spreadsheet showing total water usage requirements for the site.

Water collected in the water tanks noted above will be used for wash down purposes and dust suppression where and when required. The treated water from wash down use will be fed into a 4000 Litre septic tank and a land application area using an Advanced Enviro Septic pipes and sand bed as per drawing numbers 01 & 02.

This system is capable of treating 1600L per day of effluent and will be more than sufficient to cover wash down requirements for the site. The treated effluent in the AES system will not be used for dust suppression or irrigation. Full treatment of the advanced secondary effluent will be finally polished by ground bacteria as is similar to a standard septic system.

Attached is a spreadsheet for both the Advanced Enviro Septic system, based on AES's required spreadsheet, plus another spread sheet showing the evapo-transpiration calculations for the site. Each works satisfactorily for 1600L per day. The septic treatment system design is in accordance with AS1547:2012 'On-site Domestic Waste Water Management'.

If you have any further queries, or require additional information, please feel free to contact us.

Regards,




Peter Lennox
RPEQ 1128

Soiltest.biz

SEPTIC COVER SHEET

DATE 22/06/2020
 JOB No: 15848
 SITE 2 EMERALD HEIGHTS ROAD MAREEBA MAREEBA
 CITY MAREEBA
 CLIENT STEFANIE & GARETH HORNER

ICET

TO		STEFANIE & GARETH HORNER		FAX	
	NO.	REF. NO.	INFORMATION OR DETAILS OR DRAWINGS	AM.	DATE
			SEPTIC		
	1		AES DESIGN CERTIFICATE		
	3		WASTE WATER REQUIREMENTS		
	1		WASTE WATER MANAGEMENT MANUALS (8PAGES EACH)		
	1		CONDITIONS OF PERMIT FORM		
	1		DESIGN CERTIFICATE		
			VIRAL DIE OFF CALCULATION		
	1		INSTALLERS COMPLIANCE CERTIFICATE		
	1	01	SEPTIC LAYOUT & SITE PLAN		
	1	02	SEPTIC DETAILS		
			SEPTIC LAYOUT PLAN (AS CONSTRUCTED)		
 29 Shields St. P.O. Box 5992 Cairns, QLD 4870 Australia Ph +61 7 4051 4424 Fax +61 7 4031 1998 test@soiltest.biz Singapore, NZ London			I:\DWG\15800-15899\15848\20200622.xls M:\Data\Shared\Excel\SEPTIC\SO\septic.xls		



Advanced Enviro-septic Design Calculator v8.8 ©

Leader in Passive Solutions

Site Address	2 EMERALD CREEK ROAD, MAREEBA	State	QLD	Post Code	4880
Client Name	STEFANIE & GARETH HORNER	Date of Site Visit	18/6/20		
Designers Name	PETER LENNOX	Designers Ph Number	0429 630 442	Designers Lic Number	18267
Plumber		Plumber Ph Number		Plumb / Drainer Lic Number	
Council Area	MAREEBA SHIRE	Designers AES Cert Number	768	Date	22/6/20

This Calculator is a guide only, receiving soil classification, surface water, water tables and all other site constraints addressed by the qualified designer.

System Designers site and soil calculations only

IMPORTANT NOTES

Enter AES L/m loading rate, "30" for ADV Secondary or "35" Secondary	30	>> This design is for an ADVANCED SECONDARY system
Is this a new installation Y or N	Y	>> Minimum single vent size is 80mm or 2 x 50mm house vents
Number of person	1	a septic tank outlet filter is NOT RECOMMENDED
Daily Design Flow Allowance Litre/Person/Day	1600	
Number of rows required to suit site constraints	2	>>The maximum length of a single AES pipe run is 30 meters
Infiltration surface Soil Cat as est by site/soil evaluation, CATEGORY	4	>> Category may require design considerations. Ref AS1547
Design Loading Rate based on site & soil evaluation DLR (mm/day)	20	>> Soil conditioning may be necessary. Ref AS1547 & Comments.
Bore log depth below system Base area	600	>>Min depth below base area 600mm check water table/restrictive layer
Enter System footprint Slope in % for std AES systems to calc extension	0	
Is this design a gravity system with no outlet filter? Y or N	Y	>> A House Vent & LOW VENT required on this system
PLEASE CHECK YOU HAVE FALL FROM TANK TO AES SYSTEM PIPES		

COMMENTS :- "The outcome must be important to everyone."

- Ripping of receiving surface required in clay soil structures in Cat 4,5,6. In addition refer to AS 1547. Always excavate & rip parallel to the site slope/AES pipe.
- Specialist soils advice & special design techniques will be required for clay dominated soil having dispersive or shrink/swell behaviour. Refer AS1547

- Plumbers are reminded that good construction techniques as per AS1547 are especially important in these soil types. Refer AS1547 & AES Installation Instructions

AES System Calculated Categories			AES Dimensions	
Total System load - litres / day (Q)	1600	l/d	AES System	System Extension
Min Length of AES pipe rows to treat loading	26.7	lm	Lth m : (L)	27.6
Number of FULL AES Pipe lengths per row	9	lths	Width m:(W)	1.35
Total Capacity of AES System pipe in Litres	3816	ltr.	Sand Depth :	0.75
			Area m2	37.3
USE CUT LENGTHS OF PIPE IN THIS DESIGN? (ENTER Y)				
IF YOU WISH TO USE A TRENCH EXTENSION DESIGN OPTION ENTER "Y"			Enter Custom Width in metre	
AES INFILTRATION FOOT PRINT AREA - $L = Q / (DLR \times W)$		Length	Width	Minimum AES foot print required.
for this Basic Serial design is		27.6	x 2.90	= 80.0 m2 total

Code	AES System Bill of Materials		Chankar Environmental Use Only	
AES-PIPE	AES 3 mtr Lths required	18	lths	Digitally signed by Kane Dickson DN: cn=Kane Dickson, o=Chankar Environmental, ou=Design Review, email=designreview@enviro-septic.com.au, c=AU Date: 2020.06.24 07:46:00 +10'00' Designreview@enviro-septic.com.au
AESC	AESC Couplings required	16	ea	
AESO	AESO Offset adaptors	4	ea	
AESODV	AES Oxygen demand vent	1	ea	
AES-JPB	AES 100mm Inspection point base	2	ea	
AES Equ	AES Speed Flow Equaliser		ea	
AES DESC	Double Offset Adaptors		ea	
TOTAL SYSTEM SAND REQUIRED (Guide Only)		41	m3	
PLEASE email your AES CALC and Drawings to				
DESIGNREVIEW@ENVIRO-SEPTIC.COM.AU				

The AES Calculator is a design aid to allow checking of the AES components and configuration and is a guide only. Site and soil conditions referencing the AS 1547 standard are calculated and designed by a Qualified Designer

Chankar Environmental has no responsibility for the soil evaluation, loading calculations or DLR entered by the designer for this calculator

AES pipes can be cut to length on site. They are supplied in 3 meter lths only

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WASTE WATER TREATMENT REQUIREMENTS IN AREAS WITHOUT SEWERAGE TREATMENT FACILITIES

DATE: 22/06/2020
JOB NO: 15848
SITE: 2 EMERALD HEIGHTS ROAD MAREEBA MAREEBA

OWNER'S NAME: STEFANIE HORNER
ADDRESS: PO BOX 5992 CAIRNS QLD

CLIENT: STEFANIE & GARETH HORNER
LOCAL GOVERNMENT AREA: MAREEBA

REAL PROPERTY DESCRIPTION:

LOT NO.	R.P. NO.	ASSESSMENT NO.	PARISH	COUNTY	

Area / length of trench

See Drawings

Soil Classification

No of bedrooms

No. of persons facility is designed for

Wastewater flow allowance

Total design flow allowance

4	
N/A	persons
N/A	litres/person/day
N/A	litres/day
1600	

Recommended facility type (a) :

absorption trenches	
absorption beds	
evapo-transpiration-absorption systems	X
mounds	
Irrigation systems	

STATEMENT

The attached report and evaluation was performed for and on behalf of Soiltest.biz and in accordance with the "Queensland plumbing and wastewater code"



Authorised Signature:

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SITE EVALUATION

Embankments:	NO	Slope:	1:0.5DEG	Ground Cover:	GRASS
Primary		Secondary		Advanced Secondary	
					X

Convergence	Linear	Quadratic	Cubic
Waxing divergent			
Waxing planar			
Waxing convergent			

FARMING		FEW	
Yes	No	X	No
> 50m	> 30m	N/A	N/A
Yes	No	X	No
> 15m	> 6m	N/A	N/A
> 50m	> 10m	X	X
> higher 4m	> lower 2m	X	X
N/A			
High Neighbour	Low Neighbour	X	No
2m	> 4m	X	X
Yes	No	X	No

[illegible]

Annual Rainfall:	MAREEBA	General Comment: (rainfall intensities, seasonal variation etc.) Annual Potential Evapotranspiration: Annual Mean Evaporation Rate:	Irrigated Water Supply Source: Public supply Dam Other	Rainwater collection Borehole Other
Mean BOM values	MAREEBA			
Mean BOM values	MAREEBA			
Mean BOM values mm/day				

☐ **Environmental Concerns:**
 eg, Native plants intolerant of phosphorous
 load, high water table, swamp, waterways,
 etc.)

Is the stability expert evaluation necessary? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	If YES, attach stability report and give details here of: Author: _____ Company/Agency: _____ Date of Report: _____
Flail: YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	Stable Site: YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>

Drainage Controls		NOT FOUND AT EX DEPTH		Need for ground water cut-off drains? See drawings		Need for surface water collector/cut-off drains? See drawings	
Depth of permanent water label: > 1.5m		Winter mm	X	YES		Summer mm	
				YES			
			X	NO			
				NO			

SUBSOIL INVESTIGATION

Soil Profile Determination

Method:

Falling Water Test	
Pit	
Permeameter	X
Other (specify):	

Estimated Soil Category:

Soil Category

1
2
3
4
5
6

Description	Tick
Gravels and sands	
Sandy Loams	
Loams	
Clay loams	4
Light clays	
Medium to heavy clays	

Reason for placing in stated soil category: Visual and Texture test, percolation

(DIR) recommendation:

(DLR) recommendation:

Secondary	N/A
Primary	N/A
Secondary	20

GENERAL COMMENTS

Need for Groundwater Quality Protection:

YES ☐

NO ☒

Evaluator's preliminary assessment of minimum Land Application Area for the site

(comprising absorption area, space between and surrounding the absorption area elements, setbacks and the reserve area).

Septic trench absorption:		See Drawings
Evapotranspiration:	X	See Drawings
Irrigation Field:		See Drawings
Mound:		See Drawings
Other		

Design Considerations

Any specific environmental constraints?

Any specific public health constraints?

Yes ☐

No ☒

Yes ☐

No ☒

Results of consultation with other interested parties (neighbours, environmental agencies, local environmental groups, etc.)

YES ☐

NO ☒

Other comments:

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DESIGN CERTIFICATE FOR ON SITE SEWERAGE FACILITIES

JOB NO. 15848
SITE 2 EMERALD HEIGHTS ROAD MAREEBA MAREEBA
DWG No. 01 & 02
DATE 22/06/2020
LOC GOV MAREEBA

We Soiltest.biz being designers of the on site sewerage system, do hereby certify that the Site & Soil Evaluation Procedures used to design the On-Site Sewerage Facility for the above property have been conducted in accordance with:

- 1) Plumbing and Drainage Act 2002
- 2) AS 1547-2000 On Site Domestic Waste Water Management
- 3) Any additional requirements of the Council as required by them at time of certification

1. We are familiar with the regulatory requirements for the site evaluation.
2. We accept professional responsibility for the interpretation of, and conclusions drawn from and recommendations made as a result of the site evaluation/report
3. The On-Site Sewerage Facility (as designed) is an appropriate facility for the allotment.

DESIGN CRITERIA

Maximum Number of bedrooms in house	N/A
Number of Equivalent Persons	N/A
Maximum designed daily flow for facility (Litres)	1600
Soil Category and/ or soil texture	4
Irrigation Design Irrigation Rate DIR	N/A
OR	
Design Loading Rate for trench/s & beds DLR (Primary)	N/A
(Secondary)	20



ABN 49 250 204 480

29 Shields St.
P.O. Box 5992
Cairns, QLD
4870 Australia

Ph: +61 7 4051 4424
Fax: +61 7 4031 1998
test@soiltest.biz

Singapore, NZ, London

P. Lennox BSA 18267
Signed for SOIL TEST .BIZ

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LOCAL GOVERNMENT
AREA:

MAREEBA

COUNCIL CONDITIONS OF PERMIT FOR ON-SITE SEWERAGE FACILITIES

(To be completed by Owner at Application Stage)

WAPD

SITE ADDRESS 2 EMERALD HEIGHTS ROAD MAREEBA MAREEBA

RP/SP:

MAKE & MODEL NO. OF SEWERAGE TREATMENT FACILITY:

I/ We

being the owner/s of the above property do hereby confirm that:

i. I/We hold a **Maintenance Contract** for the servicing and maintenance of the above facility with a Council approved servicing agent and will continue to renew this contract as and when the existing contract expires;

ii. I/We have been issued with the **Operating and Maintenance Guidelines / Instructions** for the above facility;

iii. I/We realise that the Sewerage Treatment Facility and Disposal Area located at the above address has been designed to cater for a dwelling as follows:

Number of bedrooms in the house

N/A

Maximum daily flow for entire house (litres)

1600

Number of equivalent persons

N/A

iv. I/We have been made aware of any reduced flow fixtures/ facilities that must be installed (and maintained) as specified in the site evaluation report/ design.

v. I/We understand that contact with effluent can present serious health risks to frail and elderly persons, infants, persons with a history of chronic hepatitis, persons who are immunocompromised, persons with cystic fibrosis etc. I/We will take appropriate measures to restrict access to the disposal area by the above-mentioned people.

vi. I/We understand that as owner, I/we have the following obligations:

- All occupiers/ users of an on-site facility must be provided access to the manufacturers/ facility builder's operation and maintenance instructions,
- Operation and maintenance procedures are to be undertaken to a regular schedule in accordance with instructions. (On site facilities may fail if not operated and maintained correctly),
- Continuity of operation and maintenance is to be maintained throughout changes of ownership, occupancy or changes in use or development of the site,
- Paying to Council the relevant Annual Licence Fee as determined by Council (to cover the cost of maintaining records and randomly inspecting installations).

vii. Inspection reports are required to be provided to council every three (3) months unless a less frequent inspection regime is recommended in the Department of Natural Resources & Mines System Approval;

viii. All future pools, buildings, driveways, bores and the like will remain the required set back distance away from the effluent disposal area.

ix. I/We will ensure that any defective part of the on-site sewerage facility is repaired or replaced within 24 hours of written notice from Council that the facility is defective, or will have finalised any temporary arrangements to the satisfaction of the Senior Plumbing Inspector.

x. I/We understand that effluent must not come in contact with edible fruit & vegetables.

xi. I am aware that council may approve a request for dispensation (if required) for set-back distances that would allow an All-Purpose Septic Tank to be installed on this property.

Note: - If an All Purpose/ Septic Tank has been installed, Sections i), ii), vi) (d) & vii) above are not applicable

OWNER:

STEFANIE & GARETH HORNER

Owners Signature/s:

Date:

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(To be completed by the LICENCED INSTALLER of the on-site sewerage facility on completion of the installation)

COMPLIANCE CERTIFICATE FOR
ON- SITE SEWERAGE FACILITIES
BY THE INSTALLER

Date : 22/06/2020
JOB: 15848
SITE: 2 EMERALD HEIGHTS ROAD MAREEBA MAREEBA
OWNER: STEFANIE & GARETH HORNER

RP/SP:
PERMIT REFERENCE:
LOCAL GOVERNMENT AREA: MAREEBA

MAKE MODEL NO OF FACILITY:

I, as installing contractor certify and accept all responsibility, that the on site sewerage facility and land application area for the above property has been installed in accordance with the approved on site design and the requirements of the Plumbing and Drainage Act 2002, Queensland Plumbing and Wastewater Code and AS/NZS 1547:2000 and any additional requirements specified on the approval by the Council. The on-site sewerage facility / land application area has been installed by an appropriately qualified person in accordance with clause 3.5.6 of the AS/NZS 1547:2000 whose details are as follows

Qualified Installer Details:

Name:
Address:
Phone:
Fax:
Mobile:
Drainers licence No:
Plumbers licence No:
QBSA Licence No:

SIGNED:

NAME:

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4000 L SEPTIC TANK = 1600L PER DAY TREATMENT

WATER USAGE

WATER USAGE
HORSE WASH WATER = 7min X 10 X 2L/Min
(50 KPa = 140 L PER DAY
HORSE DRINKING = 50L / HORSE/ DAY
= 500L PER DAY

TOTAL WATER USAGE

WASHING & DRINKING = 640L / DAY

ASSUME ALL IS USED AS EFFLUENT
THEREFORE 1600L / DAY FOR SEPTIC
TANK IS SUFFICIENT



FINISH AES INSPECTION POINTS
LEVEL WITH GROUND

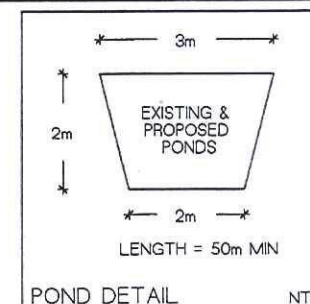
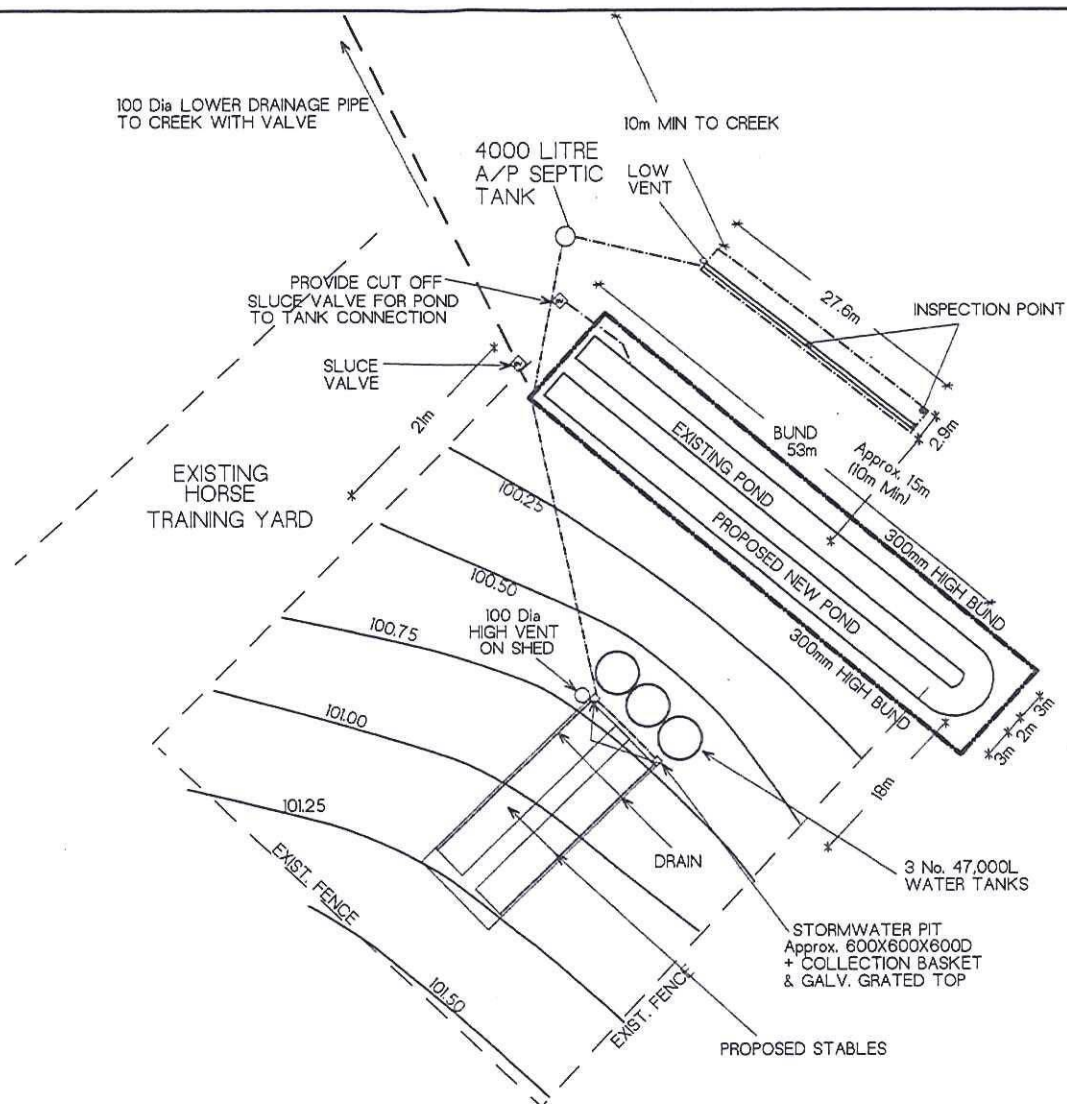
AES PIPES - 3m LENGTH
ADAPTORS @ EACH JUNCTION
END CAPS @ EACH END
INSTALLED TO MANUF. SPECS

CONSTRUCTION NOTES:

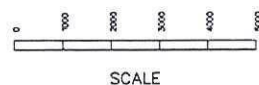
PROVIDE FALLS AS FOLLOWS:
 LINES TO SEPTIC TANK = MIN 1:300
 SEPTIC TANK TO PIPES = MIN 1:300

SETOUT NOTES

ALL DIMENSIONS & BEARINGS TO BE VERIFIED
ON SITE PRIOR TO ANY SETOUT AND CONSTRUCTION.
BUILDER TO ARRANGE FOR ANY MISSING BOUNDARY
PEGS TO BE REINSTATE. LOCATION OF UNITS &
SEPTIC SYSTEM ON SITE PLAN IS APPROX. ONLY.
BUILDER TO CONFIRM LOCATION ON SITE.
SOILTEST.BIZ TO BE NOTIFIED IMMEDIATELY OF ANY
DISCREPANCIES IN BOUNDARY DIMENSIONS & BEARINGS
OR SETOUT DIMENSIONS



PONDS - EXISTING & NEW
2.5m WIDE (Average) X 50m LONG
X 2m AV DEPTH = 250m³ X 2
= 500 m³ = 500 000 LITRES



PROJECT:

STEFANIE & GARETH HORNER
#2 EMERALD CREEK ROAD
MAREEBA

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FORBIDDEN WITHOUT WRITTEN PERMISSION

Soiltest.biz

22 Timpinton Street
Gordonvale QLD 4805
Australia
Ph 0429 830 442
email: bestpollen@big

Assigned	PI	Area	KG	Drawing no.
Approved	<i>[Signature]</i>	Job no.	15848	
Scale	1:500	Date	JUN 20 20	Rev. no.

WIND CLASSIFICATION C2

TABLE 1

CERTIFIED DESIGN		
TREATMENT SYSTEM	ADVANCED ENVIRO-SEPTIC	
EFFLUENT TYPE	ADVANCED SECONDARY	
DISPOSAL TYPE	EVAPOTRANSPIRATION	
BED WIDTH M	BED LENGTH M	
2.90	27.60	

TABLE 2

DESIGN ASSUMPTIONS	
BEDROOMS	N/A
PERSONS	N/A
TOTAL DAILY FLOW	1600 LITRES
SOIL CATEGORY	4

TABLE 3

HORIZONTAL SEPARATION DISTANCE FOR EFFLUENT DISPOSAL AREAS

	PRIMARY EFFLUENT (SEPTIC) M	SECONDARY EFFLUENT (HTSP) M	ADVANCED SECONDARY (HTSP) M
1 TOP OF BANK WATER COURSE (RIVER STREAM LAKE DAM EASMENT BNDRY OPEN UNLINED DRAINAGE CHANNEL)	50	30	10
2 FARM DAMS INTERMITTENT WATER COURSE DRAINAGE CHANNELS	50	30	10
3 BORE OR WELL USED FOR DRINKING SUPPLY	50	30	10
4 BORE OR WELL USED FOR NON DRINKING SUPPLY	15	15	10
5 PROPERTY BOUNDARIES, PATHS, WALKWAYS, BUILDING FOOTINGS RETAINING WALLS	4 LOWER THAN DISPOSAL AREA 2 HIGHER THAN DISPOSAL AREA		
6 CHILDRENS PLAY AREAS DWELLINGS RECREATION AREAS	SUBSURFACE AS FOR 5 ABOVE NO SURFACE SPRAY PERMITTED	SUBSURFACE AS FOR 5 ABOVE 15 F SURFACE SPRAYED	SUBSURFACE AS FOR 5 ABOVE 10 F SURFACE SPRAYED
7 SWIMMING POOL WATER EDGE	6	6	6
8 IN GROUND POTABLE WATER TANK	15	6	6
9 UNSATURATED SOIL DEPTH TO PERMANENT WATER TABLE	1.2 VERT	0.6 VERT	0.3 VERT

NOTES:

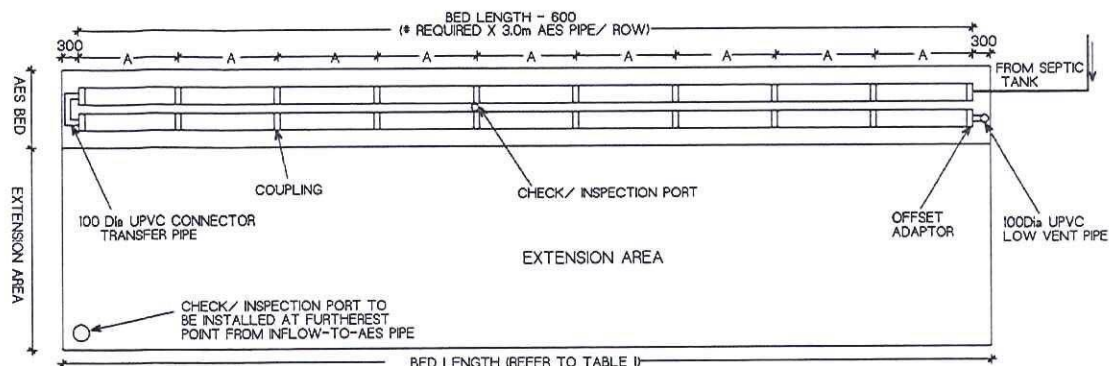
1. HSTP INSTALLED WITH MANUFACTURERS INSTRUCTIONS
2. PLUMBING AND DRAINAGE IN ACCORDANCE WITH THE ON SITE SEWERAGE CODE AND THE NATIONAL PLUMBING AND DRAINAGE CODE AS3500
3. FUTURE BORE INSTALLATIONS MUST HAVE SEPARATION DISTANCES AS PER TABLE
4. DURABLE AGGREGATE AS PER AS 2758: 20MM
5. GEOFABRIC TO BE BIDM A12 OR EQUIVALENT
6. ALL INSTALLATION TO BE IN ACCORDANCE WITH AS1547-2000 ON SITE DOMESTIC WASTEWATER MANAGEMENT
7. PLANT APPROPRIATE LARGE TREES (5m APART MAX) or BANANA PLANTS (1.5m APART @ 5m ROW CRS) or VETIVER GRASS (1m ROW CRS; 3 PLANTS PER M2) WHERE SHOWN ON DWG 06.

DURABLE METAL SIGNS ARE REQUIRED ON EACH SIDE OF AN IRRIGATION AREA LAA AND ARE TO READ:

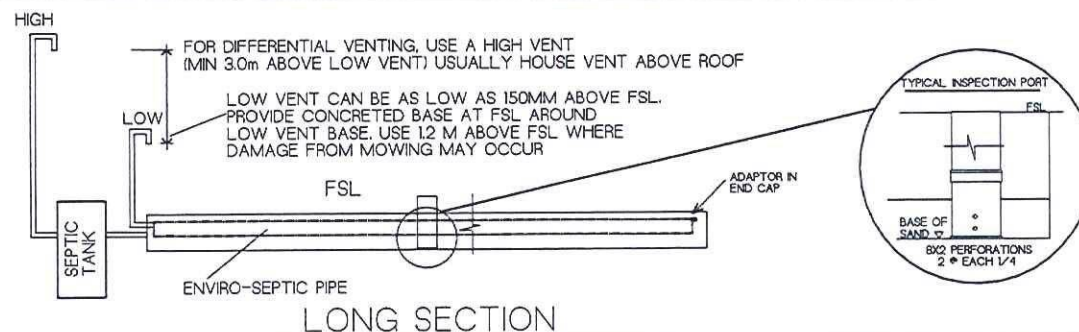
"WARNING RECLAIMED EFFLUENT DO NOT DRINK"
ALL SEWERAGE DELIVERY LINES TO BE EITHER STRIPED OR COVERED WITH PURPLE SEWERAGE TAPE
SIGNAGE FOR DELIVERY LINES TP READ: "DO NOT DIG BURIED EFFLUENT PIPES" AND "NO VEHICLE ACCESS"

REFER TO OWNERS MANUAL FOR ADDITIONAL NOTES

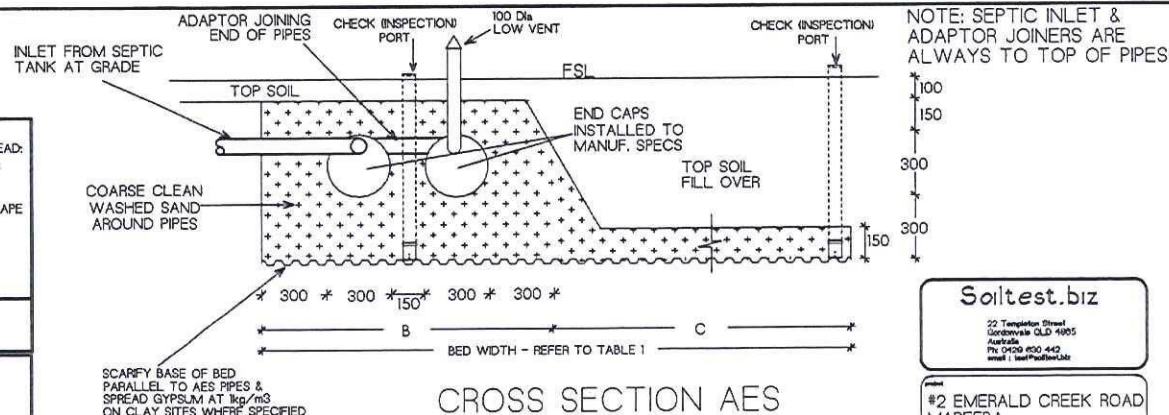
NOTE: SYSTEM HAS BEEN DESIGNED FOR THE USE OF STANDARD WATER REDUCTION FIXTURES, SUCH AS DUAL FLUSH 6/3 LTR WATER CLOSETS, SHOWER FLOW RESTRICTORS AERATOR FAUCETS (TAPS) AND WATER-CONSERVING WASHING MACHINES.
NO GARBAGE GRINDERS HAVE BEEN ALLOWED



AES SYSTEM ARRANGEMENT PLAN



LONG SECTION



CROSS SECTION AES LAA BEDDING DETAILS

CONSTRUCTION NOTES:

PROVIDE FALLS AS FOLLOWS:
RESIDENCE TO SEPTIC TANK = MIN 1:60
SEPTIC TANK TO PIPES = MIN 1:300

Soiltest.biz

22 Tanglewood Street
Gordonvale QLD 4805
Australia
Ph 0420 850 442
email: info@soiltest.biz

#2 EMERALD CREEK ROAD
MAREEBA

PL	KL	
	15848	02
NTS	JUN2020	

JOBNUM	15944		TO AS1547-2000		MAREEBA	
JOB	EMERALD CREEK ROAD MAREEBA		EVAPOTRANSPIRATION			
Bedrooms	1					
Persons	2					
Effluent/person/day	150		litres/person/day		APPENDIX 4.2D AS 1547-2000	
Effluent/day	1600		litres/day			
Porosity in disposal area	0.75		por			
Design irrigation rate	25		mm/week [litres/m2/week]		site water use 0.0% litres/day	
Design Loading Rate	BASE	DLR1	mm/day [litres/m2/day]		add to LAA 0 litres/day	
Design Loading Rate	WALL	DLR2				
Retained rain coefficient	RR					
summer	Crop Transpiration rate		OCT-MAR ET1		0.8	
winter	Crop Transpiration rate		APR-SEP ET2		0.8	
Estimated area of effluent drainfield			81 m2			
Maximum depth of stored effluent			150 mm		H 600 mm	

month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
days	pan	Evap	pan	Evapo	rainfall	retained	DLR	disp	effluent	area	trial	applic	sum	depth	incr	depth	incr	computed
	/day		/mth	trans	/mth	rainfall	/mth	/mth	/mth	/mth	area	rate						depth
			1*2	3*ET		5*RR	1*DLR	4-6+7	1*eff/day	9/8		9/11	12-8	13/por	15+14	15+14	16+15	
jan	31	3.8	118	94	202.9	122	620	593	49600	84		616	24	32	0	32	32	
feb	28	3.6	101	81	247.3	148	560	492	44800	91		557	64	86	32	117	117	
mar	31	3.3	102	82	194.9	117	620	585	49600	85		616	31	42	117	159	159	
apr	30	3	90	72	44.3	27	600	645	48000	74		596	-49	-66	159	93	93	
may	31	2.9	90	72	23.6	14	620	678	49600	73		616	-62	-82	93	11	11	
jun	30	2.4	72	58	14.9	9	600	649	48000	74		596	-52	-70	11	-59	0	
jul	31	2.4	74	60	7.2	4	620	675	49600	73		616	-59	-79	0	-79	0	
aug	31	2.9	90	72	6.7	4	620	688	49600	72		616	-72	-96	0	-96	0	
sep	30	3.9	117	94	4.6	3	600	691	48000	69		596	-95	-126	0	-126	0	
oct	31	5	155	124	14.7	9	620	735	49600	67		616	-119	-159	0	-159	0	
nov	30	4.9	147	118	57.7	35	600	683	48000	70		596	-87	-116	0	-116	0	
dec	31	4.6	143	114	106.9	64	620	670	49600	74		616	-54	-72	0	-72	0	
JAN	31	3.8	118	94	202.9	122	620	593	49600	84		616	24	32	0	32	32	
FEB	28	3.6	101	81	247.3	148	560	492	44800	91		557	64	86	32	117	117	A1
year	365	43	1299	1039	926	555	8480	7784	584000						max			A2
															min			must=0

USED
TRIAL AREA 80.5

evapotranspiration calculation

base only	81
width W	length L
0.6	134
1.2	67
1.8	45
2.4	34
3.6	22
4.8	20
	17

Base Area=L*W

Absorbion trench calculation

abs area	80
width W	length L
0.6	133
1.2	67
1.8	44
2.4	33
3.6	22
4.8	20
	17

Base Area=L*W

MAX 91
MIN 67
RATIO 1.3

Irrigation area calculation

irrig area	448
width W	length L
0.6	747
1.2	373
1.8	249
2.4	187
3.6	124
4.8	93
	28

evapotranspiration calculation

trial area inc wall	81
width W	length L
0.6	1
1.2	1
1.8	2
2.4	3
3.6	72
4.8	88
	96
	sum
	1
	1
	2
	3
	72
	88
	96
	A1
	A2
	1
	1
	2
	3
	21
	24
	26

Area=L*W+2*H*(L+W)/1000

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JOB No 15848
CLIENT STEFANIE & GARETH HORNER
SITE 2 EMERALD HEIGHTS ROAD MAREEBA MAREEBA

OWNER: STEFANIE HORNER

MANUAL WASTE WATER MANAGEMENT (OWNER COPY)

The system has been designed for effluent usage of

1600 litres/day maximum.

Excess usage may lead to failure of the system.



ABR 49 290 204 481

29 Shields St.
P.O. Box 5992
Cairns, QLD
4870 Australia

Ph +61 7 4051 4424
Fax +61 7 4031 1998
test@soiltest.biz

Singapore, NZ, London

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ON-SITE DOMESTIC WASTEWATER SYSTEM CONSTRUCTION, OPERATION AND MAINTENANCE REQUIREMENTS

DESIGN ASSUMPTIONS FOR SEWERAGE LAND APPLICATION AREAS (LAA)

The on site domestic wastewater system has been designed assuming a maximum life of 15 years without replacement or reworking therefore the following design assumptions **MUST** be followed.

1. That standard water reduction fixtures such as dual flush 11/5.5 litre water closets, shower flow restrictors, aerator faucets (taps) have been fitted to all fixtures and water-conserving automatic washing machines, **NO GARBAGE GRINDERS**.
2. Low phosphorus detergents, low sodium detergents and biodegradable soaps are used in the system.
3. **LAA MUST be fully DENSLY planted by either the owner or plumber, with recommended vegetation and grasses, PRIOR to commissioning the system. Planting must be maintained by pruning and replacement on a regular basis. The LAA has been designed assuming planting is in place.**
4. Inundation of the LAA by rain and /or surface drainage may lead to temporary or permanent failure of the LAA. Keep all surface water cut off drains clean and operational. Surface water cut off drains are to be placed to the high edge and sides of LAA, and to be graded away from the lower edge.
5. Durable metal warning signs are required on each side of an irrigation area LAA, and are to read, **"WARNING RECLAIMED EFFLUENT DO NOT DRINK"** and **"DO NOT DIG BURIED EFFLUENT PIPES"** and **"NO VEHICLE ACCESS"**.
6. Evapotranspiration and absorption LAA's do not require signs.
All LAA's shall not allow vehicle access.
7. For maintenance, Gypsum must be added to the top of the completed LAA, to replenish the Gypsum originally added, at the rate of 0.5kg/m² at intervals not exceeding 24 months (if town and low salts water is used). If bore water or high dissolved salts water is used apply Gypsum at the rate of 0.1 kg/m² on a monthly interval to the top of the LAA.
8. For above ground sprinkler systems. Sprinkler heads must be moved regularly to prevent local ponding and saturation.

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ON-SITE DOMESTIC WASTEWATER SYSTEM CONSTRUCTION, OPERATION AND MAINTENANCE REQUIREMENTS

1. ADVICE TO HOME OWNER/OCCUPIER ON USE OF THE SYSTEM.

For the on-site wastewater system to work efficiently, there are some good habits to encourage and some bad habits to avoid.

A. In order to reduce sludge building up in the tank:

1. Scrape all dishes to remove fats, grease, etc. before washing;
2. Keep all possible solids out of the system;
3. **DO-NOT USE A GARAGE GRINDER** unless the system has been specifically designed to carry the extra load;
4. **DO-NOT** put sanitary napkins and other hygiene products into the System.

B. In order to keep the bacteria working in the tank and in the land-application area.

1. Use bio-degradable soaps;
2. Use a low-phosphorus detergent;
3. Use a low-sodium detergent;
4. Use detergents in the recommended quantities;
5. **DO-NOT** use powerful bleaches, whiteners, nappy soakers, spot removers and disinfectants;
6. **DO-NOT** put chemicals or paint down the drains.

C. Conservation of water will reduce the volume of effluent requiring disposal to the land-application area, making it last longer and improving it's performance. Conservation measures include:

1. Installing standard water reduction fixtures such as dual flush 11/5.5 litre water closets, shower flow restrictors, aerator faucets (taps) fitted to all fixtures and water-conserving automatic washing machines. **NO GARBAGE GRINDERS;**
2. Taking showers instead of baths;
3. Only washing clothes when there is a full load of washing;
4. Only using the dishwasher when there is a full load to be done.

NOTE: Avoid overloading the system by spacing out water use as evenly as possible.

ITEMS: Do not do all the washing on one day.
Do not run the washing machine and dishwasher at the same time.

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2. ADVICE ON MAINTENANCE

A. The primary wastewater-treatment unit (septic tank) will need to:

1. De-sludge regularly i.e. every three to five years or when scum and sludge occupy 2/3 of the volume of the tank (or the first of a two stage system).
2. Protect from vehicles.
3. Clean out the grease trap regularly.
4. Keep the vent and/or access cover of the septic tank exposed.
5. Inspect outlet filter and clean regularly.

B. The Land Application Area (LAA) needs protection as follows:

1. No vehicle or stock should be allowed on trenches or beds;
2. Deep rooting trees or shrubs should not be grown over absorption trenches or pipes;
3. The surface water interceptor drains around the LAA should be kept clean to reduce absorption of rainwater into trenches or beds;
4. Keep grass mowed and plants pruned to ensure that these areas take up nutrients with maximum efficiency. Replace plants or prune severely when plants reach maturity. Remove prunings and grass clippings from the LAA.

C. Check equipment and:

1. Follow the manufacturers instructions for the maintaining septic tank filters:

3. ADVICE ON OPERATION PROBLEMS

Problems can occur with systems which have not been maintained and where absorption areas have become blocked or clogged. The warning signs are obvious.

1. Absorption field is wet or soggy with wastewater ponding on the surface of the ground.
2. There is a smell of "sewage" near the septic tank or absorption areas;
3. The drains and toilets run slowly;
4. The grease trap (if applicable) is full or blocked;

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4. ADVICE ON THE CONSEQUENCES OF FAILURE

A failed septic tank and land-application system is a serious environmental hazard and can lead to.

1. Spread of infectious diseases;
2. Breeding of mosquitoes and attraction of flies and rodents;
3. Nuisance and unpleasantness;
4. Pollution and infection of waterways, beaches, streams;
5. Contamination of bores, well, and groundwater;
6. Alteration of local ecology.

5. ADVICE ON HOME OWNER/OCCUPIERS RESPONSIBILITIES

Homeowners and occupiers are legally responsible to keep their on-site wastewater system in good working order. If any of the warning signs in section 3 are evident, the homeowner or occupier must take steps to rectify the situation as quickly as possible.

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ON-SITE DOMESTIC WASTEWATER SYSTEM CONSTRUCTION, OPERATION AND MAINTENANCE REQUIREMENTS

GENERAL NOTES:

1. SOILTEST.BIZ will not be liable for failure of any system if our design is not constructed in strict accordance with the drawings and if inspections are not carried out by SOILTEST.BIZ at the base of the LAA and when complete.
2. Restrict access to vehicle traffic to LAA no larger than ride on mowers.
3. Refer to Operation & Maintenance notes.
4. Owner is to be informed of their obligations for maintenance of system.

CONSTRUCTION NOTES:

1. If unforeseen ground changes occur at the base of the excavation of trenches plumber is to contact SOILTEST.BIZ immediately.
2. The base of trenches and evapotranspiration areas must remain level and have GYPSUM applied at a rate of 1KG/ M2 if clays are encountered at the base of the LAA.
3. Surface water interceptor must be constructed accordance with drawings to reduce storm water ponding. (See 'Design Assumptions' pg.2; item 4).
4. **Land Application Area (LAA) MUST be fully and DENSLY planted by either the owner or plumber with recommended vegetation and grasses PRIOR to commissioning the system. Planting must be maintained by pruning and replacement on a regular basis. The LAA has been designed assuming planting is in place.**
5. Durable metal warning signs are required on each side of an irrigation area LAA, and are to read, **"WARNING RECLAIMED EFFLUENT DO NOT DRINK" AND "DO NOT DIG BURIED EFFLUENT PIPES" AND "NO VEHICLE ACCESS"**.
6. Evapotranspiration and absorption LAA's do not require the above signs. All LAA's shall not allow vehicle access. See 'General Notes' above.
7. Pump discharge lines to be fitted with non-return valve as close as practical to the outlet of the pump.
8. Lateral drainage lines are to be installed level or following contours.
9. Distribution boxes installed on a level base of 100mm of concrete and 75mm min. below outlet of the septic tank. Distribution boxes to be fitted with a baffle suitable for pump discharge.
10. Trench moulds to be fitted with end caps and spreaders at 1500 centres.
11. Warning tape to be placed over effluent lines.
12. Base of the LAA is to be excavated by a machine with raker teeth. Tyne base to 200mm deep and place Gypsum at the rate of 1kg/m2 to the base in clay soils.
13. **Spray irrigation** sprinklers are to be spaced evenly. Sprinklers are to produce at the outlet of the pump a large droplet spray no more than 600mm high and 2000mm in diameter. A 150-200um strainer is to be fitted to the pump line prior to LAA.
14. **Subsurface irrigation systems** - provide non-return valves at the pump line near the distribution valve (K rain valve or similar). Provide 25mm ball valve to the end of each lateral to enable flushing of the line. An air admittance device is to be installed in the position indicated to prevent debris being drawn into the line by syphoning. A pressure-reducing valve is required on the pump line prior to the LAA.

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**ON-SITE DOMESTIC WASTEWATER SYSTEM
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AND MAINTENANCE REQUIREMENTS**

LAND APPLICATION AREAS (LAA)

**PLANTING FOR EVAPO-TRANSPIRATION/ ABSORPTION
SYSTEMS**

Plant species that have shallow root and high water uptake such as; Condamine couch; lomandra longisolia folia; Mondo grass; Canna Lily, Bananas (see planting species list attached).

PLANTING FOR SPRAY IRRIGATION SYSTEMS

Do not use grass on spray irrigation systems due to non-control of use and access. Instead, plant beds with flowers and plants, bushes etc. as per attached plant list. Grasses such as Vetiver grass is satisfactory and is deep rooted and high PH tolerance. This grass helps prevent erosion due to its root structure. Provide mulch to all beds such as Earthgrow (primarily composted bark and cow manure). Ensure mulch does not have too many fines. Hardwood chips are satisfactory. Apply Gypsum at the rate of 0.25kg/m². Keep irrigation even, young plants may require supplementary watering. Use automated intermittent watering allow the top 50mm to dry out prior to reapplying.

PLANTING FOR SUBSURFACE IRRIGATION SYSTEMS

Grasses as per attached list and plant species that have shallow root and high water uptake such as; Condamine couch; lomandra longisolia folia; Mondo grass; Canna Lily, Bananas, helliconias, (see planting species list attached). Provide minimum of 100 mm mulch to all beds, covering pipe work with 100 mm minimum such as Earthgrow (primarily composted bark and cow manure). Ensure mulch does not have too many fines. Hardwood chips are satisfactory. Apply Gypsum at the rate of 0.25kg/m².

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APPENDIX C
SUITABLE VEGETATION FOR WET SOILS
(Informative)

C1 SCOPE This appendix sets out suitable vegetation for growing in wet soils, e.g. on evapotranspiration beds and areas.

C2 TYPES OF VEGETATION

- | | | |
|----|--|--|
| a) | Climbers
<i>Bougainvillea</i>
<i>Hardenbergia</i>
<i>Hibbertia scandens</i> | <i>Kennedia</i>
<i>Lonicera japonica</i>
<i>Pandorea jasminoides</i> |
| b) | Grasses
<i>Buffalo</i> | <i>Kikuyu</i> |
| c) | Ground Cover
<i>Acanthus mollis</i>
<i>Coprosma x kirki</i> | <i>Liriope muscari</i>
<i>Ophiopogon</i> |
| d) | Perennials
<i>Agapanthus praecox</i>
<i>Aster novi-belgii</i>
<i>Canna x generalis</i>
<i>Chrysanthemum maximum</i> | <i>Gazania x hybrida</i>
<i>Salvia x superba</i>
<i>Stokesia laevis</i>
<i>Viola hederacea</i> |
| e) | Shrubs
<i>Abelia x grandiflora</i>
<i>Acacia longifolia</i>
<i>Callistemon citrinus</i>
<i>Cassia bicapsularis</i>
<i>Ceratostigma</i>
<i>Chaenomeles lagenaria</i>
<i>Correa alba</i>
<i>Cotoneaster glaucophyllus</i>
<i>Cotoneaster lacteus</i>
<i>Cotoneaster pannosus</i>
<i>Cuphea ignea</i>
<i>Euonymus japonicus</i>
<i>Euphorbia millii</i> | <i>Euphorbia pulcherrima</i>
<i>Hebe speciosa</i>
<i>Jasminum mesnyi</i>
<i>Jasminum officinale</i> 'Grandiflorum'
<i>Jasminum polyanthum</i>
<i>Lantana camara</i> (cultivars only)
<i>Lantana montevidensis</i>
<i>Leptospermum flavescens</i>
<i>Nerium oleander</i>
<i>Plumbago auriculata</i>
<i>Pyracantha fortuneana</i>
<i>Thunbergia alta</i>
<i>Westringia fruticosa</i> |
| f) | Trees
<i>Angophora costata</i>
<i>Banksia integrifolia</i>
<i>Callistemon salignus</i>
<i>Callistemon viminalis</i>
<i>Casuarina glauca</i>
<i>Casuarina stricta</i>
<i>Eucalyptus botryoides</i>
<i>Eucalyptus robusta</i>
<i>Hakea salicifolia</i>
<i>Hakea saligna</i> | <i>Leptospermum laevigatum</i>
<i>Leptospermum petersonii</i>
<i>Melaleuca armillaris</i> – Sandy soil
<i>Melaleuca linariifolia</i> – Clay soil
<i>Melaleuca quinquenervia</i> – Sandy Soil
<i>Melaleuca styphelioides</i> – Clay soil
<i>Nyssa sylvatica</i>
<i>Photinea x fraseri</i> 'Robusta'
<i>Tristaniopsis laurina</i> |

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