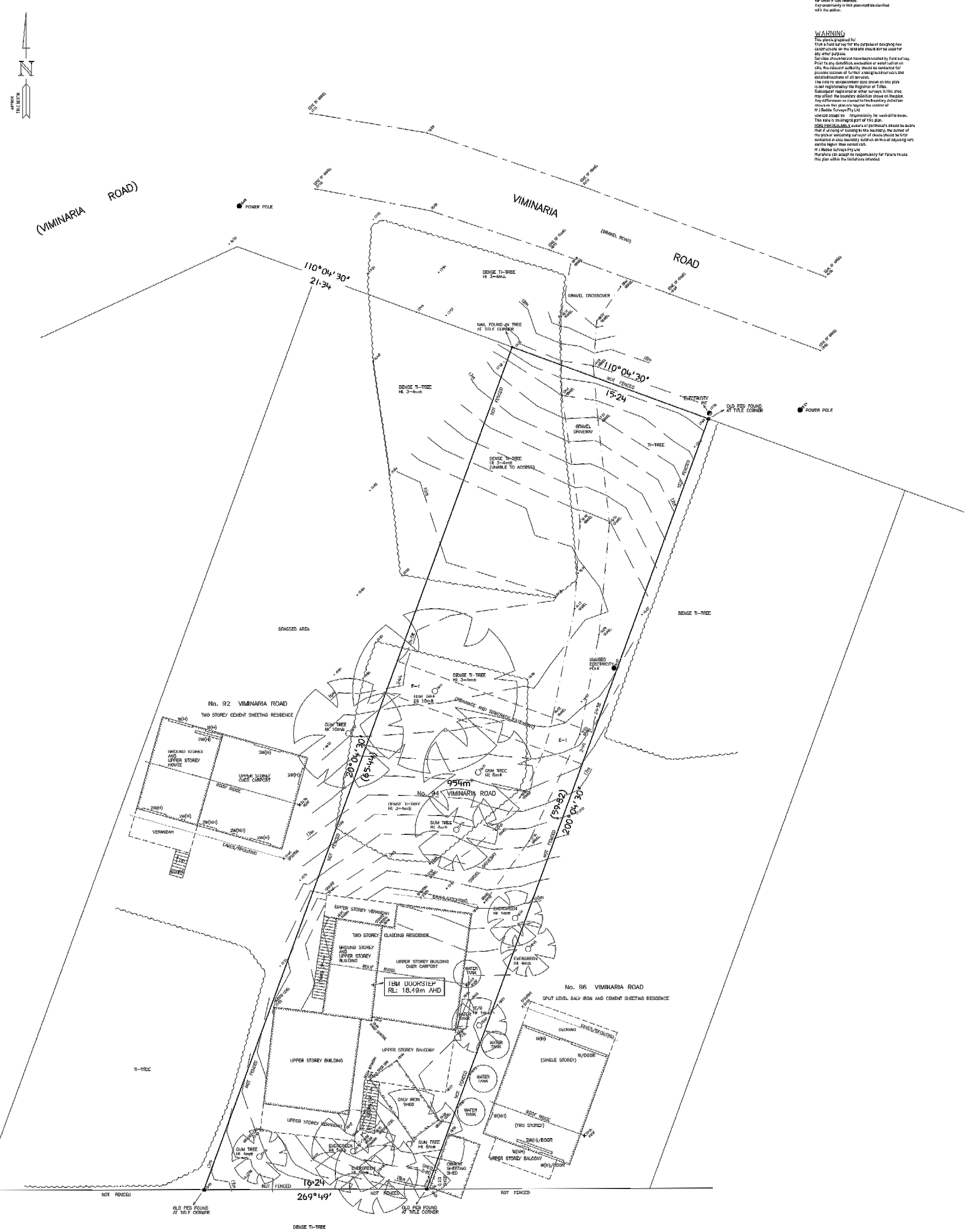
IMPORTANT NOTICE

This plan must be used only for the purpose for which it was intended.
Any uncertainty in this plan must be clarified with the author.

WARNING

This plan is prepared for
from a field survey for the purpose of designing new construction on the land and should not be used for any other purpose.
Services shown hereon have been located by field survey.
Prior to any demolition, excavation or construction on site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services.
The title re-establishment data shown on this plan is not registered by the Registrar of Titles.
Subsequent registered or other surveys in this area may affect the boundary definition shown on the plan.
Any differences or counsel to the boundary definition shown on this plan are beyond the control of
M J Reddie Surveys Pty Ltd
who can accept no responsibility for resultant differences.
This note is an integral part of this plan.
NOTE PARTICULARLY owners or purchasers should be aware that if erecting or building to the boundary, the owner of the plan or consulting surveyor of choice should be first contacted in case boundary survey on this or adjoining lots carries higher than normal risk.
M J Reddie Surveys Pty Ltd
therefore can accept no responsibility for failure to use this plan within the limitations intended.



PLAN OF SURVEY

COUNTY MORNINGTON
PARISH WONTHAGGI
(PART) CROWN ALLOTMENT 56

CERTIFICATION BY SURVEYOR

I Michael Reddie of 1 Horner Street, Beaconsfield certify that this plan has been prepared from a survey made under my direction and supervision in accordance with the Surveying Act 2004 and completed on 21-8-2018, that this plan is accurate and correctly represents the adopted boundaries and the survey accurately accords with that required from Level Red as defined in regulation 7(2) of the surveying (Cadastral Surveys) Regulations 2005.

Date: 23rd August 2018

Licensed Surveyor
Surveying Act 2004

NOTATIONS

Level datum: AHD.
AHD heights have been computed from GPS data using AusGeoid98. Data was provided by Omnisitar Cors services on 21-8-2018
Heights have not been calibrated on to Permanent Marks.
Levels shown thus: ,.00
Contour interval: 0.2 metres

POSTAL ADDRESS:
94 Viminaria Road
Harmers Haven 3995

LAND SUBJECT TO EASEMENT
E 1 Drainage and Sewerage 2.44m wide

W ground storey window
2W upper storey window
(H) window of habitable room
(NH) window of nonhabitable room

TITLE DESCRIPTION

THE LAND IN THE SURVEY IS SHOWN ENCLOSED BY CONTINUOUS THICK LINES
TITLE REF:
LAST PLAN REF: Lot 56 LP 58401

TO BE COMPLETED WHERE APPLICABLE
THIS SURVEY HAS BEEN CONNECTED TO PERMANENT MARKS NOS: —
IN PROCLAIMED SURVEY AREA NO. —

No. OF SHEETS IN PLAN 1 No. OF THIS SHEET 1

SCALE 0 1 2 3 4 5 6
LENGTHS ARE IN METRES

ORIGINAL SCALE 1:100 SHEET SIZE A0

SURVEYORS REFERENCE 18-08-47
VERSION 1
FILE 481782

M. J. Reddie Surveys Pty Ltd
ABN 49 005 983 257
1 Horner Street, Beaconsfield. 3807
P.O. Box 268, Berwick. 3806
Phone (03) 9707 4117 Fax (03) 9707 4428

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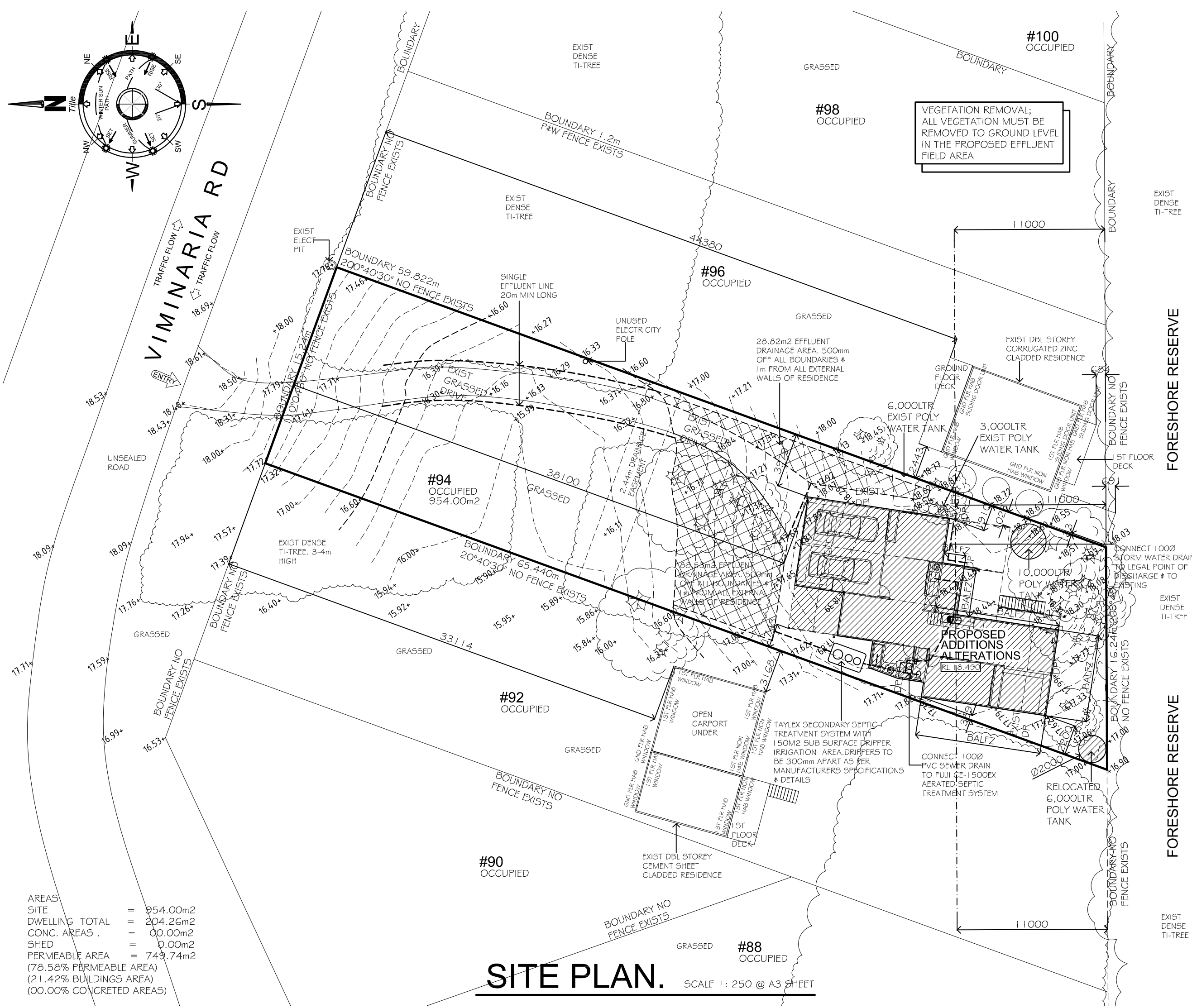

VEGETATION REMOVAL;
ALL VEGETATION MUST BE REMOVED TO GROUND LEVEL IN THE PROPOSED EFFLUENT FIELD AREA

ALL FASCIAS, BARGES, CAPPING, SPOUTING AND DOWNPIPES SHALL BE NON COMBUSTIBLE COLOURBOND TO BAL40 ZONE & BALFZ ZONE OF AS3959 2018

ALL WINDOWS SHALL BE ALUMINUM SLIDING/AWNING DBL GLAZED. ALL WINDOWS SHALL COMPLY TO AS 3959 2018 BAL 40 IN THE BAL40 ZONE. ALL WINDOWS MUST HAVE 5mm TOUGHENED GLASS. APPLIES TO OUTER PANEL IN DBL GLAZED UNITS. ALL WINDOWS SHALL HAVE METAL FLY SCREENS TO ALL OPEN ABLE & FIXED SASHES IN THE BAL 40 ZONE & ALL WINDOWS IN BALFZ ZONE SHALL BE STANDARD ALUMINUM SLIDING/AWNING DBL GLAZED W/ FLY SCREENS TO OPEN ABLE SASHES & TO HAVE BUSH FIRE SHUTTERS TO OUTSIDE FACE OF WINDOWS COMPLYING WITH BALFZ OF AS3959 2018

AREAS
SITE = 954.00m2
DWELLING TOTAL = 204.26m2
CONC. AREAS . = 00.00m2
SHED = 0.00m2
PERMEABLE AREA = 749.74m2
(78.58% PERMEABLE AREA)
(21.42% BUILDINGS AREA)
(00.00% CONCRETED AREAS)

SITE PLAN.

SCALE 1: 250 @ A3 SHEET

REVISIONS

DATE	REV	DESCRIPTION	DWN
-	-	-	-

DAVID GASKIN DESIGNS
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10 Stewart Street
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Vic, 3995
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Mob: 0409 143 197
Email: designdg@bigpond.net.au
web: www.dgdesigns.com.au

NOTES:
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TITLE: PLANNING DRAWING

SHIRE OF: BASS COAST

SOIL CLASS: A

PROJECT:
PROPOSED ADDITIONS AND ALTERATIONS FOR
FOR MR H WEBER
AT 94 VIMINARIA ROAD
HARMERS HAVEN VIC 3995

HIA Member No.532125

DRAWN: D.GASKIN
DATE: 08.05.19
SCALES: AS NOTED

PROJECT No. 080519
SHEET No. 2 OF 11
REVISION -

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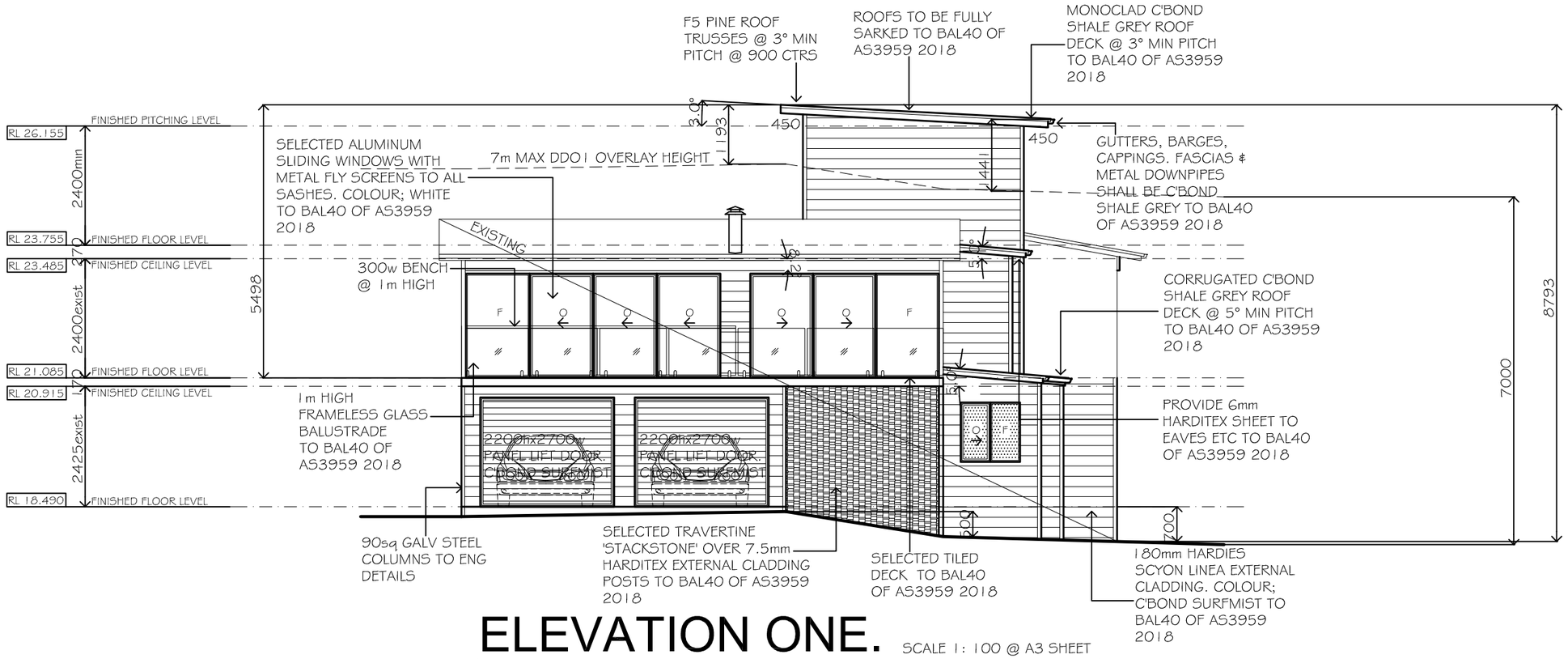
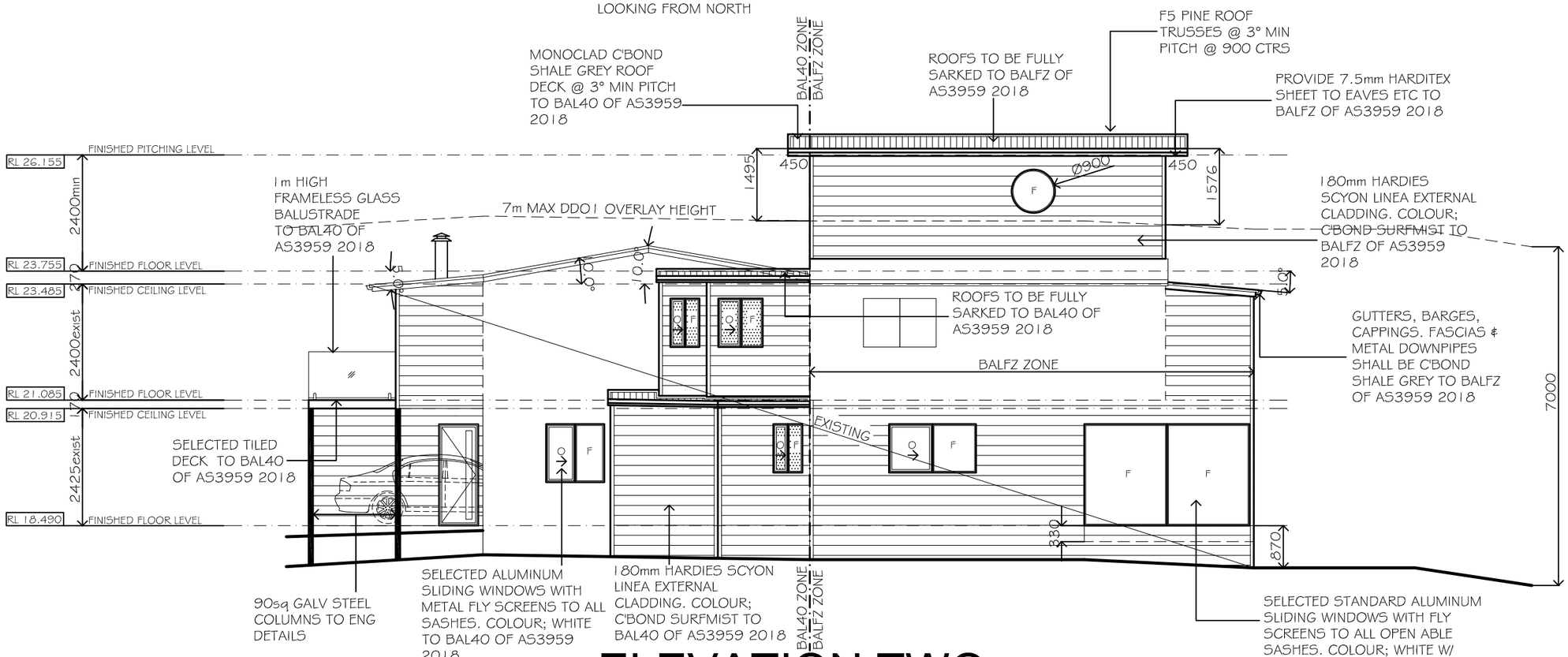


ELEVATION ONE.

SCALE 1 : 100 @ A3 SHEET

LOOKING FROM NORTH



ELEVATION TWO.

SCALE 1 : 100 @ A3 SHEET

LOOKING FROM WEST

ALL FASCIAS, BARGES, CAPPING, SPOUTING AND DOWNPIPES SHALL BE NON COMBUSTIBLE COLOURBOND TO BAL40 ZONE & BALFZ ZONE OF AS3959 2018

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HARMERS HAVEN VIC 3995

HIA Member No.532125

DRAWN : D.GASKIN
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SCALES : AS NOTED

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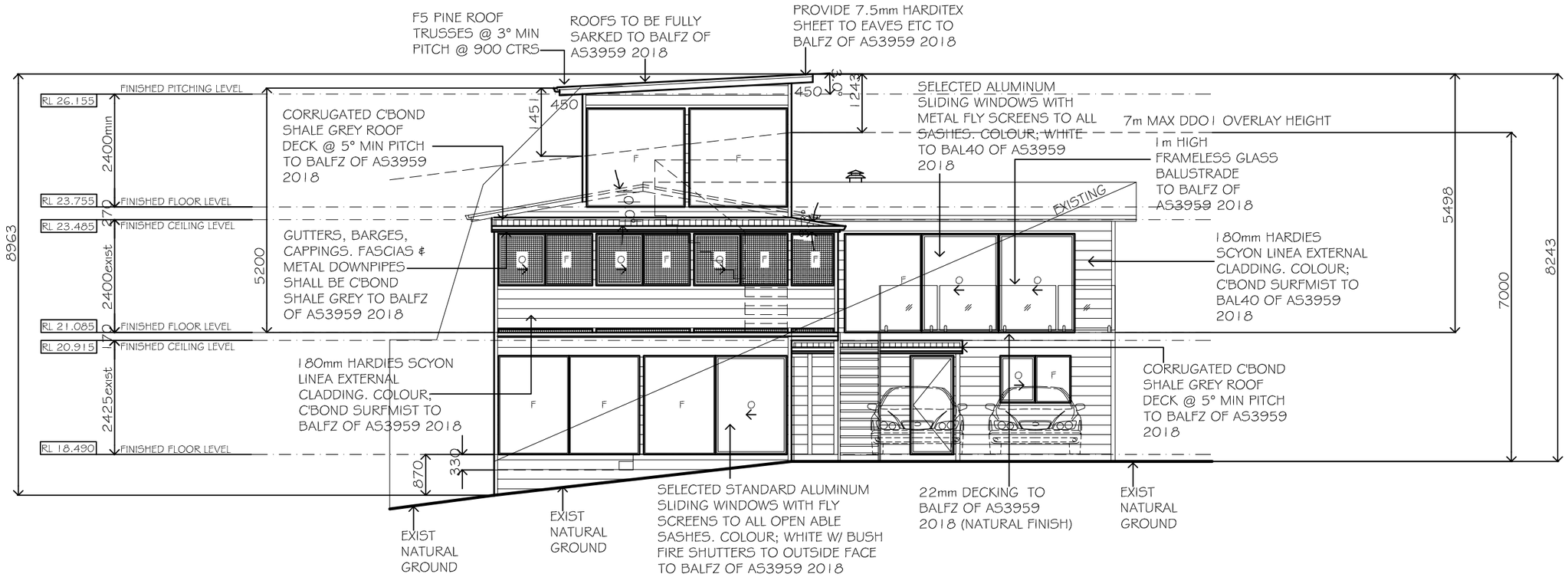
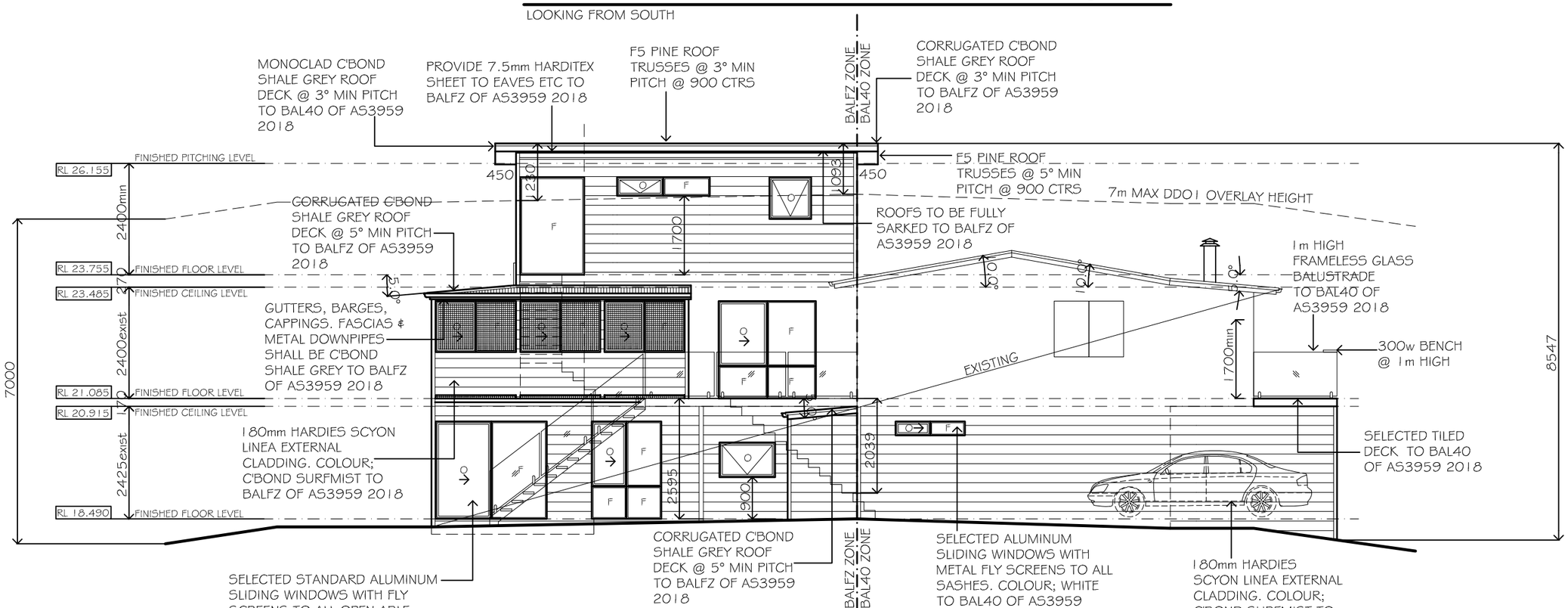


ELEVATION THREE.

SCALE 1 : 100 @ A3 SHEET

LOOKING FROM SOUTH



ELEVATION FOUR.

SCALE 1 : 100 @ A3 SHEET

LOOKING FROM EAST

ALL FASCIAS, BARGES, CAPPING, SPOUTING AND DOWNPIPES SHALL BE NON COMBUSTIBLE COLOURBOND TO BAL40 ZONE & BALFZ ZONE OF AS3959 2018

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HIA Member No.532125

DRAWN : D.GASKIN

DATE : 08.05.19

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SHEET No. 11 OF 11

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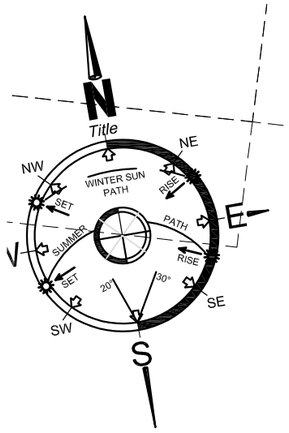

1/10

4/11

AREAS
GARAGE = 40.41m² / 434.80 ft²
STORE = 5.70m2/ 61.32 ft2
LIVING = 117.02m2/ 1258.90 ft2

TOTAL = 163.13m²/ 1754.95 ft²

ALL FASCIAS, BARGES, CAPPING, SPOUTING AND DOWNPIPES SHALL BE NON COMBUSTIBLE COLOURBOND TO BAL40 ZONE & BALFZ ZONE OF AS3959 2018

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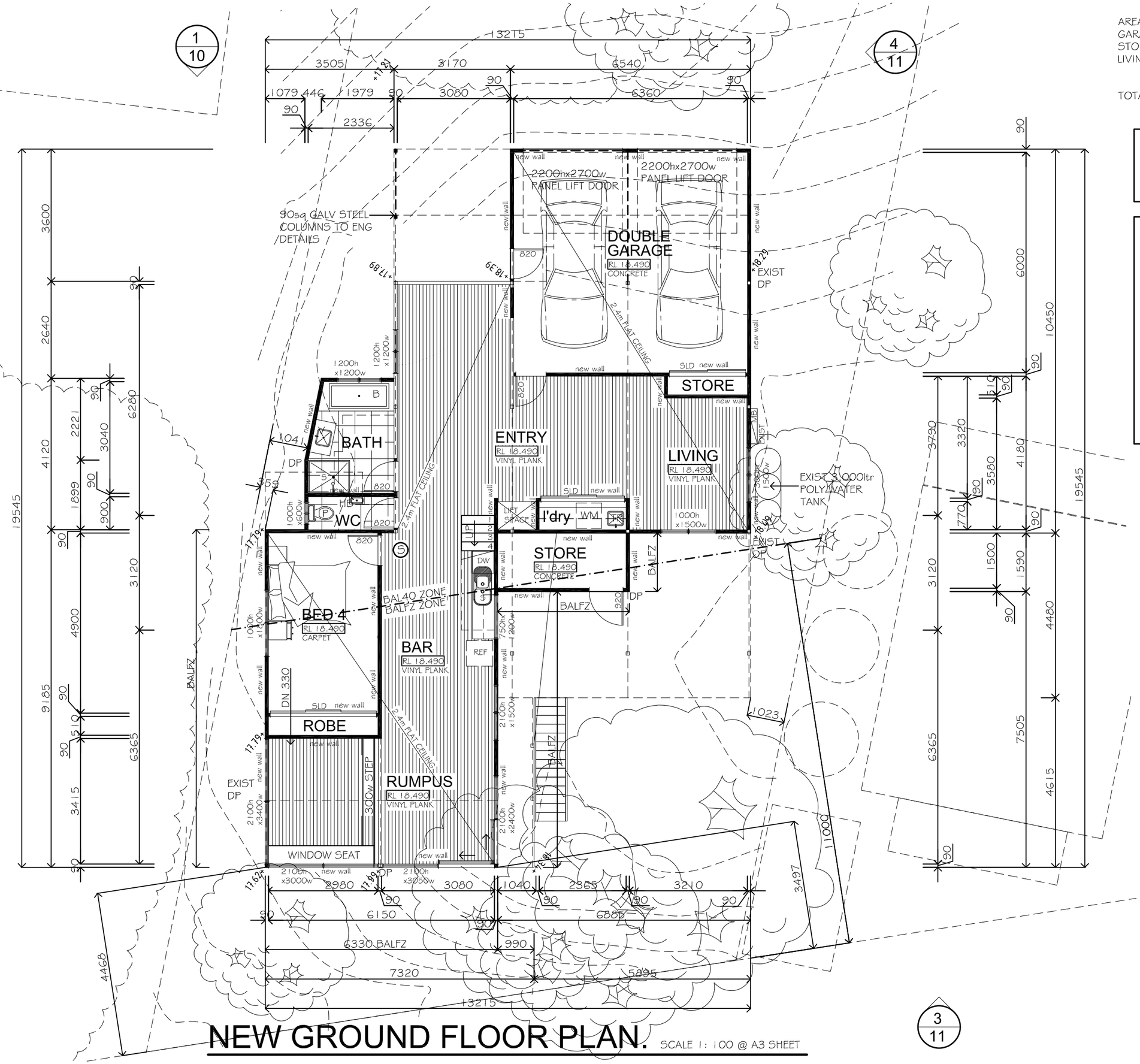

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SOIL CLASS: NA

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FOR MR H WEBER
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HARMERS HAVEN VIC 3995

HIA Member No.532125

DRAWN: D.GASKIN
DATE: 08.05.19
SCALES: AS NOTED

PROJECT No. A
SHEET No. 7 OF 11
REVISION -

NEW GROUND FLOOR PLAN. SCALE 1:100 @ A3 SHEET

2/10

3/11

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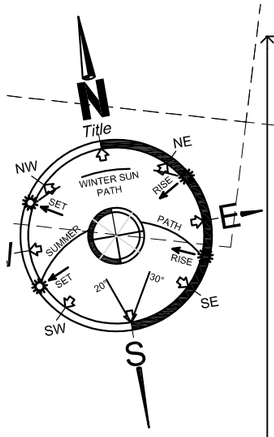

1/10

4/11

AREAS
EXIST LIVING = 122.86m² / 1321.72 ft²
NEW LIVING = 12.30m2/ 132.32 ft2
NEW DECK = 17.47m2/ 187.94 ft2
EXIST DECK = 29.91m2/ 321.77 ft2
NEW V'DAH = 17.04m2/ 183.31 ft2

TOTAL = 199.58m²/ 2147.08 ft²

EXIST ROOFED AREA = 157.35m2
ADDITIONAL BUILDING FOOTPRINT = 26.96m2
= 17.17%

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22mm TIMBER DECKING TO BAL40 OF AS3959 2018 (NATURAL FINISH)

1m HIGH FRAMELESS GLASS BALUSTRADE TO BAL40 OF AS3959 2018

DECK
RL 21.085
450sq TILES

300w BENCH @ 1m HIGH

LIVING
RL 21.090
VINYL PLANK

DBL SIDE SOLID FUEL HEATER

DINING
RL 21.090
VINYL PLANK

KITCHEN
RL 21.090
VINYL PLANK

WC

BATH

LINEN

BED 2
EXISTING
RL 21.090
CARPET

BED 3
EXISTING
RL 21.090
CARPET

SUN
EXISTING
RL 21.090
VINYL PLANK

DECK
EXISTING
RL 21.090
DECKING

STORE

VERANDAH
RL VARIES
450sq TILES

1m HIGH SOLID WALL TO BAL40 OF AS3959 2018 WITH METAL SCREENS TO 2.1m

1m HIGH FRAMELESS GLASS BALUSTRADE TO BALFZ OF AS3959 2018

ALL FASCIAS, BARGES, CAPPING, SPOUTING AND DOWNPIPES SHALL BE NON-COMBUSTIBLE COLOURBOND TO BAL40 ZONE & BALFZ ZONE OF AS3959 2018

NEW FIRST FLOOR PLAN.

SCALE 1:100 @ A3 SHEET

2/10

3/11

REVISIONS

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TITLE: PLANNING DRAWING

SHIRE OF: BASS COAST

SOIL CLASS: A

PROJECT:
PROPOSED ADDITIONS AND ALTERATIONS FOR
FOR MR H WEBER
AT 94 VIMINARIA ROAD
HARMERS HAVEN VIC 3995

HIA Member No.532125

DRAWN: D.GASKIN
DATE: 08.05.19
SCALES: AS NOTED

PROJECT No.	SHEET No.	REVISION
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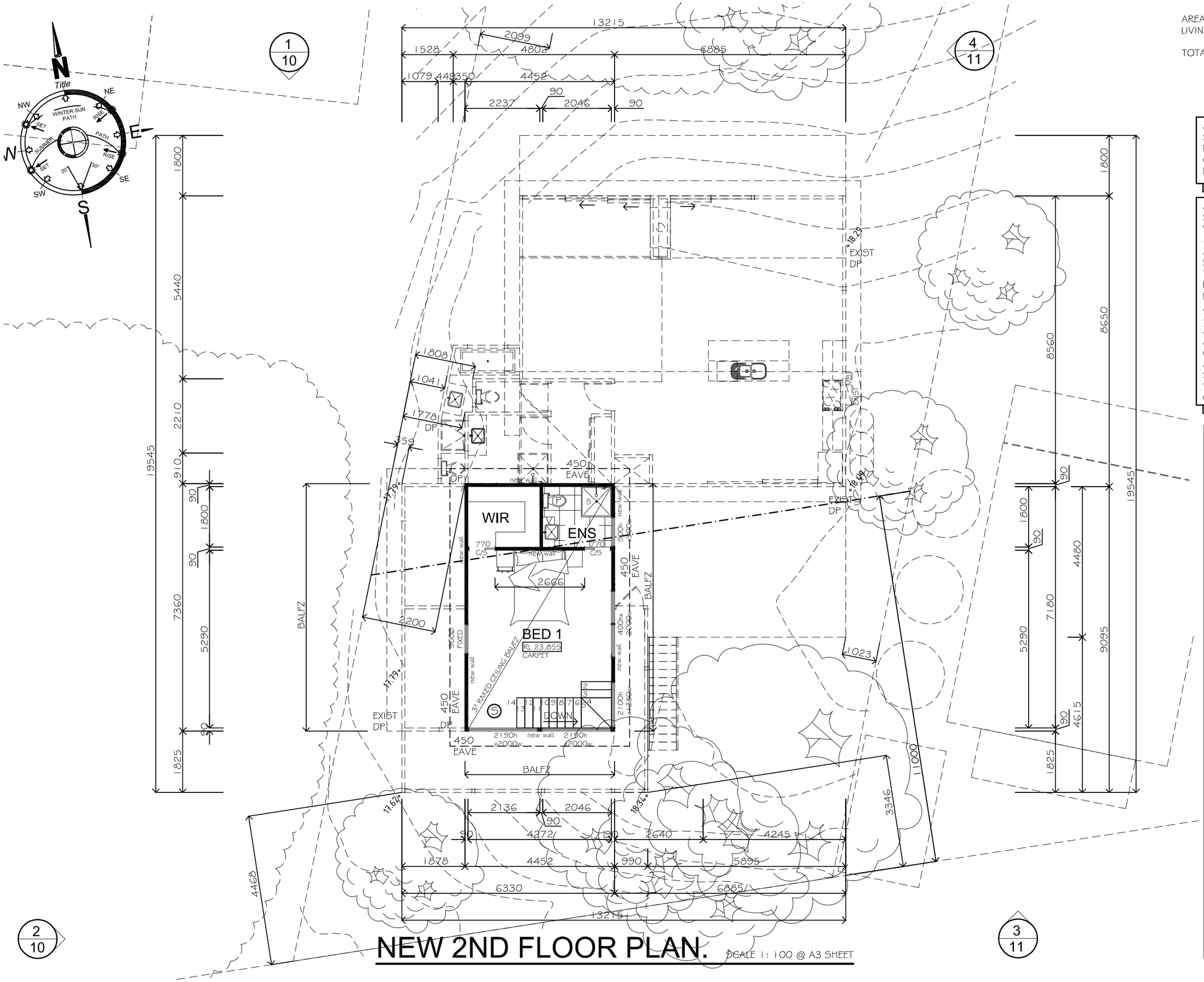

NEW 2ND FLOOR PLAN.

SCALE 1: 100 @ A3 SHEET

AREAS
LIVING = 32.76m² / 352.50 ft²

TOTAL = 32.76m² / 352.50 ft²

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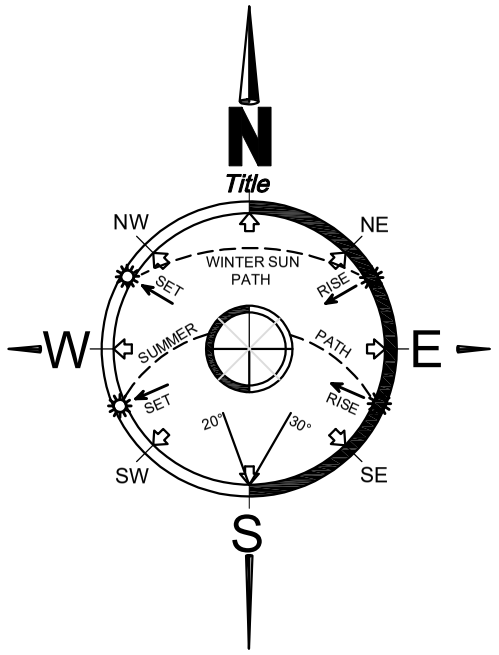

EXIST 9,000LTR MIN BMO TANKS. W/ 64mm PIPE RISER,3 THREAD PER INCH BSP MALE COUPLING W/ BALL/GATE VALVE 300 MIN/ 600 MAX VERTICAL METAL PIPE RISER TO COMPLY WITH THE BMO REQUIREMENTS

NEW 4m ALL WEATHER GRAVEL DRIVE x 4m HIGH CLEARANCE. MAX 1 IN 7 FALL

DEFENDABLE SPACE

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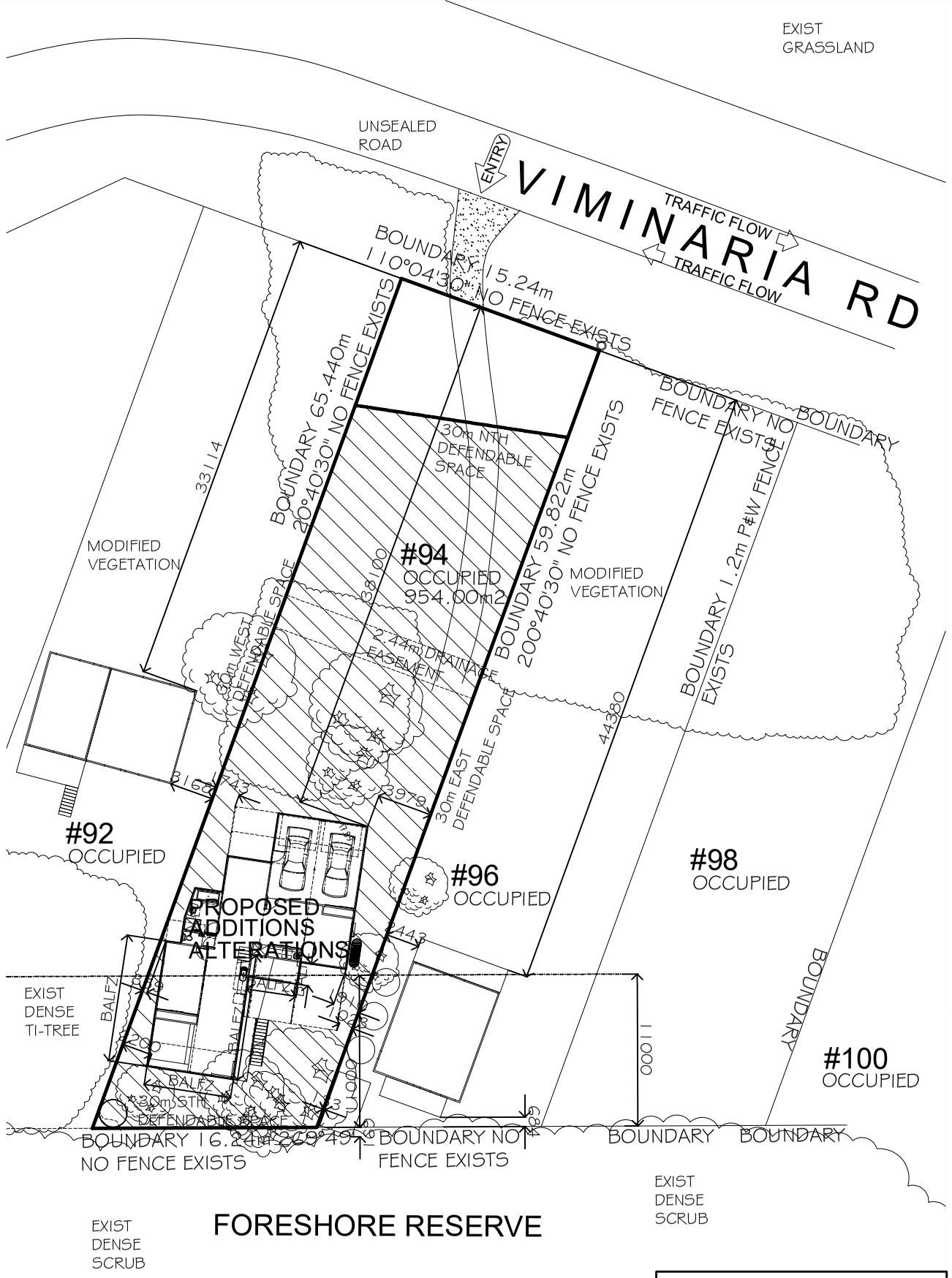
EXIST GRASSLAND
UNSEALED ROAD
ENTRY
VIMINARIA RD
TRAFFIC FLOW
TRAFFIC FLOW
BOUNDARY 110°04'30" 15.24m NO FENCE EXISTS
BOUNDARY NO FENCE EXISTS
BOUNDARY
BOUNDARY 65.440m 200°40'30" NO FENCE EXISTS
BOUNDARY 59.822m 200°40'30" NO FENCE EXISTS
BOUNDARY 1.2m P&W FENCE EXISTS
33.114
MODIFIED VEGETATION
MODIFIED VEGETATION
30m NTH DEFENDABLE SPACE
#94
OCCUPIED
954.00m2
3a100
30m WEST DEFENDABLE SPACE
2.44m DRAINAGE EASEMENT
30m EAST DEFENDABLE SPACE
44380
3979
B1662.43
#92
OCCUPIED
#96
OCCUPIED
#98
OCCUPIED
#100
OCCUPIED
PROPOSED ADDITIONS ALTERATIONS
EXIST DENSE TI-TREE
BALF
BALF
BALF

ED20/28141

dbm
GEOTECH

20 January 2020

LAND Capability Assessment

94 VIMINARIA ROAD
HARMERS HAVEN, VICTORIA, 3995



Prepared for:
David Gaskin
10 Stewart Street
Wonthaggi VIC 3995

Report Number: 19084-1

dbm Geotech
Kilcunda, Victoria, 3995
ABN 51 976 778 482
T: 0476 129 167

ED20/28141

CONTENTS

1.0 INTRODUCTION 1
2.0 DESCRIPTION OF THE DEVELOPMENT 2
3.0 SITE AND SOIL ASSESSMENT 2
3.1 SITE KEY FEATURES 2
3.2 Site Assessment Results 4
3.3 SOIL KEY FEATURES 4
4.0 WASTEWATER MANAGEMENT SYSTEM 6
4.1 Land Application 6
4.2 Sizing the Irrigation System 6
5.0 MONITORING, OPERATION AND MAINTENANCE 8
6.0 CONCULSION 8
7.0 REFERENCES 9
8.0 LIMITATIONS 9

Figures

Figure 1: Borehole location plan

Figure 2: Site photos

Figure 3: Site photos

Appendices

Appendix A

Reports of Boreholes

Appendix B

Limitations

ED20/28141

1.0 INTRODUCTION

CONSULTANTS

David Gaskin has engaged DBM Geotech to undertake a Land Capability Assessment for the proposed residential dwelling extension at 94 Viminaria Road, Harmers Haven. The field investigation and report have been undertaken and prepared by suitability experienced staff.

REPORT SUMMARY

This report will accompany an application for a Septic Tank Permit to Install submitted to Bass Coast Shire Council for an onsite wastewater management system for 94 Viminaria Road, Harmers Haven. This document provides information about the site and soil conditions. It also provides a Land Capability Assessment (LCA) for the site and includes a conceptual design for a suitable onsite wastewater management system, including recommendations for monitoring and management requirements.

Given the small size of the site the wastewater should be treated to secondary level with nutrient reduction by a suitable EPA-approved treatment system and the effluent applied to land via sub-surface irrigation.

The presence of shallow groundwater in the low-lying area of the site was noted during the site investigation. The Land Application Area (LAA) will need to take the presence of the groundwater into consideration. Due to shallow groundwater and limited space available on site the LAA may need to be split up into several zones.

SITE OVERVIEW

The site at 94 Viminaria Road, Harmers Haven comprises an existing three-bedroom dwelling with a septic tank wastewater system. We understand that as part of the planning application for renovation of the existing dwelling Bass Coast Shire has requested that a new secondary treatment septic system be installed.

The site is located about 150m from the coast. The site is undulating and falls down from the road by about 1.5m to a low point on the block. We understand that the low-lying area can hold standing water over winter months. The site then rises back up by about 2.0m towards the dwelling.

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2.0 DESCRIPTION OF THE DEVELOPMENT

Site Address: 94 Viminara Road, Harmers Haven (Figure 1)

Client/Agent: David Gaskin

Postal Address: 10 Stewart Street, Wonthaggi

Contact: Ph: 03 56723910

Council Area: Bass Coast Shire

Zoning: Township Zone (TZ)

Allotment Size: 1001m^2

Domestic Water Supply: Onsite roof water collection only

Anticipated Wastewater Load: Assume a residence with full water-reduction fixtures at maximum occupancy. Wastewater generation = 150 L/person/day; (source Table 4 of the EPA Code of Practice 891.3).

Availability of Sewer: The area is unsewered and highly unlikely to be sewered within the next 10-20 years, due to low development density in the area and the considerable distance from existing wastewater services.

3.0 SITE AND SOIL ASSESSMENT

DBM Geotech undertook a site investigation on the 11 December 2019 and 14 January 2020.

3.1 SITE KEY FEATURES

Table 1 summarises the key features of the site in relation to effluent management proposed for the site.

NOTE:

- The site is not in a special water supply catchment area.
- The site experiences negligible stormwater run-on from Viminaria Road to the northeast.
- There is evidence of a shallow watertable in low lying areas of the site.

Figure 1 attached provides a locality plan and indicates the location of the existing dwelling. Figure 2 and Figure 3 show photos of the key site features.

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Table 1: Site Assessment

Feature	Description	Level of Constraint	Mitigation Measures
Buffer Distances	All relevant buffer distances in Table 5 of the EPA Code of Practic (2016) are achievable from the proposed effluent management area.	Moderate	Locate Land Application Area appropriately
Climate	Average annual rainfall 935mm (Wonthaggi Climate Station No. 086127).	Moderate	NN
Drainage	Damp soil was observed in low lying areas with a shallow water table indicating that seasonal water logging may occur at the low point of the block. This could limit percolation of effluent through the soil profile in this area.	Moderate	Limit Land Application area to land that is 0.6m above low lying areas
Erosion & Landslip	No evidence of sheet or rill erosion; the erosion hazard is low. No evidence of landslip and landslip potential is low.	Nil	NN
Exposure & Aspect	LAA is partially cleared, partially vegitated. Vegitation will need to be cleared. Combination of northerly open aspect and southerly open aspect.	Minor	NN
Flooding	The proposed effluent management area is located above the 1:100 year flood level (source BCS).	Minor	NN
Groundwater	Shallow groundwater was observed in borehole BH3 at 0.5m below ground level. We understand that the closest groundwater bore is at 84 Viminaria Road which is about 60m away from the proposed effluent management area.	Moderate	Limit Land Application area to land that is 0.6m above low lying areas.
Imported Fill	No imported fill material was observed anywhere on the site.	Nil	NN
Land Available for LAA	Considering all the constraints and buffers, the site has limited land for land application of treated effluent. LAA may need ot be split into several zones	Moderate	Split LAA into several zones if reqiured.
Landform	Sand dunes comprising fine to medium sand.	Nil	NN
Rock Outcrops	No evidence of surface rocks or outcrops.	Nil	NN

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Feature	Description	Level of Constraint	Mitigation Measures
Run-on & Runoff	Minor stormwater run-on and minor run-off hazard.	Nil	NN
Slope	The proposed effluent management area has a slight fall.	Minor	NN
Surface Waters	Not Applicable. Nearest surface water >60m downslope from Land Application Area.	Nil	NN
Vegetation	Mixture of grasses, and native trees/shrubs (to be removed).	Nil	NN

*NN: not needed

3.2 SITE ASSESSMENT RESULTS

Based on the most constraining site features, the overall land capability of the site to sustainably manage all effluent onsite is satisfactory. The proposed effluent management area is located above the 1:100 flood level and by using secondary treatment and pressure-compensating sub-surface irrigation, there will be suitable protection of surface waters and groundwater.

3.3 SOIL KEY FEATURES

The site's soils have been assessed for their suitability for onsite wastewater management by a combination of soil survey and desktop review of published soil survey information as outlined below.

A soil survey was carried out at the site to determine suitability for application of treated effluent. Soil investigations were conducted at three locations in the vicinity of the building envelope, which may be potential land application areas. The investigation was carried out using a hand auger to depths of 1.5m below ground level. This was sufficient to adequately characterise the soils as only minor variation would be expected throughout the area of interest.

Two soil types were encountered in these investigations. Full profile descriptions are provided in Appendix A. Tables 2 describes the soil constraints in detail for each of the soils encountered.

Soils in the vicinity of the building envelope (BH1 and BH2) are characterised as sand and loamy sand.

Table 2 below provides an assessment of the physical and chemical characteristics of each soil type.

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Table 2: Soil Assessment – BH1 Sand

Feature	Assessment	Level of Constraint	Mitigation Measures
Emerson Aggregate Class	Not tested	Nil	NN
Rock Fragments	None.	Minor	NN
Soil Depth	Total soil depth greater than 1.5 m and no hardpans occur.	Minor	NN
Soil Permeability & Design Loading Rates	Sand and loamy sand: 3.0+ m/day saturated conductivity (Ksat) (AS/NZS1547:2012); 5 mm/day Design Loading Rate (DLR) for irrigation system (Code, 2013).	Minor	NN
Soil Texture & Structure	Borehole BH1 and BH2: Sand (Category 1) Borehole BH3 and top of BH2: Loamy Sand (Category 2a)	Minor	NN
Watertable Depth	Groundwater encountered at 0.5m below ground level in borehole BH3.	Moderate	Limit Land Application area to land that is 0.6m above low lying areas

NN: Not Needed

3.4 OVERALL LAND CAPABILITY RATING

For the soil in the proposed land application area (sand and loamy sand), no features present a moderate or major constrain that cannont be mitigated.

Based on the results of the site and soil assessment tabled above and provided in the Appendices, the overall land capability of the proposed effluent management area is constrained. However, the effluent management system will be designed, installed and maintained in ways which will mitigate these factors.

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4.0 WASTEWATER MANAGEMENT SYSTEM

The following sections provide an overview of a suitable onsite wastewater management system, with sizing and design considerations and justification for its selection. Detailed design for the system should be undertaken at the time of the building application and submitted to Council.

4.1 LAND APPLICATION

Based on the site constraints a secondary treatment system with nutrient removal and sub-surface drip irrigation is recommended at this site.

Based on discussion with the client we understand that a fuji clean CE-1500EX or similar will be adopted at the site.

Refer to the EPA website for the list of approved options that are available http://www.epa.vic.gov.au/en/your-environment/water/onsite-wastewater. The property owner has the responsibility for the final selection of the secondary treatment system and will include the details of it in the Septic Tank Permit to Install application form for Council approval.

4.2 SIZING THE IRRIGATION SYSTEM

To determine the necessary size of the Land Application Area, preliminary water balance modelling has been considered. The results show that the required irrigation area is 180 m². The calculations are summarised below, with full details provided in Appendix B.

The water balance can be expressed by the following equation:

A = Q/(DIR)

A = Area of Irrigation m²
Q = Average daily effluent load – 900 L (from Table 4 of the Code);
DIR = Design irrigation rate (DIR) –5 mm/day (from Table 3 of the Code);

Calculating the Irrigation area required:

A = Q/(DIR)
A = 900/5
A = 180m²

The nominated area method is used to calculate the area required to balance all inputs and outputs, without the need for wet weather storage. As a result of these considerations the following table of LAA size are recommended for the relevant number of bedrooms proposed.

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Number of Bedrooms	Number of Occupants	Total Daily wastewater flow (L/day)	Required LAA Size
3	4	600	120 m^2
4	5	750	150 m^2
5	6	900	180 m^2

SITING AND CONFIGURATION OF THE IRRIGATION SYSTEM

It is preferable to keep the irrigation area as high on the property as possible. The survey plan shows that the low-lying area in which Borehole BH3 was undertaken and which can hold standing water in winter is at an RL of 16.0m. We recommended that the Land Application Area (LAA) is restricted to land that is at or above an RL of 16.6m to mitigate the effects of shallow groundwater. The land below an RL of 16.6m has been marked on the attached site plan Figure 1 as unsuitable for the LAA.

Final placement and configuration of the irrigation system will be determined by the client and/or system installer provided it remains outside the marked unsuitable zone.

Room for the proposed effluent field is tight and may require multiple LAAs, it is important that appropriate buffer distances are adhered to when designing the LAA layout. It is important to note that buffers are measured as the overland flow path for run-off water from the effluent irrigation area.

It is recommended that the owner consult an irrigation expert familiar with effluent irrigation equipment to design the system, and an appropriately registered plumbing/drainage practitioner to install the system. The irrigation plan must ensure even application of effluent throughout the entire irrigation area.

BUFFER DISTANCES

Setback buffer distances from effluent land application areas and treatment systems are required to help prevent human contact, maintain public amenity and protect sensitive environments. The relevant buffer distances for this site, taken from Table 5 of the Code (2013) are:

Secondary Treatment buffer distances:

- 50 m from groundwater bores in sandy soils;
- 100 m upslope from watercourses in a potable water supply catchment;
- 30 m upslope from non-potable watercourses; and
- 3.0 m if area up-gradient and 1.5 m if area down-gradient of property boundaries, swimming pools and buildings.

We note that for sites with sandy soils and limited space such as this site, buffer distances are typically reduced to 0.5 meters from site boundaries and 1.0m from buildings.

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5.0 MONITORING, OPERATION AND MAINTENANCE

Maintenance is to be carried out in accordance with the EPA Certificate of Approval of the selected secondary treatment system and Council's permit conditions. The treatment system will only function adequately if appropriately and regularly maintained.

To ensure the treatment system functions adequately, residents must:

- Have a suitably qualified maintenance contractor service the secondary treatment system at the frequency required by Council under the permit to use;
- Use household cleaning products that are suitable for septic tanks;
- Keep as much fat and oil out of the system as possible; and
- Conserve water (AAA rated fixtures and appliances are recommended).

To ensure the land application system functions adequately, residents must:

- Regularly harvest (mow) vegetation within the LAA and remove this to maximise uptake of water and nutrients;
- Monitor and maintain the subsurface irrigation system following the manufacturer's recommendations, including flushing the irrigation lines;
- Regularly clean in-line filters;
- Not erect any structures and paths over the LAA;
- Avoid vehicle and livestock access to the LAA, to prevent compaction and damage; and
- Ensure that the LAA is kept level by filling any depressions with good quality topsoil (not clay).

6.0 CONCULSION

As a result of our investigations we conclude that sustainable onsite wastewater management is feasible with appropriate mitigation measures, as outlined, for the proposed five-bedroom residence at 94 Viminaria Road, Harmers Haven.

Specifically, we recommend the following:

- Secondary treatment with nutrient removal of wastewater by an EPA-accredited treatment system;
- Land application of treated effluent to a 180 m² (minimum) subsurface irrigation area (which may be subdivided into two or more evenly sized zones using an indexing or sequencing valve);
- The Land Application Area must by positioned above RL 16.6m to ensure that treated effluent is a minimum of 0.6m above the winter groundwater table.
- Installation of water saving fixtures and appliances in the new residence to reduce the effluent load;
- Use of low phosphorus and low sodium (liquid) detergents to improve effluent quality and maintain soil properties for growing plants; and
- Operation and management of the treatment and disposal system in accordance with manufacturer's recommendations, the EPA Certificate of Approval, the EPA Code of Practice (2013) and the recommendations made in this report.

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7.0 REFERENCES

Environment Protection Authority (2003). Guidelines for Environmental Management: Use of Reclaimed Water Publication 464.2.

Environment Protection Authority (1991). Guidelines for Wastewater Irrigation Publication 168.

Environment Protection Authority (2013). Publication 891.3 Code of Practice for Onsite Wastewater Management.

Geary, P. and Gardner, E. (1996). On-site Disposal of Effluent. In Proceedings from the one day conference Innovative Approaches to the Management of Waste and Water, Lismore 1996.

Isbell, R.F. (1996). The Australian Soil Classification. CSIRO Publishing, Melbourne.

Municipal Association of Victoria, Department of Environment and Sustainability and EPA Victoria (2013) Victorian Land Capability Assessment Framework.

Standards Australia / Standards New Zealand (2012). AS/NZS 1547:2012 On-site domestic-wastewater management.

8.0 LIMITATIONS

Your attention is drawn to the document – 'Limitations' which is included in Appendix B of this report. The statements presented in this document are intended to advise you of what your realistic expectations of this report should be. The document is not intended to reduce the level of responsibility accepted by DBM Geotech, but rather to ensure that all parties who may rely on this report are aware of the responsibilities each assumes is so doing.

DBM Geotech



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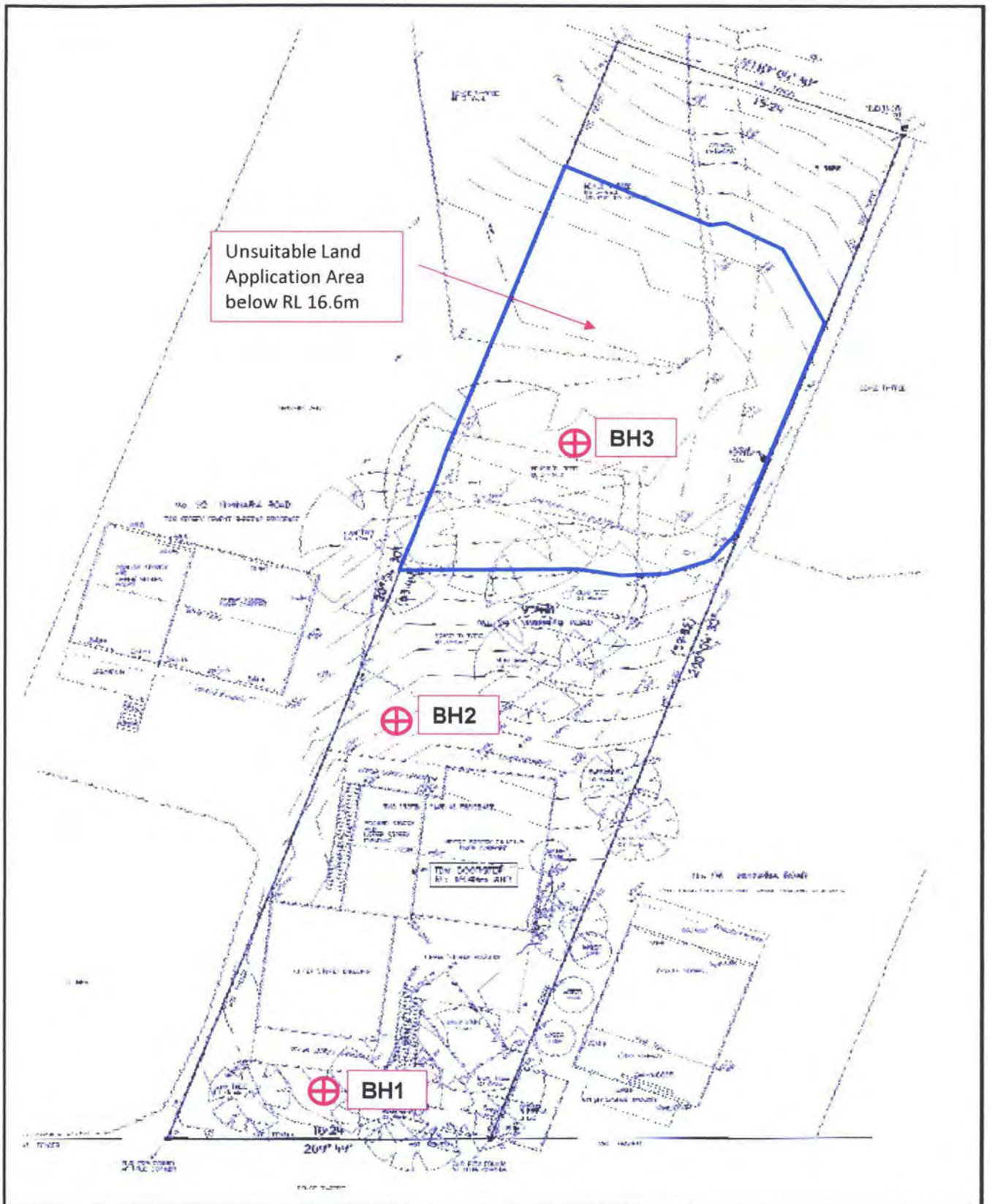

dbm GEOTECH

SITE ADDRESS:
94 Viminaria Road, Harmers Haven
CLIENT:
David Gaskin Design
JOB NUMBER:
19084

FIGURE 1: SITE PLAN



Photo 1: Low lying area subject to standing water in winter



Photo 2: Looking down driveway from Viminaria Road

dbm GEOTECH	SITE ADDRESS: 94 Viminaria Road, Harmers Haven CLIENT: David Gaskin Design JOB NUMBER: 19084	**FIGURE 2: SITE PHOTOS**



Photo 3: Looking north towards Viminaria Road from west boundary level with front of the exisiting dweling



Photo 4: Looking east from the southwest corner of site

dbm GEOTECH	SITE ADDRESS: 94 Viminaria Road, Harmers Haven CLIENT: David Gaskin Design JOB NUMBER: 19084	**FIGURE 3: SITE PHOTOS**

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Appendix A

Reports of Boreholes

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ENGINEERING BOREHOLE LOG

Borehole no. BH1
Sheet no. 1 of 1
Job no. 19084

3 Clipper Court, Kilcunda
david@dbmgeotech.com.au

Client :	David Gaskin Design		Date : 11/12/2019
Project :	94 Viminaria Road, Harmers Haven		Logged By : DBM
Location :	BH1		
Drill model :	Hand Auger	Inclination -90 deg	RL Surface : *Not measured*
Hole diameter :	55mm	Hole depth 1.5 m	Datum : -

Material Description	Depth (m)	Water	Moisture condition	Soil Category	Additional observations	Sample test notes	Method
SAND, grey, fine to medium grain, with some orgaincs, trace fines (Loamy Sand)	0.35			2a			
SAND, grey (Sand)	0.50 1.00 1.50		M	1			
EOH @ 1.5m Groundwater not observed	2.00						

ENGINEERING BOREHOLE LOG

dbm GEOTECH

3 Clipper Court, Kilcunda
david@dbmgeotech.com.au

Borehole no. BH2
Sheet no. 1 of 1
Job no. 19084

Client :	David Gaskin Design			Date :	11/12/2019
Project :	94 Viminaria Road, Harmers Haven			Logged By :	DBM
Location :	BH2				
Drill model :	Hand Auger	Inclination	-90 deg	RL Surface :	*Not measured*
Hole diameter :	55mm	Hole depth	1.5 m	Datum :	-

Material Description	Depth (m)	Water	Moisture condition	Soil Category	Additional observations	Sample test notes	Method
FILL: SAND, grey, with some organics, trace gravel (loamy Sand)	0.20			2a			HA
SAND, brown, medium grain (Sand)	0.40						
grey	0.50		M	1			
dark brown	1.00						
	1.50						
EOH @ 1.5m Groundwater not observed	2.00						

ENGINEERING BOREHOLE LOG

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3 Clipper Court, Kilcunda
david@dbmgeotech.com.au

Borehole no. BH3
Sheet no. 1 of 1
Job no. 19084

Client :	David Gaskin Design			Date :	11/12/2019
Project :	94 Viminaria Road, Harmers Haven			Logged By :	DBM
Location :	BH3				
Drill model :	Hand Auger	Inclination	-90 deg	RL Surface :	*Not measured*
Hole diameter :	55mm	Hole depth	0.8 m	Datum :	-

Material Description	Depth (m)	Water	Soil Moisture	Soil Category	Additional observations	Sample test notes	Method
SAND, grey, fine to medium grain, with some orgaincs, trace fines (Loamy Sand)	0.50	▶	M	2a	groundwater @ 0.5m		HA
	0.80						
EOH @ 0.8m Groundwater encountered at 0.5m	1.00						
	1.50						
	2.00						

Appendix B

Limitations

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LIMITATIONS

This Document has been provided by DBM Geotech subject to the following limitations:

This Document has been prepared for the particular purpose outlined in DBM Geotech's proposal and no responsibility is accepted for the use of this document, in whole or in part, in other contexts for any other purpose.

This Document is provided for use solely by DBM Geotech's Client and persons acting on the Client's behalf, such as its professional advisers. No responsibility whatsoever for the contents of this Document will be accepted to any person other than the Client. Any use which a third party makes of this Document, or any reliance on or decisions to be made on it, is the responsibility of such third parties. DBM Geotech accepts no responsibility for damages, if any, suffered by any third party as a result of decision made or actions based on this Document.

The scope and the period of DBM Geotech's Services are as described in DBM Geotech's proposal and are subject to restrictions and limitations. DBM Geotech did not perform a complete assessment of all possible conditions or circumstances that may exist at the site referenced in the Document. If a service or other work is not expressly referred to in this Report, do not assume that it has been provided or performed. If a matter is not addressed in this Report, do not assume that any determination has been made by DBM Geotech in regards to it.

Conditions may exist which were undetectable given the limited nature of the enquiry DBM Geotech was retained to undertake. Variations in conditions may occur between investigation locations, and there may be special conditions pertaining to the site which have not been revealed by the investigation and which have not therefore been taken into account in the Document. Accordingly, additional studies and actions may be required.

DBM Geotech accepts no responsibility for and makes no representation as to the accuracy or completeness of the information provided to it by or on behalf of the Client or sourced from any third party. DBM Geotech has assumed that such information is correct unless otherwise stated and no responsibility is accepted by DBM Geotech for incomplete or inaccurate data supplied by its Client or any other person for whom DBM Geotech is not responsible. DBM Geotech has not taken account of matters that may have existed when the Report was prepared but which were only later disclosed to DBM Geotech.

Having regard to the matters referred to in the previous paragraphs on this page in particular carrying out the Service has allowed DBM Geotech to form no more than an opinion as to the actual conditions at any relevant location. That opinion is necessarily constrained by the extent of the information collected by DBM Geotech or otherwise made available to DBM Geotech. Further, the passage of time may affect the accuracy, applicability or usefulness of the opinions, assessments or other information in this Document. This Document is based upon the information and other circumstances that existed and were known to DBM Geotech when the Services were performed and this Document was prepared. DBM Geotech has not considered the effect of any possible future development included physical changes to any relevant location or change to any laws or regulations relevant to such location.

By date, or revision, the Document supersedes any prior report or other document issued by DBM Geotech dealing with any matter that is addressed in the Document.