PLANNING AND DEVELOPMENT ACT 2005

LOCAL PLANNING SCHEME AMENDMENT AVAILABLE FOR INSPECTION

SHIRE OF LAKE GRACE LOCAL PLANNING SCHEME NO.4
AMENDMENT NO.7

Notice is hereby given that the Lake Grace Shire Council has resolved, pursuant to Section 75 of the *Planning and Development Act 2005*, to amend the above Local Planning Scheme as follows:

a) Rezone an 8.58 hectare portion of Lot 21 (No.19) Mather Road, Lake Grace from 'General Agriculture' to 'General Industry' zone; and

b) Amend the relevant Scheme map accordingly.

A document setting out and explaining the scheme amendment proposal is attached.

Comments on the proposal are now invited and can be emailed to shire@lakegrace.wa.gov.au or posted to the Shire's Chief Executive Officer at PO Box 50, LAKE GRACE WA 6353. All submissions must include the following information:

- Your name, address and contact telephone number;
- How your interests are affected whether as a private citizen, on behalf of a company or other organisation, or as an owner or occupier of property;
- Address of property affected (if applicable); and
- Whether your submission is in support of or objecting to the proposal, either in part or in whole, and any reasons supporting your comments.

Comments on the scheme amendment proposal may be submitted to the local government on or before **Friday 19 December 2025**.

All submissions received may be made public at a Council meeting and included in a Council Agenda, which will be available on the Shire's website in due course, unless a submission specifically requests otherwise.

Alan George
CHIEF EXECUTIVE OFFICER
SHIRE OF LAKE GRACE

SHIRE OF LAKE GRACE

LOCAL PLANNING SCHEME NO.4

AMENDMENT NO.7

July 2025

PROPOSAL TO AMEND A LOCAL PLANNING SCHEME

1. LOCAL AUTHORITY: Shire of Lake Grace

2. DESCRIPTION OF LOCAL PLANNING SCHEME: Local Planning Scheme No.4

3. TYPE OF SCHEME: District Zoning Scheme

4. SERIAL NUMBER OF AMENDMENT: No.7

5. AMENDMENT TYPE:

The Amendment is **Standard** under the provisions of the *Planning and Development (Local Planning Schemes) Regulations 2015* for the following reasons:

i) The amendment would have minimal impact on land in the Scheme area that is not the subject of the amendment; and

ii) The amendment does not result in any significant environmental, social, economic or governance impacts in the Scheme area.

6. PROPOSAL:

Amend the Shire of Lake Grace Local Planning Scheme No.4 as follows:

a) Rezoning an 8.58 hectare portion of Lot 21 (No.19) Mather Road, Lake Grace from 'General Agriculture' to 'General Industry' zone; and

b) Amending the relevant Scheme map accordingly.

PLANNING AND DEVELOPMENT ACT 2005

RESOLUTION DECIDING TO AMEND A LOCAL PLANNING SCHEME

SHIRE OF LAKE GRACE LOCAL PLANNING SCHEME NO.4

AMENDMENT NO.7

RESOLVED that the local government, in pursuance of Section 75 of the *Planning and Development Act 2005* (as amended), amend the Shire of Lake Grace Local Planning Scheme No.4 as follows:

a) Rezoning an 8.58 hectare portion of Lot 21 (No.19) Mather Road, Lake Grace from 'General Agriculture' to 'General Industry' zone; and

b) Amending the relevant Scheme map accordingly.

Resolved that the Amendment is 'standard' under the provisions of the *Planning and Development (Local Planning Schemes) Regulations 2015* for the following reason(s):

a) The amendment would have minimal impact on land in the Scheme area that is not the subject of the amendment; and

b) The amendment would not result in any significant environmental, social, economic or governance impacts on land in the Scheme area.

.....
Alan George
CHIEF EXECUTIVE OFFICER
Dated this 23rd day of October 2024

SCHEME AMENDMENT REPORT

INTRODUCTION & BACKGROUND

The Shire of Lake Grace is proposing to amend the Shire of Lake Grace Local Planning Scheme No.4 to change the current zoning classification of an additional 8.58 hectare portion of Lot 21 (No.19) Mather Road, Lake Grace from 'General Agriculture' to 'General Industry' zone to allow the land to be subdivided and developed for industrial purposes to accommodate current and future anticipated demand for vacant industrial zoned land.

The following report provides a detailed description of the subject land and its immediate surrounds, as well as the planning rationale and justifications for the scheme amendment proposal. A series of maps and plans are also provided for illustrative purposes.

LAND DESCRIPTION & OWNERSHIP

The land the subject of this proposed amendment is legally described as Lot 21 on Deposited Plan 411875 being No.19 Mather Road, Lake Grace.

Lot 21 is currently owned by Linda Anne Carruthers who has agreed to allow the Shire to purchase and subdivide a 17.75 hectare portion of the property in its south-eastern corner for industrial purposes of which 9.17 hectares is currently classified 'General Industry' zone.

A copy of the land's Certificate of Title and Deposited Plan is provided in Appendix 1.

LOCATION, PHYSICAL CHARACTERISTICS & CURRENT LAND USE

Lot 21 is located immediately adjacent to the northern boundary of the Lake Grace townsite and comprises a total area of approximately 327.5479 hectares (see Appendix 2 - Plans 1 to 4).

The subject land is gently sloping from east to west with the natural ground level ranging from approximately 298 metres AHD along its eastern boundary to 284 metres AHD along its western boundary.

A significant proportion of Lot 21, including the 17.75 hectare portion in its south-eastern corner proposed to be subdivided and developed for industrial purposes, has been extensively cleared of all native vegetation to accommodate its current and historical use for extensive agricultural purposes (i.e. cropping and grazing). The property is also characterised by a number of small, shallow salt lakes and fringing native vegetation in its western half that have not been identified in any public sector databases as being of regional environmental significance.

The property contains an existing single house, farm sheds and various associated improvements in its south-western segment, all of which are located more than 900 metres from that portion of the property proposed to be rezoned for industrial purposes and will be retained.

The property has direct frontage and access to Mather Road and Dewar Street along its southern boundary which are sealed and drained local roads under the care, control and management of the Shire of Lake Grace. It also has direct frontage and access to Kulin-Lake Grace Road along its eastern boundary which is a sealed and drained State Road under the care, control and management of Main Roads WA.

Due to its location immediately adjacent to the northern boundary of the Lake Grace townsite Lot 21 has convenient access to a comprehensive range of key essential service infrastructure including electricity, reticulated water, telecommunications and stormwater drainage. As the property is not served by reticulated sewerage disposal infrastructure all effluent disposal from the proposed industrial subdivision will be undertaken on-site using suitable effluent disposal systems (i.e. septic tanks and inverted leach drains).

The 17.75 hectare portion of Lot 21 proposed to be subdivided and developed for industrial purposes has not been designated by the Fire and Emergency Services Commissioner as being bushfire prone and is not identified on any public sector databases as being environmentally significant, contaminated, or within any designated public drinking water source or ground water protection areas. Furthermore the property does not contain any buildings or places of Aboriginal or European cultural heritage significance. A significant proportion of the land's southern half, including that portion proposed to be subdivided and developed for industrial purposes, has however been designated by the Department of Water and Environmental Regulation as being flood prone.

Existing adjoining and other nearby land uses are broadly described as follows:

- North – Extensive agriculture (i.e. cropping and grazing);
- South – The Dewar Street, Boulton Street (unconstructed) and Mather Road road reserves, low density residential development, service commercial and industrial development, the Lake Grace Caravan Park, a Crown reserve under the care, control and management of the Shire of Lake Grace for television and telecommunications purposes, a Shire managed and operated recycling depot, and an operational railway reserve and commercial development beyond;
- East – The Kulin-Lake Grace Road road reserve with a bulk grain handling and storage facility and operational railway reserve beyond; and
- West – Extensive agriculture (i.e. cropping and grazing) and vacant, undeveloped Crown land beyond comprising Lake Grace North (i.e. a large shallow salt lake).

SCHEME AMENDMENT PROPOSAL

The Shire of Lake Grace is proposing to subdivide and develop a 17.75 hectare portion of Lot 21 in its south-eastern corner for industrial purposes to accommodate current and future anticipated demand for vacant industrial zoned land in close proximity to the Lake Grace townsite. The current shortage of suitably zoned and serviced vacant industrial lots in the townsite to accommodate new industrial-type businesses and the Shire's significant investment in new housing projects has prompted Council's decision to proceed with the proposed subdivision of the relevant portion of Lot 21 for this purpose.

It is significant to note a 9.17 hectare portion of Lot 21 in its south-eastern corner at the intersection of Kulin-Lake Grace Road and Dewar Street is already classified 'General Industry' zone in the Shire of Lake Grace Local Planning Scheme No.4.

Following consideration of future potential needs and demand, the Shire has secured agreement from the current owner of Lot 21 to rezone an additional 8.58 hectare portion of the property immediately north and west of that portion already zoned for industrial purposes to allow it to be subdivided and developed for the same purpose. A variety of lot sizes are envisaged with the minimum being 2,000m^2 to ensure sufficient land area is available to accommodate on-site effluent disposal systems given reticulated sewerage disposal infrastructure is not immediately available or commercially viable.

PLANNING FRAMEWORK CONSIDERATIONS & JUSTIFICATIONS

The following elements of the State and Shire's planning frameworks are of relevance to the future proposed development and use of the subject land for industrial purposes. Written justification in the context of each are provided to assist consideration of the scheme amendment proposal.

- **State Planning Strategy 2050**
  The *State Planning Strategy 2050* is the lead strategic planning document within Government. It provides the context and basis for the integration and coordination of land use planning and development across State, regional and local jurisdictions and contains a set of planning principles, strategic goals and objectives that can be used as a basis to find synergies between competing, complex and often inter-related issues.

  The proposal for Lot 21 is considered to be consistent with this Strategy for the following reasons:

  i) It will ensure a suitable and affordable supply of suitably zoned industrial land is made available for local enterprises to support future economic development and growth;
  ii) It will facilitate the development of additional industrial land in an appropriate location that will not adversely affect the amenity of the immediate locality, constrain any existing established land uses or have any negative impacts on the health, well-being and safety of future residents and the local community more generally;
  iii) It will not compromise the efficiency of existing vehicle movement networks;
  iv) It is capable of being served by all required essential service infrastructure;
  v) It will not have any negative impacts on the natural environment and resources; and
  vi) It will ensure any adverse impacts from natural disasters (i.e. flooding) are suitably mitigated insofar as possible.

- **Wheatbelt Regional Planning and Infrastructure Framework 2015**
  The *Wheatbelt Regional Planning and Infrastructure Framework 2015* defines a strategic direction for the future development of the Wheatbelt Region over the next 20 years. It addresses the scale and distribution of population growth, opportunities for economic development and associated infrastructure priorities in the region. It aims to ensure that social, economic and environmental change will benefit residents and enhance the region's character and natural resources. The Framework also addresses land use planning responses to future growth and development pressures in the region.

  The proposal for Lot 21 is considered to be consistent with the Framework for the following reasons:

  i) It will ensure there is an adequate supply of industrial land to cater for the future needs of the local community and business enterprises;
  ii) It will help to attract, retain and diversify the local population;
  iii) It will help to further establish Lake Grace as a sub-regional centre in the Wheatbelt Region;
  vi) It will provide opportunity to attract new business enterprises that help diversify the local and State economies, drive innovation and create employment; and
  vii) It will tie into the existing road network and be served by a comprehensive range of key essential service infrastructure including electricity, reticulated water, telecommunications and stormwater drainage.

- **Shire of Lake Grace Strategic Community Plan – Aspire 2033**
  The *Shire of Lake Grace Strategic Community Plan – Aspire 2033* contains a series of objectives and prioritised strategies and actions to guide development in the Shire over the next decade to achieve the community's long-term visions and aspirations.

  The proposal for Lot 21 is consistent with this strategic plan as it will create opportunity for small business development and industry diversification and ensure the preservation of the natural environment and biodiversity values.

- **Shire of Lake Grace Local Planning Strategy 2007**
  The *Shire of Lake Grace Local Planning Strategy 2007* is a non-statutory, strategic planning tool which sets out the local government's general aims, objectives and intentions for long term development and growth within its municipal district.

  The proposal for Lot 21 is considered to be consistent with the Shire's Local Planning Strategy for the following reasons:

  i) It will help to facilitate diversification of the Shire's local economy by encouraging the development of a wide range of new commerce and industry;
  ii) It will be located immediately adjacent to the northern boundary of the Lake Grace townsite to build upon existing infrastructure in this location and maximise efficiencies of operation and economies of scale;
  iii) It will ensure a sufficient amount of industrial land is provided in an appropriate location in the townsite to accommodate new industrial activities; and
  iv) It will help to address the continued shortage of suitably zoned and serviced industrial land in the townsite.

  The 9.17 hectare portion of Lot 21 already classified 'General Industry' zone in the Shire of Lake Grace Local Planning Scheme is clearly identified in the Shire's Local Planning Strategy as the preferred location for future industrial development in the townsite (i.e. Development Area DA4 in Table 4 in the Strategy text and maps).

  The Shire's proposal to rezone an additional 8.58 hectare portion of Lot 21 for industrial purposes, whilst not entirely consistent with the Strategy, represents a logical extension to the existing industrial zoned portion of the subject land and is justified on the same grounds provided in the Strategy document. It is understood this inconsistency does not constrain or fetter the Hon. Minister for Planning's ability to approve the scheme amendment proposal, particularly in light of the fact the Strategy is non-statutory in nature.

- **State Planning Policy 3.0 - Urban Growth and Settlement**
  State Planning Policy 3.0 entitled *Urban Growth and Settlement* sets out the principles and considerations which apply to planning for urban growth and settlement in Western Australia. The policy seeks to:

  - promote a sustainable and well planned pattern of settlement across the State, with sufficient and suitable land to provide for a wide variety of housing, employment, recreation facilities and open space;
  - build on existing communities with established local and regional economies;
  - manage the growth and development of urban areas in response to the social and economic needs of the community and in recognition of relevant climatic, environmental, heritage and community values and constraints;

- promote the development of a sustainable and liveable neighbourhood form; and
- coordinate new development with the efficient, economic and timely provision of infrastructure and services.

The proposal for Lot 21 is considered to be consistent with State Planning Policy 3.0 for the following reasons:

i) It will contribute to the sustainable and well-planned future growth of the Lake Grace townsite with sufficient and suitable land to provide a variety of new business and employment opportunities;

ii) It will meet the social and economic needs of the local community, while recognising relevant climatic, environmental and community values and constraints; and

iii) It is a logical extension to existing urban development in the Lake Grace townsite and is capable of being developed efficiently and cost effectively due to its location in close proximity to a wide range of key essential service infrastructure.

- **State Planning Policy 3.4 – Natural Hazards and Disasters**

State Planning Policy 3.4 entitled *Natural Hazards and Disasters* seeks to minimise the adverse impacts of natural disasters on communities, the economy and the environment by integrating mitigation activities into the land use planning process. The policy encourages local governments to adopt a systematic approach to the consideration of natural hazards and disasters when performing their statutory or advisory functions.

Given that a significant proportion of Lot 21 has been designated by the Department of Water and Environmental Regulation as being flood prone, due consideration must be given to the future potential flood risk and appropriate mitigation measures.

Firstly, it should be noted the subject land is identified by the Department of Water and Environmental Regulation as being located within a floodplain, not a floodway, where the risk of flooding is less severe. Secondly, the Floodplain Management Strategy commissioned by the Shire following the major flood event in the Lake Grace townsite in January 2006 confirms the south-eastern portion of Lot 21 is subject to shallow flooding that ranges in depth from 0.02 to 0.15 metres above the land's natural ground level.

Given the significant effort and investment made by the Shire since the 2006 flood event to address the various mitigation measures recommended by the Floodplain Management Strategy and its intention to design and construct all proposed new industrial lots in the flood prone portion of the subject land to ensure the final finished floor level of all habitable structures is at least 300mm above the highest known flood level, it is contended all future proposed lots and habitable structures thereon will have an adequate level of flood protection that addresses the requirements of State Planning Policy 3.4.

- **State Planning Policy 4.1 – Industrial Interface**

State Planning Policy 4.1 entitled *Industrial Interface* seeks to prevent conflict and encroachment between industrial and sensitive land uses.

Those portions of Lot 21 currently zoned and proposed to be rezoned for industrial purposes are located approximately 275 metres from the nearest sensitive land uses on Stubbs Street, Lake Grace.

Having regard for:

a) the Environmental Protection Authority's Guidance Statement No.3 entitled 'Separation Distances between Industrial and Sensitive Land Uses'; and

b) the need for development approval for all development on any land classified 'General Industry' zone in the Shire of Lake Grace Local Planning Scheme No.4,

the Shire will consider and enforce the minimum buffer separation distance requirements of Guidance Statement No.3 when considering and determining development applications for all proposed new lots created once the land is subdivided to ensure compliance with the requirements of State Planning Policy 4.1.

- **Government Sewerage Policy**

The *Government Sewerage Policy* establishes the Western Australian Government's position on the provision of sewerage services through the planning and development of land.

Broadly, the policy requires reticulated sewerage to be provided during the subdivision and development of land. Where reticulated sewerage disposal infrastructure is not available it adopts a best practice approach to the provision of on-site sewage treatment and disposal in accordance with *Australian/New Zealand Standard 1547 On-site domestic wastewater management.*

Part 4 of Local Planning Scheme No.4 supports the *Government Sewerage Policy* by requiring the provision of reticulated sewerage disposal infrastructure to all residential and other developments in the Lake Grace townsite which exceeds the R5 density code.

Given Lot 21 is located outside of the designated boundaries of the Lake Grace townsite and the provision of reticulated sewerage disposal infrastructure to the proposed subdivision on the land for industrial purposes is not practical or commercially viable, all proposed new industrial lots will comprise a minimum area of 2,000m^2 with all future development thereon to be served by on-site effluent disposal systems (i.e. septic tanks and inverted leach drains).

In order to demonstrate its case for on-site effluent disposal and compliance with the specific requirements of the *Government Sewerage Policy* the Shire engaged a suitably qualified engineer to undertake a geotechnical investigation of the relevant portion of the subject land during winter 2024, the findings from which are documented in Attachment 3.

- **WAPC Development Control & Operational Policies**

The following development control and operational polices published by the Western Australian Planning Commission are of relevance to the future proposed subdivision of Lot 21 for industrial purposes:

1.1 – *Subdivision of Land – General Principles*;

1.7 – *General Road Planning*;

1.12 – *Planning Proposals Adjoining Regional Roads in Western Australia (Draft)*;

4.1 – *Industrial Subdivision*; and

4.2 – *Planning for Hazards and Safety.*

The Shire will have due regard for the requirements of these policies when formulating a subdivision plan for the subject land for formal consideration and determination by the Western Australian Planning Commission at the appropriate point in the statutory approval process.

- **Shire of Lake Grace Local Planning Scheme No.4**
  The *Shire of Lake Grace Local Planning Scheme No.4* articulates the local government's planning aims and intentions for its municipal district, sets aside land as reserves for public purposes, zones land for the purposes defined in the Scheme, controls and guides land use and development, sets out procedures for the assessment and determination of development applications, makes provision for the administration and enforcement of the Scheme and addresses other matters contained in Schedule 7 of the *Planning and Development Act 2005.*

  The stated objectives in Part 3 of Local Planning Scheme No.4 for all land classified 'General Industry' zone are as follows:

  - *To provide a location for general, light and service industries which by the nature of their operations should be separated from residential areas;*
  - *To ensure an adequate supply of suitably located land for future industrial development;*
  - *To provide for a range of compatible general, light and service industries to support the needs and development of the district;*
  - *To provide a range of employment opportunities for residents of the district;*
  - *To ensure that development is in accordance with appropriate and satisfactory standards of function, amenity and safety;*
  - *To ensure that appropriate buffers are provided and maintained between industrial uses and adjacent uses so as to avoid land use conflicts; and*
  - *To encourage the provision of additional landscaping to the established industrial areas to improve their visual appearance.*

  The proposed subdivision and development of Lot 21 for industrial purposes represents a logical extension to existing and proposed urban development in the Lake Grace townsite including that portion of Lot 21 already classified 'General Industry' zone, is capable of being developed in a manner consistent with the abovementioned Scheme objectives and all other relevant standards and requirements, and is unlikely to compromise the existing character, amenity or compatibility of existing or proposed land uses in the immediate locality or give rise to any serious land use conflicts.

CONCLUSION

In light of the above information and justifications it is concluded the proposed rezoning of an additional 8.58 hectare portion of Lot 21 (No.19) Mather Road, Lake Grace from 'General Agriculture' to 'General Industry' zone is consistent with the aims and objectives of the State and Shire's planning frameworks and will be of significant benefit to the future development and growth of the Lake Grace townsite and the local community. As such, the Shire of Lake Grace is now seeking the necessary approvals from the Environmental Protection Authority, the Western Australian Planning Commission and the Hon. Minister for Planning to amend the Shire of Lake Grace Local Planning Scheme No.4 accordingly.

APPENDIX 1 – CERTIFICATE OF TITLE & DEPOSITED PLAN

WESTERN AUSTRALIA

TITLE NUMBER	
Volume	Folio
2943	**263**

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

BGRoberts

REGISTRAR OF TITLES

REGISTRAR OF TITLES WESTERN AUSTRALIA

LAND DESCRIPTION:

LOT 21 ON DEPOSITED PLAN 411875

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

LINDA ANNE CARRUTHERS OF POST OFFICE BOX 44, LAKE GRACE

(ND P511047) REGISTERED 11/4/2023

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. G294153 MORTGAGE TO WESTPAC BANKING CORPORATION REGISTERED 2/10/1996.
2. O940631 MORTGAGE TO REGIONAL INVESTMENT CORPORATION OF 22 BATH LANE BENDIGO VIC 3552 REGISTERED 12/11/2021.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

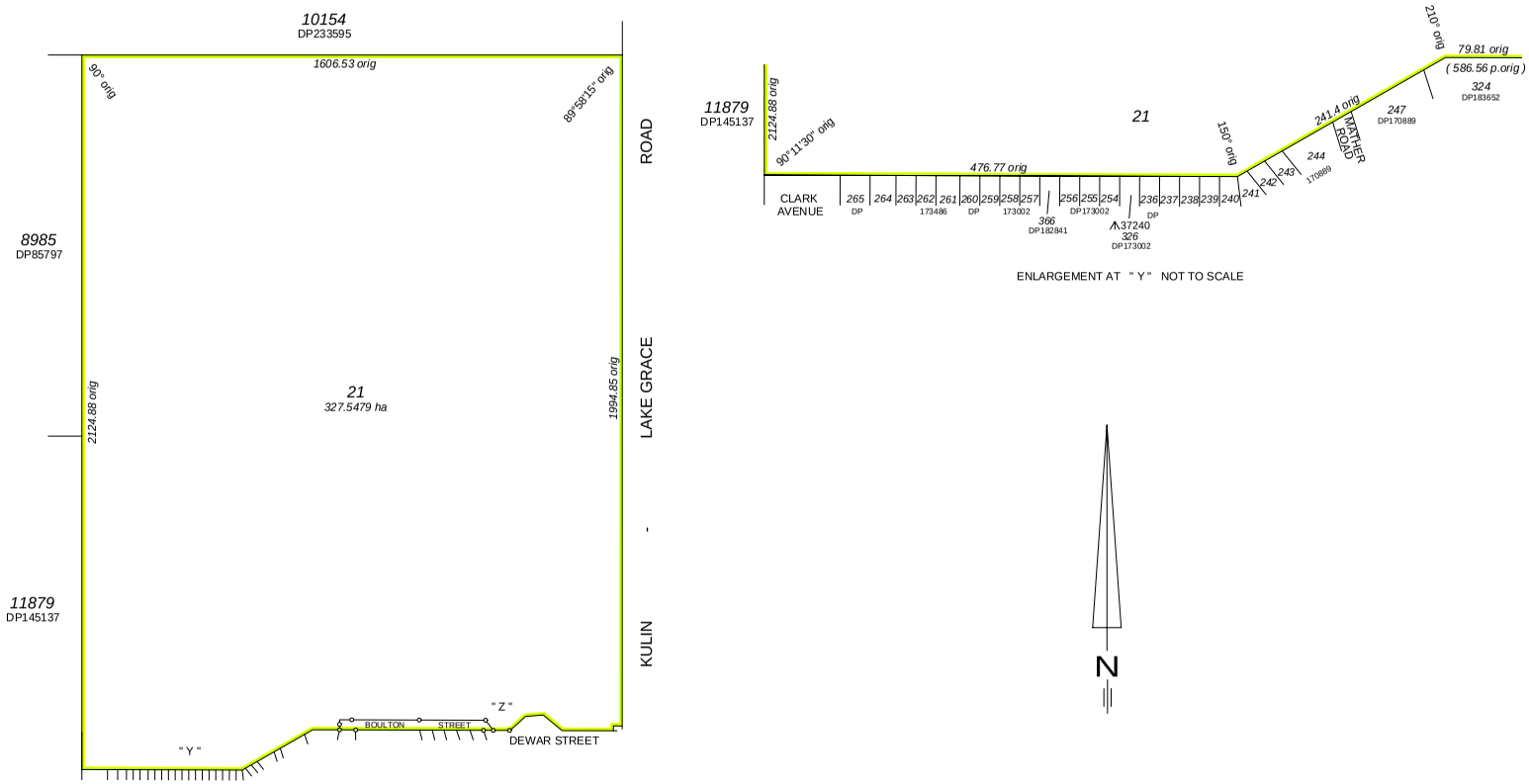
STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	DP411875
PREVIOUS TITLE:	2216-596
PROPERTY STREET ADDRESS:	19 MATHER RD, LAKE GRACE.
LOCAL GOVERNMENT AUTHORITY:	SHIRE OF LAKE GRACE

VERSION	AMENDMENT	AUTHORISED BY	DATE

LIMITED IN DEPTH TO 60.96 METRES



PH & KE GOW ,
LICENSED SURVEYORS
P . O . BOX 580 ,
NARROGIN , W.A. 6312 .
PH - 98815140 , FAX - 98815575
peter-gow@bigpond.com

1 : 10000 at A2

0 100 200 300 400 500

INTERESTS AND NOTIFICATIONS

SUBJECT	PURPOSE	STATUTORY REFERENCE	ORIGIN	LAND BURDENED	BENEFIT TO	COMMENTS

HELD BY LANDGATE IN DIGITAL FORMAT ONLY

TYPE FREEHOLD SSA ~~YES~~ / NO

PURPOSE SUBDIVISION

PLAN OF

LOT 21 AND ROAD

FORMER TENURE LOT 20 ON DP29197
C/T 2216 - 596

LOCAL AUTHORITY SHIRE OF LAKE GRACE

LOCALITY LAKE GRACE

D.O.L. FILE

FIELD RECORD 140553

SURVEYOR'S CERTIFICATE - Reg 54

I . . . . . P . H . GOW . . . . . .

hereby certify that this plan is accurate and is a correct representation of the -

(a) * survey; and / or
(b) * calculations from measurements recorded in the field records,

(* delete if inapplicable)

undertaken for the purposes of this plan and that it complies with the relevant written law(s) in relation to which it is lodged.

Peter Gow NLR
2017-07-31
09:27+08:00

Licensed Surveyor Date

LODGED

DATE	FEE PAID	ASSESS No.
31 July 2017	$345.00	255779

I.S.C.

EXAMINED

E. Milewska 31.08.2017

WESTERN AUSTRALIAN PLANNING COMMISSION

FILE 154381

01-Sep-2017

DELEGATED UNDER S.16 OF THE P & D ACT 2005 DATE

IN ORDER FOR DEALINGS

SUBJECT TO

SEC 168(1),(2) OF THE P&D ACT

4.09.2017

FOR INSPECTOR OF PLANS & SURVEYS DATE

APPROVED

INSPECTOR OF PLANS & SURVEYS
(S. 18 Licensed Surveyors Act 1909)

6.2.2018
DATE

GOVERNMENT OF WESTERN AUSTRALIA

Landgate

DEPOSITED PLAN

411875

SHEET 1 OF 1

VERSION 1

APPENDIX 2 – PLANS 1 TO 4

EXURBAN
RURAL & REGIONAL PLANNING
Tel: (08) 9303 2532
Mob: 0429 303 100
PO Box 1695
WANGARA DC WA 6947
www.exurban.com.au

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0 100 200 300 400 500m

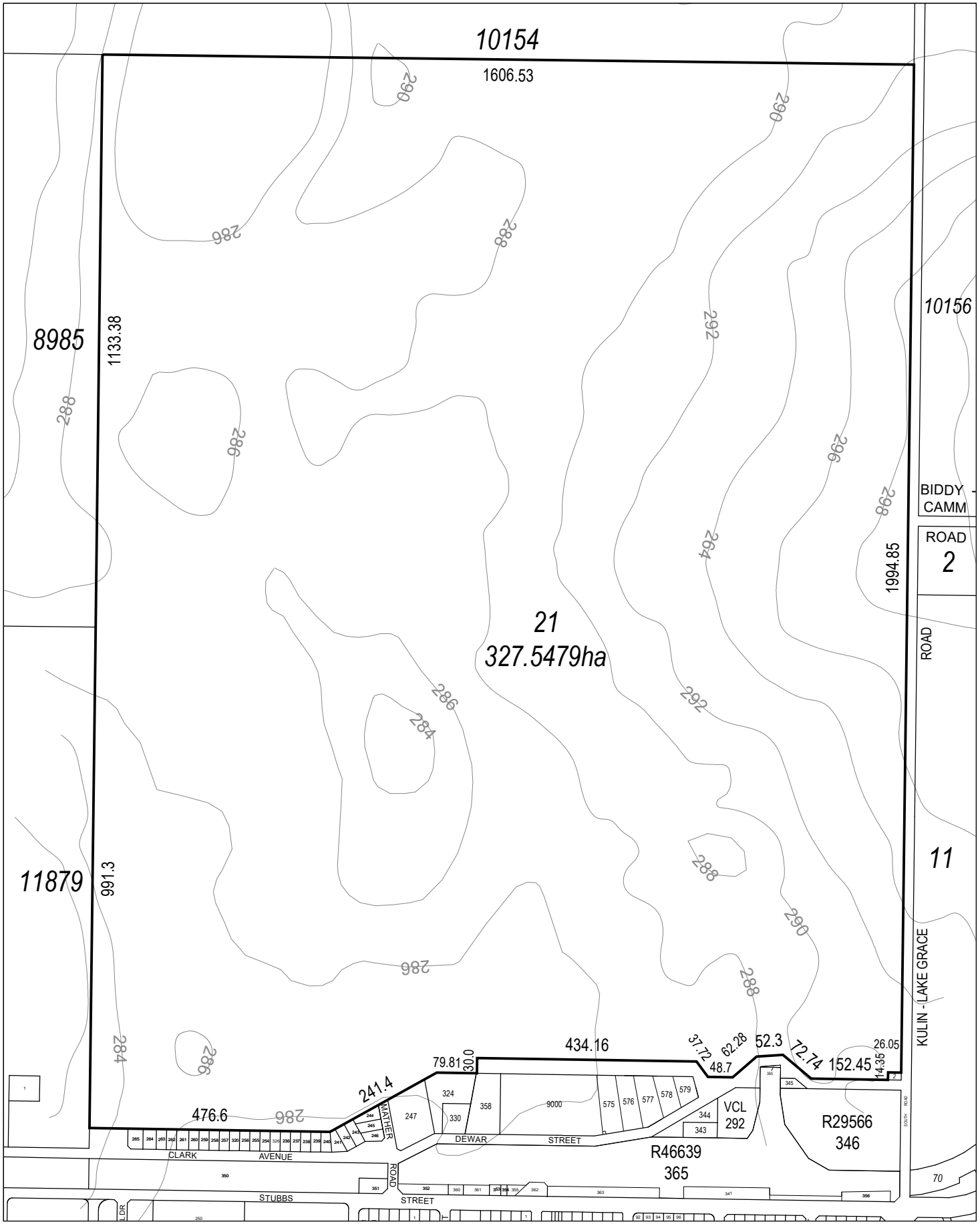
SCALE 1:12,500 @ A4
DATE: 23.06.2025

LEGEND:

SUBJECT LAND.....

LOCATION PLAN
PLAN 1

LOT 21 (No.19) MATHER ROAD
LAKE GRACE
Shire of Lake Grace



EXURBAN
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PO Box 1685
WANGARA DC WA 6947
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0 20 40 60 80 100 120 140 160m

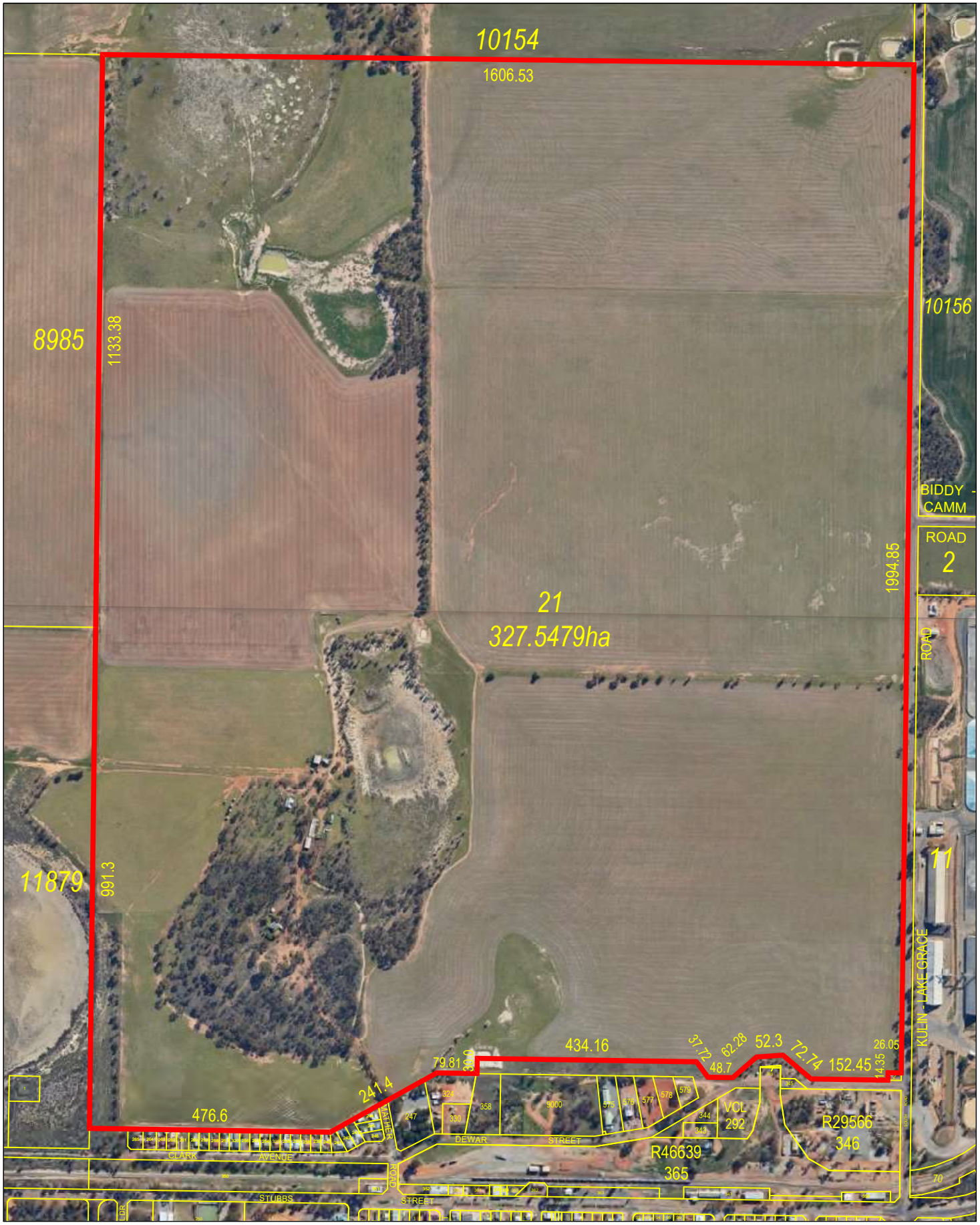
SCALE 1:10,000 @ A4
DATE: 23.06.2025

LEGEND:

SUBJECT LAND

EXISTING LOT CONFIGURATION PLAN PLAN 2

PORTION OF LOT 21 (No.19) MATHER ROAD
LAKE GRACE
Shire of Lake Grace



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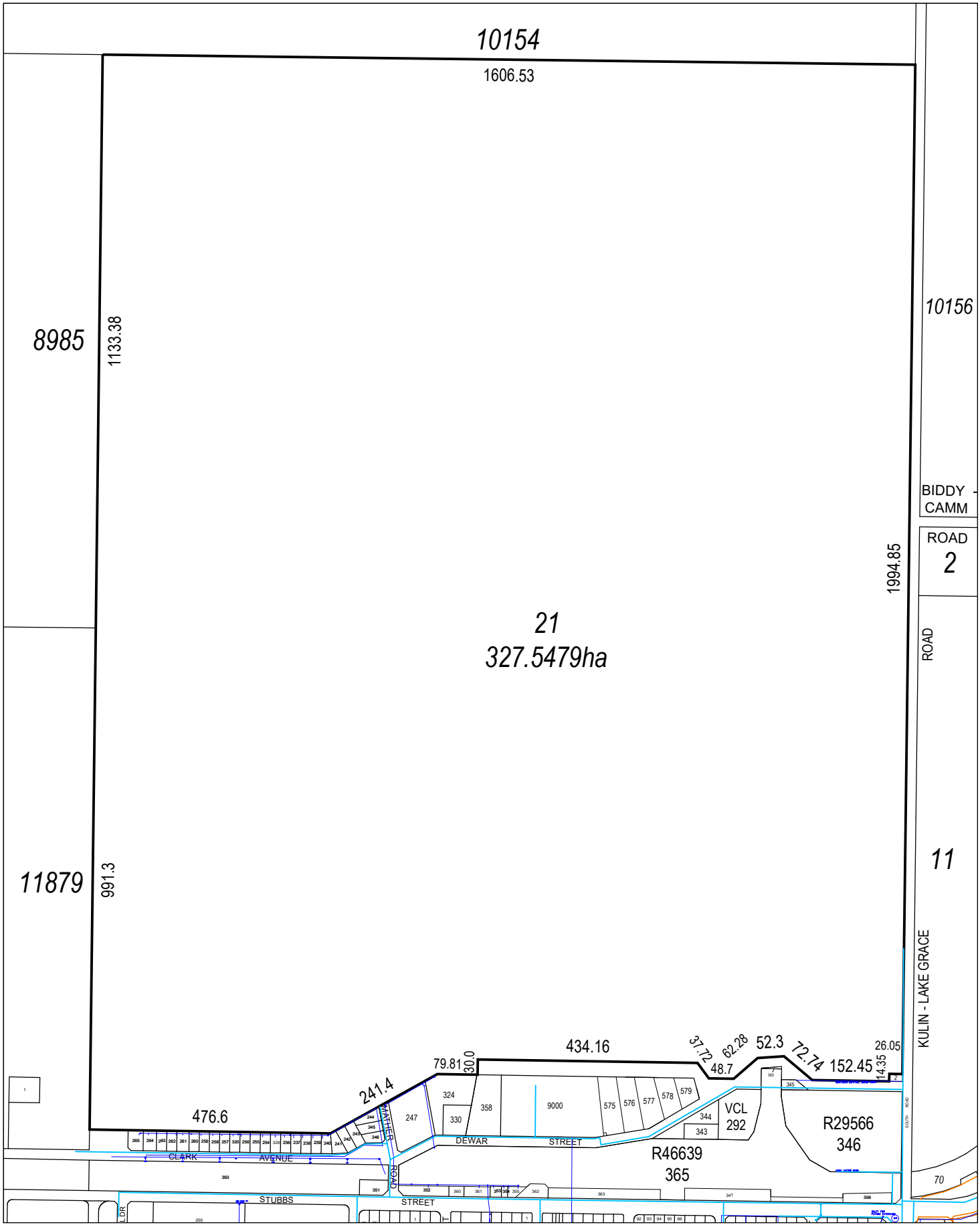
SCALE 1:10,000 @ A4
DATE: 23.06.2025

LEGEND:

SUBJECT LAND

AERIAL PHOTO PLAN 3

PORTION OF LOT 21 (No.19) MATHER ROAD
LAKE GRACE
Shire of Lake Grace



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W E
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0 20 40 60 80 100 120 140 160m

SCALE 1:10,000 @ A4
DATE: 23.06.2025

LEGEND:

SUBJECT LAND.....

OVERHEAD POWERLINES.....

TELSTRA SERVICES.....

SEWER INFRASTRUCTURE.....

WATER SUPPLY INFRASTRUCTURE

EXISTING ESSENTIAL SERVICE INFRASTRUCTURE PLAN 4

PORTION OF LOT 21 (No.19) MATHER ROAD
LAKE GRACE
Shire of Lake Grace

EXURBAN
RURAL & REGIONAL PLANNING

APPENDIX 3 – REPORT ON GEOTECHNICAL INVESTIGATION

ROBB CIVIL CONSULTANTS

Report on Geotechnical Investigation

Including Leach Drains

Proposed Commercial Development

#19 Mather Road, Lake Grace WA

Submitted to:

Shire of lake Grace

1 Bishop St

Lake Grace

WA6353

17 September 2024

1. Introduction

I was invited (E Mail) by Jason Lip (L.Grace Shire) early in August 2024 to Investigate a large Site (20 ha) in the Lake Grace Township.
The address of the property is: ***19 Mather Rd Lake Grace*** The Site is bounded by *Dewer* St to the South and *Ku/in/Lake Grace Rd* to the East.
The Site slopes steeply from North to South with a FALL of **Sm**
The Shire plans to sub-divide the Site into **1ha** lots. (**Industrial Sub-division.)**
The sole purpose of the Site Investigation (Full Geotechnical) is to determine if the Site is suitable for" Septic Effluent Disposal (Leach Drains)
W.A.Government Sewerage Policy dictates a 'soil' Investigation be expedited in the winter time when the Ground Water (G.W.) is at its *"highest"*
The mandate was for the soil testing (Full Geotechnical Investigation) to be completed before the ***END*** of August 2024.
The Site Investigation was expedited by ***ROBB CIVIL CONSULTANTS(*** Perth Based) on 28/29 August 2024.

This report presents the interpretation of the geotechnical investigation results gathered by Robb Civil Consultants.

The main objectives of the site investigation were to:

- Identify the subsurface soil condition.
- Assess the permeability of the existing ground.
- Provide site classification in accordance with AS 2870-2011 "Residential Slabs and Footings.
- Recommend appropriate site preparation, including compaction criteria.
- Recommend the allowable bearing capacity for building foundation design.

A site plan showing the proposed development was provided to Robb Civil Consultants to aid the investigation.

2. Executive Summary:

a) Soil Classification: **Class M** (+1.0m sand pad)
b) Soil Permeability: Average: Hallam+ Falling Head= **0.2m/d**
c) SEMI INVERTED LEACH DRAINS: COMPLIANT.(See Fig 11)

3. Geological Site Condition

3.1 Geological Setting

The Dumbleyung 1:250,000 Geological Series Sheet SI 50-7 1985 Edition prepared by the Geological Survey of Western Australia indicates that the site is underlain with:

- Colluvium and minor alluvium (Qc): silt, sand and gravel; generally on slopes adjoining rock and laterite outcrops.

3.2 Ground Elevation

The Landgate website indicates that the ground level is approximately 293m AHO.

3.3 Groundwater.

Groundwater level= 282.0mA.H.D (Fig 5)

3.4 Earthquake

According to AS1170.4, the site is located within an area that has an earthquake acceleration coefficient of 0.10.

4. Site Description

The site is bounded to the east by Kulin-Lake Grace Road, to the south by Dewar Street, to the by Lake Grace North, and bounded by farmland to the north.

5. Field Investigation and Results

5.1 Field Investigation

The field investigation was conducted on 28/29 Aug 2024 and consisted of:

- Drilling **4** boreholes to a depth of 2.00m or refusal for soil profiling and sampling.
- **4** x Dynamic Cone Penetrometer Test (DCP) to 1.05m or refusal.
- 3 x Hallam permeation test.
- 4 x Soil samples laboratory testing for Atterberg Limit and Particle Size Distribution

5.2 Preamble

A) Pre-requisit for 'septic effluent disposal' (Le.Leach Drains) requires:
   1) The soil be permeable.(seepage)
   2) Sufficient Evaporation required.

5.3 Computations

a) Inflow: (Q)

Ex W.C Manual
Non Residential Flows
0.85-14976-0.22 (Example-wet Ground)
(Net Area ha)- (Flow: LilTRES PER NET HECTARE/DAY) -(FLOW US)
i.e 1-16992-0.295
= 0.2951/S/Net ha
So: 1 day= 0.295 x 60 x 60 x 24
= 25488L
= 25.5m^3/d
Q= Say:+ 26m^3/d

b) EVAPORATION.

(Fig 10)= 3mm/d
(Plate 13)= 2mm/d
Average:= 2.Smm/d
=(0 .0025m) x 150m2(Leachate Area =50mx3m)
=0.375m3/d
Say E= 0.5m^3/d

c) PERCOLATION:

Perm = 0.2m/d
Say the 'leach Field' Area is 50m x 3 = 150m^2 ***(Requires Further Investigation by this Office)***
Hence: Perm (0.2m/d) x Area (150m^2)=· **30m^3/d**

RESULTANT FLOWS= (a)-(b+c)
=26m^3/d - (0.5m^3/d + 30m^3/d)
=26m^3/d - 30.5m^3/d
-4.Sm^3/d
Therefore: it is **COMPLIANT** *(i.e.Leach Drains Will Work)* Fig : 11

5.3 Soil Profile

The site comprises stiff to very stiff clay to 1.05m from the ground surface.

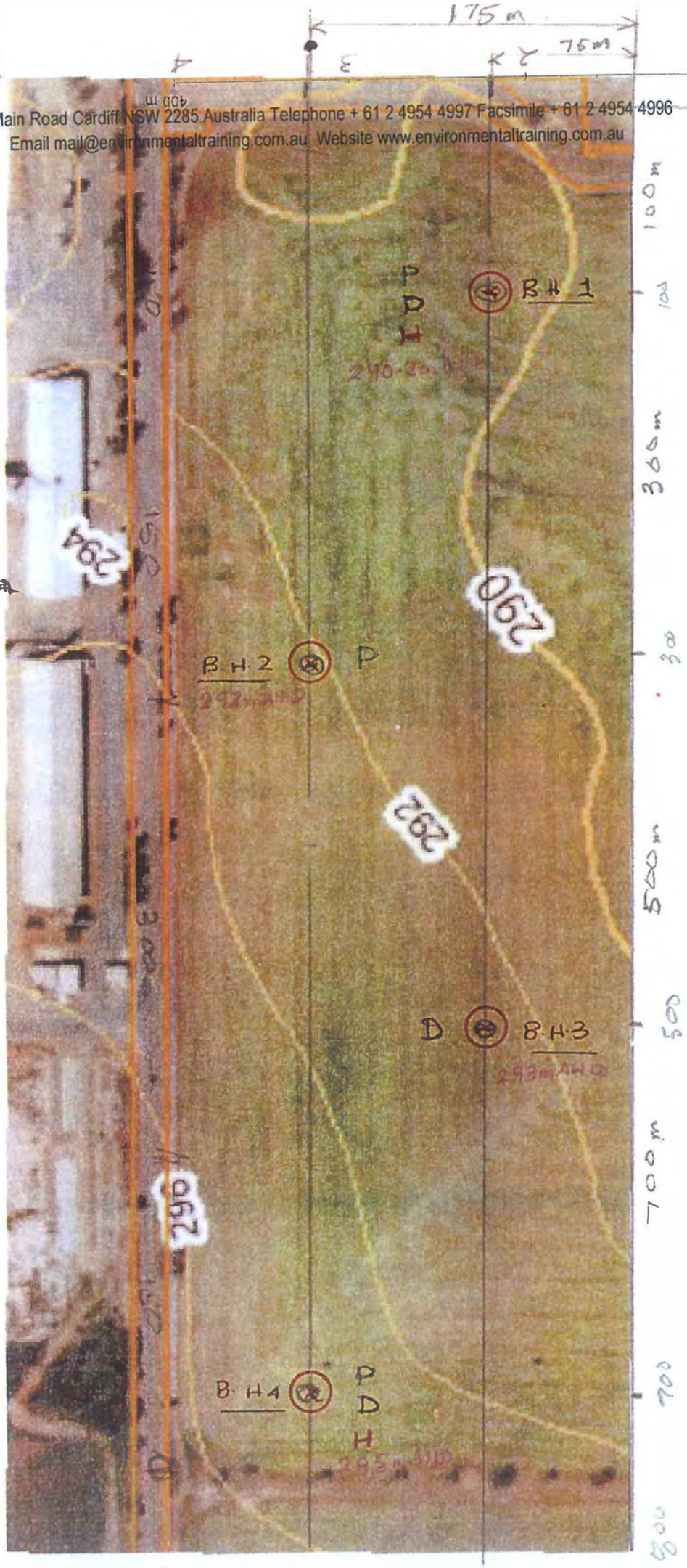
Table 1 shows the borehole profiles, and Plate 1 shows the approximate test locations.

Table 1 – Borehole Profiles

	Depth (mm)	Soil Descriptions	
BH1	0-1450	CLAY: brown, damp	
	GWL: Dry to moist	DCP {per 150mm):1-4-10-18-22-27-32	E.O.B. (End of Borehole): Too hard to drill
BH2	0-1615	CLAY: brown, damp	
	GWL: Dry to moist	DCP (per 150mm): none	E.O.B.: Too hard to drill
BH3	0-1700	Gravelly Silty SAND: red, damp	
	GWL: Dry to moist	DCP (per 150mm): 2-5-9-17-26-32-37	E.O.B.: Too hard to drill
BH4	0-1745	CLAY: brown, damp	
	GWL: Dry to moist	DCP (per 150mm): 3-10-17-27-41-60	E.O.B.: Too hard to drill

SCALE: 1:3000

197 Main Road Cardiff NSW 2285 Australia Telephone + 61 2 4954 4997 Facsimile + 61 2 4954 4996
Email mail@environmentaltraining.com.au Website www.environmentaltraining.com.au



LEGEND

= PERCOLATION

= DYNAMIC CONE

= HALLAM

W.L. = 282m AHD

BARE LOGS

DEPTH = 3m APPROX

BH 1 = 290.2m AHD

BH 2 = 292m AHD

BH 3 = 293m AHD

BH 4 = 295m AHD

PLATE 1.

BARE LOGS LAKE GRACE

5.4 Laboratory Test Results

Soil samples gathered in the boreholes were subjected to laboratory testing to determine their classification and plasticity.

Table 2 – Laboratory Test Results

Location	BH1	BH2	BH3	BH4
Depth (m)	1.0	0.5	1.3	0.5
Liquid Limit (%)	60	49	39	21
Plastic Limit (%)	19	15	16	10
Plasticity Index (%)	41	34	23	11
Linear Shrinkage	15.5	12.5	10.5	6.5
Soil Type	Clay	Clay	Clay	Clay

5.5 Hallam Permeation Test and Percolation Test Results

The Hallam permeation test result indicates that the soil's saturated hydraulic conductivity is 0.35 m /day; the analysis is shown in Figure 6.

Test # B.H. #1 19 Mather Rd lake Grace 28/8/24

Time (hr:min:sec)	Time after start (min)	Level in Tube (cm)	Drop of Level (cm)	Rate of Water Level Drop (cm/min)
4:48	0			
	0.2	46.0	-46.0	-230.0
	0.3	47.0	1.0	10.0
	0.5	50.0	-3.0	-15.0
	0.7	53.0	-3.0	-15.0
	0.8	57.0	-4.0	-40.0
	1	61.0	-4.0	-20.0
	1.2	66.0	-5.0	-25.0
	1.3	71.0	5.0	-50.0
	1.5	74.0	-3.0	-15.0
	1.7	77.0	-3.0	-15.0
	1.8	78.0	-1.0	-10.0
	2	79.0	-1.0	-5.0
	2.2	80.0	-1.0	-5.0
	2.3	81.0	-1.0	10.0
	2.5	81.0	0.0	0.0
	2.7	81.0	0.0	0.0
	2.8	81.0	0.0	0.0
	3	82.0	-1.0	5.0
			0.0	0.0
			0.0	0.0
			0.0	0.0
			0.0	0.0
			0.0	0.0
			0.0	0.0
Selected Steady Rate of Water Level Drop			(cm/min)	5.0
Rate of Loss of Water from Reservoir			(cm^3/min)	37.0

Parameter	Symbol	Value
Depth of Water in Test Hole (cm)	H	25
Radius of Test Hole (cm)	r	3.75
Inner Tube External Diameter (cm)	D_i	0.9
Outer Tube Internal Diameter (cm)	D_o	3.2
Rate of Water Level Drop (cm/min)	I	5.0
Inner Tube Cross Sectional Area (cm^2)	A	0.64
Outer Tube Cross Sectional Area (cm^2)	A_o	8.04
Flowrate (cm^3/min)	Q	37.03
Saturated Hydraulic Conductivity (cm/min)	K_{sat}	0.0244
Saturated Hydraulic Conductivity (m/day)	K_{sat}	0.35

Figure 2. Hallam Permeation Test Result

The soil's saturated hydraulic conductivity was also calculated using the Hvorslev Method, the results of which are shown in Table 3.

5.6 Table 3 - Percolation Test Results using the Hvorslev Method

Test Location	Testing Depth	Approximate Groundwater Level Below Ground Level	Soil Type	Saturated Permeability (m/day)	Indicative Drainage Class
BH1	1430 mm	10000 mm	Clay	0.13	Poorly Drained
BH2	1615 mm	10000 mm	Clay	0.10	Poorly Drained
BH4	1730 mm	10000 mm	Clay	0.03	Poorly Drained

5.7 Site Classification

Table 5-1: AS2870:2011- General Definition of Site Classes	
Class	**Foundation**
A	Most sand and rock sites with little or no ground movement from moisture changes
S	Slightly reactive clay sites with only slight ground movement from moisture changes (y.:::;2omm)
M	Moderately reactive clay or silt sites, which can experience moderate ground movement from moisture changes (20<ys::;4Qmm)
Hl	Highly reactive clay site, which can experience high ground movement from moisture changes (40<y.:::;6Qmm)
H2	Highly reactive clay site, which can experience very high ground movement from moisture changes (60<ys575mm)
E	Extreme reactive sites, which can experience extreme ground movement from moisture changes (ys>75mm)
p	Sites which include soft soils, such as soft clay or silt or loose sands; landslip; mine subsidence; collapsing soils; soils subject to erosion; reactive sites subject to abnormal moisture conditions or sites which cannot be classified otherwise.

Based on the investigation results, the site is classified as class **"H1"** in accordance with A52870:2011 Residential Slabs and Footings. The estimated surface movement due to moisture change is approximately 46mm.

AS 2870 is limited to single and double-storey residential buildings with standard shallow footings and a minimum bearing pressure of 100 kPa and does not apply to the proposed development. The structural designers must consider this.

With a 1.0m sand pad above the existing ground, the site can be upgraded to class "M".

5.8 Shallow Footings

We recommend that preliminary footing designs be based on an allowable bearing pressure of 100 kPa at least 1m wide and embedded 0.3m deep. Settlements are not likely to be excessive unless loose sand layers are present.

5.9 Site Preparation

Site preparation work would include:

- Remove any other deleterious material from the site, including construction/demolition debris and soft clay.
- Excavate to the underside of the slabs and footings.
- Compact the exposed ground to achieve the density specified in Section 5.4 to a depth of at least .Sm below the slab and footings - any areas of loose or soft soil or unsuitable material must be removed and replaced with approved fill as outlined in Section 5.4
- Where fill is required to build up levels, use approved fill (see Section 5.4), placed and compacted in layers of no greater than 300 mm loose thickness.
- A competent person must check the prepared excavation before blinding.

5.10 Compaction

Where sand is used as fill, and the Perth sand penetr□meter (PSP) is used for compaction control, the following PSP blow counts may be assumed to correlate to the required dry density ratio of 95% MMDD:

- Depth range 0.15 m to 0.45 m - 8 blows
- Depth range 0.45 m to 0.75 m - 10 blows
- Depth range 0.75 m to 1.05 m - 12 blows.

Fill must be placed in horizontal layers with a loose thickness of less than 300 mm. Each layer must be compacted by suitable compaction equipment and carefully controlled to ensure even compaction over its full area and depth.

For the day materials, use a dynamic cone penetrometer (DCP) for compaction rnntrol; the following DCP blow counts may be assumed to correlate to the required dry density ratio of 95% **MMD□:**

- Depth range 0.15 m - 4 blows

5.11 Stormwater Drainage

The existing ground has low permeability. Large diameter soakwells are required to collect stormwater from roofs and paved areas. The pits may be designed based on the soil permeability of 0.2m/d and should be at least 3.0m away from the building footings.(***Requires Further investigation by this Office)***

5.12 Fire Fighting

Street Hydrants at Kulin/Lake Grace Road have insufficient Pressure. (***55kpa-Ex*** Peter lay -W.C.)
Fire Fighting requires ***200 kpa*** Pressure.
This can be achieved by means of Pumps/Tanks/Ring Mains/Hydrants.*(* ***Requires further Investigation by this Office)***

5.13 CONCLUSIONS & RECOMMENDATIONS.

1) The Site is suitable for dissipating sewerage effluent via" **Inverted Leach Drains."(COMPLIANT)**
2) Soil Classification **Class "M"** (+ **1.0m sand Pad)**
3) Stormwater Drainage Design & Documentation by use of Large Diameter Soakwells -1800mm <!>.***((Requires Further Investigation by this Office)***
4) Fire Fighting Design & Documentation : Pumps/Tanks/Ring Mains/Hydrants ***(Requires further Investigation by this Office}.***

5.14 REFERENCES:

- Nearmap
- AS 1170.4-2007 Structural Design Actions-Earthquake Actions in Australia
- AS 1726-2017 Geotechnical Site Investigations
- **AS 2870-2011** Residential Slabs and Footings
- AS 3798-2007 Earthworks for Commercial and Residential Developments
- Landgate
- Geology Survey of Western Australia Dumbleyung 1:250,000 Geological Series Sheet SI 50-7 1985 Edition
- Bulletin No. 36-Waterways Experiment Station-Corps of Engineers, U.S. Army-Time Lag and Soil Permeability in Ground-Water Observations by M. Juul Hvorslev, 1951
- AS/NZS 1547:2000 On-Site Domestic Wastewater Management

5.15 Limitations

- This site investigation has been carried out by inspection, using a limited amount of DCP and boreholes. Achieving full site coverage to ensure all variations is not practical and is seldom done due to cost constraints and impracticality.

- It should be noted that the subsurface conditions encountered by the limited number of field tests as part of this geotechnical site investigation represent the ground conditions at the locations where the samples were taken and where tests have been undertaken. As such, they represent a tiny proportion of the site to be developed.

- Given the limited number of field tests on the overall site area, variations between investigation locations are likely, and ground conditions different from those presented in this report may be present within the subject site area. The risk associated with this variability and its impact on the proposed development should be carefully considered.

- The level of geotechnical investigation completed to date is considered appropriate for the project objectives.

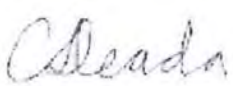
- The conclusions and recommendations in this report assume that the site conditions revealed through the selective point sampling also represent the conditions of those portions of the site not investigated. The actual characteristics may vary significantly between successive test points and sample intervals. Thus, this report's materials and their geotechnical properties will not represent the full range of materials and strengths on site. Allowance should be made for variability in the ground conditions and any consequent impact on the construction budget. Robb Civil Consultants and Optimum Engineering Consultants accept no responsibility and shall not be liable for any consequences of changed or unanticipated conditions.

We trust that this information satisfies your present requirements. Please do not hesitate to contact this office if you require clarification. We thank you for the opportunity to assist you with this project.

For and on behalf of

Optimum Engineering Consultants

Clarence Deada
Senior Geotechnical Engineer



Approved by:

Eric C. Robb
FIEAUST CPEng
Reg. No. 7085
Civil Engineer

LIST OF FIGURES

Material Test Report

LOCAL GEOTECHNICS

Local Geotechnics Pty Ltd
Canning Vale Laboratory
Unit 9/8 Production Road Canning Vale WA 6155
Phone: (08) 9457 3517
Email: admin@localgeotechnics.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Nick Rogers
Senior Lab Technician
Laboratory Accreditation Number: 20038

Report Number:	**LG/709-1**
Issue Number:	1
Date Issued:	04/09/2024
Client:	Eric C Robb
	1 Burford Street, Eden Hill WA 6054
Project Number:	LG/709
Project Name:	Rock & Civil Consulting
Project Location:	Lake Grace WA
Client Reference:	Lake Grace WA
Work Request:	529
Sample Number:	S24529A
Date Sampled:	30/08/2024
Dates Tested:	03/09/2024 - 03/09/2024
Sampling Method:	Sampled by Client
	The results apply to the sample as received
Preparation Method:	In accordance with the test method
Remarks:	All Project and sampling details are provided by the Client. Local Geotechnics Laboratory is not responsible for the accuracy of these Details. Results apply to the sample as received.
Site Selection:	Selected by Client
Sample Location:	**TH1, Depth: (1.0m)**

Particle Size Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
4.75 mm	**100**		
2.36 mm	**100**		
1.18 mm	**99**		
0.6 mm	**92**		
0.425 mm	**88**		
0.3 mm	**83**		
0.15 mm	**73**		
0.075 mm	**65**		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Air Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	60		
Plastic Limit (%)	19		
Plasticity Index (%)	**41**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**15.5**		
Cracking Crumbling Curling	Curling		

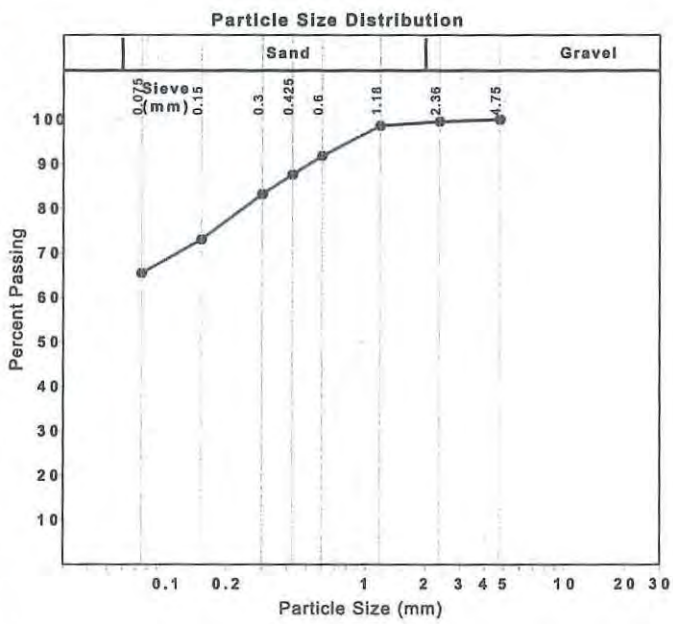


Fig 1

Material Test Report

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Senior Lab Technician
Laboratory Accreditation Number: 20038

Report Number: LG/709-1
Issue Number: 1
Date Issued: 04/09/2024
Client: Eric C Robb
1 Burford Street, Eden Hill WA 6054
Project Number: LG/709
Project Name: Rock & Civil Consulting
Project Location: Lake Grace WA
Client Reference: Lake Grace WA
Work Request: 529
Sample Number: S24529B
Date Sampled: 30/08/2024
Dates Tested: 03/09/2024 - 03/09/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Preparation Method: In accordance with the test method
Remarks: All Project and sampling details are provided by the Client. Local Geotechnics Laboratory is not responsible for the accuracy of these Details. Results apply to the sample as received.
Site Selection: Selected by Client
Sample Location: **TH2, Depth: (0.5m)**

Particle Size Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
2.36 mm	**100**		
1.18 mm	**94**		
0.6 mm	**82**		
0.425 mm	**76**		
0.3 mm	**71**		
0.15 mm	**57**		
0.075 mm	**44**		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Air Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	49		
Plastic Limit (%)	15		
Plasticity Index (%)	**34**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**12.5**		
Cracking Crumbling Curling	Curling		

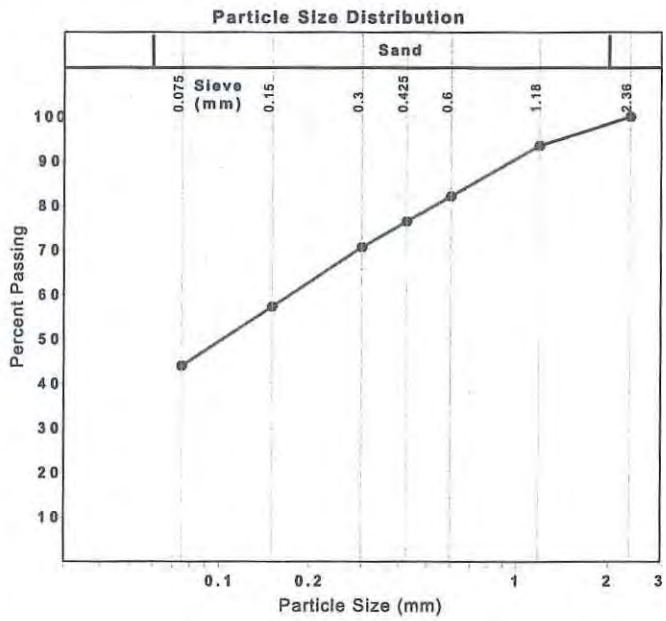

FIG 2

Material Test Report

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Approved Signatory: Nick Rogers
Senior Lab Technician
Laboratory Accreditation Number: 20038

Report Number: LG/709-1
Issue Number: 1
Date Issued: 04/09/2024
Client: Eric C Robb
1 Burford Street, Eden Hill WA 6054
Project Number: LG/709
Project Name: Rock & Civil Consulting
Project Location: Lake Grace WA
Client Reference: Lake Grace WA
Work Request: 529
Sample Number: S24529C
Date Sampled: 30/08/2024
Dates Tested: 03/09/2024 - 03/09/2024
Sampling Method: Sampled by Client

The results apply to the sample as received

Preparation Method: In accordance with the test method

Remarks: All Project and sampling details are provided by the Client. Local Geotechnics Laboratory is not responsible for the accuracy of these Details. Results apply to the sample as received.

Site Selection: Selected by Client

Sample Location: **TH3, Depth: (1.3m)**

Particle Size Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
2.36 mm	**100**		
1.18 mm	**96**		
0.6 mm	**84**		
0.425 mm	**79**		
0.3 mm	**72**		
0.15 mm	**58**		
0.075 mm	**47**		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Air Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	39		
Plastic Limit (%)	16		
Plasticity Index (%)	**23**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**10.5**		
Cracking Crumbling Curling	Curling		

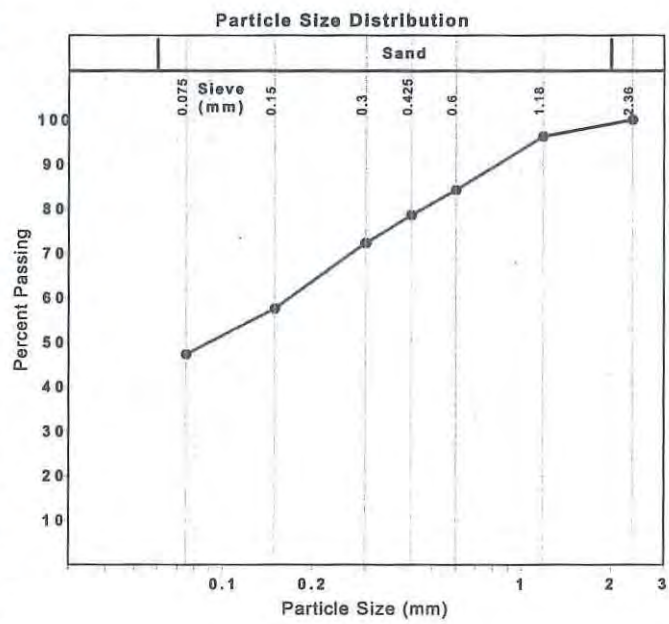

Fig 3

Material Test Report

LOCAL GEOTECHNICS

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Canning Vale Laboratory
Unit 9/8 Production Road Canning Vale WA 6155
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Approved Signatory: Nick Rogers
Senior Lab Technician
Laboratory Accreditation Number: 20038

Report Number: LG/709-1
Issue Number: 1
Date Issued: 04/09/2024
Client: Eric C Robb
1 Burford Street, Eden Hill WA 6054
Project Number: LG/709
Project Name: Rock & Civil Consulting
Project Location: Lake Grace WA
Client Reference: Lake Grace WA
Work Request: 529
Sample Number: S24529D
Date Sampled: 30/08/2024
Dates Tested: 03/09/2024 - 03/09/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Preparation Method: In accordance with the test method
Remarks: All Project and sampling details are provided by the Client. Local Geotechnics Laboratory is not responsible for the accuracy of these Details. Results apply to the sample as received.
Site Selection: Selected by Client
Sample Location: **TH4, Depth: (0.5m)**

Particle Size Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
19 mm	100		
13.2 mm	100		
9.5 mm	100		
6.7 mm	99		
4.75 mm	99		
2.36 mm	98		
1.18 mm	92		
0.6 mm	75		
0.425 mm	68		
0.3 mm	60		
0.15 mm	44		
0.075 mm	35		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Air Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	21		
Plastic Limit (%)	10		
Plasticity Index (%)	11		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	6.5		
Cracking Crumbling Curling	Cracking		

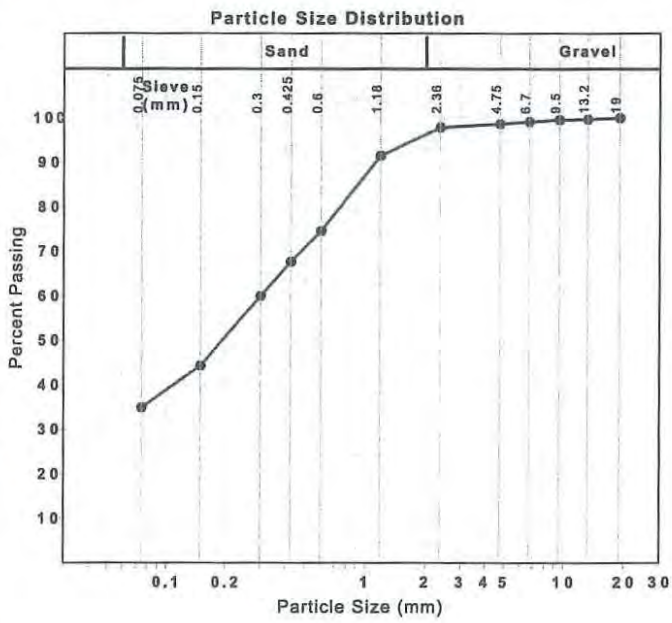


FIG 11

Robb Civil Consultants
Engineering Computations

Mobile : 0405 35 7722

Client c.t. - 19 MATHER RD (LONG SECTION)
Project LAKE GRACI
GROUND WATER LEVEL

Scale H 1:3000 V 1:125
Prep. By E.R
Date 5-9-24

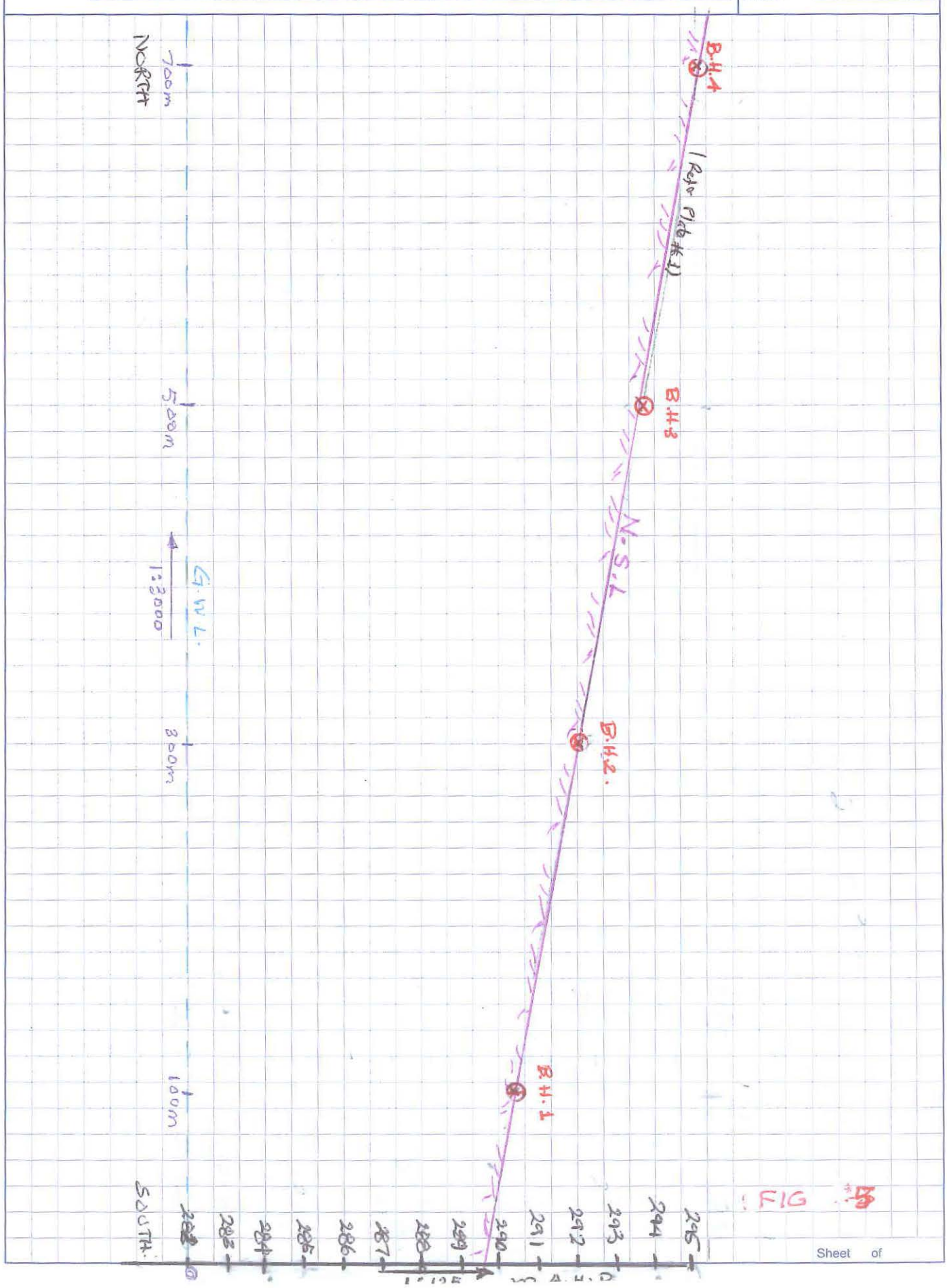


FIG 5

Sheet of

cet **Centre for Environmental Training**

Test # B.H. #1 19 Mather Rd lake Grace 28/8/24

Time (hr:min:sec)	Time after start (min)	Level in Tube (cm)	Drop of Level (cm)	Rate of Water Level Drop (cm/min)
4:48	0			
	0.2	46.0	-46.0	-230.0
	0.3	47.0	-1.0	-10.0
	0.5	50.0	-3.0	-15.0
	0.7	53.0	-3.0	-15.0
	0.8	57.0	-4.0	-40.0
	1	61.0	-4.0	-20.0
	1.2	66.0	-5.0	-25.0
	1.3	71.0	-5.0	-50.0
	1.5	74.0	-3.0	-15.0
	1.7	77.0	-3.0	-15.0
	1.8	78.0	-1.0	-10.0
	2	79.0	-1.0	-5.0
	2.2	80.0	-1.0	-5.0
	2.3	81.0	-1.0	-10.0
	2.5	81.0	0.0	0.0
	2.7	81.0	0.0	0.0
	2.8	81.0	0.0	0.0
	3	82.0	-1.0	-5.0
			0.0	0.0
			0.0	0.0
			0.0	0.0
			0.0	0.0
			0.0	0.0
			0.0	0.0
			0.0	0.0
Selected Steady Rate of Water Level Drop			(cm/min)	5.0
Rate of Loss of Water from Reservoir			(cm^3/min)	37.0

Enter data in green cells

Select Steady Rate of Water Level Drop from Rate of Water Level Drop Column (Column E) and enter in pink cell (E34). This value should be the average of three consecutive values with no more than 10% variation

Disclaimer: CET does not warrant data produced by use of this spreadsheet or any interpretation based on that data

Fig 6

313

Parameter	Symbol	Value
Depth of Water in Test Hole (cm)	H	25
Radius of Test Hole (cm)	r	3.75
Inner Tube External Diameter (cm)	D_i	0.9
Outer Tube Internal Diameter (cm)	D_o	3.2
Rate of Water Level Drop (cm/min)	L	5.0
Inner Tube Cross Sectional Area (cm^2)	A_i	0.64
Outer Tube Cross Sectional Area (cm^2)	A_o	8.04
Flowrate (cm^3/min)	Q	37.03
Saturated Hydraulic Conductivity (cm/min)	K_{sat}	0.0244
Saturated Hydraulic Conductivity (m/day)	K_{sat}	0.35

Confirm data in green cells and adjust if necessary

Fig 7

Centre for Environmental Training

Test # B.H. #2 19 Mather Rd lake Grace 28/8/24

Time (hr:min:sec)	Time after start (min)	Level in Tube (cm)	Drop of Level (cm)	Rate of Water Level Drop (cm/min)
4:48	0			
	0.2	60.0	-60.0	-300.0
	0.3	75.0	-15.0	-150.0
	0.5	89.0	-14.0	-70.0
	0.7	92.0	-3.0	-15.0
	0.8	99.0	-7.0	-70.0
	1	104.0	-5.0	-25.0
	1.2	109.0	-5.0	-25.0
	1.3	112.0	-3.0	-30.0
	1.5	114.0	-2.0	-10.0
	1.7	116.0	-2.0	-10.0
	1.8	117.0	-1.0	-10.0
	2	118.0	-1.0	-5.0
	2.2	119.0	-1.0	-5.0
	2.3	120.0	-1.0	-10.0
	2.5	121.0	-1.0	-5.0
			0.0	0.0
			0.0	0.0
			0.0	0.0
			0.0	0.0
			0.0	0.0
			0.0	0.0
			0.0	0.0
			0.0	0.0
			0.0	0.0
			0.0	0.0
Selected Steady Rate of Water Level Drop			(cm/min)	3.0
Rate of Loss of Water from Reservoir			(cm^3/min)	22.2

Enter data in green cells

Select Steady Rate of Water Level Drop from Rate of Water Level Drop Column (Column E) and enter in pink cell (E34). This value should be the average of three consecutive values with no more than 10% variation

Disclaimer: CET does not warrant data produced by use of this spreadsheet or any interpretation based on that data

F19 8

313

Parameter	Symbol	Value
Depth of Water in Test Hole (cm)	H	25
Radius of Test Hole (cm)	r	3.75
Inner Tube External Diameter (cm)	D_i	0.9
Outer Tube Internal Diameter (cm)	D_o	3.2
Rate of Water Level Drop (cm/min)	L	3.0
Inner Tube Cross Sectional Area (cm^2)	A_i	0.64
Outer Tube Cross Sectional Area (cm^2)	A_o	8.04
Flowrate (cm^3/min)	Q	22.22
Saturated Hydraulic Conductivity (cm/min)	K_{sat}	0.0146
Saturated Hydraulic Conductivity (m/day)	K_{sat}	0.21

Confirm data in green cells and adjust if necessary

Fig 9

Evapotranspiration Calculations

Lake Grace - September 2024 daily calculations

Date	Evapotrans-piration (mm) 0000-2400	Rain (mm) 0900-0900	Pan Evaporation (mm) 0900-0900	Max Temp	Min Temp	Max Rel Hum (%)	Min Rel Hum (%)	Average 10m Wind Speed (m/sec)	Solar Radiation (MJ/sq m)
30/08/2024	2.8	0.0		16.5	5.3	96	45	4.67	16.57
31/08/2024	3.0	0.0		18.8	7.6	86	51	4.73	15.52
01/09/2024	2.2	0.0		16.9	11.2	94	60	3.83	11.13
02/09/2024	3.3	0.2		23.1	5.1	99	40	2.85	17.95
03/09/2024	3.0	0.0		20.8	6.8	89	55	4.19	14.85
04/09/2024	2.9	0.0		18.8	11.7	97	51	5.55	12.94
05/09/2024	2.1	13.0		11.8	8.1	99	51	4.71	12.17
Totals:	19.3	13.2							

Monthly Archive

Year												
2009	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2011	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2012	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2013	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2014	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2016	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2018	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2019	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2020	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2021	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2022	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2023	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2024	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep			

FG 10

Robb Civil Consultants
Engineering Computations

Mobile : 0405 35 7722

Client	LAKE GRACE SHIRE	Scale	N.T.S.
Project	19 NOATHER RD	Prep. By	E.R
	EFFLUENT WATER BALANCE 'PICTORAL' (1ha site)	Date	15-9-24

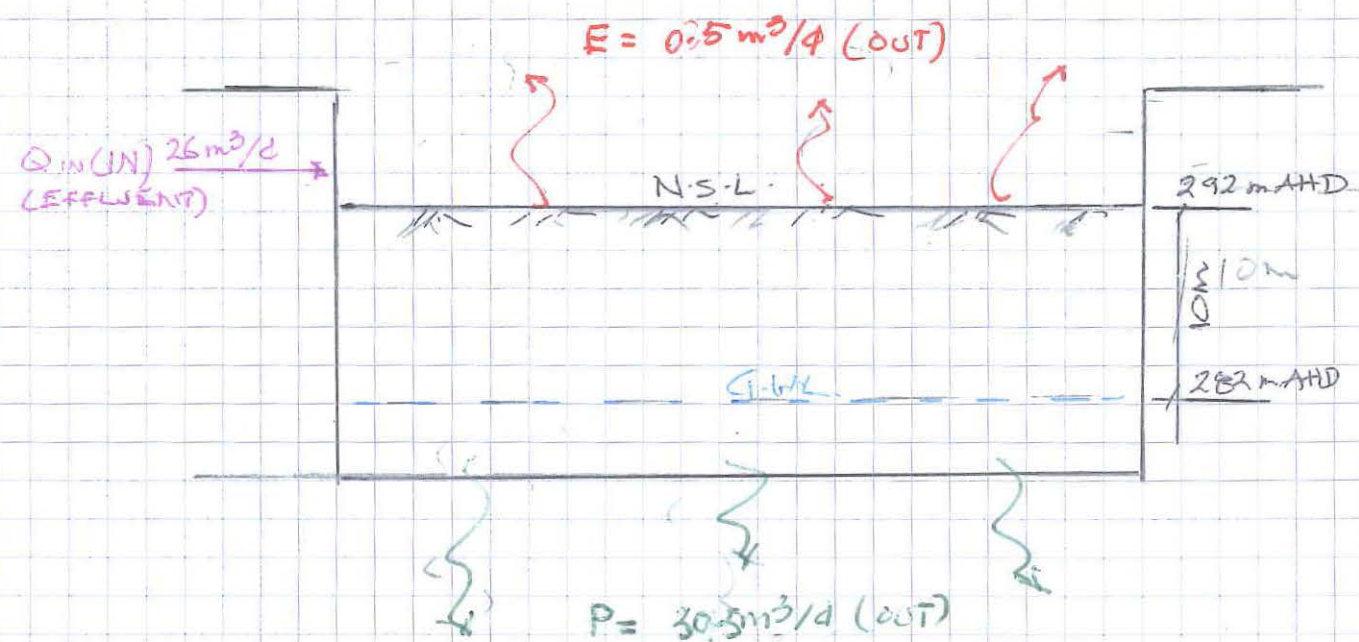


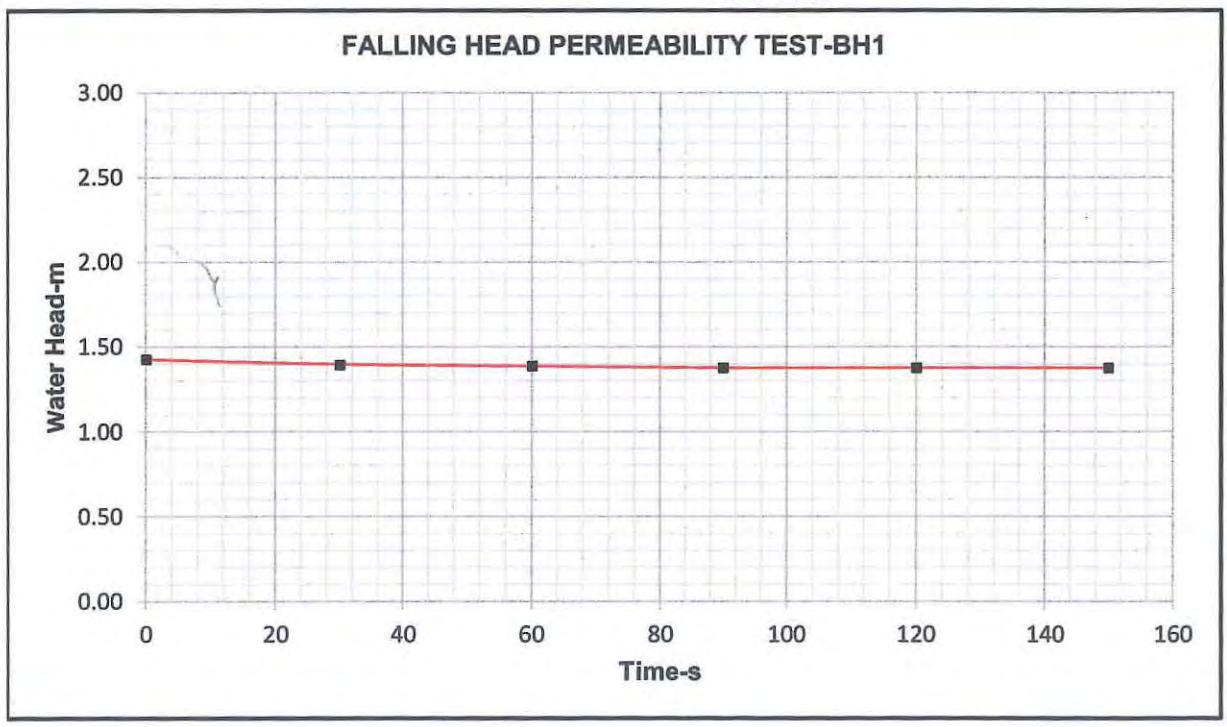
Fig 11

OPTIMUM ENGINEERING CONSULTANTS

Borehole **BH1** Job No.

GPS Location Date 28-Aug-24

Water Level



HVORSLEV METHOD CASE G:

Soakage out base and sides of test hole with no overlying restrictive layer:

Hydraulic Conductivity or Permeability Coefficient (k)

$$k = \frac{d^2 \times \ln(2mL/D) \times \ln(H_1/H_2)}{8L(t_2-t_1)} \text{ m/s}$$

where:

d=D=diameter of test hole (m)= 0.16 H_1= piezometric hear for $t=t_1$

m=transformation ratio= 1 H_2= piezometric hear for $t=t_2$

L= average soakage length (m)

t= time (secs)

Time	t_2-t_1	Piezometric Head	Average L	Ln (H_1/H_2)	Hydraulic Conductivity
sec	sec	H (m)	m		k (m/sec)
0		1.43			
30	30	1.40 0.03	1.42	0.02	4.59E-06
60	30	1.39 0.04	1.40	0.01	1.57E-06
90	30	1.38 0.05	1.39	0.01	1.59E-06
120	30	1.38 0.05	1.38	0.00	0.00E+00
150	30	1.38 0.05	1.38	0.00	0.00E+00

Average, k= 1.55E-06 m/sec

0.13 m/day

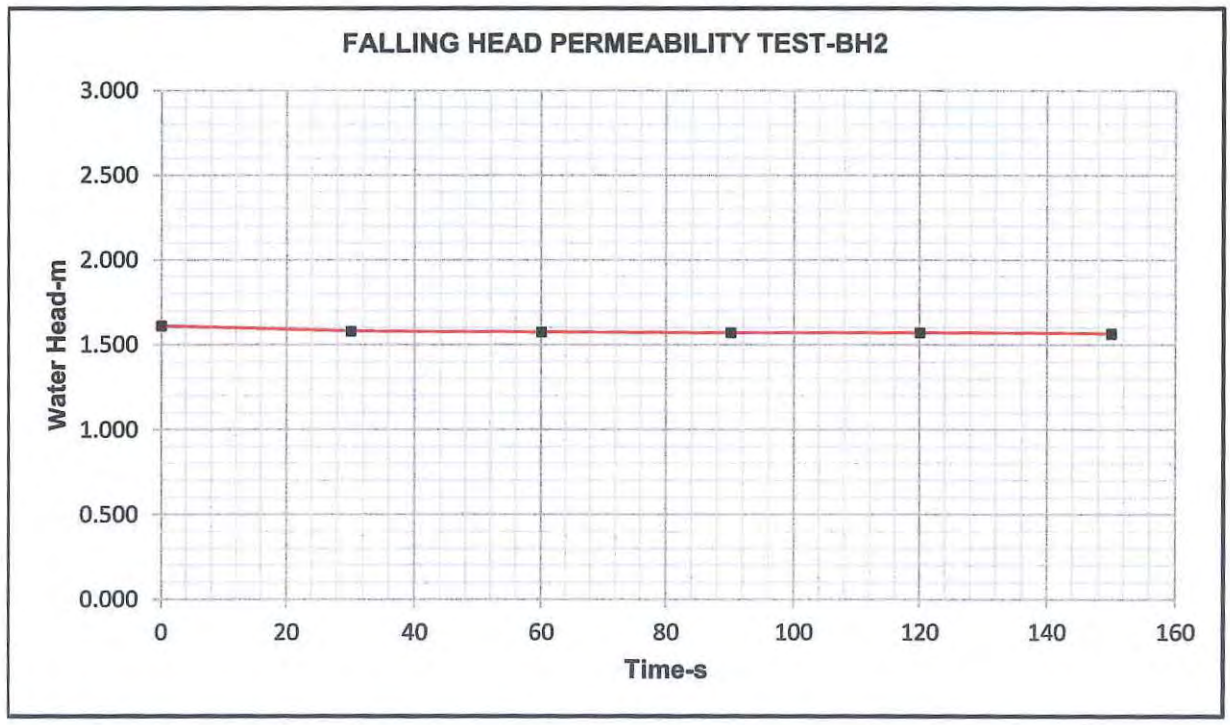
FIG 12

OPTIMUM ENGINEERING CONSULTANTS

Borehole **BH2** Job No.

GPS Location Date 28-Aug-24

Water Level



HVORSLEV METHOD CASE G:

Soakage out base and sides of test hole with no overlying restrictive layer:

Hydraulic Conductivity or Permeability Coefficient (k)

$$k = \frac{d^2 \times \ln(2mL/D) \times \ln(H_1/H_2)}{8L(t_2-t_1)} \text{ m/s}$$

where:

d=D=diameter of test hole (m)= 0.16 H_1= piezometric hear for $t=t_1$

m=transformation ratio= 1 H_2= piezometric hear for $t=t_2$

L= average soakage length (m)

t= time (secs)

Time	t_2-t_1	Piezometric Head	Average L	Ln (H_1/H_2)	Hydraulic Conductivity
sec	sec	H (m)	m		k (m/sec)
0		1.615			
30	30	1.585	1.60	0.02	3.74E-06
60	30	1.578	1.58	0.00	8.91E-07
90	30	1.575	1.58	0.00	3.84E-07
120	30	1.575	1.58	0.00	0.00E+00
150	30	1.570	1.57	0.00	6.42E-07

Average, k= 1.13E-06 m/sec

0.10 m/day

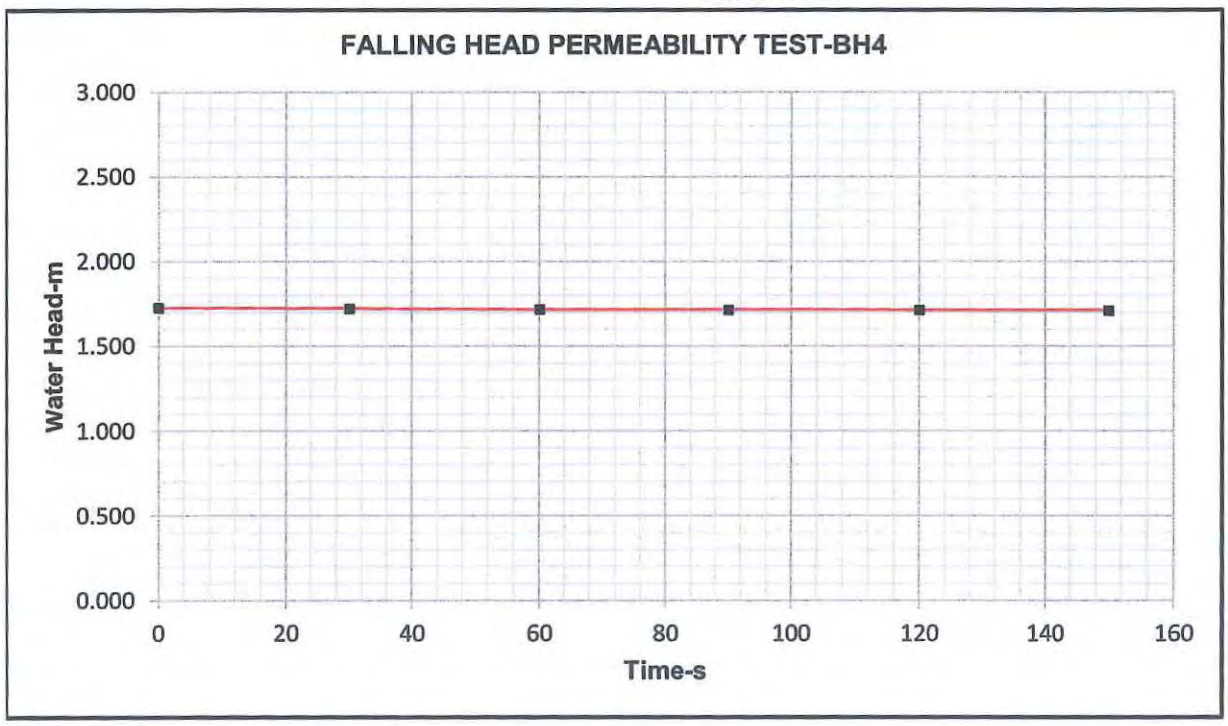
FIG 13

OPTIMUM ENGINEERING CONSULTANTS

Borehole **BH4** Job No.

GPS Location Date 28-Aug-24

Water Level



HVORSLEV METHOD CASE G:

Soakage out base and sides of test hole with no overlying restrictive layer:

Hydraulic Conductivity or Permeability Coefficient (k)

$$k = \frac{d^2 \times \ln(2mL/D) \times \ln(H_1/H_2)}{8L(t_2-t_1)} \text{ m/s}$$

where:

d=D=diameter of test hole (m)= 0.16 H_1= piezometric hear for $t=t_1$

m=transformation ratio= 1 H_2= piezometric hear for $t=t_2$

L= average soakage length (m)

t= time (secs)

Time	t_2-t_1	Piezometric Head	Average L	Ln (H_1/H_2)	Hydraulic Conductivity
sec	sec	H (m)	m		k (m/sec)
0		1.730			
30	30	1.725	1.73	0.00	5.49E-07
60	30	1.720	1.72	0.00	5.52E-07
90	30	1.718	1.72	0.00	2.21E-07
120	30	1.717	1.72	0.00	1.11E-07
150	30	1.715	1.72	0.00	2.22E-07

Average, k= 3.31E-07 m/sec

0.03 m/day

FIG 14

LIST OF PLATES

SCALE: 1:3000

9 MATHER RD
LAKE GRACE.

LEGEND

P = PERCOLATION

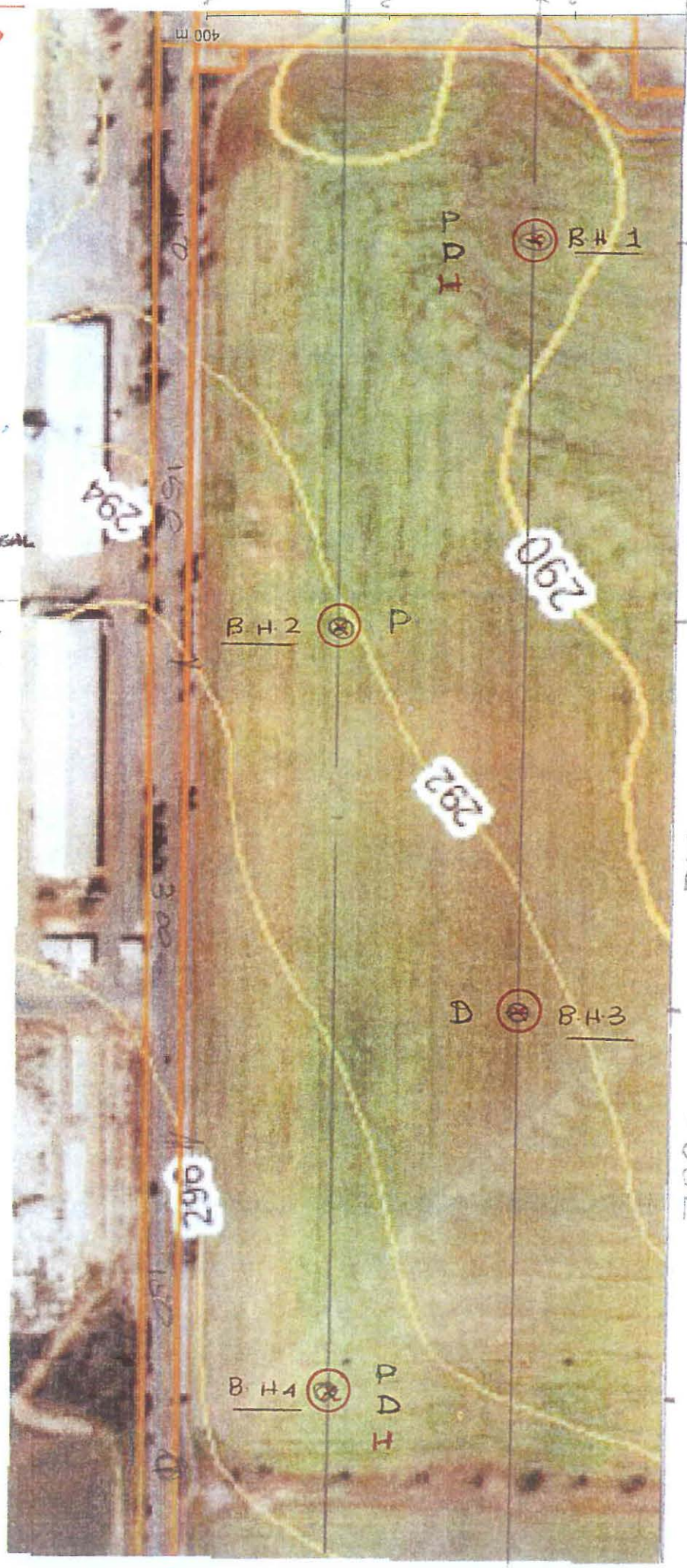
D = DYNAMIC CONE

H = HALLAM

G.W.L. = 292.0m AHD.

BORE LOGS
DEPTH = 3m/REFUSAL

BORE	A.H.D.
1	290.2m
2	292.0m
3	293.0m
4	295.0m



BORE LOGS LAKE GRACE PLATE # 1.

PLATE #2.

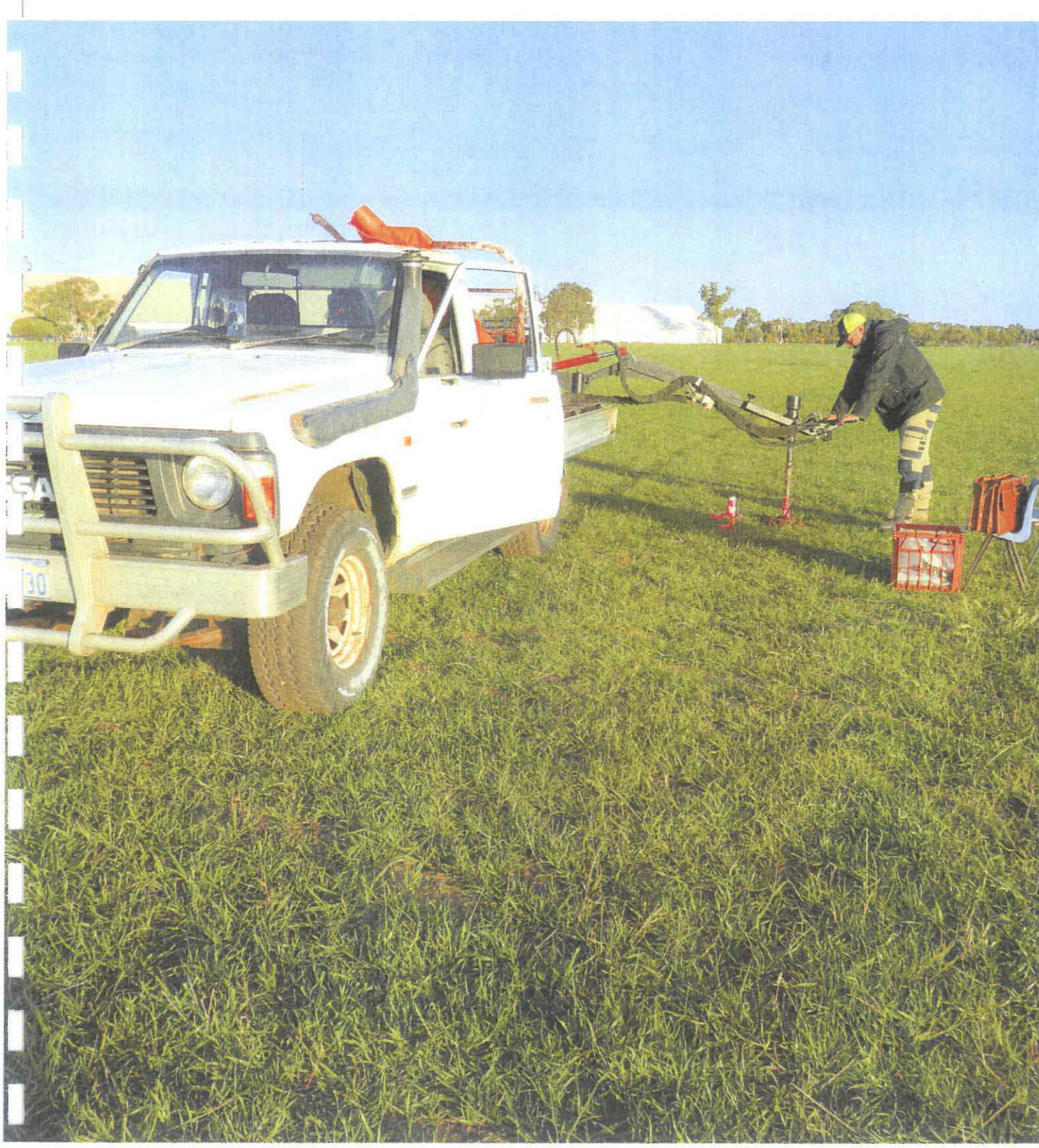


PLATE 3

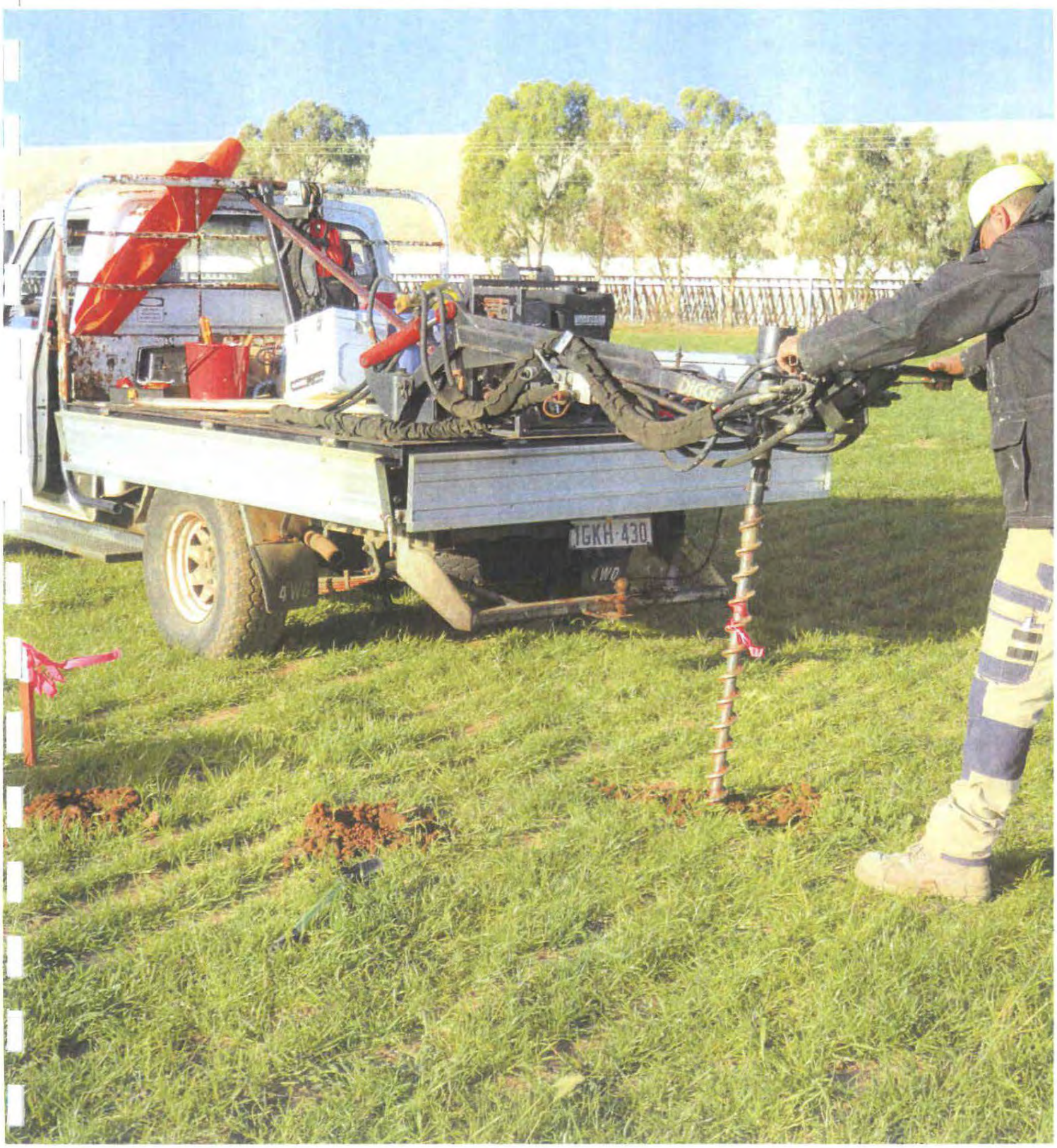


PLATE 4

PLATE 5

PLATE 6


CAT

PLATE 11

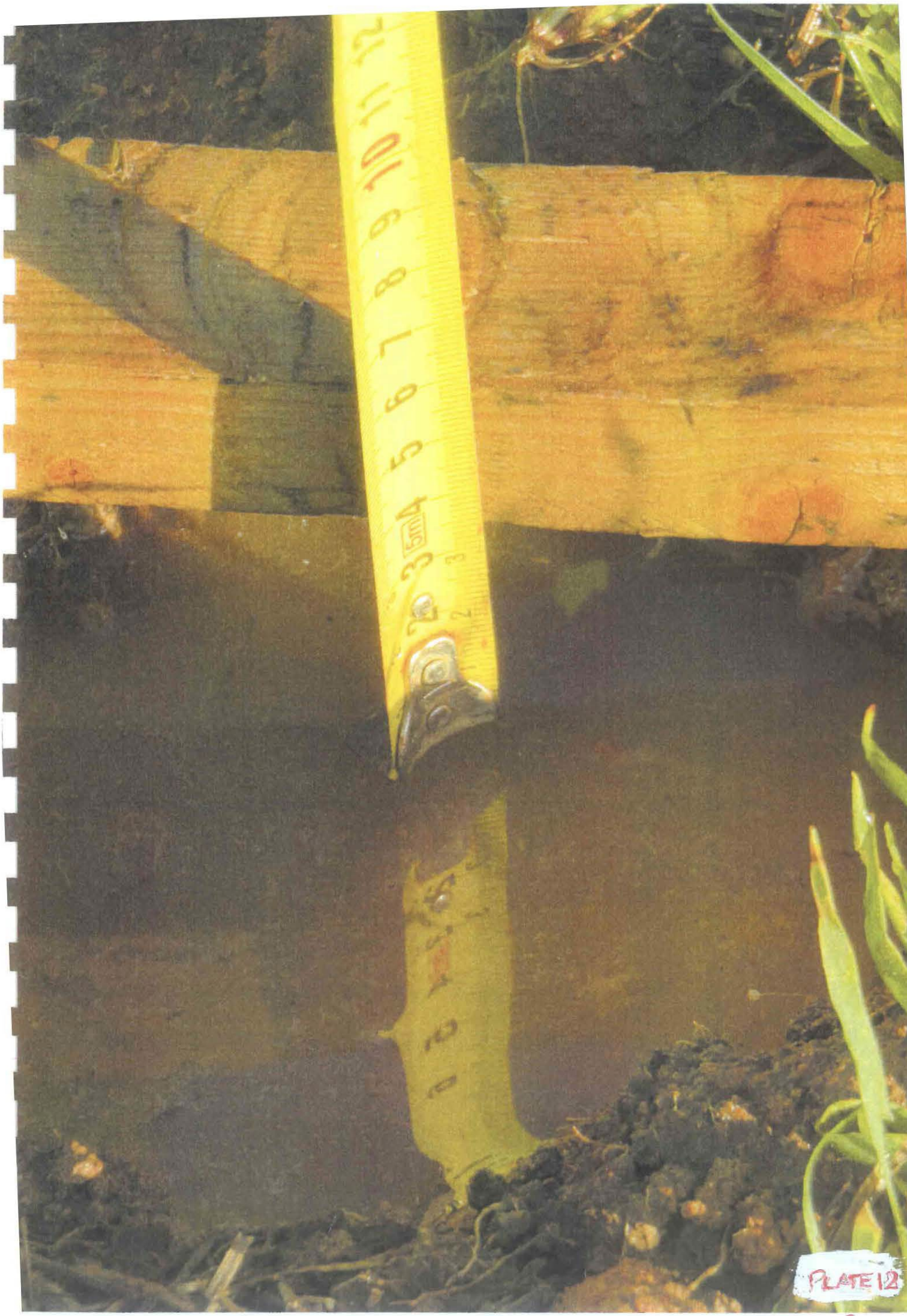


PLATE 12

Average annual, monthly and seasonal evaporation

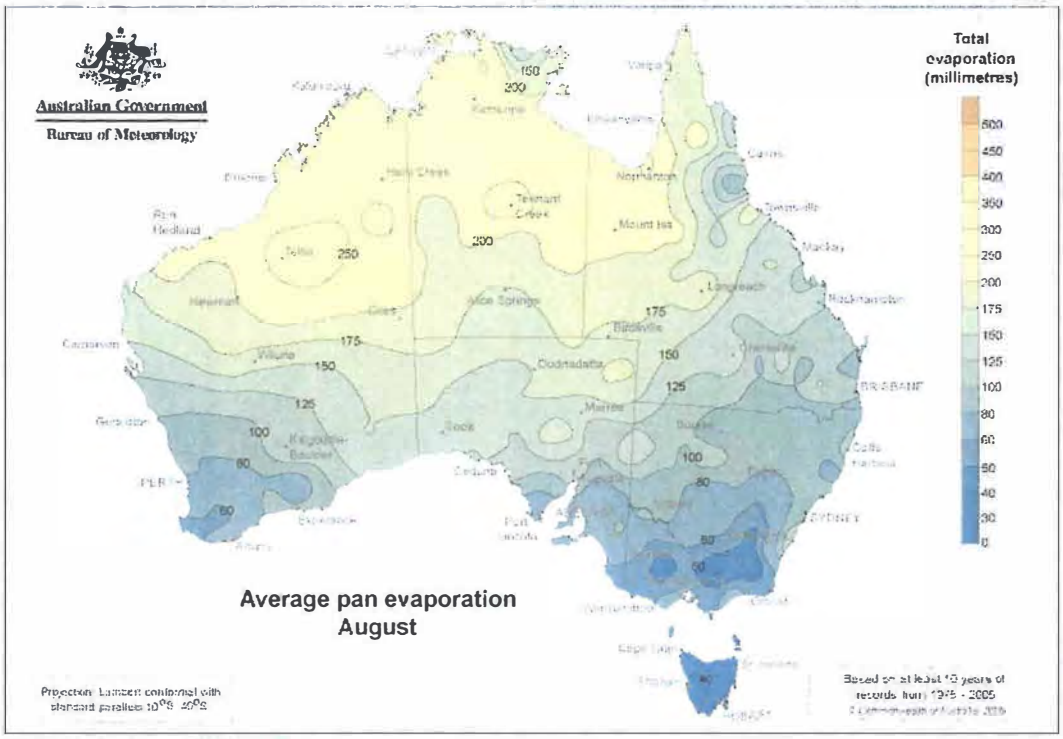
At a glance

These evaporation maps show the amount of water which evaporates from an open pan, distributed across Australia.

View the maps

Controls

Period August EARLIER LATER Download: Grid



Product Code: IDCJCM0006 $\frac{60}{30} = 2\,mm/d$

What do the maps show?

These maps show the average amount of water which evaporates from an open pan each month, season and annually. Evaporation is measured by the use of a "class A evaporation pan".

Average annual evaporation is calculated by adding evaporation totals over a specified period (1975 to 2005) and dividing by the number of years in that period (29 years in this case). Similarly, average monthly and seasonal evaporation are calculated by adding monthly or seasonal evaporation totals and dividing by the number of years in the specified period. The rate of evaporation depends on factors such as cloudiness, air temperature and wind speed. Measurements are made by the addition or subtraction of a known amount of water, which then tells us how much water has evaporated from the pan.

These maps are indicative of the amount of water evaporating from bare ground or open water, evaporation from land surfaces covered by vegetation is better estimated by evapotranspiration.

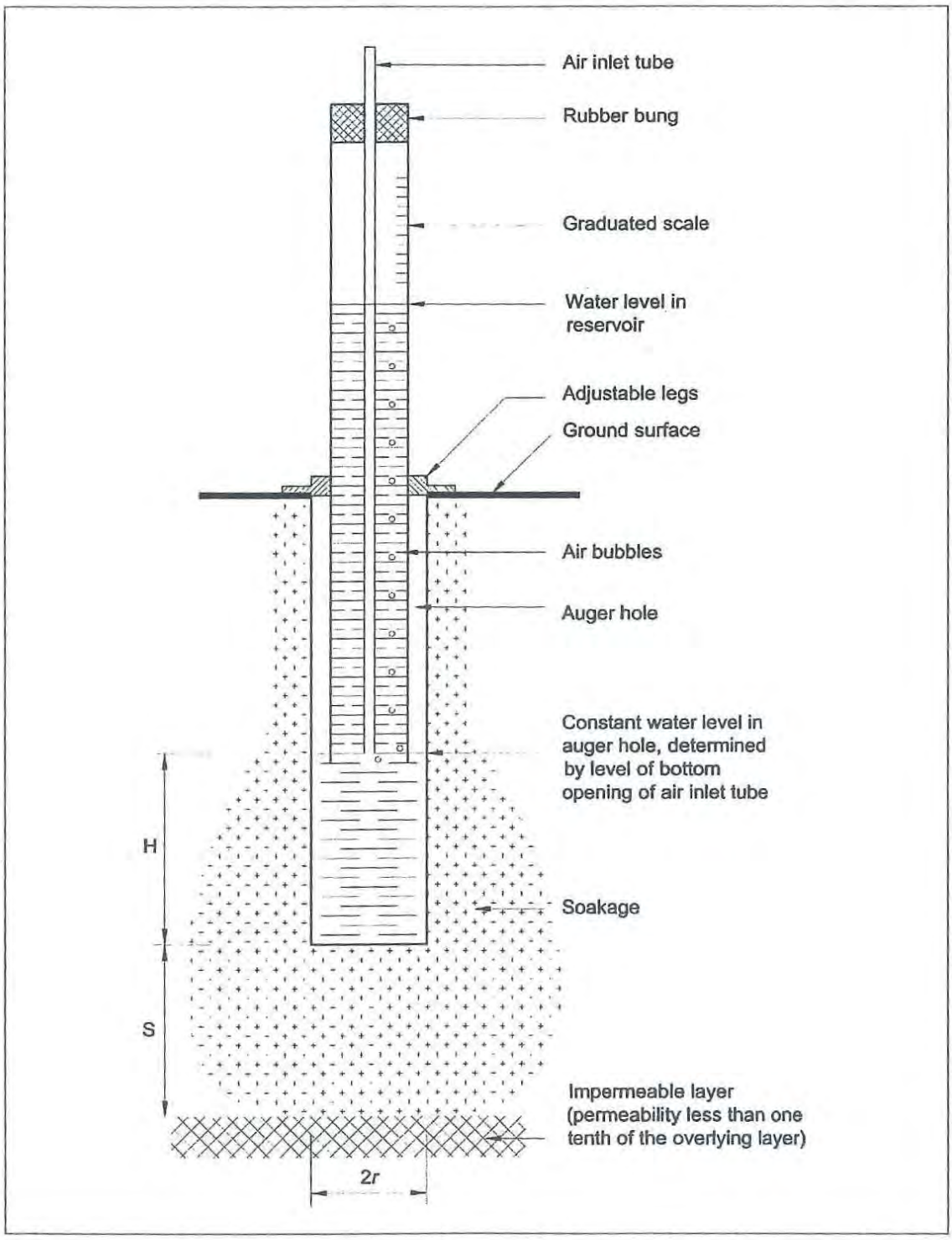
Areas in central Australia are very dry, and therefore have a high rate of evaporation. In contrast, coastal areas tend to have a lower evaporation rate as a result of their proximity to a large water source. Compare these maps to the maps showing average rainfall and humidity. Areas with low rainfall and low humidity tend to have a high evaporation rate, whilst areas with high rainfall and high humidity tend to have a low evaporation rate.

Further information

About the maps - metadata and related information.
Find out how climate statistics are calculated.
Information about the range of gridded climate data we can provide.
Information about additional climate products and other data available from the Bureau of Meteorology.
Learn about the influences on the Australian climate.
Explore other topics relating to climate education.

Page updated: November 2016

PLATE 13



where:

H = depth of water in test hole

S = the depth to an underlying impermeable layer

r = radius of the test hole

FIGURE G1 PERMEAMETER ASSEMBLY

PLATE 14

PLANNING AND DEVELOPMENT ACT 2005

SHIRE OF LAKE GRACE

LOCAL PLANNING SCHEME NO.4

AMENDMENT NO.7

The Lake Grace Shire Council, under and by virtue of the powers conferred upon it in that behalf by the *Planning and Development Act 2005* (as amended), hereby amends the above Local Planning Scheme as follows:

a) Rezoning an 8.58 hectare portion of Lot 21 (No.19) Mather Road, Lake Grace from 'General Agriculture' to 'General Industry' zone; and

b) Amending the relevant Scheme map accordingly.

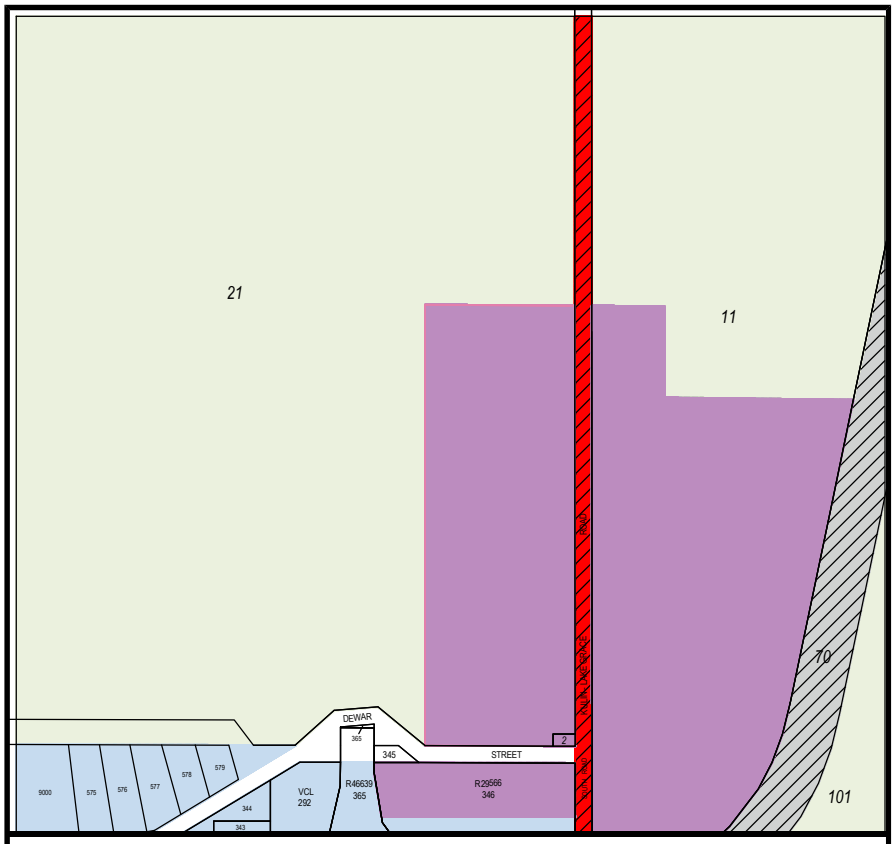
This proposed amendment to the Shire of Lake Grace Local Planning Scheme No.4 is 'standard' under the provisions of the *Planning and Development (Local Planning Schemes) Regulations 2015* for the following reason(s):

a) The amendment would have minimal impact on land in the Scheme area that is not the subject of the amendment; and

b) The amendment would not result in any significant environmental, social, economic or governance impacts in the Scheme area.

SHIRE OF LAKE GRACE
LOCAL PLANNING SCHEME No. 4

Planning and Development Act 2005



EXISTING ZONING

LEGEND

LOCAL SCHEME RESERVES

- MAJOR ROAD
- RAILWAY

LOCAL SCHEME ZONES

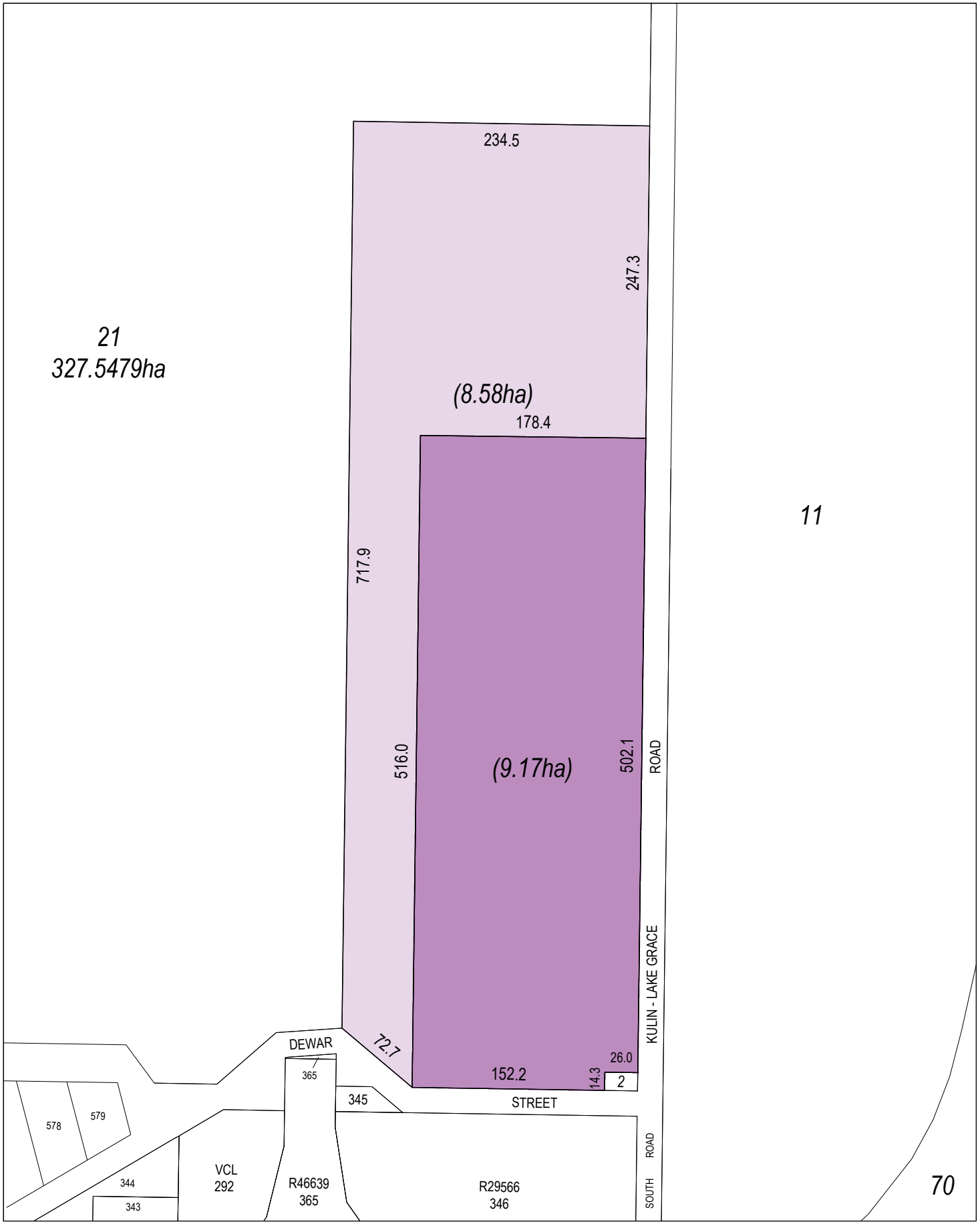
- GENERAL AGRICULTURE
- GENERAL INDUSTRY
- SERVICE COMMERCIAL

SCHEME (AMENDMENT) MAP

N

SCALE: 1:9000
DATE: 23.06.2025

Amendment No. 7



EXURBAN
RURAL & REGIONAL PLANNING
Tel: (08) 9303 2532
Mob: 0429 303 100
PO Box 1685
WANGARA DC WA 6947
www.exurban.com.au

N
W E
S

0 20 40 60 80 100 120 140 160m

SCALE 1:4000 @ A4
DATE: 14.10.2024

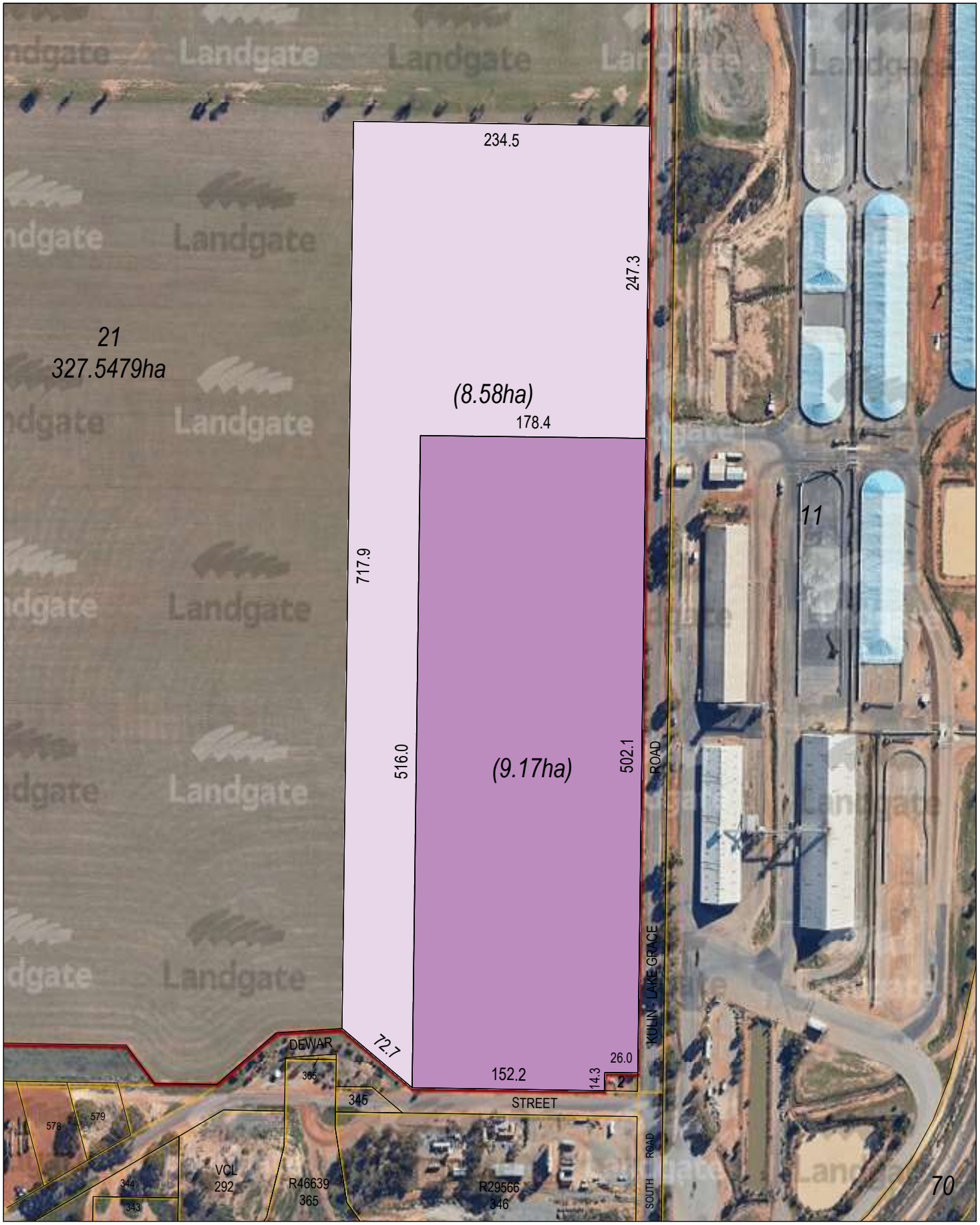
LEGEND:

EXISTING GENERAL INDUSTRY ZONE

PROPOSED EXTENSION TO EXISTING GENERAL INDUSTRY ZONE

PROPOSED EXTENSION TO EXISTING GENERAL INDUSTRY ZONING CLASSIFICATION

PORTION OF LOT 21 (No.19) MATHER ROAD
LAKE GRACE
Shire of Lake Grace



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N
W E
S

0 20 40 60 80 100 120 140 160m

SCALE 1:4000 @ A4
DATE: 14.10.2024

LEGEND:

EXISTING GENERAL INDUSTRY ZONE

PROPOSED EXTENSION TO EXISTING GENERAL INDUSTRY ZONE

PROPOSED EXTENSION TO EXISTING GENERAL INDUSTRY ZONING CLASSIFICATION

PORTION OF LOT 21 (No.19) MATHER ROAD
LAKE GRACE
Shire of Lake Grace

ADOPTION

This Standard Amendment was adopted by resolution of the Council of the Shire of Lake Grace at the Ordinary Meeting of the Council held on the 23rd day of October 2024.

.....

SHIRE PRESIDENT

.....

CHIEF EXECUTIVE OFFICER

FINAL APPROVAL

This Amendment is recommended for approval by resolution of the Shire of Lake Grace at the Ordinary Meeting of the Council held on the ..... day of ..... 2025 and the Common Seal of the Shire of Lake Grace was hereunto affixed by the authority of a resolution of the Council in the presence of:

.....

SHIRE PRESIDENT

.....

CHIEF EXECUTIVE OFFICER

RECOMMENDED / SUBMITTED FOR FINAL APPROVAL

.....

DELEGATED UNDER S.16 OF THE P&D ACT 2005

DATE.....

FINAL APPROVAL GRANTED

.....

MINISTER FOR PLANNING

DATE.....