TGM

Engineering | Surveying | Planning

Rezoning Request

Multiple Land Parcels at Forest Road, Windermere Road, Curletts Road & Osterlund Court, Lara

November 2013

Prepared for:

Multiple Land Owners

Prepared by:

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Quality Information

Document	Rezoning Request
Reference No.	10830-01
Date	November 2013
Revision No.	1
Prepared by	Chris Marshall
Reviewed by	Chris Marshall

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1. INTRODUCTION

TGM Group Pty Ltd has been engaged by multiple land owners to prepare a planning report to seek the agreement of the City of Greater Geelong to rezone multiple parcels of land at Forest Road, Windermere Road, Curletts Road & Osterlund Court, Lara, from Rural Living Zone to Low Density Residential Zone.

The subject land is approximately 25 hectares in total area and is identified by the approved 2011 Lara Structure Plan to be rezoned from the Rural Living Zone to the Low Density Residential Zone subject to a Development Plan or approved subdivision design.

This planning report has been prepared consistent with the recommendations of the Lara Structure Plan, State and Local Planning Policies and in particular Clause 21.13-4 Lara Structure Plan Map of the Greater Geelong Planning Scheme. It also includes a number of specialist reports commissioned to demonstrate the subject lands capability to facilitate Low Density Residential Development.

The subject lots within this land were chosen for their capacity to be subdivided into low density lots. Note some of the initial lots were excluded as they were considered to be either too small to further subdivide or were located within the floodway zone.

2. SUBJECT LAND AND SITE CONTEXT

The subject land is approximately 25 hectares in area and is made up of 14 individual rural living zone lots. Each lot has been developed for rural living and includes dwellings, sheds, landscaping, fencing and driveways. It is understood that the land formed part of a larger rural land holding prior to it being subdivided into the current rural living lot configuration.

The subject land is bisected by three roads being Forest Road North, Curletts Road and Osterlund Court and adjoins Windermere Road to the north. Each lot also has direct road access from Forest Road North, Windermere Road, Curletts Road and Osterlund Court which are sealed roads with grassed swale verges. Windermere Road and Forest Road North are connector type roads that provide broader access opportunities to Lara, Geelong and Melbourne.

The subject land is in the Rural Living Zone and consists of 14 parcels of land as described below:

- 120 Forest Road North, Lara (Lot 7, LP210681R)
- 130 Forest Road North, Lara (Lot 2, PS210681R)
- 235 Windermere Road, Lara (Lot 1, PS333795)
- 245 Windermere Road, Lara (Lot 3, LP130020)
- 84 Curletts Road, Lara (Lot 12, PS419303W)
- 85 Curletts Road, Lara (Lot 5, PS210681R)
- 95 Curletts Road, Lara (Lot 4, PS210681R)
- 105 Curletts Road, Lara (Lot 3, PS210681R)
- 125 Curletts Road, Lara (Lot 1, PS210681R)
- 145 Forest Road North, Lara (Lot 2, LP130020)
- 10 Osterlund Court, Lara (Lot 6, PS419303W)
- 20 Osterlund Court, Lara (Lot 7, PS419303W)
- 30 Osterlund Court, Lara (Lot 8, PS419303W)
- 60 Osterlund Court, Lara (Lot 11, PS419303W)

The land adjoins other rural living lots to the north (along Windermere Road), to the east adjoining Serendip Creek and to the south within the existing floodway zone. The land also adjoins Rural Living Zone land to the west which is also recommended for future Low Density Residential Zone. Overall the subject land is located within a rural living zone context, however the broader context also includes conventional residential land to the south east and south west.

The nearby Serendip Creek provides pedestrian access along the creek to the more densely populated areas of Lara to the south. The local school and sporting fields are conveniently located to the south east and the land is only located a short distance from central Lara which provides shopping, community and public transport opportunities.

Figure 1: Aerial of Subject Land (Attachment 1)

3. APPLICATION DETAILS

As advised the application seeks approval to rezone multiple parcels of land parcels at Forest Road, Windermere Road, Curletts Road & Osterlund Court, Lara, from Rural Living Zone to Low Density Residential Zone as indicated above.

The application has been drafted to introduce the appropriate zone over the subject land in accordance with the relevant planning provisions of the Greater Geelong Planning Scheme. The proposed Low Density Residential Zone is considered to be the appropriate zone in this context with land proposed for low density residential growth to the west and residential land to the south west and south east. It is also considered appropriate as it allows residential growth at lot sizes able to retain the rural living type edge of Lara. This is demonstrated by the indicative proposed plan of subdivision (**Attachment 2**) which proposes to create 21 lots in addition to the existing 14 lots. The creation of these lots is only considered to be a minor increase of lots that will provide a more efficient use of the existing land whilst continuing to maintain the rural open-feel that is distinctly Lara.

The introduction of the Low Density Residential Zone over the subject land also accords with the recommendations of the approved 2011 Lara Structure Plan and Clause 21.13-4 Lara Structure Plan Map of the Greater Geelong Planning Scheme.

The proposed subdivision design will retain existing dwellings and sheds on individual lots and seeks to create additional lots over the balance vacant area of each lot. By doing so the subdivision has been designed to protect the amenity of existing dwellings, whilst providing lots on or over the minimum lot size of 4000sqm within the Low Density Residential Zone.

The proposed subdivision design also demonstrates that the additional lots can be facilitated without the need to change the existing road network which also contributes to the rural feel of the land. The subdivision will result in 21 additional lots that range in size from 4000sqm to 9666sqm. The additional lots are not considered to be substantial in number to amend the current road layout.

The application also seeks the inclusion of a Schedule to the Development Plan Overlay (**Attachment 7**) to guide the future subdivision of the land to ensure the subdivision proceeds in general accordance with an agreed design. The schedule essentially seeks to formalise a preferred subdivision design to provide certainty regarding the indicative lot design and yield.

4. INDICATIVE SUBDIVISION DESIGN (ATTACHMENT 2)

The indicative subdivision design was developed in consultation with the land owners, City of Greater Geelong and in accordance with the minimum lot size provisions of the Low Density Residential Zone. The proposed lot sizes demonstrate the capacity of the subject land to facilitate orderly low density residential subdivision in accordance with the provisions of the proposed zone.

The indicative subdivision design also enables the retention of the existing rural residential landscape by:

- Proposing to rezone only those lots of sufficient size to create additional low density sized lots.
- Utilising the existing rural type road design featuring grassed swale drains.
- Establishing large lots of 4000sqm and over to provide sufficient area to develop dwellings and sheds whilst retaining a significant landscaping area surrounding these developments.

The subdivision will incorporate existing dwellings within a sensitively designed lot to avoid detrimental impacts, whilst providing sufficient space and setback opportunities to appropriately develop the remaining lots.

Importantly, some lots have been specifically designed to reduce the number of additional crossovers. This will reduce the potential impact on the existing drainage scheme which was an issue raised by Council's Engineering Department.

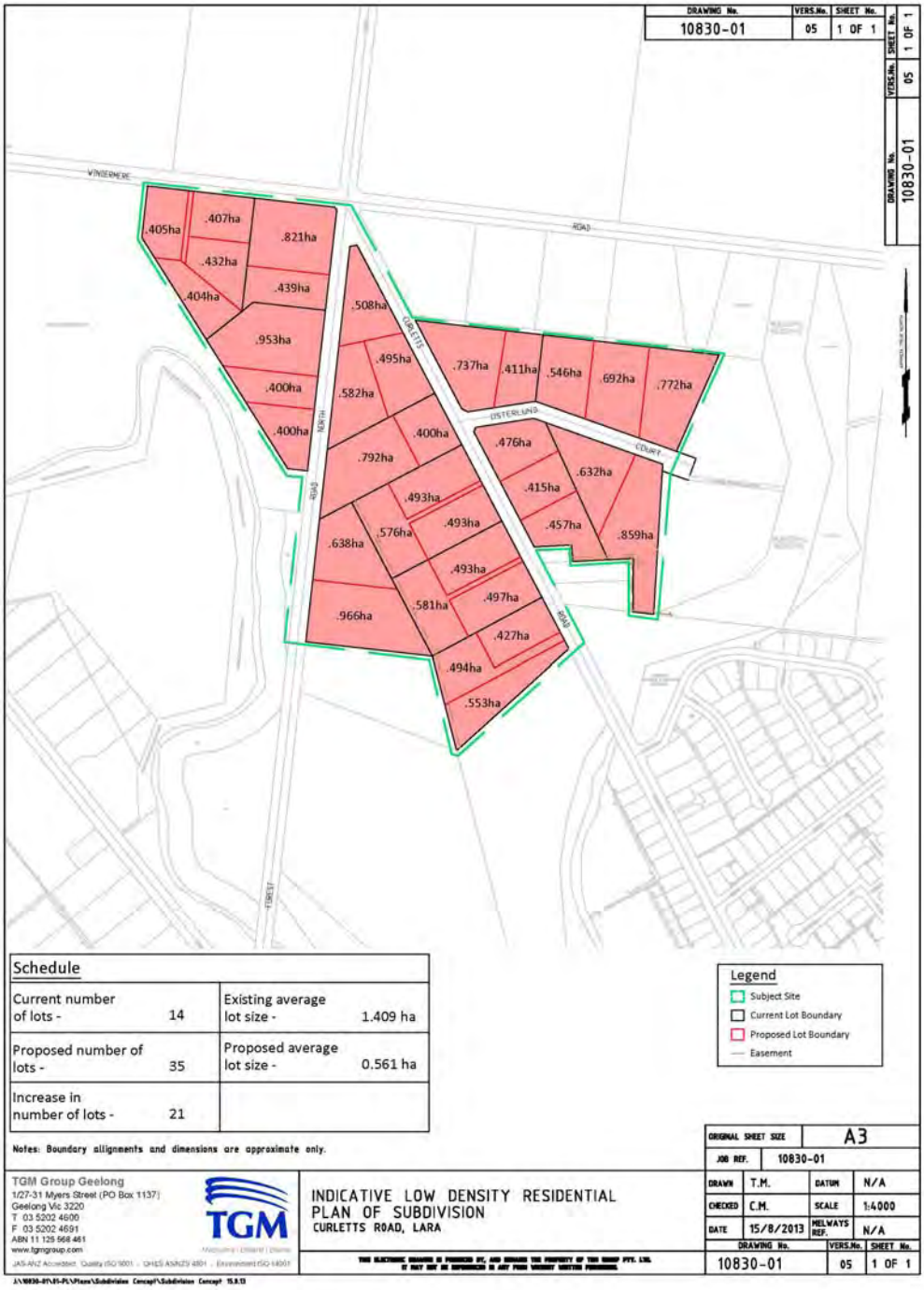


Figure 2 – Indicative Plan of Subdivision

5. PROPOSED ZONES

5.1 LOW DENSITY RESIDENTIAL ZONE

The subject site is proposed to be rezoned Low Density Residential Zone.

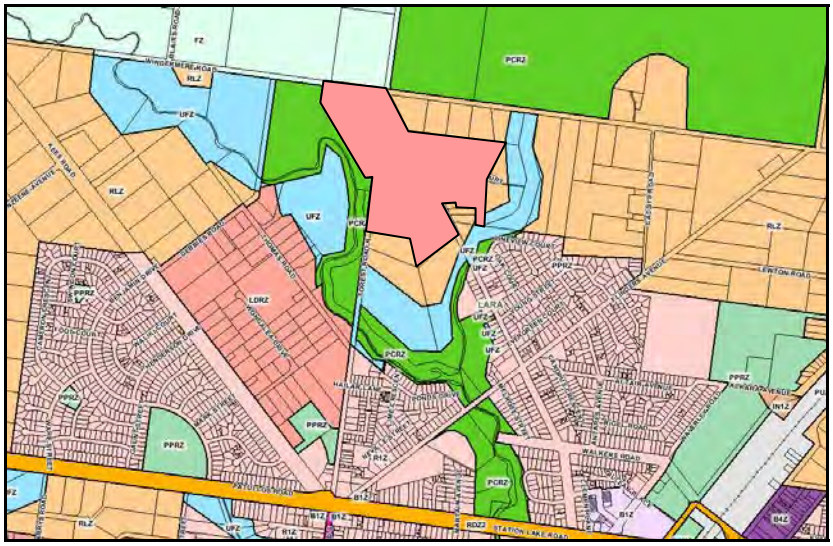


Figure 3 – Proposed Zoning Plan (Attachment 3)

The purpose of the Low Density Residential Zone is:

- To implement the State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies.
- To provide for low-density residential development on lots which, in the absence of reticulated sewerage, can treat and retain all wastewater.

Subdivision

Under Clause 32.03-3 of the Greater Geelong Planning Scheme, a Planning Permit is required to subdivide land included within the Low Density Residential Zone. Each lot must be at least the area specified in a schedule to this zone. Any area specified must be at least 0.4 hectares. If no area is specified, each lot must be at least 0.4 hectare.

Comment: The application proposes to rezone the subject land in accordance with the purpose of the zone to enable future subdivision in accordance with Clause 32.03-3 Subdivision.

The indicative plan of subdivision illustrates how the land may be subdivided and demonstrates that an additional 21 lots can be created in accordance with the 0.4 minimum lot size provisions as required by the requirements of Clause 32.03-3.

The accompanying land capability assessment also demonstrates that the subject lots are each capable of managing on-site sewerage treatment also in accordance with these provisions. The indicative design forms part of the schedule to the Development Plan Overlay which will assist in guiding the future subdivision of this land.

The application is considered to accord with the purpose of this zone as it provides sufficient detail in terms of an indicative subdivision design, land capability assessment and flooding and drainage report that demonstrates its compliance with this zone.

5.2 URBAN FLOODWAY ZONE

The purpose of the Urban Floodway Zone is:

- To implement the State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies.
- To identify waterways, major floodpaths, drainage depressions and high hazard areas within urban areas which have the greatest risk and frequency of being affected by flooding.
- To ensure that any development maintains the free passage and temporary storage of floodwater, minimises flood damage and is compatible with flood hazard, local drainage conditions and the minimisation of soil erosion, sedimentation and silting.
- To reflect any declarations under Division 4 of Part 10 of the Water Act, 1989.
- To protect water quality and waterways as natural resources in accordance with the provisions of relevant State Environment Protection Policies, and particularly in accordance with Clauses 33 and 35 of the State Environment Protection Policy (Waters of Victoria).

Comment: As previously advised the initial rezoning application considered a larger land unit which included land parcels subject to the Urban Floodway Zone to the west and south of the subject land. The current rezoning application however does not include lots located within the Urban Floodway Zone.

6. POLICY CONTEXT

The following planning policies must be considered in response to a combined planning scheme amendment and planning permit application:

- The objectives of Planning Victoria as set out in Section 4(1) of the Planning and Environment Act 1987;
- The State Planning Policy Framework of the Greater Geelong Planning Scheme; and
- The Local Planning Framework of the Greater Geelong Planning Scheme.

6.1 PLANNING AND ENVIRONMENT ACT 1987

Pursuant to Section 12(1)(a) of the Planning and Environment Act 1987, it is a duty of planning authorities to implement the following objectives of Planning Victoria as set out in Section 4(1) of the Planning and Environment Act 1987:

(a) *to provide for the fair, orderly, economic and sustainable use, and development of land;*

(b) *to provide for the protection of natural and man-made resources and the maintenance of ecological processes and genetic diversity;*

(c) *to secure a pleasant, efficient and safe working, living and recreational environment for all Victorians and visitors to Victoria;*

(d) *to conserve and enhance those buildings, areas or other places which are of scientific, aesthetic, architectural or historical interest, or otherwise of special cultural value;*

(e) *to protect public utilities and other assets and enable the orderly provision and coordination of public utilities and other facilities for the benefit of the community;*

(f) *to facilitate development in accordance with the objectives set out in paragraphs (a), (b), (c), (d) and;*

(g) *to balance the present and future interests of all Victorians.*

Comment: This proposed rezoning application accords with Section 4(1) of the Planning and Environment Act 1987 as it will provide for an orderly well planned low density residential subdivision on land identified by the Lara Structure Plan and Greater Geelong Planning Scheme for low density residential use and development. The technical reports and assessments in support of this application conclude that the land is capable of facilitating additional lot growth which will provide economic and social stimulus in Lara consistent with its function as a designated growth area in the City of Greater Geelong.

6.2 STATE PLANNING POLICY FRAMEWORK

The proposed planning scheme amendment and subdivision are considered to be consistent with a range of State Planning Policies and its implementation is supported by:

- Clause 11.02-1 Supply of Land - To ensure ongoing land supply supported by infrastructure.

- Clause 11.02-2 Planning For Growth Areas - Limiting the impact of urban development on non-urban areas by allowing development within a designated township boundary.

- Clause 15.01-1 Urban Design - To create urban environments that are safe, functional and provide good quality environments with a sense of place and cultural identity.

- Clause 19.03 Stormwater - Managing stormwater from the site through the incorporation of water-sensitive urban design techniques to reduce run-off and peak flows and integrate stormwater treatment into the landscape.

Comment: The proposed application is considered to accord with the above State Planning Policies as it proposes to rezone land to accommodate the low density residential demands in Lara within the approved Lara Settlement Boundary. This will result in establishing a more compact residential area close to existing facilities and services of Lara whilst retaining the rural character along the Settlement Boundary of Lara.

The proposed subdivision has been designed to integrate with the surrounding rural residential context to create a functional high quality residential environment.

The application will create approximately 21 lots which is not considered a substantial addition.

It is proposed to manage stormwater via an integrated stormwater management system and recreational reserve utilising best practice contemporary Water Sensitive Urban Design principles. In addition, this application includes an approved Cultural Heritage Management Plan for the subject land which does not impose any constraints on future subdivision.

6.3 LOCAL PLANNING POLICY FRAMEWORK

The proposed application is considered to be consistent with a range of Local Planning Policies and is supported by:

- Clause 21.06-2 Urban growth - The rezoning and development of a residential subdivision within a defined urban growth area and the provision of a mix of housing suited to the needs of a diverse range of household types.

- Clause 21.06-3 Urban consolidation - The encouragement of urban consolidation and encourage a range of development densities.

- Clause 21.06-4 Neighbourhood character - The development of land that seeks to ensure development appropriately responds to the existing character of the area.

- Clause 21.08 Development and community infrastructure - The need to provide for the efficient use of services and conservation of water.

- Clause 21.08-5 Accessibility - The need to facilitate the development of access opportunities for all members of the community.

Comment: The proposed rezoning will be undertaken within the defined Lara settlement boundary and will provide a variety of lot sizes to meet the varying housing demands of the Lara community. The proposed rezoning at this location accords with urban consolidation outcomes as the land is located within a largely serviced urban context. The subdivision design and lot density will result in the establishment of an integrated residential development that will add and enhance the existing established urban character of this area of Lara. The subject land is considered to be ideally located to facilitate a range of access requirements for community, educational and recreational facilities.

- Clause 21.13 Lara

The proposed application is also considered to accord with this policy as:

- The rezoning, subdivision and residential development of the subject land will maintain a compact urban form.

- The rezoning will ensure an adequate supply of appropriately zoned land.
- It will provide efficient and convenient integrated movement opportunities for vehicles, cyclists and pedestrians.
- It ensures sequential zoning and development in accordance with the Lara Structure Plan 2011.
- It will locate residential land close to educational, community and recreational facilities.
- It will protect flood prone areas and enhance the rural landscapes of Lara.

Comment: The proposal will accord with the above Local Planning Policy relating to Lara as it will rezone and develop land to create an integrated residential subdivision that will accommodate a range of housing types consistent with surrounding neighbourhood character. The proposed indicative subdivision design demonstrates the lands capacity to create 21 low density residential lots consistent with the zone requirements and the objectives of this Clause. The land is located in close proximity to the full range of services provided within Lara.

6.4 LARA STRUCTURE PLAN 2011

On 11 August 2011, the Minister for Planning approved Planning Scheme Amendment C198 which included the Lara Structure Plan 2011 and amendments to the Greater Geelong Planning Scheme consistent with the directions and policies of the Lara Structure Plan. These amendments included:

- Amending the Municipal Strategic Statement by replacing Clause 21.13 Lara to reflect the directions and policies of the Lara Structure Plan 2011.
- Inclusion of Lara Structure Plan Map 4.

The subject land is identified in both the Lara Structure Plan 2011 and Clause 21.13 Lara Structure Map 4.

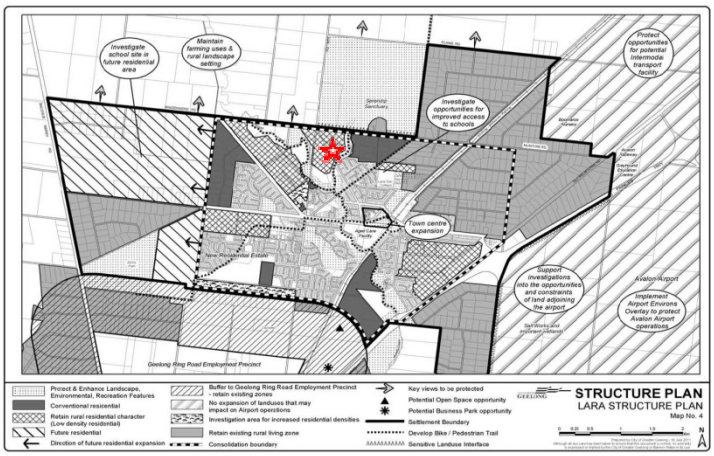


Figure 4 - Map 4 – Lara Structure Plan ★ Subject Land

Directions (Page 18, Lara Structure Plan April 2011):

'Direct new low density residential development to Hopgood Court, Lewton Road, Kees Road/Gebbies Road, Watt Street/Archimedes Avenue, Curletts Road and McHarrys Road areas subject to the resolution of the issues identified in the Structure Plan.'

Future Low Density Residential Development in Lara (Page 16, Lara Structure Plan April 2011) - Curletts Road Area (area west of Serendip Creek)

'The Curletts Road area is also considered appropriate for the Low Density Residential Zone. Flooding and drainage constraints mean conventional residential development may be problematic in this area. Drainage and flooding will have to be addressed as part of any rezoning proposal.

It is recommended that the area be rezoned from Rural Living to Low Density Residential with an accompanying Development Plan Overlay or approved subdivision layout'.

Comment: This rezoning application accords with the approved Lara Structure Plan 2011 and Clause 21.13 as it will:

- ***Contain residential growth within the Lara Settlement Boundary in accordance with Clause 21.13 Lara and as indicated in the Lara Structure Plan Map No. 4 of the Greater Geelong Planning Scheme.***
- ***Provide an increased residential density in this location of Lara in accordance with the Lara Structure Plan.***
- ***Retain the rural living character by utilising the Low Density Residential Zone.***

7. TECHNICAL ASSESSMENTS

The following technical assessments have been undertaken of the subject site in response to the proposed rezoning and subdivision of this land.

7.1 Land Capability Assessment Report, Provincial Geotechnical Pty Ltd (Attachment 5)

Provincial Geotechnical Pty Ltd was engaged by the landowners to undertake a Land Capability Assessment Report.

The report provided the following conclusions:

Vacant Allotments

'As a result of our investigations we conclude that sustainable onsite wastewater management systems can be built to meet the needs of a new residences on the proposed new 21 vacant allotments created from residential subdivision.'

This report addresses many of the physical and environmental factors that require investigation. Social factors fall outside our field of expertise and are best addressed at planning stages.

Physical factors addressed include lot size, slope, soil percolation rate, depth to rock/springwater and annual rainfall.

Based on investigation of these features, the subdivision area is regarded as suitable for conventional secondary disposal systems (but subject to other criteria, investigation and/or design).

Environmental Factors that require attention are:

- *Declared Special Water Supply Area*
- *Flood Plain (frequency) of Annual Exceedance Probability*
- *Discharge of waste water*

These factors require consultation with the relevant local authorities to determine their relevance.

In respect to allotment size (4000mD plus), our investigation indicates that with 600m2 at most required for effluent disposal envelopes for say a 5 bedroom dwelling, a low density development is possible.

Specifically, we recommend the following as a minimum requirement:

- *Secondary treatment of wastewater.*
- *Land application of wastewater into shallow subsurface or surface irrigation systems.*
- *Installation of water saving devices in the new residences to reduce the effluent load for onsite disposal.*
- *Use of low phosphorus and low sodium (liquid) detergents to improve effluent quality and maintain soil properties.*
- *Operation and management of the treatment and disposal system in accordance with the recommendations made in this report.*
- *Construction of diversion drains on the upslope side of the LAA to divert stormwater.*
- *Provincial Geotechnical Pty Ltd be consulted to either determine or confirm Land Application Area's for the proposed allotments'.*

Existing Developed Allotments

'As advised earlier in this report the existing developed allotments should be subjected to the same requirements as the vacant allotments – even though our inspections of the existing wastewater systems did not reveal any environmental or human health risk.

The existing 14 developed sites contained various systems from fully functioning wastewater treatments plants to septic tanks with minimal absorption trenching. A number of allotments contained separate grey water systems.

In respect to documenting the existing developed sites' wastewater systems the task is problematic in that in many cases visual site evidence is absent as well as land owner knowledge. Also normal vegetative indicators of the location of disposal fields is not always accurate.

It is our recommendation that at this stage further more intensive inspection of current systems be postponed subject to a determination by Council as to what restrictions or conditions may be placed upon existing septic systems.

Should the subdivision be approved and Council conditions are determined Provincial Geotechnical Pty Ltd can then provide a list of specific recommendations for each of the existing developed lots if required'.

7.2 Drainage and Flooding Report, TGM Group Pty Ltd (Attachment 6)

A Drainage and Flooding Report was commissioned to address concerns raised by the City of Greater Geelong and the Corangamite Catchment Management Authority (CCMA).

Based on information provided by the CCMA, the proposed land area was reduced and lots that were fully encumbered by 1% AEP flood event were removed from the application.

Other minor local flooding also identified was considered and assessed as part of the report. The report has identified the opportunity to improve the existing stormwater infrastructure to mitigate this issue.

8. CONCLUSION

The City of Greater Geelong has agreed to consider a strategic planning submission underpinned by appropriate technical analysis and an assessment of strategic planning policy to demonstrate the subject lands suitability for rezoning and subdivision. This proposal will rezone the land from the Rural Living Zone to Low Density Residential Zone and will create an additional 21 low density residential lots.

The proposal accords with the approved 2011 Lara Structure Plan, implemented through Clause 21.13 of the Planning Scheme, which identifies the land to be rezoned from the Rural Living Zone to the Low Density Residential Zone. The proposal is also consistent with relevant State and Local policies as discussed above. The lands capability to facilitate Low Density Residential Development is also supported by recommendations of the Land Capability Assessment.

The Low Density Residential Zone is considered to be the appropriate zone given the context of the surrounds, with land proposed for low density residential growth to the west and residential land to the south west and south east. The proposal represents a sustainable and orderly planning outcome, realising the lands development potential and utilising existing infrastructure. It will facilitate residential growth at a density that will also retain the landscaped character and rural living type edge of Lara.

In light of the above, we seek the consent of the City of Greater Geelong in supporting the rezoning of multiple parcels of land at Forest Road, Windermere Road, Curletts Road & Osterlund Court, Lara, from Rural Living Zone to Low Density Residential Zone.

…….……..

Chris Marshall
Group Manager – Town Planning

Attachment 1

Aerial Plan

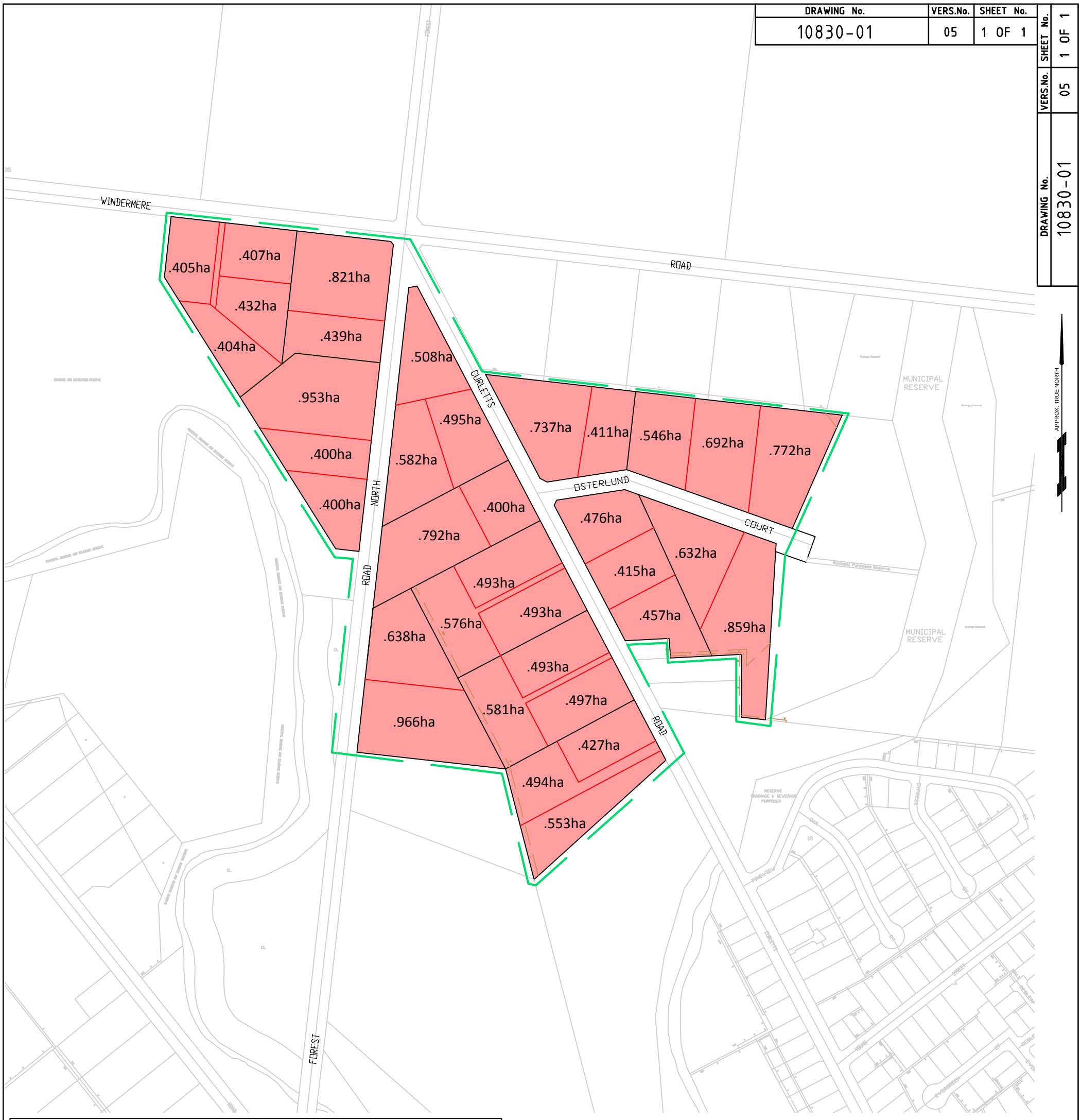
Aerial Plan – Forest Road, Windermere Road, Curletts Road & Osterlund Court, Lara

Attachment 2

Indicative Plan of Subdivision

DRAWING No.	VERS.No.	SHEET No.
10830-01	05	1 OF 1

DRAWING No. 10830-01
VERS.No. 05
SHEET No. 1 OF 1



Schedule

Current number of lots -	14	Existing average lot size -	1.409 ha
Proposed number of lots -	35	Proposed average lot size -	0.561 ha
Increase in number of lots -	21		

Legend

- Subject Site
- Current Lot Boundary
- Proposed Lot Boundary
- Easement

Notes: Boundary allignments and dimensions are approximate only.

ORIGINAL SHEET SIZE	A3
JOB REF.	10830-01

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JAS-ANZ Accredited: Quality ISO 9001 - OH&S AS/NZS 4801 - Environment ISO 14001

INDICATIVE LOW DENSITY RESIDENTIAL PLAN OF SUBDIVISION

CURLETTS ROAD, LARA

DRAWN	T.M.	DATUM	N/A
CHECKED	C.M.	SCALE	1:4000
DATE	15/8/2013	MELWAYS REF.	N/A

DRAWING No.	VERS.No.	SHEET No.
10830-01	05	1 OF 1

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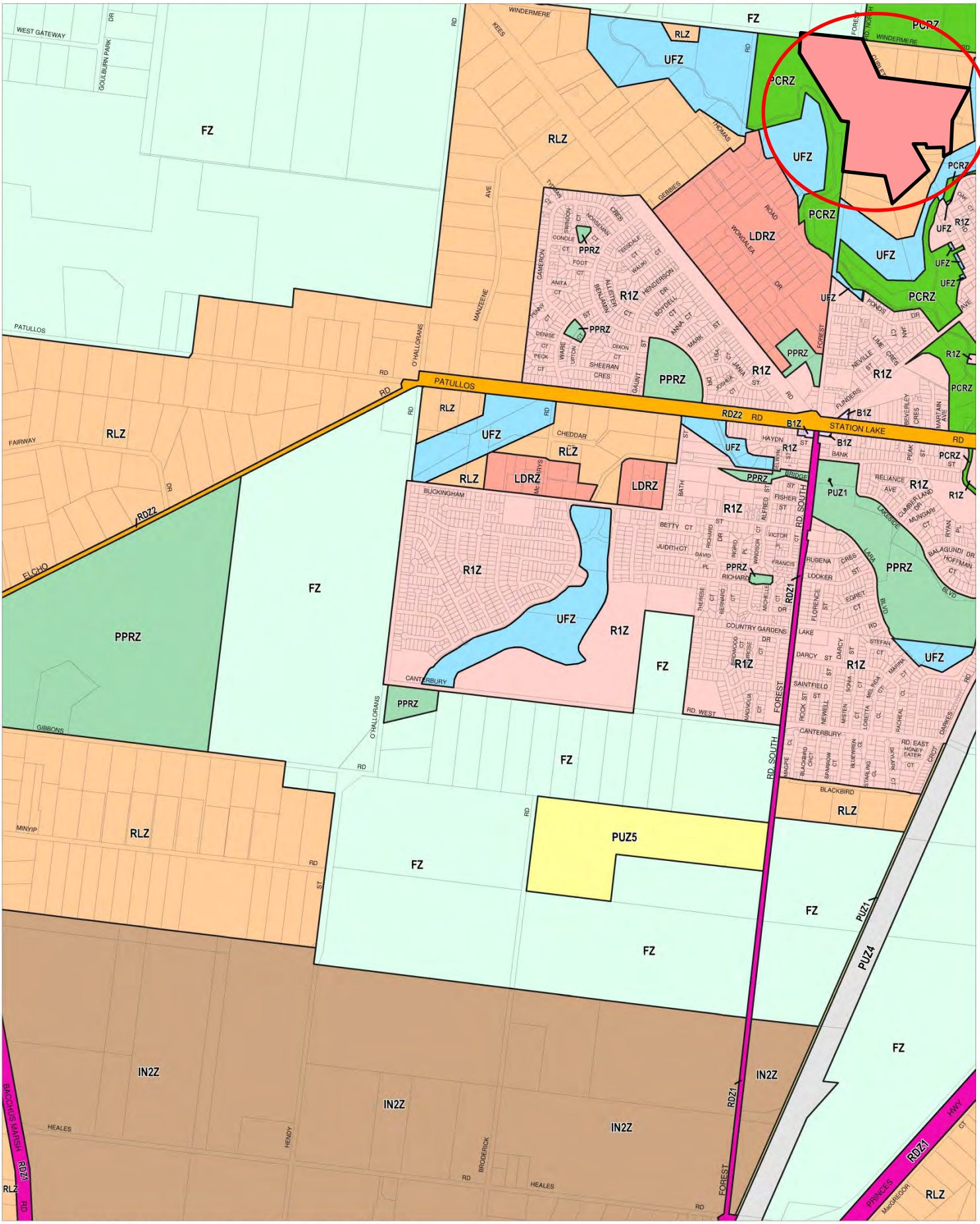
Attachment 3

Proposed Zoning Plan

GREATER GEELONG PLANNING SCHEME - LOCAL PROVISION



This map should be read in conjunction with additional Planning Overlay Maps (if applicable) as indicated on the INDEX TO MAPS.

Business
- B1Z Business 1 Zone

Industrial
- IN2Z Industrial 2 Zone

Public Land
- PCRZ Public Conservation And Resource Zone
- PPRZ Public Park And Recreation Zone
- PUZ5 Public Use Zone - Cemetery/crematorium
- PUZ1 Public Use Zone - Service And Utility
- PUZ4 Public Use Zone - Transport

Road
- RDZ1 Road Zone - Category 1
- RDZ2 Road Zone - Category 2

Residential
- LDRZ Low Density Residential Zone
- R1Z Residential 1 Zone

Rural
- FZ Farming Zone
- RLZ Rural Living Zone

Special Purpose
- UFZ Urban Floodway Zone

200 0 200 400 600 800 1000 m

AUSTRALIAN MAP GRID ZONE 55

N

State Government Victoria

INDEX TO ADJOINING METRIC SERIES MAP

Printed: 14/5/2012

AMENDMENT C260

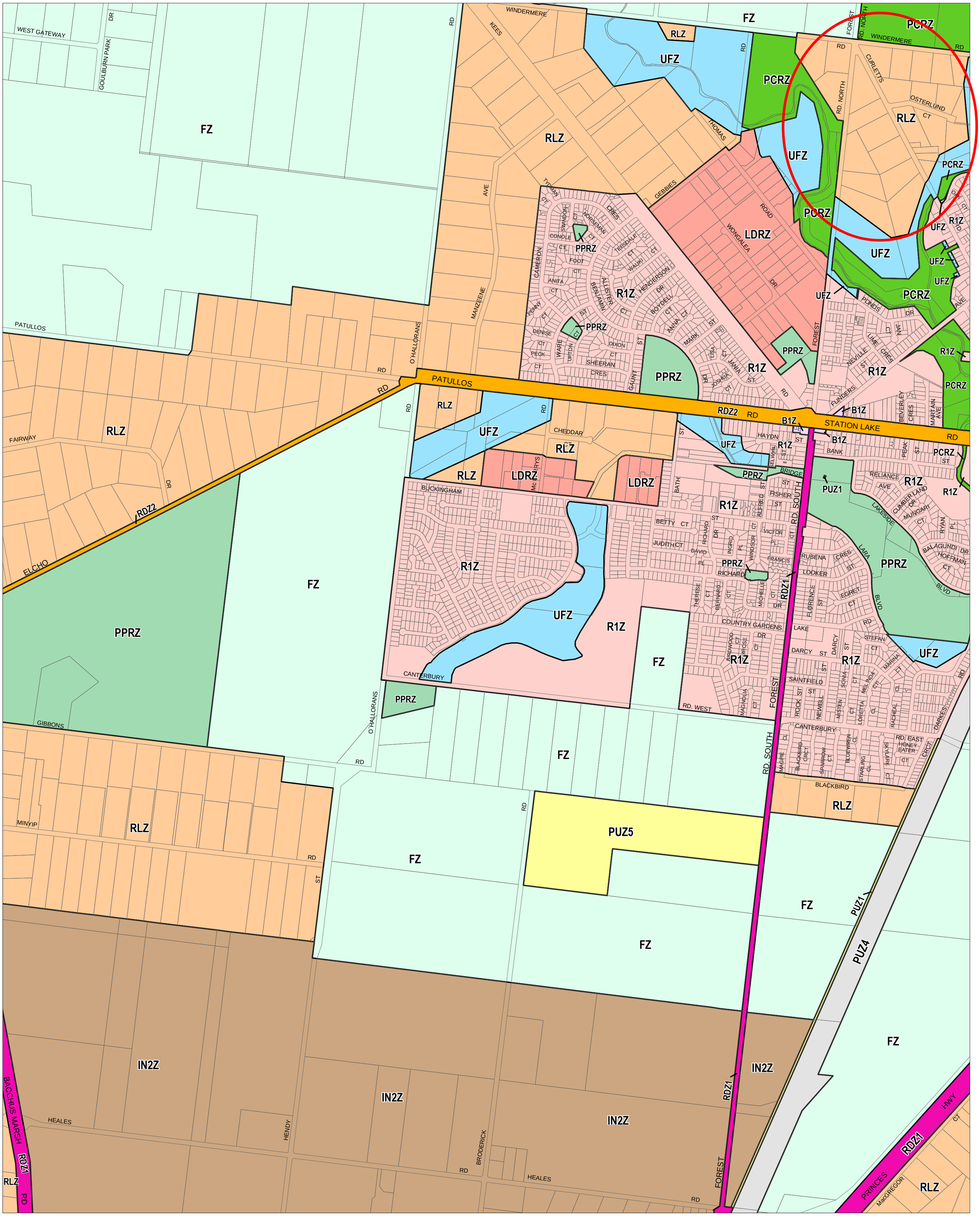
ZONES

MAP No 18

Attachment 4

Current Zoning Plan

GREATER GEELONG PLANNING SCHEME - LOCAL PROVISION



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- RDZ2 Road Zone - Category 2

Residential
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- R1Z Residential 1 Zone

Rural
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- RLZ Rural Living Zone

Special Purpose
- UFZ Urban Floodway Zone

200 0 200 400 600 800 1000 m

AUSTRALIAN MAP GRID ZONE 55

N

State Government Victoria

INDEX TO ADJOINING METRIC SERIES MAP

Printed: 14/6/2012

AMENDMENT C260

ZONES

MAP No 18

Attachment 5

Land Capability Assessment

Provincial Geotechnical Pty Ltd

PROVINCIAL GEOTECHNICAL PTY. LTD.

CONSULTING GEOLOGISTS

A.B.N. 88 090 400 114

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LAND CAPABILITY ASSESSMENT REPORT

PROPOSED LOW DENSITY RESIDENTIAL SUB-DIVISION
Curletts Road
LARA, VIC

Prepared for:	T.G.M GROUP PTY LTD ATT: STEFANIE RICHES PO BOX 1137 GEELONG VIC 3220
Prepared by:	Andrew Redman Provincial Geotechnical Pty Ltd PO Box 1124 BAKERY HILL VIC 3354
Reference No.	H3005
Report Date:	4th October 2013

TABLE OF CONTENTS

1. Introduction

Provincial Geotechnical Pty Ltd has been engaged to undertake a Land Capability Assessment (LCA) for an area of Lara that comprises 14 separate developed allotments which may be rezoned to allow the creation of 35 separately titled allotments.

The field investigation and report have been undertaken and prepared by suitably experienced staff. Provincial Geotechnical Pty Ltd has appropriate professional indemnity insurance for this type of work. Our professional indemnity insurance certificate is available on request.

We understand this report will accompany an application submitted to the City of Greater Geelong Council for the proposed residential sub-division to allow the future construction of private residences with on-site wastewater systems on 21 newly created vacant allotments.

At the time of reporting a proposed sub-division containing 35 lots in total sized at an average of 0.561 hectares was proposed. This total area is referred to in this report as "the subdivision site". A proposed plan of subdivision is appended (Appendix i).

This document provides information about the site and soil conditions for the complete subdivision area. It also provides a detailed LCA and includes a conceptual design for suitable onsite wastewater management systems, including recommendations for monitoring and management requirements.

The subdivision site has been cleared of most original vegetation and has vegetative cover in the form of grasses with all of the developed allotments having landscaping to varying degrees including mature and immature native and introduced shrubs and trees.

The general site slope varies but overall is considered gentle.

Within each of the proposed allotment boundaries there is sufficient land available for sustainable onsite effluent management that maintains appropriate buffers to protect sensitive receptors on each of the proposed allotments.

We have considered a number of options for both the treatment system and Land Application Area.

By current day standards none of the allotments (existing or proposed) **can** sustain conventional septic tank systems with primary treated waste distributed by absorption trenches.

1. Introduction Continued:

On all of the newly created vacant allotments effluent must be treated to secondary level by an Aerated Wastewater Treatment System (AWTS), single-pass sand filter or suitable EPA approved alternative treatment system.

Land application by sub-surface irrigation recommended.

In respect to the existing developed sites those that don't have secondary wastewater treatments systems it is our recommendation that their installation be considered a possible condition of the permit to subdivide if granted.

2. Description of the Development

Table 1 Site Description

Site Address:	LARA No. 120 Forest Road North, Lara. No. 130 Forest Road North, Lara. No. 85 Curletts Road, Lara. No. 10 Osterlund Court, Lara. No. 235 Windermere Road, Lara. No. 145 Forest Road North, Lara. No. 245 Windermere Road, Lara. No. 105 Curletts Road, Lara. No. 84 Curletts Road, Lara. No. 125 Curletts Road, Lara. No. 30 Osterlund Court, Lara. No. 95 Curletts Road, Lara. No. 20 Osterlund Court, Lara. No. 60 Osterlund Court, Lara.
Client:	TGM GROUP PTY LTD P.O. Box 1137 GEELONG VIC 3220
Contact:	Stefanie Riches (03) 5202 4600 email: stefanier@tgmgroup.com
Council Area:	City of Greater Geelong
Zoning:	Rural Living Zone (RLZ)

Table 1 Site Description Continued:

Proposed Allotment Sizes:	35 allotments at an allotment size of 0.4 hectares to 0.966 hectares with an average lot size of 0.561 hectares.
Domestic Water Supply:	We assume a reticulated supply is available to all the proposed allotments.
Anticipated Wastewater Load:	The design wastewater load is 150L/person/day. This load is sourced from the EPA Code of Practice – Onsite Wastewater Management 891.3 February 2013 - Table 4.1. (Households with full water reduction facilities). Loads per household are calculated in Section 6.
Availability of Sewer:	The area is unsewered and unlikely to be sewered in the short to medium term future

Variations from a minimum of 150 litres/person/day for households with full water reduction facilities up to 220 litres/person/day for households with no water saving features and extra waste water producing facilities can be adopted.

Provincial Geotechnical have adopted 150 litres/person/day as a conservative value based upon a number of factors. Should any party require modeling upon alternative waste water values Provincial Geotechnical can provide this.

3. Site Key Features

The author undertook a series of site inspections and site investigations in September 2013. A range of site features were assessed in terms of the degree of limitation they present for a range of onsite wastewater management systems.

Reference is made to the rating scale described in MAV model LCA Report (Table 6) guide. Remedial measures should be considered whenever ratings of 3, 4, or 5 occur and this might involve land improvement works, soil amelioration or simply adoption of higher-level technologies to ensure environmental protection.

Table 6 of the MAV model LCA report summarises the key features in relation to effluent management at the subdivision site.

The subdivision site experiences both stormwater run-on and run-off.

3. Site Key Features Continued:

There is no evidence of a shallow water table.

We have identified two associated sensitive environmental features that may be impacted upon by the proposed development.

The subdivision site is bordered on the west by Hovells Creek and to the east by a waterway extending from Serendip Sanctuary to the north and joining Hovells Creek south of the subdivision. The location and context of these features are delineated on the appended Google Map (Appendix ii).

The area's regional geology is uniform with all of the proposed allotments within the Quaternary aged Limestone Sediments (Appendix iii).

Mean annual rainfall for the region is considered low at 554 mm/year based on statistics calculated over the period 1961-1990 (Appendix iv).

An aerial photograph showing the region's key features with the subdivision overlay is appended (Appendix v).

Table 2 Site Features (Table 6 of MAV model LCA report reproduced)

Feature	Comment
Climate	The region has a temperate climate with maximum temperatures and minimum rainfall in summer. The area experiences an average annual rainfall of 554.8mm over the period 1961-1990 (Little River Climate Station-No. 087033). Appendix iii.
Exposure	The subdivision site is predominantly cleared of original vegetation with the majority of the proposed allotments having good to excellent aspect with a high sun and wind exposure.
Vegetation	The subdivision site contains a mixture of grasses, shrubs and trees of various age, species and density.
Landform	The site is of slightly sloping plains.
Slope	Possible effluent management areas on all allotments can have negligible to slight falls.
Fill	Natural soil profiles were observed throughout the subdivision site. No fill was observed and no filling would be required in any Land Application Area.

Table 2 Site Features (Table 6 of MAV model LCA report reproduced) Continued:

Feature	Comment
Rocks and Rock Outcrops	Surface rocks and outcrop was not evident at the subdivision site but shallow limestone bedrock was encountered at some test sites.
Erosion Potential	The erosion hazard is low to moderate.
Surface Water	Applicable: Adjacent waterways however can be buffered as per the requirements of the Code of Practice.
Flood Potential	We understand that possible areas available for application of treated effluent are able to lie above the 1:100 year flood level. This should be confirmed by the client however
Stormwater run-on and upslope seepage	Possible effluent management areas are expected to receive only minor stormwater run-on which can be diverted via surface spoon drainage. There is no evidence of groundwater seepage, soaks or springs.
Groundwater	There are no signs of shallow groundwater tables above 1.5 metre depth.
Site Drainage and Subsurface Drainage	The subdivision site could experience variable stormwater run-on and run-off. However there are no visible signs of surface dampness, spring activity or hydrophilic vegetation in any of the preferred effluent management areas, or elsewhere nearby.
Recommended Buffer Distances	All buffer distances recommended in Table 5 of the EPA Code of Practice, 891.3 February 2013 are achievable.
Available Land Application Area	Considering all site constraints and the buffers mentioned above each of the proposed allotments will have ample land that is suitable and available for land application of treated effluent. We understand that the land application envelopes can be located above the 1:100 year flood level and there will be ample protection for surface and groundwater.

4. Soil Assessment and Constraints

The subdivision site's soils have been assessed for their suitability for onsite wastewater management.

A soil survey was carried out at the subdivision site to determine suitability for application of treated effluent. Subsoil investigations were proposed at a rate of 1 borehole per allotment but due to site constraints this was not possible but were conducted at 22 separate locations over the subdivision site using an hydraulic rig mounted auger and manual hand auger (Appendix vi). This was however sufficient to adequately characterise the soils as only minor variation were expected throughout the area of interest and this proved to be so.

One predominant soil type was encountered in all of these subsurface investigations. Full profile descriptions are provided in Appendix vii.

Soils in the vicinity of the tested areas have an horizon of light clay overlying a medium clay which is not suitable for conventional absorption trenches but for irrigation.

It is on this basis that insitu percolation testing was deemed unwarranted. Falling or constant head in situ testing is relevant only to sites where absorption is the method of disposal.

In this case the disposal will need to be by evaporation and transpiration. As such the AS 1547 soil categorization method as adopted by the MAV is considered more than sufficient to characterise the soil.

The underlying medium clays will therefore play an insignificant role in waste water disposal.

A Soil Category of 5 (Light Clay) is determined suitable for the total subdivision site.

Table 3 Soil Features:

Soil Feature	Comment
Soil Depth	Soil depths up to 1500mm encountered.
Depth to watertable	Groundwater not encountered.
Coarse Fragments (%)	Less than 5% coarse fragments occur in the BI horizon. No coarse fragments were observed throughout the remainder of the profile.
Soil Permeability and Design Loading Rates	Soil permeability was not directly measured but can be inferred with reference to Table M in AS/NZS 1547:2012, that describe conservative design loading rates (DLR's) and Design Irrigation Rates (DIR's) for various effluent application systems according to soil type. Critical soil properties are texture and structure, but depth, colour and degree of mottling are also used to infer drainage conditions. We note that the indicative loading rates below assume secondary treated effluent is being applied. Reduced loading rates would apply to primary treatment systems (septic tanks), although these are not recommended here.

	Topsoils	Subsoils
Description	Light Clay	Medium Clay
Soil Category (AS/ NZ1547:2000)	5	6
Design Irrigation Rate (DIR mm/week)	20 (secondary treated)	15 (secondary treated)
Design Loading Rate (DLR mm/week) for trenches/beds	Not Applicable.	Not applicable.
pH	The pH of 1:5 soil/water suspensions was not measured. The present soil conditions do not appear to be restricting plant growth.	
Electrical Conductivity	Electrical conductivity was not measured.	

5. Land Capability Assessment Matrix

The Land Capability Assessment Matrix has been developed for that section of the proposed allotments relevant to the investigation. It specifically relates to the proposed or likely Land Application Areas. The General Characteristics Ratings are determined by direct measurement on site, provided data or inferred from site/soil conditions present or historical investigation undertaken by Provincial Geotechnical Pty Ltd within the area.

Table 4 Land Capability Assessment Matrix

LAND FEATURES	Land capability class rating					Site rating
	Very good (1)	**Good (2)**	**Fair (3)**	**Poor (4)**	**Very poor (5)**	
GENERAL CHARACTERISTICS						
Site drainage	No visible signs of dampness	Moist soil, but no standing water in soil pit		Visible signs of dampness, such as moisture-tolerant plants	Water ponding on surface	**3**
Runoff	None	Low	Moderate	High – need for diversionary structures	Very high – diversion not practical	**2**
Flood Levels	Never		<1 in 100	>1 in 100 and <1 in 20	<1 in 20	**3**
Proximity to Watercourses	>60 metres				<60	**3**
Slope (%)	0-2	2-8	8-12	12-20	>20	**2**
Landslip	No actual or potential failure		Low potential for failure	High potential for failure	Present or past failure	**1**
Groundwater (seasonal watertable depth (m))	>5	5-2.5	2.5-2.0	2.0-1.5	<1.5	**2**
Rock outcrop (1% of land surface containing rock >200mm)	0	<10%	10-20%	20-50%	>50%	**1**
Erosion potential	No erosion potential	Minor	Moderate	High	Severe erosion potential	**2**
Exposure	High sun and wind exposure		Moderate	Low sun and wind exposure		**2**

Table 4 Land Capability Assessment Matrix Continued:

LAND FEATURES	Land capability class rating					Site rating
	Very good (1)	**Good (2)**	**Fair (3)**	**Poor (4)**	**Very poor (5)**	
Landform	Hill crests, convex side slopes and plains		Concave sideslopes and footslopes		Floodplains & incised channels	**2**
Vegetation Type	Turf or pasture				Dense forest with little understorey	**2**
Average Rainfall (mm/yr)	<450	450-650	650-750	750-1000	>1000	**2**
Pan evaporation (mm/yr)	>1500	1250-1500	1000-1250	---	<1000	**2**
Fill	No fill		Fill present			**1**
SOIL PROFILE CHARACTERISTICS						
Soil permeability category	2 and 3	4		5	1 and 6	**3**
Profile depth	>2m	1.5-2m	1.5 – 1	1.0-0.5m	>0.5m	**3**
Presence of mottling	None				Extensive	**2**
Course fragments (%)	<10	10-20	20-40		>40	**1**
Permeability (m/d)	0.3-0.15	0.08-0.15 0.3-0.6	0.06-0.08 0.6-1.5	--- 1.5-2.0	<0.06 >2.0	**3**
pH	6-8		4.5-6		<4.5, >8	**3**
Emerson Aggregate	4, 6, 8	5	7	2, 3	1	**3**
Electrical Conductivity	<0.3	0.3-0.8	0.8-2	2-4	>4	**3**
Sodicitiy ESP% (Indicative)	<3		6-8	8-14	>14	**3**
Overall Subdivision Site Rating			**Fair**			**3**

6. The Management Program

This LCA has been prepared to accompany a rezoning application to City of Greater Geelong Council that may result in a residential sub-division of land to create 21 additional vacant allotments for construction of new private residences and associated necessary wastewater management systems.

As such, this report provides recommendations for treatment and land application systems that are appropriate to the proposed allotments' land capability. The following sections provide an overview of a suitable system, with sizing and design considerations and justification for its selection. Detailed design for the system is beyond the scope of this study, but should be undertaken at the time of building application and submitted to Council.

This section is also applicable to the existing 14 developed lots.

6. The Management Program Continued:

6.1 Treatment System

Primary treatment and disposal via absorption trenches is not considered suitable for any of the proposed allotments within this site. Secondary treatment of effluent is required for all proposed allotments.

6.2 Land Application

A range of possible land application systems have been considered, such as absorption trenches, evapotranspiration/absorption (ETA) beds, surface and subsurface irrigation, and sand mounds.

The system of disposal via shallow subsurface irrigation is the recommended method.

6.3 Sizing the Disposal System – Single household

To determine the necessary size of the irrigation area water and nutrient balance modelling has been considered.

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 areas are recommended to safely achieve zero wet weather storage.

Number of Bedrooms	Number of Occupants	Total Daily Wastewater Flow	Land Application Area Size
2	3	450	200m²
3	4	600	250m²
4	5	750	300m²
5	6	900	350m²

IRRIGATION AREA REQUIRED (3 bedroom dwelling for example)

i Water Balance

Soil Category: 5 – Light Clay

Design Irrigation Rate: 3mm/day (21mm/week)–(Table M1: AS/NZS 1547:2012).

Daily Flow: (3+1) x 150 = 600 L/day

Land Application Area = (600x7)÷21 = 200m²

i Water Balance Continued:

A preliminary model water balance assuming a Decile 9 rainfall with zero wet month storage and a daily wastewater of 150 litres/person/day indicates the proposed field sizings are satisfactory. Preliminary computations are based on a pan evaporation of 1200mm – 1300mm/year and an annual rainfall of 500mm-600mm/year.

The nearest Bureau of Meteorology Station to the subdivision is Little River with a mean annual rainfall of 554.8mm/year, statistics calculated over the period 1961-1990.

ii Nutrient Balance

A preliminary nutrient balance has been considered to check that the Land Application Area is of sufficient size to ensure nutrients are assimilated by the soils and vegetation. It is acknowledged that a proportion of nitrogen will be retained in the soil through processes such as mineralisation and volatilisation.

Reference: MAV Model LCA February 2006

NOTE: Soil has a high PRI (phosphorus retention index) in clayey soils. Phosphorus is readily removed under these circumstances from wastewater fixation in clayey soil by the action of adsorption. Phosphate in dispersed effluent is lost within a few centimetres of the soil.

This leaves nitrogen (N) as the limiting factor in this proposed development.

EPA performance criteria for Aerated Wastewater Treatment Systems (AWTS) is TKN 30mg/L. Adopt as design criteria.

Proposed wasterwater loading: 600L/d (Litres/day)
Determine the daily N load:
30 x 600 = 18,000mg/day

Determine the annual N load:
18,000mg/day x 365 days
Annual N load = 6,570,000mg/day

Allow 20% loss through denitrification and other processes
6,570,000 x 0.8 = 5,256,000mg/day
Annual N load = 5.256kg/yr

Allow for uptake by plants (application rate) of 220kgn/ha/yr
(This figure is suitable for a regularly maintained grass cover).

ii Nutrient Balance Continued:

Divided the annual N load by the application rate
5.256/220 = 0.0239ha
or = 239m²

Minimum area required for N uptake = 239m²

Therefore adopt 239m² as required minimal area required for effluent irrigation.

We are of the opinion that the area required for nitrogen assimilation and phosphorus can be met by the above sized Land Application Area.

Note: A factor of conservatism is applied to the water and nutrient balance calculations and the Land Application Area sizing must be adopted from the provided table above.

Notes:

A more detailed monthly water balance or nutrient balance computation was not considered necessary for this subdivision site for the following reasons:

1. Past modeling on similar sites in this area that exhibit the same climatic and soil data.

2. The proposed allotment sizes and configurations are large enough to accommodate conservative modeling providing a dedicated Land Application Area in excess of computed requirements.

Summary and Discussion

It is worth noting that modeling includes several significant factors of conservatism:

- Hydraulic load. This assumes a maximum occupancy of a residence at a rate of 150 Litres/person/day.

  It is possible that the actual occupancy and water usage will be less than this.

- From the nutrient balances, in the absence of site specific data very conservative estimates of crop nutrient uptake rates and total nitrogen lost to soil processes are considered.

6.4 Siting and Configuration of the Land Application Area

Whilst there is ample area for application of effluent, it is important that buffer distances be adhered to. It is important to note that buffers are measured as the overland flow path for run-off water from the effluent irrigation area.

The main constraint on this subdivision site is the setback requirements for future boundaries and buildings.

We have already noted the proximate waterways but all of the abutting proposed allotments maintain a nearest boundary setback of 30 metres which is the required upslope buffer for this feature.

Provincial Geotechnical can confirm specific scaled Land Application Areas on provided site plans at a future date if required but considering the proposed allotment sizes and the lack of sensitive environmental receptors in critical proximity this may not be needed.

We recommend that the individual Land Application Areas be subdivided into at least two separate fields that can be watered alternately. An automatic indexing valve generically known as a 'roto-valve can be used to allow alternation between the areas with each pump cycle.

It is recommended that owners consult an irrigation expert familiar with wastewater irrigation equipment, to help design and install the irrigation system. The irrigation plan must ensure good, even application of effluent.

A detailed irrigation system design is beyond the scope of this report, however a general description of subsurface irrigation is provided here for the information of the client and Council.

It should be noted that there is no EPA Certificate of Approval currently for subsurface irrigation. Hence, the design must comply with AS/NZS 1547:2012.

Subsurface irrigation comprises a network of drip-irrigation lines that is specially designed for use with wastewater. The pipe contains pressure compensating emitters that employ a biocide to prevent build-up of slimes and inhibit root penetration.

6.5 Irrigation System Description Continued:

The laterals are usually 0.6 to 1.0 m apart, roughly parallel and along the contour if possible. Installation depth is commonly 100-150 mm. It is critical that the irrigation pump be sized properly to ensure adequate pressure and delivery rate to the irrigation network.

A filter is installed in the main line to remove fine particulates that could block the emitters. This must be cleaned regularly following manufacturer's instructions.

Vacuum breakers should be installed at the high points in the system to prevent air and soil being sucked back into the drippers when the pump shuts off. Flushing valves are an important component and allow periodic flushing of the lines, which should be done at east yearly. Flush water can be either returned to the treatment system, or should be released where it will be readily absorbed.

All trenching used to install the pipes must be backfilled properly to prevent preferential subsurface flows along trench lines, particularly where trenches are not absolutely parallel to contours. Irrigation areas should not be subject to high traffic movement, especially by vehicles, otherwise compaction around emitters can lead to premature system failure.

6.6 Buffer Distances

Buffer distances from Land Application Area's are required to help prevent human contact, maintain public amenity and protect sensitive environments. Council should adopt the following nominal buffers, described in the EPA Code of Practice (891.3 February 2013) for 20/30 treated effluent:

- 20 metres upslope from potable or non-potable groundwater bores;
- 30 metres upslope from watercourses and surface waters that are non-potable.
- 50 metres upslope from watercourses in a potable water supply catchment.
- 3 metres if area up-gradient and 1.5 metres if area down-gradient of property boundaries, swimming pools and buildings.

All nominal buffers are achievable.

7. Monitoring, Operation and Maintenance

Maintenance is to be carried out in accordance with the relevant Certificate of Approval and Council's permit conditions. The system proposed above will only function adequately if appropriately maintained. Residents will be required to carry out maintenance as discussed below.

7. Monitoring, Operation and Maintenance Continued:

To ensure the wastewater treatment system functions adequately residents must:

- Have a suitably qualified maintenance contractor service or inspect the system, as required by Council under the approval to operate.
- Use household cleaning products sparingly and check that they are suitable for septic tanks;
- Keep as much fat and oil out of the system as possible; and
- Conserve water.

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

- Regularly harvest (mow) vegetation within the Land Application Area and remove this to maximise uptake of water and nutrients;
- Monitor and maintain the subsurface irrigation system following the manufacturer's recommendations, including flushing of irrigation lines;
- Regularly clean in-line filters;
- Not erect any structures over the Land Application Area;
- Minimise vehicle access to the Land Application Area, to prevent compaction; and
- Ensure that the Land Application Area is kept level by filling any depressions with good quality topsoil (not clay).
- Good water conservation is an important aspect in the overall management of onsite systems. It will be important for the ongoing performance of both the treatment and application system that they are not overloaded hydraulically. AAA rated plumbing is recommended for all future water fixtures.

8. Stormwater Management

As mentioned above, stormwater run off may be a concern on this subdivision site. However, the construction and maintenance of surface diversion drains would provide precaution against surface water flow onto the Land Application Area. Roof stormwater must not be disposed in the Land Application Area.

9. Conclusions

9a. Vacant Allotments

As a result of our investigations we conclude that sustainable onsite wastewater management systems can be built to meet the needs of a new residences on the proposed new 21 vacant allotments created from residential sub-division.

This report addresses many of the physical and environmental factors that require investigation. Social factors fall outside our field of expertise and are best addressed at planning stages.

Physical factors addressed include Lot size, slope, soil percolation rate, depth to rock/springwater and annual rainfall.

Based on investigation of these features, the subdivision area is regarded as suitable for conventional secondary disposal systems (but subject to other criteria, investigation and/or design).

Environmental Factors that require attention are:

- Declared Special Water Supply Area
- Flood Plain (frequency) of Annual Exceedance Probability
- Discharge of waste water

These factors require consultation with the relevant local authorities to determine their relevance.

In respect to allotment size (4000m² plus), our investigation indicates that with 600m^2 at most required for effluent disposal envelopes for say a 5 bedroom dwelling, a low density development is possible.

Specifically, we recommend the following as a minimum requirement:

- Secondary treatment of wastewater.
- Land application of wastewater into shallow subsurface or surface irrigation systems.
- Installation of water saving devices in the new residences to reduce the effluent load for onsite disposal.
- Use of low phosphorus and low sodium (liquid) detergents to improve effluent quality and maintain soil properties.
- Operation and management of the treatment and disposal system in accordance with the recommendations made in this report.

9a. Vacant Allotments Continued:

- Construction of diversion drains on the upslope side of the LAA to divert stormwater.

- Provincial Geotechnical Pty Ltd be consulted to either determine or confirm Land Application Area's for the proposed allotments.

9b. Existing Developed Allotments

As advised earlier in this report the existing developed allotments should be subjected to the same requirements as the vacant allotments – even though our inspections of the existing wastewater systems did not reveal any environmental or human health risk.

The existing 14 developed sites contained various systems from fully functioning wastewater treatments plants to septic tanks with minimal absorption trenching. A number of allotments contained separate grey water systems.

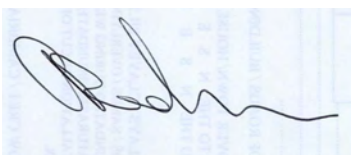
In respect to documenting the existing developed sites' wastewater systems the task is problematic in that in many cases visual site evidence is absent as well as land owner knowledge. Also normal vegetative indicators of the location of disposal fields is not always accurate.

It is our recommendation that at this stage further more intensive inspection of current systems be postponed subject to a determination by Council as to what restrictions or conditions may be placed upon existing septic systems.

Should the subdivision be approved and Council conditions are determined Provincial Geotechnical Pty Ltd can then provide a list of specific recommendations for each of the existing developed lots if required.

Site photographs are appended for the 13 developed lots of the 14 existing lots as a guide to the variable septic system conditions encountered (Appendix viii).

Any queries relating to this report should be directed to the author.



ANDREW REDMAN BSc.
SENIOR GEOLOGIST.

C.E.T. ACCREDITED
AR:mp

10. References

Guidelines for Environmental Management: Code of Practice - Onsite Wastewater Management.
Environment Protection Authority: Publication 891.3 February 2013

On-site domestic – Wastewater Management AS/NZS 1547:2012.

MAV – The Model Land Capability Assessment Report – February 2006

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Environment Protection Authority: Publication 891.2 December 2008

Environment Protection Authority Information Bulletin – Publication 746.1 March 2003 – Land Capability Assessment for On-site Domestic Wastewater Management.

Septic Tanks Code of Practice: Guidelines for Environmental Management Publication 891, March 2003. Environmental Protection Authority.

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

Environment Protection Authority Code of Practice - Publication 451, March 1996 - Septic Tanks On Site Domestic Wastewater Management

11. APPENDICES

i. Proposed Plan of Subdivision
ii. Google Map delineating context and feature locations
iii. Geovic Geology Map
iv. Bureau of Meteorology Climate Report for Little River
v. Aerial Photograph
vi. Proposed Concept Low Density Residential Subdivision Plan
vii. Borelog Descriptions
viii. Site Photographs

APPENDIX i

PROPOSED PLAN OF SUBDIVISION


DRAWING No. 10830-01
VERS.No. 04
SHEET No. 2 OF 2
Legend
Subject Site
Current Lot Boundary
Proposed Lot Boundary
Easement
Urban Floodway Zone
Notes: Boundary allignments and dimensions are approximate only.
TGM Group Geelong
1/27-31 Myers Street (PO Box 1137)
Geelong Vic 3220
T 03 5202 4600
F 03 5202 4691
ABN 11 125 568 461
www.tgmgroup.com
Melbourne | Ballarat | Ballina
JAS-ANZ Accredited: Quality ISO 9001 - OH&S AS/NZS 4801 - Environment ISO 14001
PROPOSED CONCEPT LOW DENSITY RESIDENTIAL SUBDIVISION
CURLETTS ROAD, LARA
PRINCIPAL WENDY BASHAM
THIS ELECTRONIC DRAWING IS PRODUCED BY, AND REMAINS THE PROPERTY OF TGM GROUP PTY. LTD
IT MAY NOT BE REPRODUCED IN ANY FORM WITHOUT WRITTEN PERMISSION
ORIGINAL SHEET SIZE A3
JOB REF. 10830-01
DRAWN T.M.
DATUM N/A
CHECKED C.M.
SCALE 1:4000
DATE 9/7/2012
MELWAYS REF. N/A
DRAWING No. 10830-01
VERS.No. 04
SHEET No. 2 OF 2

APPENDIX ii

GOOGLE MAP DELINEATING CONTEXT & FEATURE LOCATIONS

Google Address **Lara VIC**

SUBJECT SITE DELINEATING PROXIMATE WATERWAYS

APPENDIX iii

GEOVIC GEOLOGY MAP

LARA, VIC

Department of Primary Industries

Legend

Towns (25K)

Roads (vmtrans)

- Freeway
- Highway
- Main Road
- Other

Contact Metamorphism Zones 100K

Geological Polygons 100K

- Qc3 Unnamed slump deposits
- Qc Unnamed colluvium
- Qrc1 Unnamed
- Qrt Unnamed
- Qdl1 Unnamed coastal dune deposits
- Qc5 Unnamed
- Qc4 Unnamed granite-derived colluvium
- Qd1 Unnamed inland dune deposits
- Qc2 Coonambidgal Formation
- Qdi Unnamed inland dune deposits
- Nwo Coonambidgal Formation

GN MN

GDA Vicgrid94

State Government Victoria

Printed on 15 October 2013 12:04:59

Map Scale 1:14,951

NOT FOR NAVIGATION

APPENDIX iv

BUREAU OF METEOROLOGY CLIMATE REPORT FOR LITTLE RIVER

Monthly Rainfall (millimetres)

LITTLE RIVER

Station Number: 087033 · State: VIC · Opened: 1906 · Status: Open · Latitude: 37.99°S · Longitude: 144.49°E · Elevation: 20 m

Statistics for this station calculated over all years of data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	31.5	39.4	34.2	37.5	39.0	37.0	36.6	40.4	45.8	49.8	45.7	46.6	487.1
Lowest	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.5	1.8	2.6	0.0	0.0	247.6
5th percentile	0.1	1.5	0.3	4.7	8.9	13.0	10.8	9.9	14.4	10.4	4.9	6.4	278.4
10th percentile	2.6	2.4	4.4	7.3	12.8	16.3	15.8	13.8	17.3	15.9	11.6	9.5	325.9
Median	25.7	27.8	25.0	32.1	37.8	33.8	33.6	38.7	42.0	45.1	37.8	39.1	472.2
90th percentile	62.8	102.6	77.1	68.1	68.7	64.9	64.9	66.0	77.9	87.4	91.2	97.0	657.8
95th percentile	85.4	116.9	89.3	90.1	75.8	75.0	70.6	76.2	92.2	94.1	117.0	112.6	688.1
Highest	112.0	252.3	147.8	147.7	100.0	113.2	97.4	117.8	166.8	149.2	144.4	150.8	872.8

Statistics calculated over the period 1961-1990

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	39.9	37.2	35.9	43.7	51.2	37.5	44.2	51.9	51.9	61.1	49.1	51.3	554.8
Lowest	1.8	1.0	10.6	7.0	7.0	11.1	10.4	10.2	9.9	8.4	5.3	2.3	298.4
5th Percentile	4.3	1.8	12.4	10.4	14.3	14.5	13.6	26.0	13.3	16.5	8.4	11.6	379.3
10th percentile	9.7	2.1	13.4	12.4	26.8	18.4	20.2	29.8	17.5	21.4	18.0	13.8	408.6
Median	33.7	17.1	32.0	39.3	45.8	36.3	43.6	53.2	49.0	63.3	42.6	42.2	537.8
90th percentile	71.1	95.8	57.5	92.5	78.1	58.7	68.6	73.2	85.5	93.8	100.9	113.9	688.2
95th percentile	89.7	101.9	74.9	100.6	87.7	77.0	79.2	78.1	90.1	115.8	112.8	126.6	775.0
Highest	108.6	252.3	95.2	114.4	100.0	90.6	87.8	84.0	106.0	149.2	144.4	150.8	872.8

1) Calculation of statistics

Summary statistics, other than the Highest and Lowest values, are only calculated if there are at least 20 years of data available.

2) Gaps and missing data

Gaps may be caused by a damaged instrument, a temporary change to the site operation, or due to the absence or illness of an observer.

3) Further information

http://www.bom.gov.au/climate/cdo/about/about-rain-data.shtml.

APPENDIX v

AERIAL PHOTOGRAPH

AERIAL PHOTOGRAPH

APPENDIX vi

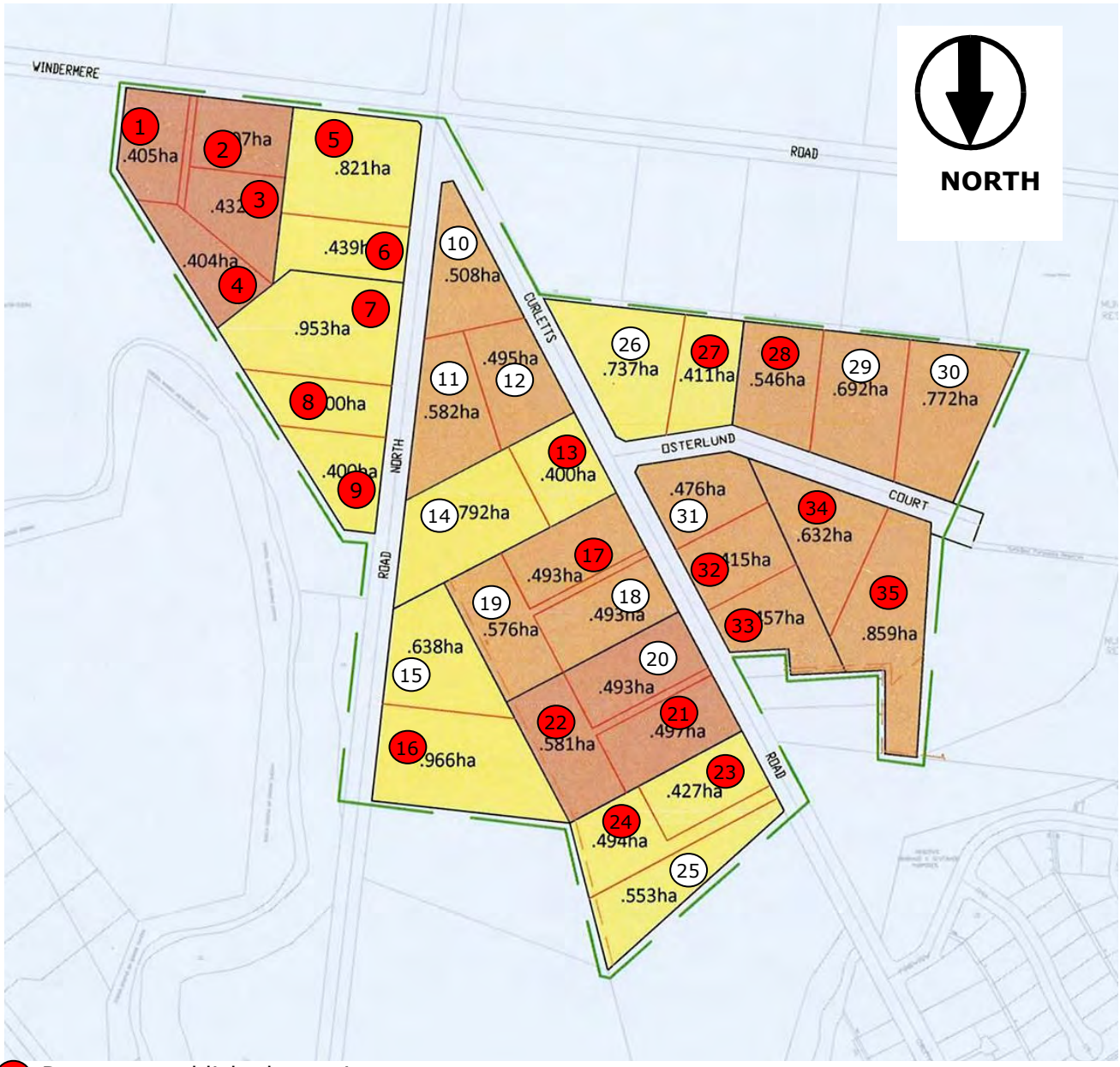
PROPOSED CONCEPT LOW DENSITY RESIDENTIAL SUBDIVISION PLAN

PROVINCIAL GEOTECHNICAL PTY. LTD.
CONSULTING GEOLOGISTS

PROPOSED CONCEPT LOW DENSITY RESIDENTIAL SUBDIVISION PLAN

(Not to Scale) – ◯ Distances are approximate)

Client: T.G.M GROUP PTY LTD
Ref. Number: H3005
Date: September 2013
Site: Lara,
Forest Road North, Curletts Road,
Osterlund Road, Windermere Road



● Denotes established test sites.

◯ Denotes test sites NOT established.

APPENDIX vii

BORELOG DESCRIPTIONS

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	TGM GROUP PTY LTD	***REFERENCE NUMBER:*** H3005	***DATE:*** 16/09/2013
PROJECT ADDRESS:	Lara, Forest Road North, Curletts Road, Osterlund Road, Windermere Road	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 1				**TEST SITE 2**				**TEST SITE 3**			
Depth mm	SOIL PROFILE	Fill	C kPa	Depth mm	SOIL PROFILE	Fill	C kPa	Depth mm	SOIL PROFILE	Fill	C kPa
100	**SILTY CLAY**			100	**SILTY CLAY brown moist and firm**			100	**SILTY CLAY**		
200	**brown moist and firm**			200	**CLAY**			200	**brown moist and firm**		
300	**CLAY**			300	**brown**			300	**CLAY**		
400	**brown**			400	**moist and stiff**			400	**brown**		
500	**moist and stiff**		**130+**	500			**130+**	500	**moist and stiff**		**130+**
600	**END BORE HOLE**			600	**END BORE HOLE**			600			
700	**(HAND AUGER)**			700	**(HAND AUGER)**			700			
800				800				800			
900				900				900			
1000				1000				1000			**130+**
1100				1100				1100			
1200				1200				1200			
1300				1300				1300			
1400				1400				1400			
1500				1500				1500			**130+**
1600				1600				1600	**END BORE HOLE**		
1700				1700				1700	**(DRILLING RIG)**		
1800				1800				1800			
1900				1900				1900			
2000				2000				2000			
2100				2100				2100			
2200				2200				2200			
2300				2300				2300			
2400				2400				2400			
2500				2500				2500			
2600				2600				2600			
2700				2700				2700			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	TGM GROUP PTY LTD	***REFERENCE NUMBER:*** H3005	***DATE:*** 16/09/2013
PROJECT ADDRESS:	Lara, Forest Road North, Curletts Road, Osterlund Road, Windermere Road	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 4				**TEST SITE 5**				**TEST SITE 6**			
Depth mm	SOIL PROFILE	Fill	C kPa	Depth mm	SOIL PROFILE	Fill	C kPa	Depth mm	SOIL PROFILE	Fill	C kPa
	SILTY CLAY				**SILTY CLAY**				**SILTY CLAY**		
100	**brown moist and firm**			100	**brown moist and firm**			100	**brown moist and firm**		
200				200	**CLAY**			200			
300	**CLAY**			300	**brown**			300	**CLAY**		
400	**brown**			400	**moist and stiff**			400	**brown**		
500	**moist and stiff**		**130+**	500			**130+**	500	**moist and stiff**		**130+**
600				600	**END BORE HOLE**			600			
700				700	**(HAND AUGER)**			700			
800				800				800			
900				900				900			
1000			**130+**	1000				1000			**130+**
1100				1100				1100			
1200				1200				1200			
1300				1300				1300			
1400				1400				1400			
1500			**130+**	1500				1500			**130+**
1600	**END BORE HOLE**			1600				1600	**END BORE HOLE**		
1700	**(DRILLING RIG)**			1700				1700	**(DRILLING RIG)**		
1800				1800				1800			
1900				1900				1900			
2000				2000				2000			
2100				2100				2100			
2200				2200				2200			
2300				2300				2300			
2400				2400				2400			
2500				2500				2500			
2600				2600				2600			
2700				2700				2700			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	TGM GROUP PTY LTD	***REFERENCE NUMBER:*** H3005	***DATE:*** 16/09/2013
PROJECT ADDRESS:	Lara, Forest Road North, Curletts Road, Osterlund Road, Windermere Road	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 7				**TEST SITE 8**				**TEST SITE 9**			
Depth mm	SOIL PROFILE	Fill	C kPa	Depth mm	SOIL PROFILE	Fill	C kPa	Depth mm	SOIL PROFILE	Fill	C kPa
	THIS TEST SITE NOT								**SILTY CLAY**		
100	**ESTABLISHED**			100	**SILTY CLAY**			100	**brown moist and firm**		
200				200	**brown moist and firm**			200	**CLAY**		
300				300	**CLAY**			300	**brown**		
400				400	**brown**			400	**moist and stiff**		
500				500	**moist and stiff**		**130+**	500			**130+**
600				600				600			
700				700				700			
800				800				800	**LIMESTONE**		
900				900				900	**highly weathered**		
1000				1000			**130+**	1000	**light grey**		
1100				1100				1100			
1200				1200				1200			
1300				1300				1300			
1400				1400				1400			
1500				1500			**130+**	1500			
1600				1600	**END BORE HOLE**			1600	**END BORE HOLE**		
1700				1700	**(DRILLING RIG)**			1700			
1800				1800				1800			
1900				1900				1900			
2000				2000				2000			
2100				2100				2100			
2200				2200				2200			
2300				2300				2300			
2400				2400				2400			
2500				2500				2500			
2600				2600				2600			
2700				2700				2700			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	TGM GROUP PTY LTD	***REFERENCE NUMBER:*** H3005	***DATE:***
PROJECT ADDRESS:	Lara, Forest Road North, Curletts Road, Osterlund Road, Windermere Road	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 10				**TEST SITE 11**				**TEST SITE 12**			
Depth mm	SOIL PROFILE	Fill	C kPa	Depth mm	SOIL PROFILE	Fill	C kPa	Depth mm	SOIL PROFILE	Fill	C kPa
100	**THIS TEST SITE NOT ESTABLISHED**			100	**THIS TEST SITE NOT ESTABLISHED**			100	**THIS TEST SITE NOT ESTABLISHED**		
200				200				200			
300				300				300			
400				400				400			
500				500				500			
600				600				600			
700				700				700			
800				800				800			
900				900				900			
1000				1000				1000			
1100				1100				1100			
1200				1200				1200			
1300				1300				1300			
1400				1400				1400			
1500				1500				1500			
1600				1600				1600			
1700				1700				1700			
1800				1800				1800			
1900				1900				1900			
2000				2000				2000			
2100				2100				2100			
2200				2200				2200			
2300				2300				2300			
2400				2400				2400			
2500				2500				2500			
2600				2600				2600			
2700				2700				2700			
2800				2800				2800			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	TGM GROUP PTY LTD	***REFERENCE NUMBER:*** H3005	***DATE:***
PROJECT ADDRESS:	Lara, Forest Road North, Curletts Road, Osterlund Road, Windermere Road	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 13				**TEST SITE 14**				**TEST SITE 15**			
Depth mm	SOIL PROFILE	Fill	C kPa	Depth mm	SOIL PROFILE	Fill	C kPa	Depth mm	SOIL PROFILE	Fill	C kPa
100	**SILTY CLAY**			100	**THIS TEST SITE NOT**			100	**THIS TEST SITE NOT**		
200	**dark brown moist firm**			200	**ESTABLISHED**			200	**ESTABLISHED**		
300	**LIMESTONE**			300				300			
400	**highly weathered**			400				400			
500	**light brown**			500				500			
600	**SILTY CLAY and**			600				600			
700	**variable lenses**			700				700			
800				800				800			
900				900				900			
1000				1000				1000			
1100				1100				1100			
1200				1200				1200			
1300				1300				1300			
1400				1400				1400			
1500				1500				1500			
1600	**END BORE HOLE**			1600				1600			
1700				1700				1700			
1800				1800				1800			
1900				1900				1900			
2000				2000				2000			
2100				2100				2100			
2200				2200				2200			
2300				2300				2300			
2400				2400				2400			
2500				2500				2500			
2600				2600				2600			
2700				2700				2700			
2800				2800				2800			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	TGM GROUP PTY LTD	***REFERENCE NUMBER:*** H3005	***DATE:***
PROJECT ADDRESS:	Lara, Forest Road North, Curletts Road, Osterlund Road, Windermere Road	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 16				**TEST SITE 17**				**TEST SITE 18**			
Depth mm	SOIL PROFILE	Fill	C kPa	Depth mm	SOIL PROFILE	Fill	C kPa	Depth mm	SOIL PROFILE	Fill	C kPa
100	**SILTY CLAY**			100	**SILTY CLAY**			100	**THIS TEST SITE NOT**		
200	**dark brown moist firm**			200	**dark brown moist firm**			200	**ESTABLISHED**		
300				300				300			
400				400				400			
500	**LIMESTONE**			500	**LIMESTONE**			500			
600	**highly weathered**			600	**highly weathered**			600			
700	**light brown**			700	**light brown**			700			
800	**SILTY CLAY and**			800	**SILTY CLAY and**			800			
900	**variable lenses**			900	**variable lenses**			900			
1000				1000				1000			
1100				1100				1100			
1200				1200				1200			
1300	**END BORE HOLE**			1300				1300			
1400	**LIMESTONE**			1400				1400			
1500				1500				1500			
1600				1600	**END BORE HOLE**			1600			
1700				1700				1700			
1800				1800				1800			
1900				1900				1900			
2000				2000				2000			
2100				2100				2100			
2200				2200				2200			
2300				2300				2300			
2400				2400				2400			
2500				2500				2500			
2600				2600				2600			
2700				2700				2700			
2800				2800				2800			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	TGM GROUP PTY LTD	***REFERENCE NUMBER:*** H3005	***DATE:***
PROJECT ADDRESS:	Lara, Forest Road North, Curletts Road, Osterlund Road, Windermere Road	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 19				**TEST SITE 20**				**TEST SITE 21**			
Depth mm	SOIL PROFILE	Fill	C kPa	Depth mm	SOIL PROFILE	Fill	C kPa	Depth mm	SOIL PROFILE	Fill	C kPa
100	**THIS TEST SITE NOT**			100	**THIS TEST SITE NOT**			100	**SILTY CLAY**		
200	**ESTABLISHED**			200	**ESTABLISHED**			200	**dark brown moist firm**		
300				300				300			
400				400				400			
500				500				500			
600				600				600			
700				700				700			
800				800				800	**LIMESTONE highly**		
900				900				900	**weathered light brown**		
1000				1000				1000	**END BORE HOLE**		
1100				1100				1100	**UNABLE TO PENETRATE**		
1200				1200				1200			
1300				1300				1300			
1400				1400				1400			
1500				1500				1500			
1600				1600				1600			
1700				1700				1700			
1800				1800				1800			
1900				1900				1900			
2000				2000				2000			
2100				2100				2100			
2200				2200				2200			
2300				2300				2300			
2400				2400				2400			
2500				2500				2500			
2600				2600				2600			
2700				2700				2700			
2800				2800				2800			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	TGM GROUP PTY LTD	***REFERENCE NUMBER:*** H3005	***DATE:***
PROJECT ADDRESS:	Lara, Forest Road North, Curletts Road, Osterlund Road, Windermere Road	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 22				**TEST SITE 23**				**TEST SITE 24**			
Depth mm	SOIL PROFILE	Fill	C kPa	Depth mm	SOIL PROFILE	Fill	C kPa	Depth mm	SOIL PROFILE	Fill	C kPa
100	**SILTY CLAY**			100	**SILTY CLAY**			100	**THIS TEST SITE NOT**		
200	**dark brown moist firm**			200	**dark brown**			200	**ESTABLISHED**		
300				300	**moist and firm**			300			
400				400	**CLAY**			400			
500				500	**red brown**		**130+**	500			
600	**LIMESTONE highly**			600	**moist and stiff**			600			
700	**weathered light brown**			700				700			
800	**SILTY CLAY and**			800				800			
900	**variable lenses**			900	**brown**			900			
1000				1000			**130+**	1000			
1100				1100	**brown grey**			1100			
1200				1200				1200			
1300	**END BORE HOLE**			1300				1300			
1400	**UNABLE TO PENETRATE**			1400	**and weathered limestone**			1400			
1500				1500	**fragments**		**130+**	1500			
1600				1600	**END BORE HOLE**			1600			
1700				1700				1700			
1800				1800				1800			
1900				1900				1900			
2000				2000				2000			
2100				2100				2100			
2200				2200				2200			
2300				2300				2300			
2400				2400				2400			
2500				2500				2500			
2600				2600				2600			
2700				2700				2700			
2800				2800				2800			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	TGM GROUP PTY LTD	***REFERENCE NUMBER:*** H3005	***DATE:***
PROJECT ADDRESS:	Lara, Forest Road North, Curletts Road, Osterlund Road, Windermere Road	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 25				**TEST SITE 26**				**TEST SITE 27**			
Depth mm	SOIL PROFILE	Fill	C kPa	Depth mm	SOIL PROFILE	Fill	C kPa	Depth mm	SOIL PROFILE	Fill	C kPa
100	**THIS TEST SITE NOT**			100	**THIS TEST SITE NOT**			100	**SILTY CLAY**		
200	**ESTABLISHED**			200	**ESTABLISHED**			200	**dark brown moist firm**		
300				300				300	**CLAY**		
400				400				400	**red brown**		
500				500				500	**moist and stiff**		**130+**
600				600				600			
700				700				700			
800				800				800			
900				900				900			**130+**
1000				1000				1000	**LIMESTONE**		
1100				1100				1100	**highly weathered**		
1200				1200				1200	**light grey**		
1300				1300				1300			
1400				1400				1400			
1500				1500				1500			
1600				1600				1600	**END BORE HOLE**		
1700				1700				1700			
1800				1800				1800			
1900				1900				1900			
2000				2000				2000			
2100				2100				2100			
2200				2200				2200			
2300				2300				2300			
2400				2400				2400			
2500				2500				2500			
2600				2600				2600			
2700				2700				2700			
2800				2800				2800			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	TGM GROUP PTY LTD	***REFERENCE NUMBER:*** H3005	***DATE:***
PROJECT ADDRESS:	Lara, Forest Road North, Curletts Road, Osterlund Road, Windermere Road	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 28				**TEST SITE 29**				**TEST SITE 30**			
Depth mm	SOIL PROFILE	Fill	C kPa	Depth mm	SOIL PROFILE	Fill	C kPa	Depth mm	SOIL PROFILE	Fill	C kPa
100	**SILTY CLAY**			100	**THIS TEST SITE NOT**			100	**THIS TEST SITE NOT**		
200	**dark brown moist firm**			200	**ESTABLISHED**			200	**ESTABLISHED**		
300	**CLAY**			300				300			
400	**red brown**			400				400			
500	**moist and stiff**		**130+**	500				500			
600				600				600			
700				700				700			
800				800				800			
900			**130+**	900				900			
1000				1000				1000			
1100				1100				1100			
1200				1200				1200			
1300	**LIMESTONE**			1300				1300			
1400	**highly weathered**			1400				1400			
1500	**light grey**			1500				1500			
1600	**END BORE HOLE**			1600				1600			
1700				1700				1700			
1800				1800				1800			
1900				1900				1900			
2000				2000				2000			
2100				2100				2100			
2200				2200				2200			
2300				2300				2300			
2400				2400				2400			
2500				2500				2500			
2600				2600				2600			
2700				2700				2700			
2800				2800				2800			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	TGM GROUP PTY LTD	***REFERENCE NUMBER:*** H3005	***DATE:***
PROJECT ADDRESS:	Lara, Forest Road North, Curletts Road, Osterlund Road, Windermere Road	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 31				**TEST SITE 32**				**TEST SITE 33**			
Depth mm	SOIL PROFILE	Fill	C kPa	Depth mm	SOIL PROFILE	Fill	C kPa	Depth mm	SOIL PROFILE	Fill	C kPa
100	**THIS TEST SITE NOT**			100	**SILTY CLAY**			100	**SILTY CLAY**		
200	**ESTABLISHED**			200	**dark brown moist firm**			200	**dark brown moist firm**		
300				300				300			
400				400				400			
500				500				500			
600				600				600	**LIMESTONE**		
700				700				700	**highly weathered**		
800				800				800	**light grey**		
900				900				900			
1000				1000				1000			
1100				1100				1100			
1200				1200	**LIMESTONE**			1200			
1300				1300	**highly weathered**			1300	**END BORE HOLE**		
1400				1400	**light grey**			1400	**UNABLE TO PENETRATE**		
1500				1500				1500			
1600				1600	**END BORE HOLE**			1600			
1700				1700				1700			
1800				1800				1800			
1900				1900				1900			
2000				2000				2000			
2100				2100				2100			
2200				2200				2200			
2300				2300				2300			
2400				2400				2400			
2500				2500				2500			
2600				2600				2600			
2700				2700				2700			
2800				2800				2800			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	TGM GROUP PTY LTD	***REFERENCE NUMBER:*** H3005	***DATE:***
PROJECT ADDRESS:	Lara, Forest Road North, Curletts Road, Osterlund Road, Windermere Road	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 34				**TEST SITE 35**				**TEST SITE 36**			
Depth mm	SOIL PROFILE	Fill	C kPa	Depth mm	SOIL PROFILE	Fill	C kPa	Depth mm	SOIL PROFILE	Fill	C kPa
100	**SILTY CLAY**			100	**SILTY CLAY dark brown**			100	**THIS TEST SITE NOT**		
200	**dark brown moist firm**			200	**CLAY**			200	**ESTABLISHED**		
300	**CLAY**			300	**red brown**			300			
400	**red brown**			400	**moist and stiff**			400			
500	**moist and stiff**		**130+**	500			**130+**	500			
600				600				600			
700				700				700			
800	**LIMESTONE**			800				800			
900	**highly weathered**			900				900			
1000				1000			**130+**	1000			
1100				1100				1100			
1200				1200				1200			
1300				1300	**LIMESTONE**			1300			
1400				1400	**highly weathered**			1400			
1500				1500				1500			
1600	**END BORE HOLE**			1600	**END BORE HOLE**			1600			
1700				1700				1700			
1800				1800				1800			
1900				1900				1900			
2000				2000				2000			
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APPENDIX vii

SITE PHOTOGRAPHS

No. 120 Forest Road North, Lara

No. 130 Forest Road North, Lara

No. 85 Curletts Road, Lara

No. 85 Curletts Road, Lara continued:

BLANK SPACE

No. 10 Osterlund Court, Lara

No. 235 Windermere Road, Lara

No. 145 Forest Road, Lara

No. 145 Forest Road, Lara continued:

No. 245 Windermere Road, Lara

No. 245 Windermere Road, Lara continued:

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No. 105 Curletts Road, Lara

No. 105 Curletts Road, Lara continued:

BLANK SPACE

No. 84 Curletts Road, Lara

No. 125 Curletts Road, Lara

No. 125 Curletts Road, Lara continued:

No. 125 Curletts Road, Lara continued:

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No. 30 Osterlund Court, Lara

No. 30 Osterlund Court, Lara continued:

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No. 95 Curletts Road, Lara

No. 95 Curletts Road, Lara continued:

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No. 20 Osterlund Court, Lara

No. 20 Osterlund Court, Lara continued:

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No. 60 Osterlund Court, Lara

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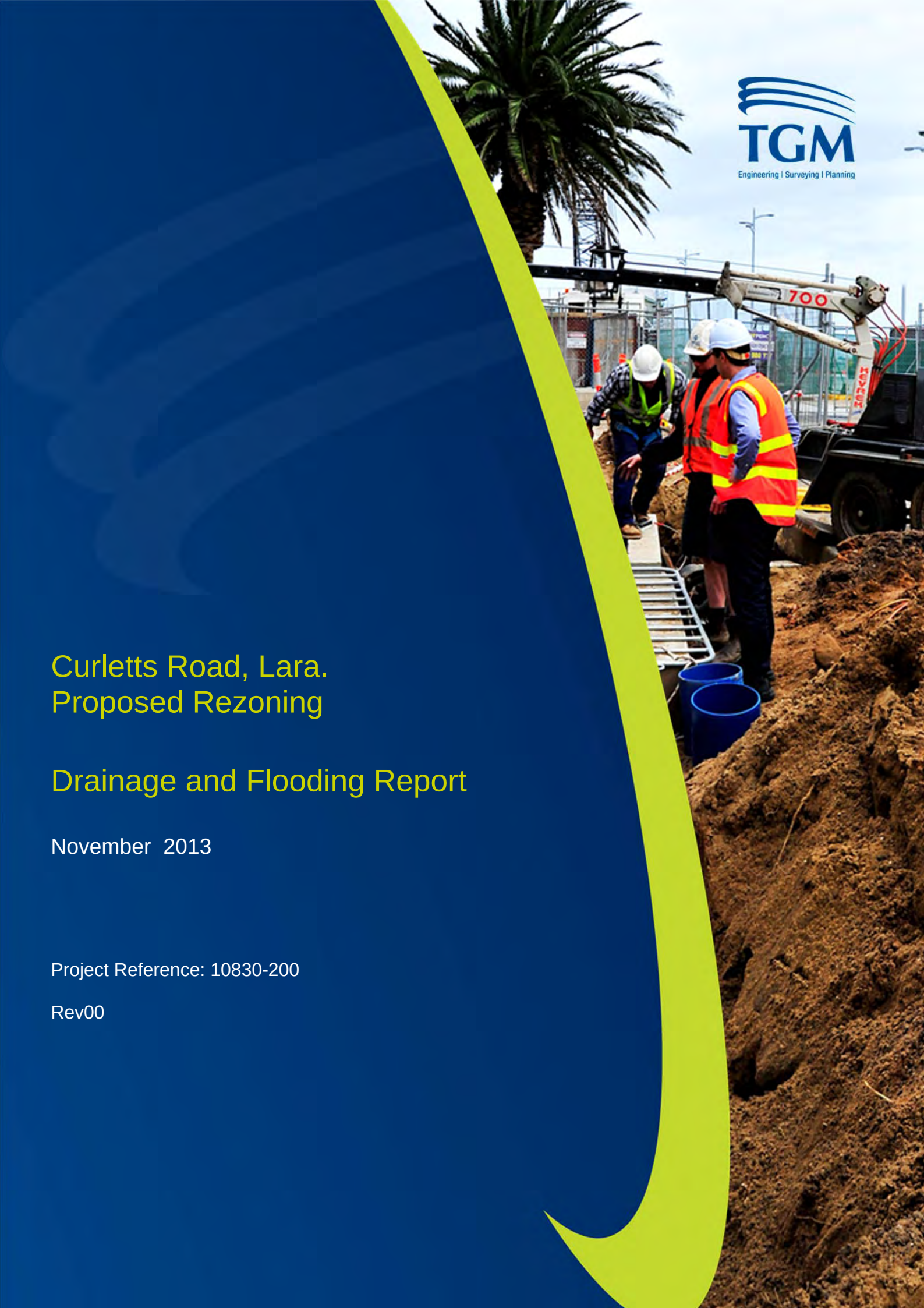
NO PHOTOS TAKEN

Attachment 6

Drainage and Flooding Report

TGM Group Pty Ltd



Curletts Road, Lara.
Proposed Rezoning

Drainage and Flooding Report

November 2013

Project Reference: 10830-200

Rev00

November 2013

Document Status

Version	Document type	Prepared by	Approved by	Date Issued
00	REPORT	Alex Wilks	C Marshall	28.2013

Project Details

Project Name:	**Curletts Road, Lara. Proposed Rezoning** **Drainage and Flooding Report**
Client	**I & W Basham & Others**
Client Project Manager	**Chris Marshall**
Report Authors	**Alex Wilks**
TGM Reference:	**10830-200**
Date:	**28th November 2013**

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1/27-31 Myers Street
Geelong, Victoria 3220
Telephone: 03 5202 4600
Facsimile: 03 5202 4691

Contents

1 Executive Summary

The land within the Forest Road, Windermere Road, Curletts Road & Osterlund Court area is proposed for rezoning and has been investigated and assessed against relative guidelines relating to subdivision within flood prone areas.

Consultation has been held with the key authorities, City of Greater Geelong and the Corangamite Catchment Management Authority to ascertain and identify areas of concern and issues due to the proximity of the subject land to Hovell Creek.

Through the assessment, it was identified that some areas were considered to be unsuitable for development. This resulted in a reduction to the land area proposed for rezoning.

The results of the investigation revealed that the proposed reduced area containing all proposed allotments were considered to be able to meet applicable policies and guidelines, therefore allowing the rezoning process to continue.

2 Introduction

The purpose of this report is to assess the flooding and drainage conditions of the land within the Forest Road, Windermere Road, Curletts Road & Osterlund Court area, as part of the rezoning application to the City of Greater Geelong. It is proposed to reduce the existing lot size to a minimum lot size of 0.4 hectares and rezone the land from Rural Living Zone to Low Density Residential Zone.

The proposed concept subdivision allows for all existing houses to be retained in one lot and proposes to create 1 – 3 additional lots per landholder utilising the existing road network. The concept does not include lots in the south and east which are subject to the Urban Floodway Zone, or the existing lots which are under 0.4 hectares and will remain the same.

During preliminary discussions with Council Officers a number of issues were raised that would be required to be addressed to enable Council's consideration of the proposal, in particular local flooding and drainage issues.

Figure 1 - Locality Plan

Figure 2 – Investigation Area

3 Background

A group of landowners have approached TGM to prepare a planning scheme amendment on their behalf for a 35 ha land parcel located in Lara, approximately 17 km North of Geelong CBD, enabling the site to be rezoned to allow the development of a low density subdivision.

4 Site Ownership

The initial site being considered for rezoning consists of 22 separate land titles currently zoned rural residential. The ownership of the site is represented by the different coloured areas, see below.

Figure 3 – Ownership Map/Initial Area

5 Investigation

The objective of the stormwater / flooding investigation for the proposed Curletts Road development is to assess the likelihood of damage to property and risk to human life and property damage from flooding generated by 100 year ARI storm events.

During the investigations of the site it was identified that it was not the discharge of storm water that would limit the future development of the area but the proximity to the Hovell Creek flood plain and localised allotment and road flooding.

Further investigation revealed that the localised flooding located around the intersection of Curletts and Osterlund Court and to Curletts Road southwards was due to the inability of the storm water to drain via the existing table drains along the roadway. This localised flooding also extended into the property at 130 Forest Road.

From the desktop study it was obvious that input from the two key authorities was identified, The City of Greater Geelong, whilst having an interest from a planning viewpoint also have a primary engineering interest in the capture and discharge of stormwater from properties and road assets to ensure appropriate public health and safety standards. Council also refer applications to the Corangamite Catchment Management Authority (CCMA) to advise on issues regarding Catchments (streams) and their flooding.

The Greater Geelong Planning Scheme (Clause 65) requires Council to consider, "the degree of flood, erosion or fire hazard associated with the location of the land and the use, development or management of the land so as to minimise any such hazard.

In the preparation of this report reference was made to "The Victorian Planning Provision Practice Note 'Applying for a Planning Permit under the Flood Provisions" to ensure that the proposed development of the subject land address issues relevant to a rezoning application.

The practice note in part provides criteria that if the response to affirmative it suggests that *"A development should be refused if it is likely to cause an unacceptable increase in flood risk in a number of situations.*

As the final concept plan area has been amended from the original proposal on one property, 120 Forest Road as this is the only property to be developed that contains some are within the Hovell Creek Floodplain and therefor the refusal criteria is only relative to this property.

See Table 1 below:

Practice Note Refusal Criteria	TGM Response / Comments
it is likely to result in danger to the life, health and safety of the occupants due to flooding of the site	The site contains a significant area above the 1% AEP flood extent which through planning controls could be used for set aside areas for structures / buildings.
it relies on low-level access to and from the site	Access to the area above the 1% AEP would be provided by a constructed causeways / access way that would be free draining underneath.
it is likely to increase the burden on emergency services and the risk to emergency personnel	It is not believed that there would be an increase in the burden on emergency services as access would not be via any areas of significant inundation and be along Forest Road, a sealed roadway.
it is likely to increase the amount of flood damage to public or private assets	No additional public assets are proposed and that private assets are to be located outside the 1% AEP. The access driveway is located along the edge of the floodway and not in an active flow area.
it is likely to raise flood levels or flow velocities to the detriment of other properties. Potentially adverse effects on upstream and downstream areas must be identified and addressed. Development should not transfer flooding problems from one location to another	The only works to be undertaken within the floodway is the construction of the access track, offset flood storage could be provided within the lot without creating any adverse effects elsewhere.
it is likely to obstruct flood flows or reduce natural flood storage. The capacity of land subject to inundation to convey and store floodwater must be maintained	The proposed access way is located along the northern edge of the floodway and not affect the conveyance of the floodwaters.
it is likely to be detrimental to natural habitats, waterway stability, water quality or sites of significance	The proposed development of the site is unlikely to be detrimental to natural habitats or water quality as its current use will be maintained.
if any subdivision, development or redevelopment is likely to increase the number of buildings located in a floodway area."	No buildings are proposed to be located within the floodway.

Table 1 – Response to Practice Note Refusal Criteria

The following flood mapping has been provided by the CCMA which indicates the extent of the flooding occurring in the 1 in 100 AEP event.

From this mapping it is clearly identified which properties and to what extent they are affected by flooding.

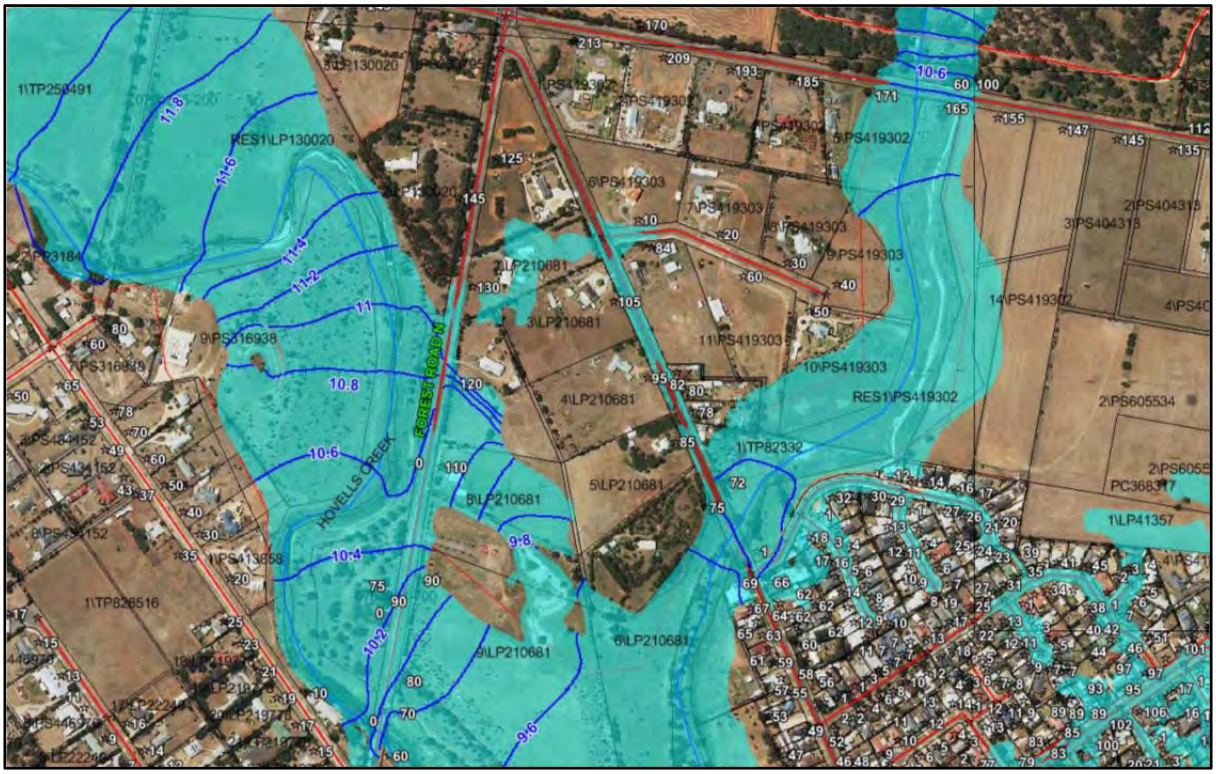

Figure 4 – Plan showing 1% AEP flood extent (shaded blue) and flood contours (blue lines and levels in AHD) – Provided by CCMA

The Corangamite Catchment Management Authority provided the following Property Flood Information:

Flood levels for the 1% Annual Exceedance Probability (AEP3) flood event under current climatic conditions have been estimated for this area. The estimated 1% flood level for the location described above ranges from 11.0 metres AHD4, at Forest Road North, and 9.6 metres AHD at the south-eastern corner of the property (Figure 1). These levels were obtained from the City of Greater Geelong Flood Study Lara Flood Study, Stage 1.

The 1% AEP flood event means that a flood of that magnitude (or greater) has a 1% chance of occurring in any given year. It is also known as the 100 year Average Recurrence Interval (ARI5) flood; however a flood of this size or greater may occur more frequently than this, and can happen more than once in any year. Please note that the 1% probability flood is the minimum standard for planning in Victoria, and is not the largest flood that could occur. There is always a possibility that a flood larger in height and extent than the 1% probability flood may occur in the future.

6 Concept Master Plan

After receiving flooding advice from Council Officer's and consideration of advice provided by the CCMA the area and the initial lots within the area of investigation for this proposal, the ownership

parcels have been reduced to include 14 owners. The lots to the south of the area that are significantly affected by flooding and several of the small land holdings have been removed from the proposed rezoning area. See figure 5 below.

Figure 5 – Revised Ownership Map

Based on this reduced area a Concept Master Plan has been developed which proposes the creation of an additional 21 allotments, 35 allotments in total as part of a low density subdivision.

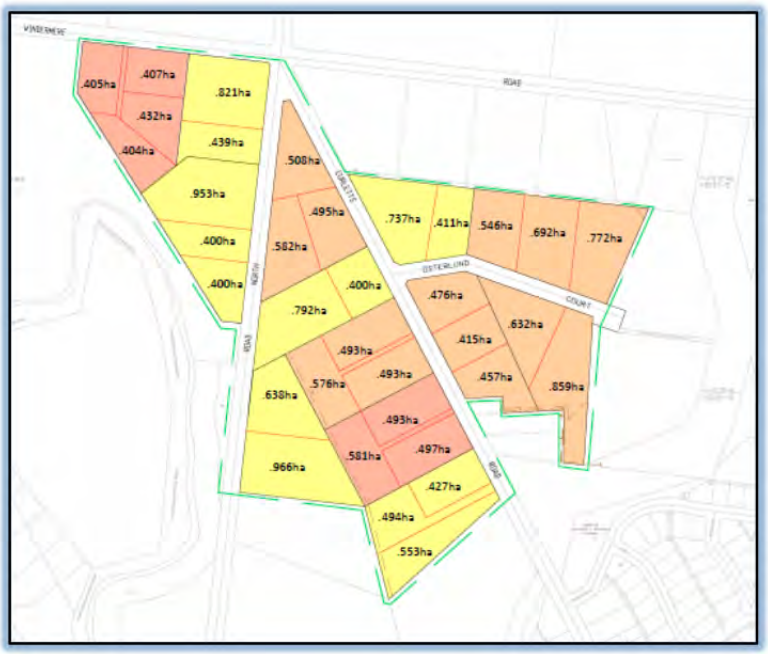

Figure 6 –Concept Master Plan

7 Conclusions

7.1 Stormwater Drainage - City of Greater Geelong

As previously mentioned the City of Greater Geelong when initially approached raised a number of issues regarding the flooding, from both storm water and Hovell Creek.

In addition Council Engineers suggested that upgrades to the road infrastructure by way kerb and channel, the additional number of additional driveways and further subdivision were also of concern.

At a subsequent meeting with Council officers to discuss the issues raised on 7 November 2012, Council Engineers advised that Hovell Creek flooding is of greater concern than the minor flooding of Curletts Road, and works within the Hovell Creek flood plain will require:

a) CCMA approval
b) Impact assessment on regional flood characteristics
c) Addressed in SWMP

At this meeting Council Officers also agreed that the flooding evident around Curletts Road and Oakland Court is a result of localised drainage issues. That the drainage of these lots could be improved by open swale drain improvements but controls/restrictions on fencing types (open wire) and vegetation to ensure the swale system can be maintained.
In regard to the need for kerb and channeling of existing roads within the proposed area, Council also advised that it would not be required and that they were willing to support the rezoning with a lower normal standard subject to controls being in place to stop further subdivision to smaller allotments (lots to be greater than 4000m^2).

As the area would be drained by open swale not kerb and channelling, to minimise number of driveways over open roadside swale, Council's officers indicated their preference for only one common driveway for each subdivided lot should be provided not additional driveways for each new allotment. This would reduce the impact on the ability of Council to maintain the open swale.

The allotments proposed to be created within 130 Forest Road and 105 Curletts Road may have areas subject to minor inundation from stormwater these areas could be drained by connection to the road side swale drains or alternatively filling of these areas may be permitted.

From an engineering viewpoint engineering controls and design can address the issues raised by Council Engineers and therefore does not compromise the application for rezoning of the area.

7.2 Hovell Creek Flooding – CCMA

Contact was made with the CCMA regarding the potential impacts of developing land that is flood prone. A copy of the responses form CCMA is attached in Appendix B.

Apart from the provision of flood maps that indicate the depth and extent of the flooding, Figures 4 & 5 the CCMA also provided a number of their Objectives and other relative guidelines that assist in the evaluation of proposals for development in flood affected areas that are relevant to the proposed Rezoning.

These objectives range from the structures affecting the floodway or storage of the floodway to site access and safety. In addition, there a number of Objectives that relate to the stream environment and health.

Reviewing the information provided by CCMA the assessment criteria that they use can be related back to the “The Victorian Planning Provision Practice Note ‘Applying for a Planning Permit under the Flood Provisions’ but provides a more quantitative method of evaluating the proposed rezoning area.

7.2.1 Site analysis vs CCMA Objectives

Reviewing each of the CCMA Objectives for the proposed lot configuration as shown in Figure 6 – Concept Master Plan, combining with the flood plan, figure 4 we can evaluate each allotment and identify any issues that may affect the Rezoning. See Figure 7 for Composite plan showing Lots and flood extents.

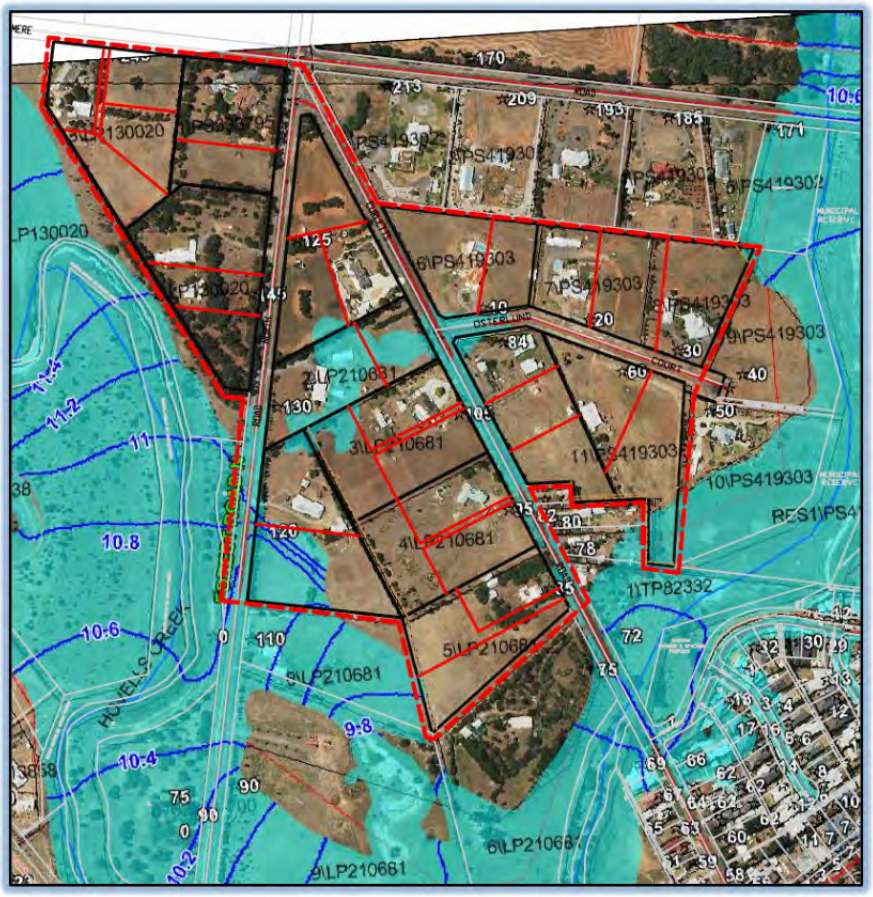

Figure 7 –Composite Lot / Flood

On reviewing the flood / composite plan, Figure 7, the properties known as 120 Forest Road, 130 Forest Road and 105 Curletts Road are all shown to be part subject to flooding.

130 Forest Road and 105 Curletts Road indicate flooding but this, as mentioned in section 7.1 is due to stormwater not associated with or within the flood plain of Hovell Creek and therefore the flooding should be considered but not in this context.

Tabulated below are TGM's assessment / comments responses to the Objectives provided by the CCMA and how they affect 120 Forest Road as this is the only property to be developed that contains some are within the Hovell Creek Floodplain.

Objectives	Target Outcome	Other Relevant Considerations
Objective 1: Flood Flow - Works or structures must not affect floodwater flow capacity Objective 2: Flood Storage - Works or structures must not reduce floodwater storage capacity	Structures should be located away from active flow areas. Causeways / access ways must not prejudice flood flow or storage requirements	Open structures, such as carports, need only meet site safety and site access requirements.
TGM Assessment / Comments	The site contains a significant area above the 1% AEP flood extent which through planning controls could be used for set aside areas for structures / buildings. Access to the area above the 1% AEP would be provided by a constructed causeways / access way that would be free draining underneath. Any loss of flood storage capacity could be provided elsewhere on the allotment.	
Objective 3: Site Safety - Development must not be allowed where the resultant depth and flow of floodwaters would create a hazard Objective 4: Site Access - Development must not be allowed where the depth and flow of floodwaters would make access or egress hazardous	Locate away from active flow areas. Access ways should be no lower than 100-year flood level. Entrance requirements for underground car parks Access to basements (e.g. car parks) must meet site safety requirements and include an entry / exit route that incorporates a continuous apex that is a minimum of 300mm above the 100-year flood level. The area between a garage and / or carport and a main building must meet site and access safety requirements. No garage, only open sided buildings and small garden sheds at natural surface if land above 100-year flood level not available.	Driveways and roads can be used as overland flow paths as long as basic safety requirements are met. Consideration should be given to guideposts along potentially submerged causeways. Mechanical mechanisms aimed at preventing inundation of basement car parks may be considered provided such mechanisms are supported by a Flood Response Plan that includes a routine test and fault fix maintenance schedule but only after the applicant has explored all other alternatives and these have been fully documented and documented and costed to the satisfaction of the Authority.
TGM Assessment / Comments	If the access way is provided along the northern side of the proposed southern lot, this is not in an active flow area, whilst the entry point to Forest Road is in an area shown as subject to flooding, again it is not in the active flow area and the depth is minimal.	

Objective 5: Flood Damage - Development must be designed to minimise the potential damage to property due to flooding	The finished floor level of garages, carports and car parks may be up to300mm below the 100-year flood level. The finished floor level of garden and other small sheds (less than 20m2) may be at natural surface if no alternative (i.e. higher ground) available The finished floor level of hay / machinery shed may be at natural surface if no alternative (i.e. higher ground) available. The finished floor level of a serviced shed (e.g. with power, offices, etc) must be a minimum of 300mm above the 100-year flood level. Extensions with a combined floor area greater than 20m2 must satisfy the above minimum floor level requirements.	
TGM Assessment / Comments	No Issues as structures will be designated to be above the 1% AEP.	
Objective 6: River Health - Development must ensure the maintenance or improvement of the stream habitat, wildlife corridors and landscape values Objective 7: Water Quality - Development must maintain or improve the quality of stormwater and catchment run-off in rural and urban areas	Environmental impacts of cut and fill proposals need to be managed carefully, particularly in relation to the excavated areas where revegetation and future management will be important issues	
TGM Assessment / Comments	Only minor earth works are proposed to address the issues listed above and would be undertaken in accordance with approved procedures	

Table 2 – Response to CCMA Criteria

8 Summary

On review of the information available and by reducing the land to be included in the proposed rezoning application it is not believed that the rezoning of the land would create any unacceptable risks as identified in the “The Victorian Planning Provision Practice Note ‘Applying for a Planning Permit under the Flood Provisions” and the objectives as provided by the CCMA. Any minor issues that may arise through the rezoning process should be able to be addressed in line with the above guidelines and objectives.

Appendix A – City of Greater Geelong

Stefanie Riches

From: Alex Wilks
Sent: Thursday, 1 November 2012 11:09 AM
To: 'Roger Harrison'
Cc: Mark Colegate; Chris Marshall
Subject: Curletts Road,
Attachments: Lara Flood Study Final Report WBM 2002.pdf.pdf

Hi Roger,

We prepared this discussion e-mail prior to you invite, was just checking the facts otherwise you would have had it earlier, it sets the scene for what we want to discuss and resolve.

Further to our conversation yesterday regarding a meeting to discussion the issues you have previously raised viz.

1. Localised flooding
2. Possible requirement to have K&C

We provide the following information as if we cannot resolve these issues it is most likely the proposal will not proceed due to the high cost to develop and little return, if any to the individual developers of the group .

1. Localised flooding

We refer to the Lara Flood Study report , Stage 1 prepared by WBM Oceanics Australia for COGG date 8/01/02, attached

The area we are interested in is referred to as Area 8A. Section 4.4.1 raises the issue of the potential for areas to be subject to localised flooding is due to insufficient local drainage.
Section 6.2 suggests that the area is suitable for development provided that local drainage improvements are undertaken. We suggest that this would be in the form of minor upgrades to the local open drainage system.

Based on this report we believe that this minor localised flooding that can be engineered out should not restrict development

2. Possible requirement to have K&C

Whilst we understand that generally for low density residential developments K&C is usually requested. In this instance we believe that it is no warranted as it is essentially LDRZ that council is supporting to retrofit and that it needs to be undertaken at a low cost whilst keeping the rural look and feel. It must be remembered the generally each owner is only going to create 2 lots, one with the existing house and be able to sell the other.

Should you have any queries, please do not hesitate to give me a call.

Regards

Alex

Alex Wilks | Infrastructure Project Engineer
Mobile 0458 365 482 • **Email** alexw@tgmgroup.com

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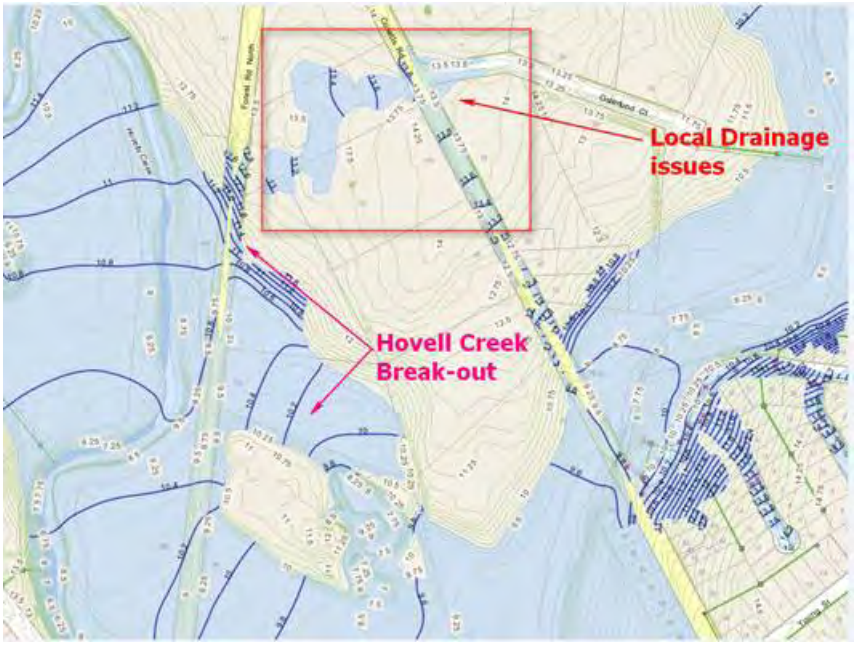
Stefanie Riches

From: Mark Colegate
Sent: Wednesday, 7 November 2012 12:34 PM
To: Alex Wilks
Subject: Meeting Notes - COGG Curletts Road meeting 7/11/12

Alex,

From the stormwater aspect, COGG have-

1. agreed that the flooding evident around Curletts Road and Oakland Crt is a result of Localised drainage issues. This will need to be addressed in the SWMP for the site.
2. Identified that the Hovell Creek flooding is of greater concern. Works within these areas will require-
    a. CCMA approval
    b. Impact assessment on regional flood characteristics
    c. Addressed in SWMP



Filling good be done within this area to reclaim flood prone land, depending on flood depths, mitigation could be designed to accommodate flood volumes and prevent worsening of flood extents. This will require a flood impact assessment to be undertaken.

Council require the latest Planning zone map for the site, identifying all the properties of the interested parties and proposed sub-development.

This comprised the concerns as per SW drainage, we will be able to formulate some options going forward.

Regards,

Mark Colegate | Project Manager
Mobile 0447 710 037 • **Email** markc@tgmgroup.com

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Stefanie Riches

From: Alex Wilks
Sent: Thursday, 28 November 2013 4:17 PM
To: Stefanie Riches
Subject: FW: Curletts Road, Lara

From: Roger Harrison [mailto:RHarrison@geelongcity.vic.gov.au]
Sent: Wednesday, 22 August 2012 9:34 AM
To: Tim Davis; Alex Wilks; James Hamilton
Cc: Graham McKenzie; Vicki Shelton; Susan Williamson
Subject: RE: Curletts Road, Lara

Hi Tim/Alex
I believe Graham has supplied a PLACES Weave schematic map of council's drainage assets and available contours. As to the request for digital contour data, CoGG is unable to provide this information. Flood modelling was carried out some time ago by BMT WBM and it is suggested that you make contact with Michael Turnley as BMT may be able to assist you in obtaining contours as requested.

As to a Stormwater Servicing Strategy for the area, I would advise that no work has been carried out on the area to produce a strategy. The general area was subdivided into RLZ-sized allotments , commencing some 34 yrs ago and the technique employed at the time by Shire of Corio was to provide a network of open swale drains to collect and direct surface flows.

Requirements generally for LDRZ with lots around the 4000 sq m size are necessarily more developed. For instance, if we look at the Wongalea Dr Lara LDRZ subdivision, (a typical LDRZ development) the roads are provided with K & C and underground drainage and are sewered by BW.

With any PS Amendment applications, particularly in difficult sites or marginal development land such as Lara, the applicant is generally required to support the proposal with a Drainage Feasibility report, a Flood Impact report and a Water Quality Impact report. Any 'Stormwater Servicing Strategy' would be 'part and parcel' of such investigations.

I trust this response will assist in the preparation of your application

Regards

Roger Harrison
Senior Planning Engineer

From: Graham McKenzie
Sent: Tuesday, 21 August 2012 2:07 PM
To: Roger Harrison
Subject: FW: Curletts Road, Lara

Roge,
Thanks for doing so at short notice. My apologies.
Graham

From: Tim Davis [mailto:timd@tgmgroup.com]
Sent: Monday, 20 August 2012 1:54 PM
To: Graham McKenzie
Cc: Alex Wilks
Subject: FW: Curletts Road, Lara

Good Afternoon Graham,

We are currently trying to make some headway with the above job and require some information from council.

Could you please provide digital contours for the area, existing drainage asset information and confirmation on councils stormwater servicing strategy at your earliest convenience.

Thanks a lot,

Should you have any queries, please do not hesitate to give me a call.

Regards

Tim Davis | Environmental Engineer
Mobile 0400852593 **Email** timd@tgmgroup.com

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From: Neil Carino
Sent: Tuesday, 7 August 2012 11:51 AM
To: gmckenzie@geelongcity.vic.gov.au
Cc: Alex Wilks
Subject: Curletts Road, Lara

Dear Graham,
Please find attached request for information of the above as per discussion with Alex Wilks.

Kind Regards,

Neil Carino | Civil Design Engineer
Mobile 0449918163 • **Email** neilc@tgmgroup.com

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Appendix B – CCMA Responses & Information

CORANGAMITE CMA

CMA Application No: F-2013-0003
Document No: 2
Your Ref: email 21/01/2013
Date: 22 January 2013

Mr Alex Wilks
TGM Group Pty Ltd
Lara, VIC 3212
alexw@tgmgroup.com

Dear Alex,

Application Number (CMA Ref): **F-2013-0003**

Property: **Street:** **Curletts Road & Forest Road North, Lara, VIC 3212**

Regarding: **Flood Advice – Proposed Rezoning and Subdivision – response to additional questions.**

Thank you for your email, received at the Corangamite Catchment Management Authority on 21 January 2013 as a follow up to our original response to a flood advice request (F-2013-0003-01) regarding confirmation on the following two points:

1. *Council has previously agreed that the flooding along Curletts Road is localised and minor works could be undertaken to alleviate flooding (130 Forest Road) does CCMA have any interest in this?*

CCMA Position: The Authority notes that a flood study has identified that this property is subject to flooding (Figure 1).

Works or structures associated with rezoning and subsequent subdivision must not reduce floodwater storage capacity. The Authority must consider, as appropriate, the effect of the development on redirecting or obstructing floodwater, stormwater or drainage water and the effect of the development on reducing flood storage and increasing flood levels and flow velocities.

The Authority must also consider the incremental long-term effects of rezoning and subdivision. While a single development may not cause a significant change, the cumulative effect of several similar developments may be substantial. Therefore the cumulative effects of modifying land levels on flood affected land must also be considered.

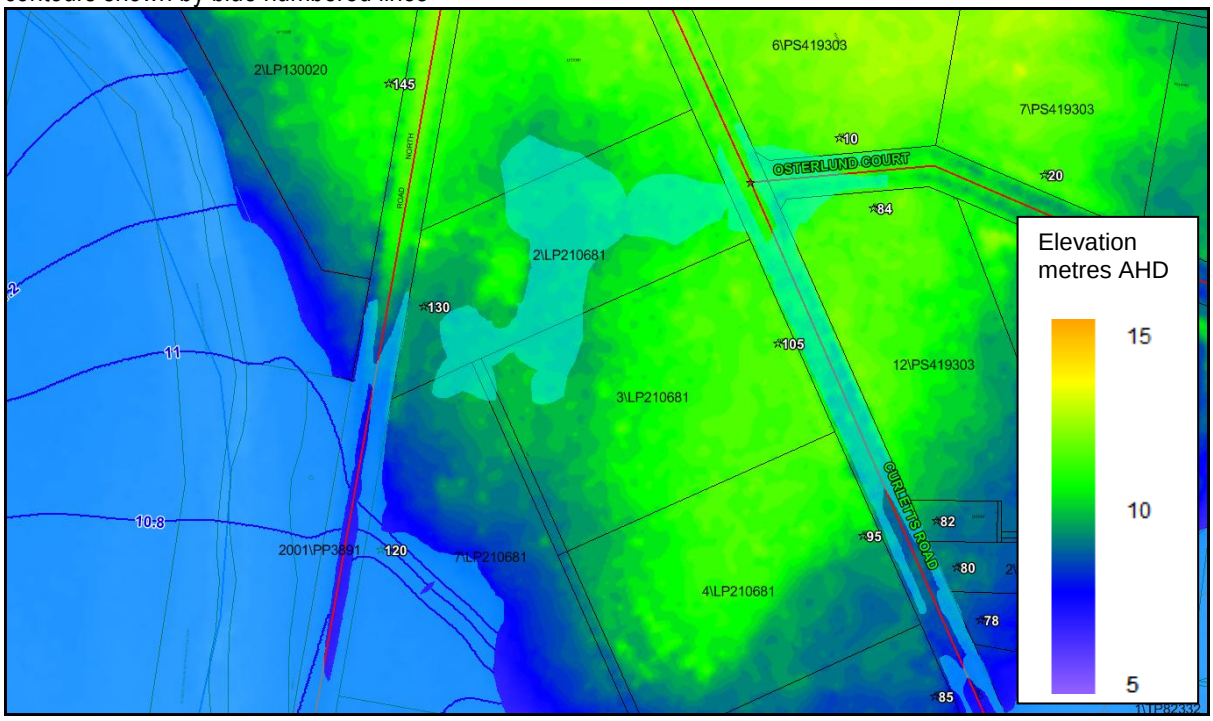
The following table summarises the Authority's position relevant to this proposal:

Table 1 – RESIDENTIAL DEVELOPMENT

Objective	Requirements	Other Relevant Considerations
Objective 1: Flood Flow - Works or structures must not affect floodwater flow capacity Objective 2: Flood Storage - Works or structures must not reduce	New buildings must be located outside the active flow area.	Afflux at adjacent property boundaries must be 0mm or less and change in velocity at site must be 0m/s or less. Cut-fill balance of 1.3:1.0 required unless flood study

floodwater storage capacity		demonstrates otherwise and cut area must be fully active during a flood. Long term cumulative impacts. Type and alignment of fences. Site drainage.
Objective 3: Site Safety - Development must not be allowed where the resultant depth and flow of floodwaters would create a hazard Objective 4: Site Access - Development must not be allowed where the depth and flow of floodwaters would make access or egress hazardous	In general and with regard for proposed development type and use, approval is unlikely if along the access route and at site: depth > 0.3m or velocity > 1.5m/s or v x d > 0.3m^2/s	Acceptable flood hazard for proposed use.
Objective 5: River Health - Development must ensure the maintenance or improvement of the stream habitat, wildlife corridors and landscape values Objective 6: Water Quality - Development must maintain or improve the quality of stormwater and catchment run-off in rural and urban areas	Environmental impacts of cut and fill proposals need to be considered carefully, particularly in relation to the excavated areas where revegetation and future management will be important issues.	

Figure 1 – Subject area showing 1% AEP flood extent (blue shading) over Digital Elevation Model. Flood level contours shown by blue numbered lines



2. *110 Forest Road has high land to the rear of the property; can fill be place along the northern boundary of this property to create a driveway above the fill level?*

CCMA Position: The Authority must consider, as appropriate, the danger to the occupants of the development, other floodplain residents and emergency personnel if the site or access way is flooded.

A development should be refused if it relies on low-level access to and from the site and / or it is likely to increase the burden on emergency services and the risk to emergency personnel (see objective 4 in table 1 above).

Development must not be allowed where the depth and flow of floodwaters would make access or egress hazardous. People trying to enter or leave a property during a flood should not be endangered by deep or fast-flowing water. This objective considers the driveways, roads and footpaths that link a property to a refuge area and aims to safeguard emergency workers as well as residents and visitors.

Raised roads are not appropriate on floodway land in view of their potential for obstruction of flood flows or transfer flooding problems from one location to another.

The following table summarises the Authority's position relevant to this proposal:

Table 2 - VEHICLE RELATED STRUCTURES

e.g. Carports, Garages, Driveways, Parking Areas, Access ways

Objectives	Target Outcome	Other Relevant Considerations
Objective 1: Flood Flow - Works or structures must not affect floodwater flow capacity Objective 2: Flood Storage - Works or structures must not reduce floodwater storage capacity	Structures should be located away from active flow areas. Causeways / access ways must not prejudice flood flow or storage requirements	Open structures, such as carports, need only meet site safety and site access requirements.
Objective 3: Site Safety - Development must not be allowed where the resultant depth and flow of floodwaters would create a hazard Objective 4: Site Access - Development must not be allowed where the depth and flow of floodwaters would make access or egress hazardous	Locate away from active flow areas. Access ways should be no lower than 100-year flood level. Entrance requirements for underground car parks Access to basements (e.g. car parks) must meet site safety requirements and include an entry / exit route that incorporates a continuous apex that is a minimum of 300mm above the 100-year flood level. The area between a garage and / or carport and a main building must meet site and access safety requirements. No garage, only open sided buildings and small garden sheds at natural surface if land above 100-year flood level not available.	Driveways and roads can be used as overland flow paths as long as basic safety requirements are met. Consideration should be given to guideposts along potentially submerged causeways. Mechanical mechanisms aimed at preventing inundation of basement car parks may be considered provided such mechanisms are supported by a Flood Response Plan that includes a routine test and fault fix maintenance schedule but only after the applicant has explored all other alternatives and these have been fully documented and documented and costed to the satisfaction of the Authority.
Objective 5: Flood Damage - Development must be designed to	The finished floor level of garages, carports and car parks may be up to	

minimise the potential damage to property due to flooding	300mm below the 100-year flood level. The finished floor level of garden and other small sheds (less than 20m^2) may be at natural surface if no alternative (i.e. higher ground) available The finished floor level of hay / machinery shed may be at natural surface if no alternative (i.e. higher ground) available. The finished floor level of a serviced shed (e.g. with power, offices, etc) must be a minimum of 300mm above the 100-year flood level. Extensions with a combined floor area greater than 20m^2 must satisfy the above minimum floor level requirements.	
Objective 6: River Health - Development must ensure the maintenance or improvement of the stream habitat, wildlife corridors and landscape values Objective 7: Water Quality - Development must maintain or improve the quality of stormwater and catchment run-off in rural and urban areas	Environmental impacts of cut and fill proposals need to be managed carefully, particularly in relation to the excavated areas where revegetation and future management will be important issues.	

A large multi-lot or staged sub-division in a new development area such as proposed, will require all new lots be created entirely outside the 1% AEP flood extent unless it can be demonstrated (with a detailed 2-dimensional flood study) that no off site afflux (of depth, velocity and depth x velocity) occurs to the satisfaction of the Authority. Appropriate floodplain storage offsets will be required and will be determined once a proposal has been submitted for assessment based on the proposed development layout. This information will be required prior to the Authority supporting a planning permit application.

Guidance on making an application for a planning permit where flooding is a consideration and an explanation of how such an application will be assessed (in effect an explanation of how the decision guidelines are applied) is provided in the VPP Practice Note "Applying for a Planning Permit under the Flood Provisions - A Guide for Councils, Referral Authorities and Applicants". A second practice note ("Applying the Flood Provisions in Planning Schemes – A Guide for Councils" provides guidance about applying the flood provisions in planning schemes.

A copy of the Practice Notes can be downloaded from the Department of Planning and Community Development website (www.dpcd.vic.gov.au) by following the links to Planning > Publications & Research > Practice and Advisory Notes (or by clicking the links below).

- PN11: Applying for a planning permit under the flood provisions - a guide for councils, referral authorities and applicants, August 2000 (PDF - 182 KB)
- PN12: Applying the flood provisions in planning schemes - a guide for councils, November 2012 (PDF - 1 MB)

Please note: The Corangamite CMA has provided this advice as preliminary information only. The Authority can provide further information regarding any proposed development of the property in response to a planning permit application referred by the Greater Geelong City in accordance with the Planning and Environment Act 1987.

This document contains flood level **advice only** and does not constitute approval or otherwise of any development at this location. The Authority recommends you seek further advice from the Greater Geelong City.

Should you have any queries, please do not hesitate to contact Geoff Taylor, on (03) 5232 9100 or floodinfo@ccma.vic.gov.au. To assist the CMA in handling any enquiries please quote **F-2013-0003** in your correspondence with us.

Yours sincerely,

Dr Geoff Taylor
Floodplain Statutory Manager

Cc: City of Greater Geelong Richard Wojnarowski rwojnarowski@geelongcity.vic.gov.au

The information contained in this correspondence is subject to the disclaimers and definitions attached.

Definitions and Disclaimers

1. The area referred to in this letter as the 'proposed development location' is the land parcel(s) that, according to the Authority's assessment, most closely represent(s) the location identified by the applicant. The identification of the 'proposed development location' on the Authority's GIS has been done in good faith and in accordance with the information given to the Authority by the applicant(s) and/or Ballarat City Shire Council.

2. While every endeavour has been made by the Authority to identify the proposed development location on its GIS using VicMap Parcel and Address data, the Authority accepts no responsibility for or makes no warranty with regard to the accuracy or naming of this proposed development location according to its official land title description.

3. **AEP** as Annual Exceedance Probability – is the likelihood of occurrence of a flood of given size or larger occurring in any one year. AEP is expressed as a percentage (%) risk and may be expressed as the reciprocal of ARI (Average Recurrence Interval).

   Please note that the 1% probability flood is not the probable maximum flood (PMF). There is always a possibility that a flood larger in height and extent than the 1% probability flood may occur in the future.

4. **AHD** as Australian Height Datum - is the adopted national height datum that generally relates to height above mean sea level. Elevation is in metres.

5. **ARI** as Average Recurrence Interval - is the likelihood of occurrence, expressed in terms of the long-term average number of years, between flood events as large as or larger than the design flood event. For example, floods with a discharge as large as or larger than the 100 year ARI flood will occur on average once every 100 years.

6. **LiDAR** (**L**ight **D**etection **A**nd **R**anging) is an optical remote sensing technology which measures the height of the ground surface using pulses from a laser. LIDAR can be used to create a topographical map of the land and highly detailed and accurate models of the land surface.

7. No warranty is made as to the accuracy or liability of any studies, estimates, calculations, opinions, conclusions, recommendations (which may change without notice) or other information contained in this letter and, to the maximum extent permitted by law, the Authority disclaims all liability and responsibility for any direct or indirect loss or damage which may be suffered by any recipient or other person through relying on anything contained in or omitted from this letter.

8. This letter has been prepared for the sole use by the party to whom it is addressed and no responsibility is accepted by the Authority with regard to any third party use of the whole or of any part of its contents. Neither the whole nor any part of this letter or any reference thereto may be included in any document, circular or statement without the Authority's written approval of the form and context in which it would appear.

9. The flood information provided represents the best estimates based on currently available information. This information is subject to change as new information becomes available and as further studies are carried out.

References

Appendix J of *Floodplain Management in Australia Best Practice Principles and Guidelines* (SCARM Report 73, CSIRO Publishing 2000) http://www.publish.csiro.au/Books/download.cfm?ID=2260

Guidelines for Development in Flood-prone areas. Melbourne Water 2007
http://www.melbournewater.com.au/content/planning_and_building/information_for_developers/guidelines_for_developers.asp?bhcp=1

CORANGAMITE CMA

CMA Application No: F-2013-0003
Document No: 1
Your Ref: email 13/12/2012
Date: 18 January 2013

Mr Alex Wilks
TGM Group Pty Ltd
Lara, VIC 3212
alexw@tgmgroup.com

Dear Alex,

Application Number (CMA Ref): F-2013-0003

Property: Street: Curletts Road & Forest Road North, Lara, VIC 3212

Regarding: Flood Advice – Proposed Rezoning and Subdivision

Thank you for your enquiry, received at the Corangamite Catchment Management Authority on 13 December 2012.

Decision guidelines

Clause 65 of the planning scheme extends the consideration of flood issues to all planning permit applications regardless of whether the site is affected by a flood zone or overlay. Clause 65 requires that for the approval of an application or plan, the council must consider, among other things, the degree of flood risk associated with the location of the land and the use, development or management of the land so as to minimise flood risk.

In addition to clause 65, the flood zone and overlays contain their own decision guidelines that the council must consider when assessing an application. The LSIO and SBO contain more detailed decision guidelines in the absence of the requirement for a flood risk report.

The Victorian Planning Provision Practice Note '*Applying for a Planning Permit under the Flood Provisions – a guide for councils, referral authorities and applicants*' requires consideration of the following:

- Residential, commercial and industrial buildings are not generally an appropriate development on floodway land in view of their potential for obstruction of flood flows
- A development should be refused if it is likely to cause an unacceptable increase in flood risk in the following situations:
  - it is likely to result in danger to the life, health and safety of the occupants due to flooding of the site
  - it relies on low-level access to and from the site
  - it is likely to increase the burden on emergency services and the risk to emergency personnel
  - it is likely to increase the amount of flood damage to public or private assets
  - it is likely to raise flood levels or flow velocities to the detriment of other properties. Potentially adverse effects on upstream and downstream areas must be identified and addressed. Development should not transfer flooding problems from one location to another
  - it is likely to obstruct flood flows or reduce natural flood storage. The capacity of land subject to inundation to convey and store floodwater must be maintained
  - it is likely to be detrimental to natural habitats, waterway stability, water quality or sites of significance
  - if any subdivision, development or redevelopment is likely to increase the number of buildings located in a floodway area.

A copy of the Practice Notes can be downloaded from the Department of Planning and Community Development website (www.dpcd.vic.gov.au) by following the links to Planning > Publications & Research > Practice and Advisory Notes (or by clicking the links below).

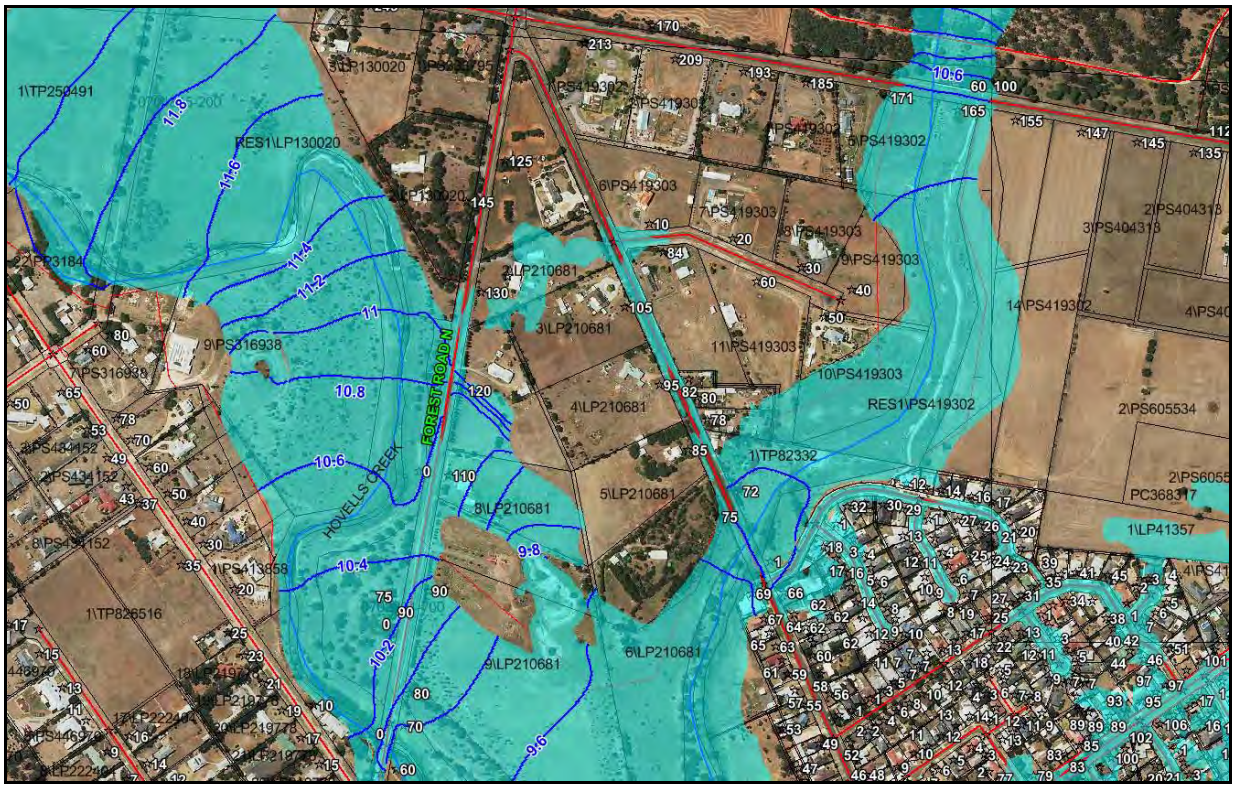
- PN11: Applying for a planning permit under the flood provisions - a guide for councils, referral authorities and applicants, August 2000 (PDF - 182 KB)
- PN12: Applying the flood provisions in planning schemes - a guide for councils, August 2000 (PDF - 2.2 MB)
- PN53: Managing coastal hazards and the coastal impacts of climate change, July 2012 (PDF - 686 KB)

Property Flood Information

Flood levels for the 1% Annual Exceedance Probability (AEP[3]) flood event under current climatic conditions have been estimated for this area. The estimated 1% flood level for the location described above ranges from 11.0 metres AHD[4], at Forest Road North, and 9.6 metres AHD at the south-eastern corner of the property (Figure 1). These levels were obtained from the City of Greater Geelong Flood Study Lara Flood Study, Stage 1.

The 1% AEP flood event means that a flood of that magnitude (or greater) has a 1% chance of occurring in any given year. It is also known as the 100 year Average Recurrence Interval (ARI[5]) flood; however a flood of this size or greater may occur more frequently than this, and can happen more than once in any year. Please note that the 1% probability flood is the minimum standard for planning in Victoria, and is not the largest flood that could occur. There is always a possibility that a flood larger in height and extent than the 1% probability flood may occur in the future.

Figure 1- Plan showing 1% AEP flood extent (shaded blue) and flood contours (blue lines and levels in AHD).



Impact during 1% flood under current climatic conditions

The Authority advises that in the event of a 1% AEP flood under current climatic conditions it is likely that a portion of the property would be subject to inundation from Hovells Creek and local drainage. Flood depth over the property is likely to range from 0.00 metres to in excess of 2.00 metres under current climatic conditions.

Flood Hazard Guidelines

Analysis of flood hazard is used to determine if it is safe for people and vehicles leaving a property during a flood event. Inappropriate development is likely to increase the burden on emergency services and personnel if an emergency evacuation is required due to illness, injury, inadequate preparation or loss of essential services. It should be noted that the relative evacuation time does not decrease the flood hazard.

Developments should not occur where the depth and flow of floodwater on a property will be hazardous. Safety is defined in terms of the depth, velocity and the product of depth multiplied by velocity as follows:

- depth should be no more than 0.35 metres; and
- velocity should be no more than 1.5m/s; and
- the product of depth multiplied by velocity should not exceed 0.35m^2 per second.

The most important on site considerations are:

- building entrance/exit points and their surrounds
- connecting routes to outbuildings or car parking areas
- connecting routes to higher ground

The depth of flooding on these lots range between low to extreme hazard based on hazard assessment from Melbourne Water Guidelines, and in Appendix J of *Floodplain Management in Australia Best Practice Principles and Guidelines* (SCARM Report 73, CSIRO Publishing 2000).

Summary

The proposed rezoning and/or subdivision must take all of the above guidelines into account. It is noted that you question the accuracy of the Lara Flood Study, from which the current flooding information has been obtained and which will be used to assess future proposals.

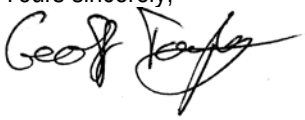
The Authority does not have any further information on which to base this advice and advises that in order to vary any of the findings of this study, computations will have to be carried out by a suitably qualified hydrologic/hydraulic engineer/professional and submitted to the Corangamite CMA and City of Greater Geelong for appraisal.

Please note: The Corangamite CMA has provided this advice as preliminary information only. The Authority can provide further information regarding any proposed development of the property in response to a planning permit application referred by the Greater Geelong City in accordance with the Planning and Environment Act 1987.

This document contains flood level advice only and does not constitute approval or otherwise of any development at this location. The Authority recommends you seek further advice from the Greater Geelong City.

Should you have any queries, please do not hesitate to contact Geoff Taylor, on (03) 5232 9100 or floodinfo@ccma.vic.gov.au. To assist the CMA in handling any enquiries please quote F-2013-0003 in your correspondence with us.

Yours sincerely,



Dr Geoff Taylor
Floodplain Statutory Manager

Cc: City of Greater Geelong - Richard Wojnarowski rwojnarowski@geelongcity.vic.gov.au

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http://www.melbournewater.com.au/content/planning_and_building/information_for_developers/guidelines_for_developers.asp?bhcp=1

Attachment 7

Amendment Documents

Planning and Environment Act 1987

GREATER GEELONG PLANNING SCHEME

AMENDMENT C**

EXPLANATORY REPORT

Who is the planning authority?

This amendment has been prepared by the City of Greater Geelong, who is the planning authority for this Amendment.

The amendment has been made at the request of TGM Group Pty Ltd on behalf of multiple landowners.

Land affected by the amendment

The amendment applies to approximately 25 hectares of land to the south of Windermere Road, Lara. The land is identified as:

- 120 Forest Road North, Lara (Lot 7, LP210681R)
- 130 Forest Road North, Lara (Lot 2, PS210681R)
- 235 Windermere Road, Lara (Lot 1, PS333795)
- 245 Windermere Road, Lara (Lot 3, LP130020)
- 84 Curletts Road, Lara (Lot 12, PS419303W)
- 85 Curletts Road, Lara (Lot 5, PS210681R)
- 95 Curletts Road, Lara (Lot 4, PS210681R)
- 105 Curletts Road, Lara (Lot 3, PS210681R)
- 125 Curletts Road, Lara (Lot 1, PS210681R)
- 145 Forest Road North, Lara (Lot 2, LP130020)
- 10 Osterlund Court, Lara (Lot 6, PS419303W)
- 20 Osterlund Court, Lara (Lot 7, PS419303W)
- 30 Osterlund Court, Lara (Lot 8, PS419303W)
- 60 Osterlund Court, Lara (Lot 11, PS419303W)

What the amendment does

The amendment proposes to rezone the land from Rural Living Zone to Low Density Residential Zone. More specifically, the amendment will:

- Rezone the land from the Rural Living Zone to the Low Density Residential Zone.
- Apply a Schedule to the Development Plan Overlay.

Strategic assessment of the amendment

- **Why is the amendment required?**

The amendment is required to facilitate low density residential growth in accordance with Clause 21.13-4 the Lara Structure Plan Map.

The approved 2011 Lara Structure Plan nominates the area known as Curletts Road Area (area west of Serendip Creek) to be rezoned from Rural Living Zone to the Low Density Residential Zone with an accompanying Development Plan Overlay or an approved subdivision layout.

- **How does the amendment implement the objectives of planning in Victoria?**

The proposed amendment aims to facilitate the rezoning of land within Lara's Settlement Boundary for low density residential purposes, which is consistent with the objectives of planning in Victoria in the following aspects:

Ensures that the planning and future subdivision of the land is subject to an orderly process through the introduction of the Low Density Residential Zone.

Facilitates the orderly development of land for low density residential purposes as identified in the approved Lara Structure Plan 2011 and Clause 21.13 Lara of the Greater Geelong Planning Scheme.

Continues to maintain the rural surrounds of Lara.

How does the amendment address any environmental, social and economic effects?

Environmental Effects

The findings of the land capability assessment demonstrates that the land is capable of managing sewerage within each lot without any broader environmental impacts.

The proposed zone will limit the number of residential allotments to avoid environmental impacts from potential flooding and drainage issues and enables the maintenance of the rural landscapes of Lara.

Social and Economic Effects

Lara has historically provided larger residential lots in the Geelong region and therefore it is considered that low density residential lots will add to the current supply and contribute to meeting the demands for larger lot sizes in Lara within close proximity to the town centre, community and recreation facilities, primary and secondary schools and public transport.

- **Does the amendment address relevant bushfire risk?**

The land is not subject to the Bush Fire Management Overlay. It is also understood that bush fire risk is reduced with the introduction of additional housing lots.

- **Does the amendment comply with the requirements of any Minister's Direction applicable to the amendment?**

The amendment is consistent with the Ministerial Direction regarding the form and content of Planning Schemes under section 7(5) of the Act and Ministerial Direction No. 11 – Strategic Assessment of Amendments. The Amendment is not affected by any other Ministerial Direction.

- **How does the amendment support or implement the State Planning Policy Framework and any adopted State policy?**

The proposal is consistent with the intent of the State Planning Policy Framework (SPPF) and supports its implementation by:

- To ensure ongoing land supply supported by infrastructure (Clause 11.02-1);
- Limiting the impact of urban development on non-urban areas by allowing development within a designated township boundary (Clause 11.02-2);
- Ensure housing developments are integrated with infrastructure and services, whether they are located in existing suburbs, growth areas or regional towns (Clause 16.01-1);

- **How does the amendment support or implement the Local Planning Policy Framework, and specifically the Municipal Strategic Statement?**

The amendment is consistent with the Local Planning Policy Framework including:

21.06 Settlement and Housing

21.06-2 Urban growth – This policy seeks to retain development within defined urban growth areas and provide a mix of housing suited to the needs of a diverse range of household types.

21.06-3 Urban consolidation – This policy seeks to encourage urban consolidation and encourage a range of development densities.

21.06-4 Neighbourhood character – This policy seeks to ensure development appropriately responds to the existing character of the area.

21.08 Development and Community Infrastructure

21.08 Development and community infrastructure – This policy recognises the need to provide for the efficient use of services and conservation of water.

21.08-5 Accessibility – The policy recognises the need to facilitate the development of access opportunities for all members of the community.

- **Does the amendment make proper use of the Victoria Planning Provisions?**

The amendment is consistent with the objectives of planning in Victoria as it will provide a more efficient use of residential land and facilitate orderly low density residential use and development of land within the urban growth boundary of Lara.

- **How does the amendment address the views of any relevant agency?**

The amendment accords with the 2011 Lara Structure which was subject to notice and referral both at the draft stage and during Planning Scheme Amendment C198.

- **Does the amendment address relevant requirements of the Transport Integration Act 2010?**

The amendment is unlikely to have any significant impact on the transport system as defined in Section 3 of the Transport Integration Act 2010.

Resource and administrative costs

- **What impact will the new planning provisions have on the resource and administrative costs of the responsible authority?**

The amendment is not expected to place any substantial resource or administrative cost burden on the responsible authority as it represents an expected strategic planning outcome for this land.

Where you may inspect this Amendment

The amendment is available for public inspection, free of charge, during office hours at the following places:

Greater Geelong City Council.

Customer Service Centre

Ground Floor, 131 Myers Street, Geelong

Or online at www.geelongcity.vic.gov.au

The amendment can also be inspected free of charge at the Department of Planning and Community Development website at www.dpcd.vic.gov.au/planning/publicinspection.

Planning and Environment Act 1987

GREATER GEELONG PLANNING SCHEME

AMENDMENT C…….

INSTRUCTION SHEET

The planning authority for this amendment is the Minister for Planning.

The Greater Geelong Planning Scheme is amended as follows:

Planning Scheme Maps

The Planning Scheme Maps are amended by a total of 1 attached map.

Zoning Maps

1. Planning Scheme Map No.18 is amended in the manner shown on the attached map marked "Greater Geelong Planning Scheme, Amendment C……".

Overlay Maps

2. Insert new Planning Scheme Map No.18DPO in the form of the 1 attached map marked "Greater Geelong Planning Scheme, Amendment C….".

Planning Scheme Ordinance

3. In Overlays – Clause 43.04, insert a new Schedule …. In the form of the attached document.

4. In General Provisions – Clause 61.03, replace the schedule with a new Schedule in the form of the attached document.

End of document

--/--/20--
C

SCHEDULE XX TO THE DEVELOPMENT PLAN OVERLAY

Shown on the planning scheme map as **DPO XX**

Low Density Subdivision of Multiple Land Parcels West of Serendip Creek

This schedule applies to land in the Low Density Residential Zone, west of Serendip Creek.

The objective of this schedule aims to facilitate low density residential subdivision in a manner that continues to maintain the existing rural living landscape in general accordance with the indicative subdivision concept plan attached to the schedule.

1.0 Requirements for Subdivision

The subdivision of the land must be undertaken generally in accordance with the attached indicative plan of subdivision including:

- No more than a total of 21 additional lots for the entire area; and

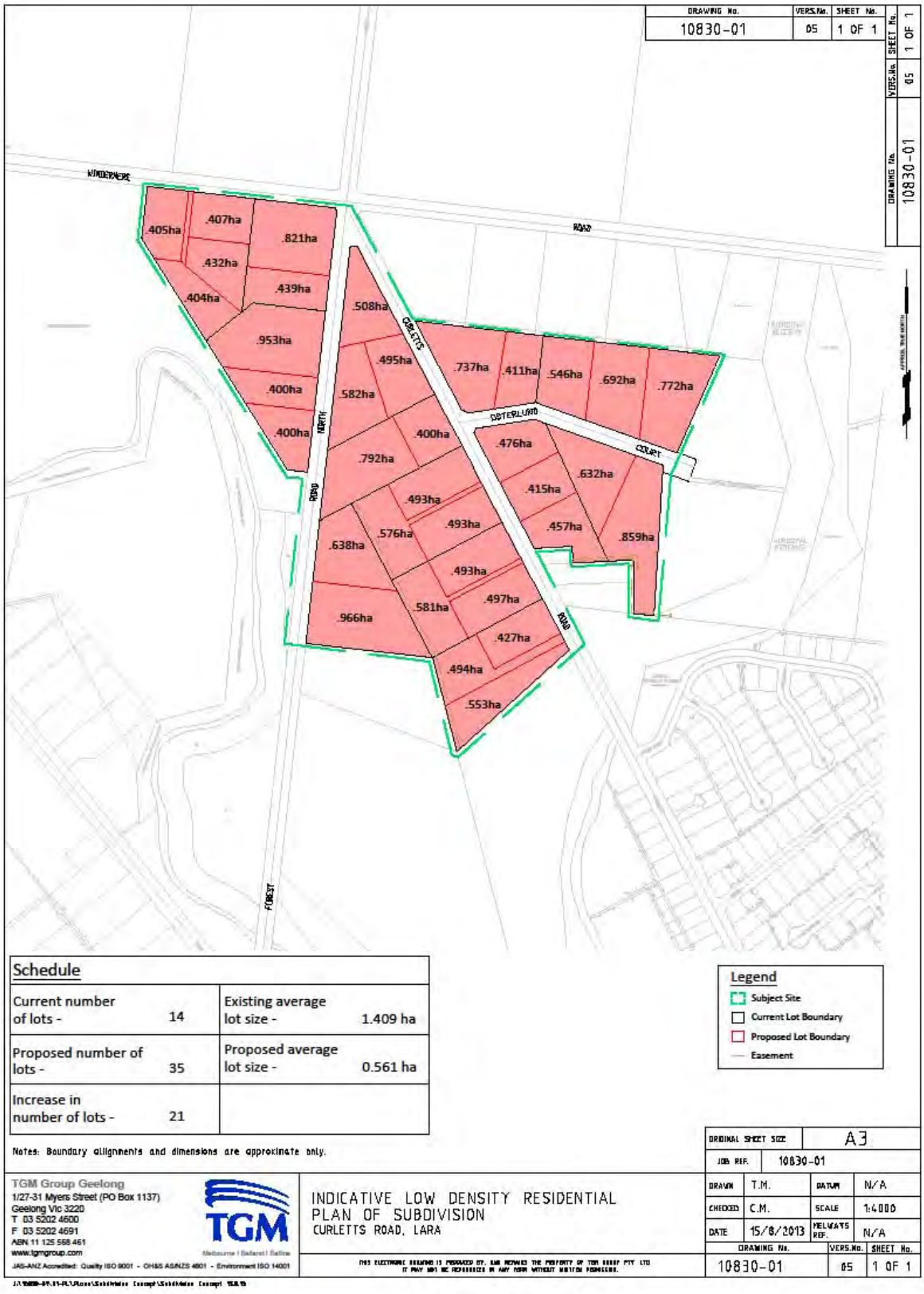
- The location of all uses proposed within each lot including:

  - The proposed development area;
  - The effluent field size and location;
  - Setbacks and landscaping; and
  - Vehicle access points.

The overall lot design and location of proposed uses must continue to maintain the existing rural living edge of Lara.

Each new lot created must be fenced using farm style post and wire fencing.

Forest Road, Windermere Road, Curletts Road & Osterlund Court, Lara



Schedule			
Current number of lots -	14	Existing average lot size -	1.409 ha
Proposed number of lots -	35	Proposed average lot size -	0.561 ha
Increase in number of lots -	21		

Notes: Boundary alignments and dimensions are approximate only.

TGM Group Geelong
1/27-31 Myers Street (PO Box 1137)
Geelong Vic 3220
T 03 5202 4600
F 03 5202 4691
ABN 11 125 568 461
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JAS-ANZ Accredited: Quality ISO 9001 - OH&S AS/NZS 4801 - Environment ISO 14001

INDICATIVE LOW DENSITY RESIDENTIAL
PLAN OF SUBDIVISION
CURLETTS ROAD, LARA

ORIGINAL SHEET SIZE	A3		
JOB REF.	10830-01		
DRAWN	T.M.	DATUM	N/A
CHECKED	C.M.	SCALE	1:4000
DATE	15/8/2013	HELWAYS REF.	N/A
DRAWING No.		VERS.No.	SHEET No.
10830-01		05	1 OF 1