




## WATER SENSITIVE URBAN DESIGN MASTER PLAN

### RESIDENTIAL SUBDIVISION REMEMBRANCE DRIVE, CARDIGAN

Planning and Environment Act 1987  
BALLARAT PLANNING SCHEME  
DEVELOPMENT PLAN OVERLAY  
Development Plan Schedule No.....6.....  
Signed........  
Authorised Officer for and on behalf of the  
CITY OF BALLARAT  
DATE.....8/05/2013.....

Prepared for  
Bricland Nominees  
Attention: Alistair Gull

Document Reference  
630-01

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This investigation and report has been authorised by Mr Chris Coughlan, the Director of Coughlan Civil Pty Ltd.

Chris Coughlan BEng (Civil), MIEAust



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## 1. INTRODUCTION

This Stormwater Strategy (SS) has been prepared for a proposed residential development at the property of Remembrance Drive, Cardigan, known as Lot 1 and Lot 2, TP740513, Parish of Windermere. The SS will investigate the effects the development will have on stormwater quality and quantity.

The objective of the SS is to ensure that there are no adverse impacts on the receiving waterways during construction and operational phases of the development. The SS will also assist in reducing the post-development flows to approximate pre-development conditions.

## 2. SITE AND SURROUNDS

The topography of the site and surrounding area is generally flat with some minor peaks and troughs and is approximately 80 hectares in area. Refer to Appendix A for site survey and topography.

The site is located within the limits of the City of Ballarat Council region. The area surrounding the site is a mixture of farming and residential land. Refer to Figure 1 below for a locality plan.



Figure 1 – Locality Plan

## 3. PROPOSED DEVELOPMENT

The development will consist of the creation of 130 residential lots and construction of associated infrastructure such as roads, drainage, sewer and other services. Refer to Appendix D for a layout plan of the development.

#### 4. EXISTING STORMWATER DRAINAGE

A declared waterway is situated on the subject site (refer to Appendix B). However, this waterway originates on the site and as such, the flow in this waterway is not expected to be significant. Once a Planning Permit is issued, engineering design is to be completed for the development and submitted to Council for approval. That design is to be completed in accordance with Ballarat City Council design standards and policies, which requires that stormwater flows generated from a storm of 10 year Average Recurrence Interval (ARI) are contained within underground pipes and flows generated from larger storm events shall follow designated overland flow paths in either a road or drainage reserve. The Infrastructure Design Manual (IDM), a standardised engineering design document adopted by Council, requires that the floor level of buildings shall be a minimum 300mm above the 100 year ARI flood level. In regards to stormwater detention, Council's Stormwater Management Policy currently overrides the requirements in the IDM and stipulates that stormwater detention is required for a 10 year ARI storm event and post-development flows are to be reduced to pre-development 10 year ARI conditions.

From site inspections, an existing culvert has been constructed adjacent to the development site across Remembrance Drive. The culvert conveys flows from the existing table drain on the south side of Remembrance Road to a table drain on the northern side. A swale on the northern side of Remembrance Drive runs through private property and into an existing creek, which is a tributary to the Burrumbeet Creek. It is considered that the existing culvert crossing Remembrance Drive be the nominated point of discharge. However, it should be noted that site survey indicates only 200mm-300mm of natural fall from the lowest point of the development site to the existing culvert. In order to drain the site, some fill may be required in the low lying areas of the development site. Refer to Figure 3 below for a plan of the existing stormwater drainage.

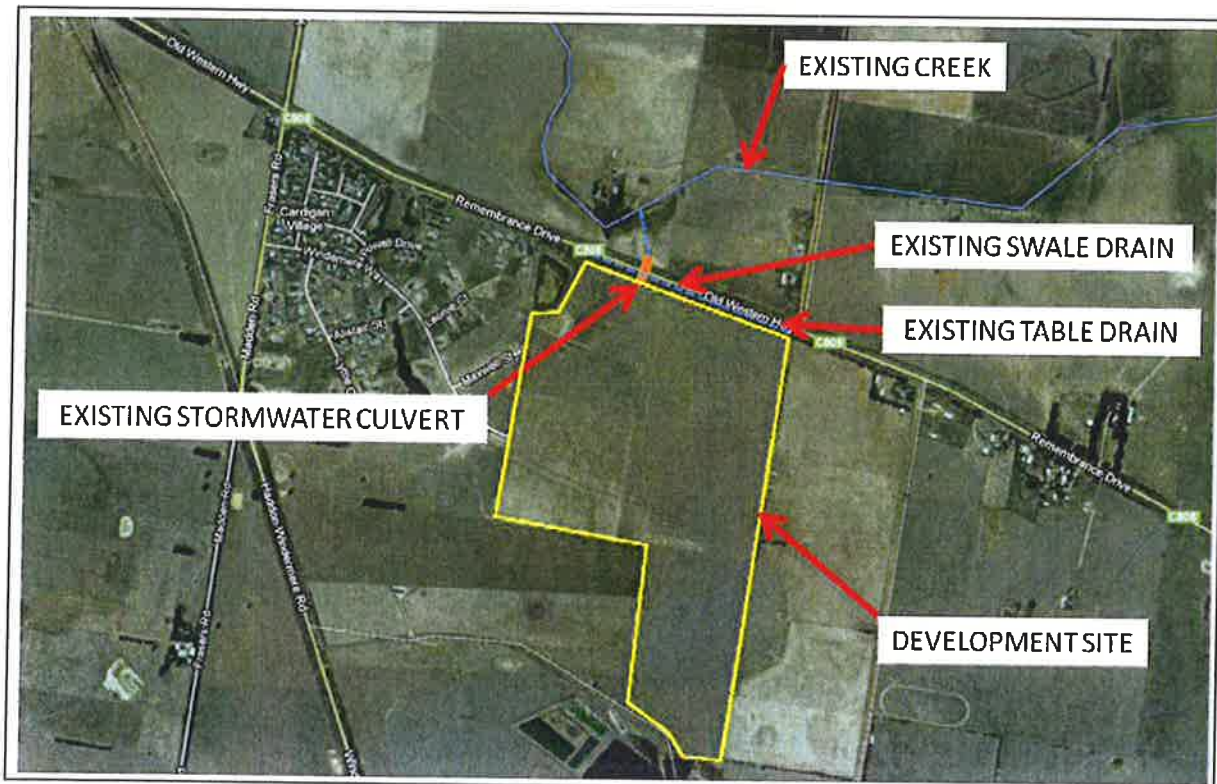


Figure 3 – Existing Stormwater Drainage

A crest runs diagonally across the middle section of the site, which divides it into two main catchments. The two catchments include land external to the development site. The northern catchment, which is approximately 103 hectares, flows to a point in the center of the northern boundary of the site. The southern catchment, which is approximately 52 hectares, flows into a creek system in the southwest corner of the site.

Any runoff generated from the land situated east of the northern catchment will be collected by underground drainage and overland flows will be conveyed via the roadways.

The existing retarding basin captures flows external to the site and is considered to have no impact on the stormwater drainage for the proposed development site.

Refer to Figure 2 below for a plan showing the northern and southern catchments.

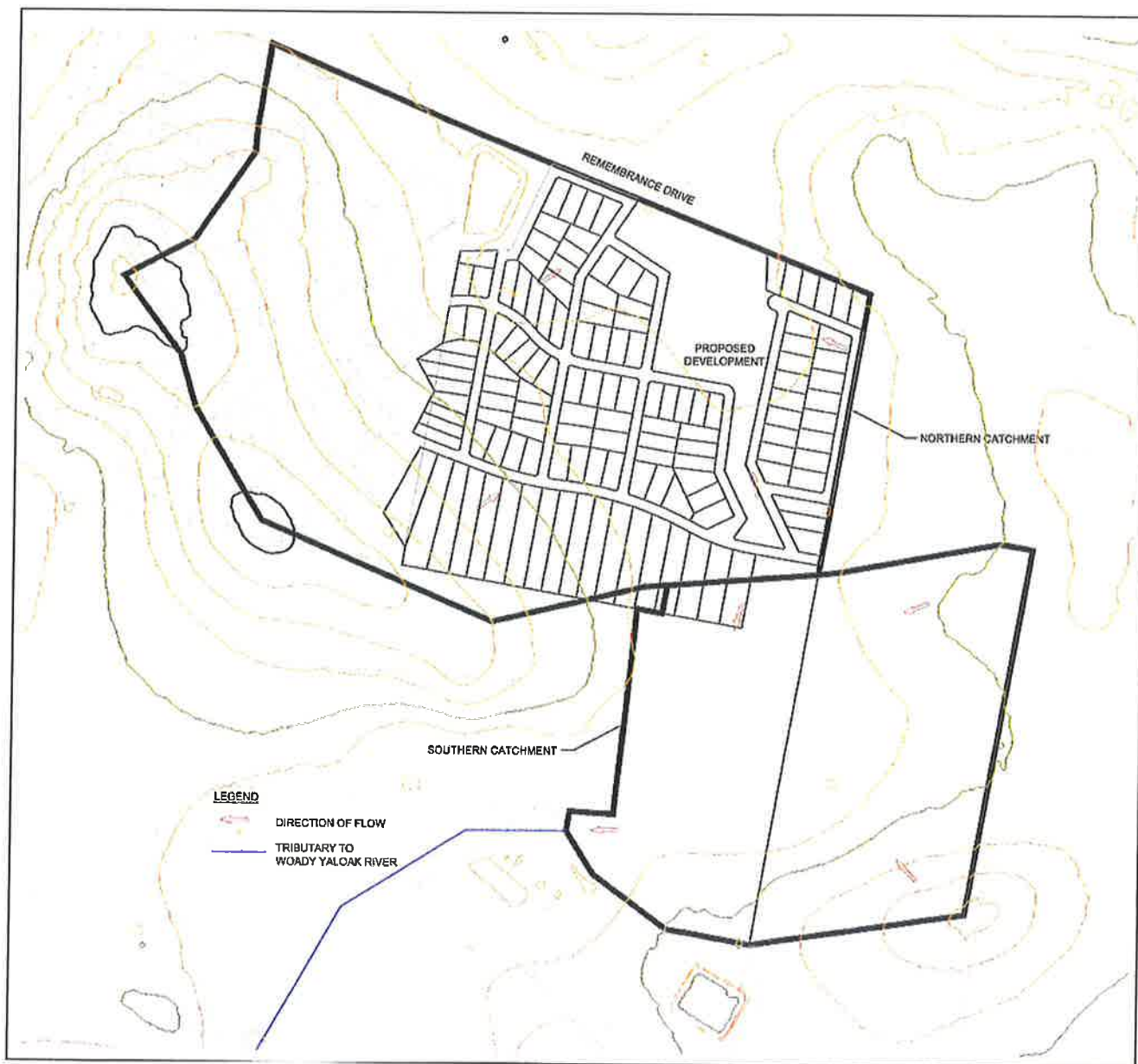


Figure 2 – Northern and Southern Catchments

It should be noted that it is anticipated that the pre-development and post-development conditions of the southern catchment in Figure 2 will remain unchanged. Therefore, the southern catchment has not been addressed, in terms of stormwater quantity and quality.

An overland flow path is present adjacent to the existing retarding basin in Cardigan Village, west of the development site. This overland flow path will not be disturbed during development works.

## 5. STORMWATER QUANTITY

A drainage system is to be designed to comply with:

1. City of Ballarat Council Planning Scheme Policies and design standards
2. Infrastructure Design Manual
3. Glenelg Hopkins Catchment Management Authority

Refer to Appendix C for a concept stormwater drainage design plan.

### 5.1 Design Flows

In accordance with current Council design standards and policies, developers are required to provide on-site stormwater detention systems, which reduce the post-development 10yr ARI flow back to the pre-development 10yr ARI flow.

Using the rational method, a pre-development 10yr ARI flow has been calculated to be  $1.169\text{m}^3/\text{s}$ , based on the following parameters:

- A Runoff Coefficient of 0.17
- Time of Concentration of 40 minutes
- Rainfall Intensity of 38mm/h (Australian Rainfall and Runoff)

Using the rational method, a post-development 10yr ARI flow has been calculated to be  $3.981\text{m}^3/\text{s}$ , based on the following parameters:

- A Runoff Coefficient of 0.40
- Time of Concentration of 21 minutes
- Rainfall Intensity of 55mm/h (Australian Rainfall and Runoff)

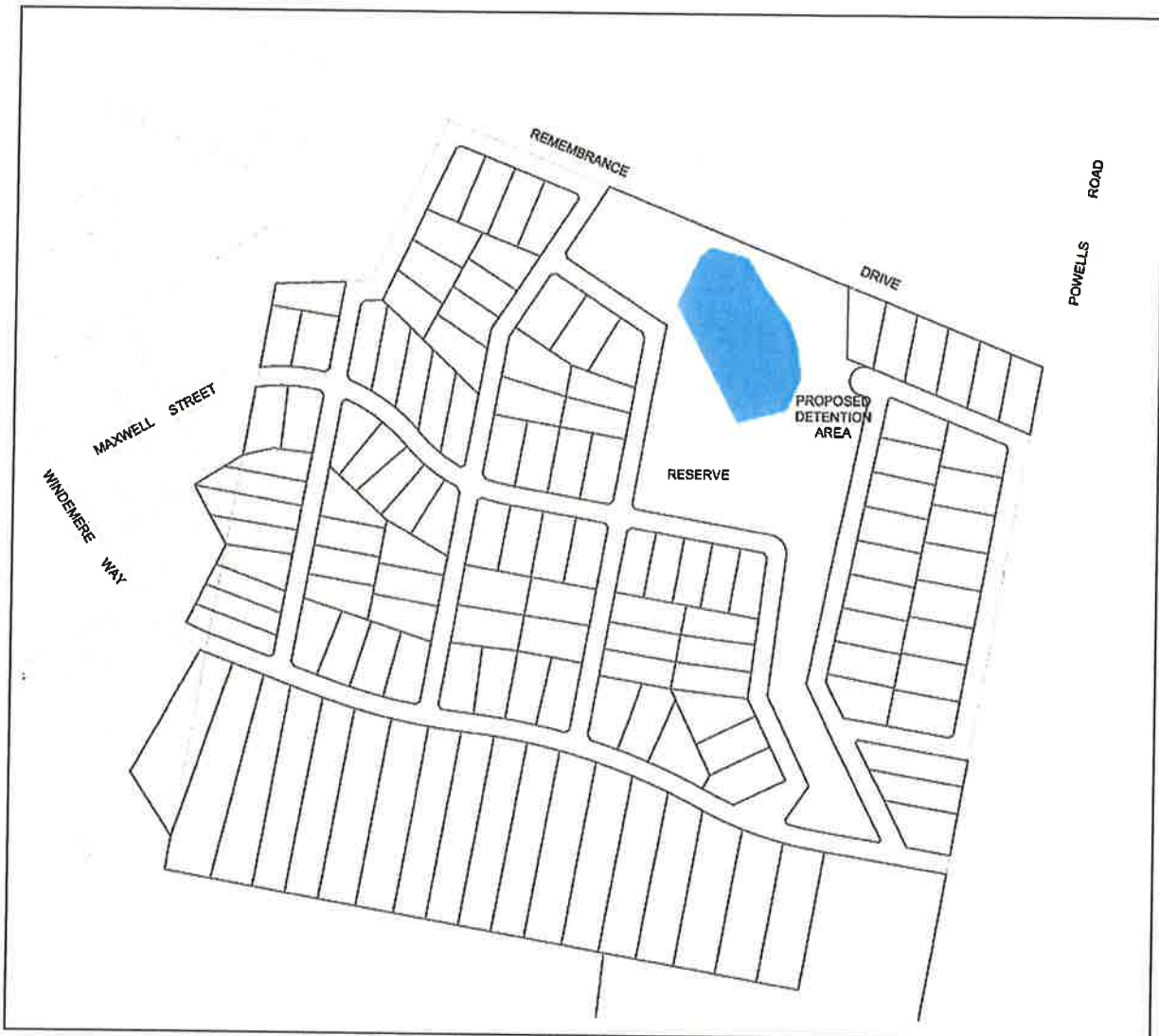
### 5.2 On-site Detention

It has been calculated that, in order to reduce post-development flows back to pre-development conditions in a 10yr ARI event,  $3,438\text{m}^3$  of stormwater detention would be required.

As the site contains a significant area of public reserve located in the lowest section of the site, it is proposed that stormwater be detained in a retarding basin located within the reserve with an outlet sized to take a maximum flow of  $1.169\text{m}^3/\text{s}$  (pre-development flow). An overflow weir will be provided for storm events greater than 10yr ARI.

In order to help reduce the impacts of flooding on downstream waterways, a further 300mm of air space above the stormwater detention level (10yr ARI) has been allowed for. This air space exceeds the amount of volume required for 100yr ARI stormwater detention. This means that in events greater than 10yr ARI and up to 100yr ARI, there will be no adverse effects on waterways downstream of the development site.

Figure 4 below shows an indicative area that would be required to accommodate the calculated stormwater detention volume.



**Figure 4 – Indicative Stormwater Detention Area**

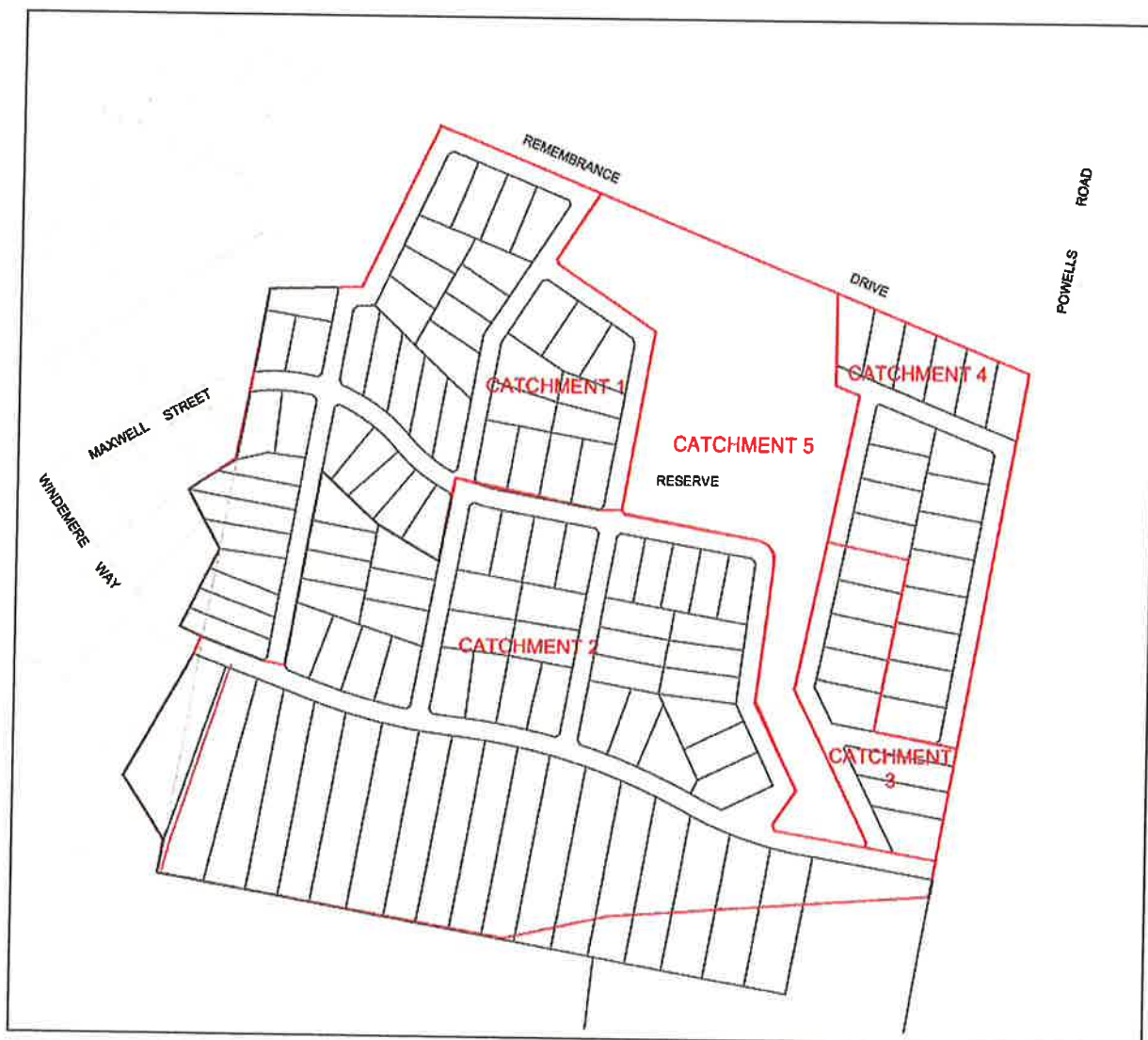
It has been estimated that the existing culvert crossing Remembrance Drive is capable of handling the pre-development flow of 1.169m<sup>3</sup>/s. Given that there is additional capacity to detain for the 100yr ARI event it is anticipated that no upgrade works will be required with the existing culvert crossing. However, some minor swale grading works from the discharge point of the site to the existing culvert will be required.

## 6. STORMWATER QUALITY

During the construction phase it is proposed that a Site Management Plan shall be prepared to address sediment and erosion control. This can be achieved with the use of siltation barriers installed at the drainage outlets of the site and at the termination of each stage of the development.

To address Water Sensitive Urban Design (WSUD) requirements for stormwater quality treatment in the post development phase, a MUSIC (stormwater quality modeling software) model has been produced.

The site has been divided up into catchments in order to model the development in MUSIC. Figure 5 below shows the catchment area plan.



**Figure 5 – Stormwater Catchment Areas**

Stormwater quality treatment best practice guidelines, as stated in *Water Sensitive Urban Design Engineering Procedures – Stormwater* published by CSIRO 2005, are as follows:

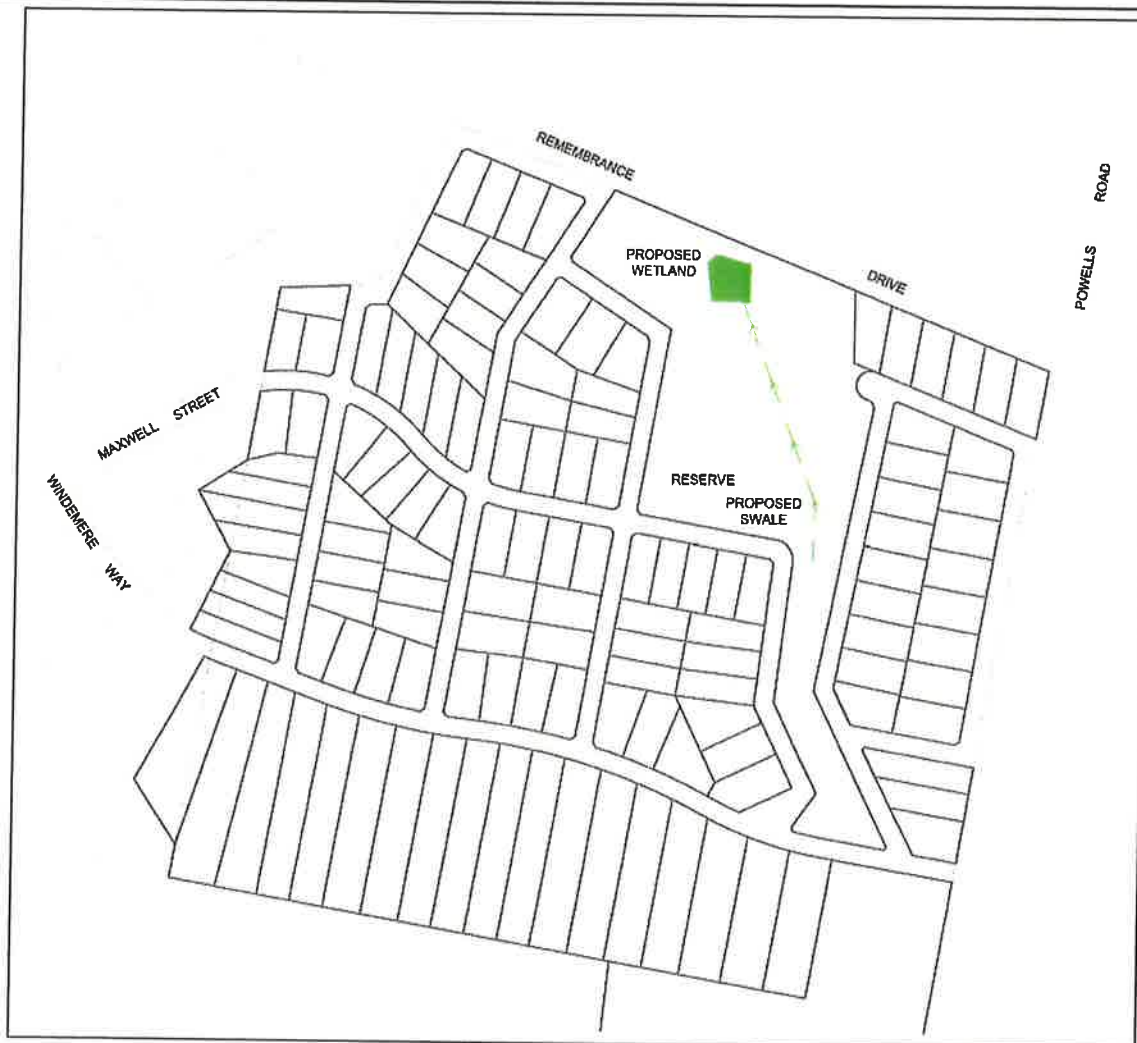
- 70% reduction in gross pollutants
- 80% reduction in total suspended solids
- 45% reduction in total nitrogen
- 45% reduction in total phosphorous

A swale and wetland system is proposed to treat stormwater runoff from the development to achieve best practice standards in reducing pollutants.

This system will be located in the proposed reserve area in the low lying region of the site.

Figure 6 below shows the proposed swale and wetland system.





**Figure 6 – Proposed Wetland and Swale**

The proposed swale shown in Figure 6 has the following parameters:

- Length 311m
- Bed Slope 0.5%
- Base Width 2m
- Top Width 5m
- Depth 0.3m
- Vegetation Height 0.3m
- Exfiltration Rate 0mm/h (worst case scenario)

The proposed wetland shown in Figure 6 has the following parameters:

- Surface Area 1,500m<sup>2</sup>
- Extended Detention Depth 0.1m
- Permanent Pool Volume 400m<sup>3</sup>
- Exfiltration Rate 0mm/h (worst case scenario)

By inputting the parameters associated with the defined catchment areas and proposed swale and wetland system into the MUSIC model, best practice guidelines for reducing pollutants can be achieved.

Figure 7 below shows the MUSIC model of the site and the percentage reduction in pollutants.

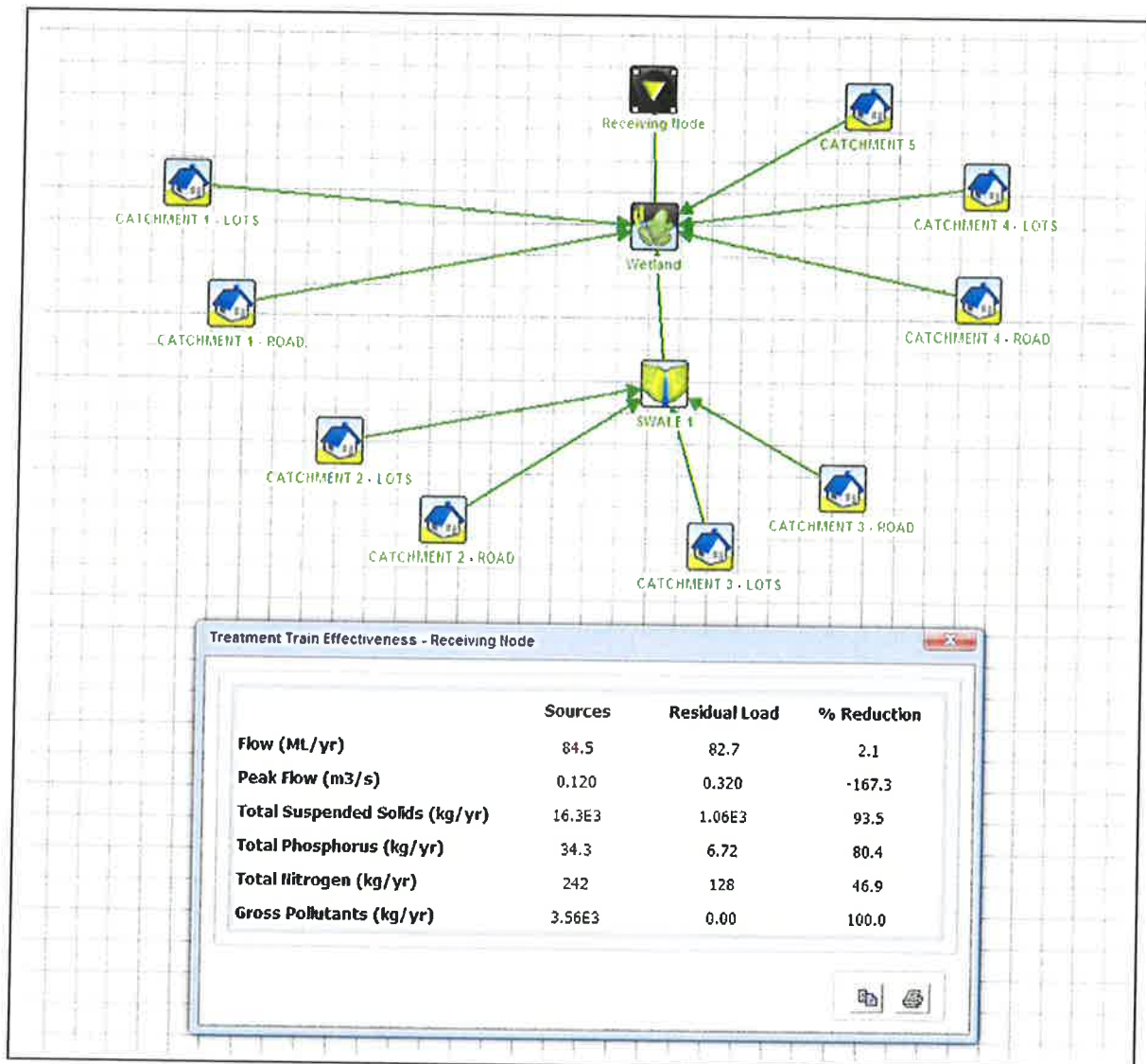


Figure 7 – MUSIC Model and Results

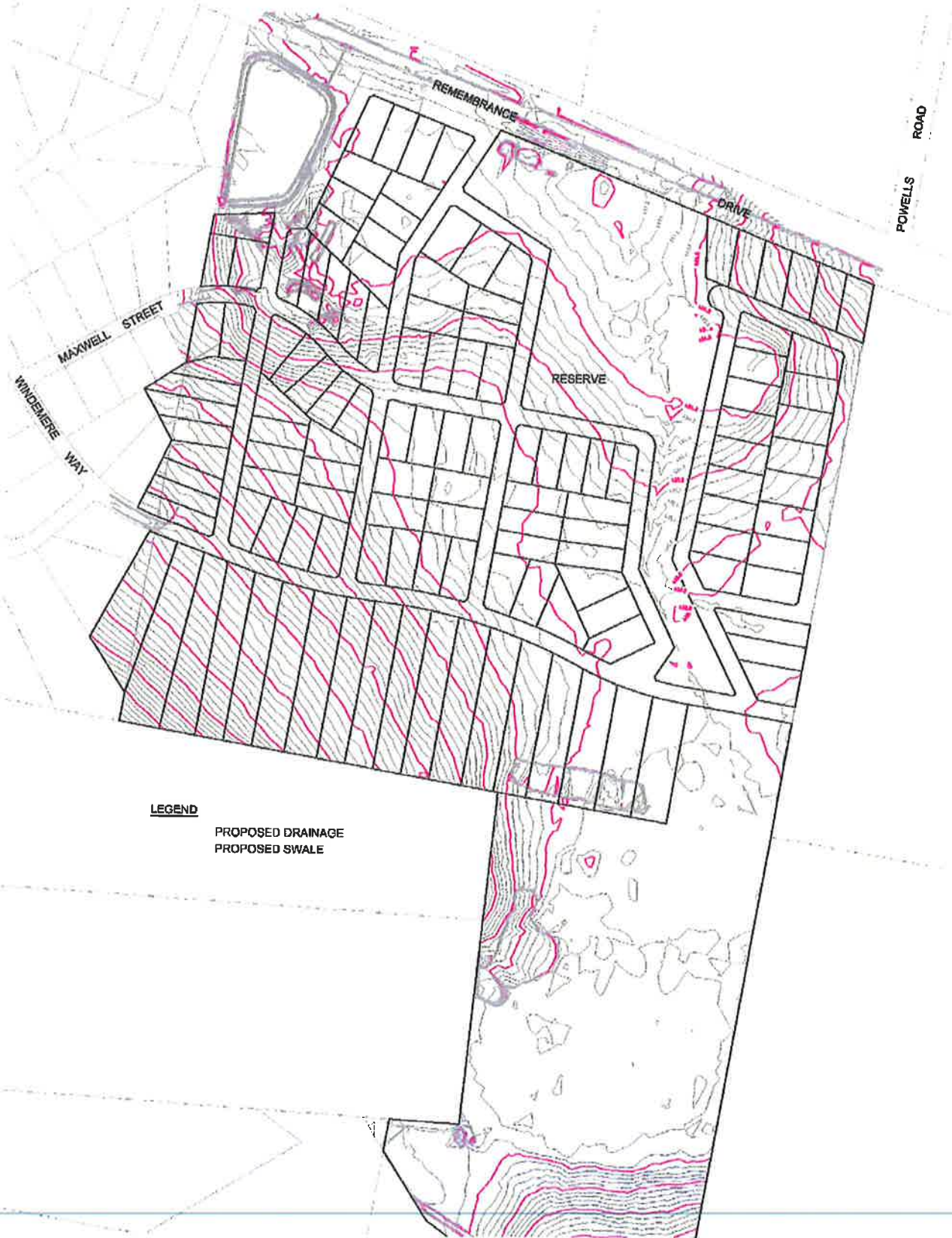
## 7. CONCLUSION

It has been determined that the site will ultimately discharge stormwater into a tributary to Burrumbeet Creek on the north of Remembrance Drive via an existing culvert and swale system adjacent to the site.

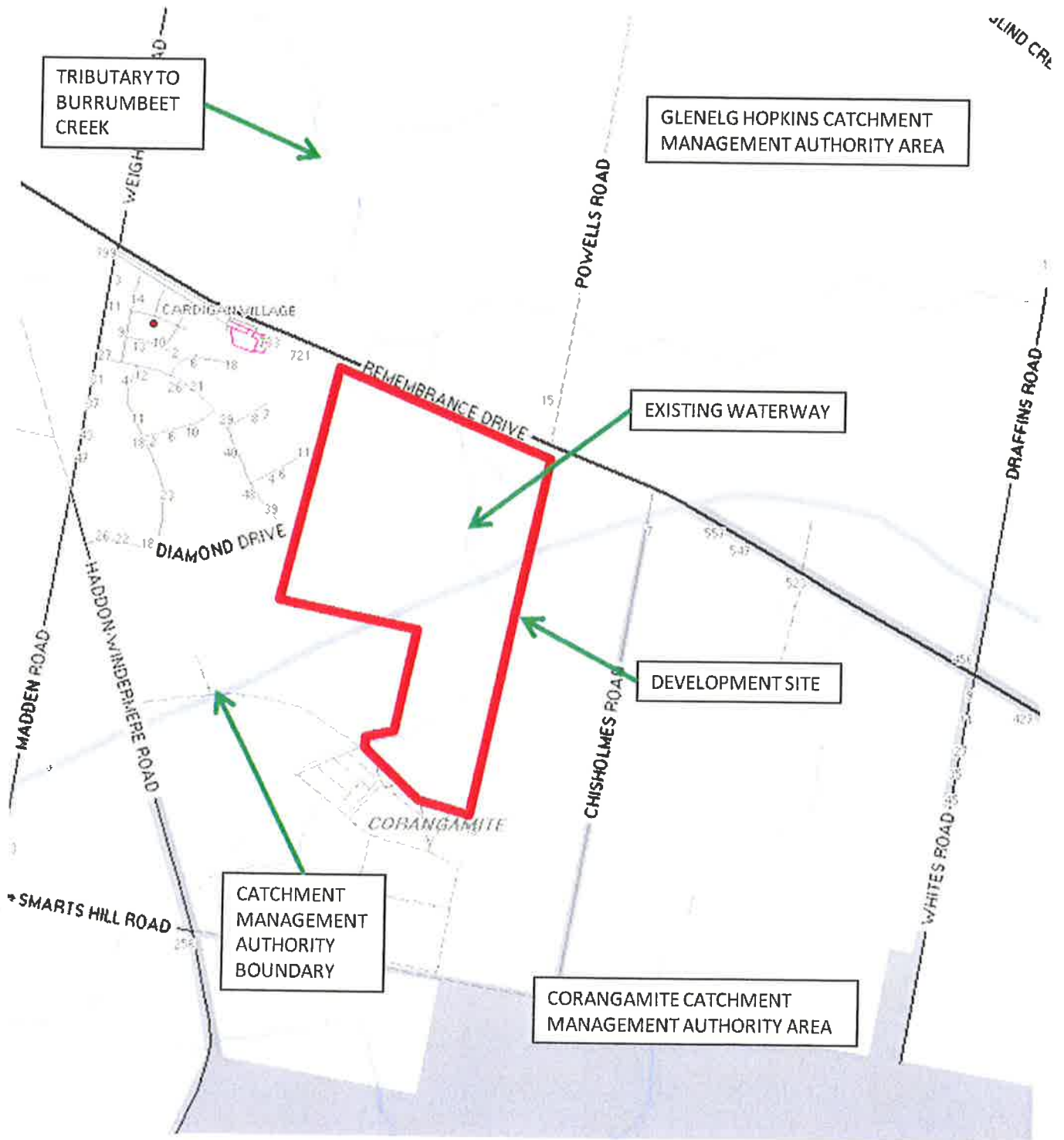
It has been calculated that approximately 3,438m<sup>3</sup> of stormwater detention would be required to satisfy Council's Stormwater Management Policy. This requirement will reduce post development flows back to pre-development conditions.

To address WSUD, a proposed swale and wetland system shall be constructed, which will achieve pollutant reduction to best practice standards. A section of the proposed reserve will be utilized for the wetland system to eliminate any impacts on lot yield.

**APPENDIX A**



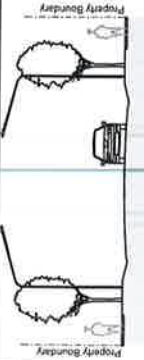
**APPENDIX B**



**APPENDIX C**



**LEGEND**  
- - - - - PROPOSED DRAINAGE  
- - - - - PROPOSED SWALE



1.2m wide table drain  
6.0m wide footpath  
1.2m wide road  
Lighting to Australian Standards  
along with various other standards

### TYPICAL STREETSCAPE

(20.0m Road Reserve)

- NOTES**
1. Granitic Sand Pedestrian footpaths to be provided across all property frontages.
  2. Relocated services to be provided including street lighting.
  3. All dwellings fronting the Avenue or Honour are to be orientated to the Avenue.
  4. Alternative cross sectional elements may be required to ensure sustainable stormwater management.

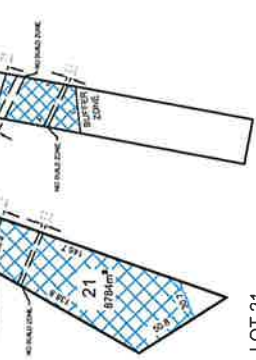
- FLOOD LEVELS**
1. All lots and roads to be filled such that the finished surface is above the 1:100 year flood levels.
  2. The proposed development must meet the requirements of the Geelong Hopkins CMA's cut and fill guideline. Compensatory excavation is to be undertaken in the proposed reserve area to offset the flood storage volume occupied by such fill. Care must be taken to ensure that the provided storage volume is continuous with the lot and street flows.

### LEGEND

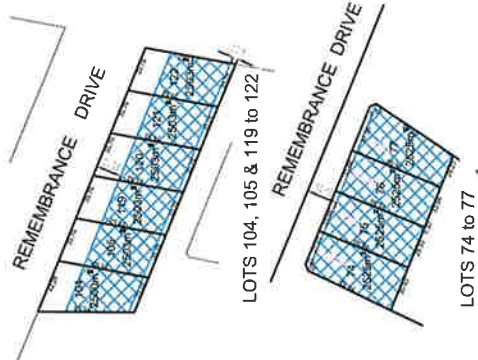
- Approximate 1:100 year Flood Limit (to be verified with site survey)
- Buffer zone around sewerage farm 400m radius from Local Park
- Open Space (minimum 5% public open space contribution)
- Reserve for drainage purposes
- Granitic Sand Path
- Existing Sewer Main
- Existing Gas Main
- Proposed building envelope
- Stage boundaries
- Lot orientation (dwellings to face Remembrance Drive)
- Access to existing street network
- Proposed detention/ wetland area
- Proposed swale drain
- Tree protection zone

Lot	Lot Area		Building Envelopes	
	Area (m <sup>2</sup> )	Frontage (m)	Area (m <sup>2</sup> )	Frontage (m)
11	2000	16.5	62.0	23.2
12	2000	16.5	62.0	23.2
13	2000	16.5	62.0	23.2
14	2000	16.5	62.0	23.2
15	2000	16.5	62.0	23.2
16	2000	16.5	62.0	23.2
17	2000	16.5	62.0	23.2
18	2000	16.5	62.0	23.2
19	2000	16.5	62.0	23.2
20	2000	16.5	62.0	23.2
21	2000	16.5	62.0	23.2
22	2000	16.5	62.0	23.2
23	2000	16.5	62.0	23.2
24	2000	16.5	62.0	23.2
25	2000	16.5	62.0	23.2
26	2000	16.5	62.0	23.2
27	2000	16.5	62.0	23.2
28	2000	16.5	62.0	23.2
29	2000	16.5	62.0	23.2
30	2000	16.5	62.0	23.2
31	2000	16.5	62.0	23.2
32	2000	16.5	62.0	23.2
33	2000	16.5	62.0	23.2
34	2000	16.5	62.0	23.2
35	2000	16.5	62.0	23.2
36	2000	16.5	62.0	23.2
37	2000	16.5	62.0	23.2
38	2000	16.5	62.0	23.2
39	2000	16.5	62.0	23.2
40	2000	16.5	62.0	23.2
41	2000	16.5	62.0	23.2
42	2000	16.5	62.0	23.2
43	2000	16.5	62.0	23.2
44	2000	16.5	62.0	23.2
45	2000	16.5	62.0	23.2
46	2000	16.5	62.0	23.2
47	2000	16.5	62.0	23.2
48	2000	16.5	62.0	23.2
49	2000	16.5	62.0	23.2
50	2000	16.5	62.0	23.2
51	2000	16.5	62.0	23.2
52	2000	16.5	62.0	23.2
53	2000	16.5	62.0	23.2
54	2000	16.5	62.0	23.2
55	2000	16.5	62.0	23.2
56	2000	16.5	62.0	23.2
57	2000	16.5	62.0	23.2
58	2000	16.5	62.0	23.2
59	2000	16.5	62.0	23.2
60	2000	16.5	62.0	23.2
61	2000	16.5	62.0	23.2
62	2000	16.5	62.0	23.2
63	2000	16.5	62.0	23.2
64	2000	16.5	62.0	23.2
65	2000	16.5	62.0	23.2
66	2000	16.5	62.0	23.2
67	2000	16.5	62.0	23.2
68	2000	16.5	62.0	23.2
69	2000	16.5	62.0	23.2
70	2000	16.5	62.0	23.2
71	2000	16.5	62.0	23.2
72	2000	16.5	62.0	23.2
73	2000	16.5	62.0	23.2
74	2000	16.5	62.0	23.2
75	2000	16.5	62.0	23.2
76	2000	16.5	62.0	23.2
77	2000	16.5	62.0	23.2

- NOTES**
1. All lots and roads to be filled such that the finished surface is above the 1:100 year flood levels.
  2. The proposed development must meet the requirements of the Geelong Hopkins CMA's cut and fill guideline. Compensatory excavation is to be undertaken in the proposed reserve area to offset the flood storage volume occupied by such fill. Care must be taken to ensure that the provided storage volume is continuous with the lot and street flows.



TYPICAL LAYOUT LOTS  
22 to 27, 47 to 51 & 68 to 73



LOTS 104, 105 & 119 to 122  
LOTS 74 to 77

- NOTES**
1. All dwellings on Lots 74 to 77, 104, 105 & 119 to 122 to face Remembrance Drive
  2. Ensure that the rear of Lots 104, 105, 119 to 122 are provided for rear loading access with appropriate setbacks to the Australian Standards
  3. Lots 104, 105 & 119 to 122 to have proposed 4m rear setback to allow for access

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**LOT AREA SUMMARY**

AREA RANGE (m <sup>2</sup> )	NO. OF LOTS
2,000-2,500	50
2,501-3,000	248
3,001-4,000	4
4,001-5,000	19
TOTAL	130

# Environmental Management Plan

## AVENUE HILL CARDIGAN

Planning and Environment Act 1987  
BALLARAT PLANNING SCHEME  
DEVELOPMENT PLAN OVERLAY

Development Plan Schedule No.....6.....

Signed..........

Authorised Officer for and on behalf of the  
CITY OF BALLARAT

DATE.....8/05/2013.....



**COUGHLAN CIVIL PTY LTD**

ABN 99 100 526 458

ACN 100 526 458

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**APPENDIX A – SITE INDUCTION PROGRAM**



## 1. INTRODUCTION

This Environmental Management Plan has been prepared by Coughlan Civil Pty Ltd in relation to the proposed residential development at Avenue Hill, Cardigan. It includes a set of requirements for management of the site, and is supported by an induction process that is intended to inform all who carry out work on the site, of the environmental issues that relate to the site.

It is not intended that this document supersede any Project Management Plan prepared by a Contractor engaged to carry out works on site. However, any such Project Management Plan must be submitted to Coughlan Civil prior to entering the site to assess the compliance with the requirements described herein.

This document will be included in tender and contract documents relating to the major components of site work associated with that project. As such, it will be the responsibility of each contractor to ensure that procedures are set, and followed, that ensure consideration is given to environmental issues during the execution of their works.

It should be noted that this Environmental Management Plan does not attempt to address all environmental issues relating to the site and is limited to the content within.

## 2. DUST, NOISE, ODOUR

Dust, noise and odour generated by moving plant or wind, from surfaces that have been exposed as a result of the construction works, shall be controlled. Such control may be by the application of water on the exposed surfaces, or placement of loose, 40mm nominal size aggregate or NDCR on access ways. When activities are scheduled that have a high likelihood of generating dust in quantity, a water truck shall be maintained on site for immediate use.

Noise pollution in areas where occupied land is in close proximity of the construction works shall be kept to a minimum compatible with the operations involved. Noise likely to be offensive shall be generated between the following working hours:

Monday-Friday 7.00am – 6.00pm  
Saturday 7.00am – 1.00pm

All plant is to be maintained in good working condition and is to be regularly checked.

All vehicles, plant & machinery to be fitted with appropriate emission control equipment. If plant or machinery is emitting smoke continuously for longer than 10 seconds, during normal operation, then it will be serviced or replaced.

Odour generated during construction works shall be monitored and offensive odours reported to the superintendent.

## 3. STOCKPILING OF SOIL

Stockpiled material shall be located away from vegetation of significance and waterways.

Topsoil stockpiles shall not exceed 1m in height.

Stockpiles of surplus clay shall be constructed with appropriate batters and slopes to ensure the stability of the stockpile.

## 4. EROSION AND SEDIMENT CONTROL

Material that is excavated from trenches is to be temporarily stockpiled on the high side of the trench.

Vehicles are to be kept to well marked and graded access roads.

Public roads are to be kept free of mud or soil. Roads are to be inspected daily before the end of work and deposited soil is to be removed.

Side Entry Pits – All side entry pits shall have sand filled geotextile socks placed to ensure no turbid water enters the drainage system.

10mm stone may be used as an alternative to sand inside the socks.

Grated Pits – A geotextile barrier fence shall be erected around all Grated pits. The fence is to be a minimum of 550mm high and held in place by one stake in each corner.

Surface drainage – Geotextile fences are to be placed at 30m intervals along the alignment of all temporary surface drains and exposed permanent drains. The fences are to be a minimum of 550mm high and held in place by a stake at each end and one in the invert of the drain.

Soil Stockpiles – Geotextile fences are to be placed adjacent to the down hill toe of all soil stockpiles. The fences are to be a minimum of 550mm high and held in place by a stake at 2m spacings.

All of these control items shall be inspected after every rain event and any deposited silt is to be removed.

## 5. VEHICLE RE-FUELLING AND MAINTENANCE

All plant and equipment shall be refueled in areas away from waterways.

Fuel trucks are to carry soak kits in order to control any spillages.

All vehicles, plant & machinery to be fitted with appropriate emission control equipment. If plant or machinery is emitting smoke continuously for longer than 10 seconds, during normal operation, then it will be serviced or replaced.

## **6. DE-WATERING OF WORK SITES**

Treat turbid water or remove sediment prior to being pumped into stormwater system or natural waterway.

De-water by pumping water, wherever practicable on to vegetated areas of sufficient width to remove suspended soil or to sediment control devices.

## **7. CONSTRUCTION WASTE MANAGEMENT**

All solid wastes should be placed in appropriately designed storage areas during construction.

There should be no vegetation burning. All waste vegetation should be chipped or mulched on-site and reused or appropriately disposed of.

Weeds are to be disposed of off site in appropriate disposal facilities.

Wastes should be collected for recycling and or disposal at registered tip sites.

Maintain a high quality of housekeeping and ensure that materials are not left where they can be washed or blown away to become litter.

Collect lubricating oil from the construction vehicle fleet and sending it to a recycler.

## **8. STORAGE OF FUELS AND CHEMICALS ON SITE**

Minimise chemicals and fuel stored on site.

Store dangerous chemicals in a roofed and bunded area with an impervious floor, separated and signed as required by relevant codes and standards.

Store fuels and other hazardous materials in appropriately bunded structures away from creeks and drainage lines.

Bunds should be impervious to prevent spilled product from escaping.

Any spillage should be cleaned up immediately.

Where possible store each type of chemical/ fuel in a separate area so that spilled product can be retrieved and re-used (providing that it has not been contaminated with water or other debris).

Maintain a list of chemicals and other potentially hazardous materials and Material Safety Data Sheets.

Restrict the area in which hazardous materials can be stored during construction works.

On site plant maintenance to be avoided where possible.

## **9. VEGETATION**

The transport of weeds and tracked mud, dirt or debris will be reduced by use of the temporary crushed rock access way. Street sweepers and/or water truck shall be used to keep existing road clear of weeds, dirt and debris from the construction site to the satisfaction of the Responsible Authority. Public roads are to be kept free of mud or soil. Roads are to be inspected daily before the end of work and deposited soil is to be removed. In addition, public roads shall be cleaned when directed by the Responsible Authority.

All construction vehicles are to be prevented from travelling too close to trees or under canopies of trees that are to be retained by erection of flagging on star pickets around the tree, generally to the drip line.

If soil compaction has occurred the soil should be loosened to ensure that plant growth is not inhibited and that infiltration of water to the soil layer can occur.

#### **10. PROTECTION OF FAUNA**

All open trenches should be inspected prior to commencement of work each day for trapped vertebrate fauna such as frogs, reptiles, birds or mammals.

If it is found that there are trapped vertebrate fauna in open trenches then an appropriate shelter for animals should be contacted to remove it from the trench.

#### **11. PERSONNEL**

Any persons who engage in works on site are to be made aware of the environmental consideration of the site. As such, all personnel must undertake an induction meeting wherein the contents of this document will be explained.

In the event that a contractor has developed their own Project Management Plan, that plan must be submitted to Coughlan Civil for assessment. It will be a requirement of those such contractors that they implement their own induction process to ensure that all personnel are aware of the environmental requirements.

**AVENUE HILL, CARDIGAN**

Surname ..... First Name .....

Employer ..... Induction Date .....

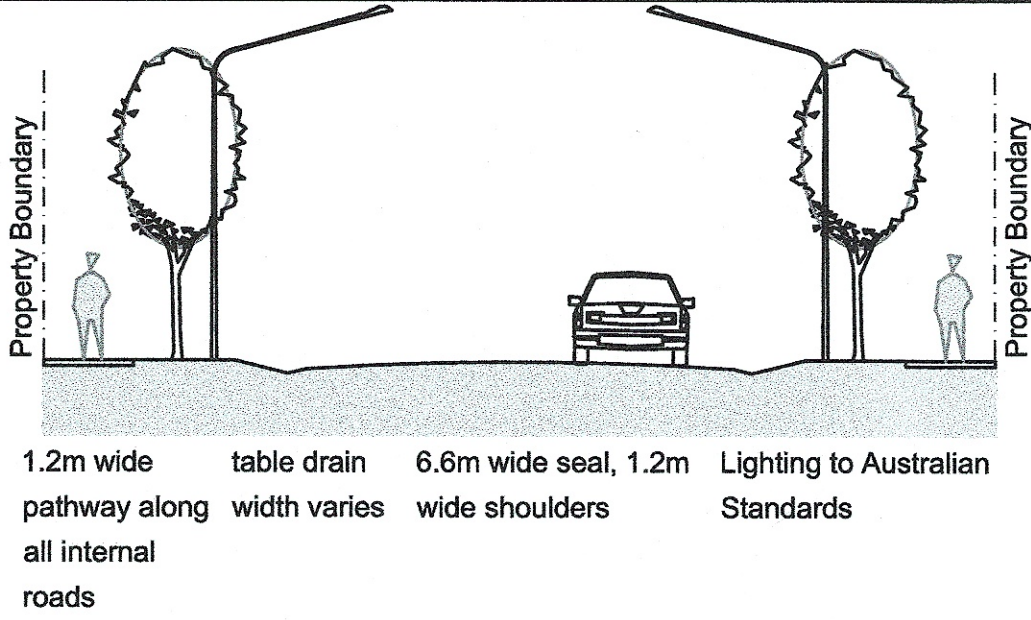
**Induction Topics**

**Inductees  
Initials**

- 1. Dust, Noise, Odour Control .....
- 2. Stockpiling of Soil .....
- 3. Erosion & Sediment Control .....
- 4. Vehicle Re-Fuelling & Maintenance .....
- 5. De-watering of Work Sites .....
- 6. Construction Waste Management. ....
- 7. Storage of Fuels & Chemicals on Site .....
- 8. Vegetation .....
- 9. Protection of Fauna .....
- 10. Site Management Plan .....

Inductee's Signature ..... Date .....

Inductor's Signature ..... Date .....



### TYPICAL STREETScape

(20.0m Road Reserve)

- NOTES**
- Granitic Sand Pedestrian footpaths to be provided across all property frontages.
  - Reticulated services to be provided including street lighting.
  - All dwellings fronting the Avenue of Honour are to be orientated to the Avenue.
  - Alternative cross sectional elements may be required to ensure sustainable stormwater management.

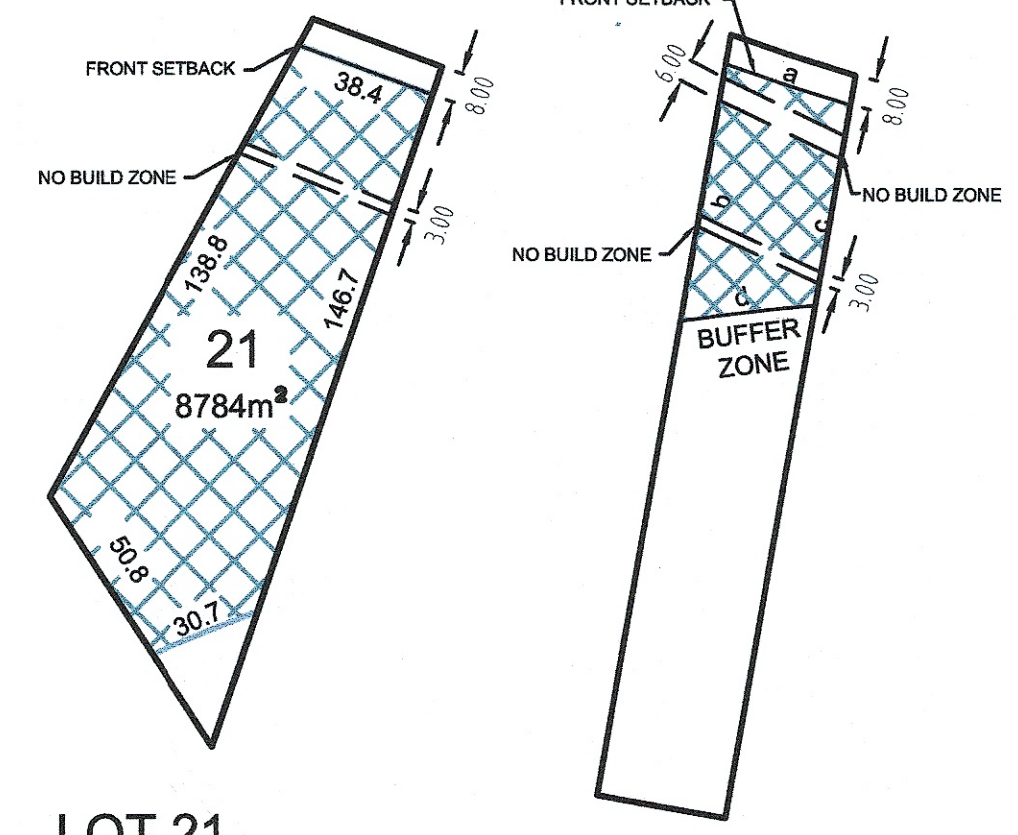
- FLOOD LEVELS**
- All lots and roads to be filled such that the finished surface is above the 1:100 year flood levels.
  - Excavation and fill works to meet the requirements of the Glenelg Hopkins CMA's cut and fill guidelines. Compensatory excavation is to be undertaken in the proposed reserve area to offset the flood storage volume occupied by such fill. Care to be taken so that the provided storage volume is continuous with inlet and outlet flows.

### LEGEND

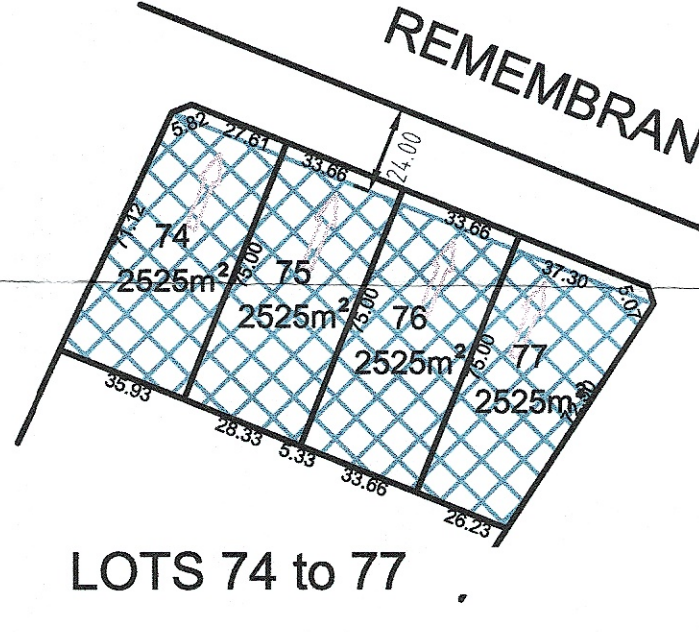
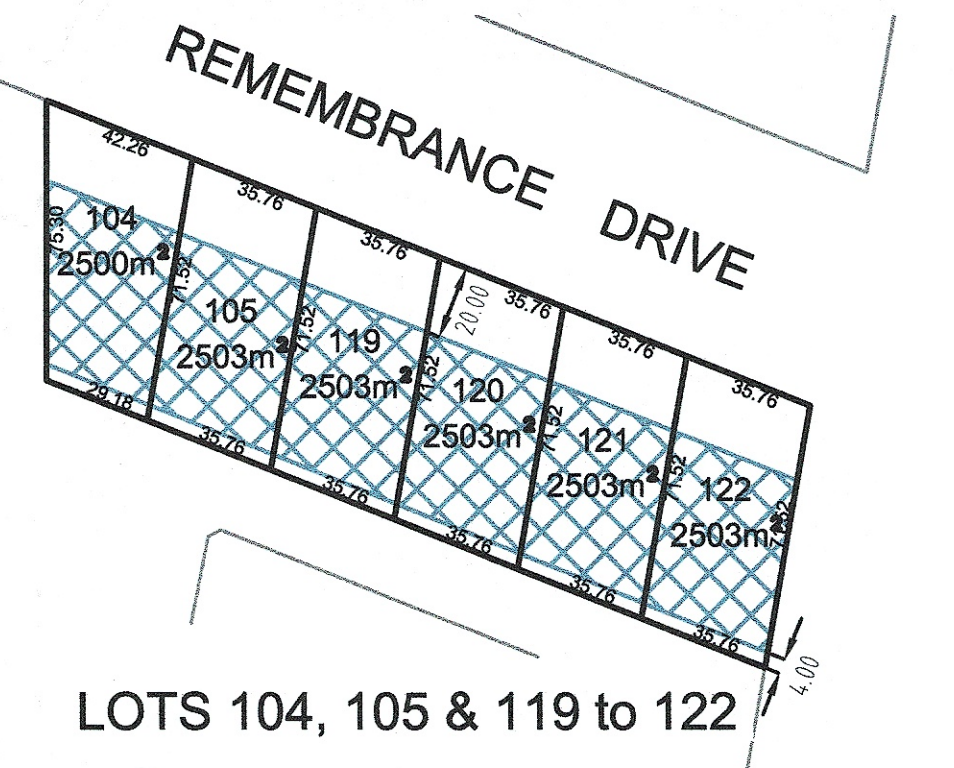
- Approximate 1:100 year Flood Limit (to be verified with site survey)
- Buffer zone around sewerage farm
- 400m radius from Local Park
- Open Space (minimum 5% public open space contribution)
- Reserve for drainage purposes
- Granitic Sand Path
- Existing Sewer Main
- Existing Gas Main
- Proposed building envelope
- Stage boundaries
- Lot orientation (dwellings to face Remembrance Drive)
- Access to existing street network
- Proposed detention/ wetland area
- Proposed swale drain
- Tree protection zone

Building Envelopes						
Lot	Lot Area	Building Envelope Area	a	b	c	d
11	2068	994	23.3	42.6	42.6	23.3
12	2200	1093	23.3	46.9	46.9	23.3
21	8784	8034	38.4	138.8	146.7	
22	9910	5286	35.6	146.7	112.0	56.7
23	8141	3431	31.2	112.0	89.5	41.6
24	7387	2786	35.6	89.5	70.3	37.3
25	7184	2176	35.3	70.3	54.8	36.6
26	8042	1921	40.1	54.8	42.1	41.1
27	7959	1517	40.0	42.1	34.6	40.6
47	6973	1156	35.0	34.6	32.1	35.2
48	7033	1121	35.0	32.1	32.0	35.0
49	7058	1119	35.0	32.0	32.0	35.0
50	7019	1121	35.1	32.0	31.1	35.1
51	7890	1287	40.3	31.1	32.3	40.3
68	7655	1297	40.7	32.3	32.7	40.7
69	7320	1313	41.2	32.7	33.2	41.3
70	6879	1334	41.9	33.2	34.0	42.1
71	7178	1653	46.4	34.0	41.2	48.6
72	6784	2193	45.4	41.2	57.9	50.4
73	6620	3164	45.0	57.9	84.3	52.8
74	2525	2405	31.8	71.1	71.0	35.9
75	2525	2390	33.7	71.0	71.0	33.7
76	2525	2390	33.7	71.0	71.0	33.7
77	2525	2372	40.6	71.0	72.4	26.2

- Notes:**
- All areas are in m<sup>2</sup>
  - All lengths are in m
  - Lengths shown on curved alignments are "chord lengths" i.e. they represent the straight line distance between corner points.
  - Building envelopes to be discontinued over existing sewer and gas mains.
  - 2.0m easement to be maintained over existing sewer main.
  - Existing gas main to be reconstructed to align with proposed road reserve (subject to Gas company approval).



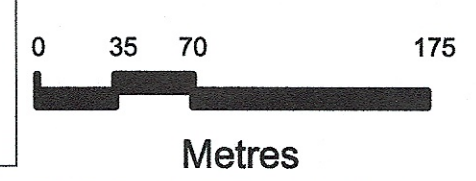
LOT 21  
TYPICAL LAYOUT LOTS  
22 to 27, 47 to 51 & 68 to 73



- Notes:**
- All dwellings on Lots 74 to 77, 104, 105 & 119 to 122 to face Remembrance Drive
  - Ensure that the rear of Lots 104, 105 & 119 to 122 are provided for rear loading access with appropriate turning circles consistent with the Australian Standards
  - Lots 104, 105 & 119 to 122 to have proposed 4m rear setback to allow for access



LOT AREA SUMMARY	
AREA RANGE (m <sup>2</sup> )	No. OF LOTS
2,001-2,500	59
2,501-3,000	48
3,001-4,000	4
>4,000	19
<b>TOTAL</b>	<b>130</b>



### MASTER PLAN

630PL-01, Rev N, 2nd May, 2013

Planning and Environment Act 1987  
**BALLARAT PLANNING SCHEME DEVELOPMENT PLAN OVERLAY**  
 Development Plan Schedule No. 6  
 Signed: \_\_\_\_\_  
 Authorised Officer for and on behalf of the  
**CITY OF BALLARAT**  
 DATE: 8/05/2013  
**AVENUE HILL**  
*the township estate*