ARCADIS Design & Consultancy for natural and built assets

IRON GATES RESIDENTIAL DEVELOPMENT

Revised

Engineering Services and Civil Infrastructure Report

23 JULY 2019

GOLDCORAL PTY LTD
IRON GATES RESIDENTIAL DEVELOPMENT

Revised
Engineering Services and Civil Infrastructure Report

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REVISIONS

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04	21/07/2015	Amended to address Richmond Valley Council RFI	BF	BL
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07	1/11/2018	Revised Report	GD	GD
08	23/07/2019	Final RFI Response	LP	GD

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REVISION 08

This Report was revised on 23rd July 2019 in order to Consolidate the Engineering Services Report and to include all amendments to the Report and include the additional details outlined in the response to RVC's recent Information Request dated 2nd February 2019. Below is a list of amendments and additions made to this report and the general engineering documents.

- Figure 1.1 was amended to incorporate consistent aerial images of the site.
- Section 3.2 was amended to include revised cut/fill earthworks volumes and provide clarity on expected haulage route and earthworks construction.
- Section 4 has been amended for slight changes to presentation and description of road design. Reference has been made to the separately prepared traffic engineering report.
- Section 6 has been amended for changes in presentation of outcomes of the BMT WBM OSD assessment letter.
- Section 9.1 has been amended to include a 40% duplex loading and reference to the Arcadis Water Network Capacity Assessment (Appendix G), which analyses the impact of the development on the Evans Head Water Network and shows no additional issues are caused by the development.
- Section 9.2 has been amended to include a 40% duplex loading and reference to the Arcadis Sewer Network Capacity Assessment (Appendix H), which analyses the capacity of the existing Evans Head sewer network and the future planning strategy to cater for the Iron Gates development.
- Section 9.3 has been amended to include new servicing connection locations for electrical and telecommunications reticulation.
- Section 10 has been added to address the development's flood emergency response strategy and discuss the impacts of regional flooding on the development and wider Evans Head region.
- Section 11 has been amended to include revised recommendation and outcomes of the prepared engineering material and summarise the new findings of this report.
- The Civil Engineering Drawings in Appendix A include the amendments to engineering components in accord with latest lot layout for the 184 Lot subdivision (Appendix F).
- Additional Reports have been prepared, collated and added to this report, including:
    - A Water Network Capacity Assessment in Appendix G.
    - A Sewer Network Capacity Assessment in Appendix H.
    - A Traffic Assessment Report in Appendix I.
    - The Arcadis Stage 1 Preliminary Contamination Report in Appendix J.
    - An Acid Sulphate Investigation and Soil Management Plan in Appendix K.
    - A Dewatering Management Plan in Appendix L.
    - A letter of supply for Electrical and Telecommunication in Appendix M.
    - A Site Analysis Plan and Design Response Plan in Appendix N.

1 INTRODUCTION

Arcadis has been engaged by Goldcoral Pty Ltd to prepare a revised Engineering Services and Civil Infrastructure Report for a Development Application for a total of 184 lots including 175 residential lots subdivision know as *Iron Gates,* located approximately 2km west of Evans Head.

The development involves the construction of 175 residential lots, with a minimum size of 600m^2, associated civil infrastructure such as internal roads, stormwater drainage, sewer and potable water services are also proposed. This revised report is to accompany an amendment to DA2015/0096 for the Iron Gates Residential Subdivision. This revised report deals with the engineering services and civil infrastructure component of the development and the engineering planning issues associated with the development application.

1.1 SITE DESCRIPTION

The subject site is known as *Iron Gates* and is surrounded by protected vegetation areas on the northern and eastern boundaries and the Evans River on the western and southern boundaries. The site is located over the following allotments:

- Lot 163 DP 831052, Lots 276 and 277 DP 755624, Crown Road Reserve between Lots 163 DP 831052 and Lot 276 DP 755724, Crown Foreshore Reserve and Iron Gates Drive, Evans Head NSW.

The main access to the site is via Iron Gates Drive to the east. Evans River is located directly to the south of the site. A site locality plan is shown in Figure 1-1 below.

Figure 1-1 Site Locality

The site has previously been developed with existing roads, sewer, stormwater and water infrastructure located on the site. The condition of the existing infrastructure on site is unknown however, where applicable testing will be undertaken to determine existing condition prior to Construction Certificate. The site was previously cleared in the mid 1990's however it has since been naturally vegetated.

1.2 LOT TOPOGRAPHY

The site features grades ranging from 0.5% to 11%. The eastern portion of the site is very flat and features very minimal grades of approximately 0.5%. This portion of the site features two (2) man made channels running from north to south to help facilitate flows to Evans River. A ridge is located on the western side of the site with an elevation of 22m AHD. Steep grades of approximately 11% are located in this area as the ridge flattens out to the east.

1.3 TOTAL AREA OF LAND

The total residential area of the site is approximately 18 ha.

1.4 PROPOSED DEVELOPMENT

The Iron Gates Development Proposal includes One Hundred and Eighty Four (184) Lot Subdivision including:

- One Hundred and Seventy Five (175) Residential Lots;
- Three (3) Residue Lots
- Four (4) Public Reserves
- One (1) Drainage Reserve
- One (1) Sewer Pump Station Lot
- Upgrading of Iron Gates Drive
- Demolition of Existing Structures Onsite
- Subdivision Work including road works, drainage, water supply, sewerage, landscaping and embellishment work and street tree planting

The proposed development is to feature 175 residential allotments. Allowances have been made in accordance with the North Coast Regional Plan 2036 in the Equivalent Tenement loadings for 40% of these to be duplex lots i.e. townhouses or other semi-attached dwellings. Duplex lots may not eventuate but is considered a conservative assessment of the site. The proposed development will utilise as much of the existing infrastructure as possible, including roads, stormwater, sewer and water infrastructure, pending on adequacy testing. Where necessary, existing infrastructure will be upgraded to ensure that it meets the standards of RVC and Northern Rivers Local Government (NRLG). Future infrastructure will be provided as an extension to the existing infrastructure and will be integrated into the previous existing design.

2 REFERENCE DOCUMENTS

This report should be read in conjunction with the following documents:

- Arcadis Engineering Drawings;
- Northern Rivers Local Government – Guidelines for Development and Subdivision of Land- January 2006;
- Northern Rivers Local Government – Development Construction Specification – Quality System Requirements – August 2013;
- NSW MUSIC Modelling Guidelines - August 2010;
- Evans Head Future Sewage Strategy Report – May 2010;

3 EARTHWORKS AND GRADING

3.1 SITE GRADING

Site grading has largely been dictated by existing ground levels, minimum and maximum road grades and drainage requirements.

Existing roads have been maintained at existing levels with allotments raised where necessary to comply with 100 year ARI flood levels.

All lots have been designed to achieve FFL above Flood Planning Levels of 3.6m. This assumes a minimum Earthworks level of 3.3m and a 300mm house slab.

3.2 EARTHWORKS QUANTITIES

The Iron Gates earthworks design estimates that earthwork volumes will not be balanced and fill will be imported. Table 3-1 below presents a summary of the estimated earthworks quantities and assume no compaction factors, road boxing or topsoil striping.

Table 3-1 Summary of Estimated Earthworks Quantities

Total Cut Volume (m3)	Total Fill Volume (m^3)	Balance Volume (m^3)
130,103	194,672	64,569

All imported fill will be sourced from local quarries with the truck haulage route nominated as being Woodburn-Evans Head Road, Woodburn Street, Wattle Street and Iron Gates Drive. The imported material will consist generally of sand fill as well as RMS specification road base and aggregates. It is expected that the earthworks activities will occur over a 16 week period and all fill will be placed in accordance with AS3798 under level 1 supervision, with all unsuitable material removed from the site.

3.3 RETAINING WALLS

In areas that have significant grade or level difference, retaining walls may be used. It is proposed that either a concrete sleeper or reinforced block walls will be used.

Roads adjacent to the environmental zone have been assessed and where required retaining walls may be provided. In these situations, the safety of both pedestrians and vehicles are considered paramount. Assessments have been undertaken and the use of a 'W' Beam guard rail will be used to minimise the risk of errant vehicles. Walls greater than, 1.0m will include a "2 rail" handrail system for pedestrian safety.

Due to a significant level difference between the proposed subdivision and the environmental zone west of Proposed Road 6 a 6.25m retain wall is proposed. The wall will be structurally designed as part of the Construction Certificate design.

Refer also to "Response to Information Request dated 11/05/2016 Items 1 & 2"

1. Section 3.2; The 6.25 metre retaining wall is considered visually excessive. Council requires a stepped embankment be provided. Please provide a revised design detail for this request.

Arcadis understands that the proposed wall could be considered visually excessive however in order to minimize the visual impact and use the wall as a feature, the development is proposing to create a green wall.

Figure 1 to 3 below show an example of the proposed treatment.

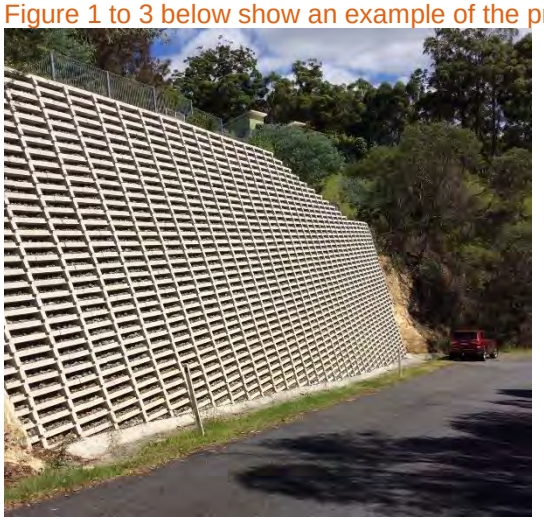


Figure 2- Retaining Wall without Vegetation

Figure 3- Example 1 of Green Wall

Figure 4- Example 2 of Green Wall

The open web construction and use of free draining material eliminates two common causes of failure in retaining walls — namely build-up of hydrostatic pressure and the destructive pressure of tree root systems.

The high quality precast concrete components provide for long-term durability and will not rot or warp.

Concrete crib walls are specifically designed to allow speed and ease of construction for minimum cost and require little or no maintenance. The standard, quality components allow for the most economical solutions for various wall heights.

A Concrib crib wall can be planted with flowers, shrubs, or creepers, using the spaces in the face of the wall. This allows the wall to blend in with any existing or proposed environment. Is it possible that we could "green" the wall with a variety of plants suitable for the Richmond Birdwing Butterfly.

To promote the Richmond Birdwing Butterfly the following plants are suggested:

> *Adult Richmond Birdwing butterflies will feed on nectar from flowers of many native plants, including native frangipani (Hymenosporum flavum), pavetta (Pavetta australiensis), black bean (Castanospermum australe) and lilly pillies (Syzygium species), as well as several exotic flowers, e.g. buddleia, pentas, honeysuckle, bougainvillea, impatiens and hibiscus. They prefer white and red blooms to other colours.*
>
> *The caterpillars (or larvae) only feed naturally on two species of vines – the lowland Richmond birdwing vine (Pararistolochia praevenosa) and the mountain aristolochia (Pararistolochia laheyana).*

These plants are proposed to be cultivated across the wall facing in order to assist in recovery of the breeding habitats for the butterfly.

Refer to Planit Drawing Iron Gates Cribb Wall Landscape Details. (attached).

2. To be noted: Plan C140 Rev 04. Ch 0 to 110 - MC1004 has a narrowing of the pavement to lessen the impact on environmental grounds with barriers and an elevated pedestrian platform. Plan C122 indicates retaining walls up to 1.5m with a pedestrian walkway on the side. -The width will need to be 2.5m wide to comply with cycleway standards and suitable balustrading to elevated walkways.

   Arcadis has amended Plan C140 to show a 2.5m wide pedestrian walkway to comply with Council's cycleway standards. Suitable balustrading will be provided with details provided during Construction Certificate Application.

4 ROADS

Vehicle access is currently provided via 1.2km of road known as Iron Gates Drive, located west of Evans Head. Iron Gates Drive has a rural residential cross section with a 2 lane sealed carriageway of 6.0m and shoulders of 0.5m-1.0m and a concrete footpath on the southern side. This road connects the existing Wattle Street in Evans Head to the proposed residential subdivision located at the western end of the road.

Pedestrian access will be provided as standard in the estate's road reserves in accordance with RVC policy. It is understood that all footpaths and bikeways must be designed in compliance with Council standards and be approved for construction prior to construction works.

4.1 INTERNAL ROADS

4.1.1 DESIGN VEHICLE

The design vehicle used in geometry checks for the internal roads is a 9.9m garbage truck with a 12.5m single unit vehicle (truck/bus) used to check all roundabouts. Fire trails have been checked based on a fire tank 7.8m long and 2.4m wide.

Design turning paths were used to determine where local increases in pavement width were required to ensure that the design vehicle could negotiate turns and bends without striking or mounting the kerb.

Where necessary, 'No Stopping' signs will be provided to ensure that required turning areas are free of parked vehicles.

4.1.2 ROAD GEOMETRY AND WIDTH

Road geometry design has generally been undertaken in accordance with Northern Rivers Local Government's (NRLG) Development and Subdivision of Land, 2006'.

The table and notes below in figure 4-1 are an extract from this document.

GEOMETRIC ROAD DESIGN

Table D.1.5 Characteristics of Roads in Residential Subdivision Road Networks

Road Type	Maximum Traffic Volume (vpd) [1]	Maximum Speed [2] (km/h)	Carriageway Width (m)[3][10] Min	Parking Provisions Within Road Reserve	Kerbing [4]	Footpath Requirement [18] minimum	Bicycle path Requirement	Verge Width (m) minimum (each side)	Minimum Road Reserve Width (m)
Access Street	100	40	6	Carriageway	Mountable	No	No	3	14
Local Street	2000	50	7-9	Carriageway	Mountable	Network Dependent	Network Dependent	3.5	15-17
Collector Street	3000	50	11	Carriageway	Mountable	One side [18]	Network Dependent	3.5	18
Distributor Road	3000+	60	13	Carriageway	Upright	One Side	Network Dependent	3.5	20

NOTES:

1. For single dwelling allotments apply traffic generation rate of 10 vehicles per day (vpd)/allotment (equivalent to approximately one vehicle per hour (vph) in the peak hour) unless a lower rate can be demonstrated. Lower rates can be applied to multi-unit dwellings based on locally derived rates.
2. See Clauses D1.09 and D1.11 on designing for specific operating speeds.
3. Widening required at bends to allow for wider vehicle paths (using AUSTROADS Turning Templates).
4. Where kerbing is not required a flush pavement edge treatment can be used. Maximum carriageway widths required if barrier kerbing used.
5. Requires:
   (i) Provision for widening to 5.0m if necessary in the future.
   (ii) Verge parking as noted with scope for additional spaces.
6. Minimum width required to provide for pedestrians, services, drainage, landscape and preservation of existing trees. Add additional width on one side for future widening of carriageway to 5.0m if required. For two lane carriageway design, no provision for widening required.

Figure 4-1 Geometric Road Design – NRLG Development & Subdivision of Land

There are 2 types of roads proposed for the Iron Gates Residential Subdivision. Details of the roads are presented in Table 4-1 and are generally consistent with the works in Council's LGA.

Table 4-1 Summary of Road Type Characteristics

Road Name	Road Type	Pavement Width
Proposed Road 1	Local Street*	11.0 (CH0-320) 9.0 (CH320+)
Proposed Road 2	Local Street*	9.0
Proposed Road 3	Local Street	9.0
Proposed Road 4	Local Street	9.0
Proposed Road 5	Collector Road*	7.0 (CH20 – 140) 11.0 (0-20; 140+)
Proposed Road 6	Local Street	9.0
Proposed Road 7	Local Street *	9.0
Proposed Road 8	Local Street	9.0
Proposed Road 9	Local Street	9.0
Proposed Road 10	Local Street	9.0
Proposed Road 11	Local Street	9.0

*The table above shows the predominant dimensions. These may vary slightly from what has been shown. Park Edge roads have reduced verge width.

A section of the Proposed Road 5 between chainage 20 and 140 has been designed with a reduced verge and pavement width to minimise impacts on the environmentally protected areas to the north and south of the road. The adopted cross-section shown on Drawing C140-AA007094-07 in Appendix A, shows two 3.5m lanes without the additional 2m parking zones on each side of the road. Safety barriers (guard rails) have been adopted on both sides of the road to help in minimizing the total width. No verge is proposed on the northern edge of the road. Along the southern edge a 2.5m wide elevated platform will be provided as a pedestrian connection between the wider sections of the road.

All roads will be provided with mountable layback kerb and channel along both edges.

The exception to the above is for "Park Edge" roads that run adjacent to either open space or environmental areas. In this instance a "barrier" style kerb and gutter will be used along with a reduced verge width. This verge width may vary depending on the requirements for paths and guard rail as mentioned above. The typical road cross sections within the current Development Approval package show these details.

Refer also "Response to Information Request dated 11/05/2016 Items 3". Inserted below.

3 To be noted: Plan C140 Rev 04. Ch 0 to 110 - MC1004 has a narrowing of the pavement to lessen the impact on environmental grounds with barriers and an elevated pedestrian platform. Plan C122 indicates retaining walls up to 1.5m with a pedestrian walkway on the side. -The width will need to be 2.5m wide to comply with cycleway standards and suitable balustrading to elevated walkways.

Arcadis has amended Plan C140 to show a 2.5m wide pedestrian walkway to comply with Council's cycleway standards. Suitable balustrading will be provided with details provided during Construction Certificate Application.

4.1.3 ROAD GRADING

Roads have been graded to ensure that parameters as presented in NRLG's 'Development and Subdivision of Land, 2006' are met. Table 4-2 presents minimum, maximum and typical road grades proposed for Iron Gates Residential Subdivision.

Table 4-2 Summary of Minimum and Maximum Road Grades Used

Road Type	Minimum Road Grade	Maximum Road Grade
Local Street	0.5%	16.0%
Collector Street	0.5%	5.5%
Fire Trail	0.5%	2.5%

All roads have generally been designed with 3% cross fall.

4.1.4 ROAD PAVEMENT

Preliminary flexible road pavement designs have been prepared based on assumed subgrade CBR of 3.0% and presented in the design drawings. These designs are indicative only and subject to detail design and actual subgrade testing.

Table 4-3 below presents a summary of design criteria and overall pavement thickness for the site:

Table 4-3 Summary of Design Criteria for Pavement Thickness

	Local Access	Local Road	Collector Road
ESA #	$3x10^5$	$3x10^5$	$1x10^6$
Assumed CBR	3.0%	3.0%	3.0%
Asphaltic Concrete (AC 10)	50 mm*	50 mm*	50 mm*
Base	150 mm	150 mm	150 mm
Sub Base	150 mm	250 mm	360 mm
Total Pavement Thickness	350 mm	450 mm	560 mm

*2x25mm AC-10 – 2nd layer postponed until the majority of houses are constructed and occupied.

ESA extracted from section D2.04 Design Traffic of the Northern Rivers' Development Design Specification D2, Pavement Design

4.1.5 FOOTPATH

Footpaths will be provided generally in accordance with NRLG's standard drawing R07. Shared paths for collector roads are intended to be provided at the time of construction. All footpaths within local roads are proposed to be postponed until the majority of the houses are constructed and occupied.

4.2 EXTERNAL ROADS - IRON GATES DRIVE

As Iron Gates Drive has been constructed approximately 20 years ago and the original design information is not easily available, the road has been assessed via a recent topographic survey to determine the original design intent. The assessment has been split into Horizontal Alignment, Vertical Grades, Design Speed, Cross Section, Pavement and Pedestrian Facilities.

In order to determine if the existing road would comply with current standards the design has been compared to the current Northern Rivers Local Government Guidelines for Development and Subdivision of Land and AUSTROADS.

4.2.1 HORIZONTAL ALIGNMENT

The existing road has been surveyed and imported into the 12D modelling software. From there an alignment was produced to create a best fit to the existing surveyed centreline.

The horizontal alignment consists of a series of straights and horizontal curves. The radii of these existing curves were noted to vary from R150m to R1750m. The R150 occurs at the southern end of Iron Gates Drive joining to an existing roundabout within the future development.

4.2.2 VERTICAL ALIGNMENT

The existing road vertical alignment has been assessed by matching a design alignment to the surveyed centreline as closely as possible. The longitudinal grades of the existing pavement have been determined to vary between 0.35% to 2.1% (approximately). The grading technique used consists of a series of crests and four sags to combat the original flat terrain.

A long section has been provided within Appendix E.

4.2.3 CROSS SECTION AND PAVEMENT

The existing cross section has been assessed based on the existing topographic survey. The assessment shows the existing section represents a Rural Residential profile in accordance with the D1.27 Carriageways section of the Geometric Road Design Aus-Spec for Northern Rivers – Local Government, Table T1.27. This table nominates 6m seal with 1m shoulders for rural roadways up to 500AADT and for rural residential roads. The existing profile consists of a pavement width of approximately 6m at 3% cross fall with varying verge widths consistent with the guidelines. It should be noted that in some areas the road does not have the full 1m shoulder as required within T1.27.

Figure 4-2, an extract from Northern Rivers Local Government Guidelines for Development, shows 7.5m seal and 1.5m shoulders for major roads over 1000 AADT. Iron Gates Drive will need to be classified as a Rural Major Road (over 1000AADT with 2×10^6 design ESAs) based on the proposed residential population.

D1.27 CARRIAGEWAYS

1. Carriageway widths for rural roads should generally be as follows:

Table T 1.27 – Carriageway and seal widths for rural roads

Local Government Area	Minor no through road up to 150 AADT	Minor road up to 1000 AADT	Major road over 1000 AADT	Rural Residential
Ballina **Byron** **Kyogle** **Richmond Valley** **Clarence Valley**	6m seal 0.5m shoulders	150 – 500 AADT 6m seal 1m shoulders 500 – 1000 AADT 7m seal 1.0m shoulders	7.5m seal 1.5m shoulders	6m seal 1m shoulders
Lismore	See City of Lismore Development Control Plan No. 28 - Subdivision			

2. Carriageway width to existing road shall generally be in accordance with Table T1.27 but shall be assessed on merit for individual applications for a reduced standard at the discretion of the Director of Engineering Services or delegated officer

Figure 4-2 NRLG Road Carriageway widths

The guidelines also state that carriageway width to an existing road shall generally be in accordance with Table T1.27 but shall be assessed on merit for individual applications for a reduced standard at the discretion of the Director of Engineering Services or delegated officer.

On areas of horizontal curves, super elevation has been provided to a maximum of 5% cross fall. Two typical road cross sections have been detailed within the Engineering Plans in Appendix E.

4.2.4 PEDESTRIAN FACILITIES

The existing road has a 2m wide concrete footpath on the southern side running the full length of the road. A duplication of this path has not been considered.

4.2.5 DESIGN SPEED

Based on the above, the current road geometry and future amendments, the design speed has been determined to be 70km/hr which incorporates a minimum horizontal radii of 200m with 5% super elevation. It should be noted that the radius 150m at the connection the existing roundabout is used to slow driver speeds as they approach the roundabout.

Both the vertical grading and horizontal alignment provide sufficient stopping sight distance for a 70m/hr design speed. It is recommended that the signed speed for Iron Gates Drive to be 60km/hr.

4.2.6 IRON GATES DRIVE COMPLIANCE

Arcadis has reviewed the cross section of the existing Iron Gates Drive in relation to the Northern Rivers Geometric Road Design in particular section D1.27 which reads “Carriageway width to existing road shall generally be in accordance with Table T1.27, but shall be assessed on merit for individual applications for a reduced standard at the discretion of the Director of Engineering services or delegated office”.

The existing road profile, which include a 6m sealed carriageway and 1m of shoulders, is insufficient to comply with current bushfire management regulations and standards and therefore must be upgraded prior to the issue of a Subdivision Certificate. An upgrade is proposed to be undertaken with the internal construction works to widen the pavement to an 8m full width carriageway seal and 1m of shoulders to comply with both bushfire management requirements and section D1.27 of the Geometric Road Design Aus-Spec for Northern Rivers – Local Government.

In support of the reduced width application we note that this proposed access road is a section of 60km/h low speed rural road, with low truck volume and is arguably supported by Austroads Table 4.3 Urban Arterial roads width, which shows lanes varying from 3.0 to 3.5 for use in low speed roads with low truck volumes. Additional information and support for the proposed width increase is included in the TTM traffic engineering report.

Table 4-4 below shows the predicted traffic volumes resulting from the proposed development. The existing Iron Gates Drive road construction has capacity for approximately 30% of the entire development, and should be upgraded prior to 30% occupancy (or 50% without any duplex construction).

Table 4-4 Predicted Iron Gates Drive Traffic Volume

Number of House constructions	Annual Average Daily Traffic *
175	1685#

*Based on calculations described in TTM traffic report

Includes 40% duplex allowance

Based on 1685 Average Annual Daily Traffic, Iron Gates Drive should be classed Rural road with over 1000 AADT and therefore 2 x 10^6 design ESA's and a prime and 2 coat flush seal is required in line with AUS-PEC#1.

4.2.7 PROPERTY ACCESS ROAD – FIRE TRAIL

A fire trail will be provided along the eastern boundary of the development to the rear of lots, to ensure that vehicle access is provided to the full perimeter of the development. All perimeter roads and the fire trail will be suitably fitted with water supply infrastructure (mains and hydrants) for use by emergency services. For further information, reference should be made to the Arcadis engineering drawings and Bushfire Management Plan prepared by Bushfire Risk.

5 ROAD STORMWATER DRAINAGE WORKS

5.1 EXISTING STORMWATER DRAINAGE CHARACTERISTICS

The existing site consists of multiple catchments and features an extensive stormwater drainage network that has been inoperative since its construction in the mid 1990's. The network consists of multiple stormwater reticulation pipes ranging in size from Ø375mm at upstream locations to Ø825mm at downstream outlets. The drainage configuration also makes use of open drainage channels collecting stormwater from the various drainage systems to direct stormwater south of the project site towards Evans River.

5.2 PROPOSED STORMWATER DRAINAGE INFRASTRUCTURE

As part of the proposed works the existing open drainage channel along the eastern boundary of proposed lots 1 to 21 will be filled. In addition to the filling of the open channel the proposed road layout and levels has precluded the utilization of any existing drainage infrastructure.

5.2.1 DRAINAGE DESIGN STANDARDS

The proposed road stormwater drainage network has been designed to comply with the Northern Rivers Local Government Handbook of Stormwater Drainage Design – D5-Stormater Drainage Design.

The proposed system will safely convey major and minor flows to the Evans River. Design rainfall intensities have been adopted from Council's Guidelines as follows:

- Minor system - Urban Residential - 5 years ARI
- Major System – 100 year ARI

Stormwater pits have been positioned to suit the proposed road geometry and generally maintain a maximum flow width of 2.5m from face of kerb during the minor design storm event (5 year ARI).

All overland flow paths are designed to cater for the 100 year ARI storm event by maintaining a velocity-depth product of 0.4 or less and maximum flow depth equal or less than 200mm.

5.2.2 HYDRAULICS CALCULATION

The preliminary hydraulic calculation was conducted using PC_DRAIN software using the Rational Method to generate flows.

The model represents all catchments collected via a pit and pipe network designed to cater for the minor flows with considerations to major design storms. All areas are gravity drained with overland flow in excess of pipe capacity safely directed to Evans River.

On grade pits have been assumed to be 10% blocked whilst sag pits have been assumed to be 20% blocked. Field inlets have been assumed with 50% blockage. Minimum lintel size is 2.4m in sags.

MHWS water level have been used as the initial level for the hydraulic grade line calculations with Ku losses being calculated depending on diameter, flows and pipe angles.

150mm Freeboard has been generally maintained to top of grate levels for the design storm in accordance with Council guidelines.

The preliminary pipe diameter is presented in the engineering drawings Appendix A.

5.2.3 OVERLAND FLOW CHECK

Generally overland flow in excess of pipe capacity will be contained within the road corridor and will comply with Councils flood safety design criteria. In a single location (Proposed Road 10) flows in excess of pipe capacity will be conveyed overland through a dedicated open space between lots 108, 104, 118 and 103.

Based on the preliminary stormwater assessment approximately 0.23 m3/s will travel south at the previously discussed location with maximum 0.08m depth and 0.04 vxd.

6 ON SITE DETENTION

Due to the proximity of the development to the river mouth an investigation was conducted by BMT WBM to show that in this case, the application of detention devices would not achieve the desirable effects of stormwater flow mitigation, rather worsening flows overall in the regional catchment if flows from the development were detained.

As discussed in the NSW Floodplain Development Manual, consideration must be given on a merit based approach in such circumstances where the use of OSD may counterproductive, and in turn a traditional rapid disposal method is more applicable, where stormwater is discharged readily from developed areas in the lower portion of regional catchments. The WBM Study concluded that "by directly discharging runoff into the river, the water can be drained from the Evans River system with the receding tide. Most runoff will then be drained prior to the larger, regional flows passing through the Evans River, either from Upper Evans River catchment runoff or from Richmond River overflow. Therefore, BMT WBM recommends against using OSD to delay the release of floodwaters from the proposed development site."

Based on the WBM BMT study the site will not provide OSD. The full study is included in Appendix C.

7 WATER QUALITY

Water quality areas on the Site have been modelled and designed in accordance with the 'Draft NSW MUSIC Modelling Guidelines'- WBM BMT August 2010 and the Richmond Valley Development Control Plan 2012 – Section I9: Water Sensitive Urban Design. Accordingly, the objectives of this element are to:

- Protect the values and quality of receiving waters for human (commercial, recreational, aesthetic, public health) and ecological purposes.
- Promote and implement stormwater quality source control.
- Implement appropriate and safe stormwater quality devices for the target pollutant and site conditions.

Applicable water quality performance targets are provided within the Richmond Valley Development Control Plan 2012 – Section I9.4.3 and are detailed in Table 7-1 below:

Table 7-1 Stormwater Quality Targets Extract

Contaminant	Target
Coarse Sediment - 0.1 to 0.5mm (Total Suspended Solids)	80%
Total Phosphorus	45%
Total Nitrogen	45%
Litter (Gross Pollutants)	70%

7.1 SOURCE NODE INPUT DATA

Water quality assessment has been undertaken using MUSIC computer software (Version 6.1.0). Catchments have been estimated from CAD base drawings assuming road areas as 70% impervious (based on CoGC standard road sections considering verge and footpath) and allotment areas being comprised of 70% roof area and 30% ground area, of which 30% of this ground area has been considered to be impervious.

The site has been delineated into three primary catchments, illustrated on the engineering drawings included in Appendix A for reference.

- Catchment A – The northern portion of the site discharging towards the northern boundary;
- Catchment B – The area of the site located to the north-east of the central ecological zone discharging towards the Evans River; and
- Catchment C – The south-western area of the site, split into three sub-catchments each discharging to a segment of bio-retention before discharging towards the Evans River.

A summary of the modelled MUSIC source nodes and their assumed imperviousness has been provided in Table 7-2 below:

Table 7-2 Summary of Source Node Imperviousness

Source Node	MUSIC Source Node	Imperviousness (%)	Area (ha)
A-Roof Source Node	Residential Roof	100	0.661
A-Road Source Node	Residential Road	70	0.595
A-Ground Source Node	Residential Ground	30	0.284
B-Roof Source Node	Residential Roof	100	3.530
B-Road Source Node	Residential Road	70	2.209
B-Ground Source Node	Residential Ground	30	1.513
B-Road Bypass Source Node	Residential Road	70	0.374
C1-Roof Source Node	Residential Roof	100	0.471
C1-Road Source Node	Residential Road	70	1.057
C1-Ground Source Node	Residential Ground	30	0.202
C2-Roof Source Node	Residential Roof	100	2.273
C2-Road Source Node	Residential Road	70	3.707
C2-Ground Source Node	Residential Ground	30	0.974
C3-Roof Source Node	Residential Roof	100	0.903
C3-Road Source Node	Residential Road	70	0.760
C3-Ground Source Node	Residential Ground	30	0.387

7.2 TREATMENT SYSTEMS INPUT DATA

7.2.1 BIO-RETENTION AREAS

The bio-retention areas have been designed specifically in accordance with Water by Design Bio-Retention Technical Design Guidelines (2014). A saturated zone has been implemented in the bio-retention basin within catchment B improving the denitrification process and allowing for additional moisture storage for plant sustenance. The remaining proposed bio-retention basins have been designed without submerged zones. General parameters for the bio-retention areas have been modelled as per the tables below:

Table 7-3 Summary of Proposed Bio-retention Properties

Parameter	Value			
	Bio B	Bio C1	Bio C2	Bio C3
Surface Area (m²)	95	80	225	200
Filter Area (m²)	80	75	210	180
Extended Detention Depth (m)	0.3	0.3	0.3	0.3
Filter Media Depth (m)	0.4	0.4	0.4	0.4
Weir Width (m)	4	4	4	4
Submerged Zone with Carbon	Yes	No	No	No

Table 7-4 Summary of Proposed Bio-retention Dimensions

Parameter	Value
	All Bio-Retention Basins
Hydraulic Conductivity	200mm/hr
Orthophosphate Content	40mg/kg
TN Content of Filter Media	400mg/kg
Base Lined?	Yes
Vegetation Properties	Vegetated with effective nutrient removal plants

7.2.2 GROSS POLLUTANT TRAPS

The gross pollutant traps included in the treatment train have been designed as per the Draft MUSIC Modelling Guidelines for New South Wales (August 2010 issue). Four GPTs have been proposed for the site, to be used as pre-treatment devices before discharge into secondary treatment devices (bio-retention basins). The minimum performance criteria have been adopted, stated below:

Table 7-5 GPT Treatment Not Inputs Extract (Adopted from Alison et al 1998)

Parameter	Value	
	Input (mg/L)	Output (mg/L)
Total Suspended Solids (TSS)	0	0
	75	75
	1000	350
Total Phosphorus (TP)	0.00	0.00
	0.50	0.50
	1.00	0.85
Total Nitrogen (TN)	0.0	0.0
	0.5	0.5
	5.0	4.3
Gross Pollutants	0	0
	15	1.5

7.2.3 INFILTRATION PITS

Due to existing soil conditions comprising high infiltration rates (refer to Appendix D for geotechnical investigation results), infiltration pit systems have been introduced into the treatment train in Catchments A & B to supplement the proposed bio-retention and swale systems. Individual infiltration pits are proposed on a per lot basis to allow for further treatment of roof areas (modelled as lumped infiltration system for lumped roof catchment areas).

The proposed infiltration pits have been designed as per the Draft MUSIC Modelling Guidelines for New South Wales (August 2010 issue) with exfiltration rates confirmed from geotechnical investigations. Additionally, these infiltration pits have been designed to provide sufficient capacity to store inflow for a 1 in 3 month Average Recurrence Interval storm event with emptying time of less than 24 hours (approximately 2.5m3 storage for 150m2 of roof area with fill at 30mm nominal particle size).

It should be noted that lots generally drain to the front of lot towards the adjacent road reserve. These infiltration systems are not proposed in lieu of inter allotment drainage, with their sole purpose being to act as stormwater quality treatment devices. All flows in excess of infiltration capacity will be directed to the road reserve where inter allotment drainage is not proposed. General parameters for the infiltration pits have been modelled as per Table 7-6 below:

Table 7-6 Summary of Proposed Infiltration Pit Parameters

Parameter	Catchment A	Catchment B
Total Surface Area (m²)	73	389
Total Filter Area (m^2)	73	389
Total Unlined Filter Media Perimeter (m)	34.2	79
Surface Area per Lot (m^2)	4.86	
Filter Area per Lot (m^2)	4.86	
Unlined Filter Media Perimeter per Lot (m)	8.82	
Extended Detention Depth (m)	1	
Infiltration Media Depth (m)	0.4	
Exfiltration Rate (mm/hr)	180 (Geotechnical Investigations revealed generally higher values but minimum hydraulic conductivity conservatively adopted)	
Evaporative Loss	0% of PET	

A typical drainage strategy is represented in Figure 7-1 below:

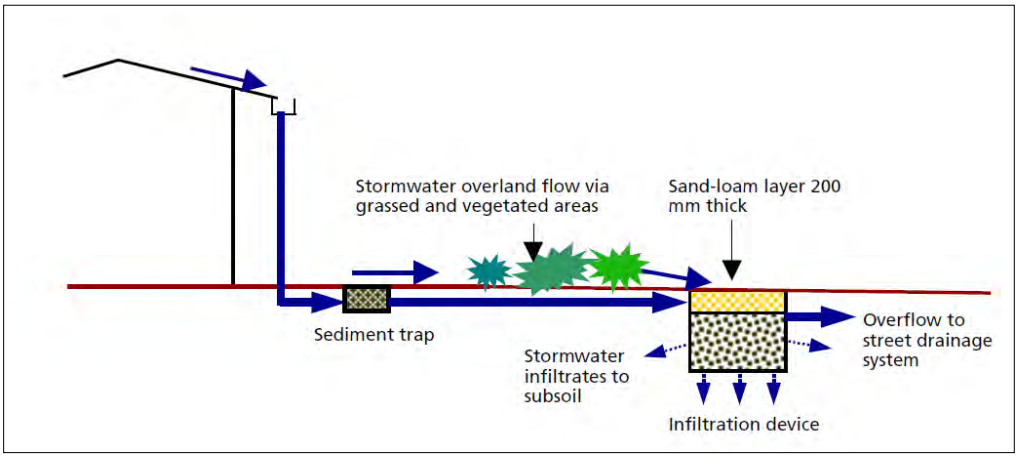


Figure 7-1 Typical Drainage Strategy

Refer also to "Response to Information Request dated 11/05/2016 Item 5"

5 Section 7.2.3 Infiltration pits are 1m deep and almost $5m^2$. Council has concerns;

What are the risks to a saturated sub base for the roads?
To avoid any risks of saturating road sub-base, all roads will be provided with subsurface drainage in accordance with The Northern River Council Specs.

Impact to/from driveways?
Driveways will be coordinated during detailed design to avoid clashes with drainage system.

How is overflow from the pits to be managed without causing nuisance stormwater flows to adjoining land owners. Council preference is for the overflow to be discharged to street kerb or via Internal Allotment Drainage (IAD).

Flows will be captured and conveyed to the infiltration system, with overflow being directed to the street kerb system. Refer figures 4 and 5 below shows a typical infiltration system details. It should also be noted that all proposed lots typically fall to the road with no inter allotment needed.

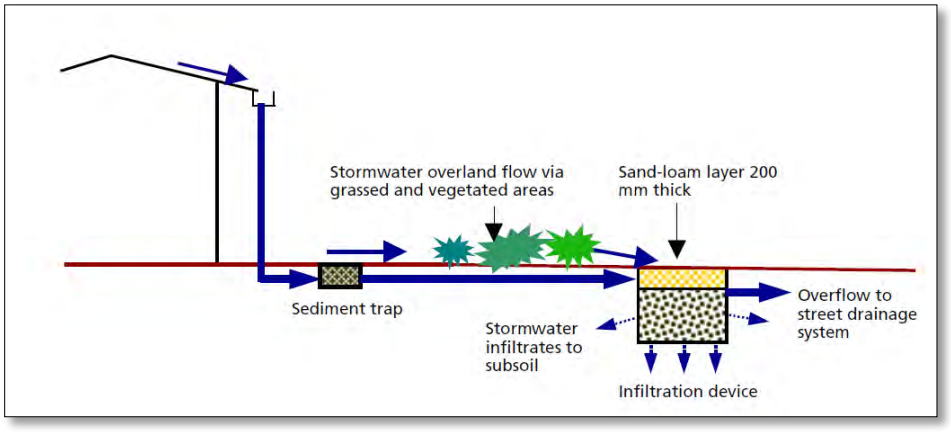


Figure 2- Typical Infiltration Strategy

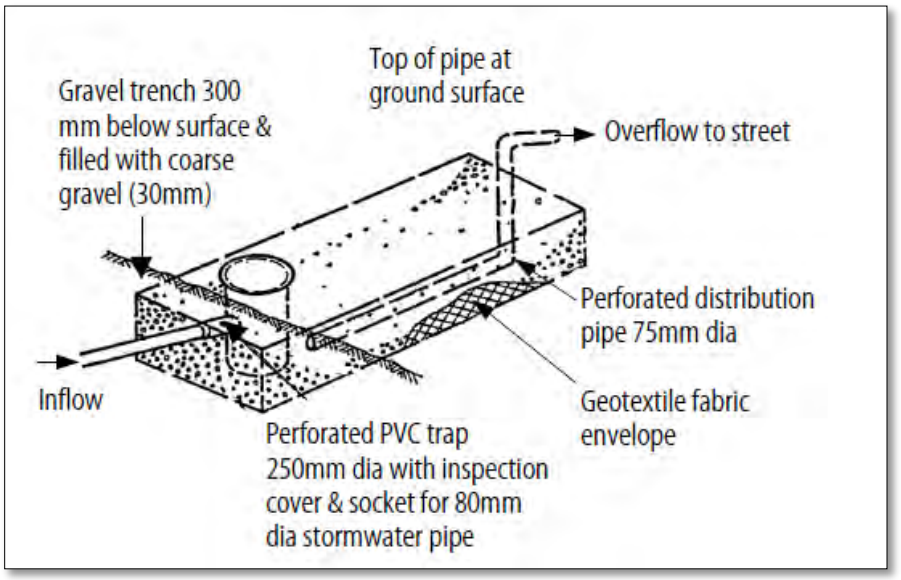


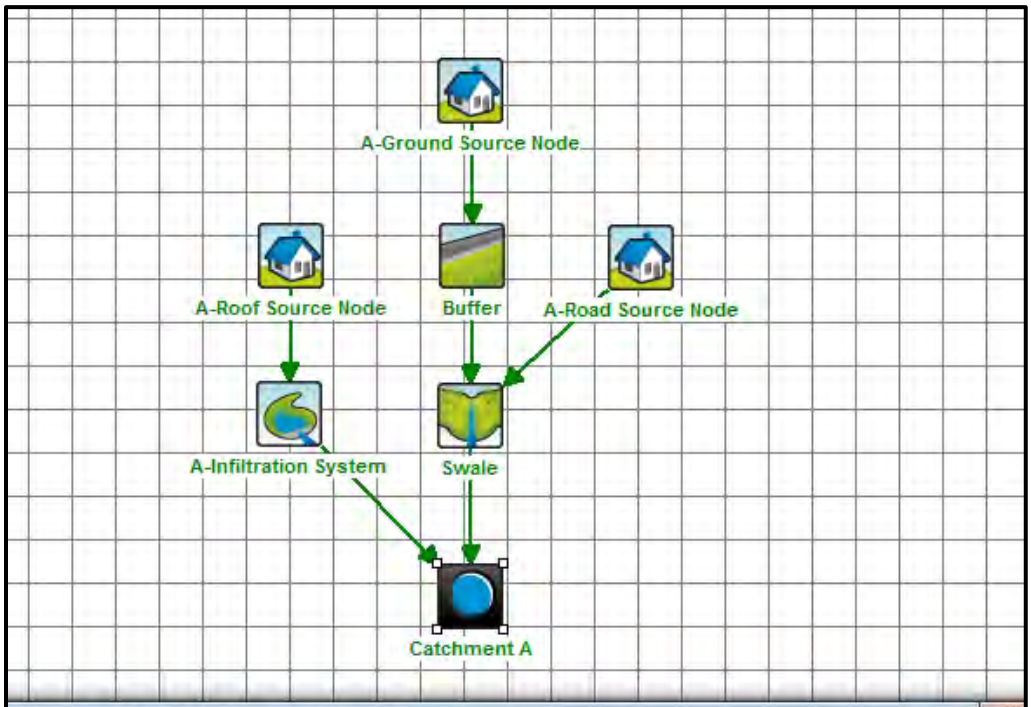
Figure 3- Infiltration System Details

- How are the pits be protected from future owners constructing over the pits or reducing the effectiveness of the pit. An easement on tittle may be an appropriate method to protect this infrastructure.

An easement for Stormwater will be provided over each device. This will be detailed during the detailed design phase of the project.

7.3 MUSIC MODELLING RESULTS

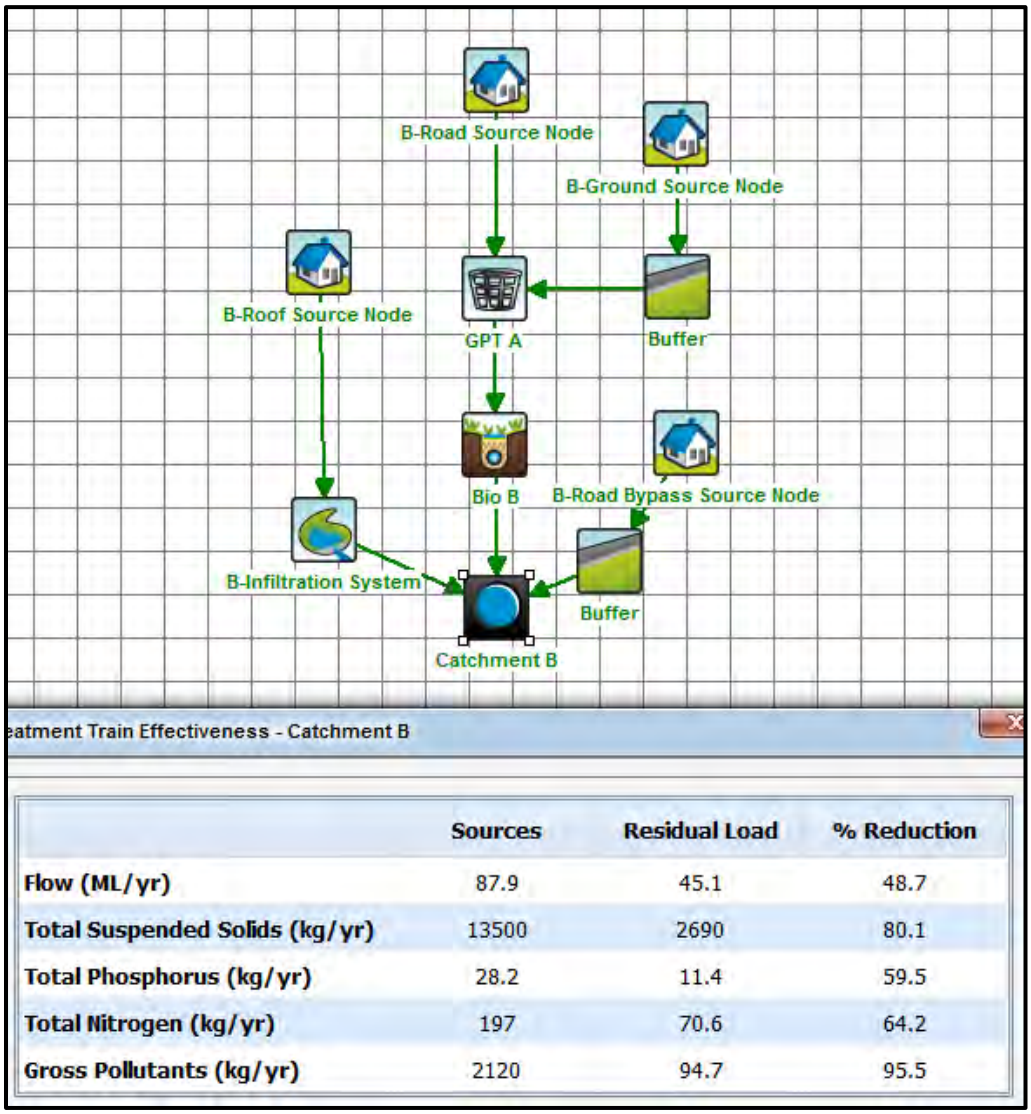
The developed site has been modelled in accordance with the sub-catchment regime to ensure each catchment meets pollutant reduction objectives as presented in Figure 7-4, Figure 7-5 and Figure 7-4 below.



eatment Train Effectiveness - Catchment A

	Sources	Residual Load	% Reduction
Flow (ML/yr)	17.6	9.22	47.7
Total Suspended Solids (kg/yr)	2850	540	81.1
Total Phosphorus (kg/yr)	6.01	1.94	67.7
Total Nitrogen (kg/yr)	39.5	18.8	52.4
Gross Pollutants (kg/yr)	425	0	100

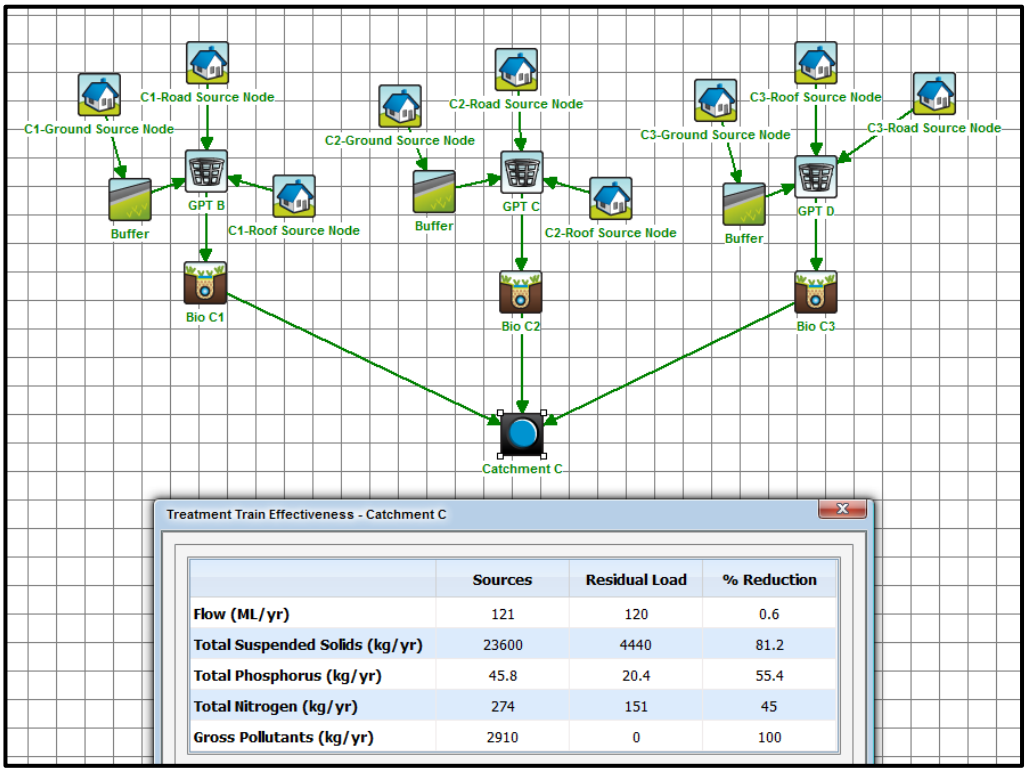
Figure 7-4 Catchment A MUSIC Layout and Pollutant Reduction Results



eatment Train Effectiveness - Catchment B

	Sources	Residual Load	% Reduction
Flow (ML/yr)	87.9	45.1	48.7
Total Suspended Solids (kg/yr)	13500	2690	80.1
Total Phosphorus (kg/yr)	28.2	11.4	59.5
Total Nitrogen (kg/yr)	197	70.6	64.2
Gross Pollutants (kg/yr)	2120	94.7	95.5

Figure 7-5 Catchment B MUSIC Layout and Pollutant Reduction Results



	Sources	Residual Load	% Reduction
Flow (ML/yr)	121	120	0.6
Total Suspended Solids (kg/yr)	23600	4440	81.2
Total Phosphorus (kg/yr)	45.8	20.4	55.4
Total Nitrogen (kg/yr)	274	151	45
Gross Pollutants (kg/yr)	2910	0	100

Figure 7-6 Catchment C MUSIC Layout and Pollutant Reduction Results

8 SEDIMENT AND EROSION CONTROL

Erosion and sediment control will be installed and maintained in accordance with NRLG's requirements and Landcom's Managing Urban Stormwater, Soils and Construction ('Blue Book').

9 PROPOSED UTILITY SERVICES PROVISION

9.1 POTABLE WATER

9.1.1 EXISTING WATER SUPPLY INFRASTRUCTURE

The site features an existing water reticulation system located within the verge of the existing road network. This reticulation features pipes ranging from Ø100mm to Ø300mm designed to service a previous lot layout.

Connection to the project site is currently through the Ø300mm main located within the Iron Gates Drive road reserve which runs along the length of Iron Gates Drive – Wattle Street before turning through Mangrove Street and connecting to the existing Ø250mm AC main located within the eastern verge of Elm Street.

9.1.2 PROPOSED WATER SUPPLY INFRASTRUCTURE

Connection for the proposed development to the RVC water supply network will be provided via a connection to the existing Ø300mm main located south-east of the project site within the Iron Gates Drive reserve. Again, it is proposed to maximise utilisation of the existing network however the adequacy of the current water reticulation is to be determined to ensure compliance with RVC standards. The internal potable water network shall be the subject of detailed design during the Construction Certification phase of the project.

9.1.3 PROJECTED DEVELOPMENT LOADINGS

Network Loadings

The development has been assessed under two loading cases in order to better determine the anticipated impact it will have on the surrounding network. These cases are the:

- **Planned Demand** – A demand assigned to the site via discussions with Richmond Valley Council based on the Evans Head Future Sewage Strategy report;
- **Actual Demand** – The calculated demand for the property based on proposed architect plans and conversion rates from the 'AUS-SPEC#1 Development and Design Manual'.

In accordance with the 'AUS-SPEC#1 Development and Design Manual'; section D11.06, Table 9-1 and Table 9-2 below show the calculations of Equivalent Persons (EPs) derived from both discussions with Richmond Valley Council and what is actually proposed on site.

Table 9-1 RVC Planned Demand as per Pre-Lodgement Meeting Minutes

Category	Conversion Rate (EP/ET)	Planned Demand (ET)	Planned Demand (EP)*
RVC Current Water Allowance	3.2	**100**	**320**

*3.2EP/ET – AUS-SPEC#1 Development and Design Manual D11.06

There are 175 lots proposed on site. 105 of these are assumed to have a loading of 1ET (3.2EP) per lot as per the RVC Development Guidelines. The other 70 have been assumed to be dual occupancy and have an applied loading of 2ET (6.4EP) per lot

Table 9-2 Proposed Development Loadings

Category	Units (No.)	Demand Rate (ET/unit)	Proposed Demand (ET)	Conversion Rate (EP/ET)	Proposed Demand (EP)*
Standard Single Dwelling Unit	105	1	105	3.2	**336**
Standard Dual Dwelling Unit	70	2	140	3.2	**448**
		Total	**245**		**784**

*3.2EP/ET – AUS-SPEC#1 Development and Design Manual D11.06

The difference in EPs between what has been planned and what is proposed is therefore **464 EPs**.

There is a difference between the current planned case as per Council's Local Area Plan and the developed case equivalent tenement calculations of 464 EP. A detailed assessment of the impact of increased loadings on the surrounding water infrastructure have been undertaken in the 'F0001-10027302-AAR' prepared by Arcadis and included in Appendix G.

9.1.4 INTERNAL WATER NETWORK

The developer shall, as part of the development works, construct an internal water reticulation service for the proposed development in accordance with the relevant building code requirements.

A water network design will be undertaken by a qualified hydraulic engineer for the proposed development to determine adequate levels of services for all internal firefighting flows and services demands.

9.1.5 CAPACITY OF EXISTING EXTERNAL WATER

A Water Network Capacity Assessment has been undertaken to determine the effects of the development on the surrounding water infrastructure. The assessment prepared by Arcadis in Appendix G indicates that once fully developed and in-use, the Iron Gates development will have no additional impact on the Evans head potable water network. This is true for both standard and fire flow events.

9.2 SEWER

9.2.1 EXISTING SEWERAGE INFRASTRUCTURE

The project site currently possesses a sewerage reticulation network dating back to a previous development attempt, consisting of Ø225mm mains cumulating at the south-east corner of the project site where a pump station is located. This station is equipped with a dual rising main configuration consisting of two Ø100mm rising mains, one which was to be used to cater for the first stage of the previous Development Application and a second to service future developments.

These rising mains are located within the Iron Gates Drive road reserve and follow Iron Gates Drive through Wattle Street and Mangrove Street to an existing Ø150mm gravity main.

9.2.2 PROPOSED SEWERAGE SUPPLY INFRASTRUCTURE

Connection for the proposed development to the RVC sewerage network will be provided via a sewerage reticulation network internal to the project site subject to a detailed sewer network capacity assessment ensuring adequate capacities are provided to service the development. Connection to the existing DN 100 rising main is to occur from the existing south-eastern pump station, to be pumped along Iron Gates Drive to the connection point in Mangrove Street. This connection point will be confirmed during detailed design with further discussion with RVC engineers.

Refer also to “Response to Information Request dated 11/05/2016 Items 4”

4 Section 9.2.2; please explain what is the comparison between the original ET loading that was the input for the dual rising main, and the proposed ET loading now by the proposed subdivision. Council needs to ensure the existing infrastructure is suitably sized for the proposed development.

The report entitled Iron Gates Residential Development Engineering Services and Civil Infrastructure Rev 06 dated 10/05/2016 has been amended to make allowance for the existing lots, currently connected to the DN150 gravity sewer in Mangrove Street upstream of the existing EHPS-02 pump station. Please refer to attached sewer calculations and Section 9 of the report.

9.2.3 PROJECTED DEVELOPMENT LOADINGS

Network Loadings

The development has been assessed under two loading cases in order to better determine the anticipated impact it will have on the surrounding network. These cases are the:

- **Planned Demand** – A demand assigned to the site via discussions with Richmond Valley Council based on the Evans Head Future Sewage Strategy report;
- **Actual Demand** – The calculated demand for the property based on proposed architect plans and conversion rates from the ‘AUS-SPEC#1 Development and Design Manual’.

In accordance with the 'AUS-SPEC#1 Development and Design Manual'; section D12.06, Table 9-3 and Table 9-4 below show the calculations of Equivalent Persons (EPs) derived from both discussions with Richmond Valley Council and what is actually proposed on site. For the sewer EP calculations, the EP/ET conversion rate is taken from the GHD report which forms the basis for RVC's future sewer planning strategy.

Table 9-3 RVC Planned Demand as per Pre-Lodgement Meeting Minutes

Category	Conversion Rate (EP/ET)	Planned Demand (ET)	Planned Demand (EP)*
RVC Current Sewer Allowance	2.3	100	230

*2.3EP/ET – GHD (2010) Sewer Planning Report

There are 175 lots proposed on site. 105 of these are assumed to have a loading of 1ET (3.2EP) per lot as per the RVC Development Guidelines. The other 70 have been assumed to be dual occupancy and have an applied loading of 2ET (6.4EP) per lot

Table 9-4 Proposed Development Loadings

Category	Units (No.)	Demand Rate (ET/unit)	Proposed Demand (ET)	Conversion Rate (EP/ET)	Proposed Demand (EP)*
Standard Single Dwelling Unit	105	1	105	2.3	**241.5**
Standard Dual Dwelling Unit	70	2	140	2.3	**322**
		Total	**245**		**563.5**

*2.3EP/ET – GHD (2010) Sewer Planning Report

The difference in EPs between what has been planned and what is proposed is therefore **333.5 EPs**.

9.2.4 CAPACITY OF EXISTING EXTERNAL SEWER

Due to the proposed loads imposed on the existing external sewerage network a preliminary assessment has been undertaken to determine whether it has sufficient capacity. A report prepared by GHD in May 2010 titled "*Review of Evans Head Sewerage Augmentation Strategy"* includes an assessment of various augmentation strategies in order to upgrade the existing Richmond Valley Council sewerage system to cater for future development.

After discussions with RVC engineers, Arcadis undertook detailed calculations using the general strategy adopted by RVC to cater for future development in the sewer network to determine whether sufficient capacity was for the Iron Gates development. These calculations and a discussion on the findings are found in the Arcadis Sewer Network Capacity Assessment in Appendix H. The assessment found that sufficient capacity was available in the Evans Head pump station 2 (EHPS-02) catchment, with no augmentations to the RVC future sewer planning strategy required.

A brief assessment of the 150mm diameter sewer gravity main in Mangrove Street that serves as the SRM connection point has been undertaken to ensure that it has sufficient capacity to cater for the additional flows from the Iron Gates development.

Currently there are approximately 60 Lots within the catchment connected to the DN 150 gravity sewer upstream of the EHPS-02. The DN 150 gravity pipe will have some capacity to accept flows from the Iron Gates estate, with the Sewer Network Capacity Assessment prepared by Arcadis indicating that the Iron Gates development has a total developed flow of 9.29L/s. The capacity of the 150mm diameter pipe at minimum grade is 11.35L/s. A detailed assessment of this pipe's capacity will be undertaken during Construction Certificate stage.

9.3 ELECTRICAL AND TELECOMMUNICATIONS SERVICES

The existing site is not equipped with electrical reticulation infrastructure however 'Essential Energy' Dial Before You Dig (DBYD) results have revealed the presence of an underground or earth wire structure within the south-western corner of the project site. Two electrical poles have also been located within the site in alignment with a service track to the north of the site. It is understood that the proposed development must incorporate an internal low-voltage electricity supply to all facilities within the development in order to comply with relevant legislation. Connection to electrical reticulation is proposed via infrastructure within Iron Gates Drive with ultimate connection in Wattle Street within Evans Head. Refer to Preferred Energy electrical consultants Electrical and Telecommunications Supply Availability in Appendix M for further detail and Appendix B for DBYD results.

Telecommunication services have been identified in the immediate surroundings of the site, with an underground telecommunication network being situated within the project site. This network is not connected to any working infrastructure and is therefore not live at this stage. Two elevated cable joints are also identified in the adjacent lot towards the west (Lot 163 DP831052), connecting to an elevated cable joint in Blue Pool Road. Telecommunications connection for the site will be made through new infrastructure through a design and submit process with NBN as outlined in the Electrical and Telecommunications Supply Availability in Appendix M.

Connection from the proposed development to the above-mentioned services will be undertaken by a specialist consultant and will form part of the future Construction Certification applications and approval processes through the relevant service providers.

A Level 3 Energy Accredited Service Provider will undertake the design and documentation of the electrical reticulation network. Street lighting will be installed in accordance with Authority standards and in accordance with the relevant conditions of approval and supporting consultant reports.

9.4 GAS

No allowance has been made to supply the development with reticulated gas. This will be subject to future agreement between the developer and local gas suppliers.

9.5 TESTING OF EXISTING INFRASTRUCTURE

There are areas of the development where it is proposed to utilise existing infrastructure constructed as part of a previous development design. Where this is proposed the infrastructure will be tested to ensure that it is of an appropriate quality as per the RVC Guidelines.

Water

- Pressure testing to detect leakage and defects in the pipeline including joints, thrust and anchor blocks.
- Disinfect all water mains in accordance with the specification in WSA 03 Part 4, section 13.

Sewer

- Compressed air testing of gravitation sewers;
- Ovality testing using a Council approved proving tool. Ovality should comply with the requirements specified in Chapter 402.40 – Initial Test of Gravitation Sewers of the Richmond Valley Council Construction Manual.
- Leakage test of maintenance holes. Tests should comply with Chapter 402.41 – Initial Test of Maintenance Holes of the Richmond Valley Council Construction Manual.
- Hydrostatic testing. Tests should comply with Chapter 402.45 – Hydrostatic testing of gravity mains of the Richmond Valley Council Construction Manual.
- Pressure testing of rising mains. Tests should comply with Chapter 402.47 – Testing of Rising Mains of the Richmond Valley Council Construction Manual.
- Visual inspection via CCTV cameras. Tests should comply with Chapter 402.65 – What is to be inspected of the Richmond Valley Council Construction Manual.

Stormwater

- Visual inspection via CCTV cameras. Tests should comply with Chapter 402.65 – What is to be inspected of the Richmond Valley Council Construction Manual.

10 FLOOD EMERGENCY MANAGEMENT

The proposed developed features 175 residential allotments, with all internal road areas and lot areas constructed above the current 1 in 100 year flood level. Permanent residents and visitors can move freely around the site during flood events up to the 1 in 100 year regional flood. The proposed development is connected to the Evans Head town centre by a single road, being Iron Gates Drive. Iron Gates drive is susceptible to current day 1 in 100 year flooding, with the lowest point inundated by approximately 400mm for 5 hours. It should be noted that this flooding is low velocity back water, and would be considered trafficable if required by emergency vehicles.

The proposed strategy for flood emergency management by residents and visitors will be ‘stay in place’ rather than an evacuation. Under this strategy, site occupants will be encouraged to remain within their homes for the duration of flooding, with medical emergencies to be dealt with by the emergency services. Considering the potential of emergency vehicles to travel through water inundating roads (with low velocity) and the duration of inundation being 5 hours, the development is not considered to be isolated during an emergency event. Residents will stay in place, in their homes, where emergency vehicles can access the site.

In the future sea level rise modelling for a 1 in 100 year flood of the Evans River, Iron Gates Drive will be inundated for a maximum of 9 hours and to a depth of 1.3m. No residential allotments on site will be beneath the 100 year flood level with sea level rise. The development is considered to be no more isolated than the town of Evans Head itself, given the flooding potential of roads leading out of Evans Head, including the currently under construction motorway upgrade. If this height of sea level rise is reached in the future, all medical emergencies in the Evans Head region must be dealt with through aerial evacuation.

11 CONCLUSION

This report has discussed the engineering aspects of the development of the proposed Iron Gates residential estate.

The proposed development is to feature 175 residential allotments that are proposed to utilise as much of the existing infrastructure as possible, including roads, stormwater, sewer and water infrastructure.

This report has demonstrated that the proposed development can be adequately provided with all necessary engineering services, including sewer, water, stormwater drainage, electrical and telecommunication infrastructure. It is assumed that the other existing services which are located within the vicinity of the site can accommodate the proposed development's needs.

A summary of the existing and proposed stormwater drainage infrastructure on site has been presented. The provision of on-site stormwater detention has been shown to be detrimental in the case of this development based on the BMT WBM study identifying a rapid disposal method to be more efficient in the release of flood waters.

To service the development with potable water a single water connection point is proposed to the 300mm diameter potable water main in the Iron Gates Drive verge adjacent to the site, connecting to the existing Ø250mm AC main. A Water Network Capacity Assessment has been undertaken to determine the effects of the development on the surrounding water infrastructure. The assessment prepared by Arcadis in Appendix G indicates that once fully developed and in-use, the Iron Gates development will have no additional impact on the Evans head potable water network. This is true for both standard and fire flow events.

The proposed connection to the RVC sewerage network for the proposed development will be via the dual 100mm diameter rising main adjacent to the project site within the southern verge of Iron Gates Drive, connecting to the existing Ø150mm gravity main. After discussions with RVC engineers, Arcadis undertook detailed calculations using the general strategy adopted by RVC to cater for future development in the sewer network to determine whether sufficient capacity was for the Iron Gates development. These calculations and a discussion on the findings are found in the Arcadis Sewer Network Capacity Assessment in Appendix H. The assessment found that sufficient capacity was available in the Evans Head pump station 2 (EHPS-02) catchment, with no augmentations to the RVC future sewer planning strategy required.

Electrical and telecommunication services shall be provided to the development through connection points through Iron Gates Drive and Wattle Street, from the Evans Head town centre. Electrical and telecommunications supply has been planned for by the relevant service authorities and will be subject to the development Construction Certificate applications. Additional engineering issues such as road access and earthworks have also been presented within the report.

It is anticipated that there will not be any detrimental effects of the proposed development on surrounding properties and that it is possible for all engineering services to be catered for.

APPENDIX A

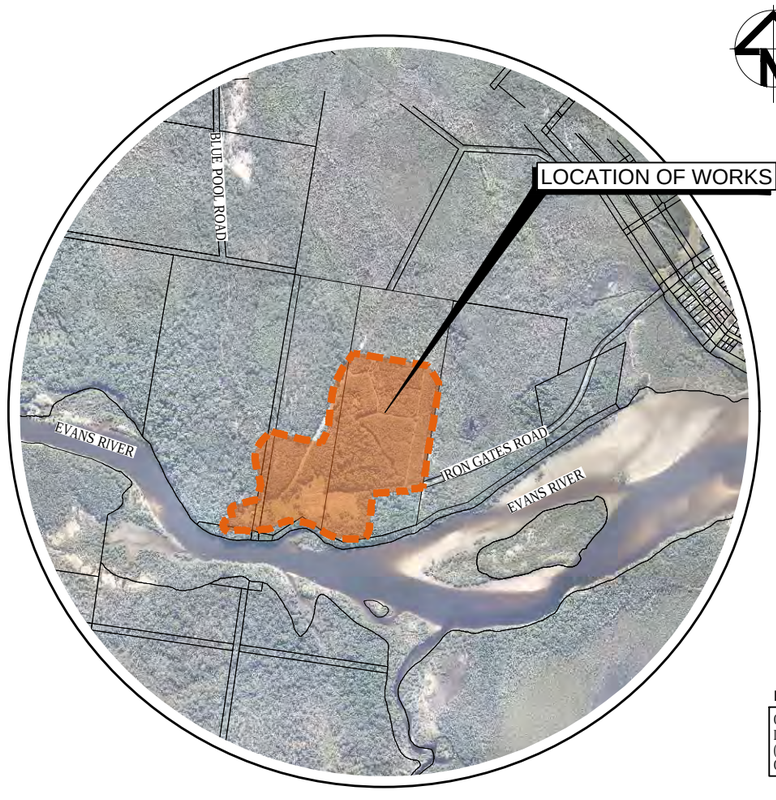
ENGINEERING DRAWINGS

ARCADIS Design & Consultancy for natural and built assets

RESIDENTIAL DEVELOPMENT LOT 277 IRON GATES ROAD EVANS HEAD

DEVELOPMENT APPLICATION
RICHMOND VALLEY COUNCIL

DRAWING SCHEDULE



LOCALITY PLAN
1 : 10000

LEVELS & GRID

ORIGIN PM 83272
LEVELS to AHD
(AUSTRALIAN HEIGHT DATUM)
GRID to GDA94

nearmap IMAGERY EXTRACTED FROM nearmap.com

Issue	Description	By	Ckd	RPEQ	Date
06	ISSUE FOR RFI RESPONSE	RR			18.07.19
05	ISSUE FOR RFI RESPONSE	AC			26.11.18
04	ISSUE FOR RFI RESPONSE			NF	04.04.16
03	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

100mm on Original

Scale
0 100 200 400 600 800 1000m
1 : 10000

Surveyor: ROBERT A HARRIES SURVEYOR

Architect:

Filename: C100-AA007094-gcd-00-DrawingScheduleAndLocalityPlan.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved:

R.P.E.Q No :

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Original Size: A1

Drawn: A. CARDEÑO

Designed: A. MAGONDACAN

Height Datum: AHD

Project Manager: L. PRIZEMAN

Grid: GRID

Project: RESIDENTIAL DEVELOPMENT LOT 277 IRON GATES ROAD EVANS HEAD

Title: DRAWING SCHEDULE AND LOCALITY PLAN

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Drawing No. C100 — Project No. AA007094 — Issue 06

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GENERAL NOTE:

ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH RVC COUNCIL DESIGN GUIDELINES & WORKS SPECIFICATION.
WHERE DISCREPANCIES OCCUR THE MORE STRINGENT SPECIFICATION WILL TAKE PRECEDENCE.

SITEWORKS NOTES

1. CONTRACTOR MUST VERIFY ALL DIMENSIONS AND EXISTING LEVELS ON SITE PRIOR TO COMMENCEMENT OF WORK. ANY DISCREPANCIES TO BE REPORTED TO HYDER CONSULTING.
2. MAKE SMOOTH CONNECTION WITH EXISTING WORKS.
3. ALL TRENCH BACKFILL MATERIAL SHALL BE COMPACTED TO THE SAME DENSITY AS THE ADJACENT MATERIAL.
4. SEWER, POTABLE WATER AND RECYCLED WATERMAINS BACKFILL TO BE IN ACCORDANCE WITH WSA03-2002-2.2, WAT-1201, WAT-1202, WAT-1203 AND WAT-1204-V.
   ALL OTHER SERVICE TRENCHES UNDER VEHICULAR PAVEMENTS SHALL BE BACKFILLED WITH SAND TO 300mm ABOVE PIPE. WHERE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH TO UNDERSIDE OF PAVEMENT WITH SAND OR APPROVED GRANULAR MATERIAL COMPACTED IN 150mm LAYERS TO MINIMUM 98% MODIFIED MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.2.1.
   (OR A DENSITY INDEX OF NOT LESS THAN 70)
5. PROVIDE 10mm WIDE EXPANSION JOINTS BETWEEN BUILDINGS AND ALL CONCRETE OR UNIT PAVEMENTS.
6. ASPHALTIC CONCRETE SHALL CONFORM TO R.T.A. SPECIFICATION R116.
7. ALL BASECOURSE MATERIAL SHALL BE IGNEOUS ROCK QUARRIED MATERIAL TO COMPLY WITH R.T.A. FORM 3051 (UNBOUND), R.T.A. FORM 3052 (BOUND) COMPACTED TO MINIMUM 98% MODIFIED DENSITY IN ACCORDANCE WITH AS 1289 5.2.1
   FREQUENCY OF COMPACTION TESTING SHALL NOT BE LESS THAN 1 TEST PER 50m OF BASECOURSE MATERIAL PLACED.
8. ALL SUB-BASE COURSE MATERIAL SHALL BE IGNEOUS ROCK QUARRIED MATERIAL TO COMPLY WITH R.T.A. FORM 3051, 3051.1 AND COMPACTED TO MINIMUM 98% MODIFIED DENSITY IN ACCORDANCE WITH A.S 1289 5.2.1
   FREQUENCY OF COMPACTION TESTING SHALL NOT BE LESS THAN 1 TEST PER 50m OF SUB-BASE COURSE MATERIAL PLACED.
9. AS AN ALTERNATIVE TO THE USE OF IGNEOUS ROCK AS A SUB-BASE MATERIAL IN (9) A CERTIFIED RECYCLED CONCRETE MATERIAL COMPLYING WITH R.T.A. FORM 3051 AND 3051.1 WILL BE CONSIDERED. SUBJECT TO MATERIAL SAMPLES AND APPROPRIATE CERTIFICATIONS BEING PROVIDED TO THE SATISFACTION OF HYDER CONSULTING AND RCV COUNCIL SPEC.
10. SHOULD THE CONTRACTOR WISH TO USE A RECYCLED PRODUCT THIS SHALL BE CLEARLY INDICATED IN THEIR TENDER AND THE PRICE DIFFERENCE BETWEEN AN IGNEOUS PRODUCT AND A RECYCLED PRODUCT SHALL BE CLEARLY INDICATED.
11. WHERE NOTED ON THE DRAWINGS THAT WORKS ARE TO BE CARRIED BY OTHERS, (eg. ADJUSTMENT OF SERVICES), THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CO-ORDINATION OF THESE WORKS.
12. ALL FOOT PATHS AND CYLCEWAYS TO BE IN ACCORDANCE WITH RVC STD DRAWING R-07

GENERAL NOTES

1. ALL WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH COUNCIL'S STANDARDS AND SPECIFICATIONS AND/OR AS DIRECTED BY THE ENGINEER.
2. THE CONTRACTOR SHALL LOCATE AND LEVEL ALL EXISTING SERVICES PRIOR TO COMMENCING CONSTRUCTION AND SHALL MAKE ALL NECESSARY ARRANGEMENTS WITH THE RELEVANT AUTHORITY TO RELOCATE OR ADJUST AS REQUIRED. ALL COSTS TO BE BORNE BY THE APPLICANT, (NOT AT COUNCIL'S EXPENSE)
3. THE CONTRACTOR SHALL NOT ENTER UPON OR DO ANY WORK WITHIN ADJACENT LANDS WITHOUT PRIOR WRITTEN PERMISSION OF THE LAND OWNER.
4. SURVEY MARKS SHOWN THUS ◘ SHALL BE MAINTAINED AT ALL TIMES. WHERE RETENTION IS NOT POSSIBLE THE ENGINEER SHALL BE NOTIFIED AND CONSENT RECEIVED PRIOR TO THEIR REMOVAL OR RELOCATION.
5. ALL NEW WORKS SHALL MAKE SMOOTH JUNCTION WITH EXISTING CONDITIONS.
6. SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED PRIOR TO SOIL DISTURBANCE IN KEEPING WITH THE "MANAGING STORMWATER MANUAL", 2004 BY LANDCOM AND TO COUNCIL'S SOIL EROSION AND SEDIMENT CONTROL POLICY.
7. ALL LAND DISTURBED BY EARTHWORKS SHALL BE HYDROMULCHED, OR SIMILARLY TREATED TO ESTABLISH GRASS COVER. SEED MIXTURES ARE TO BE APPROVED BY COUNCIL PRIOR TO SPRAYING. ALL GRASSED AREAS SHALL BE REGULARLY WATERED AND MAINTAINED UNTIL EXPIRATION OF THE MAINTENANCE PERIOD.
8. THE CONTRACTOR SHALL MAINTAIN DUST CONTROL THROUGHOUT THE DURATION OF THE PROJECT.
9. ALL PITS DEEPER THAN 1.2m SHALL HAVE STEP IRONS PROVIDED IN ACCORDANCE WITH COUNCIL'S STANDARDS.
10. ALL DRAINAGE LINES THROUGH LOTS SHALL BE CONTAINED WITHIN THEIR EASEMENTS AND CONFORM WITH COUNCIL'S STANDARDS.
11. SUBSOIL DRAINS SHALL BE CONSTRUCTED TO THE SATISFACTION OF THE COUNCIL.
12. INTERALLOTMENT DRAINAGE LINES SHALL HAVE A MINIMUM 300mm COVER AND DESIRABLE MINIMUM GRADE OF 1%.
13. MINIMUM 50mm THICK TOPSOIL SHALL BE SPREAD ON ALL FOOTPATHS, BERMS, BATTERS AND SITE REGRADING AREAS. EXCESS TOPSOIL SHALL BE DISPOSED OF AS DIRECTED BY THE ENGINEER.
14. THE CONTRACTOR SHALL PROVIDE MINIMUM 48 HOURS NOTICE TO THE ENGINEER FOR ALL INSPECTIONS.
15. THE CONTRACTOR SHALL MAINTAIN SERVICES AND ALL WEATHER ACCESS AT ALL TIMES TO THE ADJOINING PROPERTIES.
16. THE CONTRACTOR SHALL UNDERTAKE TRAFFIC CONTROL MEASURES TO ENGINEER'S AND RCV COUNCIL SATISFACTION AND SHALL DISPLAY APPROPRIATE WARNING SIGNS THROUGHOUT THE DURATION OF CONSTRUCTION.
17. ALL NATURAL SURFACE DATA HAS BEEN DETERMINED BY TERRAIN MODELLING. ALL CONSTRUCTION SITE WORKS MUST BE CARRIED OUT USING THE BENCH MARKS NOTED ON THIS DRAWING.
18. 100 YEAR FLOW PATHS TO BE FORMED AT TIME OF CONSTRUCTION.

STRUCTURAL INSPECTIONS

1. STRUCTURAL INSPECTIONS ARE REQUIRED FOR STRUCTURES WHERE NOTED ON PLANS OR REQUIRED BY COUNCIL.
2. 48 HOURS NOTICE IS REQUIRED FOR ALL INSPECTIONS.

CONCRETE NOTES

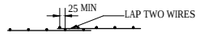
1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS 3600 CURRENT EDITION WITH AMENDMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
2. CONCRETE QUALITY
   ALL REQUIREMENTS OF THE CURRENT ACSE CONCRETE SPECIFICATION DOCUMENT 1 SHALL APPLY TO THE FORMWORK, REINFORCEMENT AND CONCRETE UNLESS NOTED OTHERWISE.

ELEMENT	AS 3600 F'c MPa AT 28 DAYS	SPECIFIED SLUMP	NOMINAL AGG. SIZE
VEHICULAR BASE	32	60	20
KERBS, PATHS, AND PITS	20	80	20
RETAINING WALLS	20	80	20

   - CEMENT TYPE SHALL BE (ACSE SPECIFICATION) TYPE SL
   - PROJECT CONTROL TESTING SHALL BE CARRIED OUT IN ACCORDANCE WITH AS 1379.
3. NO ADMIXTURES SHALL BE USED IN CONCRETE UNLESS APPROVED IN WRITING BY HYDER CONSULTING.
4. CLEAR CONCRETE COVER TO ALL REINFORCEMENT FOR DURABILITY SHALL BE 40mm TOP AND 70mm FOR EXTERNAL EDGES UNLESS NOTED OTHERWISE.
5. ALL REINFORCEMENT SHALL BE FIRMLY SUPPORTED ON MILD STEEL PLASTIC TIPPED CHAIRS, PLASTIC CHAIRS OR CONCRETE CHAIRS AT NOT GREATER THAN 1m CENTRES BOTH WAYS. BARS SHALL BE TIED AT ALTERNATE INTERSECTIONS.
6. THE FINISHED CONCRETE SHALL BE A DENSE HOMOGENEOUS MASS, COMPLETELY FILLING THE FORMWORK, THOROUGHLY EMBEDDING THE REINFORCEMENT AND FREE OF STONE POCKETS. ALL CONCRETE INCLUDING SLABS ON GROUND AND FOOTINGS SHALL BE COMPACTED AND CURED IN ACCORDANCE WITH R.T.A. SPECIFICATION R83.
7. REINFORCEMENT SYMBOLS:
   N DENOTES GRADE 450 N BARS TO AS 4671 GRADE N
   R DENOTES 230 R HOT ROLLED PLAIN BARS TO AS 4671
   SL DENOTES HARD-DRAWN WIRE REINFORCING FABRIC TO AS 4671

   NUMBER OF BARS IN GROUP — BAR GRADE AND TYPE
   17 N 20 250
   NOMINAL BAR SIZE IN mm — SPACING IN mm

   THE FIGURE FOLLOWING THE FABRIC SYMBOL SL IS THE REFERENCE NUMBER FOR FABRIC TO AS 4671.
8. FABRIC SHALL BE LAPPED IN ACCORDANCE WITH THE FOLLOWING DETAIL:



STORMWATER DRAINAGE NOTES

1. STORMWATER DESIGN CRITERIA:
   (A) AVERAGE RECURRENCE INTERVAL:
   ROAD DRAINAGE
   5 YEARS ARI MINOR STORM EVENT
   100 YEARS ARI MAJOR STORM EVENT
   INTER ALLOTMENT DRAINAGE
   5 YEARS ARI STORM EVENT
2. PIPES 375 DIA. AND LARGER TO BE REINFORCED CONCRETE CLASS '2' APPROVED SPIGOT AND SOCKET WITH RUBBER RING JOINTS. U.N.O.
3. PIPES TO BE INSTALLED TO TYPE HS1 SUPPORT IN ACCORDANCE WITH AS 3725 (1989) IN ALL CASES BACKFILL TRENCH WITH SAND TO 300mm ABOVE PIPE. WHERE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH TO UNDERSIDE OF PAVEMENT WITH SAND OR APPROVED GRANULAR MATERIAL COMPACTED IN 150mm LAYERS TO MINIMUM 98% MODIFIED. MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.2.1. (OR A DENSITY INDEX OF NOT LESS THAN 70)
4. ALL INTERNAL WORKS WITHIN PROPERTY BOUNDARIES ARE TO COMPLY WITH THE REQUIREMENTS OF AS 3500 3.1 (1998) AND AS/NZS 3500 3.2 (1998).
5. PRECAST PITS MAY BE USED SUBJECT TO APPROVAL BY HYDER CONSULTING.
6. WHERE SUBSOIL DRAINS PASS UNDER FLOOR SLABS AND VEHICULAR PAVEMENTS, UNSLOTTED uPVC SEWER GRADE PIPE IS TO BE USED.
7. CARE IS TO BE TAKEN WITH LEVELS OF STORMWATER LINES. GRADES SHOWN ARE NOT TO BE REDUCED WITHOUT APPROVAL.
8. GRATES AND COVERS SHALL CONFORM TO BCC REQUIREMENTS AND AS3996
9. AT ALL TIMES DURING CONSTRUCTION OF STORMWATER PITS, ADEQUATE SAFETY PROCEDURES SHALL BE TAKEN TO ENSURE AGAINST THE POSSIBILITY OF PERSONNEL FALLING DOWN PITS.
10. ALL EXISTING STORMWATER DRAINAGE LINES AND PITS THAT ARE TO REMAIN ARE TO BE INSPECTED AND CLEANED. DURING THIS PROCESS ANY PART OF THE STORMWATER DRAINAGE SYSTEM THAT WARRANTS REPAIR SHALL BE REPORTED TO THE SUPERINTENDENT/ENGINEER FOR FURTHER DIRECTIONS.
11. CCTV ALL PIPES AFTER CONSTRUCTION AND PRIOR TO PRACTICAL COMPLETION.
12. PIPES ARE DESIGNED FOR OPERATIONAL TRAFFIC LOADS ONLY. APPROPRIATE MEASURES SHOULD BE TAKEN TO PROTECT PIPES DURING CONSTRUCTION.

BULK EARTHWORKS NOTES

1. ORIGIN OF LEVELS: REFER SURVEY NOTES
2. STRIP ALL TOPSOIL/ORGANIC MATERIAL (50mm NOMINAL) FROM CONSTRUCTION AREA AND REMOVE FROM SITE OR STOCK PILE AS DIRECTED BY SUPERINTENDENT.
3. EXCAVATED MATERIAL TO BE USED AS STRUCTURAL FILL PROVIDED THE PLACEMENT MOISTURE CONTENT OF THE MATERIAL IS +/- 2% OF THE OPTIMUM MOISTURE CONTENT.
4. COMPACT FILL AREAS AND SUBGRADE TO NOT LESS THAN:

LOCATION	MINIMUM DRY DENSITY (AS 1289 E 5.1.1.)
UNDER BUILDING SLABS ON GROUND	95% STD
UNDER ROADS, FOOTWAYS AND CARPARKS	98% STD
LANDSCAPED AREAS UNLESS NOTED OTHERWISE	95% STD

5. BEFORE PLACING FILL, PROOF ROLL EXPOSED SUBGRADE WITH AN 12 TONNE (MIN) DEADWEIGHT SMOOTH DRUM VIBRATORY ROLLER TO DETECT THEN REMOVE SOFT SPOTS (AREAS WITH MORE THAN 2mm MOVEMENT UNDER ROLLER).
6. FREQUENCY OF COMPACTION TESTING SHALL BE NOT LESS THAN :-
   (A) 1 TEST PER 200m^3 OF FILL PLACED PER 200 LAYER OF FILL.
   (B) 3 TESTS PER LAYER
   (C) 1 TEST PER 1000m^2 OF EXPOSED SUBGRADE
   TESTING SHALL BE "LEVEL 1" TESTING IN ACCORDANCE WITH AS 3798 (1996).
7. FILLING TO BE PLACED AND COMPACTED IN MAXIMUM 250mm LAYERS
8. NO FILLING SHALL TAKE PLACE TO EXPOSED SUBGRADE UNTIL THE AREA HAS BEEN PROOF ROLLED IN THE PRESENCE OF THE GEOTECHNICAL ENGINEER AND APPROVAL GIVEN IN WRITING THAT FILLING CAN PROCEED.
9. WHERE GROUNDWATER DISCHARGE OCCURS IN BULK EXCAVATIONS OR CUT FACES, SUBSOIL DRAINAGE SHALL BE INSTALLED IN ACCORDANCE WITH THE SITE SUPERINTENDENT / GEOTECH INSTRUCTIONS TO DIRECT DISCHARGE WATER TO THE NEAREST STORMWATER / SEDIMENTATION CONTROL DEVICE. THE SUBSOIL DRAINAGE MUST BE INSTALLED AS SOON AS PRACTICALLY POSSIBLE AFTER EXCAVATION. SUBSOIL DRAINAGE SHALL ALSO BE INSTALLED AT LOW POINTS IN THE FINISHED EARTHWORK PROFILE IN ACCORDANCE WITH THE SITE SUPERINTENDENT / GEOTECH'S INSTRUCTIONS.
10. ENSURE TEMPORARY DIVERSION CHANNELS ARE CONSTRUCTED AROUND STOCKPILED MATERIALS AND DISTURBED AREAS GENERALLY AS DETAILED.
11. THE CONTRACTOR SHALL ALLOW FOR AND COORDINATE ALL MONITORING AND MAINTENANCE REQUIREMENTS IN RELATION TO SOIL AND GROUNDWATER CONDITIONS DURING CONSTRUCTION.

SUBSOIL DRAINAGE NOTES:

1. SUBSOILS DRAINAGE TO BE IN ACCORDANCE WITH RVC COUNCIL SPECIFICATIONS.
2. SUBSOIL DRAINAGE LINES TO BE CONSTRUCTED UNDER ALL KERB AND GUTTER EXCEPT WHERE LONGITUDINAL ROAD DRAINAGE IS PROVIDED.
3. CLEANOUT TO BE PROVIDED IN ACCORDANCE WITH RCV COUNCIL SPECIFICATIONS.
4. EXTRA SUBSOIL DRAINS ARE TO BE PROVIDED WHERE SHOWN ON THE SITE WORKS AND DRAINAGE PLAN.

PROPOSED SERVICES NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH:- SERVICE AUTHORITY DRAWINGS AND SPECIFICATIONS
2. THE CONTRACTOR SHALL ATTEND, MANAGE & SUPERVISE THE PROVISION OF PUBLIC UTILITY SERVICES TO THE WORKS GENERALLY AS INDICATED ON THE SERVICES PLANS, NOTING THAT PRIOR & DURING CONSTRUCTION THE PUBLIC UTILITY AUTHORITIES WILL FINALISE THEIR DOCUMENTATION TO CONSTRUCTION ISSUE STANDARD. THE FOLLOWING GENERAL ARRANGEMENTS SHALL APPLY IN RESPECT OF EACH PUBLIC UTILITY SERVICE.

   CONDUIT ROAD CROSSING

   THE CIVIL CONTRACTOR SHALL ALLOW IN THEIR PRICE FOR CONDUIT CROSSINGS UNDER THE PROPOSED ROADS AS SHOWN ON THE "SERVICES PLAN".
3. THE CIVIL CONTRACTOR (TRENCH PROVIDER) IS TO ARRANGE ON SITE MEETING WITH ALL SERVICE AUTHORITIES PRIOR TO THE INSTALLATION OF CONDUITS.
4. THE CIVIL CONTRACTOR TO CO-ORDINATE INSTALLATION OF ELECTRICITY, GAS AND TELECOMMUNICATION SERVICES.
5. ELECTRICITY, GAS AND TELECOMMUNICATION SERVICES ARE TO BE LAID FOLLOWING THE INSTALLATION OF STORMWATER, SEWER AND WATER SERVICES AND KERB AND GUTTER.
6. ALL UTILITY AUTHORITY REPRESENTATIVES TO INSPECT ROAD CROSSINGS PRIOR TO SEALING.
7. ALL ELECTRICAL ROAD CROSSINGS TO BE CLASS 6 (ORANGE) uPVC CONDUITS.
8. ALL GAS ROAD CROSSINGS TO BE uPVC GREY SEWER GRADE CONDUITS.
10. ALL STREET POLES TO BE POSITIONED 350mm FROM BOUNDARY TO CENTRELINE OF POLE. CONTRACTOR TO ALLOW TO EXCAVATE AND BACKFILL TRENCH GENERALLY IN ACCORDANCE WITH NOTE 2.
11. WHERE FOOTPATHS ARE TO BE CONSTRUCTED, ALL SERVICE PIT COVERS AND MARKERS ARE TO BE LAID WHOLLY WITHIN THE CONCRETE FOOTPATH. CONTACT SUPERINTENDENT SHOULD DIFFICULTIES ARISE.
12. ELECTRICITY CONDUITS ARE SHOWN FOR CLARITY HOWEVER, CABLES MAY BE DIRECTLY BURIED. APPROVAL BY ENERGY AUSTRALIA REQUIRED.
13. SERVICES MARKERS ARE TO BE PLACED ON THE KERB & GUTTER AT ALL ROAD CROSSING POINTS, ON BOTH SIDES OF THE ROAD.
14. ALL SERVICE PIT COVERS TO BE INSTALLED FLUSH WITH PROPOSED VERGE LEVELS AND GRADES.

TELSTRA - DUTY OF CARE NOTE

TELSTRA'S PLANS SHOW ONLY THE PRESENCE OF CABLES AND PLANT. THEY ONLY SHOW THEIR POSITION RELATIVE TO ROAD BOUNDARIES, PROPERTY FENCES ETC. AT THE TIME OF INSTALLATION AND TELSTRA DOES NOT WARRANT OR HOLD OUT THAT SUCH PLANS ARE ACCURATE THEREAFTER DUE TO CHANGES THAT MAY OCCUR OVER TIME.
DO NOT ASSUME DEPTH OR ALIGNMENT OF CABLES OR PLANT AS THESE VARY SIGNIFICANTLY.
THE CONTRACTOR HAS A DUTY OF CARE WHEN EXCAVATING NEAR TELSTRA CABLES AND PLANT. BEFORE USING MACHINE EXCAVATORS TELSTRA PLANT MUST FIRST BE PHYSICALLY EXPOSED BY SOFT DIG POTHOLING TO IDENTIFY IT'S LOCATION TELSTRA WILL SEEK COMPENSATION FOR DAMAGES CAUSED TO IT'S PROPERTY AND LOSSES CAUSED TO TELSTRA AND IT'S CUSTOMERS.

EXISTING UNDERGROUND SERVICES NOTES

THE LOCATIONS OF UNDERGROUND SERVICES SHOWN IN THIS SET OF DRAWINGS HAVE BEEN PLOTTED FROM SURVEY INFORMATION AND SERVICE AUTHORITY INFORMATION.THE SERVICE INFORMATION HAS BEEN PREPARED ONLY TO SHOW THE APPROXIMATE POSITIONS OF ANY KNOWN SERVICES AND MAY NOT BE AS CONSTRUCTED OR ACCURATE.
HYDER CONSULTING CAN NOT GUARANTEE THAT THE SERVICES INFORMATION SHOWN ON THESE DRAWINGS ACCURATELY INDICATES THE PRESENCE OR ABSENCE OF SERVICES OR THEIR LOCATION AND WILL ACCEPT NO LIABILITY FOR INACCURACIES IN THE SERVICES INFORMATION SHOWN FROM ANY CAUSE WHATSOEVER.

CONTRACTORS SHALL TAKE DUE CARE WHEN EXCAVATING ONSITE INCLUDING HAND EXCAVATION WHERE NECESSARY.

CONTRACTORS ARE TO CONTACT THE RELEVANT SERVICE AUTHORITY PRIOR TO COMMENCEMENT OF EXCAVATION WORKS.

CONTRACTORS ARE TO UNDERTAKE A SERVICES SEARCH, PRIOR TO COMMENCEMENT OF WORKS ON SITE. SEARCH RESULTS ARE TO BE KEPT ON SITE AT ALL TIMES.

TRAFFIC CONTROL NOTES

1. A TRAFFIC CONTROL PLAN IS TO BE PREPARED AND LODGED WITH COUNCIL BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF CONSTRUCTION

Issue	Description	By	Ckd	RPEQ	Date
05	ISSUE FOR RFI RESPONSE	RR			18.07.19
04	ISSUE FOR RFI RESPONSE	AC			26.11.18
03	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

Scale

Surveyor: ROBERT A HARRIES SURVEYOR

Architect

Filename: C101-AA007094-gcd-00-GeneralNotes.dwg

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Original Issue Signatures

Drawn: A. CARDEÑO

Designed: A. MAGONDACAN

Project Manager: L. PRIZEMAN

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: GENERAL NOTES

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Drawing No. C101 — Project No. AA007094 — Issue 05

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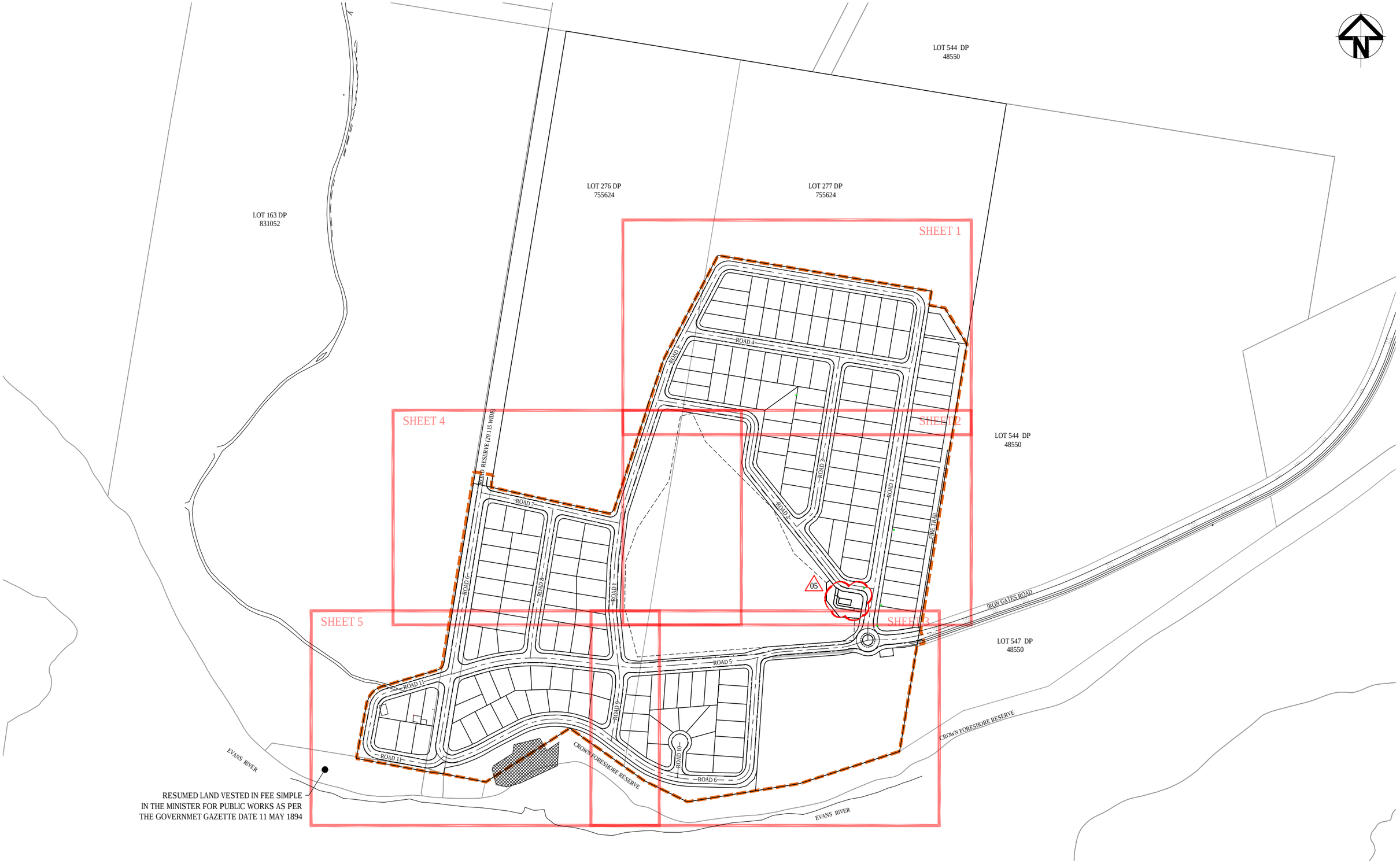

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02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

Scale

0 50 100 150 200m

1 : 2000

Surveyor

ROBERT A HARRIES
SURVEYOR

Architect

Filename C102-AA007094-gcd-00-GeneralArrangementLayoutPlan.dwg

Client

GOLDCORAL PTY LTD

Status

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		Drawn A. CARDEÑO	
Original Size	A1	Designed A. MAGONDACAN	
Height Datum	AHD	Project Manager L. PRIZEMAN	
Grid	GRID	© Copyright reserved	

Project

RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title

GENERAL ARRANGEMENT
LAYOUT PLAN

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Drawing No.	Project No.	Issue
C102	AA007094	05

100mm on Original

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LOT 544 DP
48550

LOT 276 DP
755624

LOT 277 DP
755624

EXISTING OUTLET Ø825

Outlet 840 dia

EXISTING OUTLET Ø825

LOT 544 DP
48550

SERVE (20.115 WIDE)

FOR CONTINUATION REFER DWG C106

LEGEND

- EXISTING SURFACE CONTOURS
- EXISTING STORMWATER RETICULATION
- EXISTING SEWERAGE RETICULATION
- EXISTING SEWER RISING MAIN
- EXISTING WATER RETICULATION (INDICATIVE LAYOUT)
- EXISTING OVERHEAD ELECTRICAL
- EXISTING FENCE
- EXISTING KERB INVERT
- MIDDEN LOCATION
- EXISTING TREE
- SITE BOUNDARY

KEY PLAN

SHT 1

SHT 2

Issue	Description	By	Ckd	RPEQ	Date
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01	ORIGINAL ISSUE			BD	18.06.14

100mm on Original

Scale: 0 10 20 40 60 80 100m — 1 : 1000

Surveyor: ROBERT A HARRIES SURVEYOR

Architect:

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Designed: A. MAGONDACAN

Project Manager: L. PRIZEMAN

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: EXISTING FEATURES SURVEY PLAN
SHEET 1 OF 2

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Issue	Description	By	Ckd	RPEQ	Date
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03	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
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100mm on Original

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0 10 20 40 60 80 100m

1 : 1000

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Drawn: A. CARDEÑO

Designed: A. MAGONDACAN

Project Manager: L. PRIZEMAN

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: EXISTING FEATURES
SURVEY PLAN
SHEET 2 OF 2

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Drawing No. C106 — Project No. AA007094 — Issue 05

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LOT 544 DP
48550

LOT 276 DP
755624

LOT 277 DP
755624

FOR EXISTING ELECTRICAL
INFORMATION REFER ELECTRICAL
CONSULTANTS DRAWINGS

PROPOSED SUBDIVISION
LAYOUT

WATER TO BE
RETAINED

EXISTING OUTLET Ø825

SEWER TO BE
RETAINED

EXISTING OUTLET Ø825

LOT 544 DP
48550

ERVE (20.115 WIDE)

FOR CONTINUATION REFER DWG C108

LEGEND

- EXISTING SURFACE CONTOURS
- EXISTING STORMWATER RETICULATION (TO BE REMOVED)
- EXISTING SEWERAGE RETICULATION
- EXISTING SEWERAGE RETICULATION (TO BE REMOVED)
- EXISTING WATER RETICULATION (INDICATIVE LAYOUT)
- EXISTING WATER RETICULATION (TO BE REMOVED)
- EXISTING OVERHEAD ELECTRICAL
- EXISTING FENCE
- EXISTING PAVEMENT AND KERB (TO BE REMOVED)
- MIDDEN LOCATION
- EXISTING TREE
- SITE BOUNDARY

KEY PLAN

SHT 1

SHT 2

Issue	Description	By	Ckd	RPEQ	Date
03	ISSUE FOR RFI RESPONSE	RR			18.07.19
02	ISSUE FOR RFI RESPONSE	AC			26.11.18
01	ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15

Scale
0 20 40 60 80 100m
1 : 1000

Surveyor
ROBERT A HARRIES
SURVEYOR

Architect

Filename C107-AA007094-gcd-00-DemolitionLayoutPlan.dwg

Client
GOLDCORAL PTY LTD

Status
FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved

R.P.E.Q No :

Scales 1 : 1000

Original Issue Signatures

Original Size A1

Drawn A. CARDEÑO

Designed A. MAGONDACAN

Height Datum AHD

Project Manager L. PRIZEMAN

Grid GRID

Project
RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title
DEMOLITION LAYOUT
PLAN SHEET 1 OF 2

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Drawing No. C107 — Project No. AA007094 — Issue 03

100mm on Original

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FOR CONTINUATION REFER DWG C107

ROAD RESERVE (20.115 WIDE)

FOR EXISTING ELECTRICAL INFORMATION REFER ELECTRICAL CONSULTANTS DRAWINGS

OPEN DRAIN

OPEN DRAIN

SEWER TO BE RETAINED

EXISTING 825mm OUTLET HEADWALL

WATER TO BE RETAINED

EXISTING Ø900 CULVERT

IRON GATES ROAD

EXISTING TRACK TO BE REMOVED

EXISTING OUTLETS 2xØ900

LOT 547 DP 48550

PROPOSED SUBDIVISION LAYOUT

NATURAL CHANNEL

CROWN FORESHORE RESERVE

EXISTING HOUSE TO BE DEMOLISHED

CROWN FORESHORE RESERVE

RESUMED LAND VESTED IN FEE SIMPLE IN THE MINISTER FOR PUBLIC WORKS AS PER THE GOVERNMET GAZETTE DATE 11 MAY 1894

EVANS RIVER

LEGEND

- EXISTING SURFACE CONTOURS
- EXISTING STORMWATER RETICULATION (TO BE REMOVED)
- EXISTING SEWERAGE RETICULATION
- EXISTING SEWERAGE RETICULATION (TO BE REMOVED)
- EXISTING WATER RETICULATION (INDICATIVE LAYOUT)
- EXISTING WATER RETICULATION (TO BE REMOVED)
- EXISTING OVERHEAD ELECTRICAL
- EXISTING FENCE
- EXISTING PAVEMENT AND KERB (TO BE REMOVED)
- MIDDEN LOCATION
- EXISTING TREE
- SITE BOUNDARY

KEY PLAN

SHT 1

SHT 2

Issue	Description	By	Ckd	RPEQ	Date
03	ISSUE FOR RFI RESPONSE	RR			18.07.19
02	ISSUE FOR RFI RESPONSE	AC			26.11.18
01	ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15

Scale: 0 20 40 60 80 100m — 1 : 1000

Surveyor: ROBERT A HARRIES SURVEYOR

Architect:

Filename: C107-AA007094-gcd-00-DemolitionLayoutPlan.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved

R.P.E.Q No :

Scales: 1 : 1000

Original Issue Signatures

Drawn: A. CARDEÑO

Original Size: A1

Designed: A. MAGONDACAN

Height Datum: AHD

Project Manager: L. PRIZEMAN

Grid: GRID

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: DEMOLITION LAYOUT PLAN
SHEET 2 OF 2

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Drawing No.	Project No.	Issue
C108	AA007094	03

100mm on Original

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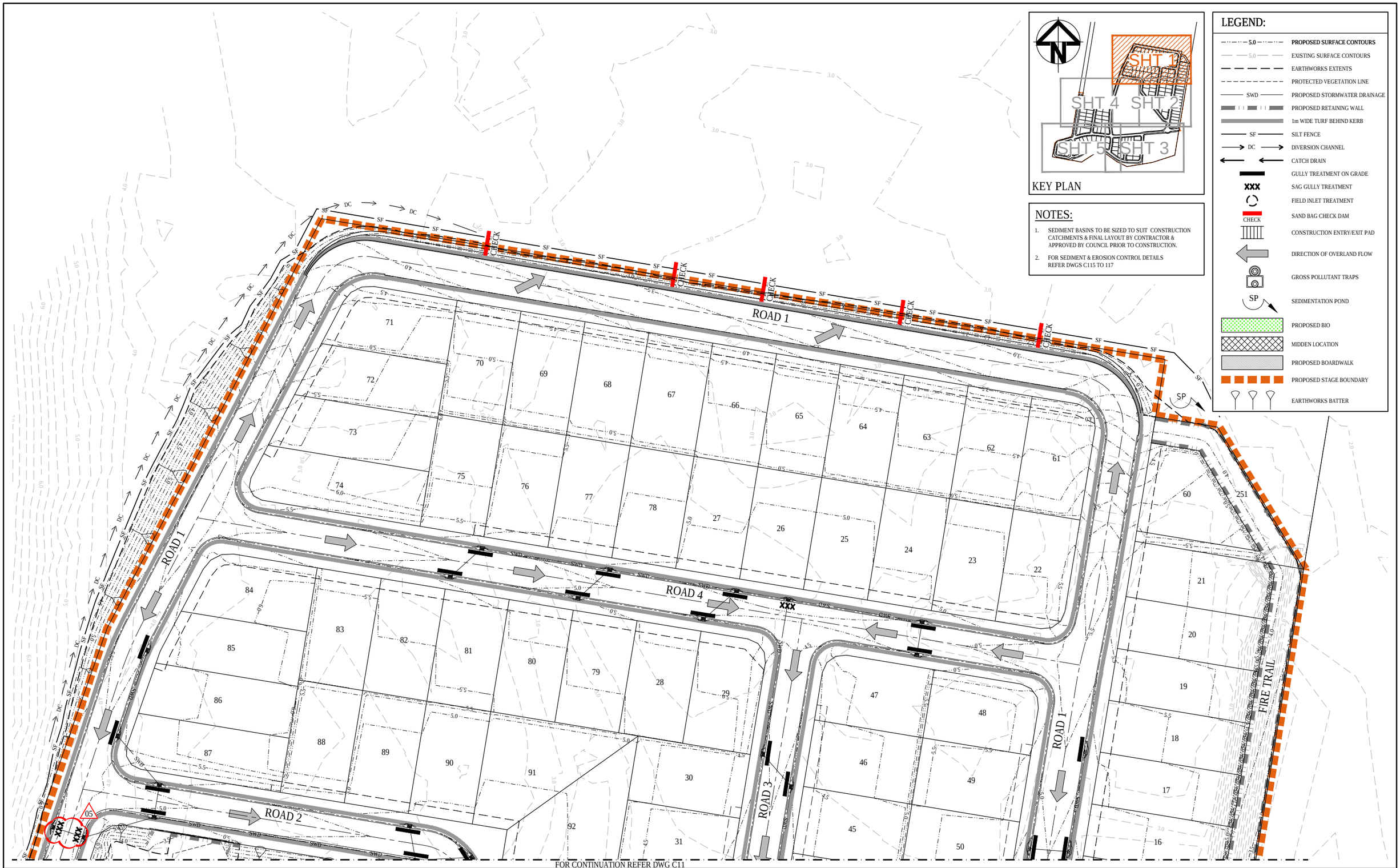

SHT 1
SHT 4
SHT 2
SHT 5
SHT 3

KEY PLAN

NOTES:

1. SEDIMENT BASINS TO BE SIZED TO SUIT CONSTRUCTION CATCHMENTS & FINAL LAYOUT BY CONTRACTOR & APPROVED BY COUNCIL PRIOR TO CONSTRUCTION.
2. FOR SEDIMENT & EROSION CONTROL DETAILS REFER DWGS C115 TO 117

LEGEND:

- PROPOSED SURFACE CONTOURS
- EXISTING SURFACE CONTOURS
- EARTHWORKS EXTENTS
- PROTECTED VEGETATION LINE
- PROPOSED STORMWATER DRAINAGE
- PROPOSED RETAINING WALL
- 1m WIDE TURF BEHIND KERB
- SILT FENCE
- DIVERSION CHANNEL
- CATCH DRAIN
- GULLY TREATMENT ON GRADE
- SAG GULLY TREATMENT
- FIELD INLET TREATMENT
- SAND BAG CHECK DAM
- CONSTRUCTION ENTRY/EXIT PAD
- DIRECTION OF OVERLAND FLOW
- GROSS POLLUTANT TRAPS
- SEDIMENTATION POND
- PROPOSED BIO
- MIDDEN LOCATION
- PROPOSED BOARDWALK
- PROPOSED STAGE BOUNDARY
- EARTHWORKS BATTER

FOR CONTINUATION REFER DWG C11

Issue	Description	By	Ckd	RPEQ	Date
05	ISSUE FOR RFI RESPONSE	RR			18.07.19
04	ISSUE FOR RFI RESPONSE	AC			26.11.18
03	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

100mm on Original

Scale: 1 : 500 (0 10 20 30 40 50m)

Surveyor: ROBERT A HARRIES SURVEYOR

Architect:

Filename: C110-AA007094-gcd-00-SedimentAndErosionControlPlan.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved

R.P.E.Q No :

Scales	1 : 500	Original Issue Signatures	
		Drawn A. CARDEÑO	
Original Size	A1	Designed A. MAGONDACAN	
Height Datum	AHD	Project Manager L. PRIZEMAN	
Grid	GRID	© Copyright reserved	

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: SEDIMENT & EROSION CONTROL PLAN
SHEET 1 OF 5

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Drawing No.	Project No.	Issue
C110	— AA007094	— 05

FOR CONTINUATION REFER DWG C110

FOR CONTINUATION REFER DWG C113

ROAD 1

ROAD 2

ROAD 3

FIRE TRAIL

PROPOSED FAUNA CROSSING AND STORMWATER CULVERT

STORMWATER QUANTITY AND QUALITY TREATMENT BASIN DESIGNATED AREA. SUBJECT TO DETAILED DESIGN AND MUST COMPLY WITH ARCADIS REVISED ENGINEERING SERVICES AND CIVIL INFRASTRUCTURE REPORT.

177

LEGEND:

- PROPOSED SURFACE CONTOURS
- EXISTING SURFACE CONTOURS
- EARTHWORKS EXTENTS
- PROTECTED VEGETATION LINE
- PROPOSED STORMWATER DRAINAGE
- PROPOSED RETAINING WALL
- 1m WIDE TURF BEHIND KERB
- SILT FENCE
- DIVERSION CHANNEL
- CATCH DRAIN
- GULLY TREATMENT ON GRADE
- SAG GULLY TREATMENT
- FIELD INLET TREATMENT
- SAND BAG CHECK DAM
- CONSTRUCTION ENTRY/EXIT PAD
- DIRECTION OF OVERLAND FLOW
- GROSS POLLUTANT TRAPS
- SEDIMENTATION POND
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NOTES:

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2. FOR SEDIMENT & EROSION CONTROL DETAILS REFER DWGS C115 TO 117

KEY PLAN

SHT 1 SHT 2 SHT 3 SHT 4 SHT 5

FOR CONTINUATION REFER DWG 112

Issue	Description	By	Ckd	RPEQ	Date
05	ISSUE FOR RFI RESPONSE	RR			18.07.19
04	ISSUE FOR RFI RESPONSE	AC			26.11.18
03	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

Scale: 1 : 500 (0 10 20 30 40 50m)

Surveyor: ROBERT A HARRIES SURVEYOR

Architect:

Filename: C110-AA007094-gcd-00-SedimentAndErosionControlPlan.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved:

R.P.E.Q No :

Original Issue Signatures

Scales: 1 : 500

Original Size: A1

Height Datum: AHD

Grid: GRID

Drawn: A. CARDEÑO

Designed: A. MAGONDACAN

Project Manager: L. PRIZEMAN

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: SEDIMENT & EROSION CONTROL PLAN
SHEET 2 OF 5

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Drawing No. C111 — Project No. AA007094 — Issue 05

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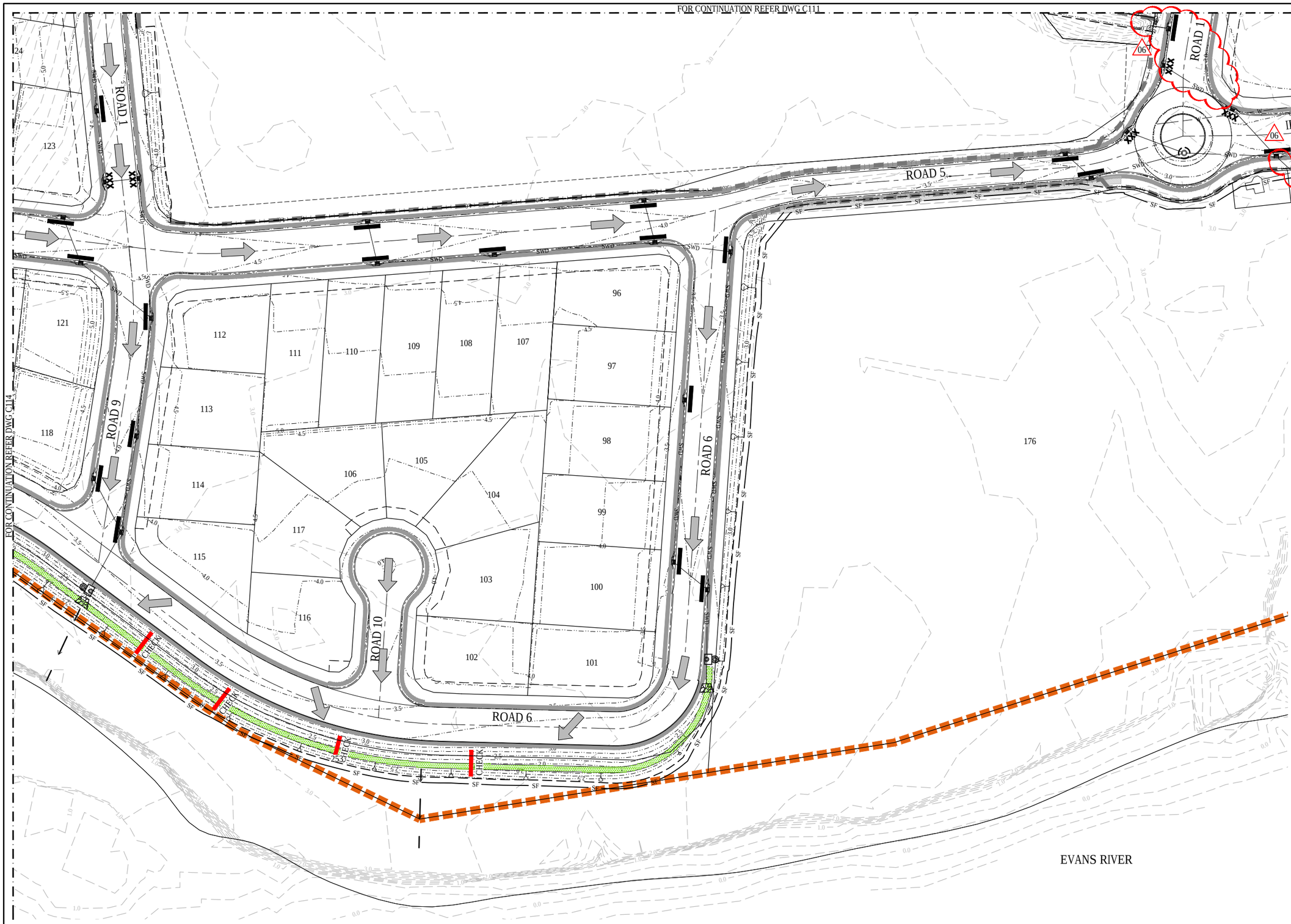
FOR CONTINUATION REFER DWG C111

FOR CONTINUATION REFER DWG C114

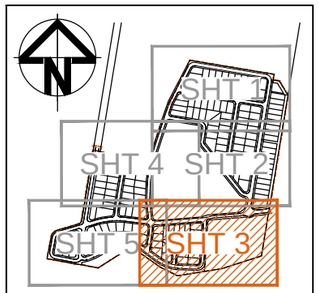


LEGEND:

- PROPOSED SURFACE CONTOURS
- EXISTING SURFACE CONTOURS
- EARTHWORKS EXTENTS
- PROTECTED VEGETATION LINE
- SWD — PROPOSED STORMWATER DRAINAGE
- PROPOSED RETAINING WALL
- 1m WIDE TURF BEHIND KERB
- SF — SILT FENCE
- DC — DIVERSION CHANNEL
- CATCH DRAIN
- GULLY TREATMENT ON GRADE
- XXX — SAG GULLY TREATMENT
- FIELD INLET TREATMENT
- CHECK — SAND BAG CHECK DAM
- CONSTRUCTION ENTRY/EXIT PAD
- DIRECTION OF OVERLAND FLOW
- GROSS POLLUTANT TRAPS
- SP — SEDIMENTATION POND
- PROPOSED BIO
- MIDDEN LOCATION
- PROPOSED BOARDWALK
- PROPOSED STAGE BOUNDARY
- EARTHWORKS BATTER

NOTES:

1. SEDIMENT BASINS TO BE SIZED TO SUIT CONSTRUCTION CATCHMENTS & FINAL LAYOUT BY CONTRACTOR & APPROVED BY COUNCIL PRIOR TO CONSTRUCTION.
2. FOR SEDIMENT & EROSION CONTROL DETAILS REFER DWGS C115 TO 117



KEY PLAN

Issue	Description	By	Ckd	RPEQ	Date
06	ISSUE FOR RFI RESPONSE	RR			18.07.19
05	ISSUE FOR RFI RESPONSE	AC			26.11.18
04	MC1004 SECTION AMENDED			BD	14.10.15
03	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

100mm on Original

Scale: 1 : 500 (0 10 20 30 40 50m)

Surveyor: ROBERT A HARRIES SURVEYOR

Architect:

Filename: C110-AA007094-gcd-00-SedimentAndErosionControlPlan.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved

R.P.E.Q No :

Scales: 1 : 500

Original Size: A1

Height Datum: AHD

Grid: GRID

Original Issue Signatures

Drawn: A. CARDEÑO

Designed: A. MAGONDACAN

Project Manager: L. PRIZEMAN

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: SEDIMENT & EROSION CONTROL PLAN
SHEET 3 OF 5

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Drawing No. C112 — Project No. AA007094 — Issue 06

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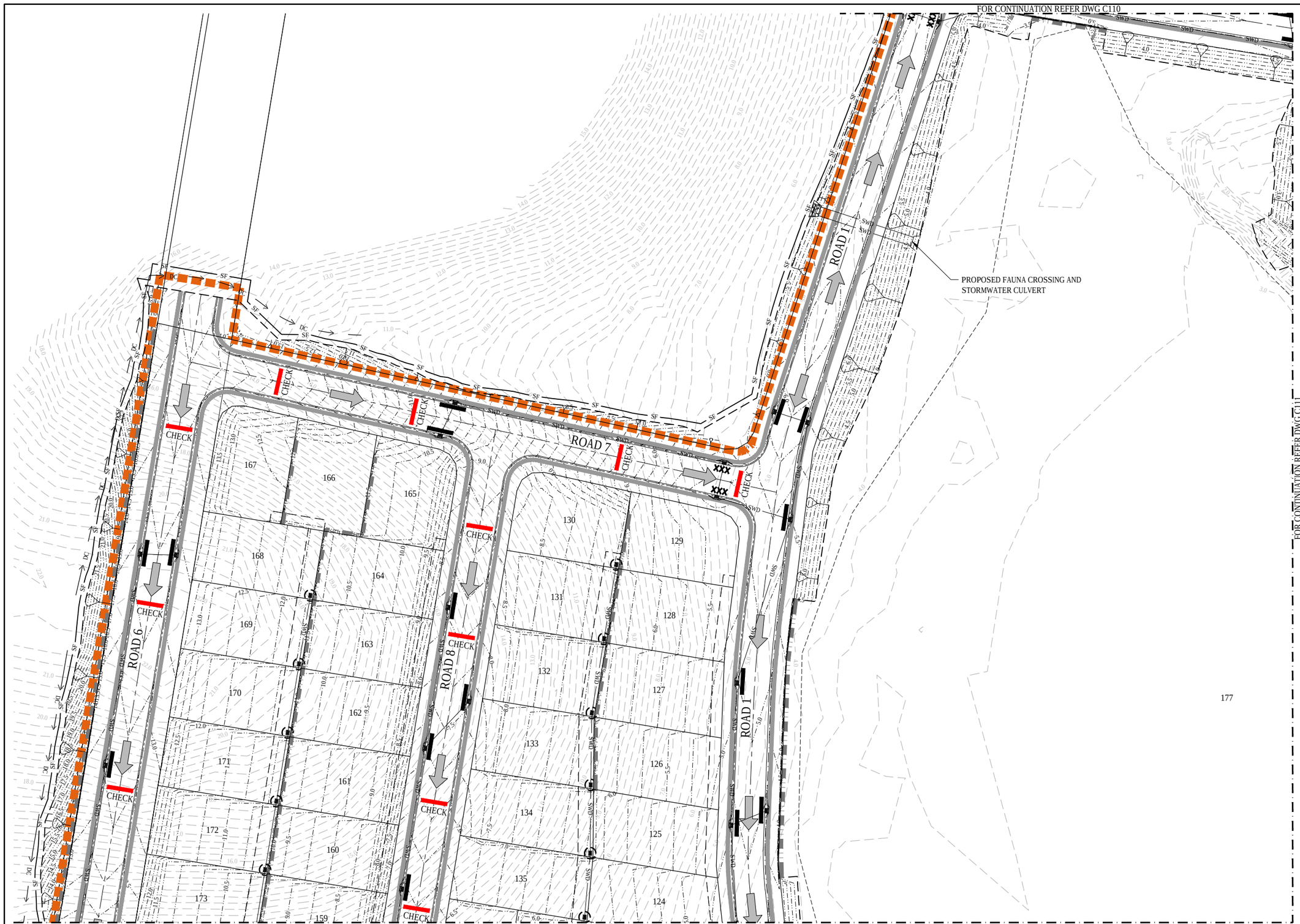

LEGEND:

- PROPOSED SURFACE CONTOURS
- EXISTING SURFACE CONTOURS
- EARTHWORKS EXTENTS
- PROTECTED VEGETATION LINE
- PROPOSED STORMWATER DRAINAGE
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NOTES:

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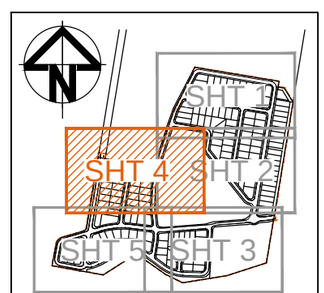
2. FOR SEDIMENT & EROSION CONTROL DETAILS REFER DWGS C115 TO 117



KEY PLAN

Issue	Description	By	Ckd	RPEQ	Date
05	ISSUE FOR RFI RESPONSE	RR			18.07.19
04	ISSUE FOR RFI RESPONSE	AC			26.11.18
03	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

Scale: 0 10 20 30 40 50m — 1 : 500

Surveyor: ROBERT A HARRIES SURVEYOR

Architect:

Filename: C110-AA007094-gcd-00-SedimentAndErosionControlPlan.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved

R.P.E.Q No :

Original Issue Signatures

Scales: 1 : 500

Original Size: A1

Height Datum: AHD

Grid: GRID

Drawn: A. CARDEÑO

Designed: A. MAGONDACAN

Project Manager: L. PRIZEMAN

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: SEDIMENT & EROSION CONTROL PLAN
SHEET 4 OF 5

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Drawing No.	Project No.	Issue
C113	AA007094	05

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LEGEND:

- PROPOSED SURFACE CONTOURS
- EXISTING SURFACE CONTOURS
- EARTHWORKS EXTENTS
- PROTECTED VEGETATION LINE
- PROPOSED STORMWATER DRAINAGE
- PROPOSED RETAINING WALL
- 1m WIDE TURF BEHIND KERB
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- SAND BAG CHECK DAM
- CONSTRUCTION ENTRY/EXIT PAD
- DIRECTION OF OVERLAND FLOW
- GROSS POLLUTANT TRAPS
- SEDIMENTATION POND
- PROPOSED BIO
- MIDDEN LOCATION
- PROPOSED BOARDWALK
- PROPOSED STAGE BOUNDARY
- EARTHWORKS BATTER

NOTES:

1. SEDIMENT BASINS TO BE SIZED TO SUIT CONSTRUCTION CATCHMENTS & FINAL LAYOUT BY CONTRACTOR & APPROVED BY COUNCIL PRIOR TO CONSTRUCTION.
2. FOR SEDIMENT & EROSION CONTROL DETAILS REFER DWGS C115 TO 117

FOR CONTINUATION REFER DWG C163

FOR CONTINUATION REFER DWG C162

ROAD 1
ROAD 5
ROAD 6
ROAD 8
ROAD 9
ROAD 11
CHECK
SWD
SF
DC
XXX
SP
05

EVANS RIVER

KEY PLAN

SHT 1
SHT 4
SHT 2
SHT 5
SHT 3

Issue	Description	By	Ckd	RPEQ	Date
05	ISSUE FOR RFI RESPONSE	RR			18.07.19
04	ISSUE FOR RFI RESPONSE	AC			26.11.18
03	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

Scale: 0 10 20 30 40 50m — 1 : 500

100mm on Original

Surveyor: ROBERT A HARRIES SURVEYOR

Architect:

Filename: C110-AA007094-gcd-00-SedimentAndErosionControlPlan.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved

R.P.E.Q No :

Scales: 1 : 500

Original Issue Signatures

Original Size: A1

Drawn: A. CARDEÑO

Designed: A. MAGONDACAN

Height Datum: AHD

Project Manager: L. PRIZEMAN

Grid: GRID

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: SEDIMENT & EROSION CONTROL PLAN
SHEET 5 OF 5

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Drawing No. C114 — Project No. AA007094 — Issue 05

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GENERAL

1. IT IS THE CONTRACTORS RESPONSIBILITY TO ENSURE INSPECTION, MAINTENANCE AND TESTING OF ALL DRAINAGE, EROSION AND SEDIMENT CONTROL MEASURES ARE UNDERTAKEN ON SITE.
2. ALL DRAINAGE, EROSION AND SEDIMENT CONTROL MEASURES MUST BE APPLIED AND MAINTAINED IN ACCORDANCE WITH THE LATEST INTERNATIONAL EROSION CONTROL ASSOCIATION (IECA) AUSTRALASIA BEST PRACTICE EROSION AND SEDIMENT CONTROL (BPESC) DOCUMENT.
3. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND CONSTRUCTION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, OR METHOD OF INSTALLATION, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.
4. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES MUST BE IMPLEMENTED AND A REVISED EROSION AND SEDIMENT CONTROL PLAN (ESCP) MUST BE SUBMITTED FOR APPROVAL IN THE EVENT THAT SITE CONDITIONS CHANGE SIGNIFICANTLY FROM THOSE CONSIDERED WITHIN THIS ESCP.
5. IN CIRCUMSTANCES WHERE IT IS CONSIDERED NECESSARY TO PREPARE AN AMENDED EROSION AND SEDIMENT CONTROL PLAN (ESCP), AND WHERE THE DELIVERY OF SUCH AN AMENDED ESCP IS NOT IMMINENT, THEN ALL NECESSARY NEW OR MODIFIED EROSION AND SEDIMENT CONTROL WORKS MUST BE IN ACCORDANCE WITH THE LATEST VERSION OF THE IECA BPESC DOCUMENT. UPON APPROVAL OF THE AMENDED ESCP, ALL WORKS MUST BE IMPLEMENTED IN ACCORDANCE WITH THE AMENDED PLAN.
6. WHERE THERE IS A HIGH PROBABILITY THAT SERIOUS OR MATERIAL ENVIRONMENTAL HARM MAY OCCUR AS A RESULT OF SEDIMENT LEAVING THE SITE, APPROPRIATE ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES MUST BE IMPLEMENTED SUCH THAT ALL REASONABLE AND PRACTICABLE MEASURES ARE BEING TAKEN TO PREVENT OR MINIMISE SUCH HARM. ONLY THOSE WORKS NECESSARY TO MINIMISE OR PREVENT ENVIRONMENTAL HARM SHALL BE CONDUCTED ON-SITE PRIOR TO APPROVAL OF THE AMENDED EROSION AND SEDIMENT CONTROL PLAN (ESCP).
7. AT ALL TIMES THE CONTRACTOR SHALL MONITOR THE PREVAILING WEATHER CONDITIONS AND PROTECT ANY DOWNSTREAM CONSTRUCTION OR RECEIVING ENVIRONMENTS.
8. WORKS SHALL BE COMPLETED ON SITE GENERALLY IN ACCORDANCE WITH THE FOLLOWING SCHEDULE:
   (i) PRE CONSTRUCTION - CONSTRUCT SILT FENCES PRIOR TO PRE-START MEETING, WHICH WILL PROTECT EXISTING DOWNSTREAM PROPERTIES, PARKS OR ROAD RESERVES FROM SEDIMENTATION AND EROSION.
   (ii) CLEARING AND BULK EARTHWORKS - CONSTRUCT AND MAINTAIN SILT FENCES WHICH CONTROL SEDIMENTATION AND EROSION DURING CLEARING AND BULK EARTHWORKS. ALL DISTURBED AREAS TO BE EITHER GRASS SEEDED OR TURFED, AS SPECIFIED, AS SOON AS POSSIBLE OR WITHIN 7 DAYS OF FINAL TRIMMING OF EARTHWORKS.
   (iii) MAINTENANCE PERIOD - CONSTRUCT AND MAINTAIN SILT MANAGEMENT CONTROLS WHICH CONTROL SEDIMENTATION AND EROSION PRIOR TO THE ESTABLISHMENT OF GRASS COVER AND REHABILITATION. PROVIDE GRASS FILTER STRIPS IN LOCATIONS AS SHOWN ON EROSION AND SEDIMENT CONTROL PLANS.
9. EROSION AND SEDIMENT CONTROL PROTECTION MEASURES SHALL BE MAINTAINED BY THE CONTRACTOR THROUGHOUT THE CONTRACT.

RECOMMENDED IMPLEMENTATION SEQUENCE

1 ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND FUNCTIONAL PRIOR TO WORKS COMMENCING AND IN THE FOLLOWING SEQUENCE:
   a. CONSTRUCT TEMPORARY STABILISED SITE ACCESS
   b. PROVIDE INLET PROTECTION TO STORMWATER INLETS AND GULLIES ON ALL ROADS ADJOIN THE SITE.
   c. CONSTRUCT BARRIER FENCING AROUND RESTRICTED 'NO-GO' ZONES OF THE RETAINED VEGETATION AND AREAS NOT TO BE DISTURBED AND AREAS WHICH REMAIN UN-WORKED.
   d. INSTALL ALL TEMPORARY SEDIMENT FENCES
   e. CONSTRUCT DIVERSION BANKS AS NECESSARY (PARALLEL TO CONTOURS) TO DIVERT RUNOFF FROM DISTURBED AREAS INTO THE SEDIMENT PONDS/BASINS
   f. WORK AREAS TO BE DELINEATED BY BARRIER FENCING AND DIVERSION CHANNEL UPSLOPE AND SEDIMENT FENCING DOWNSLOPE.
   g. MAINTAIN EXISTING SEDIMENT PONDS/BASINS AS LONG AS PRACTICALLY POSSIBLE
   h. STABILISE ALL DISTURBED AREAS ASAP AND PROGRESSIVELY AS WORKS ARE COMPLETED.
   i. TEMPORARY STABILISATION TO BE DONE USING MULCHING, HYDROMULCHING, HYDROSEEDING OR DIRECT SEEDING TO GIVE A 70% COVERAGE OF GROUND SURFACE WITHIN 14 DAYS OF WORKS COMPLETING (EVEN IF WORKS MAY CONTINUE LATER)
2 EROSION AND SEDIMENT CONTROL PROTECTION MEASURES MAY NEED TO BE REVISED AND UPDATED TO REFLECT THE SITE CONDITIONS AND PROGRESSION OF THE WORKS, I.E. MEASURES INCLUDING SEDIMENT FENCES SHOULD BE MOVED AND REINSTATED AS WORKS PROGRESS.

SITE MANAGEMENT

1. ALL OFFICE FACILITIES AND OPERATIONAL ACTIVITIES MUST BE LOCATED SUCH THAT ANY LIQUID EFFLUENT (E.G. PROCESS WATER, WASH-DOWN WATER, EFFLUENT FROM EQUIPMENT CLEANING, OR PLANT WATERING), CAN BE TOTALLY CONTAINED AND TREATED WITHIN THE SITE.
2. THE CONSTRUCTION SCHEDULE MUST AIM TO MINIMISE THE DURATION THAT ANY AND ALL AREAS OF SOIL ARE EXPOSED TO THE EROSIVE EFFECTS OF WIND, RAIN AND SURFACE WATER.
3. LAND-DISTURBING ACTIVITIES MUST BE UNDERTAKEN IN ACCORDANCE WITH THE ESCP AND ASSOCIATED DEVELOPMENT CONDITIONS.
4. LAND-DISTURBING ACTIVITIES MUST BE UNDERTAKEN IN SUCH A MANNER THAT ALLOWS ALL REASONABLE AND PRACTICABLE MEASURES TO BE UNDERTAKEN TO:
   (i) ALLOW STORMWATER TO PASS THROUGH THE SITE IN A CONTROLLED MANNER AND AT NON-EROSIVE FLOW VELOCITIES UP TO THE SPECIFIED DESIGN STORM DISCHARGE;
   (ii) MINIMISE SOIL EROSION RESULTING FROM RAIN, WATER FLOW AND/OR WIND;
   (iii) MINIMISE ADVERSE EFFECTS OF SEDIMENT RUNOFF, INCLUDING SAFETY ISSUES;
   (iv) PREVENT, OR AT LEAST MINIMISE, ENVIRONMENTAL HARM RESULTING FROM WORK-RELATED SOIL EROSION AND SEDIMENT RUNOFF;
   (v) ENSURE THAT THE VALUE AND USE OF LAND/PROPERTIES ADJACENT TO THE DEVELOPMENT (INCLUDING ROADS) ARE NOT DIMINISHED AS A RESULT OF THE ADOPTED ESC MEASURES.
5. ALL EROSION AND SEDIMENT CONTROL MEASURES MUST CONFORM TO THE STANDARDS AND SPECIFICATIONS CONTAINED IN:
   (i) THE DEVELOPMENT APPROVAL CONDITION ISSUED BY THE RELEVANT REGULATORY AUTHORITY; AND
   (ii) THE APPROVED ESCP AND SUPPORTING DOCUMENTATION; OR
   (iii) THE LATEST VERSION OF THE IECA BPESC DOCUMENT, IF THE STANDARDS AND SPECIFICATIONS ARE NOT CONTAINED IN THE APPROVED ESCP.
6. ANY WORKS THAT MAY CAUSE SIGNIFICANT SOIL DISTURBANCE AND ARE ANCILLARY TO ANY ACTIVITY FOR WHICH REGULATORY BODY APPROVAL IS REQUIRED, MUST NOT COMMENCE BEFORE THE ISSUE OF THAT APPROVAL.
7. ADDITIONAL AND/OR ALTERNATIVE ESC MEASURES MUST BE IMPLEMENTED IN THE EVENT THAT SITE INSPECTIONS, THE SITE'S MONITORING AND MAINTENANCE PROGRAM, OR THE REGULATORY AUTHORITY, IDENTIFIES THAT UNACCEPTABLE OFF-SITE SEDIMENTATION IS OCCURRING AS A RESULT OF THE WORK ACTIVITIES.
8. LAND-DISTURBING ACTIVITIES MUST NOT CAUSE UNNECESSARY SOIL DISTURBANCE IF AN ALTERNATIVE CONSTRUCTION PROCESS IS AVAILABLE THAT ACHIEVES THE SAME OR EQUIVALENT OUTCOMES AT AN EQUIVALENT COST.
9. SEDIMENT (INCLUDING CLAY, SILT, SAND, GRAVEL, SOIL, MUD, CEMENT AND CERAMIC WASTE) DEPOSITED OFF THE SITE AS A DIRECT RESULT OF AN ON-SITE ACTIVITY, MUST BE COLLECTED AND THE AREA APPROPRIATELY CLEANED/REHABILITATED AS SOON AS REASONABLE AND PRACTICABLE, AND IN A MANNER THAT GIVES APPROPRIATE CONSIDERATION TO THE SAFETY AND ENVIRONMENTAL RISKS ASSOCIATED WITH THE SEDIMENT DEPOSITION.
10. WHEREVER REASONABLE AND PRACTICABLE, BRICK, TILE AND MASONRY CUTTING MUST BE CARRIED OUT ON A PERVIOUS SURFACE, SUCH AS GRASS, OR OPEN SOIL, OR IN SUCH A MANNER THAT ALL SEDIMENT-LADEN RUNOFF IS PREVENTED FROM DISCHARGING INTO A GUTTER, DRAIN, OR WATER BODY.
11. ADEQUATE WASTE COLLECTION BINS MUST BE PROVIDED ON-SITE AND MAINTAINED SUCH THAT POTENTIAL AND ACTUAL ENVIRONMENTAL HARM RESULTING FROM SUCH MATERIAL WASTE IS MINIMISED.
12. CONCRETE WASTE AND CHEMICAL PRODUCTS, INCLUDING PETROLEUM AND OIL-BASED PRODUCTS, MUST BE PREVENTED FROM ENTERING AN INTERNAL WATER BODY, OR AN EXTERNAL DRAIN, STORMWATER SYSTEM, OR WATER BODY.
13. ALL FLAMMABLE AND COMBUSTIBLE LIQUIDS, INCLUDING ALL LIQUID CHEMICALS IF SUCH CHEMICALS COULD POTENTIALLY BE WASHED OR DISCHARGED FROM THE SITE, ARE STORED AND HANDLED ON-SITE IN ACCORDANCE WITH RELEVANT STANDARDS SUCH AS AS1940 THE STORAGE AND HANDLING OF FLAMMABLE AND COMBUSTIBLE LIQUIDS.
14. TRENCHES NOT LOCATED WITHIN ROADWAYS MUST BE BACKFILLED, CAPPED WITH TOPSOIL, AND COMPACTED TO A LEVEL AT LEAST 75mm ABOVE ADJOINING GROUND LEVEL AND APPROPRIATELY STABILISED.
15. ALL STORMWATER, SEWER LINE AND OTHER SERVICE TRENCHES, NOT LOCATED WITHIN ROADWAYS, MUST BE MULCHED AND SEEDED, OR OTHERWISE APPROPRIATELY STABILISED WITHIN 7 DAYS AFTER BACKFILL.
16. NO MORE THAN 150m OF A STORMWATER, SEWER LINE OR OTHER SERVICE TRENCH MUST TO BE OPEN AT ANY ONE TIME.
17. SITE SPOIL MUST BE LAWFULLY DISPOSED OF IN A MANNER THAT DOES NOT RESULT IN ONGOING SOIL EROSION OR ENVIRONMENTAL HARM.
18. ALL FILL MATERIAL PLACED ON SITE MUST COMPRISE ONLY NATURAL EARTH AND ROCK, AND IS TO BE FREE OF CONTAMINANTS, BE FREE DRAINING, AND BE COMPACTED IN LAYERS NOT EXCEEDING 300mm TO 95% STANDARD RELATIVE DRY DENSITY IN ACCORDANCE WITH AS1289.
19. FOOT AND VEHICULAR TRAFFIC WILL BE RESTRICTED IN RECENTLY STABILISED AREAS INCLUDING THOSE HYDROSEEDED, TURFED OR GRASS SEEDED.
20. TEMPORARY SITE STABILISATION PROCEDURES MUST COMMENCE AT LEAST 30 DAYS PRIOR TO THE NOMINATED SITE SHUTDOWN DATE. AT LEAST 70% STABLE COVER OF ALL UNSTABLE AND/OR DISTURBED SOIL SURFACES MUST BE ACHIEVED PRIOR TO SHUTDOWN. THE STABILISATION WORKS MUST NOT RELY UPON THE LONGEVITY OF NON-VEGETATED EROSION CONTROL BLANKETS, OR TEMPORARY SOIL BINDERS.
21. IF BIO-RETENTION FILTER MEDIA IS INSTALLED PRIOR TO 80% OF THE UPSTREAM CATCHMENT BEING FULLY DEVELOPED, THE FILTER MEDIA SHALL BE PROTECTED WITH A LAYER OF GEOFABRIC WITH TURF ON TOP.

LAND CLEARING

1. LAND CLEARING MUST BE DELAYED AS LONG AS PRACTICABLE AND MUST BE UNDERTAKEN IN CONJUNCTION WITH DEVELOPMENT OF EACH STAGE OF WORKS, UNLESS OTHERWISE APPROVED BY SUPERINTENDENT.
2. ALL REASONABLE AND PRACTICABLE EFFORTS MUST BE TAKEN TO DELAY THE REMOVAL OF, OR DISTURBANCE TO, EXISTING GROUND COVER (ORGANIC OR INORGANIC) PRIOR TO LAND-DISTURBING ACTIVITIES.
6. BULK TREE CLEARING MUST OCCUR IN A MANNER THAT MINIMISES DISTURBANCE TO EXISTING GROUND COVER (ORGANIC OR INORGANIC).
7. BULK TREE CLEARING AND GRUBBING OF THE SITE MUST BE IMMEDIATELY FOLLOWED BY SPECIFIED TEMPORARY STABILISATION MEASURES (E.G. TEMPORARY GRASSING, OR MULCHING) PRIOR TO COMMENCEMENT OF EACH STAGE OF CONSTRUCTION WORKS.
8. DISTURBANCE TO NATURAL WATERCOURSES (INCLUDING BED AND BANKS) AND THEIR ASSOCIATED RIPARIAN ZONES MUST BE LIMITED TO THE MINIMUM PRACTICABLE.
9. NO LAND CLEARING SHALL BE UNDERTAKEN UNLESS PRECEDED BY THE INSTALLATION OF ADEQUATE DRAINAGE AND SEDIMENT CONTROL MEASURES, UNLESS SUCH CLEARING IS REQUIRED FOR THE PURPOSE OF INSTALLING SUCH MEASURES, IN WHICH CASE, ONLY THE MINIMUM CLEARING REQUIRED TO INSTALL SUCH MEASURES SHALL OCCUR.
10. LAND CLEARING MUST BE LIMITED TO 5M FROM THE EDGE OF PROPOSED CONSTRUCTED WORKS, 2M OF ESSENTIAL CONSTRUCTION TRAFFIC ROUTES, AND A TOTAL OF 10M WIDTH FOR CONSTRUCTION ACCESS, UNLESS OTHERWISE APPROVED BY SUPERINTENDENT.
11. PRIOR TO LAND CLEARING, AREAS OF PROTECTED VEGETATION, AND SIGNIFICANT AREAS OF RETAINED VEGETATION MUST BE CLEARLY IDENTIFIED (E.G. WITH HIGH-VISIBILITY TAPE, OR LIGHT FENCING) FOR THE PURPOSES OF MINIMISING THE RISK OF UNNECESSARY LAND CLEARING.
12. ALL REASONABLE AND PRACTICABLE MEASURES MUST BE TAKEN TO MINIMISE THE REMOVAL OF, OR DISTURBANCE TO, THOSE TREES, SHRUBS AND GROUND COVERS (ORGANIC OR INORGANIC) THAT ARE INTENDED TO BE RETAINED.
13. ALL LAND CLEARING MUST BE IN ACCORDANCE WITH THE FEDERAL, STATE AND LOCAL GOVERNMENT VEGETATION PROTECTION/PRESERVATION REQUIREMENTS AND/OR POLICIES.
14. LAND CLEARING IS LIMITED TO THE MINIMUM PRACTICABLE DURING THOSE PERIODS WHEN SOIL EROSION DUE TO WIND, RAIN OR SURFACE WATER IS POSSIBLE.
15. LAND CLEARING MUST NOT EXTEND BEYOND THAT NECESSARY TO PROVIDE UP TO EIGHT (8) WEEKS OF SITE ACTIVITY DURING THOSE MONTHS WHEN THE ACTUAL OR AVERAGE RAINFALL IS LESS THAN 45mm, SIX (6) IF BETWEEN 45 AND 100mm, FOUR (4) WEEKS IF BETWEEN 100 AND 225mm, AND TWO (2) WEEKS IF GREATER THAN 225mm.
16. NATIVE SITE VEGETATION REQUIRED AND APPROVED FOR CLEARING SHOULD BE MULCHED AND STOCKPILED FOR LATER USE IN LANDSCAPING, STABILISATION AND/OR SITE REHABILITATION WORKS.

SITE ACCESS

1. PRIOR TO THE COMMENCEMENT OF SITE WORKS, THE LOCATION OF THE SITE ACCESS POINT(S) MUST BE VERIFIED WITH THE RELEVANT REGULATORY AUTHORITY.
2. SITE ACCESS MUST BE RESTRICTED TO THE MINIMUM PRACTICAL NUMBER OF LOCATIONS.
3. SITE EXIT POINTS MUST BE APPROPRIATELY MANAGED TO MINIMISE THE RISK OF SEDIMENT BEING TRACKED ONTO SEALED, PUBLIC ROADWAYS.
5. INSTALL SEDIMENT FENCING AND/OR BARRIER FENCING TO CONFINE INGRESS TO AND EGRESS FROM THE SITE TO STABILISED ACCESS POINTS ONLY.
4. STORMWATER RUNOFF FROM ACCESS ROADS AND STABILISED ENTRY/EXIT POINTS MUST DRAIN TO AN APPROPRIATE SEDIMENT CONTROL DEVICE.

CONSTRUCTION EXIT - ROCK PAD

MATERIALS:

1. ROCK: WELL GRADED, HARD, ANGULAR, EROSION RESISTANT ROCK, NOMINAL DIAMETER OF 50 TO 75mm (SMALL DISTURBANCES) OR 100 TO 150mm (LARGE DISTURBANCES). ALL REASONABLE MEASURES MUST BE TAKEN TO OBTAIN ROCK OF NEAR UNIFORM SIZE.
2. FOOTPATH STABILISING AGGREGATE: 25 TO 50mm GRAVEL OR AGGREGATE.
3. GEOTEXTILE FABRIC: HEAVY-DUTY, NEEDLE -PUNCHED, NON-WOVEN FILTER CLOTH ('BIDIM' A24 OR EQUIVALENT).

INSTALLATION:

1. CLEAR THE LOCATION OF THE ROCK PAD, REMOVING STUMPS, ROOTS AND OTHER VEGETATION TO PROVIDE A FIRM FOUNDATION SO THAT THE ROCK IS NOT PRESSED INTO SOFT GROUND. CLEAR SUFFICIENT WIDTH TO ALLOW PASSAGE OF LARGE VEHICLES, BUT CLEAR ONLY THAT NECESSARY FOR THE EXIT. DO NOT CLEAR ADJACENT AREAS UNTIL THE REQUIRED EROSION AND SEDIMENT CONTROL DEVICES ARE IN PLACE.
2. IF THE EXPOSED SOIL IS SOFT, PLASTIC OR CLAYEY, PLACE A SUB-BASE OF CRUSHED ROCK OR A LAYER OF HEAVY-DUTY FILTER CLOTH TO PROVIDE A FIRM FOUNDATION.
3. PLACE THE ROCK PAD FORMING A MINIMUM 200mm THICK LAYER OF CLEAN, OPEN-VOID ROCK.
4. IF THE ASSOCIATED CONSTRUCTION SITE IS UP-SLOPE OF THE ROCKPAD, THUS CAUSING STORMWATER RUNOFF TO FLOW TOWARD THE ROCK PAD, THEN FORM A MINIMUM 300mm HIGH FLOW CONTROL BERM ACROSS THE ROCK PAD TO DIVERT SUCH RUNOFF TO A SUITABLE SEDIMENT TRAP.
5. THE LENGTH OF THE ROCK PAD SHOULD BE AT LEAST 15m WHERE PRACTICABLE, AND AS WIDE AS THE FULL WIDTH OF THE ENTRY OR EXIT AND AT LEAST 3m. THE ROCK PAD SHOULD COMMENCE AT THE EDGE OF THE OFF-SITE SEALED ROAD OR PAVEMENT.
6. FLARE THE END THE ROCK PAD WHERE IT MEETS THE PAVEMENT SO THAT THE WHEELS OF TURNING VEHICLES DO NOT TRAVEL OVER UNPROTECTED SOIL.
7. IF THE FOOTPATH IS OPEN TO PEDESTRIAN MOVEMENT, THEN COVER THE COARSE ROCK WITH FINE AGGREGATE OR GRAVEL, OR OTHERWISE TAKE WHATEVER MEASURES ARE NEEDED TO MAKE THE AREA SAFE.

SOIL AND STOCKPILE MANAGEMENT

1. TOPSOIL SHALL BE STRIPPED AND STOCKPILED FOR LATER USE ONSITE.
2. ALL REASONABLE AND PRACTICABLE MEASURES MUST BE TAKEN TO OBTAIN THE MAXIMUM BENEFIT FROM EXISTING TOPSOIL, INCLUDING:
   (i) WHERE THE PROPOSED AREA OF SOIL DISTURBANCE DOES NOT EXCEED 2500m², AND THE TOPSOIL DOES NOT CONTAIN UNDESIRABLE WEED SEED, THE TOP 100mm OF SOIL LOCATED WITHIN AREAS OF PROPOSED SOIL DISTURBANCE (INCLUDING STOCKPILE AREAS) MUST BE STRIPPED AND STOCKPILED SEPARATELY FROM THE REMAINING SOIL.
   (ii) WHERE THE PROPOSED AREA OF SOIL DISTURBANCE EXCEEDS 2500m², AND THE TOPSOIL DOES NOT CONTAIN UNDESIRABLE WEED SEED, THE TOP 50mm OF SOIL MUST BE STRIPPED AND STOCKPILED SEPARATELY FROM THE REMAINING TOPSOIL, AND SPREAD AS A FINAL SURFACE SOIL.
   (iii) IN AREAS WHERE THE TOPSOIL CONTAINS UNDESIRABLE WEED SEED, THE AFFECTED SOIL MUST BE SUITABLY BURIED OR REMOVED FROM THE SITE.
3. STOCKPILES OF ERODABLE MATERIAL THAT HAS THE POTENTIAL TO CAUSE ENVIRONMENTAL HARM IF DISPLACED, MUST BE:
   (i) APPROPRIATELY PROTECTED FROM WIND, RAIN, CONCENTRATED SURFACE FLOW AND EXCESSIVE UP-SLOPE STORMWATER SURFACE FLOWS.
   (ii) LOCATED AT LEAST 2M (PREFERABLY 5M) FROM ANY HAZARDOUS AREA, RETAINED VEGETATION, ROADS AND CONCENTRATED WATER FLOW.
   (iii) LOCATED UP-SLOPE OF AN APPROPRIATE SEDIMENT CONTROL SYSTEM.
   (iv) PROVIDED WITH AN APPROPRIATE PROTECTIVE COVER (SYNTHETIC, MULCH OR VEGETATIVE) IF THE MATERIALS ARE LIKELY TO BE STOCKPILED FOR MORE THAN 28 DAYS.
   (v) PROVIDED WITH AN APPROPRIATE PROTECTIVE COVER (SYNTHETIC, MULCH OR VEGETATIVE) IF THE MATERIALS ARE LIKELY TO BE STOCKPILED FOR MORE THAN 10 DAYS DURING THOSE MONTHS THAT HAVE A HIGH EROSION RISK.
   (vi) PROVIDED WITH AN APPROPRIATE PROTECTIVE COVER (SYNTHETIC, MULCH OR VEGETATIVE) IF THE MATERIALS ARE LIKELY TO BE STOCKPILED FOR MORE THAN 5 DAYS DURING THOSE MONTHS THAT HAVE AN EXTREME EROSION RISK.
4. A SUITABLE FLOW DIVERSION SYSTEM MUST BE ESTABLISHED IMMEDIATELY UP-SLOPE OF A STOCKPILE OF ERODABLE MATERIAL THAT HAS THE POTENTIAL TO CAUSE ENVIRONMENTAL HARM IF DISPLACED, IF THE UP-SLOPE CATCHMENT AREA DRAINING TO THE STOCKPILE EXCEEDS 1500m².

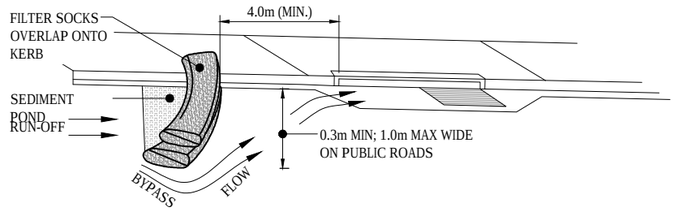
FILTER SOCKS-CONCENTRATED FLOW

MATERIALS:

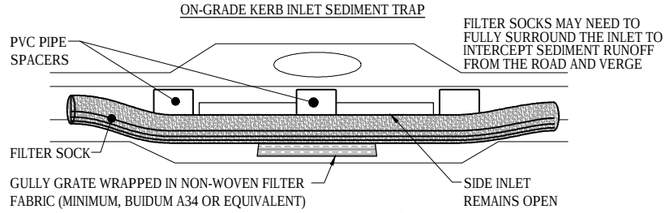
1. SOCKS: MINIMUM Ø200mm SYNTHETIC OR BIODEGRADABLE TUBES MANUFACTURED FROM NON-WOVEN OR COMPOSITE FABRIC SUITABLE FOR THE "FILTRATION" OF COURSE SEDIMENT.
2. FILL MATERIALS: STRAW, CANE MULCH, COMPOSTED MATERIAL (AS4454), COARSE SAND, OR CLEAN AGGREGATE

INSTALLATION:

1. ENSURE THE SOCKS ARE PLACED INDIVIDUALLY OR COLLECTIVELY (AS A SINGLE SEDIMENT TRAP) SUCH THAT:
   i) LEAKAGE AROUND OR UNDER THE SOCKS IS MINIMISED;
   ii) ADJOINING SOCKS ARE TIGHTLY BUTTED OR OVERLAPPED AT LEAST 450mm.
   iii) THE SURFACE AREA OF POTENTIAL WATER PONDING UP-SLOPE OF EACH SEDIMENT TRAP IS MAXIMISED.
   iv) TO THE MAXIMUM DEGREE PRACTICAL, ALL SEDIMENT-LADEN WATER WILL PASS THROUGH THE FORMED POND BEFORE FLOWING OVER THE DOWN-SLOPE END OF THE SEDIMENT TRAP.

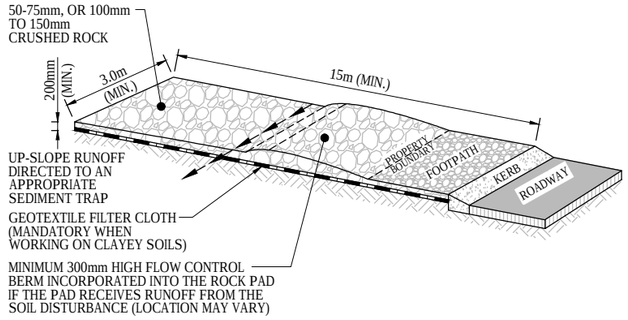


ON-GRADE KERB INLET SEDIMENT TRAP

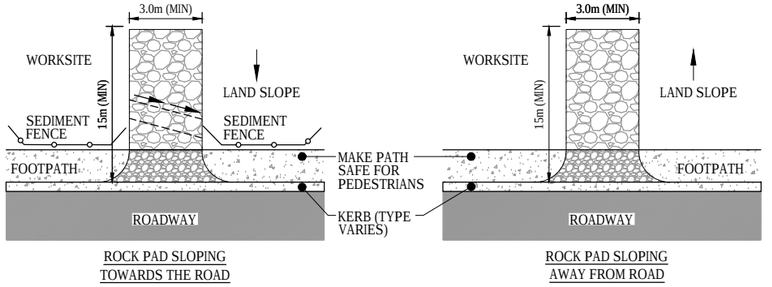


SAG INLET SEDIMENT TRAP

FILTER SOCKS - CONCENTRATED FLOWS

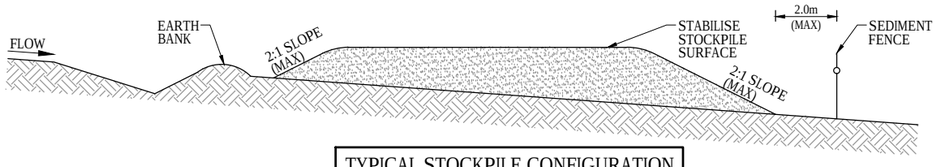


ROCK ENTRY/EXIT PAD FOR CONSTRUCTION SITES



CONSTRUCTION EXIT - ROCK PAD

(CONSTRUCTION SITES ONLY)



TYPICAL STOCKPILE CONFIGURATION

Issue	Description	By	Ckd	RPEQ	Date
04	ISSUE FOR RFI RESPONSE	RR			18.07.19
03	ISSUE FOR RFI RESPONSE	BF			26.11.18
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

Scale

Surveyor: ROBERT A HARRIES SURVEYOR

Architect

Filename: C115-AA007094-gcd-00-SedimentAndErosionControlDetails.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved

R.P.E.Q No :

Scales	N.T.S	Original Issue Signatures	
		Drawn B. MONROYO	
Original Size	A1	Designed A. MAGONDACAN	
Height Datum	AHD	Project Manager L. PRIZEMAN	
Grid	GRID	© Copyright reserved	

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: SEDIMENT & EROSION CONTROL DETAILS
SHEET 1 OF 3

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Drawing No.	Project No.	Issue
C115 —	AA007094 —	04

100mm on Original

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DRAINAGE CONTROL

1. WHEREVER REASONABLE AND PRACTICABLE, STORMWATER RUNOFF ENTERING THE SITE FROM EXTERNAL AREAS, AND NON-SEDIMENT LADEN (CLEAN) STORMWATER RUNOFF ENTERING A WORK AREA OR AREA OF SOIL DISTURBANCE, MUST BE DIVERTED AROUND OR THROUGH THAT AREA IN A MANNER THAT MINIMISES SOIL EROSION AND THE CONTAMINATION OF THAT WATER FOR ALL DISCHARGES UP TO THE SPECIFIED DESIGN STORM DISCHARGE.
2. DURING THE CONSTRUCTION PERIOD, ALL REASONABLE AND PRACTICABLE MEASURES MUST BE IMPLEMENTED TO CONTROL FLOW VELOCITIES IN SUCH A MANNER THAT PREVENTS SOIL EROSION ALONG DRAINAGE PATHS AND AT THE ENTRANCE AND EXIT OF ALL DRAINS AND DRAINAGE PIPES DURING ALL STORMS UP TO THE RELEVANT DESIGN STORM DISCHARGE.
3. TO THE MAXIMUM DEGREE REASONABLE AND PRACTICABLE, ALL WATERS DISCHARGED DURING THE CONSTRUCTION PHASE MUST DISCHARGE ONTO STABLE LAND, IN A NON-EROSIVE MANNER, AND AT A LEGAL POINT OF DISCHARGE.
4. DURING THE CONSTRUCTION PERIOD, ROOF WATER MUST BE MANAGED IN A MANNER THAT MINIMISES SOIL EROSION THROUGHOUT THE SITE, AND SITE WETNESS WITHIN ACTIVE WORK AREAS.

DIVERSION CHANNELS AND CATCH DRAINS

1. CLEAR THE LOCATION FOR THE CHANNEL, CLEARING ONLY WHAT IS NEEDED TO PROVIDE ACCESS FOR PERSONNEL AND CONSTRUCTION EQUIPMENT.
2. REMOVE ROOTS, STUMPS, AND OTHER DEBRIS AND DISPOSE OF THEM PROPERLY. DO NOT USE DEBRIS TO BUILD ANY ASSOCIATED EMBANKMENTS.
3. EXCAVATE THE CHANNEL TO THE SPECIFIED SHAPE, ELEVATION AND GRADIENT (1% MIN). THE SIDES OF THE CHANNEL SHOULD BE NO STEEPER THAN A 2:1 (H:V) IF CONSTRUCTED IN EARTH, UNLESS SPECIFICALLY DIRECTED WITHIN THE APPROVED PLANS.
4. STABILISE THE CHANNEL AND BANKS IMMEDIATELY UNLESS IT WILL OPERATE FOR LESS THAN 30 DAYS. IN EITHER CASE, TEMPORARY EROSION PROTECTION (MATTING, ROCK, TURF, ETC.) WILL BE REQUIRED AS SPECIFIED WITHIN THE APPROVED PLANS OR AS DIRECTED.
5. IF THE CHANNEL IS CUT INTO A DISPERSIVE (SODIC) SOIL, THE EXPOSED DISPERSIVE SOIL MUST BE COVERED AND MAINTAINED WITH A MINIMUM 200mm THICK LAYER OF NON-DISPERSIVE SOIL PRIOR TO PLACEMENT OF EROSION PROTECTION MEASURES.
6. ENSURE THE CHANNEL DISCHARGES TO A STABLE AREA SUCH THAT SOIL EROSION WILL BE PREVENTED. SPECIFICALLY, ENSURE THE DRAIN DOES NOT DISCHARGE TO AN UNSTABLE FILL SLOPE.

EROSION CONTROL

1. THE APPLICATION OF LIQUID-BASED DUST SUPPRESSION MEASURES MUST ENSURE THAT SEDIMENT-LADEN RUNOFF RESULTING FROM SUCH MEASURES DOES NOT CREATE A TRAFFIC OR ENVIRONMENTAL HAZARD.
2. ALL TEMPORARY EARTH BANKS, FLOW DIVERSION SYSTEMS, AND EMBANKMENTS ASSOCIATED WITH CONSTRUCTED SEDIMENT BASINS MUST BE MACHINE-COMPACTED, SEEDED AND MULCHED FOR THE PURPOSE OF ESTABLISHING A TEMPORARY VEGETATIVE COVER WITHIN 10 DAYS AFTER GRADING.
3. UNPROTECTED SLOPE LENGTHS MUST NOT EXCEED 80M, OR AN EQUIVALENT VERTICAL FALL OF 3M.
4. THE CONSTRUCTION AND STABILISATION OF EARTH BATTERS STEEPER THAN 6:1 (H:V) MUST BE STAGED SUCH THAT NO MORE THAN 3 VERTICAL-METRES OF ANY BATTER IS EXPOSED TO RAINFALL AT ANY INSTANT.
5. SYNTHETIC REINFORCED EROSION CONTROL MATS AND BLANKETS MUST NOT BE PLACED WITHIN, OR ADJACENT TO, RIPARIAN ZONES AND WATERCOURSES IF SUCH MATERIALS ARE LIKELY TO CAUSE ENVIRONMENTAL HARM TO WILDLIFE OR WILDLIFE HABITATS.
6. A MINIMUM 60% GROUND COVER MUST BE ACHIEVED ON ALL NON-COMPLETED EARTHWORKS EXPOSED TO ACCELERATED SOIL EROSION IF FURTHER CONSTRUCTION ACTIVITIES OR SOIL DISTURBANCES ARE LIKELY TO BE SUSPENDED FOR MORE THAN 30 DAYS DURING THOSE MONTHS WHEN THE EXPECTED RAINFALL IS LESS THAN 30mm; MINIMUM 70% COVER WITHIN 30 DAYS IF BETWEEN 30 AND 45mm; MINIMUM 70% COVER WITHIN 20 DAYS IF BETWEEN 45 AND 100mm; MINIMUM 75% COVER WITHIN 10 DAYS IF BETWEEN 100 AND 225mm; AND MINIMUM 80% COVER WITHIN 5 DAYS IF GREATER THAN 225mm. (ALTERNATIVE TO ABOVE)

EROSION CONTROL MAT LINING

1. EROSION CONTROL MATS MUST BE STORED AWAY FROM DIRECT SUNLIGHT OR COVERED WITH ULTRAVIOLET PROTECTIVE SHEETING UNTIL THE SITE IS READY FOR THEIR INSTALLATION.
2. VEHICLES AND CONSTRUCTION EQUIPMENT MUST NOT BE PERMITTED TO MANEUVER OVER THE MATTING UNLESS IT HAS BEEN COVERED WITH A LAYER OF SOIL OR GRAVEL AT LEAST 150mm THICK.
3. IF THE CHANNEL IS TO BE GRASSED, PREPARE A SMOOTH SEED BED OF APPROXIMATELY 75mm OF TOPSOIL, SEED, FERTILISE, WATER AND RAKE TO REMOVE ANY REMAINING SURFACE IRREGULARITIES.
4. EXCAVATE A 300mm DEEP BY 150mm WIDE ANCHOR TRENCH ALONG THE FULL WIDTH OF THE UPSTREAM END OF THE AREA TO BE TREATED.
5. AT LEAST 300mm OF THE MAT MUST BE ANCHORED INTO THE TRENCH WITH THE ROLL OF MATTING RESTING ON THE GROUND UP-SLOPE OF THE TRENCH.
6. WHEN SPREADING THE MATS, AVOID STRETCHING THE FABRIC. THE MATS SHOULD REMAIN IN GOOD CONTACT WITH THE SOIL.
7. THE INSTALLATION PROCEDURE MUST ENSURE THAT THE MAT ACHIEVES AND RETAINS GOOD CONTACT WITH THE SOIL.
8. DAMAGED MATTING MUST BE REPAIRED OR REPLACED.

TURF LINED

1. TURF SHOULD BE USED WITHIN 12 HOURS OF DELIVERY, OTHERWISE ENSURE THE TURF IS STORED IN CONDITIONS APPROPRIATE FOR THE WEATHER CONDITIONS (e.g. A SHADED AREA).
2. MOISTENING THE TURF AFTER IT IS UNROLLED WILL HELP MAINTAIN ITS VIABILITY.
3. TURF SHOULD BE LAID ON A MINIMUM 75mm BED OF ADEQUATELY FERTILISED TOPSOIL. RAKE THE SOIL SURFACE TO BREAK THE CRUST JUST BEFORE LAYING THE TURF.
4. DURING THE WARMER MONTHS, LIGHTLY IRRIGATE THE SOIL IMMEDIATELY BEFORE LAYING THE TURF.
5. ENSURE THE TURF IS NOT LAID ON GRAVEL, HEAVILY COMPACTED SOILS, OR SOILS THAT HAVE BEEN RECENTLY TREATED WITH HERBICIDES.
6. ENSURE THE TURF EXTENDS UP THE SIDES OF THE DRAIN AT LEAST 100mm ABOVE THE ELEVATION OF THE CHANNEL INVERT, OR AT LEAST TO A SUFFICIENT ELEVATION TO FULLY CONTAIN EXPECTED CHANNEL FLOW.
7. ON CHANNEL GRADIENTS OF 3:1(H:V) OR STEEPER, OR IN SITUATIONS WHERE HIGH FLOW VELOCITIES (i.e. VELOCITY >1.5m/s) ARE LIKELY WITHIN THE FIRST TWO WEEK FOLLOWING PLACEMENT, SECURE THE INDIVIDUAL TURF STRIPS WITH WOODEN OR PLASTIC PEGS.
8. ENSURE THAT INTIMATE CONTACT IS ACHIEVED AND MAINTAINED BETWEEN THE TURF AND THE SOIL SUCH THAT SEEPAGE FLOW BENEATH THE TURF IS AVOIDED.
9. WATER UNTIL THE SOIL IS WET 100mm BELOW THE TURF. THEREAFTER, WATERING SHOULD BE SUFFICIENT TO MAINTAIN AND PROMOTE HEALTHY GROWTH.

ROCK-LINED

1. ALL ROCK MUST BE HARD, WEATHER RESISTANT, AND DURABLE AGAINST DISINTEGRATION UNDER CONDITIONS TO BE MET IN HANDLING, PLACEMENT AND OPERATION.
2. ALL ROCK MUST HAVE ITS GREATEST DIMENSION NOT GREATER THAN 3 TIMES ITS LEAST DIMENSIONS.
3. THE ROCK USED IN FORMATION OF THE DRAIN MUST BE EVENLY GRADED WITH 50% BY WEIGHT LARGER THAN THE SPECIFIED NOMINAL ROCK SIZE AND HAVE SUFFICIENT SMALL ROCK TO FILL THE VOIDS BETWEEN THE LARGER ROCK. DIRT, FINES, AND SMALLER ROCK MUST NOT EXCEED 5% BY WEIGHT.
4. THE DIAMETER OF THE LARGEST ROCK SIZE SHOULD BE NO LARGER THAN 1.5 TIMES THE NOMINAL ROCK SIZE. SPECIFIC GRAVITY TO BE AT LEAST 2.5.
5. FILTER CLOTH GEOTEXTILE FABRIC: HEAVY-DUTY, NEEDLE-PUNCHED, NON-WOVEN FILTER CLOTH, MINIMUM 'BIDIM' A24 OR EQUIVALENT.
6. PRIOR TO PLACEMENT, ALL ROCKS MUST BE VISUALLY CHECKED FOR SIZE, ELONGATION, CRACKS, DETERIORATION AND OTHER VISIBLE DEFECTS. THE DEGREE AND THOROUGHNESS OF SUCH CHECKING MUST BE APPROPRIATE FOR THE POTENTIAL CONSEQUENCES ASSOCIATED WITH FAILURE OF THE STRUCTURE OR PURPOSE FOR WHICH THE MATERIAL WILL BE USED.
7. IF A FILTER CLOTH UNDERLAY IS SPECIFIED, PLACE THE FILTER FABRIC DIRECTLY ON THE PREPARED FOUNDATION. IF MORE THAN ONE SHEET OF FILTER CLOTH IS REQUIRED OVER THE AREA, OVERLAP THE EDGE OF EACH SHEET AT LEAST 300mm, AND SECURE ANCHOR PINS AT MINIMUM 1M SPACING ALONG THE OVERLAP.
8. ENSURE THE FILTER CLOTH IS PROTECTED FROM PUNCHING OR TEARING DURING INSTALLATION OF THE FABRIC AND THE ROCK. REPAIR ANY DAMAGE BY REMOVING THE ROCK AND REPLACING WITH ANOTHER PIECE OF FILTER CLOTH OVER THE DAMAGED AREA OVERLAPPING THE EXISTING FABRIC A MINIMUM OF 300mm.
9. PLACEMENT OF ROCK SHOULD FOLLOW IMMEDIATELY AFTER PLACEMENT OF THE FILTER LAYER. PLACE ROCK SO THAT IT FORMS A DENSE, WELL-GRADED MASS OF ROCK WITH A MINIMUM OF VOIDS.
10. PLACE ROCK LINING TO THE EXTENT AND DEPTH INDICATED WITHIN THE APPROVED PLANS.
11. ENSURE THE ROCK IS PLACED IN AN APPROPRIATE MANNER TO AVOID DISPLACING UNDERLYING MATERIALS OR PLACING UNDUE IMPACT FORCE ON THE BEDDING MATERIALS.
12. ENSURE THE ROCK IS PLACED WITH A MINIMUM THICKNESS OF 1.5 TIMES THE NOMINAL ROCK SIZE (D50).
13. ENSURE MATERIALS THAT ARE D50 AND LARGER ARE POSITIONED FLUSH WITH THE TOP SURFACE WITH FACES AND SHAPES MATCHED TO MINIMISE VOIDS.
14. ENSURE PROJECTIONS ABOVE OR DEPRESSIONS UNDER THE SPECIFIED TOP SURFACE ARE LESS THAN 20% OF THE ROCK LAYER THICKNESS. THE AVERAGE SURFACE PLANE OF THE FINISHED ROCK IS DEFINED AS THE PLANE WHERE 50% OF THE TOPS OF ROCKS WOULD CONTACT.
15. ENSURE THE COMPLETED CHANNEL HAS SUFFICIENT DEPTH (AS SPECIFIED FOR THE TYPE OF CHANNEL) MEASURED FROM THE CHANNEL INVERT (AVERAGE SURFACE PLANE ALONG CHANNEL INVERT) TO THE TOP OF THE EMBANKMENT. THE AVERAGE SURFACE PLANE OF THE FINISHED ROCK IS DEFINED AS THE PLANE WHERE 50% OF THE TOPS OF ROCKS WOULD CONTACT.
16. TO THE MAXIMUM DEGREE PRACTICABLE, THE MATERIAL BETWEEN LARGER ROCK MUST NOT BE LOOSE OR EASILY DISPLACED BY THE EXPECTED FLOW.
17. AFTER PLACEMENT OF THE ROCK LINING, ENSURE THE DRAIN HAS A CONSTANT FALL IN THE DESIRED DIRECTION FREE OF OBSTRUCTIONS.

CHECK DAMS

1. CHECK DAMS CAN BE BUILT WITH VARIOUS MATERIALS INCLUDING ROCKS AND SANDBAGS.

MATERIALS:

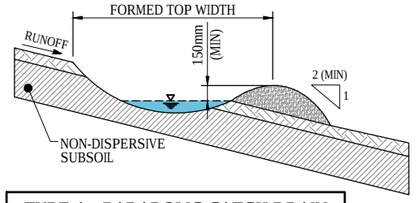
1. ROCK: 150 TO 300mm EQUIVALENT DIAMETER HARD EROSION RESISTANT ROCK.
2. RECYCLED CONCRETE: 150 TO 300mm EQUIVALENT DIAMETER FREE FROM FINES AND CEMENT DUST.
3. SANDBAGS: GEOTEXTILE BAGS (WOVEN SYNTHETIC, OR NON-WOVEN BIODEGRADABLE) FILLED WITH CLEAN COARSE SAND, CLEAN AGGREGATE, OR COMPOST.

INSTALLATION:

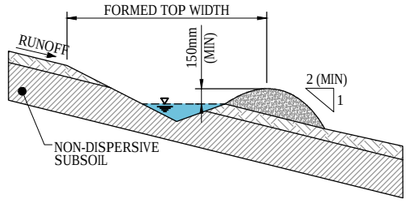
1. PRIOR TO PLACEMENT OF THE SEDIMENT TRAP, ENSURE THE DRAINAGE CHANNEL IS DEEP ENOUGH TO PREVENT WATER BEING UNSAFELY DIVERTED OUT OF THE DRAIN ONCE THE CHECK DAMS ARE INSTALLED.
2. LOCATE EACH CHECK DAM SEDIMENT TRAP AS DIRECTED WITHIN THE APPROVED PLANS, OR OTHERWISE AT SUCH A SPACING TO ACHIEVE THE REQUIRED SEDIMENT TRAPPING OUTCOMES. REFER DETAIL.
3. PLACE EACH CHECK DAM SEDIMENT TRAP TO THE LINES AND PROFILE SHOWN IN THE APPROVED PLAN OR AS DIRECTED BY THE SITE SUPERVISOR.

LEVEL SPREADER INSTALLATION:

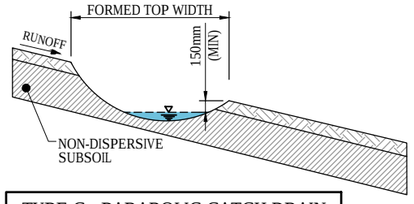
1. THE OUTLET SILL OF THE SPREADER SHOULD BE PROTECTED WITH EROSION CONTROL MATTING TO PREVENT EROSION DURING THE ESTABLISHMENT OF VEGETATION. THE MATTING SHOULD BE A MINIMUM OF 1200mm WIDE EXTENDING AT LEAST 300mm UPSTREAM OF THE EDGE OF THE OUTLET CREST AND BURIED AT LEAST 150mm IN A VERTICAL TRENCH. THE DOWNSTREAM EDGE SHOULD BE SECURELY HELD IN PLACE WITH CLOSELY SPACED HEAVY-DUTY WIRE STAPLES AT LEAST 150mm LONG.
2. ENSURE THAT THE OUTLET SILL (CREST) IS LEVEL FOR THE SPECIFIED LENGTH.
3. IMMEDIATELY AFTER CONSTRUCTION, TURF, OR SEED AND MULCH WHERE APPROPRIATE, THE LEVEL SPREADER.



TYPE A - PARABOLIC CATCH DRAIN WITH DOWN-SLOPE BANK



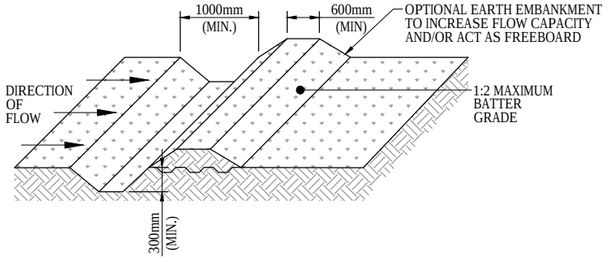
TYPE B - TRIANGULAR V-DRAIN CATCH DRAIN WITH DOWN-SLOPE BANK



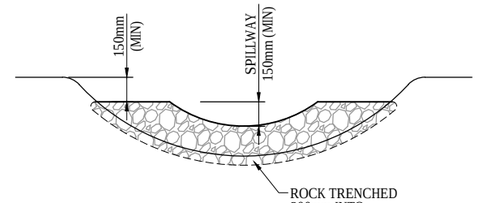
TYPE C - PARABOLIC CATCH DRAIN WITH BANK

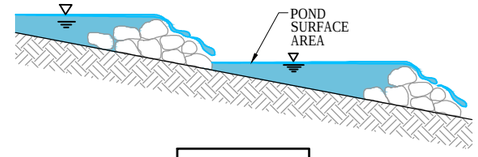
CONSTRUCTED DIMENSIONS OF PARABOLIC CATCH DRAINS		
DRAIN TYPE	FORMED WIDTH WITH OR WITHOUT BANK	FORMED DEPTH WIDTH OR WITHOUT BANK
TYPE-A	1.6m	0.30m
TYPE-B	2.4m	0.45m
TYPE-C	3.6m	0.65m

CONSTRUCTED DIMENSIONS OF TRIANGULAR V-DRAINS		
DRAIN TYPE	FORMED WIDTH WITH OR WITHOUT BANK	FORMED DEPTH WIDTH OR WITHOUT BANK
TYPE-AV	2.0m	0.30m
TYPE-BV	2.7m	0.45m
TYPE-CV	3.9m	0.65m

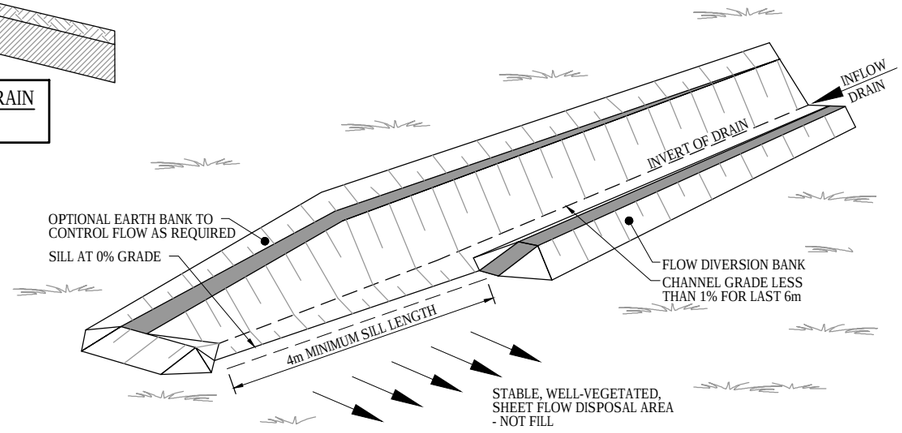


DIVERSION CHANNEL

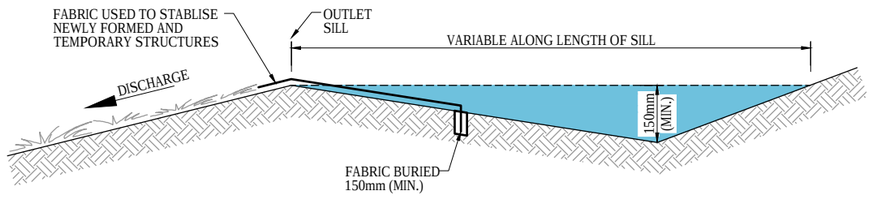




CHECK DAMS



TYPICAL LAYOUT OF LEVEL SPREADER



TYPICAL PROFILE OF THE OUTLET WEIR

LEVEL SPREADER

Issue	Description	By	Ckd	RPEQ	Date
04	ISSUE FOR RFI RESPONSE	RR			18.07.19
03	ISSUE FOR RFI RESPONSE	BF			26.11.18
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

Scale

Surveyor: ROBERT A HARRIES SURVEYOR

Architect:

Filename: C115-AA007094-gcd-00-SedimentAndErosionControlDetails.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved

R.P.E.Q No :

Scales: N.T.S

Original Issue Signatures

Original Size: A1

Drawn: B. MONROYO

Designed: A. MAGONDACAN

Height Datum: AHD

Project Manager: L. PRIZEMAN

Grid: GRID

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: SEDIMENT & EROSION CONTROL DETAILS
SHEET 2 OF 3

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Drawing No. C116 — Project No. AA007094 — Issue 04

100mm on Original

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SEDIMENT CONTROL

1. OPTIMUM BENEFIT MUST BE MADE OF EVERY OPPORTUNITY TO TRAP SEDIMENT WITHIN THE WORK SITE, AND AS CLOSE AS PRACTICABLE TO ITS SOURCE.
2. SEDIMENT TRAPS MUST BE INSTALLED AND OPERATED TO BOTH COLLECT AND RETAIN SEDIMENT.
3. THE POTENTIAL SAFETY RISK OF A PROPOSED SEDIMENT TRAP TO SITE WORKERS AND THE PUBLIC MUST BE GIVEN APPROPRIATE CONSIDERATION, ESPECIALLY THOSE DEVICES LOCATED WITHIN PUBLICLY ACCESSIBLE AREAS.
4. ALL REASONABLE AND PRACTICABLE MEASURES MUST BE TAKEN TO PREVENT, OR AT LEAST MINIMISE, THE RELEASE OF SEDIMENT FROM THE SITE.
5. SUITABLE ALL-WEATHER MAINTENANCE ACCESS MUST BE PROVIDED TO ALL SEDIMENT CONTROL DEVICES.

SEDIMENT FENCE

1. SEDIMENT FENCE TO BE INSTALLED ALONG A LINE OF CONSTANT GROUND ELEVATION WHEREVER PRACTICAL.
2. BOTH ENDS OF THE SEDIMENT FENCE TO EXTEND UP THE SLOPE AT LEAST 1m.
3. SUPPORT POST TO BE SPACED A MAXIMUM 2m UNLESS THE FENCE IS SUPPORTED BY A TOP WIRE OR MESH BACKING, IN WHICH CASE 3m MAXIMUM SPACING.
4. FENCE 'RETURNS' SHALL BE INSTALLED AT MAXIMUM 20m SPACING IF FENCE IS INSTALLED ALONG THE CONTOUR, OTHERWISE 5 TO 10m MAXIMUM SPACING DEPENDING ON SLOPE.
5. MINIMUM 4 STAPLES OR TIE WIRES PER STAKE.

MATERIALS:

1. FABRIC: POLYPROPYLENE, POLYAMIDE, NYLON, POLYESTER, OR POLYETHYLENE WOVEN OR NON-WOVEN FABRIC, AT LEAST 700mm IN WIDTH AND A MINIMUM UNIT WEIGHT OF 140GSM. ALL FABRICS TO CONTAIN ULTRAVIOLET INHIBITORS AND STABILISERS TO PROVIDE A MINIMUM OF 6 MONTHS OF USEABLE CONSTRUCTION LIFE (ULTRAVIOLET STABILITY EXCEEDING 70%).
2. FABRIC REINFORCEMENTS: WIRE OR STEEL MESH MINIMUM 14-GAUGE WITH A MAXIMUM MESH SPACING OF 200mm.
3. SUPPORT POSTS/STAKES: 1500mm² (MIN.) HARDWOOD, 2500mm² (MIN.) SOFTWOOD, OR 1.5kg/m (MIN) STEEL STAR PICKETS SUITABLE FOR ATTACHING FABRIC.

INSTALLATION OF A SPILL-THROUGH WEIR:

1. LOCATE THE SPILL-THROUGH WEIR SUCH THAT THE WEIR CREST WILL BE LOWER THAN THE GROUND LEVEL AT EACH END OF THE FENCE.
2. ENSURE THE CREST OF THE SPILL-THROUGH WEIR IS AT LEAST 300mm ABOVE THE GROUND ELEVATION.
3. SECURELY TIE A HORIZONTAL CROSS MEMBER (WEIR) TO THE SUPPORT POSTS/STAKES EACH SIDE OF THE WEIR. CUT THE FABRIC DOWN THE SIDE OF EACH POST AND FOLD THE FABRIC OVER THE CROSS MEMBER AND APPROPRIATELY SECURE THE FABRIC.
4. INSTALL A SUITABLE SPLASH PAD AND/OR CHUTE IMMEDIATELY DOWN-SLOPE OF THE SPILL-THROUGH WEIR TO CONTROL SOIL EROSION AND APPROPRIATELY DISCHARGE THE CONCENTRATED FLOW PASSING OVER THE WEIR.

INSTALLATION FABRIC DROP INLET PROTECTION:

1. ENSURE THAT THE INSTALLATION OF THE SEDIMENT TRAP WILL NOT CAUSE UNDESIRABLE SAFETY OR FLOODING ISSUES.
2. WHERE POSSIBLE, EXCAVATE A 200x200mm TRENCH AROUND THE INLET STRUCTURE.
3. SPACE STAKES EVENLY AROUND THE PERIMETER OF THE STORMWATER INLET AT A MAXIMUM 1m SPACING AND SECURELY DRIVE THEM INTO THE GROUND.
4. WHERE NECESSARY, INSTALL A HORIZONTAL SPILL-THROUGH WEIR TO LIMIT THE MAXIMUM HEIGHT WATER PONDING AROUND THE STRUCTURE.
5. ENSURE THE MAXIMUM POND HEIGHT WILL NOT CAUSE A SAFETY HAZARD, INCLUDING UNDESIRABLE FLOODING OF AN ADJACENT PROPERTY OR ROADWAY. WHEREVER PRACTICAL, THE SPILL-THROUGH WEIR SHOULD BE AT LEAST 300mm ABOVE GROUND LEVEL.
6. IF A SPILL THROUGH WEIR IS NOT INSTALLED, THEN FRAME THE TOP OF THE STAKES WITH HORIZONTAL CROSS MEMBERS.
7. CUT FABRIC FROM A CONTINUOUS ROLL TO ELIMINATE JOINTS.
8. PLACE THE BOTTOM 300mm OF FABRIC IN THE EXCAVATED TRENCH
9. SECURELY FASTEN THE FABRIC TO THE STAKES AND CROSS MEMBERS AT THE FABRIC JOINT, OVERLAP THE FABRIC TO THE NEXT STAKE.
10. BACKFILL THE TRENCH WITH AT LEAST 200mm OF AGGREGATE OR COMPACTED SOIL. IF A TRENCH CANNOT BE EXCAVATED, LAY THE BOTTOM 300mm OF FABRIC EVENLY ON THE GROUND SURFACE AND COVER WITH A 300mm LAYER OF AGGREGATE, NOT EARTH OR SOIL.
11. WHERE REQUIRED, INSTALL A FLOW CONTROL BUND TO MAINTAIN THE SPECIFIED POOL DEPTH AND CONTROL THE MOVEMENT OF WATER.
12. TAKE ALL NECESSARY MEASURES TO MINIMISE THE SAFETY RISK CAUSED BY THE STRUCTURE AND TO PREVENT UNSAFE ENTRY INTO THE STORMWATER INLET.

SEDIMENT BASIN

1. REMOVE ALL VEGETATION AND TOPSOIL FROM UNDER THE DAM WALL AND FROM WITHIN THE STORAGE AREA.
2. PREPARE THE SITE UNDER THE EMBANKMENT BY RIPPING AT LEAST 100mm TO HELP BOND COMPACTED FILL TO THE EXISTING SUBSTRATE.
3. FOR EARTH EMBANKMENT MATERIAL TYPE AND COMPACTION REFER TO DTMR SPECIFICATION MRTS04 SECTION14.2.6 - WATER RETAINING EMBANKMENTS.
4. CONSTRUCT EMERGENCY SPILLWAY.
5. INSTALL MARKER POST SHOWING MAXIMUM STORAGE AND SETTLING ZONE VOLUMES.
6. AS-CONSTRUCTED PLANS MUST BE PREPARED FOR ALL CONSTRUCTED SEDIMENT BASINS AND ASSOCIATED EMERGENCY SPILLWAYS. SUCH PLANS MUST APPROPRIATELY VERIFY THE BASIN'S DIMENSIONS, LEVELS AND VOLUMES, AND MUST BE SUBMITTED TO THE RELEVANT REGULATORY AUTHORITY WITHIN 14 CALENDAR DAYS OF THE CONSTRUCTION OF EACH BASIN.
7. BASINS SHOULD BE APPROPRIATELY FENCED AND MARKED BY WARNING SIGNS IF UNSUPERVISED PUBLIC ACCESS IS LIKELY AND PUBLIC SAFETY IS AT RISK.

SITE MONITORING AND MAINTENANCE

1. ALL DRAINAGE, EROSION AND SEDIMENT CONTROL MEASURES MUST BE INSPECTED:
   (i) AT LEAST DAILY (WHEN WORK IS OCCURRING ON-SITE);
   (ii) AT LEAST WEEKLY (WHEN WORK IS NOT OCCURRING ON-SITE);
   (iii) WITHIN 24 HOURS OF EXPECTED RAINFALL; AND
   (iv) WITHIN 18 HOURS OF A RAINFALL EVENT OF SUFFICIENT INTENSITY AND DURATION TO CAUSE RUNOFF ON-SITE).
2. INSPECTION SHALL BE CONDUCTED IN LINE WITH THE FOLLOWING AS A MINIMUM:
   i) RECORD TYPE OF DEVICE/CONTROL MEASURE BEING INSPECTED AND ITS LOCATION;
   ii) RECORD THE CONDITION OF EACH DEVICE/CONTROL MEASURE BEING INSPECTED;
   iii) RECORD MAINTENANCE REQUIREMENTS FOR DEVICE/CONTROL MEASURE BEING INSPECTED;
   iv) RECORD SEDIMENT VOLUMES REMOVED FROM DEVICE/CONTROL MEASURE BEING INSPECTED;
   v) RECORD DETAILS OF SEDIMENT BASIN TREATMENT, FLOCCULENT DOSAGE AND CLEANOUTS;
   vi) RECORD SEDIMENT DISPOSAL PROCEDURES AND LOCATION;
2. ALL DRAINAGE, EROSION AND SEDIMENT CONTROL MEASURES MUST BE MAINTAINED IN PROPER WORKING ORDER AT ALL TIMES DURING THEIR OPERATIONAL LIVES.
4. SEDIMENT CONTROL DEVICES MUST BE DE-SILTED AND MADE FULLY OPERATIONAL AS SOON AS REASONABLE AND PRACTICABLE AFTER A SEDIMENT-PRODUCING EVENT, WHETHER NATURAL OR ARTIFICIAL, IF THE DEVICE'S SEDIMENT RETENTION CAPACITY FALLS BELOW 75% OF ITS DESIGN RETENTION CAPACITY. DE-SILT SEDIMENT TRAP IF THE SEDIMENT LEVEL EXCEEDS 1/3 OF THE CREST HEIGHT.
5. MATERIALS, WHETHER LIQUID OR SOLID, REMOVED FROM SEDIMENT CONTROL DEVICES DURING MAINTENANCE OR DECOMMISSIONING, MUST BE DISPOSED OF IN A MANNER THAT DOES NOT CAUSE ONGOING SOIL EROSION OR ENVIRONMENTAL HARM.
7. ALL WATER QUALITY DATA, INCLUDING DATES OF RAINFALL, DATES OF TESTING, TESTING RESULTS AND DATES OF WATER RELEASE, MUST BE KEPT IN AN ON-SITE REGISTER. THE REGISTER IS TO BE MAINTAINED UP TO DATE FOR THE DURATION OF THE APPROVED WORKS AND BE AVAILABLE ON-SITE FOR INSPECTION BY THE RELEVANT REGULATORY AUTHORITY ON REQUEST.
8. AT NOMINATED INSTREAM WATER MONITORING SITES, A MINIMUM OF 3 WATER SAMPLES MUST BE TAKEN AND ANALYSED, AND THE AVERAGE RESULT USED TO DETERMINE QUALITY.
9. ALL ENVIRONMENTALLY RELEVANT INCIDENTS MUST BE RECORDED IN A FIELD LOG THAT MUST REMAIN ACCESSIBLE TO ALL RELEVANT REGULATORY AUTHORITIES.
10. WASHING/FLUSHING OF SEALED ROADWAYS MUST ONLY OCCUR WHERE SWEEPING HAS FAILED TO REMOVE SUFFICIENT SEDIMENT AND THERE IS A COMPELLING NEED TO REMOVE THE REMAINING SEDIMENT (E.G. FOR SAFETY REASONS). IN SUCH CIRCUMSTANCES, ALL REASONABLE AND PRACTICABLE SEDIMENT CONTROL MEASURES MUST BE USED TO PREVENT, OR AT LEAST MINIMISE, THE RELEASE OF SEDIMENT INTO RECEIVING WATERS. ONLY THOSE MEASURES THAT WILL NOT CAUSE SAFETY AND PROPERTY FLOODING ISSUES SHALL BE EMPLOYED. SEDIMENT REMOVED FROM ROADWAYS MUST BE DISPOSED OF IN A LAWFUL MANNER THAT DOES NOT CAUSE ONGOING SOIL EROSION OR ENVIRONMENTAL HARM.
11. ALL SEEDING, HYDROSEEDING AND TURFING REQUIRES REGULAR WATERING UNTIL EFFECTIVE COVER IS ESTABLISHED AND PLANTS ARE GROWING VIGOROUSLY. WATERING SHOULD DEPEND ON WEATHER AND SOIL CONDITIONS. WATERING SHOULD START IMMEDIATELY AFTER PLANTING AND SHOULD COMPLY WITH THE FOLLOWING AS A MINIMUM:
    i) WEEK 1 3 WATERINGS PER WEEK
    ii) WEEK 2-6 2 WATERINGS PER WEEK
    iii) WEEK 7-12 1 WATERING PER WEEK
11. MAINTENANCE MOWING OF ALL ROAD SHOULDERS, TABLE DRAINS, BATTERS AND OTHER SURFACES LIKELY TO EXPERIENCE ACCELERATED SOIL EROSION MUST AIM TO LEAVE THE GRASS LENGTH NO SHORTER THAN 50mm WHERE REASONABLE AND PRACTICABLE.
12. MAINTENANCE MOWING MUST BE DONE IN A MANNER THAT WILL NOT DAMAGE THE PROFILE OF FORMED, SOFT EDGES, SUCH AS THE CREST OF EARTH EMBANKMENTS.

SEDIMENT BASIN

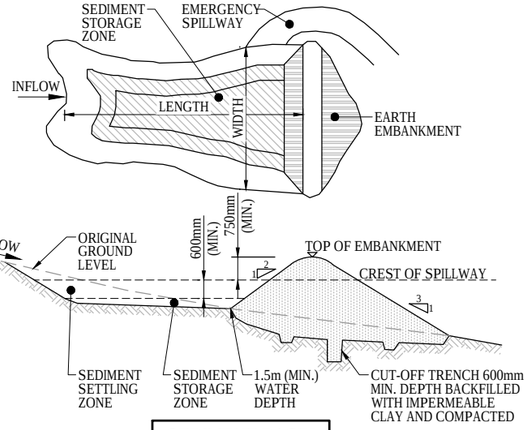
1. CONSTRUCTED SEDIMENT BASINS MUST BE MAINTAINED AND FULLY OPERATIONAL THROUGHOUT THE CONSTRUCTION PERIOD AND UNTIL EACH BASIN'S CATCHMENT AREA ACHIEVES 80% GROUND COVER ON ALL SOIL SURFACES.
2. SETTLED SEDIMENT MUST BE REMOVED FROM SEDIMENT BASINS WHEN THE VOLUME OF THE SEDIMENT EXCEEDS THE DESIGNATED SEDIMENT STORAGE VOLUME, OR THE DESIGN MAXIMUM SEDIMENT STORAGE ELEVATION.
3. SEDIMENT BASIN WATER QUALITY SAMPLES MUST BE TAKEN AT A DEPTH NO GREATER THAN 200mm ABOVE THE LEVEL OF SETTLED SEDIMENT BY A SUITABLY QUALIFIED PERSON. WATER TESTING TO BE UNDERTAKEN USING EITHER A HANDHELD PH/TURBIDITY METER OR SAMPLES COLLECTED FOR LABORATORY TESTING PRIOR TO BASIN DEWATERING. ALL LABORATORY TESTING TO BE UNDERTAKEN BY A NATA ACCREDITED LABORATORY.
4. ALL WATER PUMPED FROM THE SEDIMENT BASIN SHALL BE TESTED FOR ENVIRONMENTAL COMPLIANCE AGAINST THE RELEASE CRITERIA IN THE TABLE BELOW (AS A MINIMUM), UNLESS ALTERNATIVE (MORE STRINGENT) STANDARDS ARE SPECIFIED BY THE LOCAL AUTHORITY PRIOR TO RELEASE.

PARAMETER	RELEASE CRITERIA
SUSPENDED SOLIDS	50mg/l MAX
pH	WITHIN RANGE 6.5-8.5
VISUAL AMENITY	NO VISUAL PLUME

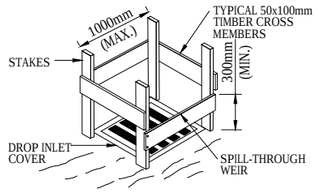
5. THE SEDIMENT BASIN SHALL BE TREATED BY FLOCCULATION AFTER ALL RAINFALL EVENTS (> 5mm) USING GYPSUM OR ALUM. MANUAL DOSAGE OF BASIN SHALL BE UNDERTAKEN USING A MINIMUM RATE OF 32kg/100m³ FOR GYPSUM AND 1.5-8kg/100m³ FOR ALUM. HIGHER DOSAGE MAY BE REQUIRED DEPENDING ON SOIL TYPE AND APPLICATION TECHNIQUE. ALUM SHALL NOT BE USED WHERE THE CATCHMENT DISCHARGES DIRECTLY TO A WATERWAY.
6. THE CHOSEN FLOCCULENT SHALL BE SPREAD EVENLY OVER THE BASIN SURFACE AREA. THE BASIN WILL REQUIRE A PUMP SYSTEM TO SPRAY SLURRY OF FLOCCULANTS OVER SURFACE AT AN ANGLE OF 10°-20°.
7. THE TREATED BASIN SHALL BE DEWATERED WITH A PUMP SYSTEM WITH A FLOATING INLET TO ENSURE SETTLED SEDIMENT IS NOT ENTRAINED AND DISCHARGED. BASIN DEWATERING SHALL OCCUR WITHIN 5 DAYS FROM CONCLUSION OF RAINFALL EVENT.

SITE REHABILITATION

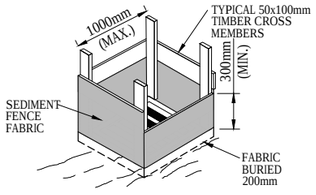
1. ALL DISTURBED AREAS IDENTIFIED AS VERY LOW, LOW, MEDIUM, HIGH, OR EXTREME EROSION RISK MUST BE SUITABLY STABILISED WITHIN 60, 30, 20, 10 OR 5 DAYS RESPECTIVELY, OR PRIOR TO ANTICIPATED RAINFALL, WHICHEVER IS THE GREATER, FROM THE DAY THAT SOIL DISTURBANCES ON THE AREA HAVE BEEN FINALISED.
2. THE TYPE OF GROUND COVER APPLIED TO COMPLETED EARTHWORKS SHOULD BE COMPATIBLE WITH THE ANTICIPATED LONG-TERM LAND USE, ENVIRONMENTAL RISK, AND SITE REHABILITATION MEASURES.
3. UNLESS OTHERWISE DIRECTED BY SUPERINTENDENT OR WHERE DIRECTED BY THE APPROVED REVEGETATION PLAN, TOPSOIL MUST BE PLACED AT A MINIMUM DEPTH OF 75mm ON SLOPES 4:1 (H:V) OR FLATTER, AND 50mm ON SLOPES STEEPER THAN 4:1.
4. THE PH LEVEL (SOIL:WATER 1:5) OF TOPSOIL MUST BE ADEQUATE TO ENABLE ESTABLISHMENT AND GROWTH OF THE SPECIFIED VEGETATION.
5. SOIL AMELIORANTS MUST BE ADDED TO THE SOIL IN ACCORDANCE WITH THE APPROVED LANDSCAPE/REVEGETATION PLANS AND/OR SOIL ANALYSIS.
6. SOIL DENSITY/COMPACTION MUST BE ADJUSTED PRIOR TO SEEDING/PLANTING IN ACCORDANCE WITH THE RELEVANT SPECIFICATIONS, SOIL REPORT AND/OR APPROPRIATE REFERENCE PLANS.
7. ALL UNSTABLE OR DISTURBED SOIL SURFACES MUST BE ADEQUATELY STABILISED AGAINST EROSION (MINIMUM 80%) PRIOR TO COMMENCEMENT OF USE, OR SURVEY PLAN ENDORSEMENT.
8. ALL TEMPORARY DRAINAGE, EROSION AND SEDIMENT CONTROL MEASURES MUST BE REMOVED AFTER ACHIEVING A SATISFACTORY "OFF-MAINTENANCE INSPECTION" BY THE RELEVANT REGULATORY AUTHORITY.
9. DISPOSE OF ANY COLLECTED SEDIMENT OR FILL IN A LAWFUL MANNER THAT DOES NOT CAUSE ONGOING SOIL EROSION OR ENVIRONMENTAL HARM.
10. IMMEDIATELY PRIOR TO THE CONSTRUCTION OF THE PERMANENT STORMWATER TREATMENT DEVICE, APPROPRIATE FLOW BYPASS CONDITIONS MUST BE ESTABLISHED TO PREVENT SEDIMENT-LADEN WATER ENTERING THE DEVICE.
11. IMMEDIATELY FOLLOWING THE CONSTRUCTION OF THE FILTER MEDIA OF THE PERMANENT STORMWATER TREATMENT DEVICE, THE FILTER MEDIA MUST BE COVERED BY HEAVY-DUTY FILTER CLOTH (MINIMUM BIDUM A44 OR EQUIVALENT) AND A MINIMUM 200mm LAYER OF EARTH OR SACRIFICIAL FILTER MEDIA. SUCH EARTH AND FILTER CLOTH MUST NOT BE REMOVED FROM THE DEVICE UNTIL SUITABLE SURFACE CONDITIONS BEING ACHIEVED WITHIN THE BASIN'S CATCHMENT AREA.
12. IMMEDIATELY FOLLOWING THE CONSTRUCTION OF THE PERMANENT STORMWATER TREATMENT DEVICE AN APPROPRIATE TYPE 2 SEDIMENT TRAP MUST BE INSTALLED IN A MANNER TO PREVENT SEDIMENT INTRUSION INTO THE DEVICE.
13. THE MINIMUM SEDIMENT CONTROL STANDARD FOR THE PROTECTION OF THE PERMANENT STORMWATER TREATMENT DEVICE DURING THE CONSTRUCTION AND MAINTENANCE PHASES IS A TYPE 2 SEDIMENT TRAP. (ALTERNATIVE TO ABOVE)
14. PLANT ESTABLISHMENT WITHIN THE PERMANENT STORMWATER TREATMENT DEVICE MUST BE DELAYED UNTIL SEDIMENT INTRUSION INTO THE DEVICE IS SUITABLY UNDER CONTROL.
15. UPON SUITABLE CONDITIONS BEING ACHIEVED WITHIN THE BASIN'S CATCHMENT AREA, THE OPERATIONAL FEATURES OF THE PERMANENT STORMWATER TREATMENT SYSTEM MUST BE MADE FULLY OPERATIONAL (I.E. MAINTENANCE AND/OR RECONSTRUCTION AS REQUIRED).
16. THE PERMANENT STORMWATER TREATMENT FEATURES OF THE REHABILITATED BASIN MUST NOT BE MADE OPERATIONAL UNTIL ALL UP-SLOPE SITE STABILISATION MEASURES HAVE BEEN IMPLEMENTED AND ARE APPROPRIATELY WORKING TO CONTROL SOIL EROSION AND SEDIMENT RUNOFF IN ACCORDANCE WITH THE SPECIFIED ESC STANDARD. (ALTERNATIVE TO ABOVE).



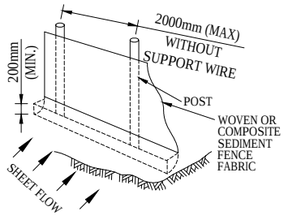
SEDIMENT BASIN



DETAILS OF SUPPORT FRAME WITH SPILL-THROUGH WEIR

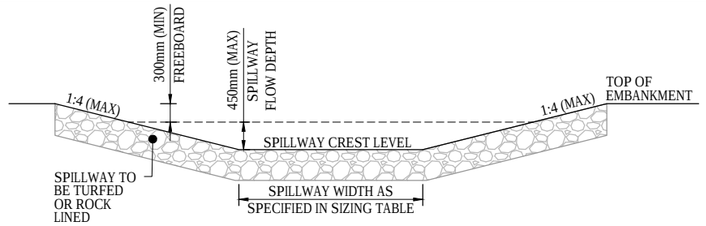


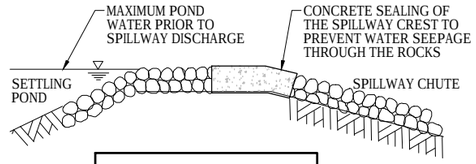
FABRIC DROP INLET PROTECTION WITH SPILL-THROUGH WEIR



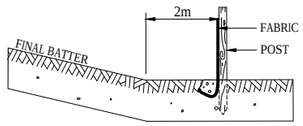
INSTALLATION WITHOUT BACKING SUPPORT

FABRIC DROP INLET PROTECTION

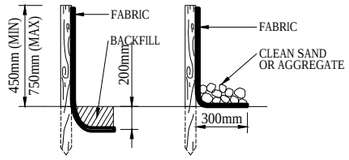




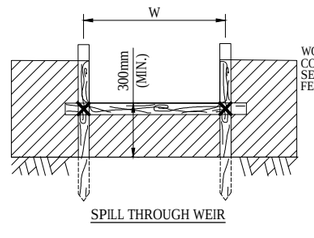
EMERGENCY SPILLWAY



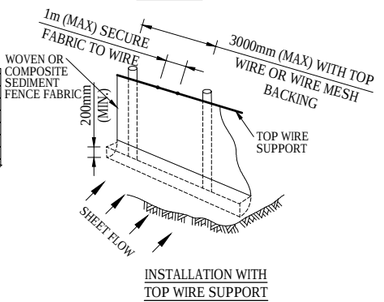
LOCATION OF FENCE RELATIVE TO BASE OF SLOPE



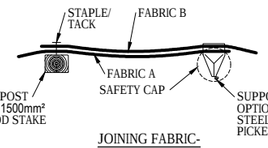
ANCHORING BASE OF FABRIC



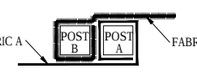
SPILL THROUGH WEIR



INSTALLATION WITH TOP WIRE SUPPORT

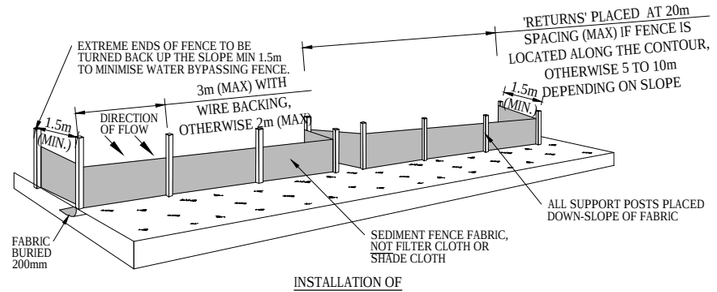


JOINING FABRIC- METHOD 2



FABRIC TO FOLD AROUND EACH STAKE ONE FULL TURN. STAKE B TO BE DRIVEN TIGHTLY AGAINST STAKE A. THE TOPS OF BOTH STAKES TO BE SECURED WITH WIRE.

JOINING FABRIC - METHOD 1



INSTALLATION OF SEDIMENT FENCE

SEDIMENT FENCE

Issue	Description	By	Ckd	RPEQ	Date
04	ISSUE FOR RFI RESPONSE	RR			18.07.19
03	ISSUE FOR RFI RESPONSE	BF			26.11.18
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

Scale

Surveyor: ROBERT A HARRIES SURVEYOR

Architect

Filename C115-AA007094-gcd-00-SedimentAndErosionControlDetails.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved R.P.E.Q No :

Scales	N.T.S	Original Issue Signatures	
Original Size	A1	Drawn B. MONROYO	
Height Datum	AHD	Designed A. MAGONDACAN	
Grid	GRID	Project Manager L. PRIZEMAN	
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Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: SEDIMENT & EROSION CONTROL DETAILS
SHEET 3 OF 3

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Drawing No. C117 — Project No. AA007094 — Issue 04

100mm on Original

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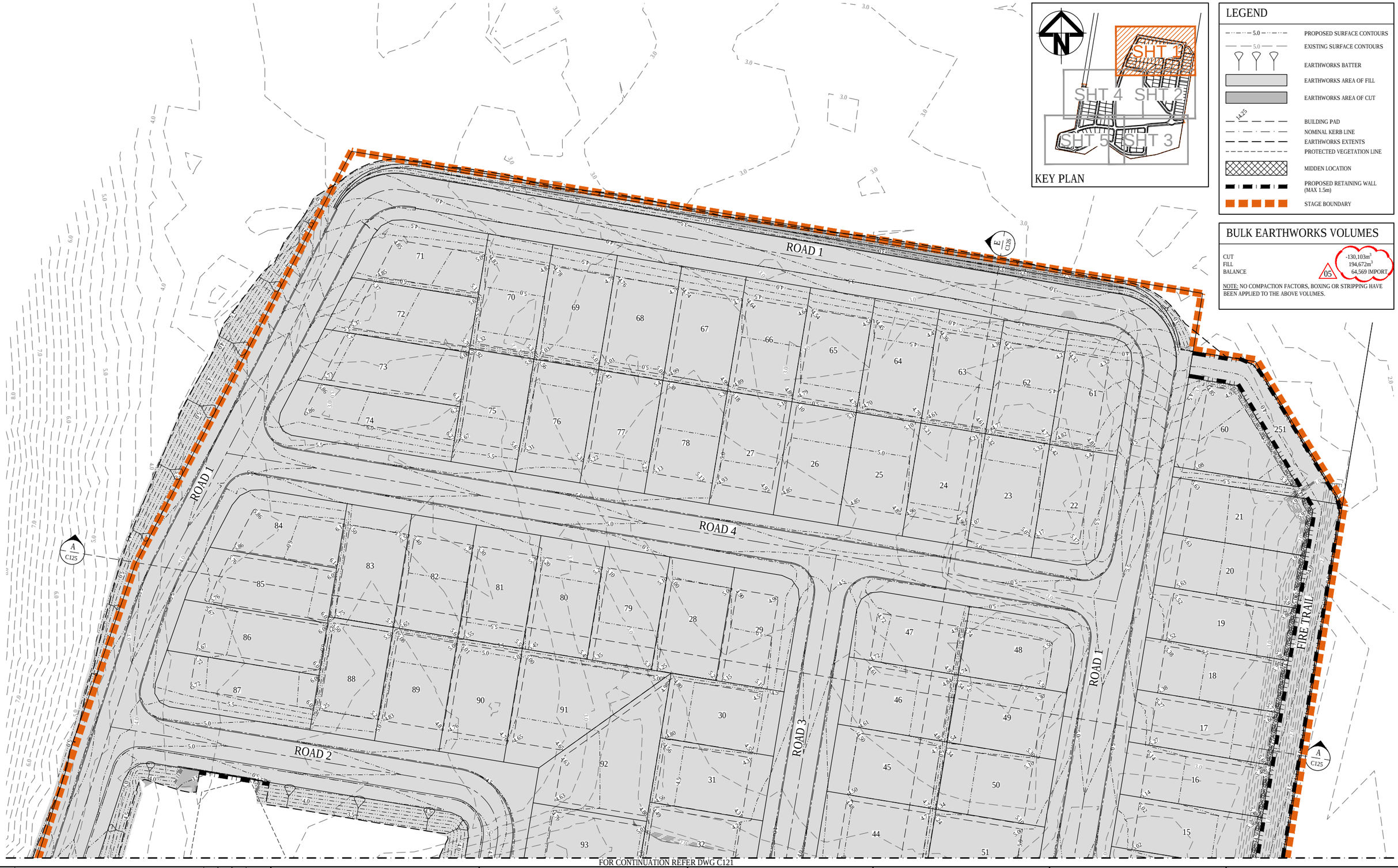

KEY PLAN

LEGEND

- PROPOSED SURFACE CONTOURS
- EXISTING SURFACE CONTOURS
- EARTHWORKS BATTER
- EARTHWORKS AREA OF FILL
- EARTHWORKS AREA OF CUT
- BUILDING PAD
- NOMINAL KERB LINE
- EARTHWORKS EXTENTS
- PROTECTED VEGETATION LINE
- MIDDEN LOCATION
- PROPOSED RETAINING WALL (MAX 1.5m)
- STAGE BOUNDARY

BULK EARTHWORKS VOLUMES

CUT	-130,103m³
FILL	194,672m³
BALANCE	64,569 IMPORT

05

NOTE: NO COMPACTION FACTORS, BOXING OR STRIPPING HAVE BEEN APPLIED TO THE ABOVE VOLUMES.

FOR CONTINUATION REFER DWG C121

Issue	Description	By	Ckd	RPEQ	Date
05	ISSUE FOR RFI RESPONSE	RR			18.07.19
04	ISSUE FOR RFI RESPONSE	AC			26.11.18
03	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

Scale: 0 10 20 30 40 50m — 1 : 500

Surveyor: ROBERT A HARRIES SURVEYOR

Architect:

Filename: C120-AA007094-gcd-00-BulkEarthworksCut&FillLayoutPlan.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved: R.P.E.Q No :

Scales	1 : 500	Original Issue Signatures	
		Drawn A. CARDEÑO	
Original Size	A1	Designed A. MAGONDACAN	
Height Datum	AHD	Project Manager L. PRIZEMAN	
Grid	GRID	© Copyright reserved	

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: BULK EARTHWORKS CUT & FILL LAYOUT PLAN SHEET 1 OF 5

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Drawing No.	Project No.	Issue
C120	AA007094	05

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FOR CONTINUATION REFER DWG C120

FOR CONTINUATION REFER DWG C122

FOR CONTINUATION REFER DWG C122

ROAD 1

ROAD 3

ROAD 1

ROAD 2

FIRE TRAIL

177

B / C125

E / C126

STORMWATER QUANTITY AND QUALITY TREATMENT BASIN DESIGNATED AREA. SUBJECT TO DETAILED DESIGN AND MUST COMPLY WITH ARCADIS REVISED ENGINEERING SERVICES AND CIVIL INFRASTRUCTURE REPORT.

LEGEND

- PROPOSED SURFACE CONTOURS (5.0)
- EXISTING SURFACE CONTOURS (5.0)
- EARTHWORKS BATTER
- EARTHWORKS AREA OF FILL
- EARTHWORKS AREA OF CUT
- BUILDING PAD (14.25)
- NOMINAL KERB LINE
- EARTHWORKS EXTENTS
- PROTECTED VEGETATION LINE
- MIDDEN LOCATION
- PROPOSED RETAINING WALL (MAX 1.5m)
- STAGE BOUNDARY

BULK EARTHWORKS VOLUMES

CUT	-130,103m³
FILL	194,672m³
BALANCE	64,569 IMPORT

05

NOTE: NO COMPACTION FACTORS, BOXING OR STRIPPING HAVE BEEN APPLIED TO THE ABOVE VOLUMES.

KEY PLAN

SHT 1 SHT 2 SHT 3 SHT 4 SHT 5

Issue	Description	By	Ckd	RPEQ	Date
05	ISSUE FOR RFI RESPONSE	RR			18.07.19
04	ISSUE FOR RFI RESPONSE	AC			26.11.18
03	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

100mm on Original

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Surveyor: ROBERT A HARRIES SURVEYOR

Architect:

Filename: C120-AA007094-gcd-00-BulkEarthworksCut&FillLayoutPlan.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved

R.P.E.Q No :

Scales: 1 : 500

Original Size: A1

Height Datum: AHD

Grid: GRID

Original Issue Signatures

Drawn: A. CARDEÑO

Designed: A. MAGONDACAN

Project Manager: L. PRIZEMAN

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: BULK EARTHWORKS CUT & FILL LAYOUT PLAN SHEET 2 OF 5

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Drawing No. C121 — Project No. AA007094 — Issue 05

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FOR CONTINUATION REFER DWG C121

FOR CONTINUATION REFER DWG C124

ROAD 1
ROAD 5
ROAD 1
IRON GATES ROAD
ROAD 9
ROAD 6
ROAD 10
ROAD 6
EVANS RIVER

D
C126

LEGEND

- PROPOSED SURFACE CONTOURS
- EXISTING SURFACE CONTOURS
- EARTHWORKS BATTER
- EARTHWORKS AREA OF FILL
- EARTHWORKS AREA OF CUT
- BUILDING PAD
- NOMINAL KERB LINE
- EARTHWORKS EXTENTS
- PROTECTED VEGETATION LINE
- MIDDEN LOCATION
- PROPOSED RETAINING WALL (MAX 1.5m)
- STAGE BOUNDARY

BULK EARTHWORKS VOLUMES

CUT	130,103m³
FILL	194,672m³
BALANCE	64,569 IMPORT

06

NOTE: NO COMPACTION FACTORS, BOXING OR STRIPPING HAVE BEEN APPLIED TO THE ABOVE VOLUMES.

SHT 1
SHT 4
SHT 2
SHT 5
SHT 3

KEY PLAN

Issue	Description	By	Ckd	RPEQ	Date
06	ISSUE FOR RFI RESPONSE	RR			18.07.19
05	ISSUE FOR RFI RESPONSE	AC			26.11.18
04	MC1004 SECTION AMENDED			BD	14.10.15
03	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

100mm on Original

Scale
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1 : 500

Surveyor
ROBERT A HARRIES
SURVEYOR

Architect

Filename C120-AA007094-gcd-00-BulkEarthworksCut&FillLayoutPlan.dwg

Client
GOLDCORAL PTY LTD

Status
FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved

R.P.E.Q No :

Scales 1 : 500

Original Issue Signatures

Original Size A1

Drawn A. CARDEÑO

Designed A. MAGONDACAN

Height Datum AHD

Project Manager L. PRIZEMAN

Grid GRID

Project
RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title
BULK EARTHWORKS CUT
& FILL LAYOUT PLAN
SHEET 3 OF 5

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Drawing No.	Project No.	Issue
C122	AA007094	06

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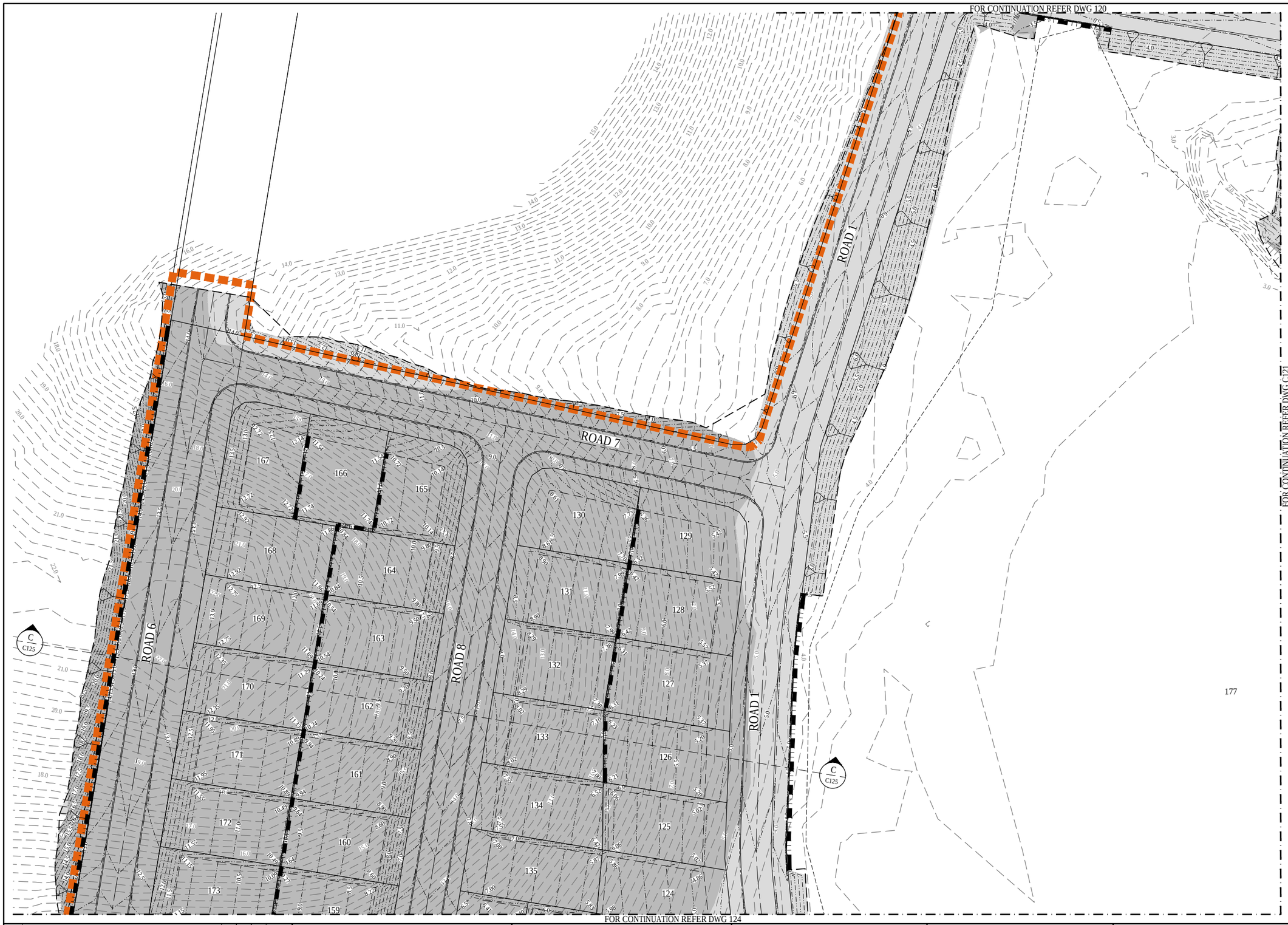


LEGEND

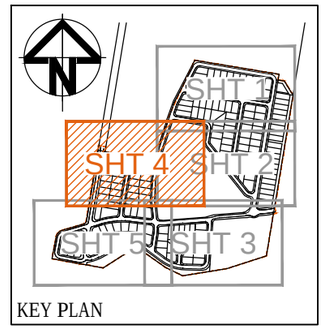
- PROPOSED SURFACE CONTOURS
- EXISTING SURFACE CONTOURS
- EARTHWORKS BATTER
- EARTHWORKS AREA OF FILL
- EARTHWORKS AREA OF CUT
- BUILDING PAD
- NOMINAL KERB LINE
- EARTHWORKS EXTENTS
- PROTECTED VEGETATION LINE
- MIDDEN LOCATION
- PROPOSED RETAINING WALL (MAX 1.5m)
- STAGE BOUNDARY

BULK EARTHWORKS VOLUMES

CUT	-130,103m^3
FILL	194,672m^3
BALANCE	64,569 IMPORT

05

NOTE: NO COMPACTION FACTORS, BOXING OR STRIPPING HAVE BEEN APPLIED TO THE ABOVE VOLUMES.



KEY PLAN

Issue	Description	By	Ckd	RPEQ	Date
05	ISSUE FOR RFI RESPONSE	RR			18.07.19
04	ISSUE FOR RFI RESPONSE	AC			26.11.18
03	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

Scale: 0 10 20 30 40 50m — 1 : 500

Surveyor: ROBERT A HARRIES SURVEYOR

Architect:

Filename: C120-AA007094-gcd-00-BulkEarthworksCut&FillLayoutPlan.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved: R.P.E.Q No :

Scales	1 : 500	Original Issue Signatures	
		Drawn A. CARDEÑO	
Original Size	A1	Designed A. MAGONDACAN	
Height Datum	AHD	Project Manager L. PRIZEMAN	
Grid	GRID	© Copyright reserved	

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: BULK EARTHWORKS CUT & FILL LAYOUT PLAN
SHEET 4 OF 5

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Drawing No.	Project No.	Issue
C123	— AA007094	— 05

100mm on Original

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FOR CONTINUATION REFER DWG C123

LEGEND

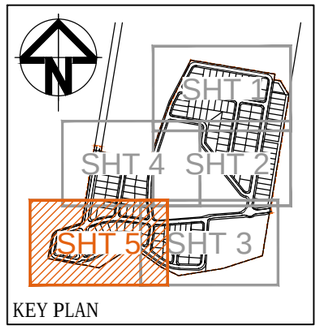
- PROPOSED SURFACE CONTOURS
- EXISTING SURFACE CONTOURS
- EARTHWORKS BATTER
- EARTHWORKS AREA OF FILL
- EARTHWORKS AREA OF CUT
- BUILDING PAD
- NOMINAL KERB LINE
- EARTHWORKS EXTENTS
- PROTECTED VEGETATION LINE
- MIDDEN LOCATION
- PROPOSED RETAINING WALL (MAX 1.5m)
- STAGE BOUNDARY

BULK EARTHWORKS VOLUMES

CUT	-130,103m³
FILL	194,672m³
BALANCE	64,569 IMPORT

05

NOTE: NO COMPACTION FACTORS, BOXING OR STRIPPING HAVE BEEN APPLIED TO THE ABOVE VOLUMES.



KEY PLAN

ROAD 1 · ROAD 5 · ROAD 6 · ROAD 8 · ROAD 9 · ROAD 11

EVANS RIVER

FOR CONTINUATION REFER DWG C122

Issue	Description	By	Ckd	RPEQ	Date
05	ISSUE FOR RFI RESPONSE	RR			18.07.19
04	ISSUE FOR RFI RESPONSE	AC			26.11.18
03	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

Scale: 0 10 20 30 40 50m — 1 : 500

Surveyor: ROBERT A HARRIES SURVEYOR

Architect:

Filename: C120-AA007094-gcd-00-BulkEarthworksCut&FillLayoutPlan.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved

R.P.E.Q No :

Scales: 1 : 500

Original Issue Signatures

Drawn: A. CARDEÑO

Original Size: A1

Designed: A. MAGONDACAN

Height Datum: AHD

Project Manager: L. PRIZEMAN

Grid: GRID

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: BULK EARTHWORKS CUT & FILL LAYOUT PLAN
SHEET 5 OF 5

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Drawing No. C124 — Project No. AA007094 — Issue 05

100mm on Original

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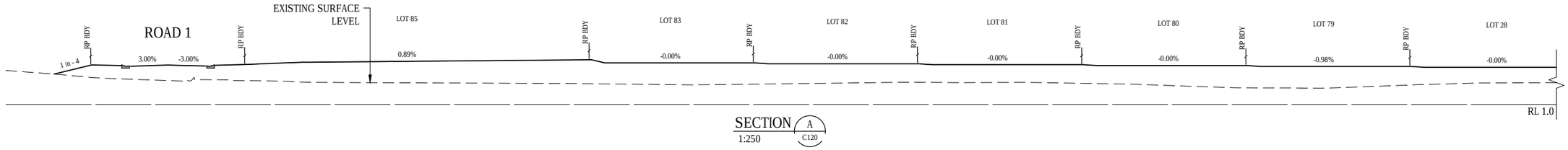

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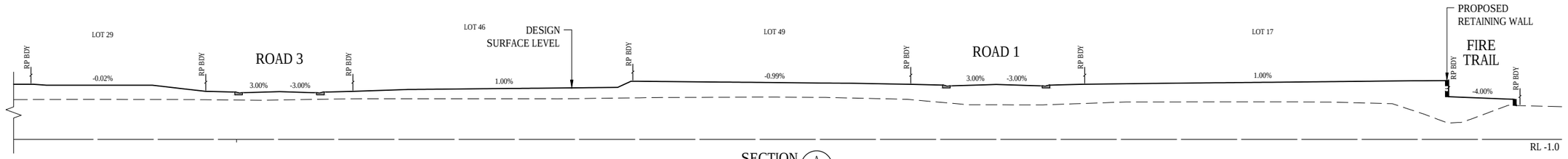
1:250 C120



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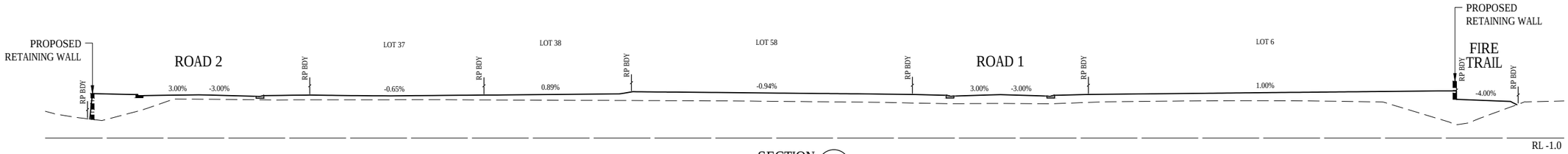
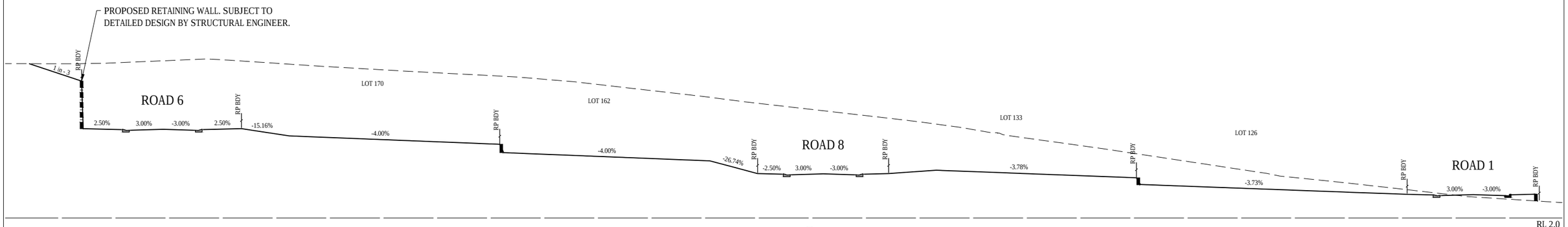


SECTION B
1:250 C121



SECTION C
1:250 C123

Issue	Description	By	Ckd	RPEQ	Date
03	ISSUE FOR RFI RESPONSE	RR			18.07.19
02	ISSUE FOR RFI RESPONSE	BF			26.11.18
01	ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15

Scale
0 5 10 15 20 25m
1 : 250

Surveyor
ROBERT A HARRIES SURVEYOR

Architect

Filename C125-AA007094-gcd-00-BulkEarthworksCut&FillSections.dwg

Client
GOLDCORAL PTY LTD

Status
FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved

R.P.E.Q No :

Scales 1 : 250

Original Size A1

Height Datum AHD

Grid GRID

Original Issue Signatures

Drawn B. MONROYO

Designed A. MAGONDACAN

Project Manager L. PRIZEMAN

Project
RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title
BULK EARTHWORKS
CUT & FILL SECTIONS
SHEET 1 OF 2

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Drawing No. C125 — Project No. AA007094 — Issue 03

100mm on Original

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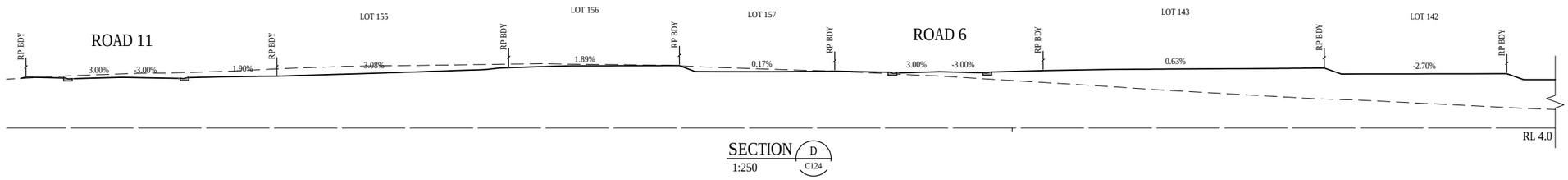
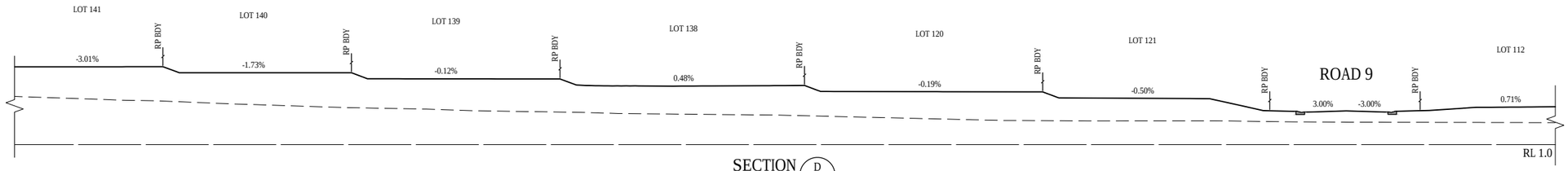


SECTION D
1:250 C124



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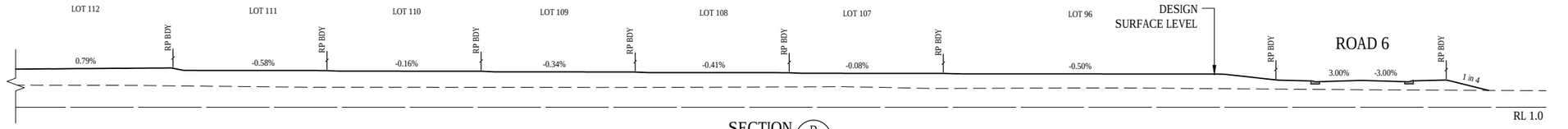

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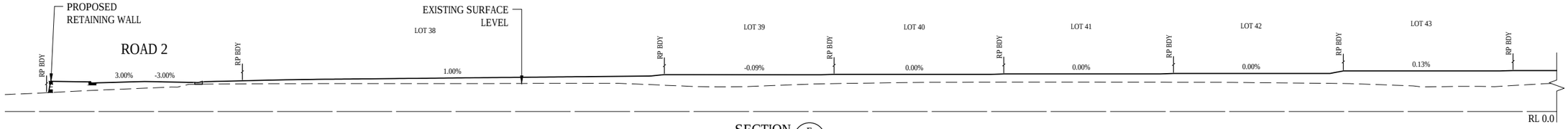
1:250 C122



SECTION E
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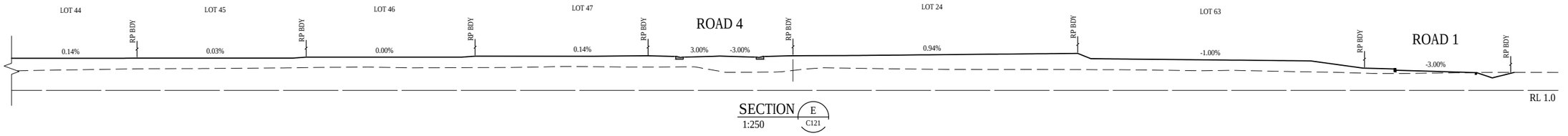

SECTION E
1:250 C121

Issue	Description	By	Ckd	RPEQ	Date
03	ISSUE FOR RFI RESPONSE	RR			18.07.19
02	ISSUE FOR RFI RESPONSE	BF			26.11.18
01	ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15

100mm on Original

Scale
0 5 10 15 20 25m
1 : 250

Surveyor
ROBERT A HARRIES
SURVEYOR

Architect

Filename C125-AA007094-gcd-00-BulkEarthworksCut&FillSections.dwg

Client
GOLDCORAL PTY LTD

Status
FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved

R.P.E.Q No :

Scales 1 : 250

Original Size A1

Height Datum AHD

Grid GRID

Original Issue Signatures

Drawn B. MONROYO

Designed A. MAGONDACAN

Project Manager L. PRIZEMAN

Project
RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title
BULK EARTHWORKS
CUT & FILL SECTIONS
SHEET 2 OF 2

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Drawing No. C126 — Project No. AA007094 — Issue 03

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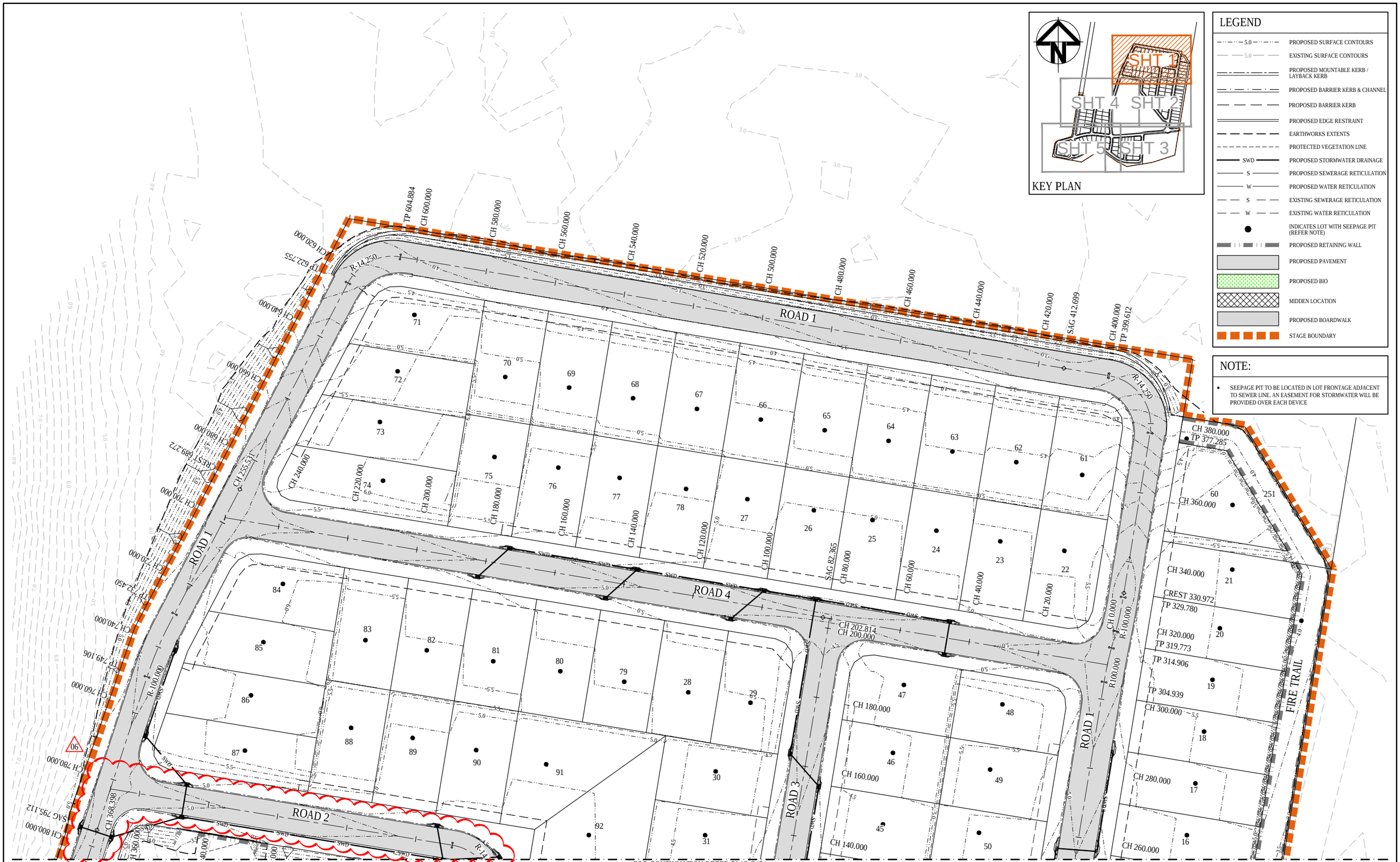

LEGEND

- PROPOSED SURFACE CONTOURS
- EXISTING SURFACE CONTOURS
- PROPOSED MOUNTABLE KERB / LAYBACK KERB
- PROPOSED BARRIER KERB & CHANNEL
- PROPOSED BARRIER KERB
- PROPOSED EDGE RESTRAINT
- EARTHWORKS EXTENTS
- PROTECTED VEGETATION LINE
- PROPOSED STORMWATER DRAINAGE
- PROPOSED SEWERAGE RETICULATION
- PROPOSED WATER RETICULATION
- EXISTING SEWERAGE RETICULATION
- EXISTING WATER RETICULATION
- INDICATES LOT WITH SEEPAGE PIT (REFER NOTE)
- PROPOSED RETAINING WALL
- PROPOSED PAVEMENT
- PROPOSED BIO
- MIDDEN LOCATION
- PROPOSED BOARDWALK
- STAGE BOUNDARY

NOTE:

- SEEPAGE PIT TO BE LOCATED IN LOT FRONTAGE ADJACENT TO SEWER LINE. AN EASEMENT FOR STORMWATER WILL BE PROVIDED OVER EACH DEVICE

FOR CONTINUATION REFER DWG C131

Issue	Description	By	Ckd	RPEQ	Date
06	ISSUE FOR RFI RESPONSE	RR			18.07.19
05	ISSUE FOR RFI RESPONSE	AC			26.11.18
04	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
03	ISSUE FOR DEVELOPMENT APPROVAL / PAVEMENT HATCH ADDED			ND	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

100mm on Original

Scale: 1 : 500 (0 10 20 30 40 50m)

Surveyor: ROBERT A HARRIES SURVEYOR

Architect:

Filename: C130-AA007094-gcd-00-RoadworksAndDrainageLayoutPlan.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved: R.P.E.Q No :

Scales: 1 : 500 — Original Issue Signatures

Original Size: A1 — Drawn: A. CARDEÑO

Height Datum: AHD — Designed: A. MAGONDACAN

Grid: GRID — Project Manager: L. PRIZEMAN

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: ROADWORKS &
DRAINAGE LAYOUT PLAN
SHEET 1 OF 5

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Drawing No.	Project No.	Issue
C130 —	AA007094 —	06

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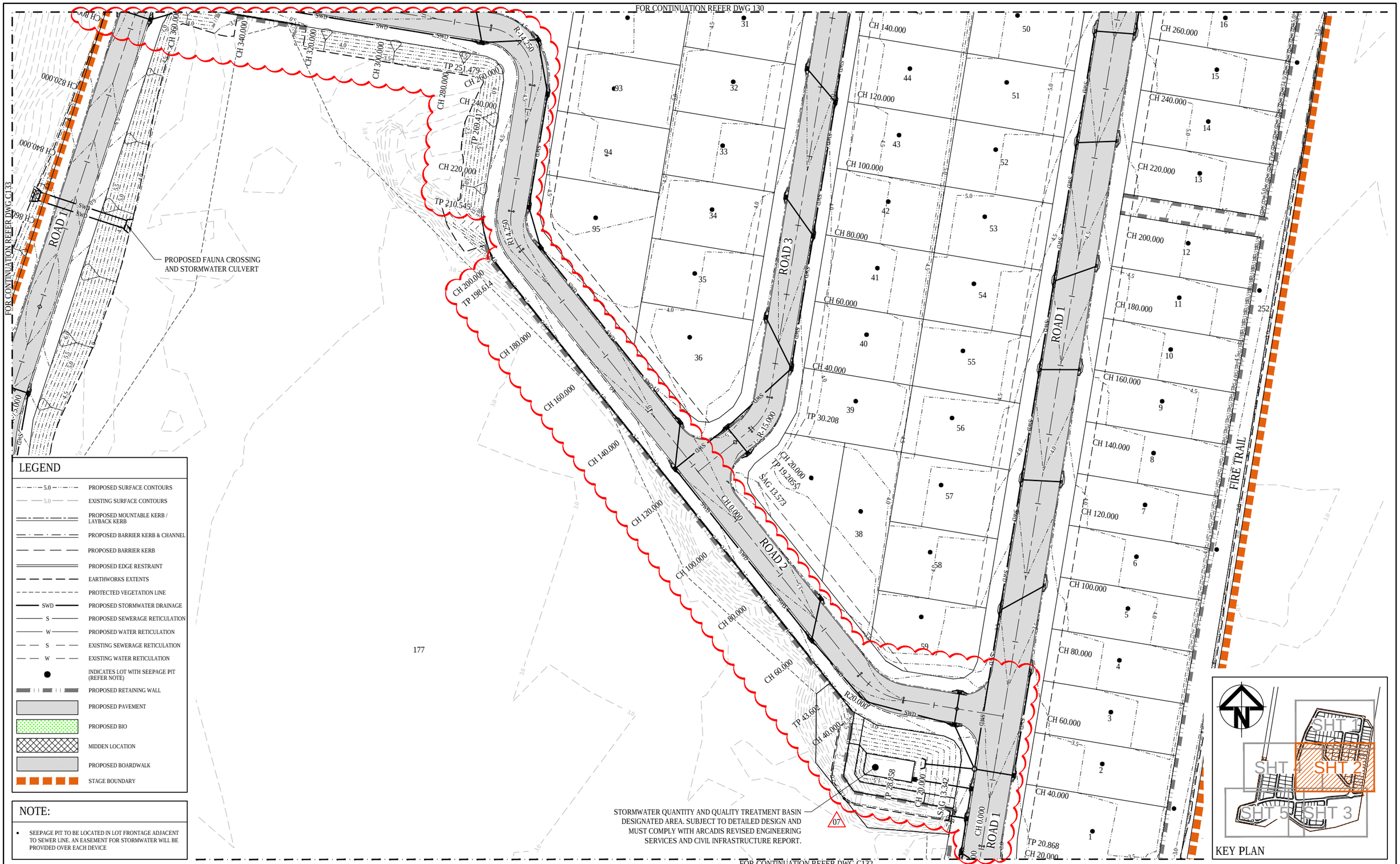

LEGEND

- PROPOSED SURFACE CONTOURS
- EXISTING SURFACE CONTOURS
- PROPOSED MOUNTABLE KERB / LAYBACK KERB
- PROPOSED BARRIER KERB & CHANNEL
- PROPOSED BARRIER KERB
- PROPOSED EDGE RESTRAINT
- EARTHWORKS EXTENTS
- PROTECTED VEGETATION LINE
- PROPOSED STORMWATER DRAINAGE
- PROPOSED SEWERAGE RETICULATION
- PROPOSED WATER RETICULATION
- EXISTING SEWERAGE RETICULATION
- EXISTING WATER RETICULATION
- INDICATES LOT WITH SEEPAGE PIT (REFER NOTE)
- PROPOSED RETAINING WALL
- PROPOSED PAVEMENT
- PROPOSED BIO
- MIDDEN LOCATION
- PROPOSED BOARDWALK
- STAGE BOUNDARY

NOTE:

- SEEPAGE PIT TO BE LOCATED IN LOT FRONTAGE ADJACENT TO SEWER LINE. AN EASEMENT FOR STORMWATER WILL BE PROVIDED OVER EACH DEVICE

Issue	Description	By	Ckd	RPEQ	Date
07	ISSUE FOR RFI RESPONSE	RR			18.07.19
06	ISSUE FOR RFI RESPONSE	AC			26.11.18
05	DRAINAGE AND FAUNA CROSSING ADDED			BD	14.10.15
04	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
03	ISSUE FOR DEVELOPMENT APPROVAL / PAVEMENT HATCH ADDED			ND	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

Scale: 0 10 20 30 40 50m — 1 : 500

100mm on Original

Surveyor: ROBERT A HARRIES SURVEYOR

Architect:

Filename: C130-AA007094-gcd-00-RoadworksAndDrainageLayoutPlan.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved: R.P.E.Q No :

Original Issue Signatures

Scales	1 : 500	Drawn	A. CARDEÑO
Original Size	A1	Designed	A. MAGONDACAN
Height Datum	AHD	Project Manager	L. PRIZEMAN
Grid	GRID	©	Copyright reserved

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: ROADWORKS & DRAINAGE LAYOUT PLAN
SHEET 2 OF 5

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Drawing No.	Project No.	Issue
C131	AA007094	07

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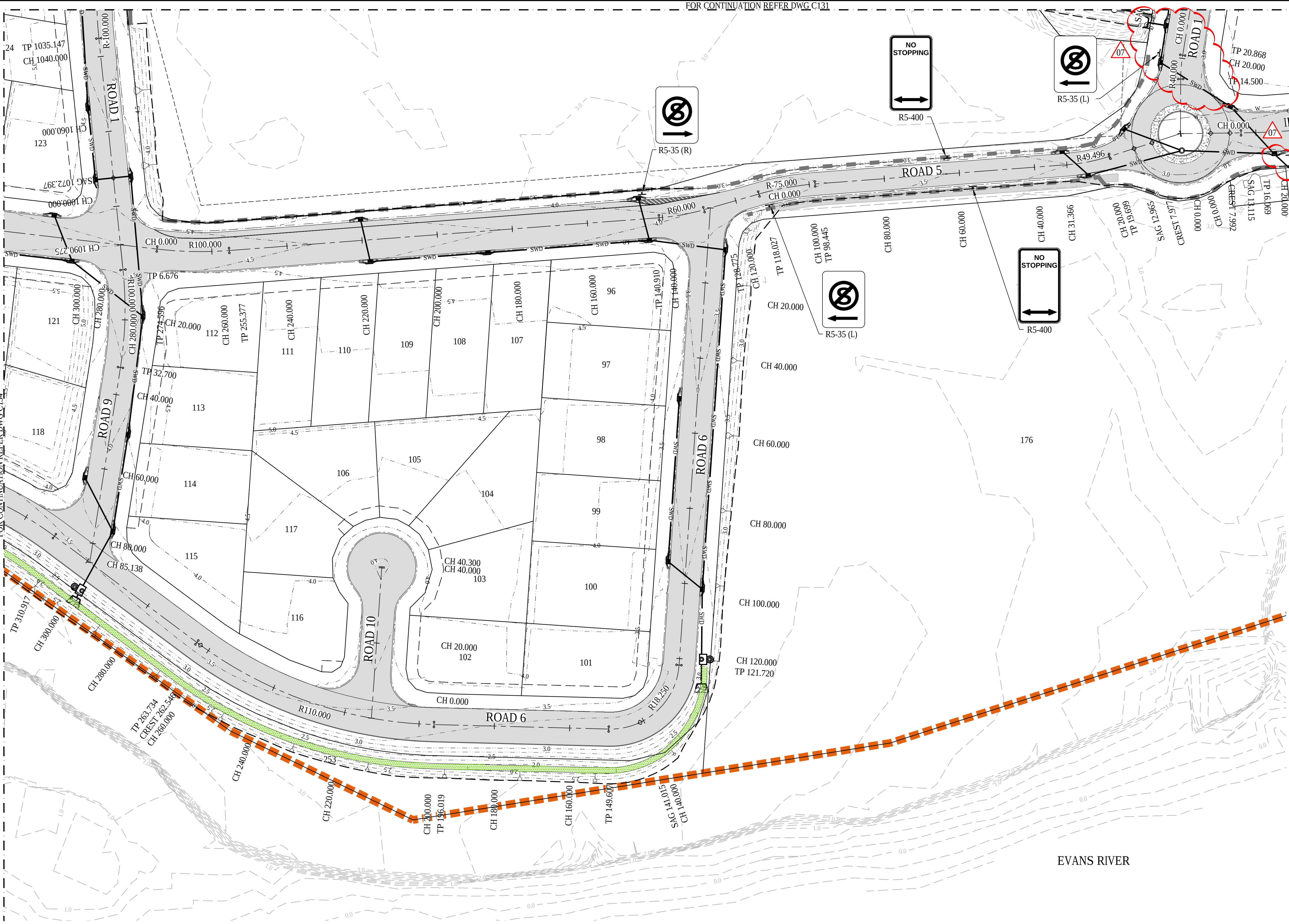
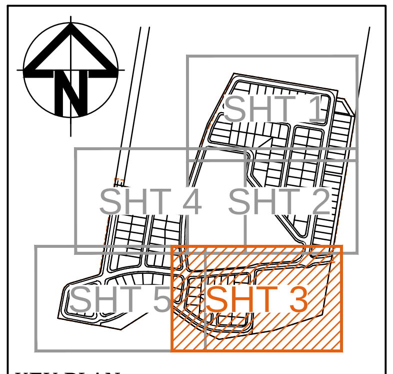


LEGEND

- PROPOSED SURFACE CONTOURS
- EXISTING SURFACE CONTOURS
- PROPOSED MOUNTABLE KERB / LAYBACK KERB
- PROPOSED BARRIER KERB & CHANNEL
- PROPOSED BARRIER KERB
- PROPOSED EDGE RESTRAINT
- EARTHWORKS EXTENTS
- PROTECTED VEGETATION LINE
- PROPOSED STORMWATER DRAINAGE
- PROPOSED SEWERAGE RETICULATION
- PROPOSED WATER RETICULATION
- EXISTING SEWERAGE RETICULATION
- EXISTING WATER RETICULATION
- INDICATES LOT WITH SEEPAGE PIT (REFER NOTE)
- PROPOSED RETAINING WALL
- PROPOSED PAVEMENT
- PROPOSED BIO
- MIDDEN LOCATION
- PROPOSED BOARDWALK
- STAGE BOUNDARY

NOTE:

- SEEPAGE PIT TO BE LOCATED IN LOT FRONTAGE ADJACENT TO SEWER LINE. AN EASEMENT FOR STORMWATER WILL BE PROVIDED OVER EACH DEVICE



KEY PLAN

Issue	Description	By	Ckd	RPEQ	Date
07	ISSUE FOR RFI RESPONSE	RR			18.07.19
06	ISSUE FOR RFI RESPONSE	AC			26.11.18
05	MC1004 SECTION AMENDED / BOARDWALK ADDED			BD	15.10.15
04	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
03	ISSUE FOR DEVELOPMENT APPROVAL / PAVEMENT HATCH ADDED			ND	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

100mm on Original

Scale: 0 10 20 30 40 50m — 1 : 500

Surveyor: ROBERT A HARRIES SURVEYOR

Architect:

Filename: C130-AA007094-gcd-00-RoadworksAndDrainageLayoutPlan.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved: R.P.E.Q No :

Scales: 1 : 500 — Original Issue Signatures
Drawn: A. CARDEÑO
Original Size: A1 — Designed: A. MAGONDACAN
Height Datum: AHD — Project Manager: L. PRIZEMAN
Grid: GRID — © Copyright reserved

Project: RESIDENTIAL DEVELOPMENT LOT 277 IRON GATES ROAD EVANS HEAD

Title: ROADWORKS & DRAINAGE LAYOUT PLAN SHEET 3 OF 5

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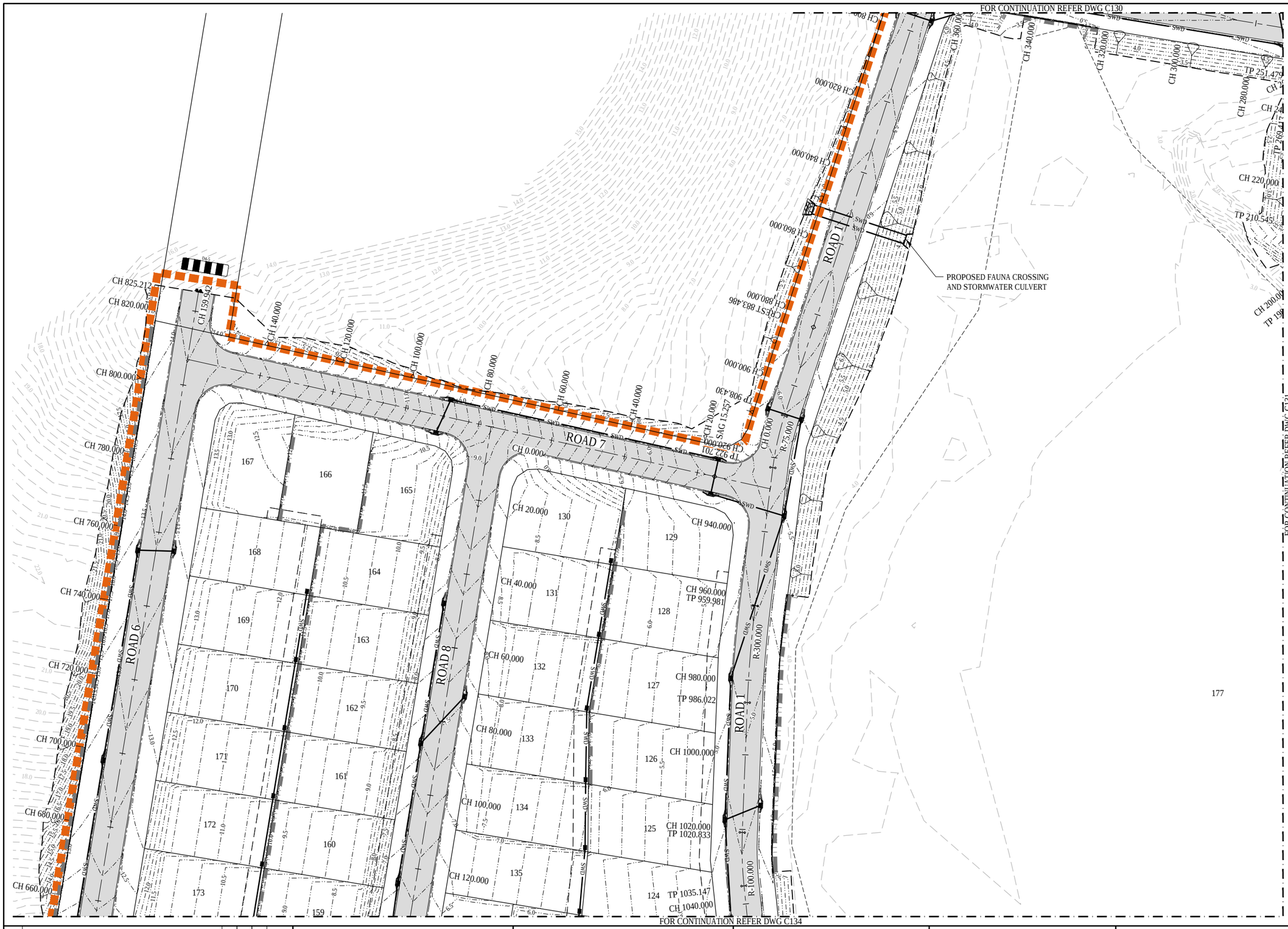
Brisbane QLD 4000
ABN 76 104 485 289
Tel No: +61 7 3337 0000
Fax No: +61 7 3337 0055
www.arcadis.com

Drawing No.	Project No.	Issue
C132	AA007094	07



Issue	Description	By	Ckd	RPEQ	Date
07	ISSUE FOR RFI RESPONSE	RR			18.07.19
06	ISSUE FOR RFI RESPONSE	AC			26.11.18
05	DRAINAGE AND FAUNA CROSSING ADDED			BD	15.10.15
04	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
03	ISSUE FOR DEVELOPMENT APPROVAL / PAVEMENT HATCH ADDED			ND	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

Scale: 0 10 20 30 40 50m — 1 : 500

Surveyor: ROBERT A HARRIES SURVEYOR

Architect:

Filename: C130-AA007094-gcd-00-RoadworksAndDrainageLayoutPlan.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved

R.P.E.Q No :

Scales: 1 : 500

Original Issue Signatures

Drawn: A. CARDEÑO

Original Size: A1

Designed: A. MAGONDACAN

Height Datum: AHD

Project Manager: L. PRIZEMAN

Grid: GRID

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: ROADWORKS &
DRAINAGE LAYOUT PLAN
SHEET 4 OF 5

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Drawing No. C133 — Project No. AA007094 — Issue 07

100mm on Original

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LEGEND

- PROPOSED SURFACE CONTOURS
- EXISTING SURFACE CONTOURS
- PROPOSED MOUNTABLE KERB / LAYBACK KERB
- PROPOSED BARRIER KERB & CHANNEL
- PROPOSED BARRIER KERB
- PROPOSED EDGE RESTRAINT
- EARTHWORKS EXTENTS
- PROTECTED VEGETATION LINE
- PROPOSED STORMWATER DRAINAGE
- PROPOSED SEWERAGE RETICULATION
- PROPOSED WATER RETICULATION
- EXISTING SEWERAGE RETICULATION
- EXISTING WATER RETICULATION
- INDICATES LOT WITH SEEPAGE PIT (REFER NOTE)
- PROPOSED RETAINING WALL
- PROPOSED PAVEMENT
- PROPOSED BIO
- MIDDEN LOCATION
- PROPOSED BOARDWALK
- STAGE BOUNDARY

NOTE:

- SEEPAGE PIT TO BE LOCATED IN LOT FRONTAGE ADJACENT TO SEWER LINE. AN EASEMENT FOR STORMWATER WILL BE PROVIDED OVER EACH DEVICE

KEY PLAN

FOR CONTINUATION REFER DWG C133

FOR CONTINUATION REFER DWG C132

Issue	Description	By	Ckd	RPEQ	Date
06	ISSUE FOR RFI RESPONSE	RR			18.07.19
05	ISSUE FOR RFI RESPONSE	AC			26.11.18
04	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
03	ISSUE FOR DEVELOPMENT APPROVAL / PAVEMENT HATCH ADDED			ND	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

Scale

0 10 20 30 40 50m

1 : 500

100mm on Original

Surveyor: ROBERT A HARRIES SURVEYOR

Architect:

Filename: C130-AA007094-gcd-00-RoadworksAndDrainageLayoutPlan.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved:

R.P.E.Q No :

Original Issue Signatures

Scales: 1 : 500

Original Size: A1

Height Datum: AHD

Grid: GRID

Drawn: A. CARDEÑO

Designed: A. MAGONDACAN

Project Manager: L. PRIZEMAN

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: ROADWORKS &
DRAINAGE LAYOUT PLAN
SHEET 5 OF 5

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Drawing No.	Project No.	Issue
C134	AA007094	06

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CATCHMENT TABLE

CATCHMENT	AREA (ha)
1/1	0.2252
1/10	0.0926
1/11	0.1503
1/12	0.1505
1/13	0.1510
1/14	0.0310
1/15	0.1503
1/16	0.1510
1/17	0.1780
1/18	0.1631
1/19	0.1520
1/2	0.1799
1/20	0.1537
1/21	0.1519
1/22	0.1828
1/23	0.1531
1/24	0.0479
1/25	0.1659
1/26	0.0911
1/27	0.1039
1/28	0.1296
1/29	0.0602
1/3	0.0540
1/30	0.1172
1/31	0.2311
1/32	0.0639
1/33	0.0186
1/34	0.1586
1/35	0.0639
1/36	0.1069
1/37	0.1391
1/38	0.0582
1/39	0.0456
1/4	0.0254
1/40	0.1760
1/41	0.0561
1/5	0.1465
1/6	0.1501
1/7	0.2177 03
1/8	0.1056
1/9	0.1848
10/1	0.0047 03
10/29	0.0815
10/31	0.0623
10/6	0.1482
10/9	0.1527
11/29	0.0937
11/6	0.1187

CATCHMENT TABLE

CATCHMENT	AREA (ha)
11/1	0.0078 03
11/9	0.1229
12/1	0.022 03
12/29	0.0787
12/6	0.0518
13/29	0.0909
13/6	0.0185 03
14/29	0.0176
14/6	0.0369 03
15/29	0.1472
16/29	0.1424
2/1	0.1518
2/14	0.1711
2/18	0.0864
2/24	0.1449
2/25	0.0790
2/29	0.0602
2/3	0.0423
2/31	0.0567
2/33	0.0191
2/35	0.0602
2/36	0.1517
2/39	0.1701
2/40	0.1613
2/5	0.1518
2/6	0.1538
2/9	0.2026
3/1	0.1711
3/24	0.2388
3/25	0.1101
3/29	0.0602
3/31	0.0882
3/35	0.0602
3/36	0.1514
3/39	0.1484
3/6	0.0276
3/9	0.1503
4/1	0.1510
4/24	0.1340
4/25	0.0636
4/29	0.0602
4/31	0.0568
4/35	0.0599
4/36	0.1845
4/39	0.0991

CATCHMENT TABLE

CATCHMENT	AREA (ha)
4/6	0.0094
4/9	0.1500
5/1	0.1587
5/24	0.0405
5/25	0.1415
5/29	0.0602
5/31	0.0216
5/35	0.0618
5/39	0.0077
5/6	0.0622
5/9	0.2259
6/1	0.0848
6/24	0.0323
6/25	0.1949
6/29	0.0602
6/31	0.1604
6/35	0.0623
6/39	0.0742
6/6	0.1688
6/9	0.1132
7/1	0.1510
7/24	0.0857
7/31	0.1624
7/6	0.1031
7/9	0.1823
8/1	0.1616
8/29	0.1925
8/31	0.1504
8/35	0.0967
8/6	0.1476
8/9	0.1528
9/1	0.0032 03
9/29	0.1696
9/31	0.0400
9/6	0.0113
9/9	0.1528
14/1	0.0796 03

Issue	Description	By	Ckd	RPEQ	Date
03	ISSUE FOR RFI RESPONSE	RR			18.07.19
02	ISSUE FOR RFI RESPONSE	BF			26.11.18
01	ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15

Scale: 0 20 40 60 80 100m — 1 : 1000

Surveyor: ROBERT A HARRIES SURVEYOR

Architect:

Filename: C135-AA007094-gcd-00-StormWaterCatchmentLayoutPlan.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved

R.P.E.Q No :

Scales: 1 : 1000

Original Issue Signatures

Original Size: A1

Drawn: B. MONROYO

Designed: R. MACAS

Height Datum: AHD

Project Manager: L. PRIZEMAN

Grid: GRID

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: STORMWATER CATCHMENT
LAYOUT PLAN SHEET 1 OF 2

ARCADIS
Arcadis Australia Pacific Pty Limited
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ABN 76 104 485 289

Tel No: +61 7 3337 0000
Fax No: +61 7 3337 0055
www.arcadis.com

Drawing No.	Project No.	Issue
C135	AA007094	03

100mm on Original

C:\Users\nfaz3463\Desktop\Iron Gates\D-Final\c135-AA007094-gcd-00-StormWaterCatchmentLayoutPlan.dwg 23/Jul/2019 1:31 PM V1

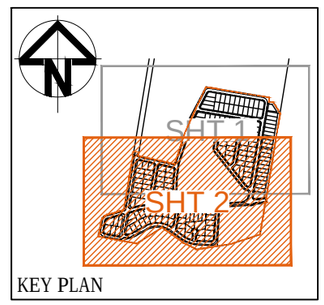
FOR CONTINUATION REFER DWG C135

LEGEND

- 5.0 — PROPOSED SURFACE CONTOURS
- 5.0 — EXISTING SURFACE CONTOURS
- SWD — PROPOSED STORMWATER DRAINAGE
- PROPOSED CATCHMENT BOUNDARY
- X / X — CATCHMENT NUMBER

NOTE

REFER TO DWG C135 FOR CATCHMENT AREAS.



KEY PLAN

Issue	Description	By	Ckd	RPEQ	Date
03	ISSUE FOR RFI RESPONSE	RR			18.07.19
02	ISSUE FOR RFI RESPONSE	BF			26.11.18
01	ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15

Scale: 0 20 40 60 80 100m — 1 : 1000

Surveyor: ROBERT A HARRIES SURVEYOR

Architect:

Filename: C135-AA007094-gcd-00-StormWaterCatchmentLayoutPlan.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved: R.P.E.Q No :

Scales: 1 : 1000 — Original Issue Signatures

Original Size: A1 — Drawn B. MONROYO — Designed R. MACAS

Height Datum: AHD — Project Manager L. PRIZEMAN

Grid: GRID

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: STORMWATER CATCHMENT LAYOUT PLAN SHEET 2 OF 2

ARCADIS
Arcadis Australia Pacific Pty Limited
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ABN 76 104 485 289

Tel No: +61 7 3337 0000
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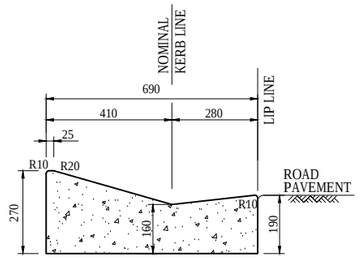
www.arcadis.com

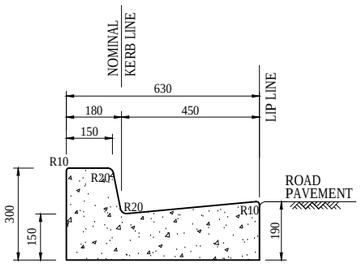
Drawing No.	Project No.	Issue
C136	AA007094	03

100mm on Original

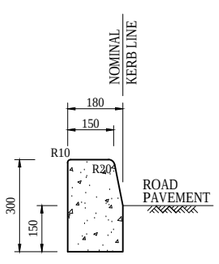
C:\Users\nfaz3463\Desktop\Iron Gates\D-Final\c135-AA007094-gcd-00-StormWaterCatchmentLayoutPlan.dwg 23/Jul/2019 1:33 PM V1



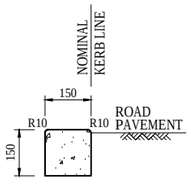
MOUNTABLE / LAYBACK KERB
SCALE 1:10
AS-PER NORTHERN RIVERS STD DRG. SEQ R-03



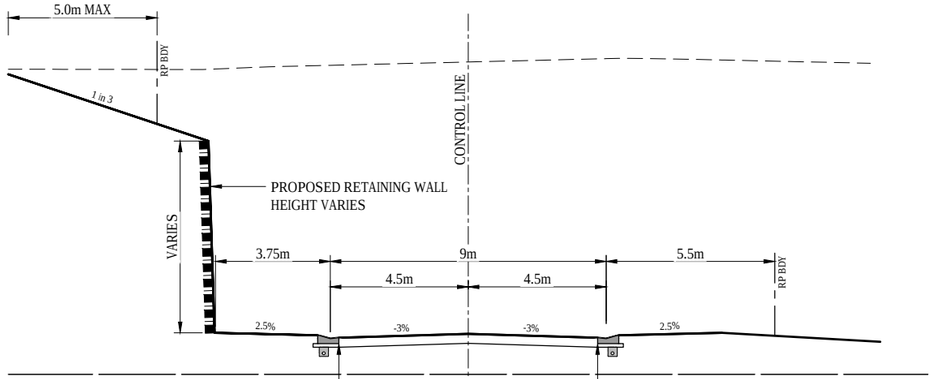
BARRIER KERB & CHANNEL- B1
SCALE 1:10
AS-PER NORTHERN RIVERS STD DRG. SEQ R-03



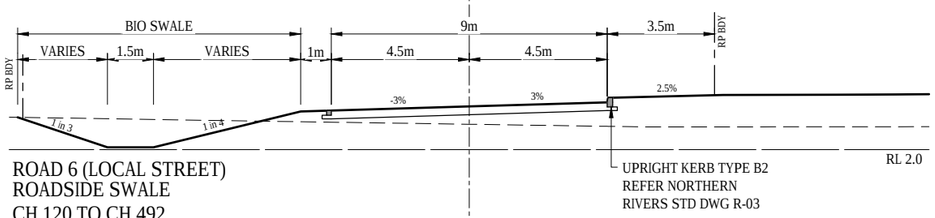
BARRIER KERB - B2
SCALE 1:10
AS-PER NORTHERN RIVERS STD DRG. SEQ R-03



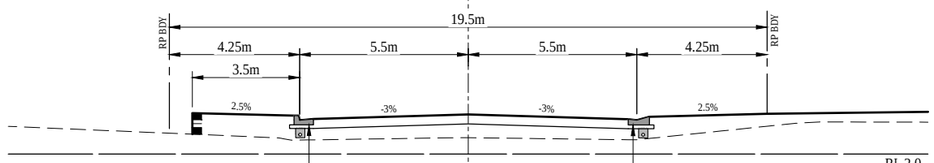
EDGE RESTRAINT - ER1
SCALE 1:10
AS-PER NORTHERN RIVERS STD DRG. SEQ R-03



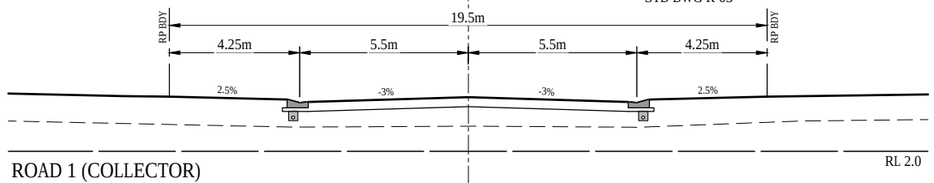
ROAD 6 (LOCAL STREET)
CH 640 TO CH 800



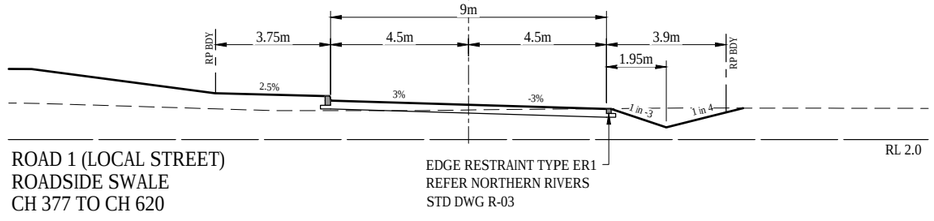
ROAD 6 (LOCAL STREET)
ROADSIDE SWALE
CH 120 TO CH 492



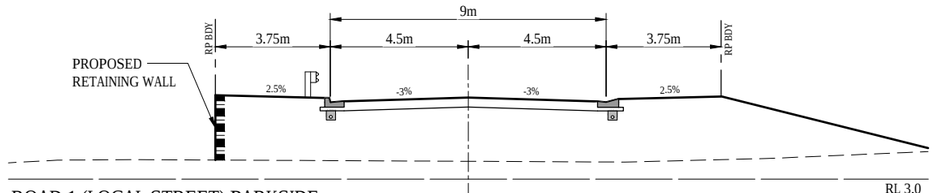
ROAD 1 (COLLECTOR) PARKSIDE
CH 0.60 TO CH 60



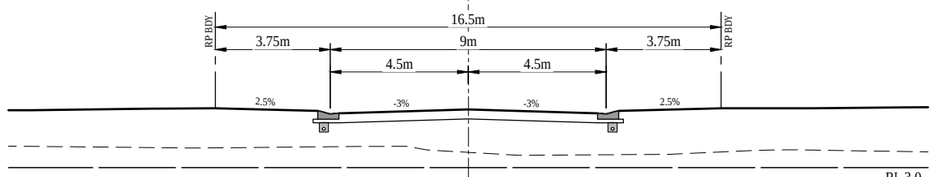
ROAD 1 (COLLECTOR)
CH 60 TO CH 300



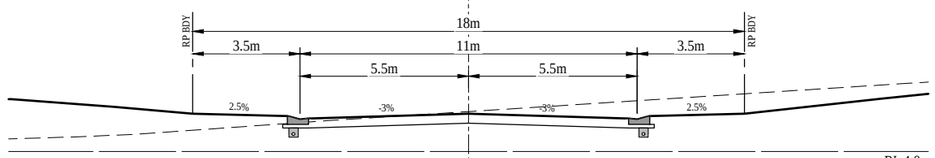
ROAD 1 (LOCAL STREET)
ROADSIDE SWALE
CH 377 TO CH 620



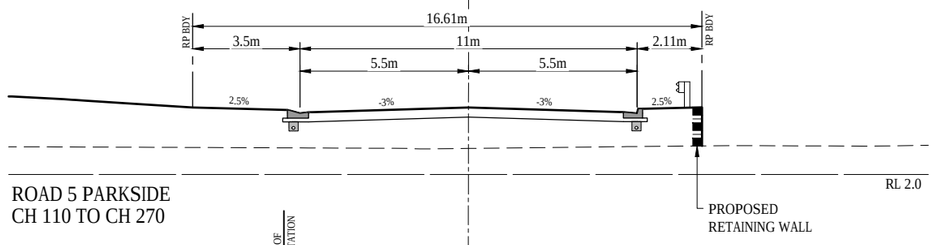
ROAD 1 (LOCAL STREET) PARKSIDE
CH 620 TO END



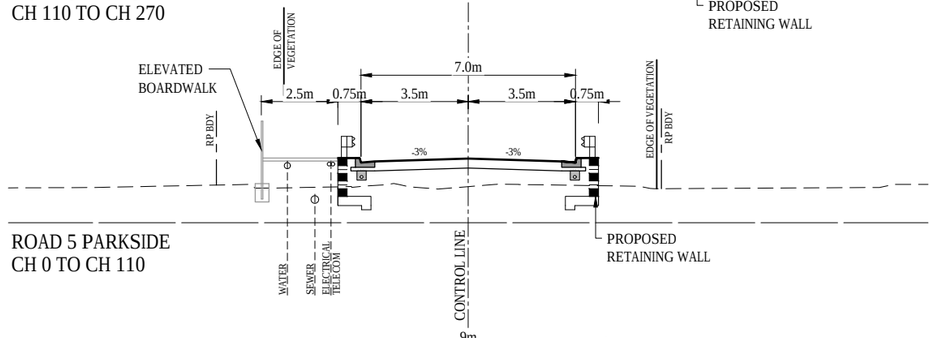
ROAD 1, ROAD 3, ROAD 4, ROAD 6
ROAD 7, ROAD 8, ROAD 10, ROAD 11



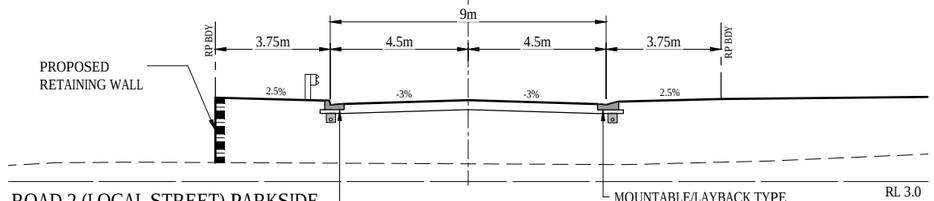
ROAD 5
CH 270 TO END



ROAD 5 PARKSIDE
CH 110 TO CH 270



ROAD 5 PARKSIDE
CH 0 TO CH 110



ROAD 2 (LOCAL STREET) PARKSIDE

Issue	Description	By	Ckd	RPEQ	Date
07	ISSUE FOR RFI RESPONSE	RR			18.07.19
06	ISSUE FOR RFI RESPONSE	BF			26.11.18
05	ISSUE FOR RFI RESPONSE			BD	04.04.16
04	MC1004 SECTION AMENDED			BD	14.10.15
03	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

100mm on Original

Scale
0 100 200 400 600 800 1000mm
1 : 10
0 2 4 6 8 10m
1 : 100

Surveyor: ROBERT A HARRIES SURVEYOR

Architect:

Filename: C140-AA007094-gcd-00-TypicalRoadCrossSections.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved: R.P.E.Q No :

Scales: AS SHOWN
Original Size: A1
Height Datum: AHD
Grid: GRID

Original Issue Signatures
Drawn: A. CARDEÑO
Designed: A. MAGONDACAN
Project Manager: L. PRIZEMAN

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: TYPICAL ROAD CROSS SECTIONS

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www.arcadis.com

Drawing No. C140 — Project No. AA007094 — Issue 07

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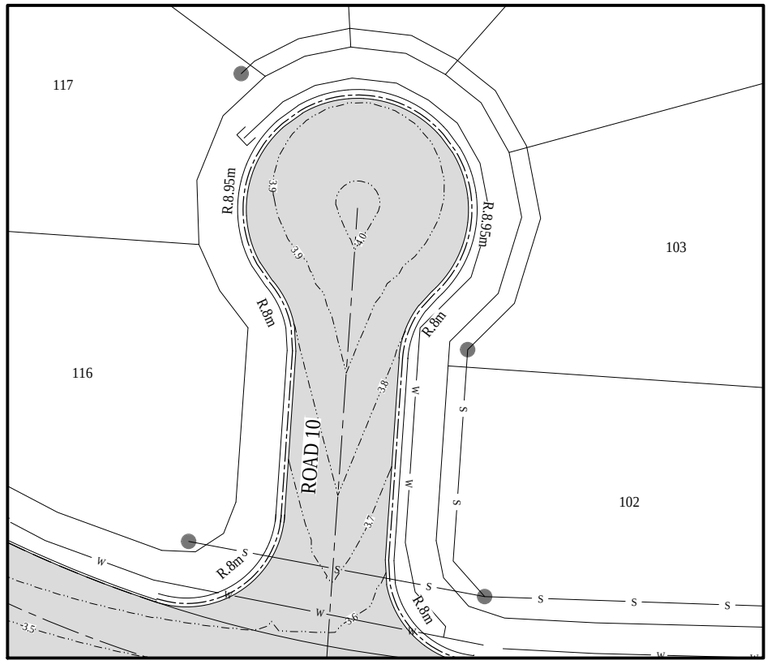
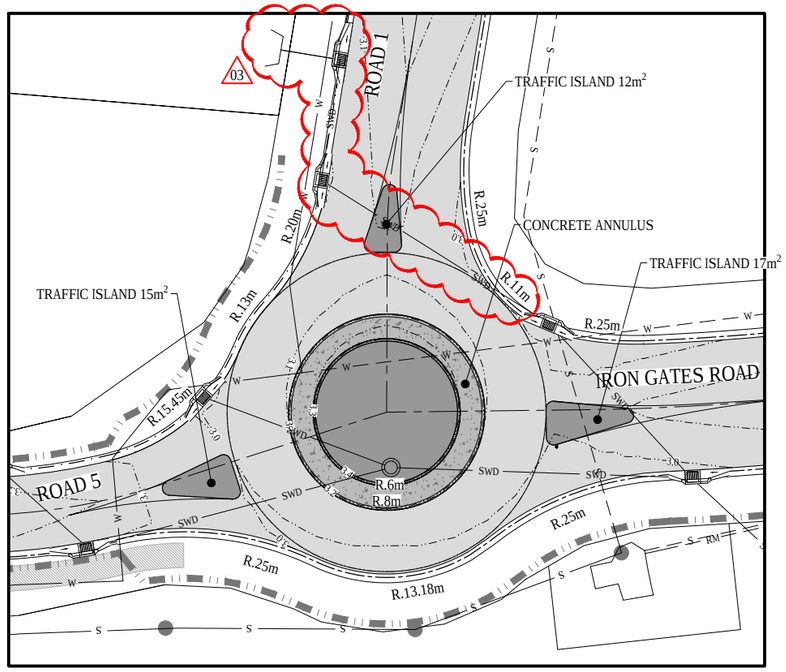
LEGEND

- PROPOSED SURFACE CONTOURS
- EXISTING SURFACE CONTOURS
- PROPOSED LAYBACK KERB
- PROPOSED CONCRETE ANNULUS
- PROPOSED BOARDWALK
- PROPOSED RETAINING WALL



ROAD 10 - CULDESAC DETAIL
SCALE 1 : 250



ROUNDABOUT DETAIL
SCALE 1 : 250

Issue	Description	By	Ckd	RPEQ	Date
03	ISSUE FOR RFI RESPONSE	RR			18.07.19
02	ISSUE FOR RFI RESPONSE	AC			26.11.18
01	ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15

Scale
0 5 10 15 20 25m
1 : 250

Surveyor
ROBERT A HARRIES
SURVEYOR

Architect

Filename C145-AA007094-gcd-00-IntersectionDetails.dwg

Client
GOLDCORAL PTY LTD

Status
FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved

R.P.E.Q No :

Scales 1: 250

Original Issue Signatures

Original Size A1

Drawn A. CARDEÑO

Designed A. MAGONDACAN

Height Datum AHD

Project Manager L. PRIZEMAN

Grid GRID

Project
RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title
INTERSECTION DETAILS

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Drawing No. C145 — Project No. AA007094 — Issue 03

100mm on Original

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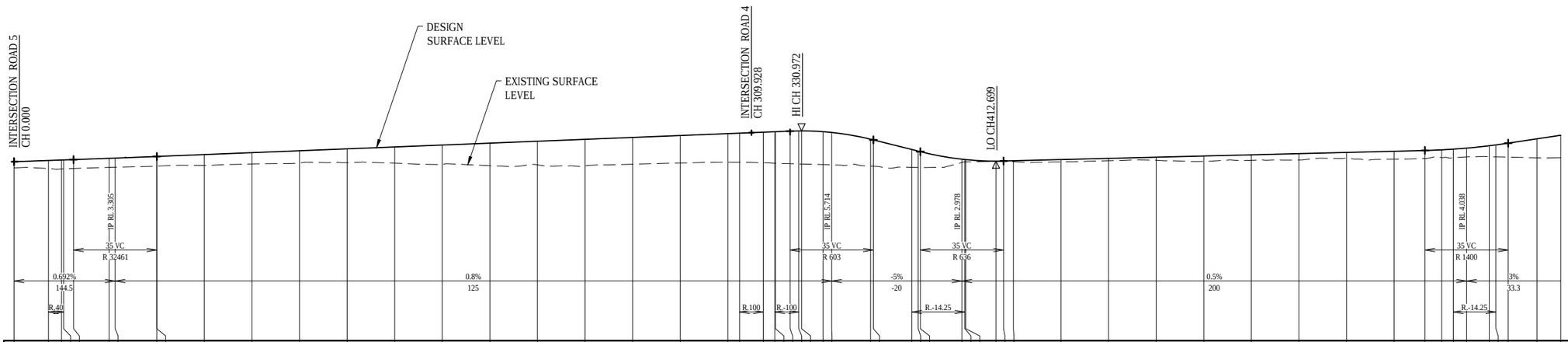

PEGGED CHAINAGE	DESIGN LEVELS ON ROAD CENTRELINE	DESIGN LIP OF KERB (LHS)	DESIGN LIP OF KERB (RHS)	EXISTING SURFACE ON ROAD CENTRELINE	CUT / FILL DEPTH
0.000	3.011		4.364	2.488	0.523
14.500	3.111		4.481	2.434	0.677
20.000	3.149	2.998	4.844	2.403	0.747
20.868	3.155	3.004	4.902	2.409	0.746
25.032	3.184	3.033	3.028	2.440	0.745
40.000	3.291		3.135	2.531	0.760
42.532	3.310		3.154	2.545	0.765
60.000	3.445	3.289	3.289	2.635	0.810
60.032	3.445	3.289	3.289	2.635	0.810
80.000	3.605	3.449	3.449	2.701	0.904
100.000	3.765	3.609	3.609	2.818	0.947
120.000	3.925	3.769	3.769	2.911	1.015
140.000	4.085	3.929	3.929	2.930	1.155
160.000	4.245	4.089	4.089	2.887	1.358
180.000	4.405	4.249	4.249	2.790	1.615
200.000	4.565	4.409	4.409	2.671	1.894
220.000	4.725	4.569	4.569	2.748	1.977
240.000	4.885	4.729	4.729	2.649	2.236
260.000	5.045	4.889	4.889	2.799	2.246
280.000	5.205	5.049	5.049	2.891	2.315
300.000	5.365	5.211	5.209	2.971	2.394
304.939	5.405	5.257	5.248	2.970	2.435
314.906	5.484	5.350	5.338	2.914	2.570
319.773	5.523	5.395	5.386	2.873	2.651
320.000	5.525	5.397	5.389	2.873	2.653
326.144	5.574	5.448	5.446	2.838	2.736
329.780	5.592	5.466	5.466	2.816	2.776
330.972	5.594	5.467	5.467	2.811	2.783
340.000	5.526	5.399	5.399	2.768	2.758
343.644	5.461	5.333	5.333	2.745	2.716
360.000	4.895	4.823	4.769	2.636	2.259
361.144	4.839	4.780	4.713	2.625	2.214
377.285	4.032	4.167	3.906	2.535	1.497
380.000	3.897	4.042	3.762	2.524	1.372
380.880	3.852	4.001	3.717	2.510	1.343
398.380	3.218	3.359	3.083	2.944	0.275
399.612	3.192	3.327	3.057	2.990	0.201
400.000	3.184	3.316	3.049	2.992	0.192
412.699	3.057	3.192	2.922	3.034	0.023
415.880	3.065	3.200	2.930	3.034	0.031
420.000	3.086	3.221	2.951	3.001	0.084
440.000	3.186	3.321	3.051	2.991	0.195
460.000	3.286	3.421	3.151	3.090	0.196
480.000	3.386	3.521	3.251	3.129	0.256
500.000	3.486	3.621	3.351	3.033	0.452
520.000	3.586	3.721	3.451	3.125	0.461
540.000	3.686	3.821	3.551	3.151	0.535
560.000	3.786	3.921	3.651	3.303	0.483
580.000	3.886	4.021	3.751	3.217	0.669
592.946	3.950	4.085	3.815	3.277	0.673
600.000	4.003	4.138	3.868	3.353	0.650
604.884	4.061	4.198	3.926	3.330	0.731
610.446	4.147	4.301	4.012	3.413	0.734
620.000	4.347	4.494	4.212	3.422	0.925
622.755	4.417	4.553	4.282	3.414	1.003
627.946	4.563	4.630	4.436	3.392	1.171
640.000	4.924	4.853	4.798	3.336	1.589
650.000	5.224	5.098	5.098	3.348	1.877

ROAD 1 LONGITUDINAL SECTION

SCALE 1:200 VERTICAL
1:1000 HORIZONTAL

Issue	Description	By	Ckd	RPEQ	Date
05	ISSUE FOR RFI RESPONSE	RR			18.07.19
04	ISSUE FOR RFI RESPONSE	BF			26.11.18
03	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

100mm on Original

Scale
0 20 40 60 80 100m
1 : 1000
0 5 10 15 20m
1 : 200

Surveyor
ROBERT A HARRIES
SURVEYOR

Architect

Filename C150-AA007094-gcd-00-MC1000RoadLongitudinalSection.dwg

Client
GOLDCORAL PTY LTD

Status
FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved
R.P.E.Q No :

Scales	AS SHOWN	Original Issue Signatures
		Drawn A. CARDEÑO
Original Size	A1	Designed A. MAGONDACAN
Height Datum	AHD	Project Manager L. PRIZEMAN
Grid	GRID	Ⓒ Copyright reserved

Project
RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title
ROAD 1 LONGITUDINAL SECTION -
SHEET 1 OF 2

ARCADIS
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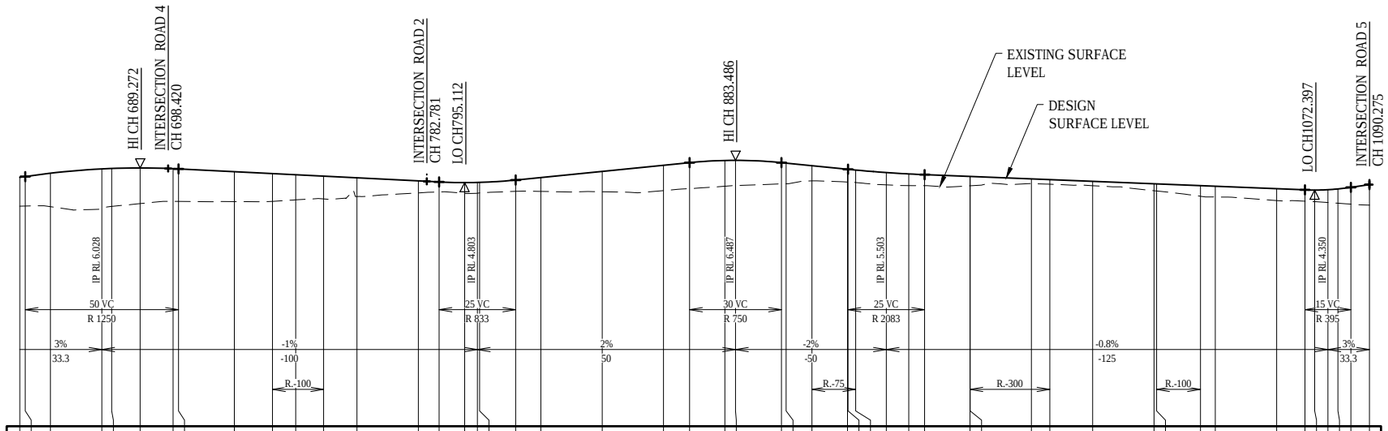
www.arcadis.com

Drawing No.	Project No.	Issue
C150	AA007094	05



Vertical Curve Length (m)	
Vertical Curve Radius (m)	
Vertical Grade (%)	
Vertical Grade (1 in ...)	
Horizontal Curve Radius (m)	
DATUM RL.-11.000	
DESIGN LEVELS ON ROAD CENTRELINE	5.224 5.278 5.497 5.278 5.806 5.840 5.794 5.778 5.595 5.471 5.395 5.304 5.195 4.995 4.928 4.886 4.896 4.900 5.053 5.217 5.617 6.017 6.187 6.329 6.337 6.187 6.156 5.988 5.756 5.635 5.704 5.541 5.451 5.403 5.285 5.284 5.124 5.076 4.964 4.804 4.798 4.683 4.644 4.484 4.410 4.398 4.422 4.471 4.576 4.757
DESIGN LIP OF KERB (LHS)	5.098 5.151 5.371 5.651 5.679 5.713 5.667 5.651 5.469 5.344 5.269 5.178 5.069 4.869 4.801 4.764 4.775 4.779 4.931 5.095 5.495 5.895 6.065 6.207 6.215 6.065 6.035 5.866 5.633 5.632 5.582 5.419 5.329 5.282 5.163 5.163 5.003 4.955 4.843 4.683 4.676 4.562 4.523 4.363 4.289 4.276 4.301
DESIGN LIP OF KERB (RHS)	5.098 5.151 5.371 5.651 5.679 5.713 5.667 5.651 5.469 5.344 5.269 5.178 5.069 4.869 4.801 4.759 4.770 4.774 4.926 5.090 5.490 5.890 6.060 6.202 6.210 6.060 6.030 5.861 5.630 5.626 5.577 5.414 5.324 5.276 5.158 5.158 4.998 4.950 4.838 4.678 4.671 4.557 4.518 4.358 4.284 4.271
EXISTING SURFACE ON ROAD CENTRELINE	3.348 3.354 3.316 3.195 3.331 3.516 3.660 3.657 3.658 3.760 3.820 3.977 4.213 4.277 4.183 4.189 4.208 4.314 4.313 4.287 4.366 4.491 4.646 4.699 4.799 4.869 4.999 4.932 4.903 4.889 4.735 4.691 4.684 4.678 4.678 4.821 4.780 4.684 4.354 4.337 3.994 3.946 3.718 3.674 3.643 3.583 3.538 3.479 3.420
CUT / FILL DEPTH	1.877 1.923 2.181 2.582 2.475 2.324 2.134 2.121 1.950 1.813 1.635 1.484 1.218 0.782 0.650 0.703 0.707 0.692 0.728 0.904 1.329 1.651 1.695 1.683 1.638 1.388 1.247 0.989 0.824 0.824 0.815 0.806 0.759 0.719 0.607 0.606 0.394 0.296 0.281 0.450 0.461 0.689 0.698 0.767 0.736 0.755 0.839 0.933 1.096 1.337
PEGGED CHAINAGE	650.000 651.771 660.000 676.771 680.000 689.272 700.000 701.771 720.000 732.450 740.000 749.106 760.000 780.000 786.779 795.112 799.279 800.000 811.779 820.000 840.000 860.000 868.486 880.000 883.486 898.486 900.000 908.430 920.000 920.115 922.701 932.665 940.000 945.165 959.981 960.000 980.000 986.022 1000.000 1020.000 1020.833 1035.147 1040.000 1060.000 1069.239 1072.397 1076.739 1080.000 1084.239 1090.275

ROAD 1 LONGITUDINAL SECTION

SCALE 1:200 VERTICAL
1:1000 HORIZONTAL

Issue	Description	By	Ckd	RPEQ	Date
05	ISSUE FOR RFI RESPONSE	RR			18.07.19
04	ISSUE FOR RFI RESPONSE	BF			26.11.18
03	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

Scale
0 20 40 60 80 100m
1 : 1000
0 5 10 15 20m
1 : 200

Surveyor: ROBERT A HARRIES SURVEYOR
Architect:
Filename: C150-AA007094-gcd-00-MC1000RoadLongitudinalSection.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL
Approved
R.P.E.Q No :
Scales: AS SHOWN
Original Size: A1
Height Datum: AHD
Grid: GRID
Original Issue Signatures
Drawn: A. CARDEÑO
Designed: A. MAGONDACAN
Project Manager: L. PRIZEMAN

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: ROAD 1 LONGITUDINAL SECTION - SHEET 2 OF 2

ARCADIS
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www.arcadis.com

Drawing No. C151 — Project No. AA007094 — Issue 05

100mm on Original

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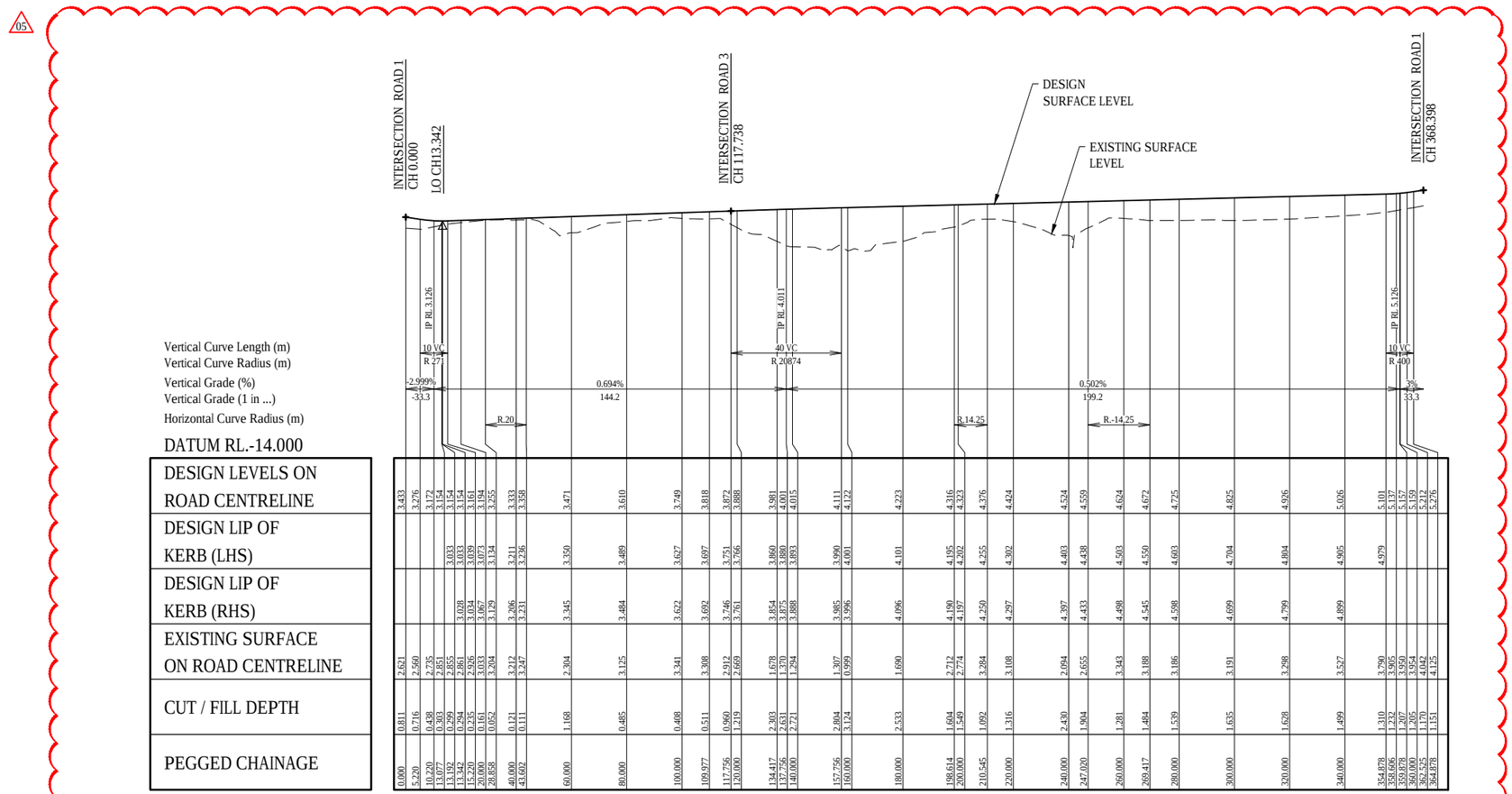

05

PEGGED CHAINAGE	DESIGN LEVELS ON ROAD CENTRELINE	DESIGN LIP OF KERB (LHS)	DESIGN LIP OF KERB (RHS)	EXISTING SURFACE ON ROAD CENTRELINE	CUT / FILL DEPTH
0.000	3.433			2.621	0.811
5.220	3.276			2.560	0.716
10.220	3.172			2.735	0.438
13.077	3.154			2.851	0.303
13.192	3.154	3.033		2.855	0.299
13.342	3.154	3.033	3.028	2.861	0.294
15.220	3.161	3.039	3.034	2.926	0.235
20.000	3.194	3.073	3.067	3.033	0.161
28.858	3.255	3.134	3.129	3.204	0.052
40.000	3.333	3.211	3.206	3.212	0.121
43.602	3.358	3.236	3.231	3.247	0.111
60.000	3.471	3.350	3.345	2.304	1.168
80.000	3.610	3.489	3.484	3.125	0.485
100.000	3.749	3.627	3.622	3.341	0.408
109.977	3.818	3.697	3.692	3.308	0.511
117.756	3.872	3.751	3.746	2.912	0.960
120.000	3.888	3.766	3.761	2.669	1.219
134.417	3.981	3.860	3.854	1.678	2.303
137.756	4.001	3.880	3.875	1.370	2.631
140.000	4.015	3.893	3.888	1.294	2.721
157.756	4.111	3.990	3.985	1.307	2.804
160.000	4.122	4.001	3.996	0.999	3.124
180.000	4.223	4.101	4.096	1.690	2.533
198.614	4.316	4.195	4.190	2.712	1.604
200.000	4.323	4.202	4.197	2.774	1.549
210.545	4.376	4.255	4.250	3.284	1.092
220.000	4.424	4.302	4.297	3.108	1.316
240.000	4.524	4.403	4.397	2.094	2.430
247.020	4.559	4.438	4.433	2.655	1.904
260.000	4.624	4.503	4.498	3.343	1.281
269.417	4.672	4.550	4.545	3.188	1.484
280.000	4.725	4.603	4.598	3.186	1.539
300.000	4.825	4.704	4.699	3.191	1.635
320.000	4.926	4.804	4.799	3.298	1.628
340.000	5.026	4.905	4.899	3.527	1.499
354.878	5.101	4.979		3.790	1.310
358.606	5.137			3.905	1.232
359.878	5.157			3.950	1.207
360.000	5.159			3.954	1.205
362.525	5.212			4.042	1.170
364.878	5.276			4.125	1.151

ROAD 2 LONGITUDINAL SECTION

SCALE 1:200 VERTICAL
1:1000 HORIZONTAL

Issue	Description	By	Ckd	RPEQ	Date
05	ISSUE FOR RFI RESPONSE	RR			18.07.19
04	ISSUE FOR RFI RESPONSE	BF			26.11.18
03	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

100mm on Original

Scale

0 20 40 60 80 100m
1 : 1000

0 5 10 15 20m
1 : 200

Surveyor
ROBERT A HARRIES
SURVEYOR

Architect

Filename C150-AA007094-gcd-00-MC1000RoadLongitudinalSection.dwg

Client
GOLDCORAL PTY LTD

Status
FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved
R.P.E.Q No :

Scales	AS SHOWN	Original Issue Signatures	
		Drawn A. CARDEÑO	
Original Size	A1	Designed A. MAGONDACAN	
Height Datum	AHD	Project Manager L. PRIZEMAN	
Grid	GRID	Ⓒ Copyright reserved	

Project
RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title
ROAD 2 LONGITUDINAL SECTION

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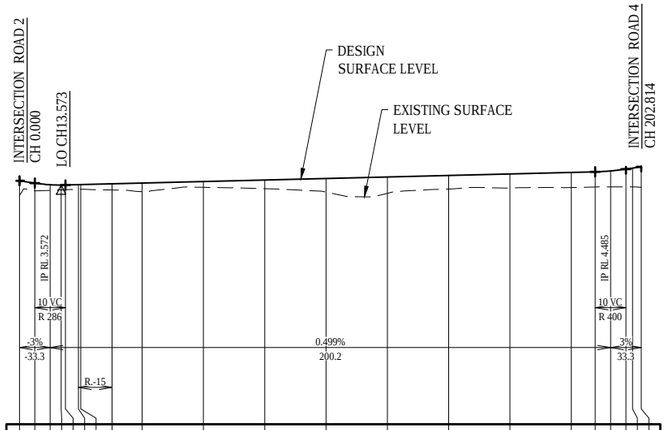
www.arcadis.com

Drawing No.		Project No.		Issue
C152	—	AA007094	—	05



Vertical Curve Length (m)
Vertical Curve Radius (m)
Vertical Grade (%)
Vertical Grade (1 in ...)
Horizontal Curve Radius (m)

DATUM RL.-12.000

DESIGN LEVELS ON ROAD CENTRELINE	3.872	3.722	3.616	3.593	3.597	3.618	3.622	3.673	3.722	3.822	3.922	4.021	4.121	4.221	4.321	4.421	4.460	4.516	4.635	4.701	4.785
DESIGN LIP OF KERB (LHS)				3.467	3.470	3.491	3.495	3.546	3.595	3.695	3.795	3.895	3.995	4.095	4.195	4.294	4.333				
DESIGN LIP OF KERB (RHS)				3.467	3.470	3.491	3.495	3.546	3.595	3.695	3.795	3.895	3.995	4.095	4.195	4.294	4.333				
EXISTING SURFACE ON ROAD CENTRELINE	2.914	3.210	3.250	3.278	3.289	3.312	3.315	3.269	3.156	3.449	3.359	3.135	3.054	3.334	3.398	3.428	3.466	3.476	3.474	3.473	3.452
CUT / FILL DEPTH	0.958	0.512	0.366	0.315	0.308	0.306	0.307	0.403	0.566	0.372	0.563	0.886	1.068	0.887	0.923	0.993	0.994	1.040	1.161	1.227	1.333
PEGGED CHAINAGE	0.000	5.000	10.000	13.573	15.000	19.205	20.000	30.208	40.000	60.000	80.000	100.000	120.000	140.000	160.000	180.000	187.814	192.814	197.814	200.000	202.814

ROAD 3 LONGITUDINAL SECTION

SCALE 1:200 VERTICAL
1:1000 HORIZONTAL

Vertical Curve Length (m)
Vertical Curve Radius (m)
Vertical Grade (%)
Vertical Grade (1 in ...)
Horizontal Curve Radius (m)

DATUM RL.-12.000

DESIGN LEVELS ON ROAD CENTRELINE	5.445	5.295	5.175	5.114	5.084	4.962	4.867	4.842	4.786	4.785	4.785	4.820	4.846	4.922	5.028	5.133	5.239	5.344	5.450	5.555	5.558	5.615	5.734	5.884
DESIGN LIP OF KERB (LHS)				4.982	4.952	4.831	4.738	4.713	4.659	4.659	4.658	4.694	4.720	4.796	4.902	5.007	5.113	5.218	5.324	5.429	5.432	5.491		
DESIGN LIP OF KERB (RHS)				4.982	4.952	4.831	4.738	4.713	4.659	4.659	4.658	4.694	4.720	4.796	4.902	5.007	5.113	5.218	5.324					
EXISTING SURFACE ON ROAD CENTRELINE	2.953	2.873	2.819	2.842	2.885	2.975	3.564	3.521	3.450	3.452	3.460	3.598	3.649	3.652	3.485	3.059	3.394	3.481	3.317	3.416	3.425	3.505	3.532	3.663
CUT / FILL DEPTH	2.492	2.422	2.355	2.273	2.198	1.986	1.303	1.321	1.336	1.333	1.325	1.223	1.197	1.270	1.543	2.074	1.845	1.863	2.133	2.139	2.132	2.110	2.202	2.222
PEGGED CHAINAGE	0.000	5.000	10.000	15.000	20.000	40.000	55.542	60.000	80.000	80.542	82.365	100.000	105.542	120.000	140.000	160.000	180.000	200.000	220.000	240.000	240.523	245.523	250.523	255.531

ROAD 4 LONGITUDINAL SECTION

SCALE 1:200 VERTICAL
1:1000 HORIZONTAL

Issue	Description	By	Ckd	RPEQ	Date
06	ISSUE FOR RFI RESPONSE	RR			18.07.19
05	ISSUE FOR RFI RESPONSE	BF			26.11.18
04	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
03	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

100mm on Original

Scale

1 : 1000

1 : 200

Surveyor
ROBERT A HARRIES
SURVEYOR

Architect

Filename C150-AA007094-gcd-00-MC1000RoadLongitudinalSection.dwg

Client
GOLDCORAL PTY LTD

Status
FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved
R.P.E.Q No :

Scales	AS SHOWN	Original Issue Signatures	
		Drawn A. CARDEÑO	
Original Size	A1	Designed A. MAGONDACAN	
Height Datum	AHD	Project Manager L. PRIZEMAN	
Grid	GRID	© Copyright reserved	

Project
RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title
ROAD 3 & 4 LONGITUDINAL
SECTIONS

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Drawing No.		Project No.		Issue
C153	—	AA007094	—	06

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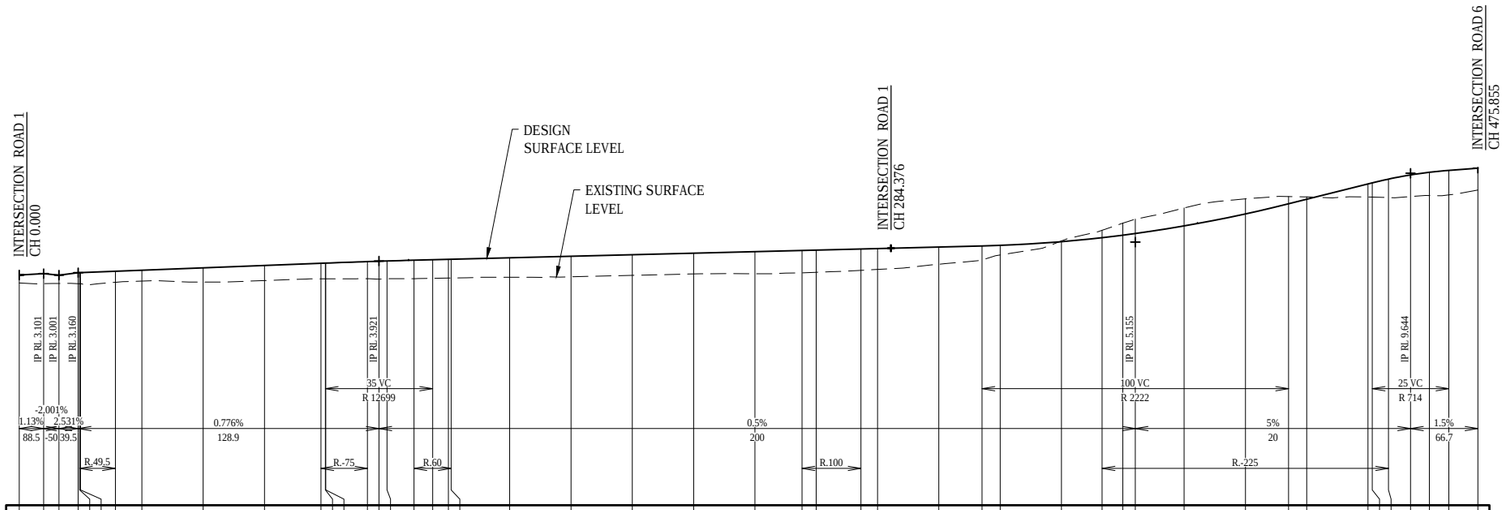

DATUM RL.-12.000

PEGGED CHAINAGE	CUT / FILL DEPTH	EXISTING SURFACE ON ROAD CENTRELINE	DESIGN LIP OF KERB (RHS)	DESIGN LIP OF KERB (LHS)	DESIGN LEVELS ON ROAD CENTRELINE
0.000	0.523	2.488			3.011
7.977	0.654	2.447			3.101
12.965	0.541	2.461			3.001
19.243	0.711	2.449			3.160
19.699	0.719	2.445			3.164
20.000	0.724	2.442			3.166
31.366	0.719	2.535	3.163	3.163	3.254
40.000	0.704	2.618	3.230	3.230	3.321
60.000	0.926	2.551	3.385	3.385	3.476
80.000	0.983	2.648	3.540	3.540	3.632
98.445	1.013	2.762	3.683	3.683	3.775
99.866	1.024	2.762	3.694	3.694	3.786
100.000	1.025	2.762	3.695	3.695	3.787
113.602	1.113	2.771	3.793	3.793	3.885
117.366	1.169	2.741	3.818	3.818	3.909
120.000	1.155	2.771	3.834	3.834	3.926
128.775	1.203	2.774	3.859	3.860	3.977
134.866	1.216	2.793	3.866	3.857	4.009
140.000	1.224	2.810	3.883	3.878	4.035
140.910	1.225	2.814	3.888	3.883	4.039
160.000	1.270	2.865	3.983	3.978	4.135
180.000	1.341	2.894	4.083	4.078	4.235
200.000	1.347	2.988	4.183	4.178	4.335
220.000	1.353	3.081	4.283	4.278	4.435
240.000	1.439	3.096	4.383	4.378	4.535
255.377	1.459	3.152	4.460	4.455	4.612
260.000	1.448	3.187	4.483	4.478	4.635
274.596	1.392	3.316	4.556	4.551	4.708
280.000	1.361	3.373	4.583	4.578	4.735
300.000	1.120	3.714	4.678	4.678	4.835
314.085	0.914	3.991	4.749	4.749	4.905
320.000	0.624	4.318	4.786	4.786	4.943
340.000	-0.045	5.231	5.029	5.029	5.186
353.254	-0.483	5.929	5.290	5.290	5.446
360.000	-0.783	6.392	5.452	5.452	5.609
364.085	-0.937	6.655	5.561	5.561	5.718
380.000	-1.172	7.384	6.056	6.056	6.212
400.000	-0.986	7.981	6.839	6.839	6.996
414.085	-0.475	8.131	7.499	7.499	7.655
420.000	-0.154	8.105	7.794	7.794	7.951
440.000	0.851	8.100	8.794	8.794	8.951
441.365	0.926	8.093	8.863	8.863	9.019
446.681	1.202	8.063	9.109	9.109	9.265
453.865	1.410	8.125	9.378	9.378	9.535
460.000	1.516	8.192		9.552	9.708
466.365	1.595	8.236		9.677	9.832
475.855	1.424	8.550			9.974

ROAD 5 LONGITUDINAL SECTION

SCALE 1:200 VERTICAL
1:1000 HORIZONTAL

Issue	Description	By	Ckd	RPEQ	Date
06	ISSUE FOR RFI RESPONSE	RR			18.07.19
05	ISSUE FOR RFI RESPONSE	BF			26.11.18
04	MC1004 SECTION AMENDED			BD	14.10.15
03	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

Scale
0 20 40 60 80 100m
1 : 1000
0 5 10 15 20m
1 : 200

Surveyor
ROBERT A HARRIES
SURVEYOR

Architect

Filename C150-AA007094-gcd-00-MC1000RoadLongitudinalSection.dwg

Client
GOLDCORAL PTY LTD

Status
FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved
R.P.E.Q No :

Scales AS SHOWN
Original Issue Signatures
Drawn A. CARDEÑO
Original Size A1
Designed A. MAGONDACAN
Height Datum AHD
Project Manager L. PRIZEMAN
Grid GRID
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Project
RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title
ROAD 5 LONGITUDINAL SECTION

ARCADIS

Arcadis Australia Pacific Pty Limited
Level 5, 120 Edward Street
Brisbane QLD 4000
ABN 76 104 485 289
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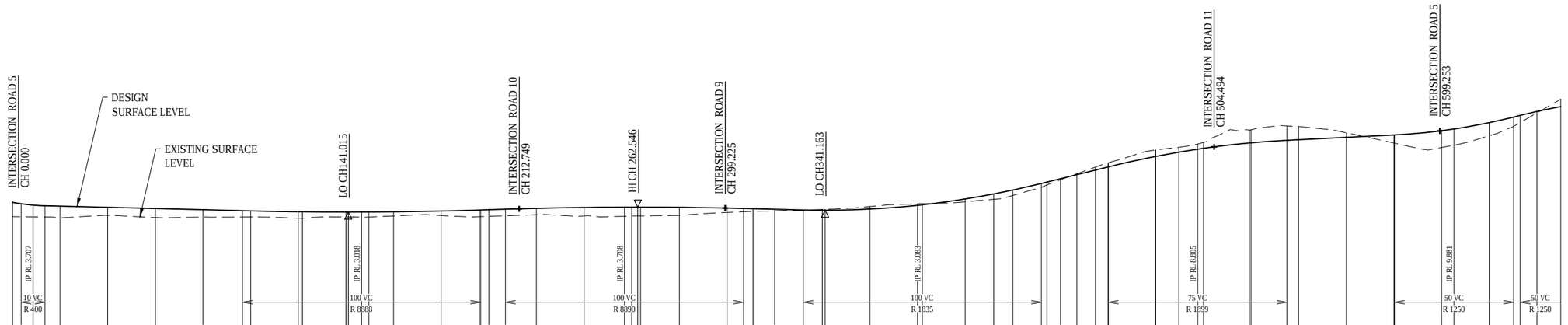
Fax No: +61 7 3337 0055
www.arcadis.com

Drawing No. C154 — Project No. AA007094 — Issue 06



DESIGN LEVELS ON ROAD CENTRELINE	3.967	3.857	3.739	3.682	3.651	3.551	3.451	3.351	3.268	3.251	3.181	3.177
DESIGN LIP OF KERB (LHS)	11.540	11.377	3.613	3.556	3.524	3.424	3.324	3.224	3.141	3.125	3.055	3.051
DESIGN LIP OF KERB (RHS)					3.524	3.424	3.324	3.224	3.141	3.125	3.055	3.051
EXISTING SURFACE ON ROAD CENTRELINE	2.774	2.766	2.754	2.744	2.678	2.869	2.695	2.732	2.738	2.742	2.641	2.629
CUT / FILL DEPTH	1.193	1.092	0.985	0.939	0.972	0.681	0.756	0.618	0.529	0.509	0.540	0.549
PEGGED CHAINAGE	0.000	3.646	8.646	13.646	20.000	40.000	60.000	80.000	96.557	100.000	120.000	121.720

DESIGN LEVELS ON ROAD CENTRELINE	3.157	3.157	3.158	3.161	3.177	3.242	3.327	3.330	3.352	3.395	3.467	3.540
DESIGN LIP OF KERB (LHS)	3.022	3.022	3.023	3.026	3.042	3.107	3.192	3.195	3.217	3.260	3.332	3.405
DESIGN LIP OF KERB (RHS)	3.292	3.292	3.293	3.296	3.312	3.377	3.462	3.465	3.487	3.530	3.602	3.675
EXISTING SURFACE ON ROAD CENTRELINE	2.745	2.746	2.724	2.738	2.827	2.861	2.770	2.774	2.797	2.845	2.933	2.830
CUT / FILL DEPTH	0.412	0.411	0.434	0.422	0.349	0.381	0.557	0.556	0.554	0.550	0.534	0.710
PEGGED CHAINAGE	140.000	141.015	146.557	149.607	160.000	180.000	196.019	196.557	200.000	206.995	220.000	240.000

DESIGN LEVELS ON ROAD CENTRELINE	3.567	3.568	3.569	3.569	3.552	3.490	3.458	3.438	3.393	3.333	3.310	3.310
DESIGN LIP OF KERB (LHS)	3.432	3.433	3.434	3.434	3.417	3.355	3.323	3.303	3.258	3.198	3.175	3.175
DESIGN LIP OF KERB (RHS)	3.702	3.703	3.704	3.704	3.687	3.625	3.593	3.573	3.528	3.468	3.445	3.445
EXISTING SURFACE ON ROAD CENTRELINE	2.795	2.828	2.827	2.827	2.874	3.120	3.179	3.211	3.252	3.304	3.376	3.386
CUT / FILL DEPTH	0.772	0.741	0.742	0.742	0.678	0.369	0.279	0.227	0.141	0.028	-0.066	-0.076
PEGGED CHAINAGE	256.995	260.000	262.546	263.734	280.000	300.000	306.995	310.917	320.000	331.989	340.000	341.163

DESIGN LEVELS ON ROAD CENTRELINE	3.407	3.721	3.764	4.253	4.676	5.003	5.558	5.673	5.954	6.294	6.682	6.944
DESIGN LIP OF KERB (LHS)	3.272	3.586	3.629	4.118	4.541	4.868	5.423	5.538	5.819	6.159	6.547	6.809
DESIGN LIP OF KERB (RHS)	3.542	3.856	3.899	4.388	4.811	5.138	5.693	5.808	6.089	6.429	6.817	7.079
EXISTING SURFACE ON ROAD CENTRELINE	3.618	3.846	3.860	4.016	4.224	4.548	5.235	5.426	5.870	6.368	6.932	7.288
CUT / FILL DEPTH	-0.212	-0.125	-0.096	0.237	0.452	0.455	0.322	0.247	0.084	-0.074	-0.250	-0.344
PEGGED CHAINAGE	360.000	380.000	381.989	400.000	411.958	420.000	431.989	434.319	440.000	446.867	454.697	460.000

DESIGN LEVELS ON ROAD CENTRELINE	6.949	7.820	7.830	8.183	8.434	8.505	8.957	8.969	9.180	9.229	9.429	9.629
DESIGN LIP OF KERB (LHS)	6.814	7.685	7.695	8.048	8.308	8.378	8.830	8.842	9.053	9.102	9.302	9.502
DESIGN LIP OF KERB (RHS)	7.084	7.826	7.833	8.067	8.308	8.378	8.830	8.842	9.053	9.102	9.302	9.502
EXISTING SURFACE ON ROAD CENTRELINE	7.293	8.368	8.377	8.591	8.862	8.999	10.042	10.065	10.386	10.341	9.807	8.952
CUT / FILL DEPTH	-0.344	-0.548	-0.547	-0.409	-0.428	-0.495	-1.085	-1.096	-1.206	-1.112	-0.379	0.676
PEGGED CHAINAGE	460.085	479.738	480.000	489.673	497.585	500.000	519.315	520.000	535.085	540.000	560.000	580.000

DESIGN LEVELS ON ROAD CENTRELINE	9.631	9.985	10.131	10.662	11.131	11.270	11.601	12.005
DESIGN LIP OF KERB (LHS)	9.504	9.859	10.005	10.535	11.004	11.144	11.474	11.878
DESIGN LIP OF KERB (RHS)	9.504	9.859	10.005	10.535	11.004	11.144	11.474	11.878
EXISTING SURFACE ON ROAD CENTRELINE	8.943	8.578	8.773	9.559	10.347	10.668	11.473	12.629
CUT / FILL DEPTH	0.688	1.407	1.358	1.103	0.784	0.603	0.128	-0.624
PEGGED CHAINAGE	580.218	600.000	605.218	620.000	630.218	633.004	640.000	650.000

ROAD 6 LONGITUDINAL SECTION

SCALE 1:200 VERTICAL
1:1000 HORIZONTAL

Issue	Description	By	Ckd	RPEQ	Date
05	ISSUE FOR RFI RESPONSE	RR			18.07.19
04	ISSUE FOR RFI RESPONSE	BF			26.11.18
03	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

Scale
0 20 40 60 80 100m
1 : 1000
0 5 10 15 20m
1 : 200

Surveyor
ROBERT A HARRIES
SURVEYOR

Architect

Filename C150-AA007094-gcd-00-MC1000RoadLongitudinalSection.dwg

Client
GOLDCORAL PTY LTD

Status
FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved
R.P.E.Q No :

Scales	AS SHOWN	Original Issue Signatures
		Drawn A. CARDEÑO
Original Size	A1	Designed A. MAGONDACAN
Height Datum	AHD	Project Manager L. PRIZEMAN
Grid	GRID	Ⓒ Copyright reserved

Project
RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title
ROAD 6 LONGITUDINAL SECTION

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Drawing No.	Project No.	Issue
C155	AA007094	05

100mm on Original

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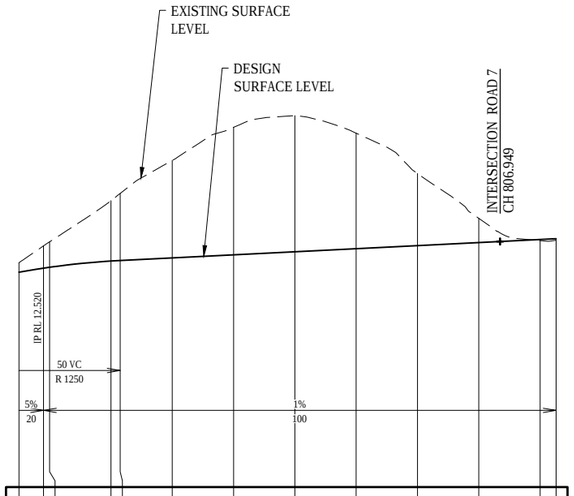

Vertical Curve Length (m)
Vertical Curve Radius (m)
Vertical Grade (%)
Vertical Grade (1 in ...)
Horizontal Curve Radius (m)

DATUM RL.-2.000

DESIGN LEVELS ON ROAD CENTRELINE	12.005	12.270	12.329	12.737	12.770	12.940	13.140	13.340	13.540	13.740	13.940	14.140	14.192
DESIGN LIP OF KERB (LHS)	11.878	12.144	12.202	12.610	12.644	12.814	13.014	13.214	13.414	13.614	13.814	14.014	14.066
DESIGN LIP OF KERB (RHS)	11.878	12.144	12.202	12.610	12.644	12.814	13.014	13.214	13.414	13.614	13.814	14.014	14.066
EXISTING SURFACE ON ROAD CENTRELINE	12.629	13.727	13.991	16.670	17.141	19.294	21.455	22.215	21.074	18.444	15.521	14.069	14.103
CUT / FILL DEPTH	-0.624	-1.456	-1.662	-3.933	-4.371	-6.354	-8.315	-8.875	-7.534	-4.704	-1.581	0.071	0.090
PEGGED CHAINAGE	650.000	658.004	660.000	680.000	683.004	700.000	720.000	740.000	760.000	780.000	800.000	820.000	825.212

ROAD 6 LONGITUDINAL SECTION

SCALE 1:200 VERTICAL
1:1000 HORIZONTAL

Vertical Curve Length (m)
Vertical Curve Radius (m)
Vertical Grade (%)
Vertical Grade (1 in ...)
Horizontal Curve Radius (m)

DATUM RL.-10.000

DESIGN LEVELS ON ROAD CENTRELINE	5.604	5.318	5.232	5.281	5.291	5.768	6.552	8.052	9.552	11.052	11.116	12.387	12.710	13.362	13.741	14.014
DESIGN LIP OF KERB (LHS)			5.106	5.156	5.165	5.641	6.426	7.926	9.426	10.926	10.989	12.261	12.583	13.236		
DESIGN LIP OF KERB (RHS)			5.106	5.156	5.165	5.641	6.426	7.926	9.426	10.926	10.989	12.261	12.583	13.236		
EXISTING SURFACE ON ROAD CENTRELINE	4.783	5.351	5.693	5.996	6.029	6.895	7.923	9.327	10.567	11.578	11.594	12.737	13.099	13.829	14.220	14.565
CUT / FILL DEPTH	0.821	-0.033	-0.461	-0.716	-0.737	-1.127	-1.371	-1.275	-1.014	-0.526	-0.478	-0.349	-0.389	-0.466	-0.479	-0.551
PEGGED CHAINAGE	0.000	9.543	15.257	19.543	20.000	29.543	40.000	60.000	80.000	100.000	100.847	120.000	125.847	140.000	150.847	159.942

ROAD 7 LONGITUDINAL SECTION

SCALE 1:200 VERTICAL
1:1000 HORIZONTAL

Issue	Description	By	Ckd	RPEQ	Date
06	ISSUE FOR RFI RESPONSE	RR			18.07.19
05	ISSUE FOR RFI RESPONSE	BF			26.11.18
04	ISSUE FOR RFI RESPONSE			NF	04.04.16
03	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

100mm on Original

Scale

0 20 40 60 80 100m
1 : 1000

0 5 10 15 20m
1 : 200

Surveyor
ROBERT A HARRIES
SURVEYOR

Architect

Filename C150-AA007094-gcd-00-MC1000RoadLongitudinalSection.dwg

Client
GOLDCORAL PTY LTD

Status
FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved
R.P.E.Q No :

Scales	AS SHOWN	Original Issue Signatures	
		Drawn A. CARDEÑO	
Original Size	A1	Designed A. MAGONDACAN	
Height Datum	AHD	Project Manager L. PRIZEMAN	
Grid	GRID	© Copyright reserved	

Project
RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title
ROAD 6 & 7 LONGITUDINAL
SECTIONS

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Drawing No.		Project No.		Issue
C156	—	AA007094	—	06

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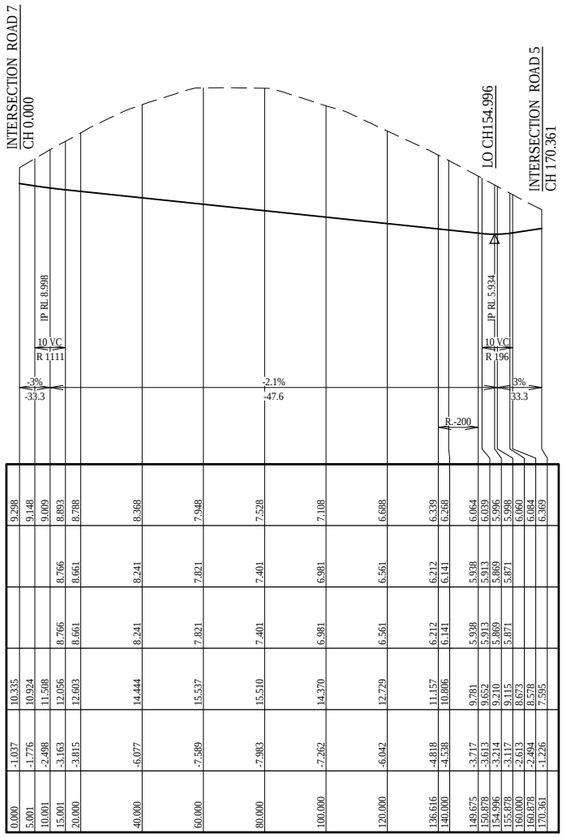

DESIGN LEVELS ON ROAD CENTRELINE	9.298	9.148	9.009	8.893	8.788	8.368	7.948	7.528	7.108	6.688	6.339	6.268	6.064	6.039	5.996	5.998	6.060	6.084	6.369
DESIGN LIP OF KERB (LHS)				8.766	8.661	8.241	7.821	7.401	6.981	6.561	6.212	6.141	5.938	5.913	5.869	5.871			
DESIGN LIP OF KERB (RHS)				8.766	8.661	8.241	7.821	7.401	6.981	6.561	6.212	6.141	5.938	5.913	5.869	5.871			
EXISTING SURFACE ON ROAD CENTRELINE	10.335	10.924	11.508	12.056	12.603	14.444	15.537	15.510	14.370	12.729	11.157	10.806	9.781	9.652	9.210	9.115	8.673	8.578	7.595
CUT / FILL DEPTH	-1.037	-1.776	-2.498	-3.163	-3.815	-6.077	-7.589	-7.983	-7.262	-6.042	-4.818	-4.538	-3.717	-3.613	-3.214	-3.117	-2.613	-2.494	-1.226
PEGGED CHAINAGE	0.000	5.001	10.001	15.001	20.000	40.000	60.000	80.000	100.000	120.000	136.616	140.000	149.675	150.878	154.996	155.878	160.000	160.878	170.361

ROAD 8 LONGITUDINAL SECTION

SCALE 1:200 VERTICAL
1:1000 HORIZONTAL

DESIGN LEVELS ON ROAD CENTRELINE	4.757	4.607	4.559	4.482	4.407	4.357	4.230	4.157	3.957	3.861	3.786	3.661	3.647	3.493
DESIGN LIP OF KERB (LHS)					4.280	4.230	4.103	4.030	3.830	3.735	3.659			
DESIGN LIP OF KERB (RHS)					4.280	4.230	4.103	4.030	3.830					
EXISTING SURFACE ON ROAD CENTRELINE	3.420	3.387	3.369	3.333	3.281	3.256	3.275	3.286	3.283	3.217	3.161	3.105	3.100	3.114
CUT / FILL DEPTH	1.337	1.220	1.190	1.148	1.126	1.101	0.955	0.871	0.673	0.645	0.625	0.556	0.548	0.379
PEGGED CHAINAGE	0.000	5.000	6.676	10.000	15.000	20.000	32.700	40.000	60.000	69.531	74.531	79.531	80.000	85.138

ROAD 9 LONGITUDINAL SECTION

SCALE 1:200 VERTICAL
1:1000 HORIZONTAL

Issue	Description	By	Ckd	RPEQ	Date
04	ISSUE FOR RFI RESPONSE	RR			18.07.19
03	ISSUE FOR RFI RESPONSE	BF		BD	26.11.18
02	ISSUE FOR RFI RESPONSE			NF	04.04.16
01	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15

100mm on Original

Scale

0 20 40 60 80 100m
1 : 1000

0 5 10 15 20m
1 : 200

Surveyor
ROBERT A HARRIES
SURVEYOR

Architect

Filename C150-AA007094-gcd-00-MC1000RoadLongitudinalSection.dwg

Client
GOLDCORAL PTY LTD

Status
FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved
R.P.E.Q No :

Scales	AS SHOWN	Original Issue Signatures	
		Drawn A. CARDEÑO	
Original Size	A1	Designed A. MAGONDACAN	
Height Datum	AHD	Project Manager L. PRIZEMAN	
Grid	GRID	© Copyright reserved	

Project
RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title
ROAD 8 & 9 LONGITUDINAL
SECTIONS

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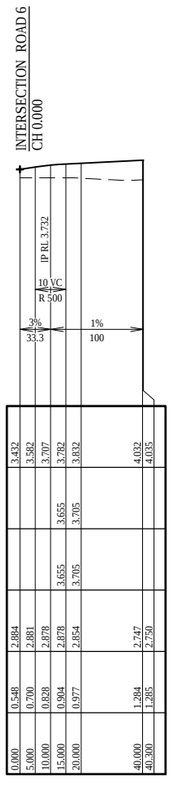
Drawing No.		Project No.		Issue
C157	—	AA007094	—	04



DATUM RL.-12.000

DESIGN LEVELS ON ROAD CENTRELINE	3.432	3.582	3.707	3.782	3.832	4.032	4.035
DESIGN LIP OF KERB (LHS)				3.655	3.705		
DESIGN LIP OF KERB (RHS)				3.655	3.705		
EXISTING SURFACE ON ROAD CENTRELINE	2.884	2.881	2.878	2.878	2.854	2.747	2.750
CUT / FILL DEPTH	0.548	0.700	0.828	0.904	0.977	1.284	1.285
PEGGED CHAINAGE	0.000	5.000	10.000	15.000	20.000	40.000	40.300

ROAD 10 LONGITUDINAL SECTION

SCALE 1:200 VERTICAL
1:1000 HORIZONTAL

DATUM RL.-7.000

DESIGN LEVELS ON ROAD CENTRELINE	8.639	8.489	8.443	8.382	8.360	8.363	8.388	8.411	8.488
DESIGN LIP OF KERB (LHS)	8.983	8.958	8.951	8.256	8.233	8.237	8.262	8.284	8.362
DESIGN LIP OF KERB (RHS)							8.262	8.284	8.362
EXISTING SURFACE ON ROAD CENTRELINE	9.439	9.243	9.218	9.188	9.206	9.239	9.367	9.370	9.386
CUT / FILL DEPTH	-0.800	-0.754	-0.775	-0.806	-0.846	-0.875	-0.979	-0.959	-0.897
PEGGED CHAINAGE	0.000	5.000	6.686	10.000	13.571	15.000	20.000	24.475	40.000

DESIGN LEVELS ON ROAD CENTRELINE	8.588	8.683	8.688	8.788	8.795	8.888	8.988	8.988	9.088
DESIGN LIP OF KERB (LHS)	8.462	8.557	8.562	8.662	8.669	8.762	8.861	8.862	8.962
DESIGN LIP OF KERB (RHS)	8.462	8.557	8.562	8.662	8.669	8.762	8.861	8.862	8.962
EXISTING SURFACE ON ROAD CENTRELINE	8.689	8.269	8.206	8.053	8.102	8.853	9.142	9.147	9.851
CUT / FILL DEPTH	-0.100	0.415	0.483	0.736	0.694	0.036	-0.154	-0.159	-0.763
PEGGED CHAINAGE	60.000	78.983	80.000	100.000	101.376	120.000	139.834	140.000	160.000

DESIGN LEVELS ON ROAD CENTRELINE	9.098	9.188	9.288	9.354	9.410	9.449	9.529	9.997
DESIGN LIP OF KERB (LHS)	8.971	9.062	9.162	9.227	9.283	9.322	9.402	
DESIGN LIP OF KERB (RHS)	8.971	9.062	9.162	9.227	9.283			
EXISTING SURFACE ON ROAD CENTRELINE	9.925	10.275	10.084	9.663	9.421	9.327	9.177	8.579
CUT / FILL DEPTH	-0.827	-1.087	-0.795	-0.309	-0.011	0.122	0.351	1.418
PEGGED CHAINAGE	161.810	180.000	200.000	213.053	218.053	220.000	223.053	238.668

ROAD 11 LONGITUDINAL SECTION

SCALE 1:200 VERTICAL
1:1000 HORIZONTAL

Issue	Description	By	Ckd	RPEQ	Date
03	ISSUE FOR RFI RESPONSE	RR			18.07.19
02	ISSUE FOR RFI RESPONSE	BF			26.11.18
01	ISSUE FOR RFI RESPONSE			NF	04.04.16

100mm on Original

Scale
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1 : 1000
0 5 10 15 20m
1 : 200

Surveyor
ROBERT A HARRIES
SURVEYOR

Architect

Filename C150-AA007094-gcd-00-MC1000RoadLongitudinalSection.dwg

Client
GOLDCORAL PTY LTD

Status
FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved
R.P.E.Q No :

Scales: AS SHOWN
Original Size: A1
Height Datum: AHD
Grid: GRID

Original Issue Signatures
Drawn: A. CARDEÑO
Designed: A. MAGONDACAN
Project Manager: L. PRIZEMAN

Project
RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title
ROAD 10 & 11 LONGITUDINAL SECTIONS

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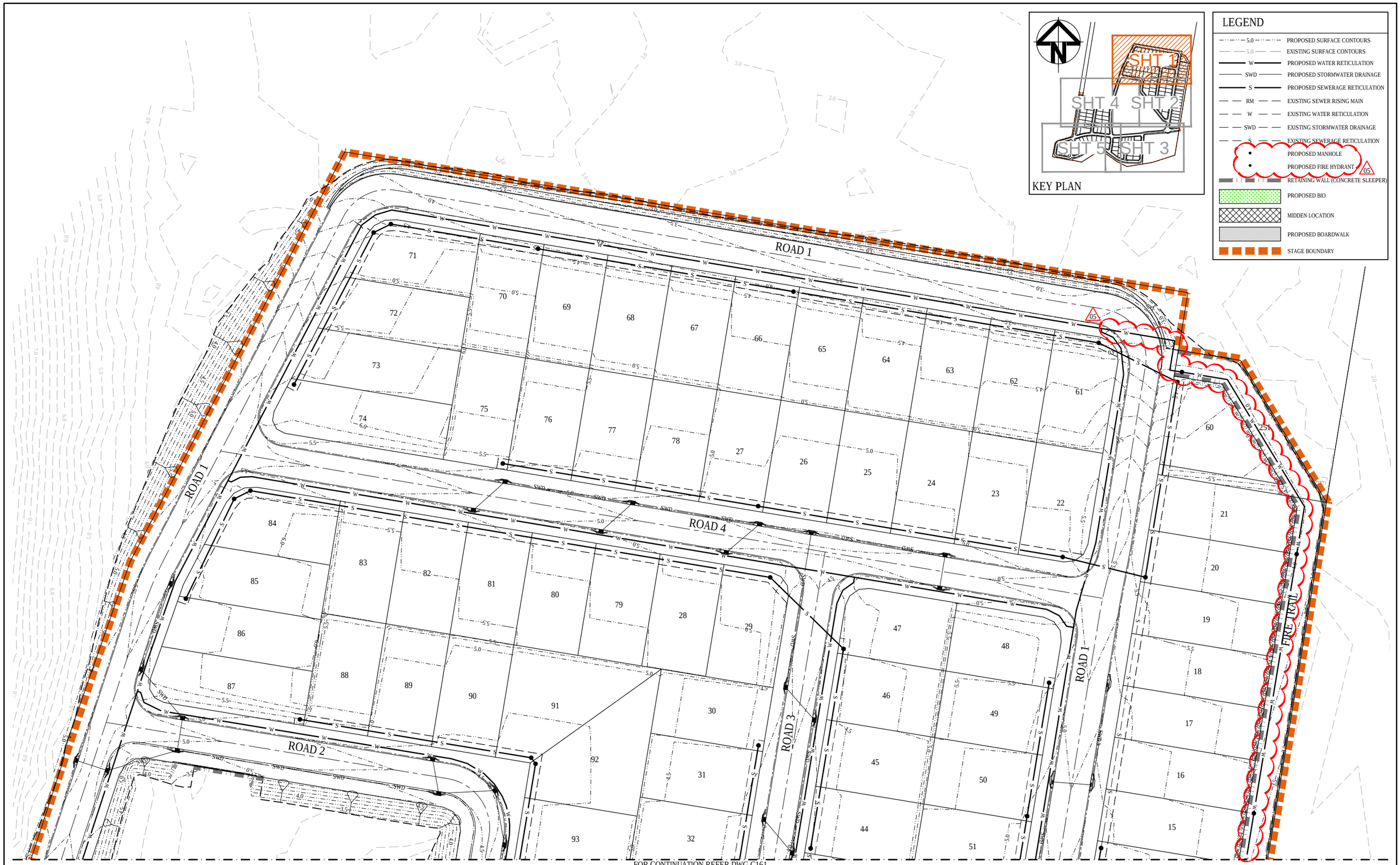
Drawing No.	Project No.	Issue
C158	AA007094	03



FOR CONTINUATION REFER DWG C161

Issue	Description	By	Ckd	RPEQ	Date
05	ISSUE FOR RFI RESPONSE	RR			18.07.19
04	ISSUE FOR RFI RESPONSE	AC			26.11.18
03	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

Scale: 0 10 20 30 40 50m — 1 : 500

Surveyor: ROBERT A HARRIES SURVEYOR

Architect:

Filename: C160-AA007094-gcd-00-CombinedServicesLayoutPlan.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved:

R.P.E.Q No :

Scales: 1 : 500

Original Size: A1

Height Datum: AHD

Grid: GRID

Original Issue Signatures

Drawn: A. CARDEÑO

Designed: J. PECSON

Project Manager: L. PRIZEMAN

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: COMBINED SERVICES LAYOUT PLAN SHEET 1 OF 5

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Drawing No. C160 — Project No. AA007094 — Issue 05

100mm on Original

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FOR CONTINUATION REFER DWG C160

FOR CONTINUATION REFER DWG C163

ROAD 1

ROAD 3

ROAD 2

FIRE TRAIL

177

1.5m

2.5m

LEGEND

- PROPOSED SURFACE CONTOURS (5.0)
- EXISTING SURFACE CONTOURS (5.0)
- PROPOSED WATER RETICULATION (W)
- PROPOSED STORMWATER DRAINAGE (SWD)
- PROPOSED SEWERAGE RETICULATION (S)
- EXISTING SEWER RISING MAIN (RM)
- EXISTING WATER RETICULATION (W)
- EXISTING STORMWATER DRAINAGE (SWD)
- EXISTING SEWERAGE RETICULATION (S)
- PROPOSED MANHOLE
- PROPOSED FIRE HYDRANT (05)
- RETAINING WALL (CONCRETE SLEEPER)
- PROPOSED BIO
- MIDDEN LOCATION
- PROPOSED BOARDWALK
- STAGE BOUNDARY

KEY PLAN

SHT 1 SHT 2 SHT 3 SHT 4 SHT 5

FOR CONTINUATION REFER DWG C162

Issue	Description	By	Ckd	RPEQ	Date
05	ISSUE FOR RFI RESPONSE	RR			18.07.19
04	ISSUE FOR RFI RESPONSE	AC			26.11.18
03	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

Scale: 0 10 20 30 40 50m — 1 : 500

100mm on Original

Surveyor: ROBERT A HARRIES SURVEYOR

Architect:

Filename: C160-AA007094-gcd-00-CombinedServicesLayoutPlan.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved:

R.P.E.Q No :

Scales: 1 : 500

Original Size: A1

Height Datum: AHD

Grid: GRID

Original Issue Signatures

Drawn: A. CARDEÑO

Designed: J. PECSON

Project Manager: L. PRIZEMAN

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: COMBINED SERVICES LAYOUT PLAN SHEET 2 OF 5

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Drawing No. C161 — Project No. AA007094 — Issue 05

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FOR CONTINUATION REFER DWG C161

FOR CONTINUATION REFER DWG C164

ROAD 1
ROAD 5
ROAD 6
ROAD 9
ROAD 10
IRON GATES ROAD

EXISTING SEWER PUMP STATION

EVANS RIVER

LEGEND

- PROPOSED SURFACE CONTOURS
- EXISTING SURFACE CONTOURS
- PROPOSED WATER RETICULATION
- PROPOSED STORMWATER DRAINAGE
- PROPOSED SEWERAGE RETICULATION
- EXISTING SEWER RISING MAIN
- EXISTING WATER RETICULATION
- EXISTING STORMWATER DRAINAGE
- EXISTING SEWERAGE RETICULATION
- PROPOSED MANHOLE
- PROPOSED FIRE HYDRANT
- RETAINING WALL (CONCRETE SLEEPER)
- PROPOSED BIO
- MIDDEN LOCATION
- PROPOSED BOARDWALK
- STAGE BOUNDARY

KEY PLAN

SHT 1 SHT 4 SHT 2 SHT 5 SHT 3

Issue	Description	By	Ckd	RPEQ	Date
06	ISSUE FOR RFI RESPONSE	RR			18.07.19
05	ISSUE FOR RFI RESPONSE	AC			26.11.18
04	MC1004 SECTION AMENDED			BD	14.10.15
03	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

Scale: 1 : 500 (0 10 20 30 40 50m)

Surveyor: ROBERT A HARRIES SURVEYOR

Architect:

Filename: C160-AA007094-gcd-00-CombinedServicesLayoutPlan.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved

R.P.E.Q No :

Scales: 1 : 500

Original Size: A1

Height Datum: AHD

Grid: GRID

Original Issue Signatures

Drawn: A. CARDEÑO

Designed: J. PECSON

Project Manager: L. PRIZEMAN

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

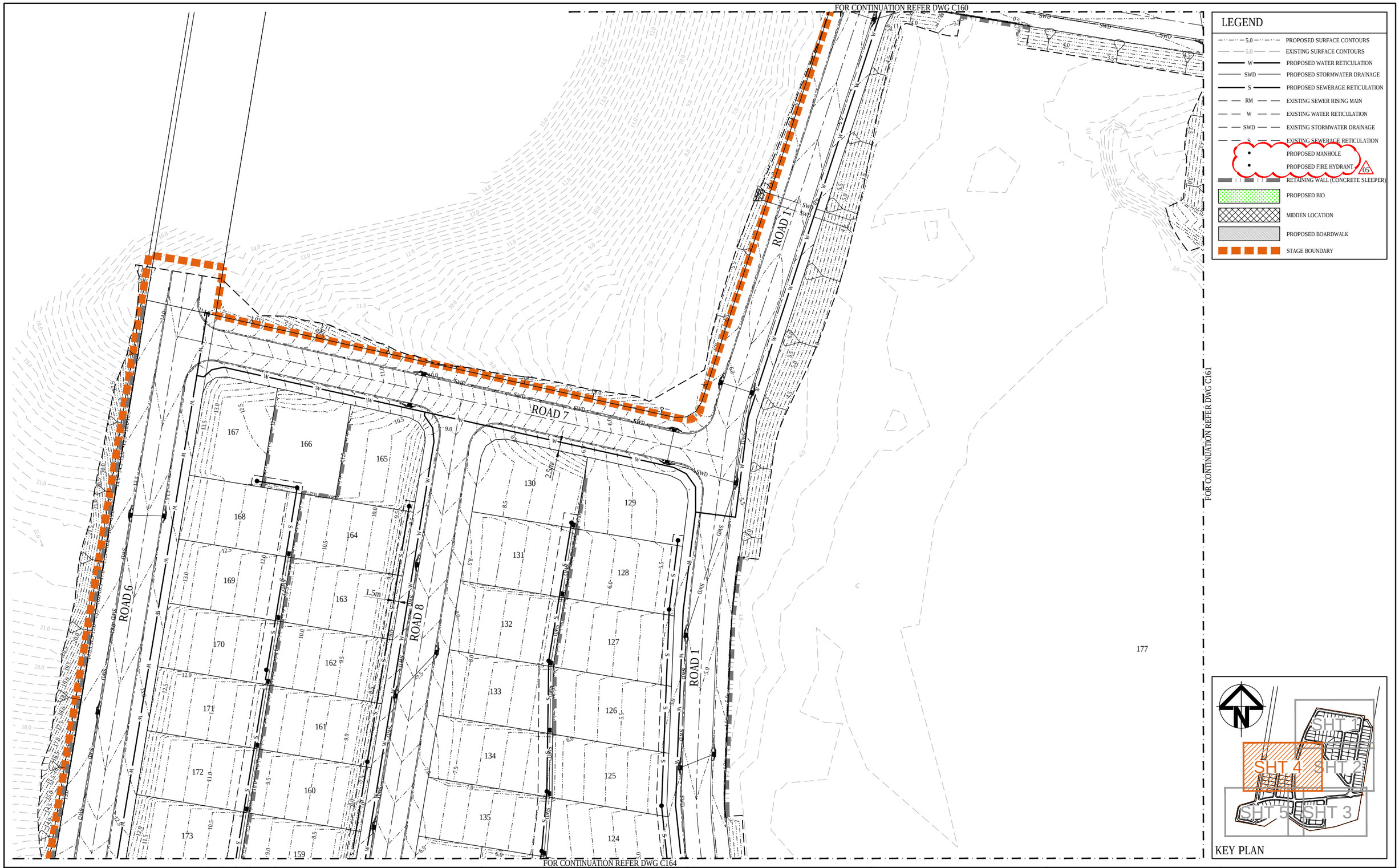
Title: COMBINED SERVICES LAYOUT PLAN SHEET 3 OF 5

ARCADIS
Arcadis Australia Pacific Pty Limited
Level 5, 120 Edward Street
Brisbane QLD 4000
ABN 76 104 485 289
Tel No: +61 7 3337 0000
Fax No: +61 7 3337 0055
www.arcadis.com

Drawing No. C162 — Project No. AA007094 — Issue 06

100mm on Original

C:\Users\nlaz3463\Desktop\Iron Gates\D-Final\c160-AA007094-gcd-00-CombinedServicesLayoutPlan.dwg 23/Jul/2019 12:45 PM V1



Issue	Description	By	Ckd	RPEQ	Date
05	ISSUE FOR RFI RESPONSE	RR			18.07.19
04	ISSUE FOR RFI RESPONSE	AC			26.11.18
03	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

Scale: 1 : 500 (0 10 20 30 40 50m)

Surveyor: ROBERT A HARRIES SURVEYOR

Architect:

Filename: C160-AA007094-gcd-00-CombinedServicesLayoutPlan.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved

R.P.E.Q No :

Scales: 1 : 500

Original Size: A1

Height Datum: AHD

Grid: GRID

Original Issue Signatures

Drawn: A. CARDEÑO

Designed: J. PECSON

Project Manager: L. PRIZEMAN

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: COMBINED SERVICES LAYOUT
PLAN SHEET 4 OF 5

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Drawing No.	Project No.	Issue
C163	AA007094	05

100mm on Original

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FOR CONTINUATION REFER DWG C163

FOR CONTINUATION REFER DWG C162

LEGEND

- PROPOSED SURFACE CONTOURS
- EXISTING SURFACE CONTOURS
- PROPOSED WATER RETICULATION
- PROPOSED STORMWATER DRAINAGE
- PROPOSED SEWERAGE RETICULATION
- EXISTING SEWER RISING MAIN
- EXISTING WATER RETICULATION
- EXISTING STORMWATER DRAINAGE
- EXISTING SEWERAGE RETICULATION
- PROPOSED MANHOLE
- PROPOSED FIRE HYDRANT
- RETAINING WALL (CONCRETE SLEEPER)
- PROPOSED BIO
- MIDDEN LOCATION
- PROPOSED BOARDWALK
- STAGE BOUNDARY

ROAD 1
ROAD 5
ROAD 6
ROAD 8
ROAD 9
ROAD 11
1.5m
2.5m
254
EVANS RIVER

KEY PLAN
SHT 1
SHT 4
SHT 2
SHT 5
SHT 3

Issue	Description	By	Ckd	RPEQ	Date
05	ISSUE FOR RFI RESPONSE	RR			18.07.19
04	ISSUE FOR RFI RESPONSE	AC			26.11.18
03	RE-ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15
02	ISSUE FOR DEVELOPMENT APPROVAL			BD	03.10.14
01	ORIGINAL ISSUE			BD	18.06.14

Scale
0 10 20 30 40 50m
1 : 500

Surveyor
ROBERT A HARRIES
SURVEYOR

Architect

Filename C160-AA007094-gcd-00-CombinedServicesLayoutPlan.dwg

Client
GOLDCORAL PTY LTD

Status
FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved

R.P.E.Q No :

Scales 1 : 500

Original Size A1

Height Datum AHD

Grid GRID

Original Issue Signatures

Drawn A. CARDEÑO

Designed J. PECSON

Project Manager L. PRIZEMAN

Project
RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title
COMBINED SERVICES LAYOUT
PLAN SHEET 5 OF 5

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Drawing No.	Project No.	Issue
C164	AA007094	05

100mm on Original

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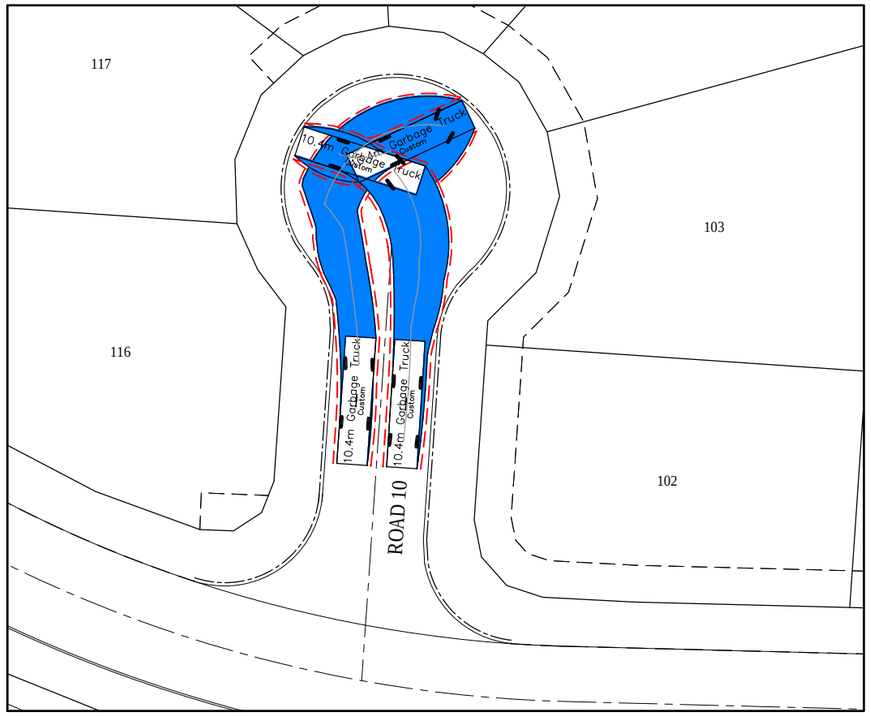
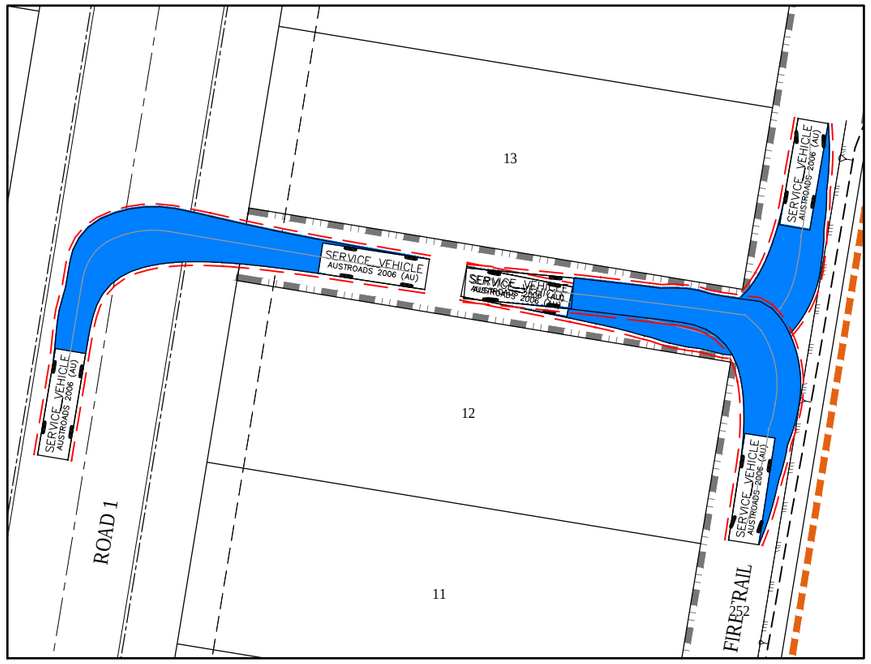


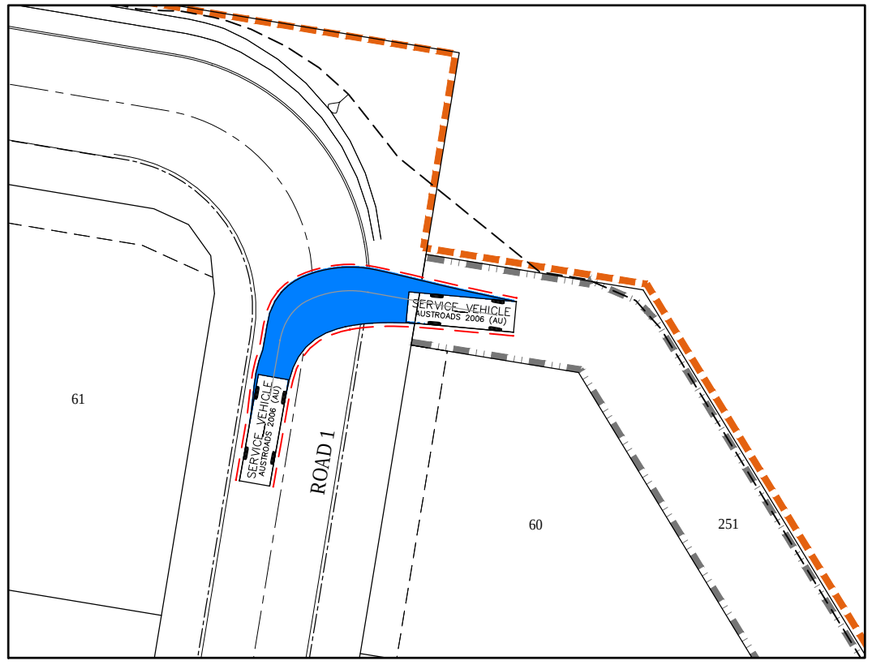
GARBAGE TRUCK TURNING MOVEMENT MC1010

SCALE 1 : 250



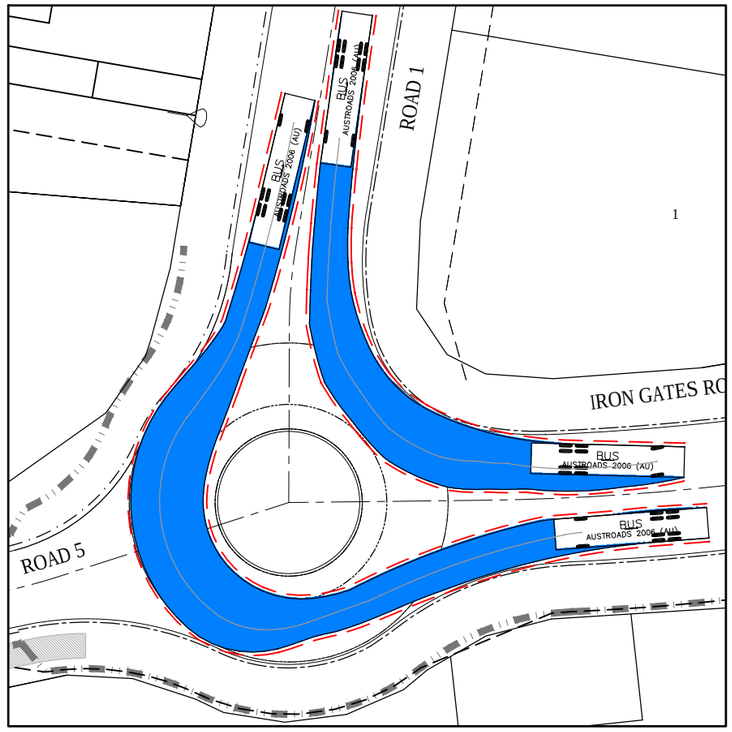
SERVICE VEHICLE TURNING MOVEMENT MC1000 AND FIRETRAIL

SCALE 1 : 250



SERVICE VEHICLE TURNING MOVEMENT MC1000 AND FIRETRAIL

SCALE 1 : 250

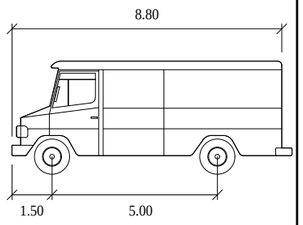


12.5m BUS TURNING MOVEMENT

SCALE 1 : 250

LEGEND

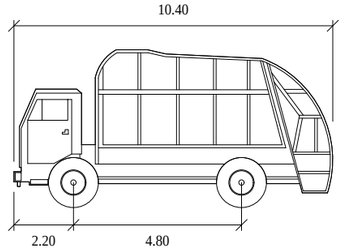
- DENOTES 300mm BODY CLEARANCE
- DENOTES VEHICLE BODY
- DENOTES VEHICLE BODY ENVELOPE
- PROPOSED RETAINING WALL
- STAGE BOUNDARY



BUS	METERS
WIDTH	: 2.50
TRACK	: 2.50
LOCK TO LOCK TIME	: 6.0
STEERING ANGLE	: 38.7

SERVICE VEHICLE DETAILS

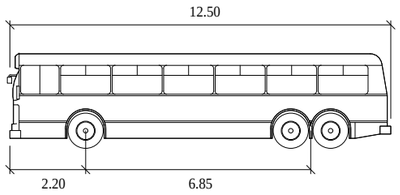
NTS



BUS	METERS
WIDTH	: 2.48
TRACK	: 2.48
LOCK TO LOCK TIME	: 6.0
STEERING ANGLE	: 33.5

10.4m GARBAGE TRUCK DETAILS

NTS



BUS	METERS
WIDTH	: 2.50
TRACK	: 2.50
LOCK TO LOCK TIME	: 6.0
STEERING ANGLE	: 36.6

12.5m BUS DETAILS

NTS

Issue	Description	By	Ckd	RPEQ	Date
04	ISSUE FOR RFI RESPONSE	RR			18.07.19
03	ISSUE FOR RFI RESPONSE	AC			26.11.18
02	AMENDED AS PER COUNCIL RFI			ANC	10.07.15
01	ISSUE FOR DEVELOPMENT APPROVAL			BD	13.07.15

Scale: 0 5 10 15 20 25m — 1 : 250

Surveyor: ROBERT A HARRIES SURVEYOR

Architect:

Filename C170-AA007094-gcd-00-IronGatesRoadVehicleSweptPathAnalysis.dwg

Client: GOLDCORAL PTY LTD

Status: FOR APPROVAL
CONSTRUCTION SUBJECT TO APPROVAL

Approved

R.P.E.Q No :

Scales: 1: 250 — Original Issue Signatures

Original Size: A1

Height Datum: AHD

Grid: GRID

Drawn: A. CARDEÑO

Designed: A. MAGONDACAN

Project Manager: L. PRIZEMAN

Project: RESIDENTIAL DEVELOPMENT
LOT 277 IRON GATES ROAD
EVANS HEAD

Title: IRON GATES ROAD VEHICLE SWEPT PATH ANALYSIS

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Drawing No. C170 — Project No. AA007094 — Issue 04

100mm on Original

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APPENDIX B

DIAL BEFORE YOU DIG SEARCH RESULTS

DIAL BEFORE YOU DIG www.1100.com.au

Job No 8032706

Phone: 1100
www.1100.com.au

Caller Details

Contact:	Mr Mike Cazeres	**Caller Id:**	1280753	**Phone:**	07 5503 4886
Company:	Not Supplied	**Mobile:**	0410 101 179	**Fax:**	Not Supplied
Address:	Level 7 Premion Place Queen Street Southport QLD 4215	**Email:**	mike.cazeres@hyderconsulting.com		

Dig Site and Enquiry Details

WARNING: The map below only displays the location of the proposed dig site and does not display any asset owners' pipe or cables. The area highlighted has been used only to identify the participating asset owners, who will send information to you directly.

User Reference: AA007094
Working on Behalf of:
Private

Enquiry Date:	Start Date:	End Date:
24/06/2014	26/06/2014	30/06/2014

Address:
Iron Gates Road
Iron Gates NSW 2473

Job Purpose: Excavation
Onsite Activity: Mechanical Excavation
Location of Workplace: Private Property
Location in Road: Not Supplied

- Check that the location of the dig site is correct. If not you must submit a new enquiry.
- Should the scope of works change, or plan validity dates expire, you must submit a new enquiry.
- Do NOT dig without plans. Safe excavation is your responsibility. If you do not understand the plans or how to proceed safely, please contact the relevant asset owners.

Notes/Description of Works:
Not Supplied

Your Responsibilities and Duty of Care

- If plans are not received within 2 working days, contact the asset owners directly & quote their Sequence No.
- ALWAYS perform an onsite inspection for the presence of assets. Should you require an onsite location, contact the asset owners directly. Please remember, plans do not detail the exact location of assets.
- Pothole to establish the exact location of all underground assets using a hand shovel, before using heavy machinery.
- Ensure you adhere to any State legislative requirements regarding Duty of Care and safe digging requirements.
- If you damage an underground asset you MUST advise the asset owner immediately.
- By using this service, you agree to Privacy Policy and the terms and disclaimers set out at **www.1100.com.au**
- **For more information on safe excavation practices, visit www.1100.com.au**

Asset Owner Details

The assets owners listed below have been requested to contact you with information about their asset locations within 2 working days. Additional time should be allowed for information issued by post. It is **your responsibility** to identify the presence of any underground assets in and around your proposed dig site. Please be aware, that not all asset owners are registered with the Dial Before You Dig service, so it is **your responsibility** to identify and contact any asset owners not listed here directly.
** Asset owners highlighted by asterisks ** require that you visit their offices to collect plans.
# Asset owners highlighted with a hash require that you call them to discuss your enquiry or to obtain plans.

Seq. No.	Authority Name	Phone	Status
40148856	Essential Energy	132391	NOTIFIED
40148855	Richmond Valley	0266600300	NOTIFIED
40148857	Telstra NSW, North	1800653935	NOTIFIED

END OF UTILITIES LIST

LEGEND

Exchange
(major cable present)

Footway access chamber
(can vary from 1-lid to 12-lid)

Roadway access chamber

Pillar/cabinet
(above the ground / free standing)

Above ground complex equipment housing (eg RIM)
Please Note: This equipment is powered by 240V electricity.

PT **Public telephone**
Please Note: This equipment is powered by 240V electricity.

Direct buried cable

Cable jointing pit
(number indicating pit type)

Buried cable jointing pit
(number indicating pit type)

Elevated cable joint
(above ground joint on buried cable)

Cable loop (direct buried)

Telstra Plant in shared utility trench

Aerial Cable
(above ground)

Aerial Cable
(attached to joint use pole e.g. power)

SMOF **Optical fibre cable direct buried**

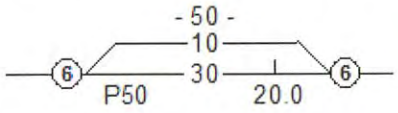
Single to multiple round conduit
Configurations 1, 2, 4, 9 respectively
(Attached text denotes conduit type and size)
P100

Multiple square conduit
Configurations 2, 4, 6 respectively
(Attached text denotes conduit type and size)
E85

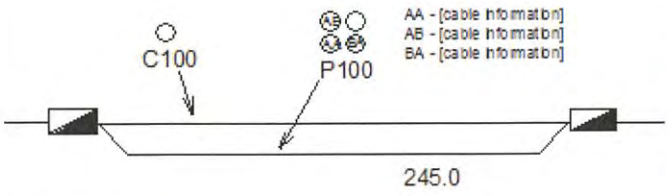
Some examples of conduit type and size:
A - Asbestos cement, P - PVC / plastic, C - Concrete, GI - Galvanised iron, E - Earthenware.
Conduit sizes *nominally* range from 20mm to 100mm.

P50	50mm PVC conduit
P100	100mm PVC conduit
A100	100mm asbestos cement conduit
E 85	85mm square earthenware conduit

Some examples of how to read Telstra plans:

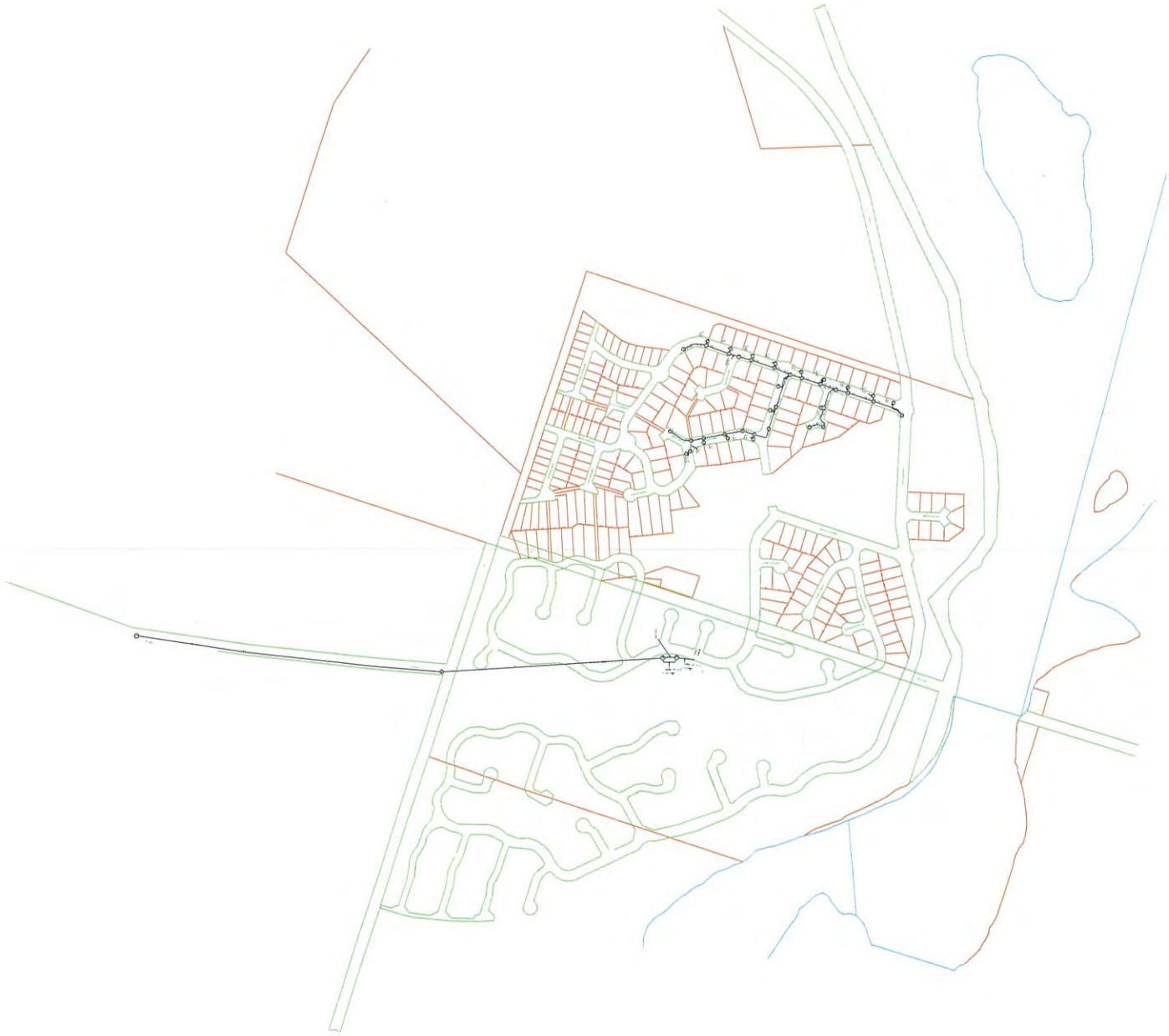


One 50mm PVC conduit (P50) containing a 50-pair and a 10-pair cable between two 6-pits, 20.0m apart, with a direct buried 30-pair cable along the same route.



Two separate conduit runs between two footway access chambers (manholes) 245m apart. A nest of four 100mm PVC conduits (P100) containing assorted cables in three ducts (one being empty) and one empty 100mm concrete duct (C100) along the same route.

WARNING: Telstra's plans show only the presence of cables and plant. They only show their position relative to road boundaries, property fences etc. at the time of installation and Telstra does not warrant or hold out that such plans are accurate thereafter due to changes that may occur over time.
DO NOT ASSUME DEPTH OR ALIGNMENT of cables or plant as these vary significantly.
The customer has a DUTY OF CARE when excavating near Telstra cables and plant. Before using machine excavators TELSTRA PLANT MUST FIRST BE PHYSICALLY EXPOSED BY SOFT DIG (potholing) to identify its location.
Telstra will seek compensation for damages caused to its property and losses caused to Telstra and its customers.



Overhead wires not shown LOOK UP & LIVE!

LEGEND

- LV Underground Cable
- HV Underground Cable
- Underground Pipe
- Underground Earth or Wires
- Ground Substation
- Pole
- Cubicle
- Pit
- Proposed Construction
- Critical* Underground Cable
- Critical* Zone Substation

* Critical Assets: Contact Essential Energy on 13 23 91

THE INFORMATION ON THIS MAP MAY NOT BE ACCURATE.
If details are incorrect, please notify Essential Energy on 13 23 91 (or fax 1800 354 636)

ISSUE DATE: 24/06/2014

You must resubmit your request if you have not started work within 4 weeks of the 'Issue Date' above

A4 | SCALE: 1:7111

essential energy

Job Number: 8032706 Sequence number: 40148856 Job location: Iron Gates Road, Iron Gates

Map Centre: 153° 24' 51.8", -29° 7' 17.8"