Stormwater Management Strategy

INDUSTRIAL DEVELOPMENT

280 Evans Road, Cranbourne West

Murphy Trust No.1

April 2021

KLM SPATIAL
LAND DEVELOPMENT INTELLIGENCE

280 Evans Road, Cranbourne West

Contents

Document Control

Date Prepared	Version Number	Author	Reviewed	Distributed
13 April 2021	1	S,Young	R.Flack	Internal Client Council
20 December 2020	1	S,Young	R.Flack	Internal Client Council

1.0 Introduction

This report has been prepared by KLM Spatial on behalf of Murphy Trust No.1 to assess stormwater management requirements for the proposed development of 280 Evans Road Cranbourne West.

The assessment has been conducted by experienced engineers from KLM Spatial with consideration to the existing conditions, proposed site usage and layout, surrounding drainage scheme and relevant feedback/advice from catchment management authorities.

The report considers the following elements of stormwater management relevant to development of the site:

- Stormwater Catchments and Hydrology
- Stormwater Quantity & Quality Management
- Proposed Drainage Network and Hydraulics

2.0 Site and Surrounds

The existing site at 280 Evans Road Cranbourne West is approximately 23.28ha in size. It is currently a rural residential property with a singular dwelling. The remainder of the property is used for grazing.

The site is bound by an Ausnet Terminal Station to the east, Evans Rd to the west, Thompsons Rd to the north and Breen's Road to the south. Thompsons Road has recently been upgraded by VicRoad's which includes the installation of Melbourne Water Main Drainage Pipelines.

The site generally grades to the north west. There is over 5m fall across the site with an average grade just under 1in150. There are a number of undulations on the site, including a ridge in the south eastern corner. There is an existing low point in the north of the site conveying flows from the AusNet site to Evans Road. Feature survey can be found in *Appendix A.*

Figure 1: Melways Image of Site and Surrounds

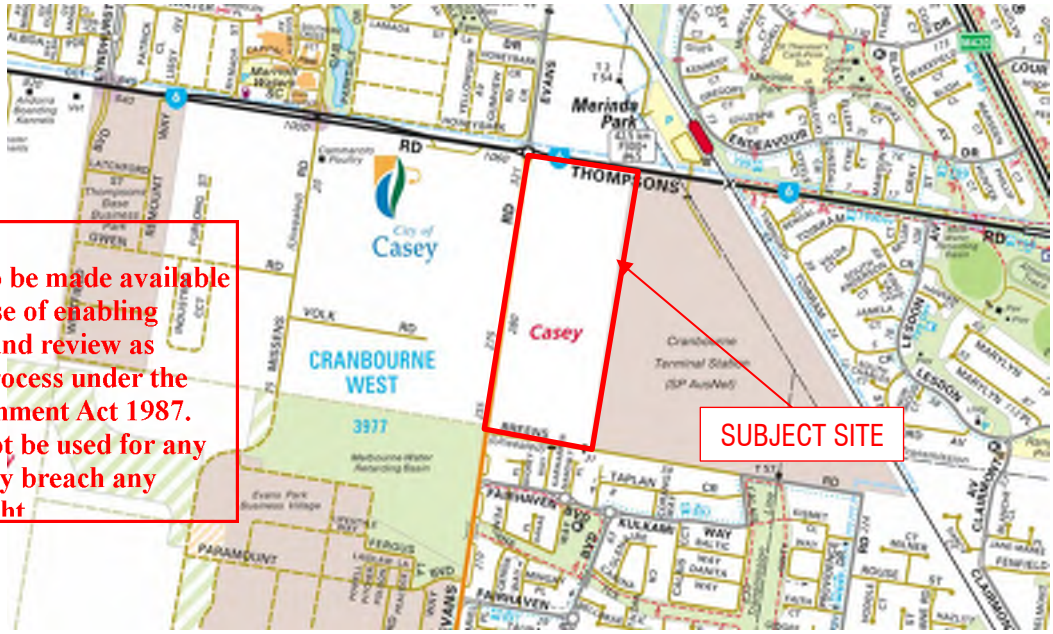


Figure 2: Aerial Image of Site and Surrounds

3.0 Proposed Development

The subject site is proposed to subdivide the site for industrial and commercial use. The ultimate development will combine a mixture of uses including, but not limited to warehousing and large-scale commercial/retail.

Stages 1-3 splits the site into 2 large superlots and includes the construction of trunk infrastructure to service the ultimate development of the site. Master plan can be found in *Appendix B*.

In the future these superlots will be further developed, either as an owner's corporation with shared access roads or by subdivision. To assist the assessment for stormwater requirements, the below figure shows a likely ultimate layout for the site in blue subject to further refinement of development on that land.

The report presumes a staged drainage strategy for the site to cater for development of land south of Rangebank Drive in advance of land north of Rangebank Drive.

Figure 3: Proposed Layout Plan

The subject site falls within Melbourne Waters Lyndhurst Drainage Scheme (DSS 0711). Please find extract of the scheme below, with full scheme included within *Appendix C*.

The site ultimately drains to the wetland on the north of Thompsons Road within the Marriot Waters Estate. Construction of this wetland is completed and the wetland is well established.

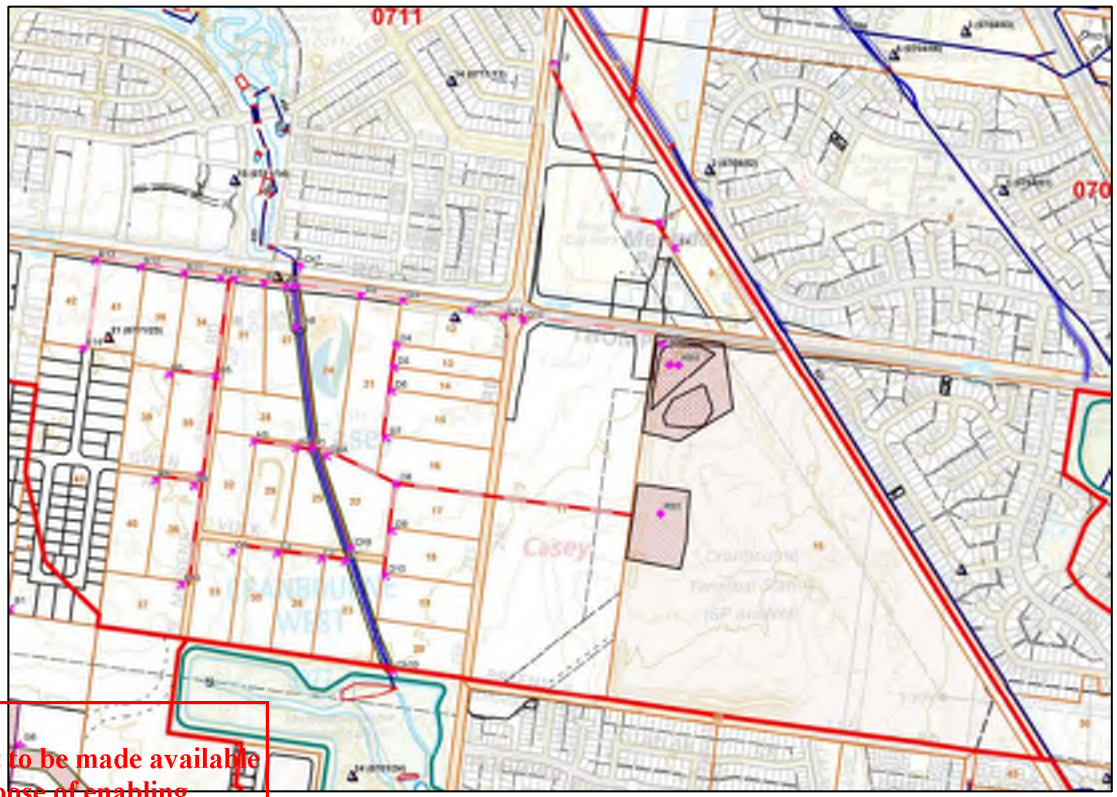
The Northern portion of the site will drain to scheme pipeline B1-D13. Construction of this pipeline was completed recently as part of the Thompsons Road Upgrade Project, including the construction of culverts beneath Thompsons Road linking the Pipeline and Cranbourne Outfall Drain to the wetland on the northern side. Construction plans for the pipeline are included in *Appendix D.*

The southern portion of the site will drain to scheme pipeline H1-RB5 which will in turn connect to the Cranbourne Outfall Drain. The Cranbourne Outfall Drain is currently very shallow and narrow and not suitable for the connection of additional flows. Timing for the development of these properties to the west of the subject site is unknown, but not anticipated in the near future. It has been determined it will not be feasible to acquire land to upgrade the Cranbourne Outfall Drain or install the proposed pipeline through these properties at this point in time.

There are no external catchments from the south of the subject site. Flows are being diverted around the site to the Evans Road Retarding Basin and Wetland located on the south west corner of the Breen's Road and Evans Road intersection. There are no external catchments to the west or north as this area grades away from the subject site.

External catchments will need to be allowed for the AusNet Terminal Station to the east of the site. The site is currently largely impervious, with small hard stand areas for electrical infrastructure only. Should the site be developed in the future, retarding basins have been allowed under the scheme to retard flows back to existing. As such, it can be assumed only existing flows will need to be allowed from this site.

Figure 4: Lyndhurst Drainage Scheme (DSS 0711)



As the drainage scheme will provide hydraulic capacity and treatment to best practise for the site, contributions will be payable accordingly. Calculation of applicable contributions have been calculated as per the below.

Contributions payable on the electrical easement are subject to final land use. For the purpose of this report its has been assumed as developed land, however, if this land is encumbered and unusable, contributions would not be payable on this area.

Figure 5: Melbourne Water Contribution Calculations

0711 Lyndhurst DS as at 18 Dec 2020

Standard residential rates:	$216,374 (hydraulic) $15,988 (water quality)
Area (in ha):	23.28
Development type: (Density ratios)	Industrial/commercial
Best practice expected / achieved %:	0

Notes

The calculator stipulates the level of best practice expected within a development. The level of treatment achieved (% of best practice) can be increased beyond the expected amount or decreased where mitigating circumstances prevent local treatment.

Calculate | Clear | Close | Print

Calculated at $20,784 (water quality) and $281,286 (hydraulic) (1.3 x residential rate) per hectare.

Hydraulic contribution:	$6,548,343
Water quality contribution reduction for on-site treatment:	$0
Water quality contribution payable:	$483,861
Final total contribution:	$7,032,204

4.0 Catchments and Hydrology

An analysis has been made to determine appropriate catchments for the site to inform hydrological calculations and assess both existing and design flows.

4.1. Existing Impervious

The critical factor in determining the existing runoff from a site is the imperviousness.

The impervious area of the subject site is negligible. As such a minimum of 20% will be adopted in line with EDCM standards for rational method calculations.

The impervious hardstands within the AusNet Terminal Station were measured as a total of 5.5ha. The total site is 48.46ha, giving an imperviousness of 11%. As such, the minimum 20% impervious will be adopted for rational method calculations as above.

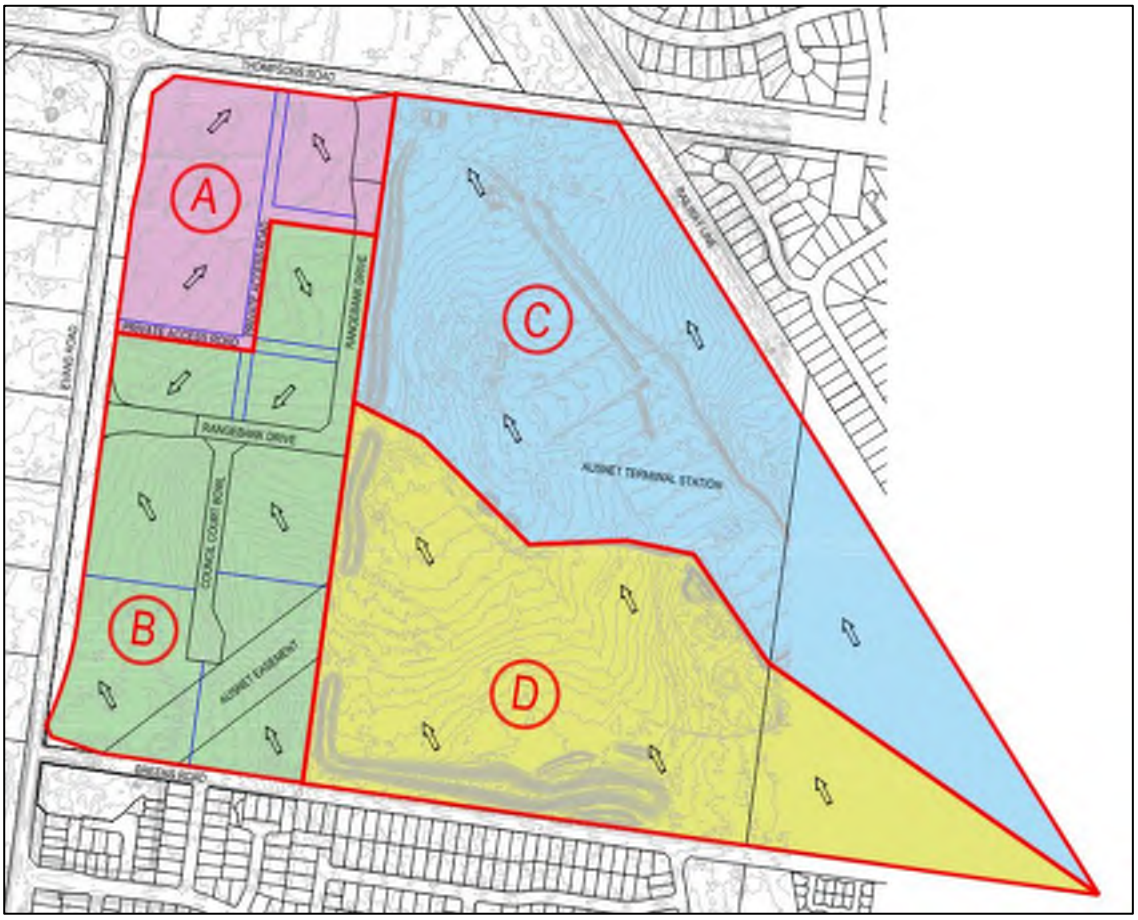
Figure 6: Existing Impervious Areas

4.2. Minor Storm Event

The minor drainage system will consist of a subsurface pipe network designed to capture and convey all stormwater runoff generated from the catchment for rainfall events up to and including the 10% AEP storm for industrial catchments. The system will be owned and maintained by council and designed in accordance with the Engineering Design and Construction Manual (EDCM).

There are 4 major catchments which have been identified relevant to the development of the subject site. The rational method has been utilised to calculate existing and design flows for these catchments. As the AusNet site will be retarded back to existing, the developed flows from this site are not applicable.

Figure 8: Catchment Plan



Minor (10% AEP) Storm - Existing Flow Calculations								
Catchment	Area (ha)	L (m)	Slope (%)	n	tc (mins)	C	I (mm/hr)	Q (m3/s)
A	6.75	300	0.5	0.035	29	0.272	46.3	0.24
B	15.85	500	0.5	0.035	34	0.272	41.8	0.50
C	26.28	1200	0.667	0.035	43	0.272	35.8	0.71
D	22.20	1000	0.667	0.035	41	0.272	37	0.62

Minor (10% AEP) Storm - Developed Flow Calculations								
Catchment	Area (ha)	L (m)	Slope (%)	n	tc (mins)	C	I (mm/hr)	Q (m3/s)
A	6.75	300	0.5	0.013	11	0.822	80.2	1.24
B	15.85	500	0.5	0.013	13	0.822	73.7	2.67
C	n/a							
D	n/a							

4.3. Major Drain Network

The major drainage system will utilise a combination of pipelines and the road network to safely convey gap flows between the 10% and 1% AEP storm overland in accordance with DELWP Guidelines for Development in Flood Affected Areas.

Catchments for the major storm even will be the same as those for the minor event above.

Major (1% AEP) Storm - Existing Flow Calculations								
Catchment	Area (ha)	L (m)	Slope (%)	n	tc (mins)	C	I (mm/hr)	Q (m3/s)
A	6.75	300	0.5	0.035	29	0.326	76	0.46
B	15.85	500	0.5	0.035	34	0.326	68.1	0.98
C	26.28	1200	0.667	0.035	43	0.326	57.6	1.37
D	22.20	1000	0.667	0.035	41	0.326	59.6	1.20

Major (1% AEP) Storm - Developed Flows Calculations								
Catchment	Area (ha)	L (m)	Slope (%)	n	tc (mins)	C	I (mm/hr)	Q (m3/s)
A	6.75	300	0.5	0.013	11	0.986	133	2.46
B	15.85	500	0.5	0.013	13	0.986	123	5.34
C	n/a							
D	n/a							

5.0 Proposed Drainage System

The drainage system for the development will be designed to safely convey stormwater runoff and provide protection from flooding in a 1% AEP storm event.

5.1. Pipelines

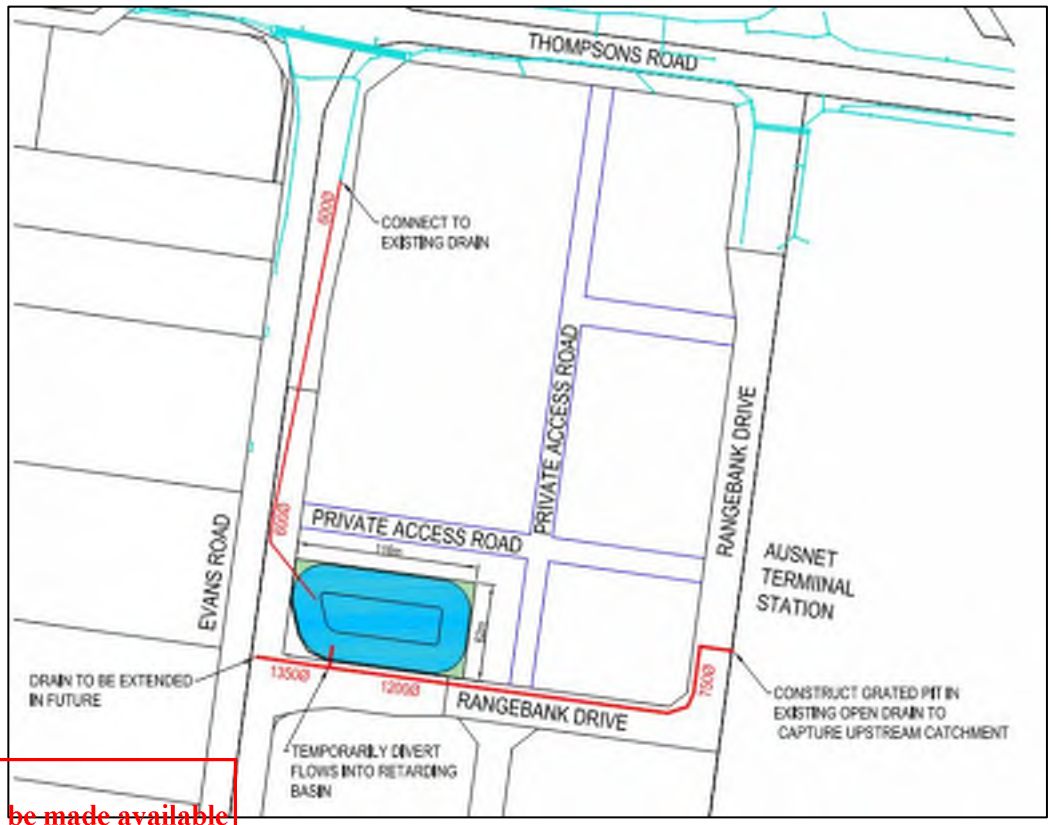
The northern catchment (A&C in the above) will drain to the existing Thompsons Road drainage system. The Melbourne Water Pipeline in Thompsons Road has sufficient capacity to cater for the major storm event (1% AEP). Construction plans for the pipeline have been provided within *Appendix D*. As hydraulic calculations for the pipeline are not available, the pipeline has been remodelled to confirm its hydraulic capacity. Please find calculations included in *Appendix E.*

The southern catchment (B&D in the above) will drain to the proposed Melbourne Water scheme pipe through the centre of the site. As it is not feasible to construct the proposed drainage outfall for this catchment, a temporary retarding basin will be required at the boundary of the site to limit flows to existing.

Functional Design for the proposed pipeline gives a size of 750-1350mm dia. and a length of 340m, please find functional design for the pipe included in *Appendix F*. A pit at the boundary of the property will be temporary blocked, diverting flows into the required temporary retarding basin. A temporary 600mm dia. outfall pipe will be constructed from the retarding basin and connect to the existing 600mm dia. drain in Evans Road.

Once the proposed scheme outfall to the west is completed, the retarding basin will be backfilled, the temporary outfall drains decommissioned and the plate in the diversion pit removed to allow the pipe to perform in its ultimate functionality.

Figure 8: Proposed Drainage System



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All works relating to the permanent DSS pipeline will be reimbursable under the drainage scheme. Sacrificial temporary works will be at the cost of the developer.

5.2. Stormwater Retention

Using Boyd's formula, a required storage volume has been calculated to retain flows in the 1% AEP storm back to a sufficient level which will allow discharge into the existing drainage. As the existing drainage cannot cater for the existing 1%AEP storm, we have had to over-size the proposed retarding basin to provide an outflow which can fit into the existing pipe.

A 0.7ha area has been allocated which will cater sufficiently for the below required storage. The size and shape of the proposed basin will be refined in subsequent design stages.

Storage Volume Calculation - 1% AEP Storm Event					
Area	38.050	Developed C	0.602	CA	22.906
Duration	I	I_p	Q_p	V_1	S_{max}
(mins)	(mm/hr)	(m^3/s)	(m^3/s)	(m^3)	(m^3)
210	17.700	1.126	0.307	14190.329	10322
215	17.400	1.107		14281.953	10322
220	17.100	1.088		14362.125	10310
225	16.900	1.075		14516.741	10372
230	16.600	1.056		14575.915	10339
235	16.300	1.037		14623.636	10295
240	16.100	1.024		14751.528	10331
245	15.900	1.012		14871.785	10359
250	15.700	0.999		14984.407	10379
255	15.400	0.980		14992.042	10295
260	15.200	0.967		15087.485	10298
265	15.000	0.954		15175.291	10294
270	14.800	0.942		15255.463	10282
				STORAGE REQUIRED	10380

5.3. Road Network

The northern catchment will utilise the Thompsons Road pipeline to convey storms up to and including the 1% AEP. As such, Thompsons Road will be protected and there will be no overland flow on the road in major storm events.

The southern catchment will utilise the Rangebank Drive Road reserve to convey gap flows between the 10% AEP capacity of the proposed pipeline and the 1% AEP major storm event.

6.0 Water Quality

It is required that stormwater quality measures are applied to this site in accordance with the Clause 44 of the State Environmental Protection Policy (SEPP).To meet minimum SEPP requirements, developments should meet the Best Practice Environmental Management Guidelines for Urban Stormwater, available from CSIRO Publishing. Best practice stipulates the following outcomes for both construction, and post-construction phases of the project:

Construction Phase

Pollutant type	Receiving water objective	Current best practice performance objective
Suspended solids	Comply with SEPP	Effective treatment of 90% of daily run-off events (e.g. <4 months ARI). Effective treatment equates to a 50 percentile suspended solids concentration of 50 mg/L. This can be achieved by installing a sediment ponds to remove 95% of sediment down to 125 µm for a 1 year ARI.
Litter	Comply with SEPP	Prevent litter from entering the stormwater system. This requirement extends until 95% of the lots are constructed or a period of two years has passed.
Other pollutants	Comply with SEPP	Limit the application, generation and migration of toxic substances to the maximum extent practicable.

Post-construction Phase

Pollutant type	Receiving water objective	Current best practice performance objective
Suspended solids (SS)	Comply with SEPP (not to exceed the 90th percentile of 80 mg/L) (1)	80% retention of the typical urban annual load
Total phosphorus (TP)	Comply with SEPP (base flow concentration not to exceed 0.08 mg/L) (2)	45% retention of the typical urban annual load
Total nitrogen (TN)	Comply with SEPP (base flow concentration not to exceed 0.9 mg/L) (2)	45% retention of the typical urban annual load
Litter	Comply with SEPP (No litter in waterways) (1)	70% reduction of typical urban annual load (3)
Flows	Maintain flows at pre-urbanisation levels	Maintain discharges for the 1.5 year ARI at pre-development levels

Treatment of stormwater runoff from the development will be treated to best practise standards by the treatment infrastructure constructed downstream under the Lyndhurst DSS (0711). No further treatment will be required on site. All treatment assets are existing so no interim measures will be required.

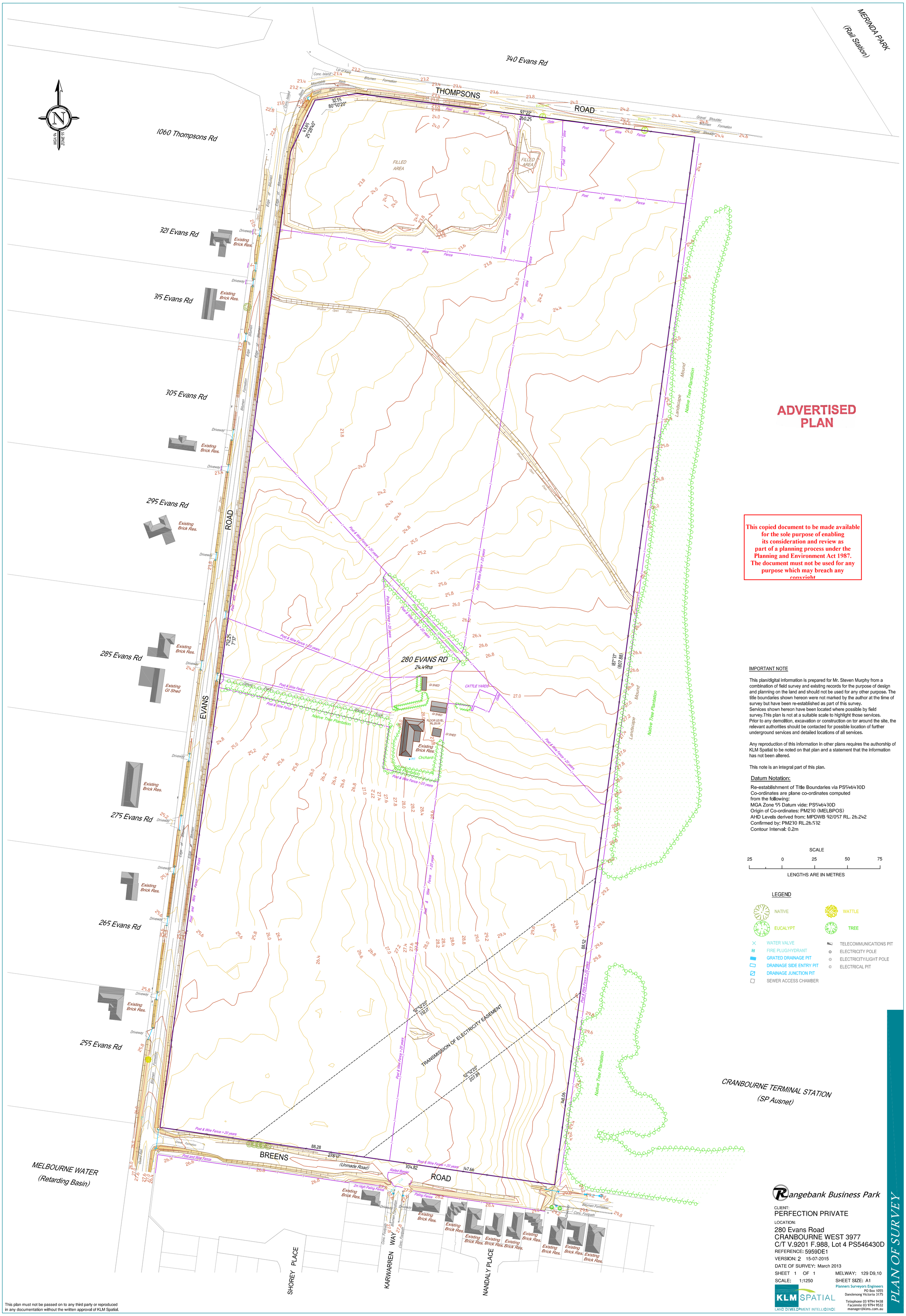
7.0 Conclusion

This report makes the following general conclusions:

- The proposed drainage strategy for the site will safely convey stormwater runoff and provide protection from flooding in a 1% AEP storm event.
- The existing Melbourne Water scheme pipeline within Thompsons Road has sufficient capacity to cater for the development of the northern catchment of the subject site in storms up to and including the 1% AEP.
- Proposed Melbourne Water scheme pipeline through the centre of the subject site will be constructed as part of this development. As it is not feasible to construct the scheme outfall for this catchment, a temporary retention basin has been proposed to retard flows back to a suitable level for storms up to the 1% AEP.
- Sufficient treatment is provided downstream of the subject site by the existing Marriot Waters Wetland under the Melbourne Water Drainage Scheme to treat flows from the development to best practise.

Appendix A

Feature Survey



ADVERTISED PLAN

IMPORTANT NOTE

This plan/digital information is prepared for Mr. Steven Murphy from a combination of field survey and existing records for the purpose of design and planning on the land and should not be used for any other purpose. The title boundaries shown hereon were not marked by the author at the time of survey but have been re-established as part of this survey.
Services shown hereon have been located where possible by field survey.This plan is not at a suitable scale to highlight those services.
Prior to any demolition, excavation or construction on tor around the site, the relevant authorities should be contacted for possible location of further underground services and detailed locations of all services.

Any reproduction of this information in other plans requires the authorship of KLM Spatial to be noted on that plan and a statement that the information has not been altered.

This note is an integral part of this plan.

Datum Notation:

Re-establishment of Title Boundaries via PS546430D
Co-ordinates are plane co-ordinates computed
from the following:
MGA Zone 55 Datum vide: PS546430D
Origin of Co-ordinates: PM230 (MELBPOS)
AHD Levels derived from: MPDWB 92/057 RL. 26.242
Confirmed by: PM230 RL.26.532
Contour Interval: 0.2m

SCALE
25 0 25 50 75
LENGTHS ARE IN METRES

LEGEND

NATIVE
WATTLE
EUCALYPT
TREE
WATER VALVE
FIRE PLUG/HYDRANT
GRATED DRAINAGE PIT
DRAINAGE SIDE ENTRY PIT
DRAINAGE JUNCTION PIT
SEWER ACCESS CHAMBER
TELECOMMUNICATIONS PIT
ELECTRICITY POLE
ELECTRICITY/LIGHT POLE
ELECTRICAL PIT

Rangebank Business Park

CLIENT:
PERFECTION PRIVATE
LOCATION:
280 Evans Road
CRANBOURNE WEST 3977
C/T V.9201 F.988, Lot 4 PS546430D
REFERENCE: 5959DE1
VERSION: 2 15-07-2015
DATE OF SURVEY: March 2013
SHEET 1 OF 1 MELWAY: 129 D9,10
SCALE: 1:1250 SHEET SIZE: A1

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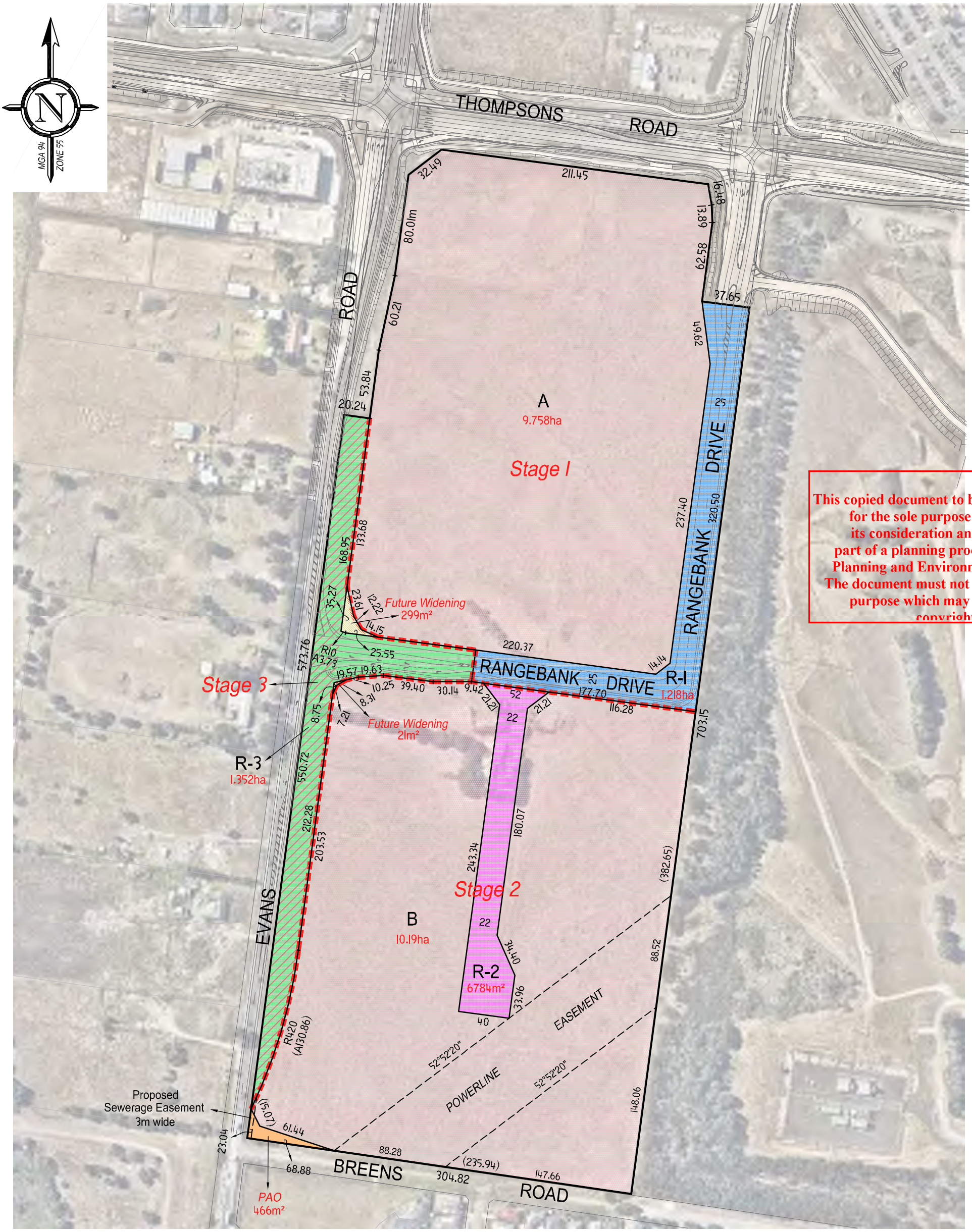
PO Box 1055
Dandenong Victoria 3175
Telephone 03 9794 9438
Facsimile 03 9794 9532
manager@klms.com.au

PLAN OF SURVEY

Appendix B

Development Masterplan



NOTE

Road linework indicative only and subject to engineering approval

IMPORTANT NOTE

Title has been re-established but not marked at time of survey, see title for full easement details.

The dimensions, areas and total number of lots shown hereon are subject to field survey and also to the requirements of Council and any other authority which may have requirements under any relevant legislation that could cause a change to this plan.

KLM Spatial can therefore accept no responsibility for reliance on this plan for any financial dealings involving the land.

This note is an integral part of this plan.

LEGEND

- PROPOSED LOTS
- ROAD RESERVE R-1
- ROAD RESERVE R-2
- ROAD RESERVE R-3
- PUBLIC ACQUISITION OVERLAY (PAO)
- INDICATIVE ULTIMATE INTERSECTION FLARING
- PUBLIC ACQUISITION OVERLAY TO BE ACQUIRED (1.028ha)

SCALE

60 0 60 120 180

LENGTHS ARE IN METRES

Photomaps courtesy of Nearmap.
Photomap Flown: 22-02-2019

ADVERTISED PLAN

Client:
2 Bond Street Nominees Pty Ltd

Title Details:
Vol. 12141 Fol. 517
Lot 1 on PS823198L

Reference:	5959.07 PP10
Plan Date:	30-09-2020
Version:	2
Scale:	1:3000
Sheet	1 of 1
Sheet Size:	A3

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280 Evans Road, CRANBOURNE WEST 3977

Proposed Subdivision

Appendix C

Melbourne Water Drainage Scheme – Lyndhurst DSS (0711)

ADVERTISED
PLAN

Melbourne Water

0711 - Lyndhurst DSS Infrastructure 1/1

N

Melway Ref: 129 C7

Author: Iain Scott

Scale @ A1 1:6000

DSCM Legend

- DSS Boundary
- DS Strategy Boundary
- DSCM Property
- Stage (Allocated)
- Stage (Works in Progress)
- Stage (Finalised)
- Nodes
- Bio-Retention Swale
- Channel
- Cleanout works
- Culvert
- Grassed Swale
- Low flow pipe with Channel
- Overland flow path
- Pipeline
- Soft Engineering
- Bio-Retention Basin
- Buffer Strip
- Inlet/Outlet Structure
- Junction Pit
- Litter trap
- Retarding Basin
- Sediment trap
- Wetland

As Constructed Legend

- Channel
- Natural Waterway
- Sewer Main
- Underground Drain
- Water Main
- Flood Extents
- Lake
- Retarding Basin
- Sediment Trap
- Wetland

Plan Date: August 2017

Melbourne Water is providing our indicative assets information and is not to be used as the basis of future design and expects that the appointed engineering consultant will perform their own calculations as part of requirements for their development.
Please note that as schemes develop and Melbourne Water receives additional information, the conceptual/indicative advice you have been provided as part of the feasibility request may become co-dated. Under the QA process it is the responsibility of the consultant to ensure that Melbourne Water's feasibility advice is current and to certify that all information ultimately provided to Melbourne Water for acceptance is correct having completed their own detailed catchment analysis.

0705

0711

0704

LYNBROOK 3975

LYNDHURST

CRANBOURNE WEST

GLASSCOCKS

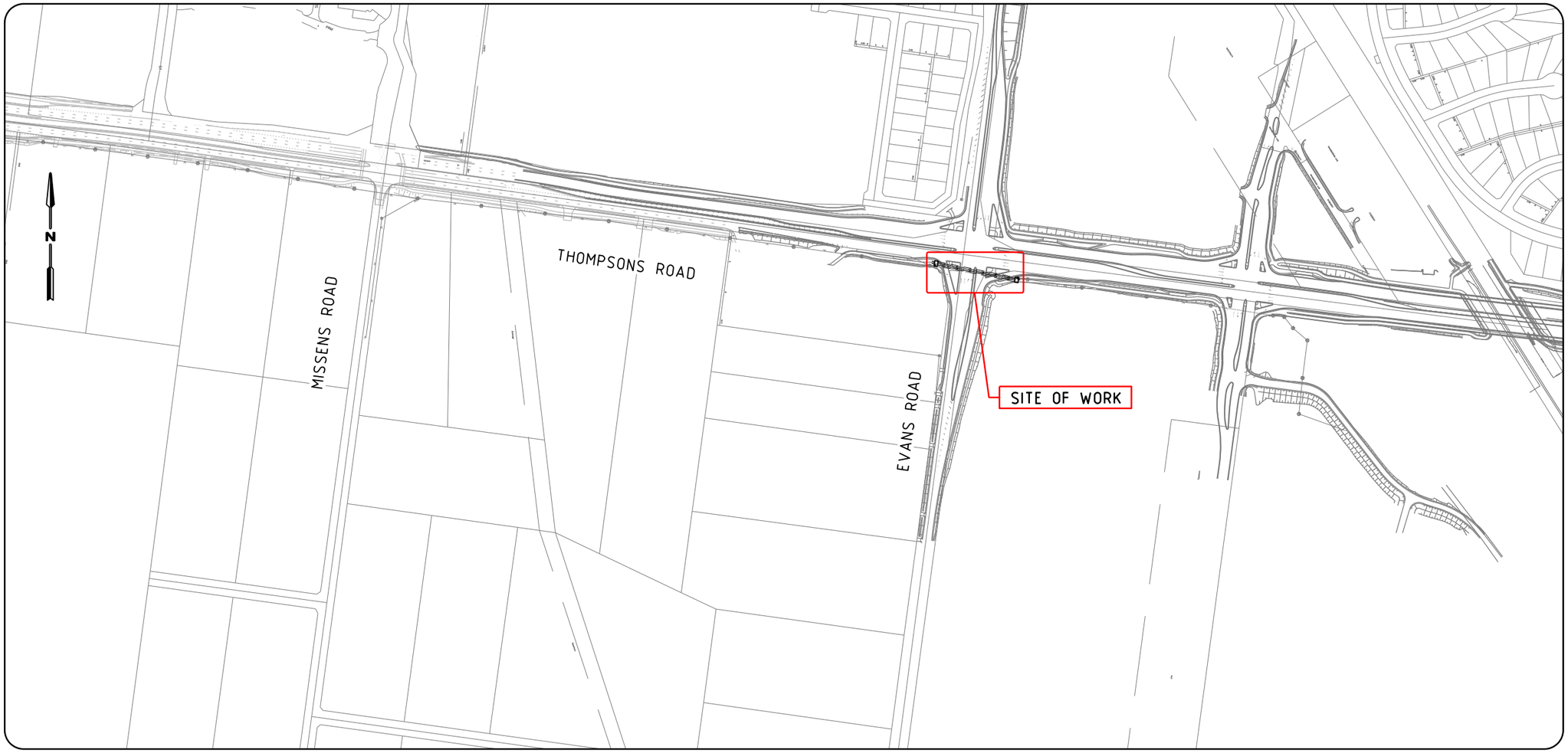
Casey

Appendix D

Thompsons Road Upgrade Drainage Plans

THOMPSONS ROAD DUPLICATION PROJECT - STAGE ONE

EVANS ROAD DRAINAGE PITS



LOCALITY PLAN
1 : 5000

ADVERTISED PLAN

Issue	Description	Date	Approved
A	ISSUED FOR CONSTRUCTION	03/10/2018	E.H

50mm on Original

Client: vicroads; BMD constructions

Status: CONSTRUCTION
FOR CONSTRUCTION

Scales	1:5000	Drawn	R. ABLING
Original Size	A3	Designed	A. ULEP
Height Datum	AHD	Checked	S. OWEN
Grid	MGA	Approved	E. HERATH

Filename: B401-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: EVANS ROAD DRAINAGE PITS

COVER SHEET AND LOCALITY PLAN

ARCADIS

Drawing No.	Project No.	Issue
B401	AA009732	A

V1

K:\MP001389-Thompsons_Road_Upgrade-THWE-CAD\F-Bridges\D-Field\DGN\EVANS ROAD DRAINAGE PITS\B401-AA009732-VCD-00.dgn
03/10/2018 1:18:23 PM

DRAWING No.	DESCRIPTION
B401	COVER SHEET AND LOCALITY PLAN
B402	DRAWING LIST
B405	GENERAL NOTES SHEET 1
B406	GENERAL NOTES SHEET 2
B411	GENERAL ARRANGEMENT - PLAN AND ELEVATION
B421	CONCRETE DETAILS - MW-08
B422	CONCRETE DETAILS - MW-09
B431	REINFORCEMENT DETAILS - MW-08
B432	REINFORCEMENT DETAILS - MW-09

Issue	Description	Date	Approved
A	ISSUED FOR CONSTRUCTION	03/10/2018	E.H

vicroads

Client: BMD constructions

Status: CONSTRUCTION FOR CONSTRUCTION

Scales	NTS	Drawn	R. ABLING
Original Size	A3	Designed	A. ULEP
Height Datum	AHD	Checked	S. OWEN
Grid	MGA	Approved	E. HERATH

Filename: B402-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: EVANS ROAD DRAINAGE PITS

DRAWING LIST

ARCADIS

Drawing No.	Project No.	Issue
B402	AA009732	A

V1

50mm on Original

03/10/2018 1:17:05 PM K:\MP001389-Thompsons_Road_Upgrade-THWE-CA\DF-Bridges\D-Final\DGN\EVANS ROAD DRAINAGE PITS\B402-AA009732-VCD-00.dgn

GENERAL

G1 THE DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE PROJECT REQUIREMENTS AND ALL ROADS, DRAINAGE, ARCHITECTURAL LANDSCAPING AND OTHER CONSULTANTS DRAWINGS AND SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE WORK. ANY DISCREPANCY SHALL BE REFERRED TO THE SUPERINTENDENT BEFORE PROCEEDING WITH THE WORK. THE SUPERINTENDENT'S ROLE IN RELATION TO THE FOLLOWING ACTIVITIES IS DEFINED AS FOLLOWS:

CONSTRUCTION QUERIES - CONTRACTOR
DESIGN QUERIES - DESIGNER
ROAD AUTHORITY QUERIES - VICROADS

G2. UNLESS NOTED OTHERWISE:
ALL DIMENSIONS ARE IN MILLIMETRES.
ALL REDUCED LEVELS ARE IN METRES.
ALL SET OUT CO-ORDINATES ARE TO MAP GRID AUSTRALIA (MGA).
ALL LEVELS ARE TO AUSTRALIAN HEIGHT DATUM (AHD).
ALL CHAINAGES REFER TO THE ROAD DESIGN LINE AND ARE NOTED IN METRES.

G3. ALL DIMENSIONS RELEVANT TO SETTING OUT AND OFF-SITE WORK SHALL BE CONFIRMED AND VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION AND FABRICATION IS COMMENCED. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE SUPERINTENDENT. THE DRAWINGS SHALL NOT BE SCALED.

G4. DUE ATTENTION AND CARE SHALL BE MAINTAINED BY THE CONTRACTOR REGARDING THE CARRYING OUT OF CONSTRUCTION ACTIVITIES IN AREAS CONTAINING EXISTING SERVICES.

G5. THE LOCATIONS OF ALL EXISTING UNDERGROUND SERVICES IDENTIFIED ON THE DRAWINGS ARE INDICATIVE ONLY. ALL EXISTING SERVICES LOCATIONS SHALL BE VERIFIED ON SITE BY THE CONTRACTOR BEFORE COMMENCING WORK. THE CONTRACTOR SHALL SATISFY HIMSELF THAT THE LOCATION OF ALL SERVICES THAT MAY BE AFFECTED BY THE WORKS HAS BEEN CORRECTLY IDENTIFIED.

G6. PRIOR TO ANY EXCAVATION, PILING OR CONSTRUCTION ON THE SITE, THE CONTRACTOR SHALL CHECK WITH ALL RELEVANT AUTHORITIES AND OBTAIN ALL NECESSARY PERMITS AND BY SITE EXPLORATION TO DETERMINE THE LOCATION OF ANY EXISTING SERVICES WHICH MAY AFFECT THE WORKS. IF SERVICES ARE FOUND TO EXIST, THEN THE CONTRACTOR SHALL NOTIFY THE NOMINATED AUTHORITY ON THE WORKS AND OBTAIN INSTRUCTIONS PRIOR TO PROCEEDING.

G7. CONSTRUCTION WORKS SHALL NOT COMMENCE UNTIL APPROVED BY THE SUPERINTENDENT.

G8. THE STRUCTURAL DRAWINGS DO NOT SHOW ALL DETAILS OF FIXTURES, INSERTS, SLEEVES, OPENINGS, ETC. REQUIRED BY THE VARIOUS TRADES. ALL SUCH DETAILS, INCLUDING RECESSES AND CHASES, MUST BE APPROVED BY THE SUPERINTENDENT BEFORE PROCEEDING WITH CONSTRUCTION.

G9. THE CONTRACTOR RETAINS RESPONSIBILITY OF THE WORKS EVEN IF THE SUPERINTENDENT HAS INSPECTED THE WORKS DURING CONSTRUCTION.

G10. DURING CONSTRUCTION THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE STRUCTURE IN A STABLE CONDITION AND ENSURING NO PART IS OVER STRESSED UNDER CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL INSTALL TEMPORARY BRACING, FALSEWORK AND FORMWORK AS INDICATED IN THESE DRAWINGS AND ALL RELEVANT TEMPORARY WORKS AS REQUIRED.

G11. THE CONTRACTOR SHALL PROVIDE FOR THE METHOD OF CONSTRUCTION AND THE MAINTENANCE OF SAFETY DURING CONSTRUCTION. IF ANY STRUCTURAL ELEMENT PRESENTS DIFFICULTY IN CONSTRUCTABILITY OR SAFETY, THE MATTER SHALL BE REFERRED TO THE SUPERINTENDENT FOR RESOLUTION BEFORE PROCEEDING WITH THE WORK.

G12. IF THE CONTRACTOR INTENDS TO VARY THE SCOPE OR METHOD OF WORKS OR MATERIALS USED THE CONTRACTOR SHALL SUBMIT FULL DETAILS OF THE PROPOSAL TO THE SUPERINTENDENT FOR DESIGN REVIEW.

G13. ALL PROPRIETARY PRODUCTS SHALL BE INSTALLED STRICTLY IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS AND RECOMMENDATIONS. NOMINATION OF PROPRIETARY ITEMS DOES NOT INDICATE EXCLUSIVE PREFERENCE BUT INDICATES THE REQUIRED PROPERTIES OF THE ITEM. SIMILAR ALTERNATIVE PRODUCTS HAVING EQUIVALENT FUNCTIONS OR PERFORMANCE MAY BE OFFERED FOR APPROVAL.

G14. THE APPROVAL OF A SUBSTITUTION SHALL BE SOUGHT FROM THE SUPERINTENDENT.

DESIGN SPECIFICATION

DS1. VICROADS, CONTRACT No. 9262 PROJECT SPECIFIC SPECIFICATION
DS2. DESIGN STANDARD: AS5100-2004 BRIDGE DESIGN
DS3. DESIGN LOADING: 80kN
DS4. DESIGN LIFE: 100 YEARS

CONCRETE

C1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS5100-2004 AND VICROADS SPECIFICATION FOR BRIDGE WORKS EXCEPT WHERE VARIED BY THE PROJECT REQUIREMENTS.

C2. IF ABBREVIATIONS OTHER THAN THOSE IN ACCORDANCE WITH AS1100.501 ARE USED AND THEIR MEANING IS NOT EXPLICITLY SHOWN ON DRAWINGS, REFER TO SUPERINTENDENT FOR CLARIFICATION PRIOR TO PROCEEDING.

C3. CONCRETE SHALL BE FROM AN APPROVED SOURCE AND SHALL COMPLY WITH THE REQUIREMENTS OF THE FOLLOWING STANDARDS, UNLESS VARIED BY THE PROJECT REQUIREMENTS:

AS5100.5	BRIDGE DESIGN PART 5 CONCRETE
AS3972	PORTLAND CEMENT
AS1379	READY-MIXED CONCRETE
AS2758.1	CONCRETE AGGREGATES

C4. CONCRETE SHALL BE SPECIAL CLASS PERFORMANCE CONCRETE AS SPECIFIED IN VICROADS SPECIFICATION 610. CONCRETE GRADE AND MINIMUM COVER TO REINFORCEMENT SHALL BE AS NOTED BELOW UNLESS NOTED OTHERWISE ON THE DRAWINGS OR VARIED BY THE PROJECT REQUIREMENTS.

ELEMENT	CONCRETE GRADE	EXPOSURE CLASSIFICATION	CHARACTERISTIC COMPRESSIVE STRENGTH AT 28 DAYS (MPa)	MIN.COVER (mm) EXPOSURE CONDITION			
				CAST AGAINST FORMS	CAST AGAINST BLINDING	CAST AGAINST GROUND	PRECAST
ROOF SLAB	VR 400/40	B1	40	40	50	70	N/A
WALLS	VR 400/40	B1	40	40	50	70	N/A
BASE SLAB	VR 400/40	B1	40	40	50	70	N/A
BLINDING CONCRETE	15MPa	-	-	N/A	N/A	N/A	N/A

1 DENOTES RIGID FORMWORK AND INTENSE COMPACTION REQUIRED

NOTES:

A. COVER IS THE CLEAR DISTANCE BETWEEN ANY REINFORCING INCLUDING FITMENTS AND THE FACE OF THE STRUCTURAL ELEMENT.

B. FOR ALL EXTERNAL SURFACES, PROVIDE APPROVED BAR CHAIRS. TIE WIRE SHALL NOT BE NAILED TO THE FORMS. REINFORCING BARS SHALL NOT BE USED TO KEEP FORMS APART AND A THROUGH TIE STEEL SYSTEM SHALL BE USED TO TIE THE FORMS.

C. THE COVERS SHALL BE MAINTAINED USING APPROVED BAR CHAIRS AT MAX 800mm CENTRES U.N.O. IN SLABS BAR CHAIRS SHALL BE AT 800 x 800mm MAXIMUM CENTRES. BAR CHAIRS SHALL BE PROVIDED ALONG THE EDGES OF ALL CONSTRUCTION JOINTS.

D. EXTERNAL ELEMENTS ARE THOSE EXPOSED TO WEATHER, RAIN AND WATER PENETRATION AND ARE CLASSIFIED B1 UNLESS VARIED BY THE PROJECT REQUIREMENTS.

E. WHERE MINIMUM COVER IS SPECIFIED AS 25mm THE MAXIMUM SIZE OF AGGREGATE IN THE CONCRETE SHALL BE NOT MORE THAN 14mm.

C5. UNLESS VARIED BY THE PROJECT REQUIREMENTS ALL CEMENT SHALL BE "GP" GENERAL PURPOSE OR "GB" GENERAL PURPOSE BLENDED CEMENT OR "SR" SULPHATE RESISTANT CEMENT, AS REQUIRED AND SHALL COMPLY WITH AS3972.

C6. NO PENETRATIONS, RECESSES OR CHASES OTHER THAN THOSE SHOWN ON THE DRAWINGS SHALL BE MADE IN THE CONCRETE MEMBERS WITHOUT APPROVAL OF THE SUPERINTENDENT.

C7. CONCRETE SHALL BE COMPACTED TO ENSURE A DENSE HOMOGENEOUS PRODUCT. ALSO NOTE THAT THE INITIAL DISCHARGE FROM THE CONCRETE PUMP SHALL NOT BE USED UNTIL A CONSISTENT WORKABLE APPROVED MIX, IN ACCORDANCE WITH THE PROJECT REQUIREMENTS, IS DISCHARGED.

C8. THE FINISHED CONCRETE SHALL BE A DENSE HOMOGENEOUS MASS, COMPLETELY FILLING THE FORMWORK THOROUGHLY EMBEDDING THE REINFORCEMENT AND FREE OF AIR POCKETS. ALL CONCRETE INCLUDING SLABS ON GROUND AND FOOTINGS SHALL BE COMPACTED WITH MECHANICAL VIBRATORS.

C9. NO EMBEDMENT OF PIPES AND CONDUITS OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE MADE IN CONCRETE MEMBERS WITHOUT PRIOR APPROVAL OF THE SUPERINTENDENT.

C10. CONSTRUCTION JOINTS SHALL BE LOCATED AND DETAILED AS SHOWN ON THE DRAWINGS OR SHALL BE LOCATED AND FORMED TO THE APPROVAL OF THE SUPERINTENDENT AND IN ACCORDANCE WITH THE PROJECT REQUIREMENTS. CONCRETE AGAINST WHICH NEW CONCRETE IS TO BE PLACED SHALL BE INTENTIONALLY ROUGHENED IN ACCORDANCE WITH THE STANDARD SPECIFICATION TO EXPOSE THE COURSE AGGREGATE TO ENSURE A SATISFACTORY BOND BETWEEN ADJACENT CONCRETE SURFACES U.N.O. ALL CONCRETE SURFACES SHALL BE CLEAN AND FREE OF LAITANCE. THOROUGHLY MOISTEN THE ROUGHENED SURFACE IMMEDIATELY PRIOR TO PLACING CONCRETE. NO CONSTRUCTION JOINT SHOWN ON DRAWINGS SHALL BE OMITTED WITHOUT THE WRITTEN APPROVAL OF THE SUPERINTENDENT.

C11. CURING OF CONCRETE SHALL COMMENCE IMMEDIATELY AFTER FINISHING OPERATIONS HAVE BEEN COMPLETED. THE CONCRETE SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATION.

C12. ALL CONCRETE SURFACE FINISHES ARE TO BE IN ACCORDANCE WITH THE STANDARD SPECIFICATION.

C13. CONCRETE SIZES DO NOT INCLUDE THICKNESS OF APPLIED FINISHES.

C14. UNLESS SPECIFICALLY NOTED OTHERWISE ON THE DRAWING OR VARIED BY THE PROJECT REQUIREMENTS ALL CONCRETE EDGES HAVING A CONTAINED ANGLE LESS THAN 120°SHALL BE PROVIDED WITH 20mm FILLETS OR CHAMFERS AS APPROPRIATE. MAINTAIN COVER TO REINFORCEMENT AT THESE DETAILS.

C15. BEFORE PLACING CONCRETE, REMOVE ALL WATER, DUST AND DEBRIS FROM THE FORMWORK.

C16. FILL ALL HOLES LEFT BY FORM TIE BOLTS WITH MORTAR MATCHING THE SURFACE COLOUR OF THE FINISHED SURFACE.

C17. ANTI-GRAFFITI COATINGS TO BE IN ACCORDANCE WITH THE PROJECT REQUIREMENTS AND STANDARD SPECIFICATION.

FORMWORK

FM1. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN, PROOF ENGINEER CERTIFICATION, CONSTRUCTION, INSPECTION AND PERFORMANCE OF THE FORMWORK AND FALSEWORK, EXCEPT TO THE EXTENT THAT FORMWORK DESIGN IS SHOWN ON THE STRUCTURAL DRAWINGS.

FM2. DESIGN AND CONSTRUCTION AND STRIPPING TIMES SHALL COMPLY WITH THE PROJECT SPECIFICATION AND AS5100 UNLESS OTHERWISE APPROVED BY THE SUPERINTENDENT.

FM3. DURING CONSTRUCTION, SUPPORT PROPPING IS REQUIRED WHERE LOADS FROM STACKED MATERIALS, FORMWORK AND OTHER SUPPORTED SLABS INDUCE LOADS IN A SLAB OR BEAM WHICH EXCEED THE DESIGN LOAD FOR STRENGTH OR SERVICEABILITY AT THAT AGE OR WHERE THE STRUCTURE IS INCOMPLETE. ONCE THE NOMINATED 28 DAY STRENGTH HAS BEEN ATTAINED, THESE LOAD SHALL NOT EXCEED THE DESIGN LOADS SET OUT UNDER THE DESIGN SPECIFICATION.

FM4. THE FORMWORK SHALL NOT BE DESIGNED TO RELY ON RESTRAINT OR SUPPORT FROM THE PERMANENT STRUCTURE WITHOUT PRIOR APPROVAL FROM THE SUPERINTENDENT.

FM5. ALL FORMED EXPOSED EDGES AND RE-ENTRANT CORNERS SHALL BE CHAMFERED OR FILLETED 20 x 20mm UNLESS NOTED OTHERWISE ON THE STRUCTURAL DRAWINGS OR VARIED BY THE PROJECT REQUIREMENTS.

FM6. DIMENSIONAL TOLERANCES SHALL COMPLY WITH THE STANDARD SPECIFICATIONS.

ADVERTISED PLAN

Issue	Description	Date	Approved
A	ISSUED FOR CONSTRUCTION	03/10/2018	E.H

vicroads

Client: BMD constructions

Status: CONSTRUCTION FOR CONSTRUCTION

Scales	NTS	Drawn	R. ABLING
Original Size	A3	Designed	A. ULEP
Height Datum	AHD	Checked	S. OWEN
Grid	MGA	Approved	E. HERATH

Filename: B405-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: EVANS ROAD DRAINAGE PITS
GENERAL NOTES SHEET 1

ARCADIS

Drawing No.	Project No.	Issue
B405	AA009732	A

V1

50mm on Original

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REINFORCEMENT

R1. REINFORCEMENT SHOWN ON THE DRAWINGS IS REPRESENTED DIAGRAMMATICALLY AND NOT NECESSARILY SHOWN IN TRUE PROJECTION. FOR CLARITY, BAR LOCATIONS MAY BE EXAGGERATED.

R2. SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN THE POSITION SHOWN ON THE DRAWINGS OR AS OTHERWISE APPROVED BY THE ENGINEER AND THE PRINCIPAL. UNLESS ALTERNATIVE OR EXTRA LOCATIONS ARE APPROVED IN WRITING BY THE ENGINEER AND THE PRINCIPAL. WHERE THE LAP LENGTH IS NOT SHOWN IT SHALL BE SUFFICIENT TO DEVELOP THE FULL STRENGTH OF THE REINFORCEMENT. BAR LAPS IN MILLIMETRES ARE TO BE AS SHOWN BELOW UNLESS SHOWN OTHERWISE:

BAR DIAMETER	BAR LAPS
N12	350
N16	500
N20	750
N24	1000
N28	1200
N32	1500
N36	1800
N40	MECHANICAL SPLICE ONLY
FABRIC	2 TRANSVERSE BARS +25mm

NOTES:

A. THE MINIMUM LAP LENGTH SHOWN SHALL BE INCREASED BY 30% FOR HORIZONTAL BARS WITH 300mm OR MORE CONCRETE CAST BELOW THE BAR.

B. NOT MORE THAN 50% OF THE BARS SHALL BE LAPPED AT ANY LOCATION.

C. WHERE STAGGERED BAR SPLICES ARE NOT POSSIBLE THE MINIMUM LAP LENGTH SHALL NOT BE LESS THAN 1.3 TIMES THE STANDARD LAP LENGTH.

D. THE LAP LENGTH OF BUNDLED BARS SHALL BE INCREASED FROM THE VALUES SHOWN BELOW:

- 3 BAR BUNDLE - 20%
- 4 BAR BUNDLE - 33%

E. INDIVIDUAL BARS WITHIN A BUNDLE SHALL BE TERMINATED AT DIFFERENT POINTS STAGGERED BY AT LEAST 40 TIMES THE DIAMETER OF THE LARGER BAR.

F. REINFORCEMENT DEVELOPMENT LENGTHS SHALL EQUAL LAP LENGTHS.

G. REINFORCEMENT SYMBOLS:
- N GRADE 500 DEFORMED REINFORCING BARS, DUCTILITY CLASS N TO AS4671.
- R GRADE 250 PLAIN REINFORCING BARS TO AS4671.
- W HARD DRAWN STEEL REINFORCING WIRE, GRADE 500 DUCTILITY CLASS L TO AS4671.
- TM HARD DRAWN STEEL TRENCH MESH, GRADE 500 DUCTILITY CLASS L TO AS4671.
- RL RECTANGULAR RIB MESH, GRADE 500 DUCTILITY CLASS L TO AS4671.
- SL SQUARE RIB MESH, GRADE 500 DUCTILITY CLASS L TO AS4671.

R3. REINFORCEMENT NOTATION AS FOLLOWS: 9N16-150 T
- THE NUMBER PRECEDING THE BAR SYMBOL (9) IS BAR QUANTITY
- THE NUMBER FOLLOWING THE BAR SYMBOL IS THE NOMINAL BAR DIAMETER IN MILLIMETRES.
- THE NUMBER FOLLOWING THE 'DASH' (150) IS THE SPACING IN MILLIMETRES.
- THE LETTER FOLLOWING THE SPACING (T) IS THE LOCATION OF THE BAR IN THE ELEMENT AS FOLLOWS:
  - T - TOP
  - B - BOTTOM
  - CP - CENTRALLLY PLACED
  - NF - NEAR FACE
  - FF - FAR FACE
  - EF - EACH FACE
  - EW - EACH WAY
  - LV - LENGTH VARIES
  - ABR - ALTERNATE BAR REVERSED
  - ALT - ALTERNATING BARS

R4. REINFORCEMENT SPACING NOT SHOWN SHALL BE TAKEN AS EQUAL.

R5. REINFORCING BARS SHOWN MAY REPRESENT MORE THAN ONE LENGTH AND/OR PROFILE.

R6. BARS MAY NOT BE SHOWN IN TRUE POSITION FOR CLARITY.

R7. ALL HOOKS, BENDS AND COGS ARE STANDARD AND SHALL BE IN ACCORDANCE WITH AS5100.5 BRIDGE DESIGN 2004 UNLESS NOTED OTHERWISE.

R8. WELDING OF REINFORCEMENT IS NOT PERMITTED UNLESS SHOWN ON THE DRAWINGS OR APPROVED BY THE SUPERINTENDENT. WELDING SHALL BE IN ACCORDANCE WITH AS1554.3.

R9. ALL REINFORCEMENT SHALL BE SECURELY TIED WITH WIRE TIES AND ALL TIE ENDS SHALL BE TURNED INTO THE MEMBER CLEAR OF THE COVER ZONE. MESH SHALL BE SUPPORTED ON CONCRETE CHAIRS AT 800mm MAXIMUM CENTRES.

R10. MINIMUM LAPS IN MESH SHALL BE THE LARGER SPACING OF TRANSVERSE WIRES UNLESS SHOWN OTHERWISE.

R11. ALL RE-ENTRANT CORNERS OF PENETRATIONS THROUGH WALLS AND SLABS SHALL BE TRIMMED USING MINIMUM 2 No. N16 DIAGONAL CORNER BARS 1500mm LONG EACH FACE.

R12. REINFORCEMENT SHALL NOT BE CUT OR BENT ON SITE UNLESS APPROVED BY THE SUPERINTENDENT.

R13. AT SLAB EDGES INCLUDING CONSTRUCTION AND OTHER JOINTS, AT LEAST ONE REINFORCING BAR OR FABRIC WIRE SHALL BE LOCATED PARALLEL TO AND WITHIN 75mm OF THE SLAB EDGE.

R14. AT PENETRATIONS WITH DIMENSIONS LESS THAN 400mm DO NOT CUT REINFORCEMENT, RATHER GATHER REINFORCEMENT TO EACH SIDE OF PENETRATION U.N.O. ON THE PLANS. AT PENETRATIONS WITH DIMENSIONS LESS THAN 600mm PLACE REINFORCEMENT IN REQUIRED POSITION AND CUT OUT TO SUIT PENETRATION. PROVIDE ADDITIONAL BARS TO MATCH THE SIZE, LENGTH AND NUMBER OF BARS CUT, AND PLACE EQUALLY ON EACH SIDE OF THE PENETRATION U.N.O. ON PLANS. PROVIDE 2 No. N16 DIAGONAL BARS ACROSS PENETRATION CORNERS OF THE 4 DIAGONAL SIDES OF CIRCULAR/ELLIPTICAL PENETRATIONS.

R15. THE TOLERANCE ON THE NOMINAL COVERS FOR FIXING THE REINFORCEMENT SHALL BE AS NOTED IN THE STANDARD SPECIFICATION.

Issue	Description	Date	Approved
A	ISSUED FOR CONSTRUCTION	03/10/2018	E.H

Client: BMD constructions

Status: CONSTRUCTION FOR CONSTRUCTION

Scales	NTS	Drawn	R. ABLING
Original Size	A3	Designed	A. ULEP
Height Datum	AHD	Checked	S. OWEN
Grid	MGA	Approved	E. HERATH

Filename: B406-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: EVANS ROAD DRAINAGE PITS

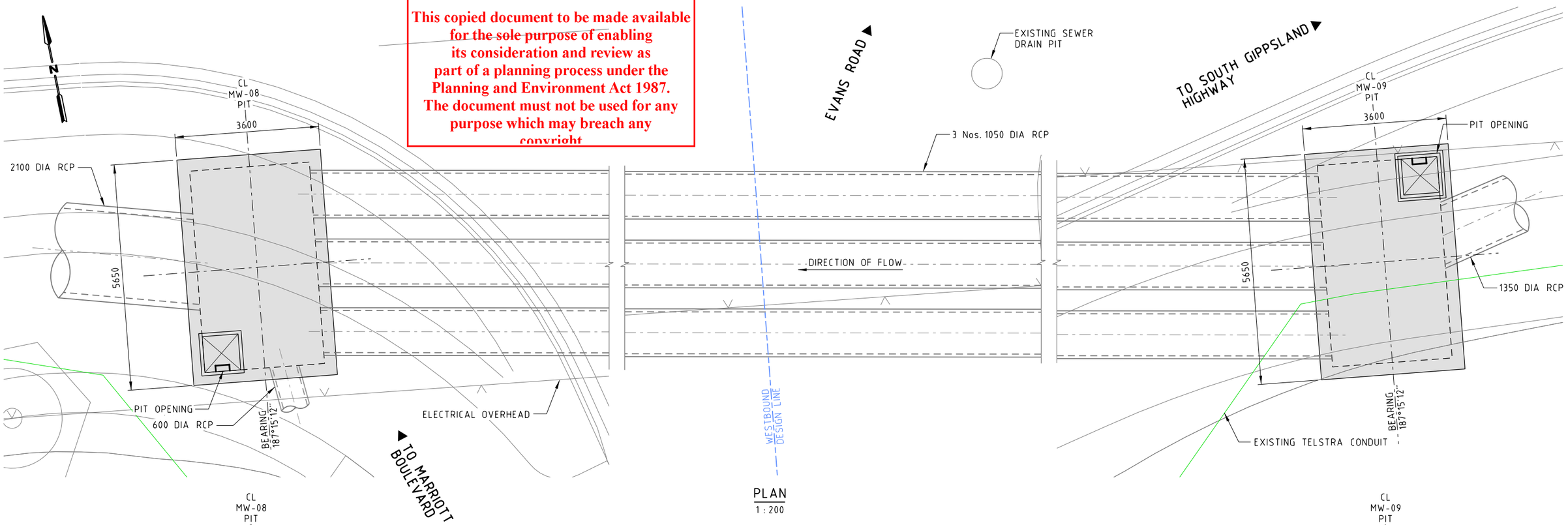
GENERAL NOTES SHEET 2

ARCADIS

Drawing No.	Project No.	Issue
B406	AA009732	A

V1

50mm on Original



PLAN
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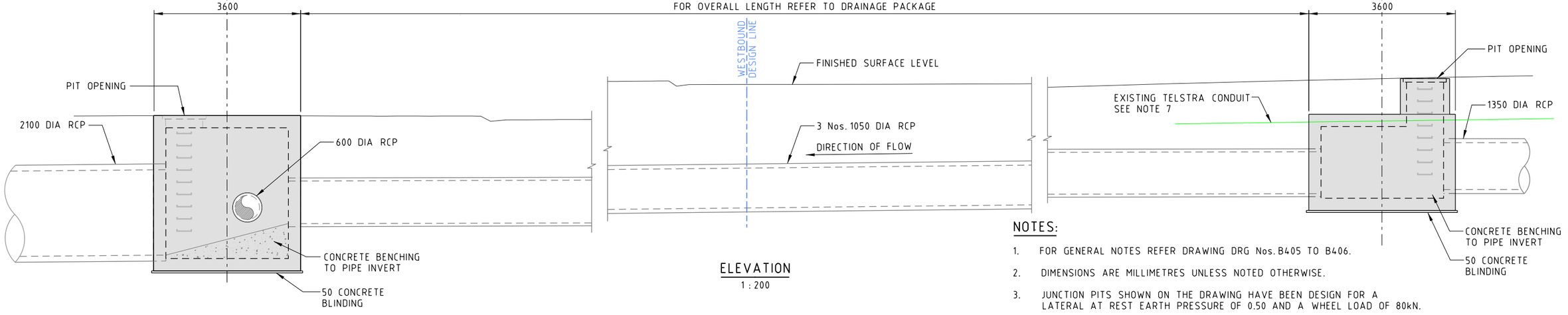

ELEVATION
1 : 200

NOTES:

1. FOR GENERAL NOTES REFER DRAWING DRG Nos. B405 TO B406.
2. DIMENSIONS ARE MILLIMETRES UNLESS NOTED OTHERWISE.
3. JUNCTION PITS SHOWN ON THE DRAWING HAVE BEEN DESIGN FOR A LATERAL AT REST EARTH PRESSURE OF 0.50 AND A WHEEL LOAD OF 80kN.
4. USE HEAVY DUTY D CAST IRON, CONCRETE INFILL COVERS IN ACCORDANCE WITH AS 3996. VENTS IN COVERS TO BE FORMED IN THE MANUFACTURING PROCESS, NOT ON SITE.
5. MINIMUM BEARING CAPACITY 100kPa, TO BE CONFIRMED BY GEOTECH ENGINEER.
6. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH RELEVANT DRAINAGE PACKAGES.
7. EXISTING TELSTRA CONDUIT TO BE RELOCATED. CONTRACTOR TO CONFIRM THE FINAL LOCATION AND RL.

CAUTION
THIS DRAWING IS BASED ON SURVEY THAT IS INCOMPLETE AND NOT VERIFIED. THE EXISTING SURFACE MAY VARY FROM THAT INDICATED AND SOME FEATURES MAY NOT BE SHOWN.

WARNING
BEWARE OF UNDERGROUND/OVERHEAD SERVICES THE LOCATIONS OF UNDERGROUND/OVERHEAD SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

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The Essential First Step.

Issue	Description	Date	Approved
A	ISSUED FOR CONSTRUCTION	03/10/2018	E.H

vicroads

Client: BMD constructions

Status: CONSTRUCTION
FOR CONSTRUCTION

Scales	1:200	Drawn	R. ABLING
Original Size	A3	Designed	A. ULEP
Height Datum	AHD	Checked	S. OWEN
Grid	MGA	Approved	E. HERATH

Filename: B411-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: EVANS ROAD DRAINAGE PITS
GENERAL ARRANGEMENT PLAN AND ELEVATION

ARCADIS

Drawing No.	Project No.	Issue
B411	AA009732	A

V1

50mm on Original

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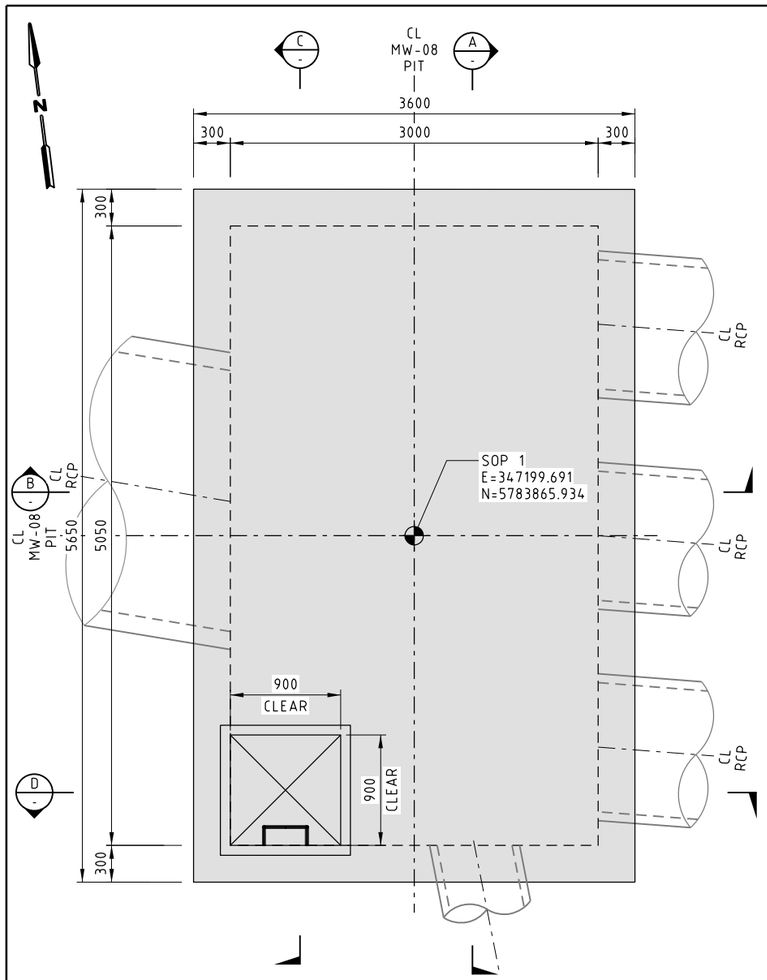

PLAN - MW-08

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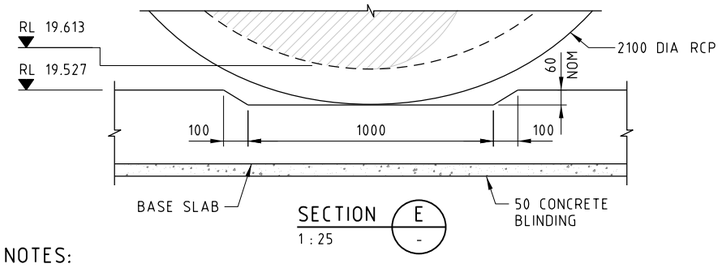
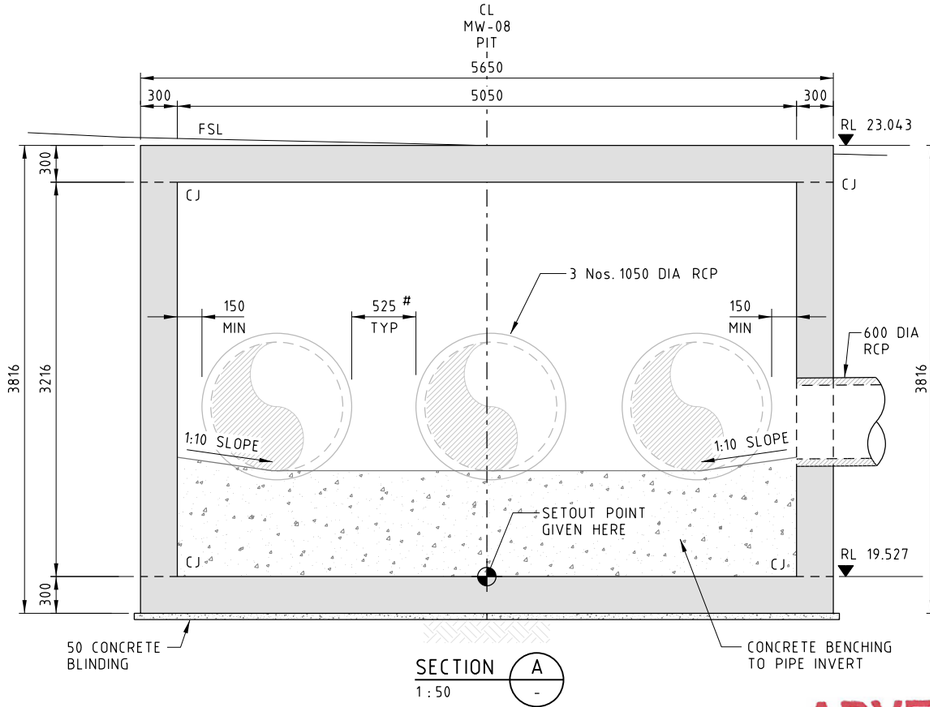


SECTION E

1 : 25

NOTES:

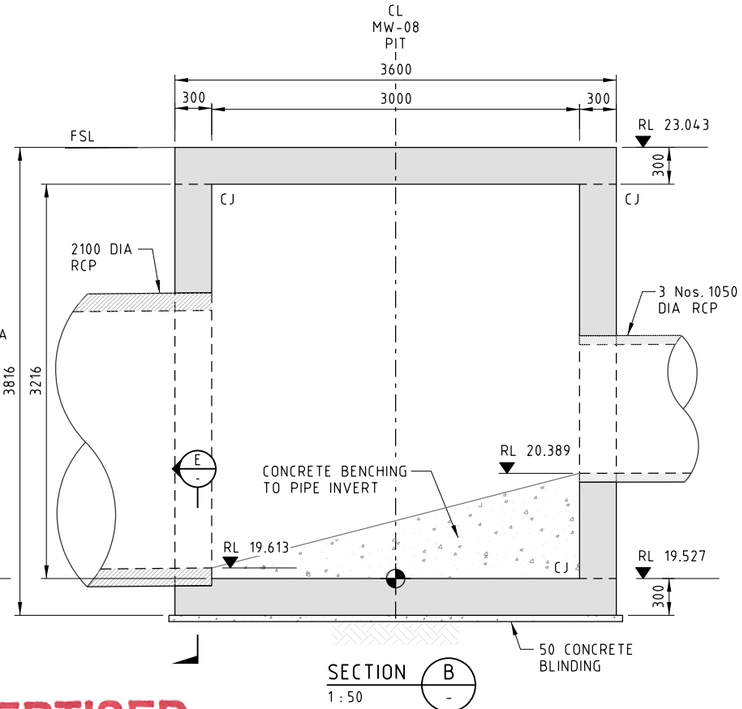
1. FOR GENERAL NOTES REFER DRAWING DRG Nos. B405 TO B406.
2. DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
3. PIPE AND PIT INVERTS SHOULD BE READ IN CONJUNCTION WITH RELEVANT DRAINAGE DRAWINGS.



SECTION A

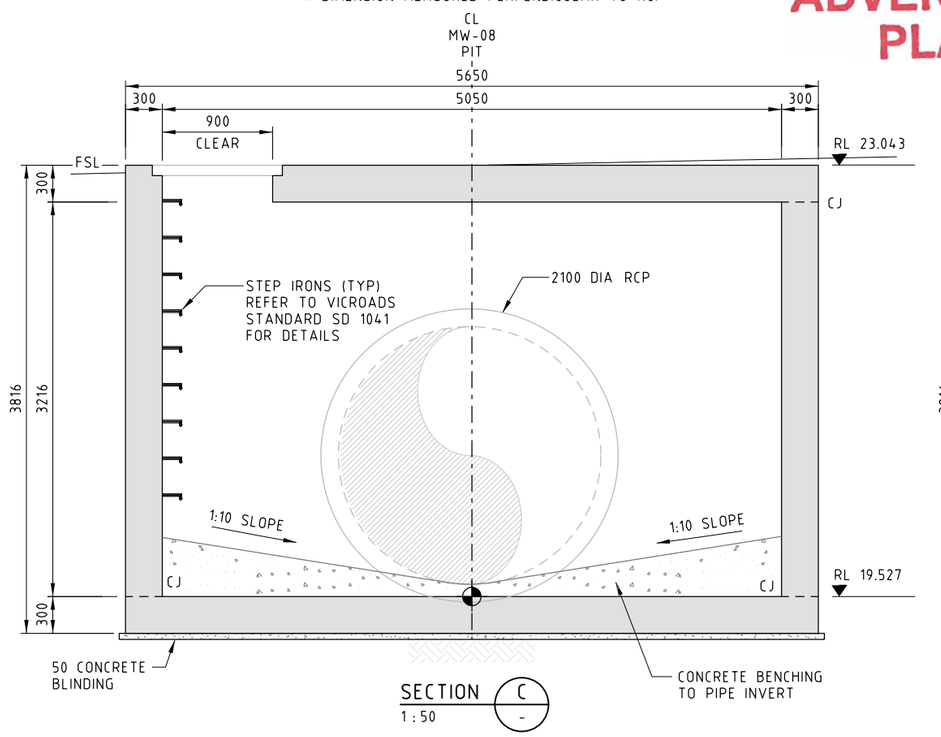
1 : 50

DIMENSION MEASURED PERPENDICULAR TO RCP



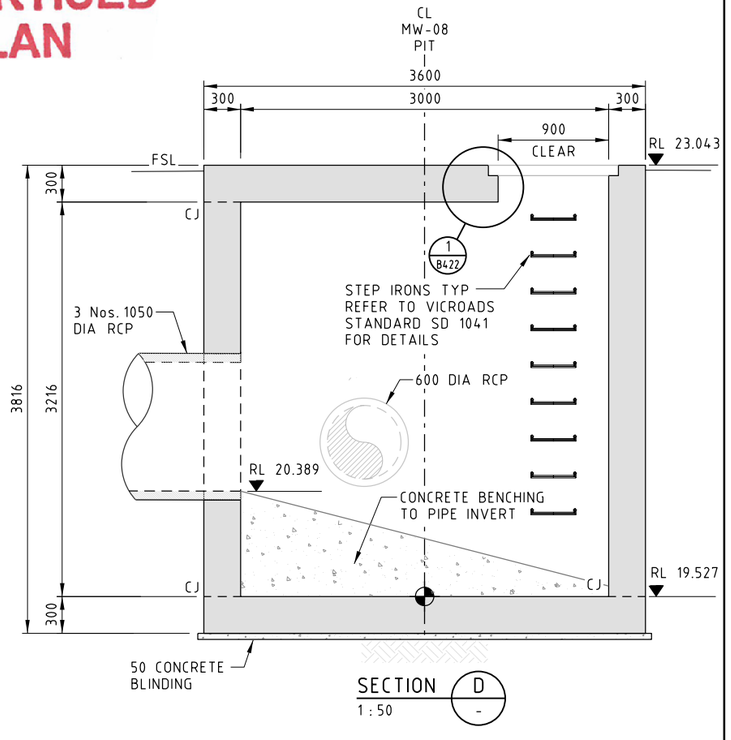
SECTION B

1 : 50



SECTION C

1 : 50



SECTION D

1 : 50

Issue	Description	Date	Approved
A	ISSUED FOR CONSTRUCTION	03/10/2018	E.H

50mm on Original

Client: VICROADS BMD constructions

Status: CONSTRUCTION
FOR CONSTRUCTION

Scales	1:50	Drawn	R. ABLING
Original Size	A3	Designed	A. ULEP
Height Datum	AHD	Checked	S. OWEN
Grid	MGA	Approved	E. HERATH

Filename: B421-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: EVANS ROAD DRAINAGE PITS

CONCRETE DETAILS - MW-08

ARCADIS

Drawing No.	Project No.	Issue
B421	AA009732	A

V1

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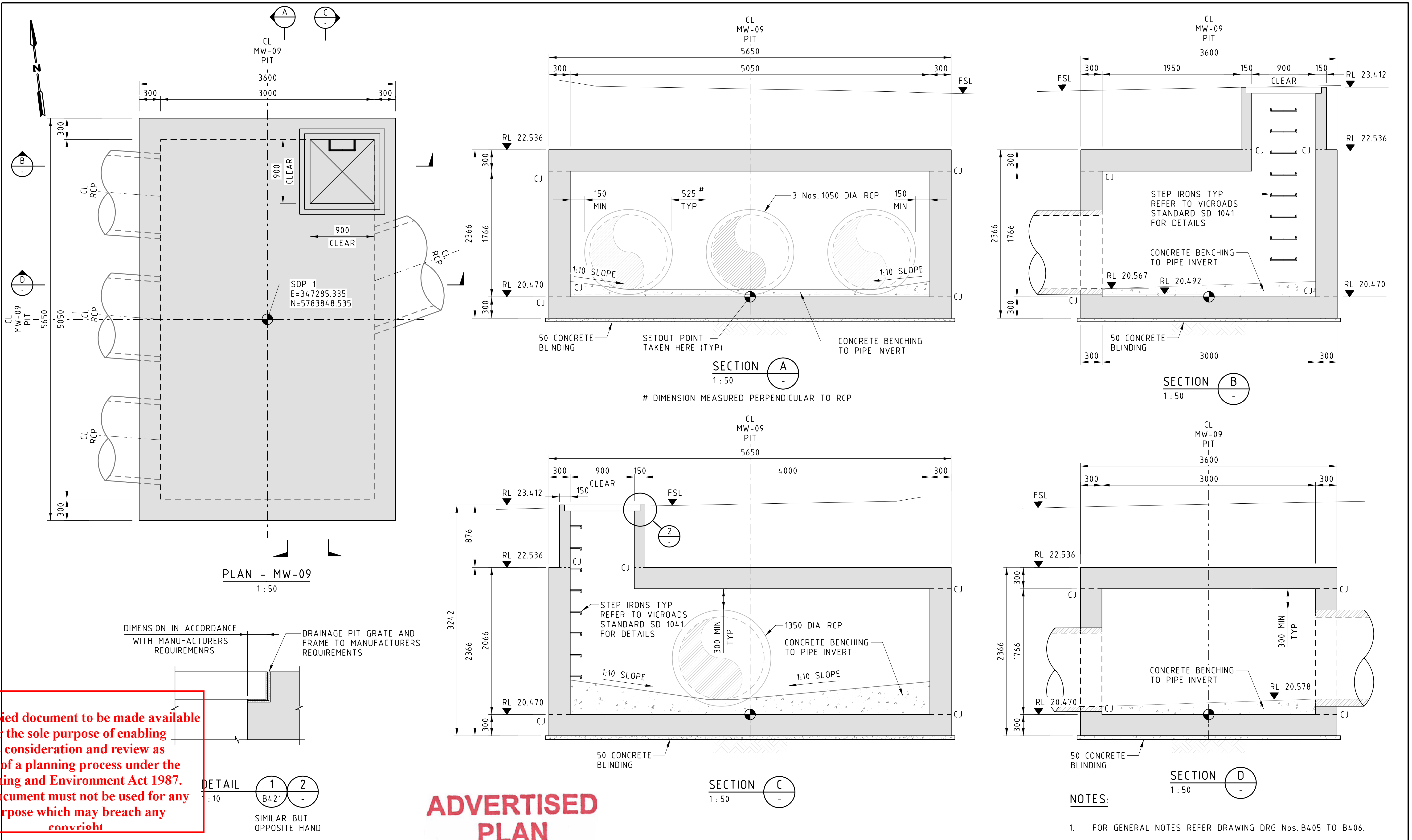

NOTES:

1. FOR GENERAL NOTES REFER DRAWING DRG Nos. B405 TO B406.
2. DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

Issue	Description	Date	Approved
A	ISSUED FOR CONSTRUCTION	03/10/2018	E.H

vicroads

Client: BMD constructions

Status: CONSTRUCTION
FOR CONSTRUCTION

Scales	1:50	Drawn	R. ABLING
Original Size	A3	Designed	A. ULEP
Height Datum	AHD	Checked	S. OWEN
Grid	MGA	Approved	E. HERATH

Filename: B422-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE MARRIOTT BOULEVARD TO SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: EVANS ROAD DRAINAGE PITS
CONCRETE DETAILS - MW-09

ARCADIS

Drawing No.: B422 | Project No.: AA009732 | Issue: A

50mm on Original

V1

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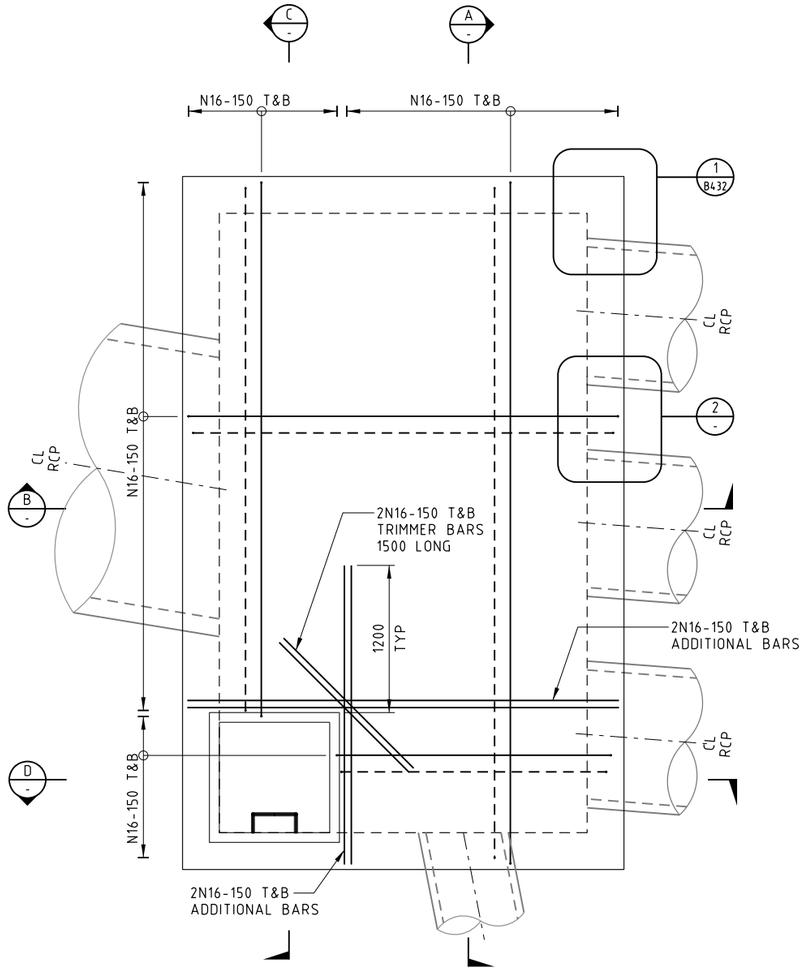
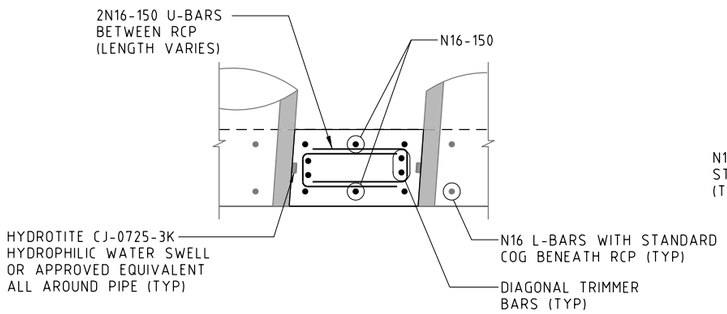
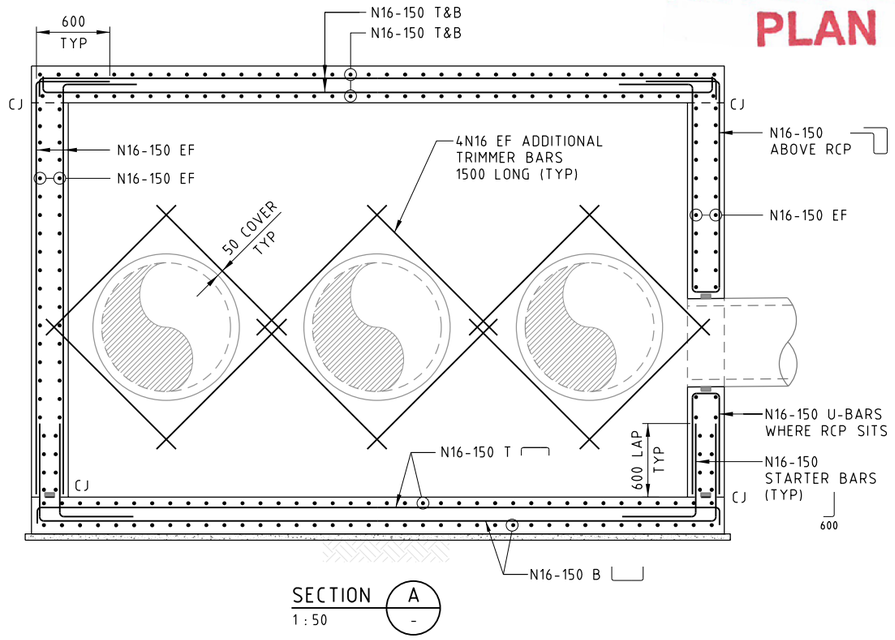


TOP SLAB REINFORCEMENT PLAN - MW-08
1 : 50

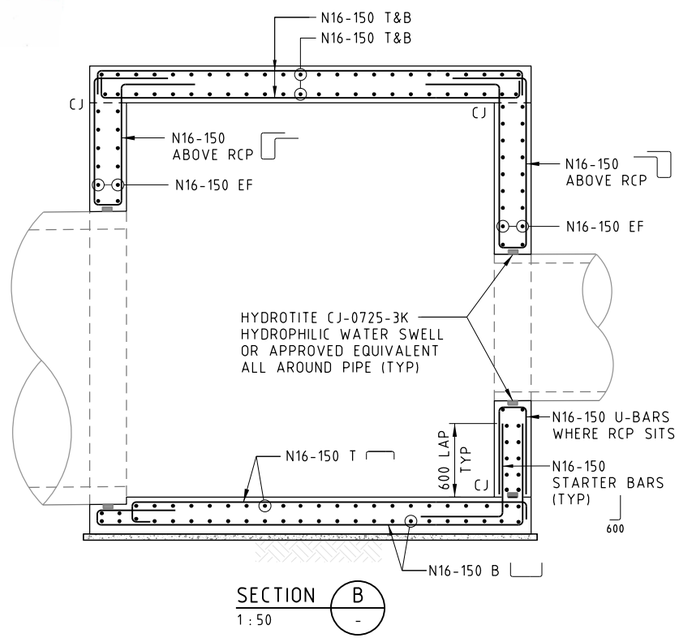


DETAIL 2/B432
1 : 25

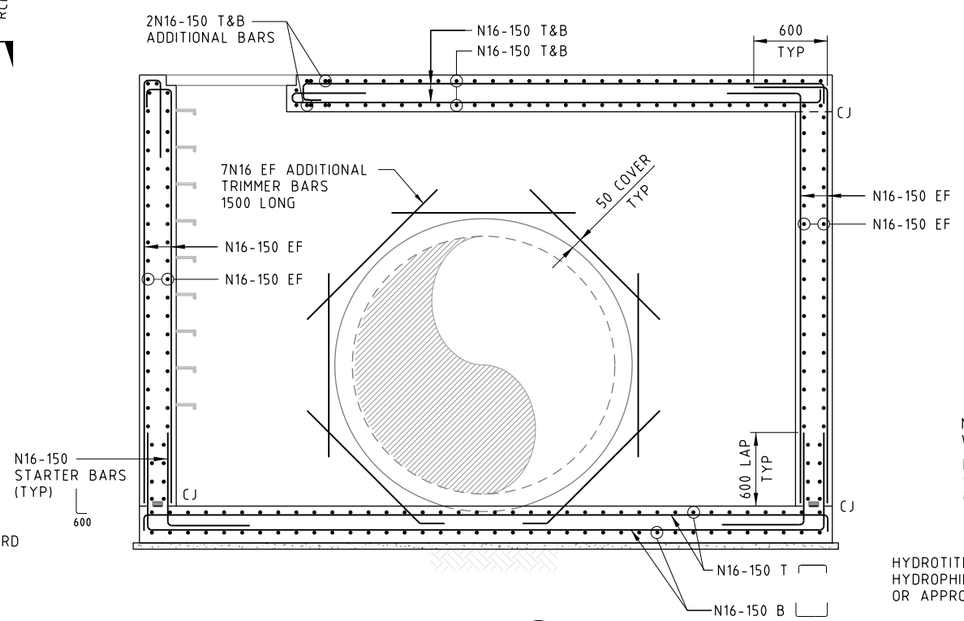
TYPICAL SECTION BETWEEN PIPE OPENING



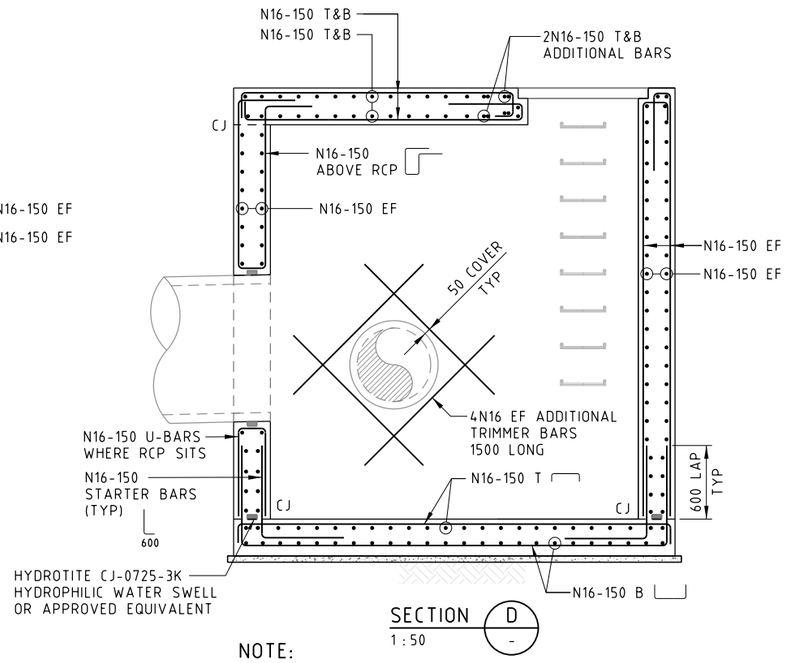
SECTION A/-
1 : 50



SECTION B/-
1 : 50



SECTION C/-
1 : 50



SECTION D/-
1 : 50

NOTE:

1. FOR GENERAL NOTES REFER DRAWING DRG Nos. B405 TO B406.

Issue	Description	Date	Approved
A	ISSUED FOR CONSTRUCTION	03/10/2018	E.H

50mm on Original

Client: vic roads / BMD constructions

Status: CONSTRUCTION
FOR CONSTRUCTION

Scales	1:50	Drawn	R. ABLING
Original Size	A3	Designed	A. ULEP
Height Datum	AHD	Checked	S. OWEN
Grid	MGA	Approved	E. HERATH

Filename: B431-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: EVANS ROAD DRAINAGE PITS
REINFORCEMENT DETAILS - MW-08

ARCADIS

Drawing No.	Project No.	Issue
B431	AA009732	A

V1

K:\MP001389-Thompsons_Road_Upgrade-THWE-CADF-Bridges\D-Final\DGN\EVANS ROAD DRAINAGE PITS\B431-AA009732-VCD-00.dgn
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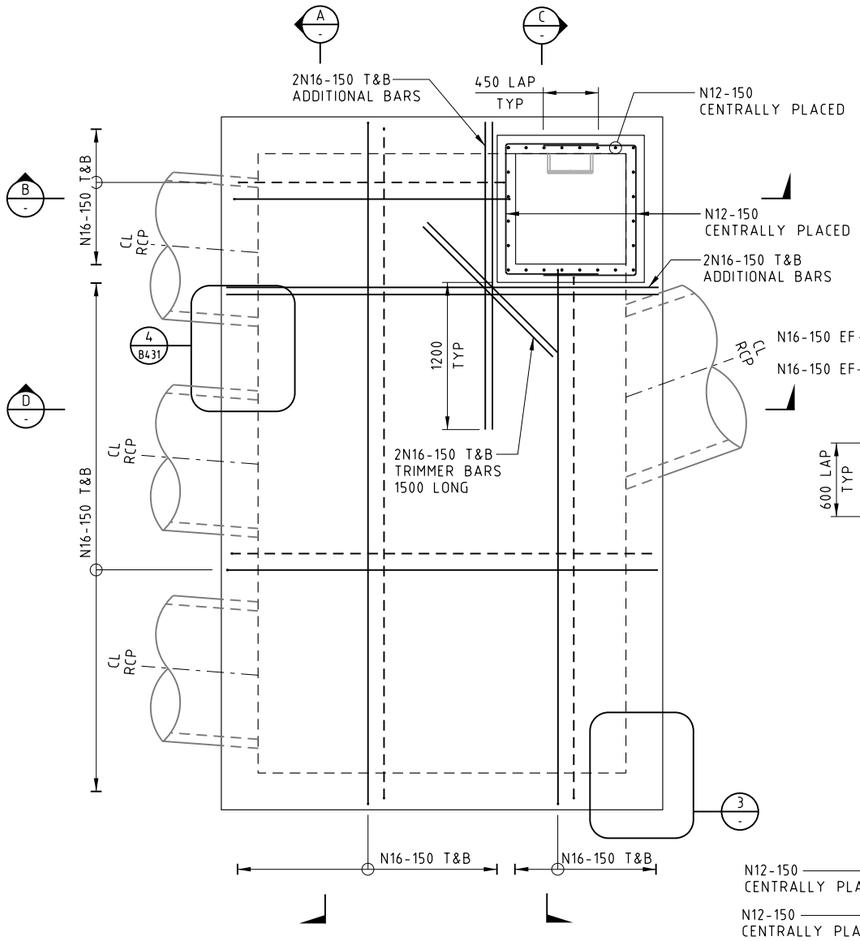
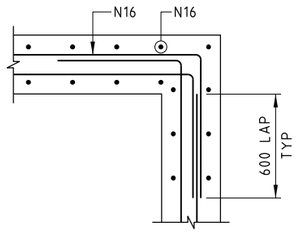
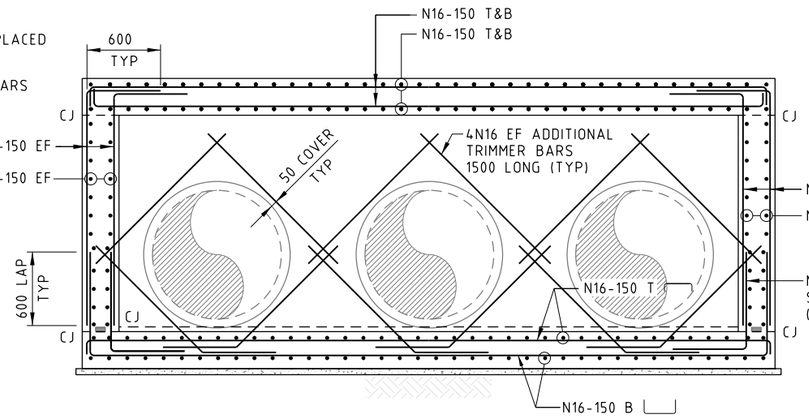


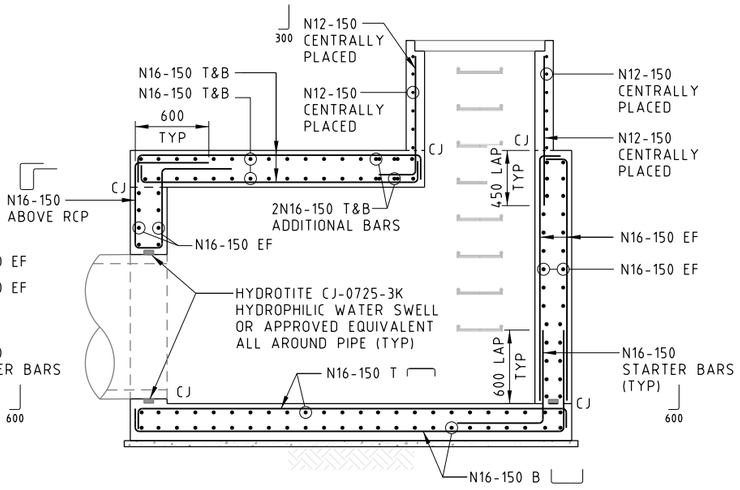
TOP SLAB REINFORCEMENT PLAN - MW-09
1 : 50



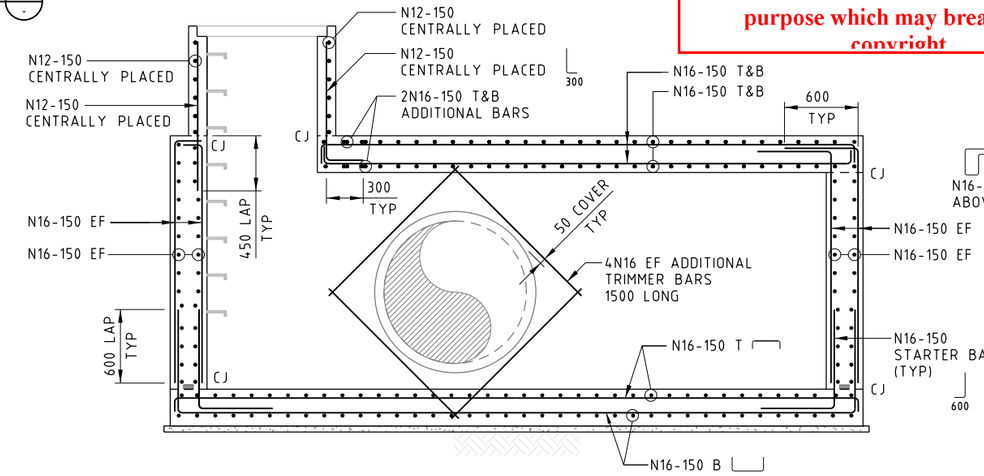
DETAIL 1 / B431 — 3 / -
NTS
SIMILAR BUT
OPPOSITE HAND



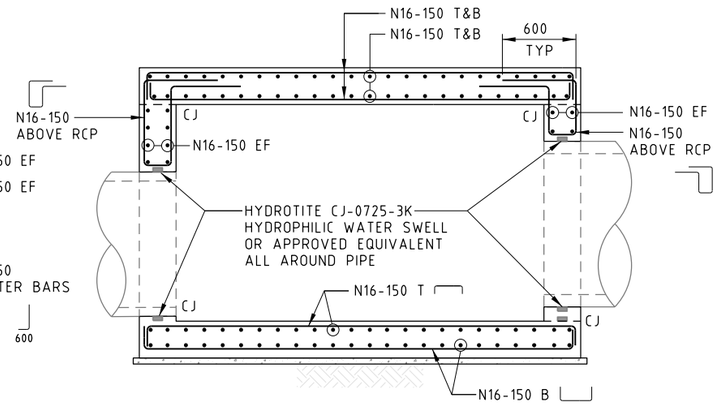
SECTION A - / 1 : 50



SECTION B - / 1 : 50



SECTION C - / 1 : 50



SECTION D - / 1 : 50

NOTE:

1. FOR GENERAL NOTES REFER DRAWING DRG Nos. B405 TO B406.

Issue	Description	Date	Approved
A	ISSUED FOR CONSTRUCTION	03/10/2018	E.H

50mm on Original

Client: BMD constructions

Status: CONSTRUCTION
FOR CONSTRUCTION

Scales	1:50	Drawn	R. ABLING
Original Size	A3	Designed	A. ULEP
Height Datum	AHD	Checked	S. OWEN
Grid	MGA	Approved	E. HERATH

Filename: B432-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: EVANS ROAD DRAINAGE PITS

REINFORCEMENT DETAILS - MW-09

Drawing No.	Project No.	Issue
B432	AA009732	A

V2

K:\MP001380-Thompsons_Road_Upgrade-THWE-CADF-Bridges\D-Final\DGN\EVANS ROAD DRAINAGE PITS\B432-AA009732-VCD-00.dgn
10/4/2018 9:29:17 AM

MARRIOTT WATERS SHOPPING CENTRE

MARRIOTT BOULEVARD

THOMPSONS ROAD

MISSENS ROAD

LIMIT OF WORKS

ECOSOL TRASH RACK - ETR105 TO BE PROVIDED

A-01A

1050 DIA RCP

A-01 ROW BOUNDARY

SHARED USE PATH

1050 DIA RCP

22.50

TO CLYDE

A-02A

1050/ DIA RCP

5 - 1650 DIA.

EASTBOUND CARRIAGEWAY

WESTBOUND CARRIAGEWAY

IL 21.770

TO CONTINUATION REFER TO SHEET 2

TO CARRUM

MELBOURNE WATER CRANBOURNE OUTFALL DRAIN

MW-01

MW-02

2250 DIA RCP

2250 DIA RCP

ROW BOUNDARY

CONNECT INTO SIDE OF DROP STRUCTURE

PROPOSED ROW BOUNDARY

POB 15000.000

15050

15100

5100

5150

NOTE:
WHERE NO SSD IL IS PROVIDED, SSD TO GRADE WITH ROAD

5784000 N
5783950 N
5783900 N
346600 E
346650 E
346700 E
346750 E

0 5 10 15 20 25m
1 : 500

ADVERTISED PLAN

CAUTION
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WARNING
BEWARE OF UNDERGROUND/OVERHEAD SERVICES
THE LOCATIONS OF UNDERGROUND/OVERHEAD SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

Issue	Description	Date	Approved
E	MELBOURNE WATER DRAINAGE NETWORK REVISED	21.02.18	E. H
D	MELBOURNE WATER DRAINAGE NETWORK ADDED	13.12.17	E. H
C	MELBOURNE WATER DRAINAGE NETWORK ADDED (FOR INFORMATION)	10.11.17	E. H
B	MELBOURNE WATER OUTFALL DRAIN PLACED ON HOLD AND DRAINAGE ALIGNMENT AMENDED	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

50mm on Original

Client: VicRoads, BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:500	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C601-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PLAN SHEET 1

ARCADIS

Drawing No.	Project No.	Issue
C601	AA009732	E

V1

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21/02/2018 4:50:36 PM

ADVERTISED PLAN

5784000 N
346800 E
346850 E
346900 E
5150
5200
5250
5300
ROW BOUNDARY
TO CLYDE
SHARED USE PATH
EASTBOUND CARRIAGEWAY
WESTBOUND CARRIAGEWAY
THOMPSONS ROAD STAGE 2
FOR CONTINUATION REFER TO SHEET 1
FOR CONTINUATION REFER TO SHEET 3
TO CARRUM
A-02
A-03
A-03A
A-03B
A-04
A-05
A-06
A-07
A-08
A-09
IL 21.286
RE-ALIGN EXISTING PIT TO MATCH NEW KERB ALIGNMENT
IL 21.246
1050 DIA RCP
IL 21.519
IL 21.489
IL 21.54
IL 21.891
IL 21.484
IL 21.508
IL 21.141
IL 21.348
900 DIA RCP
IL 21.265
IL 21.278
IL 21.379
IL 21.231
IL 21.321
IL 21.286
IL 21.381
IL 21.391
IL 21.004
IL 21.254
IL 21.347
IL 21.393
IL 21.162
IL 21.088
22.50
MW-03
MW-04
2250 DIA RCP
2100 DIA RCP
PROPOSED ROW BOUNDARY
15150
15200
15250
15300
TC 15306.330
5783900 N
5783950 N
346750 E

NOTE:
WHERE NO SSD IL IS PROVIDED,
SSD TO GRADE WITH ROAD

0 5 10 15 20 25m
1 : 500

CAUTION
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WARNING
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Issue	Description	Date	Approved
E	MELBOURNE WATER DRAINAGE NETWORK REVISED	21.02.18	E. H
D	MELBOURNE WATER DRAINAGE NETWORK ADDED	13.12.17	E. H
C	MELBOURNE WATER DRAINAGE NETWORK ADDED (FOR INFORMATION)	10.11.17	E. H
B	DRAINAGE ALIGNMENT AMENDED	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

Client: vicroads / BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:500	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C602-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PLAN
SHEET 2

ARCADIS

Drawing No.	Project No.	Issue
C602	AA009732	E

V1

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21/02/2018 4:50:56 PM
50mm on Original

N

346950 E
347000 E
347050 E
347100 E
5783950 N
5783900 N
5783850 N

GUMVIEW ROAD
5400
5450
5500

TO CLYDE
IL 22.200
IL 22.100
IL 22.300
ABANDON EXISTING HEADWALL
ROW BOUNDARY
SHARED USE PATH
22.50
A-10 A-11 A-12 A-13 A-14 A-15 A-17 A-18A A-18 A-19 A-20 A-21
375 DIA RCP
900 DIA RCP
EASTBOUND CARRIAGEWAY
THOMPSONS ROAD
WESTBOUND CARRIAGEWAY
KERB OUTLET
CURVED PIPE 530.0R
1200 DIA RCP
1800 DIA RCP (EXISTING)
EXISTING 1800 DIA RCP TO CONNECT INTO MW-05
LIMIT OF WORKS
TO CARRUM
REPLACE OR MODIFY EXISTING PIT
MW-05
PROPOSED ROW BOUNDARY
EXISTING COUNCIL DRAINAGE SYSTEM TO CONNECT INTO MW-05
RETAIN EXISTING PIT
CONNECT EXISTING PIPE TO NEW PIT
BREAK INTO EXISTING PIT AND CONNECT PIPE
15350
15400
15450
15500
CT 15372.906
TC 15450.347

FOR CONTINUATION REFER TO SHEET 2
FOR CONTINUATION REFER TO SHEET 4

ADVERTISED PLAN

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NOTE:
WHERE NO SSD IL IS PROVIDED, SSD TO GRADE WITH ROAD

0 5 10 15 20 25m
1 : 500

Issue	Description	Date	Approved
E	MELBOURNE WATER DRAINAGE NETWORK REVISED (RFI-131-3201-00321)	05.10.18	E. H
D	MELBOURNE WATER DRAINAGE NETWORK REVISED	21.02.18	E. H
C	MELBOURNE WATER DRAINAGE NETWORK ADDED	13.12.17	E. H
B	MELBOURNE WATER DRAINAGE NETWORK ADDED (FOR INFORMATION)	10.11.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

Client: vicroads; BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:500	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C603-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PLAN
SHEET 3

ARCADIS

Drawing No.	Project No.	Issue
C603	AA009732	E

V1

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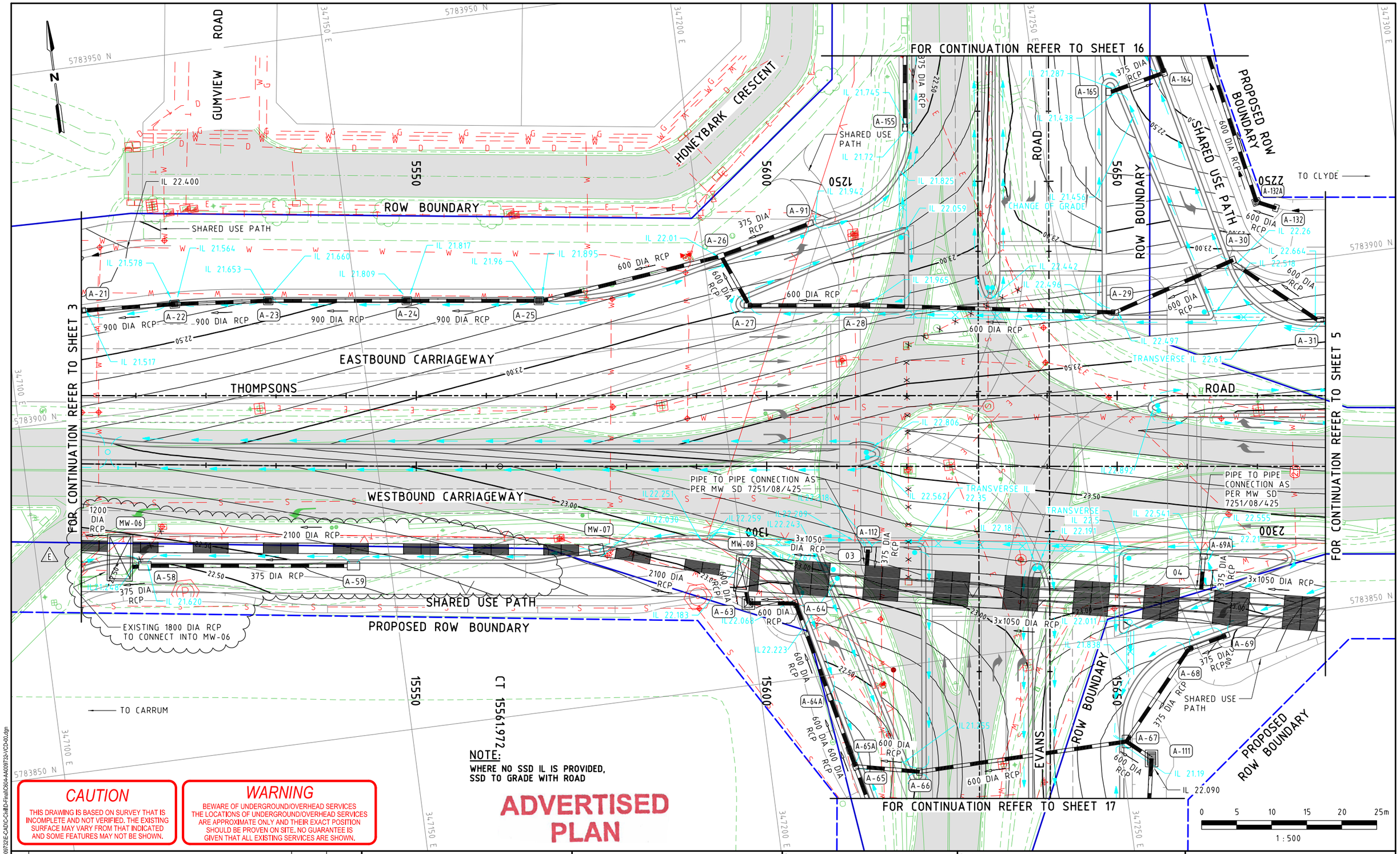
2/03/21 PM
5/10/2018
50mm on Original



NOTE:
WHERE NO SSD IL IS PROVIDED, SSD TO GRADE WITH ROAD

CAUTION
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WARNING
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ADVERTISED PLAN

Issue	Description	Date	Approved
E	MELBOURNE WATER DRAINAGE NETWORK REVISED (RFI-131-3201-00321)	05.10.18	E. H
D	MELBOURNE WATER DRAINAGE NETWORK REVISED	21.02.18	E. H
C	MELBOURNE WATER DRAINAGE NETWORK ADDED	13.12.17	E. H
B	MELBOURNE WATER DRAINAGE NETWORK ADDED (FOR INFORMATION)	10.11.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

50mm on Original

Client: VicRoads, BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:500	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C604-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PLAN
SHEET 4

ARCADIS

Drawing No.	Project No.	Issue
C604	AA009732	E

V1

0 5 10 15 20 25m
1 : 500

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5/10/2018

N

PROPOSED ROW BOUNDARY

TO CLYDE

SHARED USE PATH

EASTBOUND CARRIAGEWAY

THOMPSONS ROAD

WESTBOUND CARRIAGEWAY

SHARED USE PATH

PROPOSED ROW BOUNDARY

TO CARRUM

ROW BOUNDARY

ROW BOUNDARY

FOR CONTINUATION REFER TO SHEET 4

FOR CONTINUATION REFER TO SHEET 6

5700 5750 5800

15700 15750 15800

5783900 N

5783850 N

5783800 N

347300 E 347350 E 347400 E 347450 E 347250 E 347300 E 347350 E 347400 E

IL 21.917 IL 22.193 IL 22.319 IL 22.725

IL 22.69 IL 22.675 IL 22.654 IL 22.675 IL 22.749 IL 22.73 IL 22.793 IL 22.776 IL 22.867 IL 23.142 IL 23.091 IL 23.187 IL 22.726 IL 22.901 IL 22.724 IL 22.724 IL 22.724 IL 23.471 IL 23.368 IL 23.289 IL 23.25 IL 22.454 IL 22.698 IL 22.835 IL 22.36 IL 22.551 IL 22.551 IL 22.39 IL 22.353 IL 22.339 IL 22.374

A-32 A-33 A-34 A-35 A-36 A-37 A-38 A-71 A-72 A-73 A-74 A-75 A-76 A-93 MW-09 MW-13

600 DIA RCP 1350 DIA RCP 1200 DIA RCP 375 DIA RCP

23.50 24.00

D

ADVERTISED PLAN

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CAUTION

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WARNING

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NOTE:
WHERE NO SSD IL IS PROVIDED.
SSD TO GRADE WITH ROAD

0 5 10 15 20 25m
1 : 500

Issue	Description	Date	Approved
D	MELBOURNE WATER DRAINAGE NETWORK REVISED	21.02.18	E. H
C	MELBOURNE WATER DRAINAGE NETWORK ADDED	13.12.17	E. H
B	MELBOURNE WATER DRAINAGE NETWORK ADDED (FOR INFORMATION)	03.11.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

50mm on Original

Client: vicroads / BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:500	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C605-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PLAN
SHEET 5

ARCADIS

Drawing No.	Project No.	Issue
C605	AA009732	D

V1

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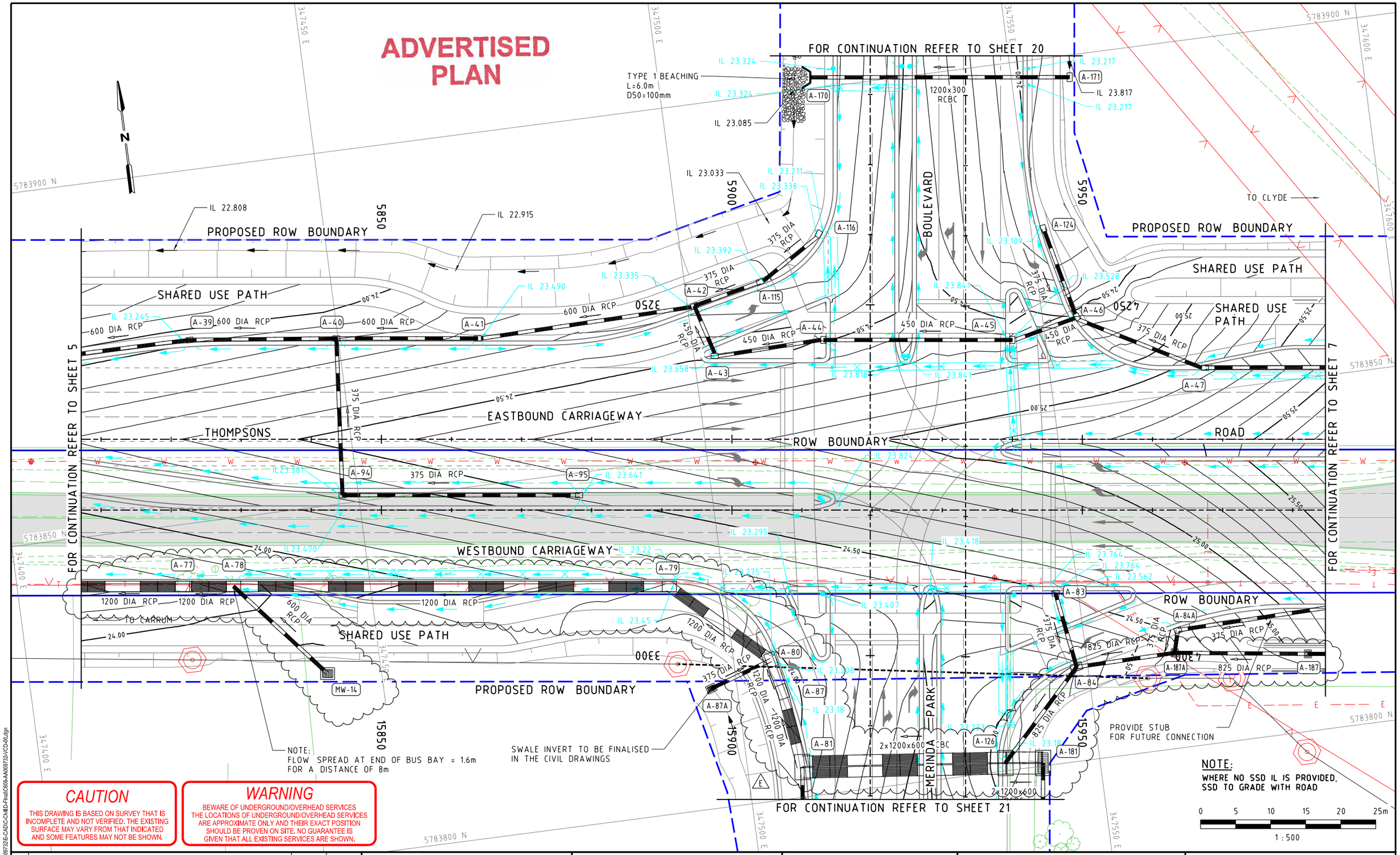
21/02/2018

ADVERTISED PLAN



CAUTION

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WARNING

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Issue	Description	Date	Approved
E	MELBOURNE WATER DRAINAGE NETWORK REVISED	21.02.18	E. H
D	MELBOURNE WATER DRAINAGE NETWORK REVISED	13.12.17	E. H
C	MELBOURNE WATER DRAINAGE NETWORK ADDED (FOR INFORMATION)	03.11.17	E. H
B	NOTE AND PIT NUMBER UPDATED	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

50mm on Original

Client: VicRoads, BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:500	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C606-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PLAN
SHEET 6

ARCADIS

Drawing No.	Project No.	Issue
C606	AA009732	E

V1

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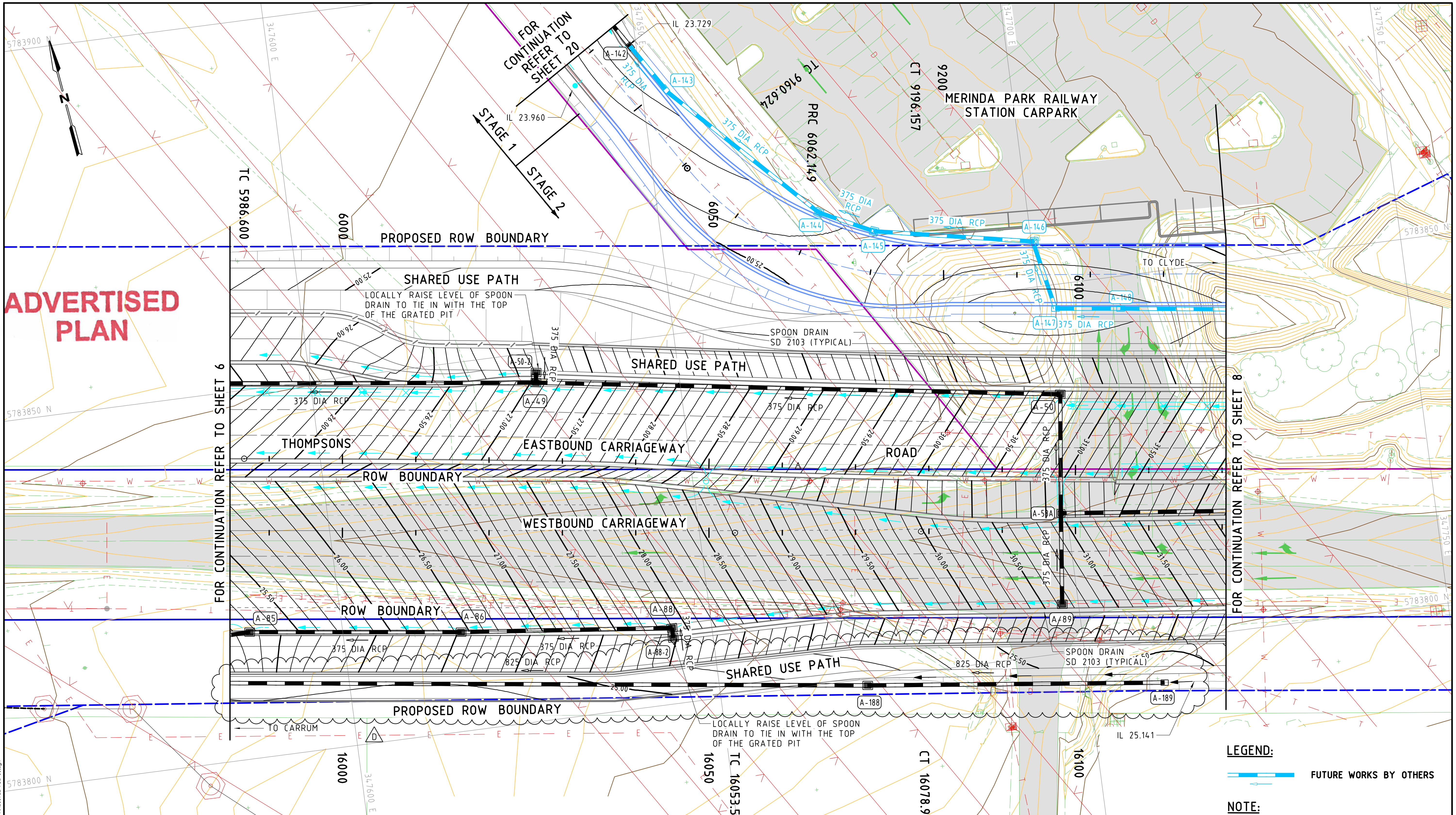

LEGEND:

FUTURE WORKS BY OTHERS

NOTE:

WHERE NO SSD IL IS PROVIDED, SSD TO GRADE WITH ROAD

0 5 10 15 20 25m

1 : 500

CAUTION

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WARNING

BEWARE OF UNDERGROUND/OVERHEAD SERVICES
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Issue	Description	Date	Approved
D	MELBOURNE WATER DRAINAGE NETWORK ADDED	13.12.17	E. H
C	EXISTING UTILITIES ADDED	27.09.17	E. H
B	LEGEND UPDATED	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

13/12/2017 12:02:56 PM

Client: vicroads / BMD constructions

Status: **CONSTRUCTION**
ISSUED FOR CONSTRUCTION

Scales	1:500	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C607-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PLAN SHEET 7

ARCADIS

Drawing No. C607 | Project No. AA009732 | Issue D

50mm on Original

V1

MERINDA PARK RAILWAY STATION CARPARK

LIMIT OF WORKS

MERINDA PARK RAILWAY STATION

DRAINAGE ZONE A

DRAINAGE ZONE B & C

PROPOSED SWALE DRAINS TO OUTLET TO EXISTING GRATED PIT

PROPOSED ROW BOUNDARY

TC 6243.202

CT 9291782

9200

6250

IL 26.24

IL 26.72

IL 27.17

MW PIT

1050 DIA RCP

CONNECT PROPOSED PIPE TO EXISTING GRATED PIT

IL 25.50

SPOON DRAIN SD2103 (TYPICAL)

ROW BOUNDARY

B01

TO CLYDE

IL 34.07

SHARED USE PATH

IL 33.839
CHANGE OF GRADE

EASTBOUND CARRIAGEWAY

ROAD

IL 26.47

IL 34.207
CHANGE OF GRADE

IL 34.468

IL 34.238
CHANGE OF GRADE

WESTBOUND CARRIAGEWAY

9350

IL 26.62

IL 34.102

SHARED USE PATH

B55

B56

IL 33.884
CHANGE OF GRADE

SPOON DRAIN SD2103 (TYPICAL)

DISCHARGE OPEN CHANNEL TO GRATED PIT

INSTALL JUNCTION PIT ON EXISTING DRAINAGE LINE

TC 16292.401

16250

9400

PDE 9409.206

VICTRACK BOUNDARY

CRANBOURNE RAILWAY LINE

TO CRANBOURNE

TC 6205.186

CT 6142379

6150

FROM MELBOURNE

SSD FOLLOWS TOE OF STRUCTURAL CONCRETE BARRIER. REFER TO PAVEMENT CROSS SECTIONS

375 DIA RCP

SPOON DRAIN SD 2103 (TYPICAL)

A-149

A-150

A-151

A-52

A-530

A-53

THOMPSONS

ROW BOUNDARY

TO CARRUM

IL 25.385

IL 25.530

SPOON DRAIN SD 2103 (TYPICAL)

A-172A

(2x) 900x300 RCBC

PROPOSED ROW BOUNDARY

A-172

A-152

A-173

(2x) 900x300 RCBC

DIRECT FLOW FROM EXISTING CULVERTS TO ENDWALL

TYPE 1 BEACHING
L=2.0m
D50=100mm

16200

6150

DRAINAGE ZONE A

DRAINAGE ZONE B & C

B LEGEND:

FUTURE WORKS BY OTHERS

NOTE:
WHERE NO SSD IL IS PROVIDED, SSD TO GRADE WITH ROAD

0 5 10 15 20 25m

1 : 500

FOR CONTINUATION REFER TO SHEET 7

FOR CONTINUATION REFER TO SHEET 9

5783850 N

5783800 N

5783750 N

347750 E

347800 E

347850 E

347900 E

CAUTION

THIS DRAWING IS BASED ON SURVEY THAT IS INCOMPLETE AND NOT VERIFIED. THE EXISTING SURFACE MAY VARY FROM THAT INDICATED AND SOME FEATURES MAY NOT BE SHOWN.

WARNING

BEWARE OF UNDERGROUND/OVERHEAD SERVICES THE LOCATIONS OF UNDERGROUND/OVERHEAD SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

Issue	Description	Date	Approved
B	LEGEND UPDATED	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

50mm on Original

vicroads

ADVERTISED PLAN

Client: BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:500	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E.HERATH

Filename: C608-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PLAN SHEET 8

ARCADIS

Drawing No.	Project No.	Issue
C608	AA009732	B

V1

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ADVERTISED PLAN

N

5783850 N
5783800 N
5783750 N
347900 E
347950 E
348000 E
348050 E

CT 6309594

6300 6350 6400 6450

16300 16350 16400 16450

CT 16410.297

IP 16460.931

PROPOSED ROW BOUNDARY

IL 27.241

1050DIA RCP

28.50

RETAINING WALL

29.00

IL 28.702

PROPOSED WORKS OUTSIDE OF ROW BOUNDARY

LOCALLY RAISE LEVEL OF SPOON DRAIN TO TIE IN WITH THE TOP OF THE GRATED PIT

TO CLYDE

ROW BOUNDARY

SPOON DRAIN SD2103 (TYP.)

B02 B50 B51 B49 B47 B39 B38 B37 B40 B46 B48 B42 B41 B53

SHARED USE PATH

EASTBOUND CARRIAGEWAY

WESTBOUND CARRIAGEWAY

THOMPSONS ROAD

375DIA RCP

750DIA RCP

450DIA RCP

675DIA RCP

CONTINUATION REFER TO SHEET 8

CONTINUATION REFER TO SHEET 10

IL 27.704

IL 28.627

IL 29.966

TO CARRUM

CONSTRUCT PIT OVER EXISTING PIPE

LOCALLY RAISE LEVEL OF SPOON DRAIN TO TIE IN WITH THE TOP OF THE GRATED PIT

0 5 10 15 20 25m

1 : 500

CAUTION

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Issue	Description	Date	Approved
C	AMENDED SUBSURFACE DRAINAGE	20.06.17	E. H.
B	LAYOUT PLAN REVISED	19.05.17	E. H.
A	ISSUED FOR CONSTRUCTION	27.04.17	E. H.

50mm on Original

Client: vicroads / BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:500	Drawn	G.CONSTABLE
Original Size	A3	Designed	A. PRASAD
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	C. PATTINSON

Filename: C609-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PLAN SHEET 9

ARCADIS

Drawing No.	Project No.	Issue
C609	AA009732	C

V1

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ADVERTISED PLAN

LONSDALE CRESCENT

LIMIT OF WORKS

JUNCTION PIT TO AVOID CLASH WITH LIGHTING POLE

CONNECT EXISTING DRAINAGE PIPE TO HAUNCHED PIT

RETAIN THE EXISTING DRAINAGE WITHIN THE SERVICE ROAD.

POTENTIAL CLASH WITH EXISTING DRAIN.

TO CLYDE

ROW BOUNDARY

EASTBOUND CARRIAGEWAY

WESTBOUND CARRIAGEWAY

ROAD

THOMPSONS

TO CARRUM

CONSTRUCT PIT OVER EXISTING PIPE

FOR CONTINUATION REFER SHEET 9

FOR CONTINUATION REFER SHEET 11

IP 6497

6500

6550

6600

16500

16550

16600

5783800 N

5783750 N

5783700 N

348100 E

348150 E

348200 E

348250 E

348050 E

CAUTION

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0 5 10 15 20 25m

1 : 500

Issue	Description	Date	Approved
B	LAYOUT PLAN REVISED	19.05.17	E. H.
A	ISSUED FOR CONSTRUCTION	27.04.17	E. H.

50mm on Original

Client: vicroads

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:500	Drawn	G.CONSTABLE
Original Size	A3	Designed	A. PRASAD
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	C. PATTINSON

Filename: C610-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PLAN SHEET 10

ARCADIS

Drawing No.	Project No.	Issue
C610	AA009732	B

V2

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MAWSON COURT

LIMIT OF WORKS

POTENTIAL CLASH WITH EXISTING DRAIN.

RETAIN THE EXISTING DRAINAGE WITHIN THE SERVICE ROAD.

GRAY STREET

LIMIT OF WORKS

POTENTIAL CLASH WITH EXISTING DRAIN.

IL: 28.959
TO CLYDE

ROW BOUNDARY

IL: 28.486 IL: 28.547 IL: 28.611 IL: 28.293 IL: 28.815 IL: 28.700 IL: 28.750

B33 B34

IL: 28.699 IL: 28.638 IL: 28.772 IL: 28.707 IL: 28.763 IL: 28.885 IL: 28.863 IL: 28.985 IL: 28.814

375DIA RCP

B14 B15 B16 B17 B18 B19

29.50 30.00

EASTBOUND CARRIAGEWAY

THOMPSONS ROAD

IL: 29.112

WESTBOUND CARRIAGEWAY

IL: 28.655 IL: 28.756 IL: 28.725 IL: 28.026 IL: 28.872 IL: 28.866 IL: 29.013 IL: 29.020 IL: 29.174 IL: 29.177

B27 B28 B29 B30 C08

IL: 28.613

ROW BOUNDARY

TO CARRUM

ADJUST EXISTING SEP TO SUIT NEW KERB ALIGNMENT

FOR CONTINUATION REFER TO SHEET 4

6650 6700 6750 6800

16650 16700 16750 16800

5783800 N 5783750 N 5783700 N

348250 E 348300 E 348350 E 348400 E

0 5 10 15 20 25m
1 : 500

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Issue	Description	Date	Approved
C	AMENDED SUBSURFACE DRAINAGE	20.06.17	E. H.
B	LAYOUT PLAN REVISED	19.05.17	E. H.
A	ISSUED FOR CONSTRUCTION	27.04.17	E. H.

50mm on Original

vicroads

ADVERTISED PLAN

Client: BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:500	Drawn	G.CONSTABLE
Original Size	A3	Designed	A. PRASAD
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	C. PATTINSON

Filename: C611-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PLAN SHEET 11

Drawing No. C611 | Project No. AA009732 | Issue C

ARCADIS

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N

348400 E
348450 E
348500 E
348550 E
5783750 N
5783700 N
5783650 N

RETAIN THE EXISTING DRAINAGE WITHIN THE SERVICE ROAD.

POTENTIAL CLASH WITH EXISTING DRAIN.

TYPE 1 BEACHING
L=1.1m
D50=100mm

DRAINAGE PIPE TO PENETRATE THROUGH THE EXISTING WALL

REMOVE PIT AND EXTEND PIPE TO NEW PIT.

TO CLYDE

6850
6900
6950
TC 6890.904
CT 6894.109
TC 6929.668

ROW BOUNDARY

CONNECT EXISTING PIPE TO NEW PIT

IL: 29.389
IL: 29.283
IL: 29.670 (BUS STOP)
IL: 29.927 (BUS STOP)
IL: 29.368
IL: 29.264
IL: 29.683
IL: 29.650
IL: 29.389
IL: 29.36
IL: 30.008
IL: 29.653

375DIA RCP
600DIA RCP
B20
B21
B22
C01
C02
C03
C04
C05
C06
C07

EASTBOUND CARRIAGEWAY

THOMPSONS ROAD

FOR CONTINUATION REFER TO SHEET 11

FOR CONTINUATION REFER TO SHEET 13

IL: 29.526
IL: 29.326
IL: 29.744
IL: 29.316
IL: 29.860
IL: 29.985
IL: 30.026
IL: 30.059
IL: 30.145
IL: 29.185

CONVERT EXISTNG PIT TO JP (HEAVY DUTY COVER) AND ADJUST TO SUIT FINISHED SURFACE LEVEL.

WESTBOUND CARRIAGEWAY

C09
C10
C11
C12
C13
C14
C15
C16
C17
C18
C19
C20
C21
C22
C23

375 DIA RCP
375 DIA RCP
375 DIA RCP
375 DIA RCP
375 DIA RCP
375 DIA RCP
375 DIA RCP
375 DIA RCP
375 DIA RCP
375 DIA RCP

CONVERT AND ADJUST EXISTING SEP TO GSEP TO SUIT NEW KERB ALIGNMENT

ADJUST EXISTING SEP TO SUIT NEW KERB ALIGNMENT

IL: 29.138
IL: 29.155

TO CARRUM

LIMIT OF WORKS

LESDON AVENUE

CONVERT AND ADJUST EXISTING SEP TO GSEP TO SUIT NEW KERB ALIGNMENT

IL: 29.227
IL: 29.206

EXISTING DRIVEWAY CULVERT AND ENDWALLS TO BE DEMOLISHED

EXISTING HEADWALL AND PIPE TO BE DEMOLISHED

16850
16900
16950
TC 16917.775
PRC 16946.175

ROW BOUNDARY

ADVERTISED PLAN

0 5 10 15 20 25m
1 : 500

CAUTION
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WARNING
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DIAL BEFORE YOU DIG www.1100.com.au
The Essential First Step.

Issue	Description	Date	Approved
E	SUP REMOVED; PIT C19 REVISED (RFI-131-3201-00307)	21.08.18	E. H.
D	DRAINAGE ALIGNMENT AMENDED	03.10.17	E. H.
C	AMENDED SUBSURFACE DRAINAGE	20.06.17	E. H.
B	LAYOUT PLAN REVISED	19.05.17	E. H.
A	ISSUED FOR CONSTRUCTION	27.04.17	E. H

vicroads

Client: BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:500	Drawn	G. CONSTABLE
Original Size	A3	Designed	A. PRASAD
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	C. PATTINSON

Filename: C612-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PLAN
SHEET 12

ARCADIS

Drawing No.	Project No.	Issue
C612	AA009732	E

V1

50mm on Original

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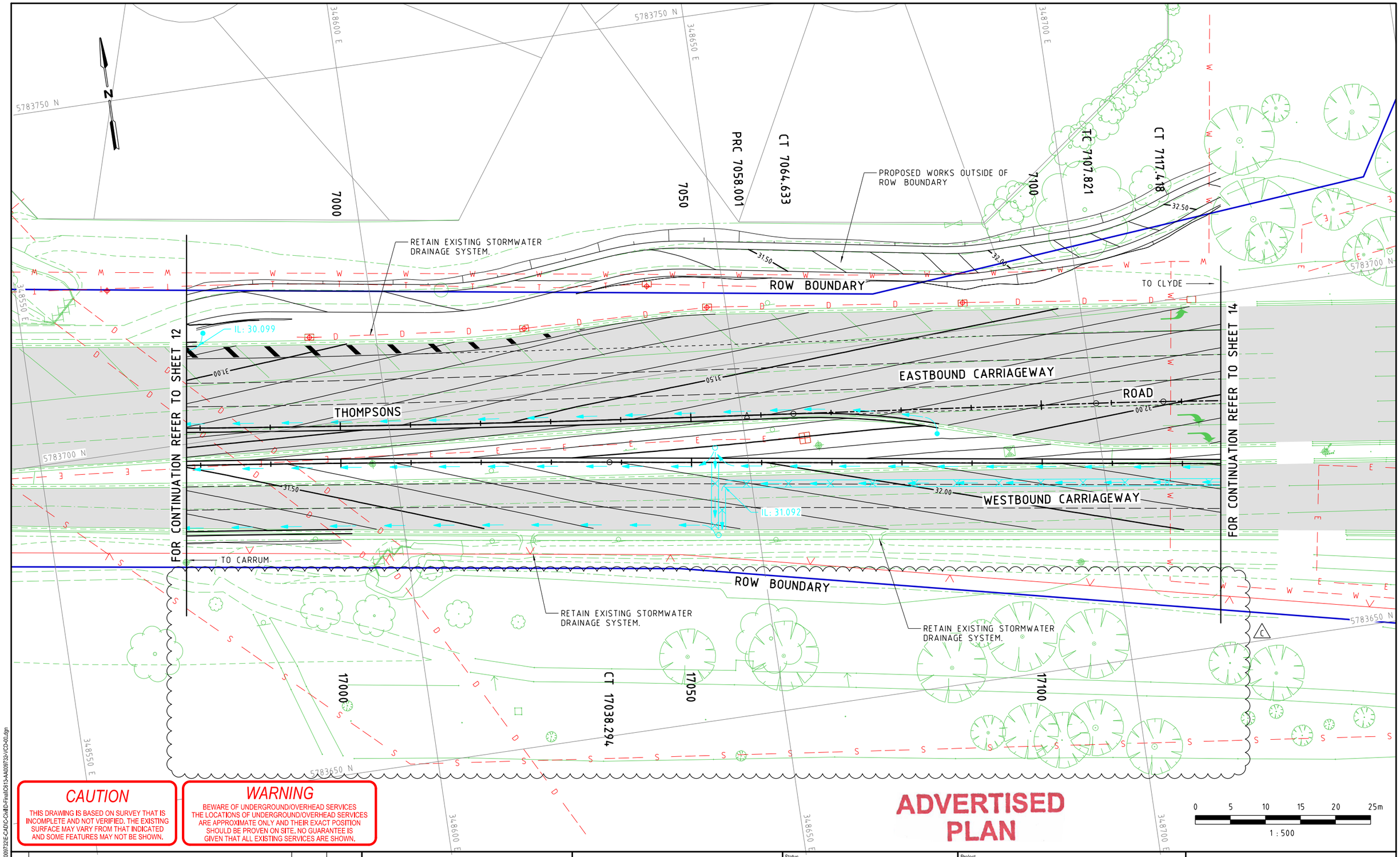

CAUTION

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WARNING

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ADVERTISED PLAN

Issue	Description	Date	Approved
C	SUP REMOVED (RFI-131-3201-00307)	21.08.18	E. H.
B	LAYOUT PLAN REVISED	19.05.17	E. H.
A	ISSUED FOR CONSTRUCTION	27.04.17	E. H.

50mm on Original

Client: vicroads

BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:500	Drawn	G.CONSTABLE
Original Size	A3	Designed	A. PRASAD
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	C. PATTINSON

Filename: C613-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PLAN SHEET 13

ARCADIS

Drawing No.	Project No.	Issue
C613	AA009732	C

V1

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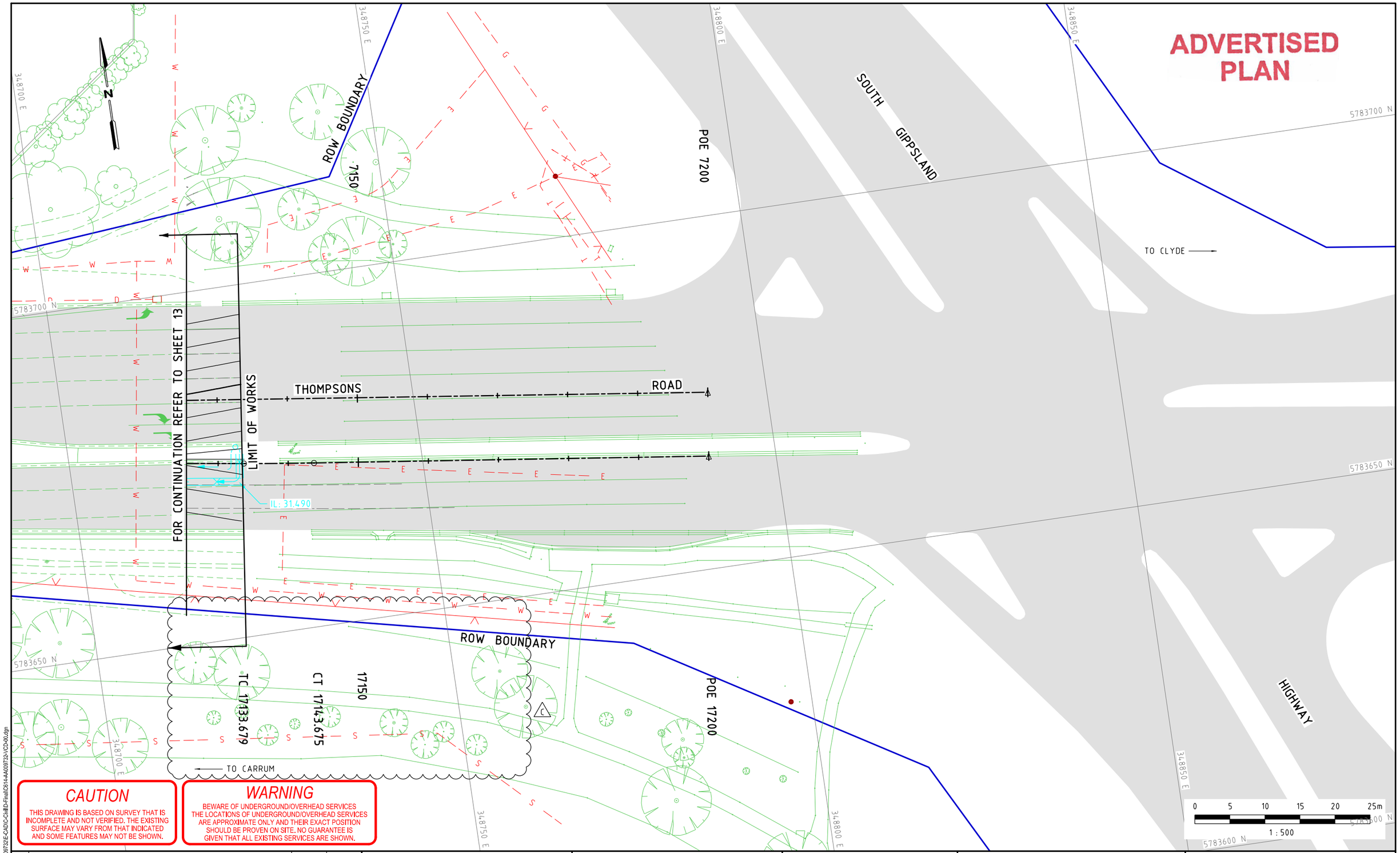
ADVERTISED PLAN



CAUTION

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WARNING

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Issue	Description	Date	Approved
C	SUP REMOVED (RFI-131-3201-00307)	21.08.18	E. H.
B	LAYOUT PLAN REVISED	19.05.17	E. H.
A	ISSUED FOR CONSTRUCTION	27.04.17	E. H.

50mm on Original

Client: vicroads

PMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:500	Drawn	G.CONSTABLE
Original Size	A3	Designed	A. PRASAD
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	C. PATTINSON

Filename: C614-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PLAN
SHEET 14

ARCADIS

Drawing No.	Project No.	Issue
C614	AA009732	C

V1

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ADVERTISED PLAN

N

347350 E
347300 E
347250 E
5784200 N
5784150 N
5784100 N
5784050 N

POB 2000.000
TC 2026.675
2050
CT 2068.780
ROW BOUNDARY
SHARED USE PATH
IL 22.131
IL 22.167
IL 22.197
IL 22.071
IL 22.020
22.50
A-191
FOR CONTINUATION REFER TO SHEET 16
IL 21.775
IL 21.672
IL 21.647
A-135
IL 21.421
IL 21.628
LIMIT OF WORKS
A-133
375 DIA RCP
22.50
375 DIA RCP
A-134
IL 21.668
EVANS ROAD
22.50
IL 21.381
375 DIA RCP
22.00
A-177
IL 20.962
IL 21.385 (EX. PIT)
ROW BOUNDARY
BREAK INTO EXISTING PIT AND CONNECT PROPOSED PIPE
IL 20.947
POB 1000.000
TC 1033.705
1050
CT 1060.282

NOTE:
WHERE NO SSD IL IS PROVIDED, SSD TO GRADE WITH ROAD

0 5 10 15 20 25m
1 : 500

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Issue	Description	Date	Approved
B	DRAINAGE PIT A-133 AND SUBSURFACE DRAINAGE RELOCATED	30.05.17	E. H.
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

50mm on Original

Client: vicroads

BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:500	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C615-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PLAN
SHEET 15

ARCADIS

Drawing No.	Project No.	Issue
C615	AA009732	B

V1

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30/05/2017

N

5784050 N
5784000 N
5783950 N
5783900 N
347300 E
347250 E
347200 E
5784100 N

TC 2104.813
CT 2171.596
2100
2150
2200

PROPOSED ROW BOUNDARY
ROW BOUNDARY
SHARED USE PATH
EVANS ROAD
HONEYBARK CRESCENT

FOR CONTINUATION REFER TO SHEET 15
FOR CONTINUATION REFER TO SHEET 4

A-190 450 x 300 RCBC IL 21.879
A-136 22.50 375 DIA RCP IL 21.853 IL 21.748 IL 21.681
A-163 375 DIA RCP IL 21.64
A-162 375 DIA RCP IL 21.813 IL 21.686 IL 21.631
A-161 375 DIA RCP IL 21.6 IL 21.631 IL 21.666
A-161A 375 DIA RCP IL 21.682 IL 21.5
A-166 IL 21.762
375 DIA RCP 750 DIA RCP
A-160 750 DIA RCP IL 21.889
IL 21.677 IL 21.678
A-178 IL 21.780 IL 21.698
DEMOLISH/REMOVE EXISTING PIT AND CONSTRUCT NEW JUNCTION PIT AT BACK OF KERB
IL 22.715
IL 21.642 (EX. PIT)
EX. SEP
IL 21.390 (EX. PIT)
IL 22.134
IL 21.656
IL 21.537
IL 21.493
IL 21.610
IL 21.414
EX. 750 DIA RCP
375 DIA RCP 22.50
A-159 IL 21.653
A-158 IL 21.578
MODIFY EXISTING PIT TO SUIT FSL AND CONNECT NEW DRAINAGE
IL 21.482
A-157 IL 21.521
A-156 IL 21.641
A-180

NOTE:
WHERE NO SSD IL IS PROVIDED, SSD TO GRADE WITH ROAD

0 5 10 15 20 25m
1 : 500

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Issue	Description	Date	Approved
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

vicroads

Client: BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:500	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C616-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PLAN
SHEET 16

ARCADIS

Drawing No.	Project No.	Issue
C616	AA009732	A

V1

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50mm on Original

ADVERTISED PLAN

N

347300 E
347250 E
347200 E
5783800 N
5783750 N
5783700 N
5783650 N
5783850 N

TC 2353.905
CT 2404.941
TC 1424.828
PRC 1469.529

2350
2400
2450
1350
1400
1450

PROPOSED ROW BOUNDARY
ROW BOUNDARY
PROPOSED ROW BOUNDARY

600 DIA RCP
375 DIA RCP
22.50
23.00

A-98
A-99
A-100
A-101
A-102
A-103
A-103A
A-111A

IL 22.262
IL 22.163
IL 22.284
IL 21.69
IL 22.200
IL 22.294
IL 21.821
IL 22.309
IL 22.158
IL 21.841
IL 21.955
IL 21.68
IL 21.98
IL 21.98
IL 22.123
IL 22.125
IL 22.132
IL 22.301

EXISTING ACCESS
TO BE RETAINED

FOR CONTINUATION REFER TO SHEET 4
FOR CONTINUATION REFER TO SHEET 18

NOTE:
WHERE NO SSD IL IS PROVIDED,
SSD TO GRADE WITH ROAD

0 5 10 15 20 25m
1 : 500

CAUTION
THIS DRAWING IS BASED ON SURVEY THAT IS INCOMPLETE AND NOT VERIFIED. THE EXISTING SURFACE MAY VARY FROM THAT INDICATED AND SOME FEATURES MAY NOT BE SHOWN.

WARNING
BEWARE OF UNDERGROUND/OVERHEAD SERVICES
THE LOCATIONS OF UNDERGROUND/OVERHEAD SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

Issue	Description	Date	Approved
B	SWALE DRAIN REVISED, DRAINAGE PIPE ADDED	21.02.18	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

vicroads

Client: BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:500	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C617-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PLAN
SHEET 17

ARCADIS

Drawing No.	Project No.	Issue
C617	AA009732	B

V1

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20/02/2018 4:51:14 PM

50mm on Original

N

5783650 N
5783600 N
5783550 N
5783500 N
347250 E
347200 E
347150 E

TC 2496.872
2500
2550
CT 2576.743
POE 2600.000
1500
1550
CT 1556.6
POE 1600

PROPOSED ROW BOUNDARY
ROW BOUNDARY
ROW BOUNDARY
EVANS ROAD
LIMIT OF WORKS
FOR CONTINUATION REFER TO SHEET 17

IL 22.352
IL 22.500
IL 22.314
IL 22.623
LOCATE EXISTING SSD
AND CONNECT TO SI PIT
EXISTING ACCESS
TO BE RETAINED
EXISTING ACCESS
TO BE RETAINED
23.00
23.00
A-105
A-106
A-107
A-108
450 x 300
RCBC
450 x 300
RCBC
IL 22.365
TYPE 1 BEACHING
L=1.40m
D50=100mm
IL 22.620
IL 22.3
IL 22.745
TYPE 1 BEACHING
L=1.40m
D50=100mm
IL 22.767
IL 23.000

CAUTION

THIS DRAWING IS BASED ON SURVEY THAT IS INCOMPLETE AND NOT VERIFIED. THE EXISTING SURFACE MAY VARY FROM THAT INDICATED AND SOME FEATURES MAY NOT BE SHOWN.

WARNING

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NOTE:
WHERE NO SSD IL IS PROVIDED,
SSD TO GRADE WITH ROAD

0 5 10 15 20 25m
1 : 500

Issue	Description	Date	Approved
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

50mm on Original

Client: BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:500	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C618-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PLAN
SHEET 18

ARCADIS

Drawing No.	Project No.	Issue
C618	AA009732	A

V1

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18/05/2017

ADVERTISED PLAN

LOCATE EXISTING SSD AND TIE TO S1 PIT

LIMIT OF WORKS

SSD MUST TIE TO EXISTING DRAINAGE PITS

ROW BOUNDARY

MERINDA PARK BOULEVARD

VICTRACK BOUNDARY

CRANBOURNE RAILWAY LINE

MERINDA PARK RAILWAY STATION CARPARK

IL 23.593

IL 23.489

IL 23.632

IL 23.237

BREAK INTO EXISTING PIT AND CONNECT PIPE

DEMOLISH EXISTING PIPE

A-153

A-137

FOR CONTINUATION REFER TO SHEET 20

CT 3009.081

TC 3000.000

CT 4008.935

TC 3076.709

TC 4076.614

CT 4093.165

CT 9024.218

3050

3100

4050

4100

5784100 N

5784050 N

5784000 N

347550 E

347600 E

347650 E

347700 E

POB 9000.000

NOTE:
WHERE NO SSD IL IS PROVIDED, SSD TO GRADE WITH ROAD

CAUTION

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0 5 10 15 20 25m

1 : 500

Issue	Description	Date	Approved
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

50mm on Original

Client: BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:500	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C619-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PLAN
SHEET 19

ARCADIS

Drawing No.	Project No.	Issue
C619	AA009732	A

V1

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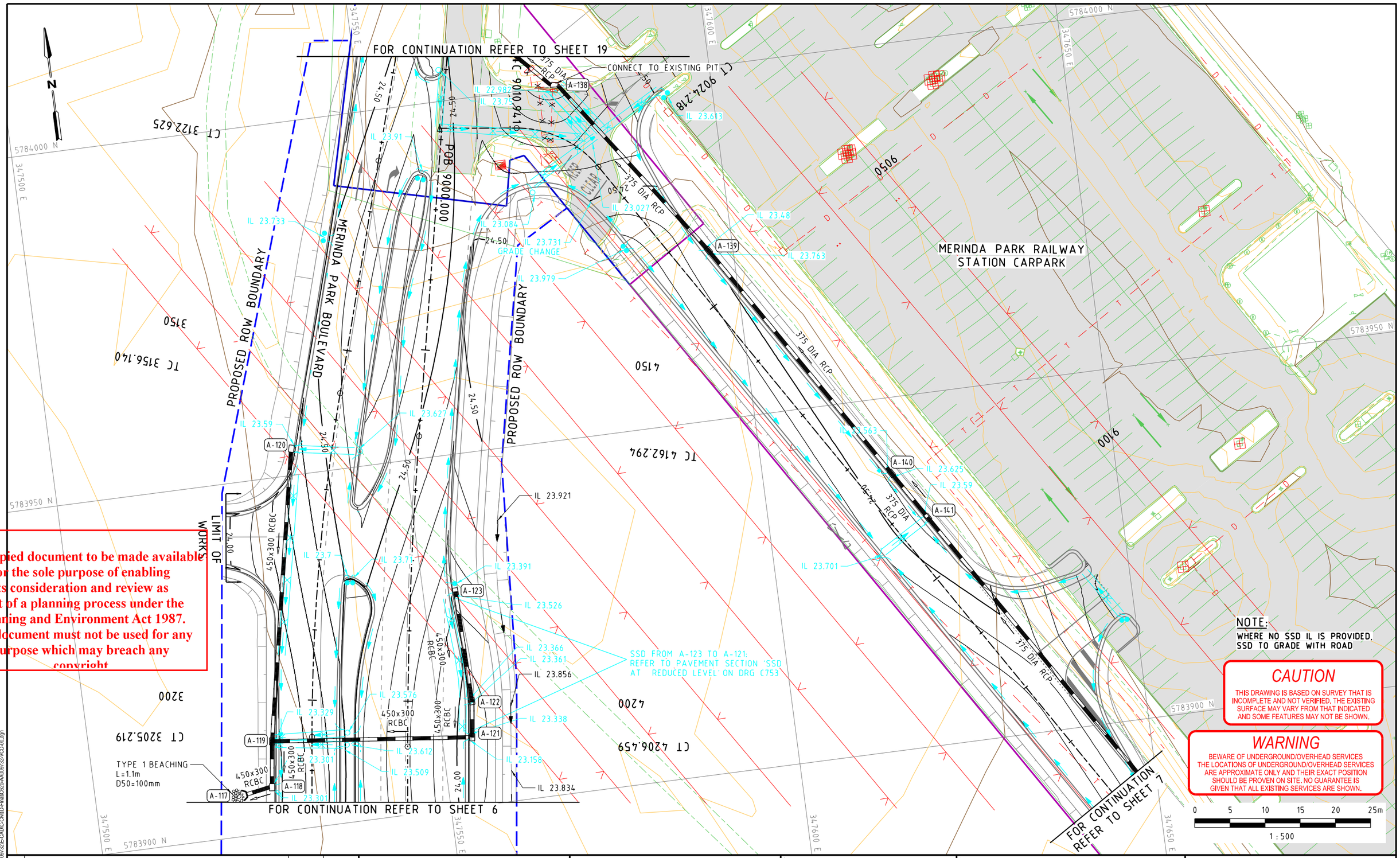

Issue	Description	Date	Approved
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

ADVERTISED PLAN

Client: BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:500	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C620-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PLAN
SHEET 20

ARCADIS

Drawing No.	Project No.	Issue
C620	AA009732	A

V1

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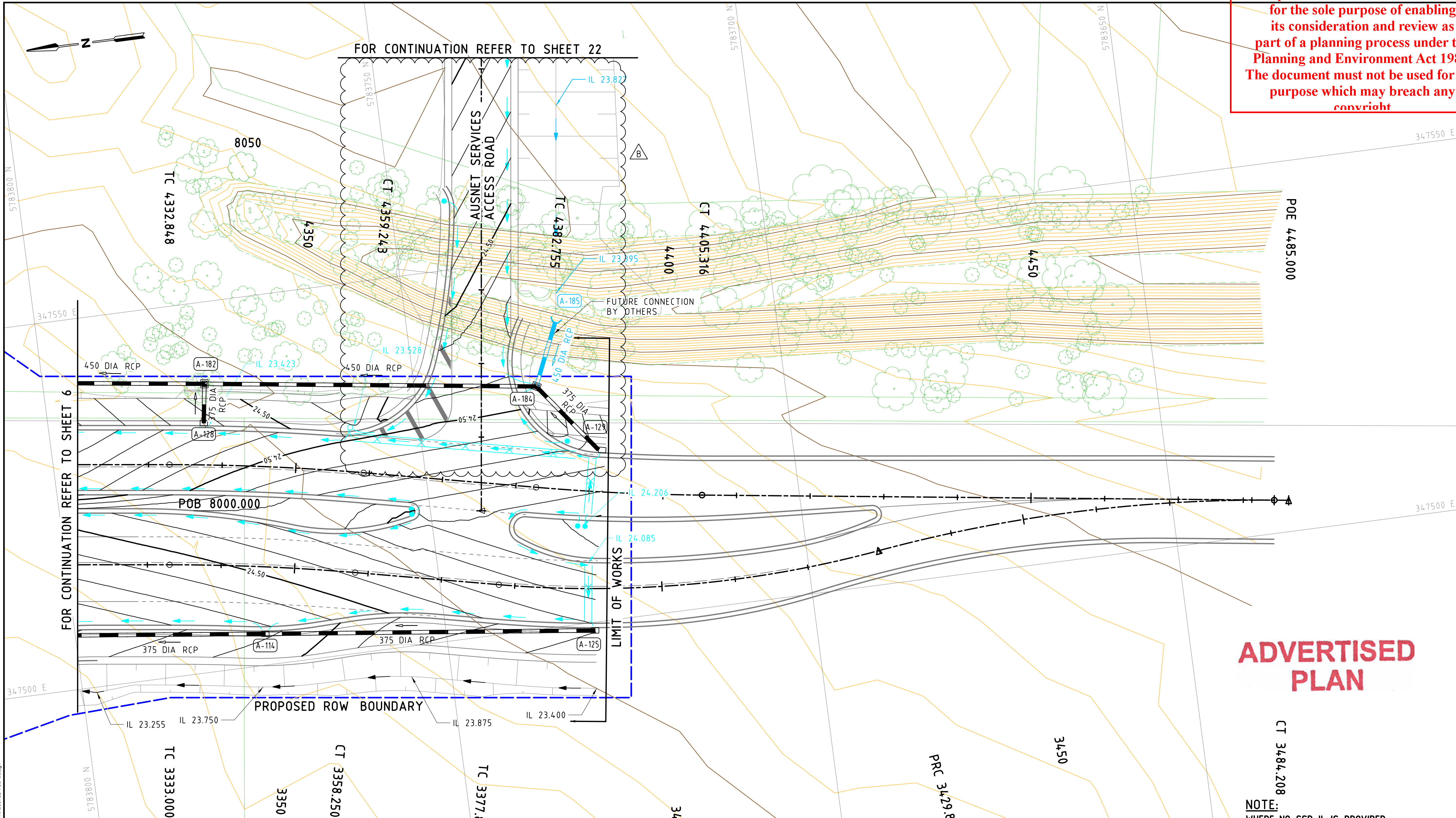

ADVERTISED PLAN

NOTE:
WHERE NO SSD IL IS PROVIDED, SSD TO GRADE WITH ROAD

0 5 10 15 20 25m
1 : 500

CAUTION
THIS DRAWING IS BASED ON SURVEY THAT IS INCOMPLETE AND NOT VERIFIED. THE EXISTING SURFACE MAY VARY FROM THAT INDICATED AND SOME FEATURES MAY NOT BE SHOWN.

WARNING
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Issue	Description	Date	Approved
B	SUBSURFACE DRAINAGE ADDED	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

vicroads

Client: BMD constructions

Status: **CONSTRUCTION** ISSUED FOR CONSTRUCTION

Scales	1:500	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C621-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PLAN SHEET 21

ARCADIS

Drawing No. C621 | Project No. AA009732 | Issue B

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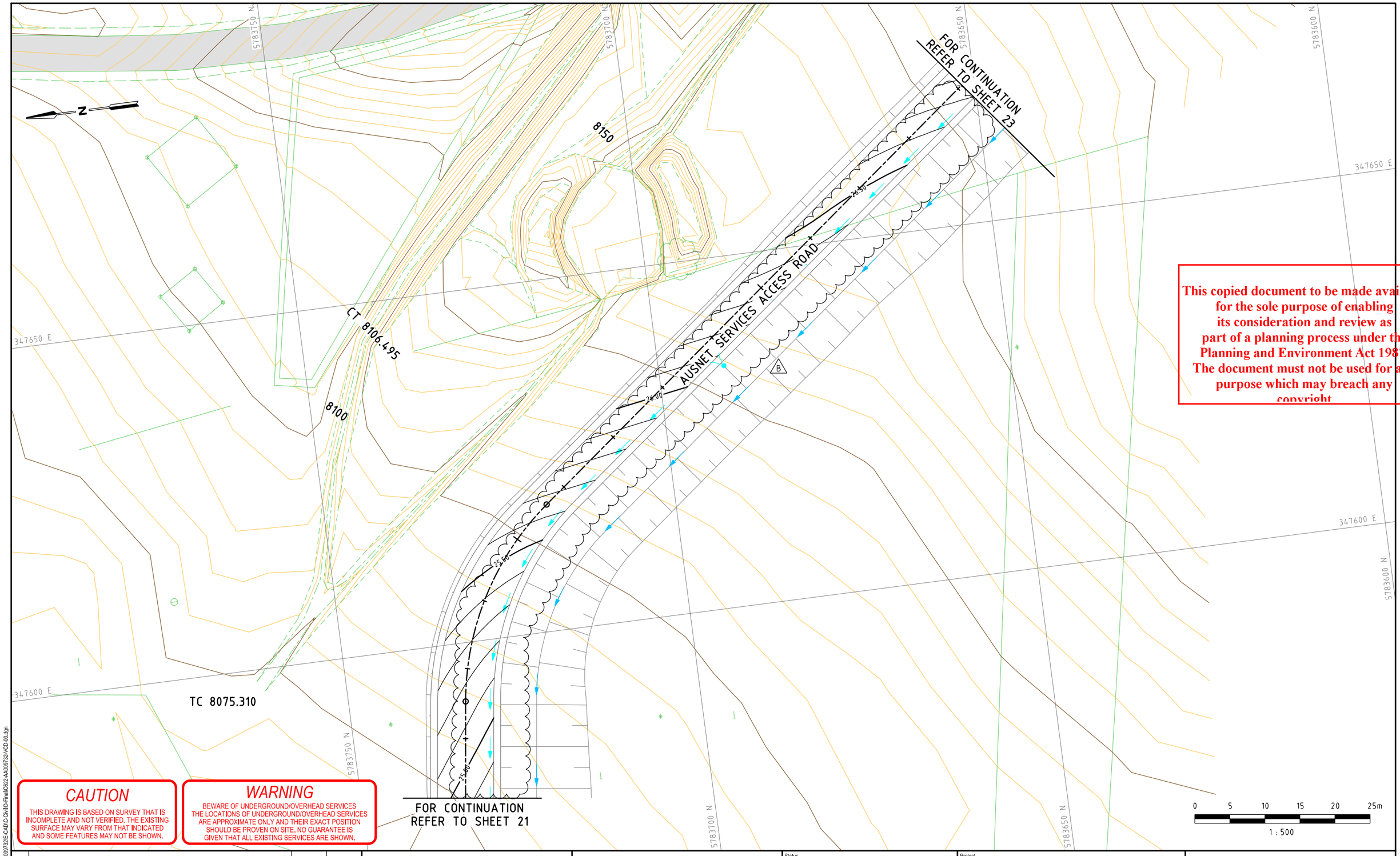
50mm on Original

V1



CAUTION

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WARNING

BEWARE OF UNDERGROUND/OVERHEAD SERVICES THE LOCATIONS OF UNDERGROUND/OVERHEAD SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

Issue	Description	Date	Approved
B	SUBSURFACE DRAINAGE ADDED	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

50mm on Original

vicroads

ADVERTISED PLAN

Client: BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:500	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C622-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PLAN
SHEET 22

ARCADIS

Drawing No.	Project No.	Issue
C622	AA009732	B

V1

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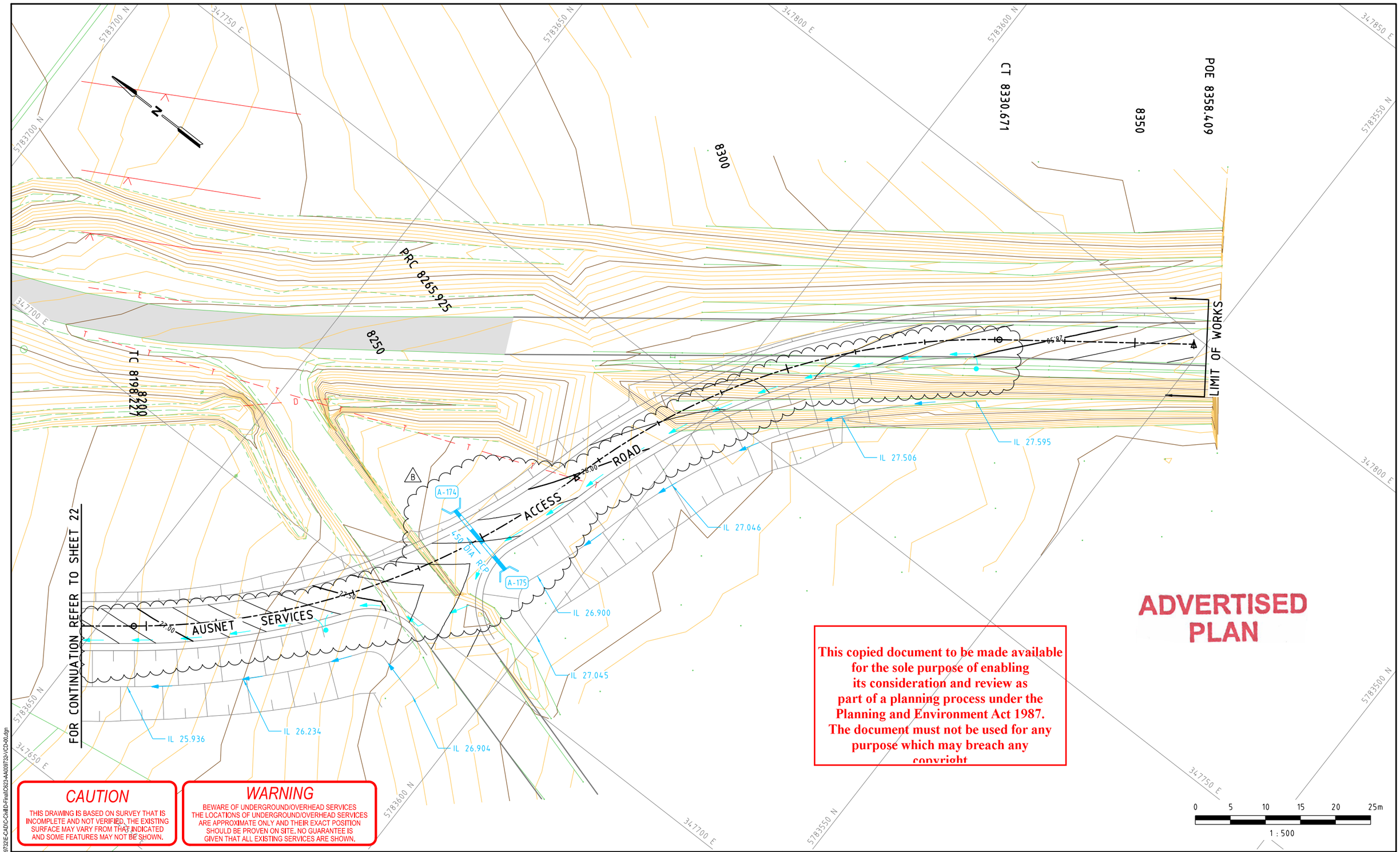

ADVERTISED PLAN

CAUTION

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WARNING

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Issue	Description	Date	Approved
B	PIPE AND ENDWALLS LOCATION AMENDED, SUBSURFACE DRAINAGE ADDED	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

Client: vicroads; BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:500	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C623-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PLAN SHEET 23

ARCADIS

Drawing No.	Project No.	Issue
C623	AA009732	B

V1

50mm on Original

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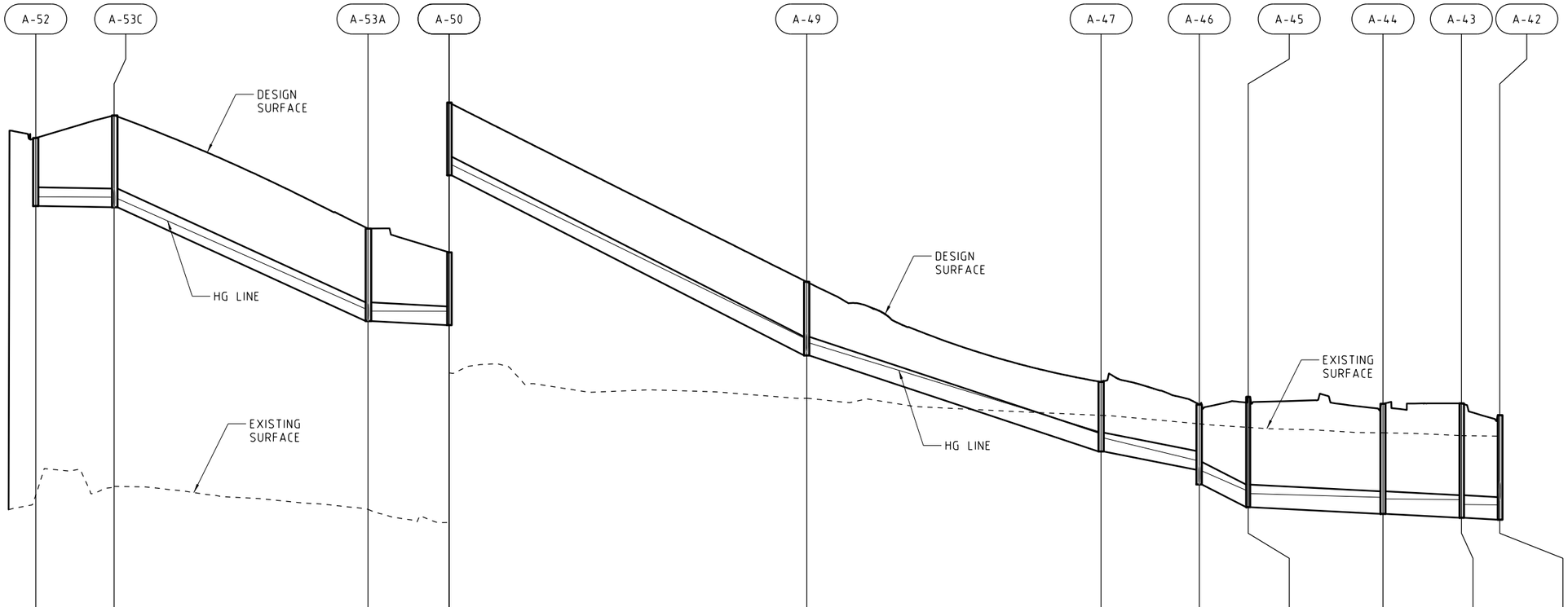

1 IN 10 YR FLOW (m3/s)	0.028	0.057	0.068	0.085	0.118	0.134	0.15	0.149	0.146	0.144	
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	0.250	0.514	0.617	0.770	1.065	1.209	0.944	0.936	0.919	0.905	
PIPE SIZE & TYPE	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ450RCP	Φ450RCP	Φ450RCP	Φ450RCP	
SLOPE 1 IN X	605	22.3	200	19.8	30.7	53.5	21.5	200	201	202	
DATUM RL.	20.0			17.0							
DEPTH TO PIPE INVERT (m)	1.360	1.841	1.841	1.852	1.852	1.457	1.457	1.475	1.475	1.393	1.393	1.306	1.599	2.209	2.209	2.204	2.204	2.291	2.291	2.091
HYDRAULIC GRADE LINE (m AHD)	31.740	31.731	31.703	29.500	29.452	29.450	29.382	25.912	25.814	24.040	23.910	23.458	23.252	22.865	22.796	22.722	22.688	22.676	22.578	22.569
PIPE INVERT LEVEL (m AHD)	31.556	31.530	31.530	29.250	29.250	29.169	29.169	25.561	25.561	23.640	23.640	23.273	22.980	22.525	22.525	22.390	22.390	22.312	22.312	22.274
FINISHED SURFACE (m AHD)	32.916	33.371		31.102		30.626		27.036		25.033		24.579		24.734		24.594		24.603		24.365
EXISTING SURFACE (m AHD)	25.756	25.941		25.481		25.216		24.706		24.363		24.193		24.121		24.013		23.958		23.947
CHAINAGE (m)	0.000	15.696		66.474		82.693		154.241		213.131		232.779		242.576		269.526		285.217		292.907

ADVERTISED PLAN

HORIZ 1 : 1000 — 0 10 20 30 40 50m

VERT 1 : 100 — 0 1 2 3 4 5m

Issue	Description	Date	Approved
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

50mm on Original

Client: BMD constructions

Status: CONSTRUCTION — ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C651-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE LONGITUDINAL SECTION SHEET 1

ARCADIS

Drawing No.	Project No.	Issue
C651	AA009732	A

V1

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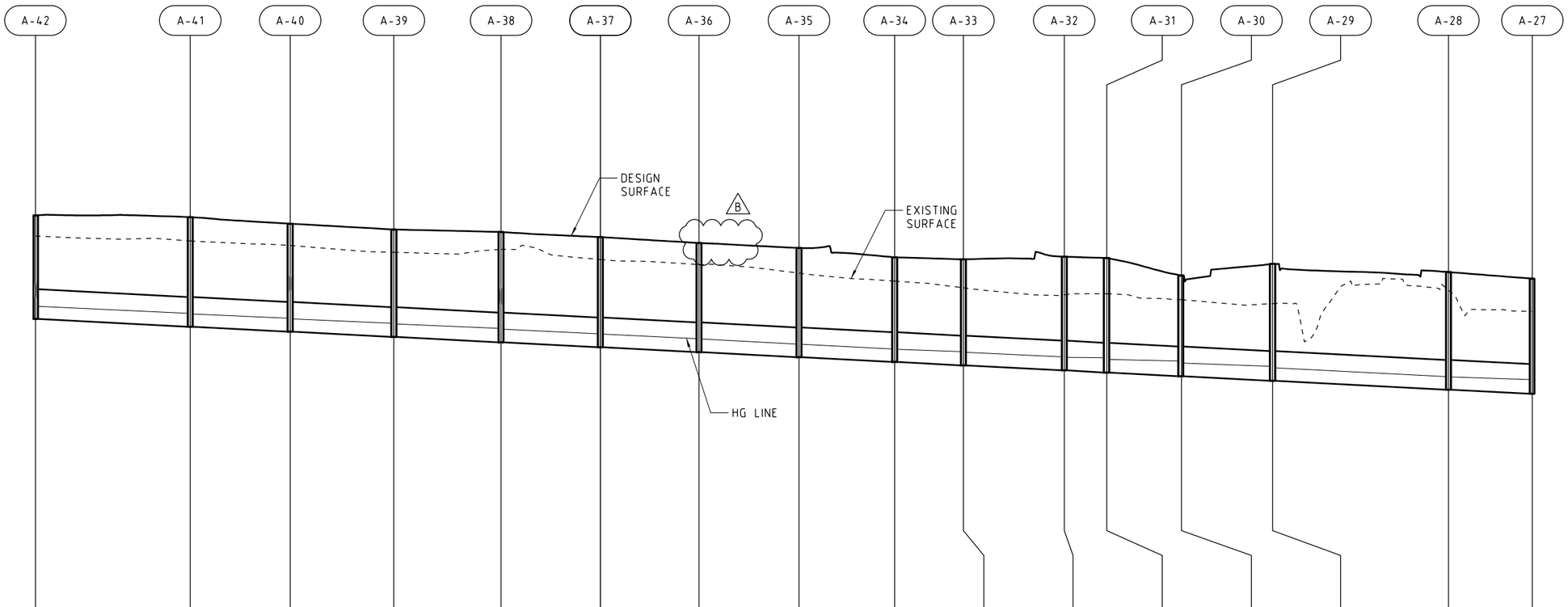

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1 IN 10 YR FLOW (m3/s)	0.158	0.158	0.163	0.164	0.168	0.167	0.169	0.163	0.157	0.169	0.169	0.169	0.169	0.167	0.161	
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	0.559	0.557	0.577	0.581	0.593	0.591	0.597	0.576	0.555	0.596	0.596	0.596	0.597	0.591	0.569	
PIPE SIZE & TYPE	Φ600RCP	Φ600RCP	Φ600RCP	Φ600RCP	Φ600RCP	Φ600RCP	Φ600RCP	Φ600RCP	Φ600RCP	Φ600RCP	Φ600RCP	Φ600RCP	Φ600RCP	Φ600RCP	Φ600RCP	
SLOPE 1 IN X	200	200	199	200	200	199	200	212	188	200	200	201	198	199	202	
DATUM RL.	13.0															
DEPTH TO PIPE INVERT (m)	2.091	2.213	2.213	2.180	2.180	2.166	2.166	2.226	2.226	2.223	2.223	2.203	2.203	2.205	2.205	2.112	2.112	2.140	2.140	2.296	2.296	2.312	2.312	2.032	2.032	2.361	2.361	2.374	2.374	2.326
HYDRAULIC GRADE LINE (m AHD)	22.529	22.387	22.373	22.289	22.277	22.186	22.173	22.083	22.068	21.975	21.967	21.876	21.868	21.768	21.763	21.743	21.727	21.616	21.602	21.510	21.500	21.492	21.457	21.425	21.382	21.320	21.288	21.111	21.105	21.047 B
PIPE INVERT LEVEL (m AHD)	22.274	22.118	22.118	22.017	22.017	21.912	21.912	21.804	21.804	21.704	21.704	21.604	21.604	21.503	21.503	21.407	21.407	21.338	21.338	21.236	21.236	21.193	21.193	21.118	21.118	21.025	21.025	20.847	20.847	20.763
FINISHED SURFACE (m AHD)	24.331	24.331	24.197	24.078	24.030	23.927	23.807	23.708	23.519	23.478	23.532	23.505	23.150	23.386	23.221	23.089														
EXISTING SURFACE (m AHD)	23.850	23.850	23.756	23.619	23.680	23.474	23.374	23.199	23.039	22.903	22.762	22.782	22.665	22.581	22.856	22.426														
CHAINAGE (m)	0.000	31.247	51.420	72.347	93.978	114.024	133.934	154.108	173.423	187.284	207.647	216.232	231.285	249.706	285.188	302.114														

1 : 1000

HORIZ 0 10 20 30 40 50m

VERT 0 1 2 3 4 5m

1 : 100

Issue	Description	Date	Approved
B	DESIGN SURFACE AND HG LINE AMENDED	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

vicroads

Client: BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C652-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE LONGITUDINAL SECTION
SHEET 2

ARCADIS

Drawing No.	Project No.	Issue
C652	AA009732	B

V1

50mm on Original

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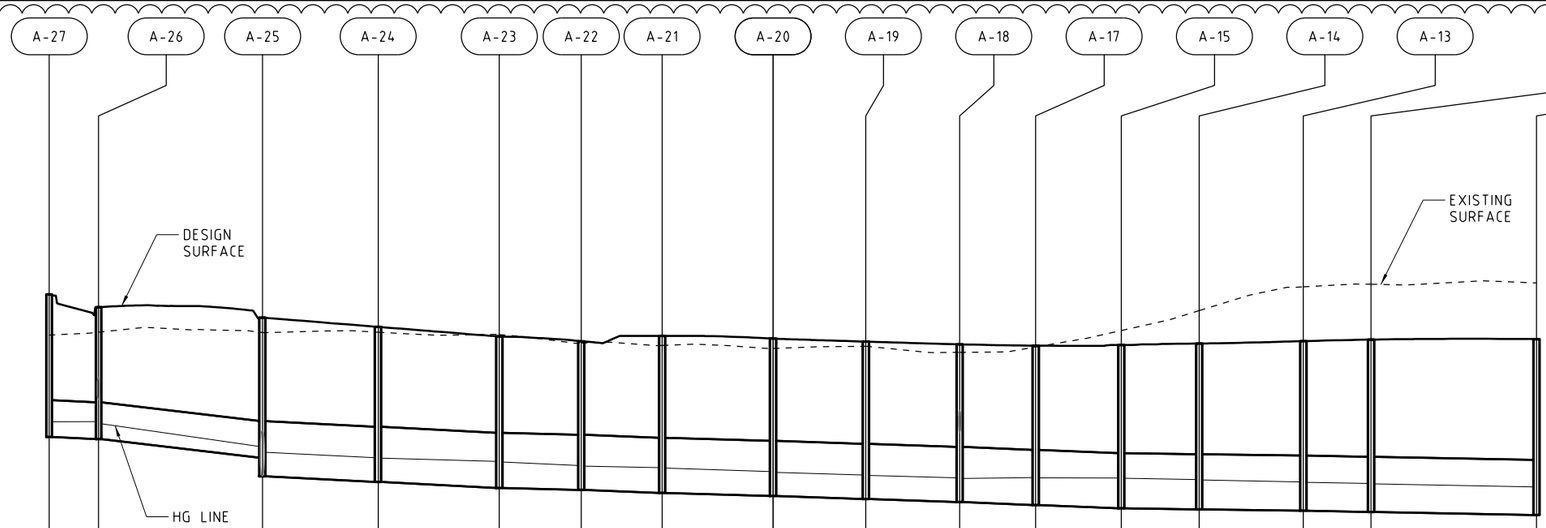

1 IN 10 YR FLOW (m3/s)		0.151	0.155	0.447	0.447	0.444	0.442	0.437	0.438	0.437	0.442	0.441	0.44	0.438	0.434	0.43
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)		0.533	0.548	0.703	0.703	0.697	0.695	0.686	0.689	0.688	0.695	0.694	0.691	0.689	0.682	0.676
PIPE SIZE & TYPE		Φ600RCP	Φ600RCP	Φ900RCP	Φ900RCP	Φ900RCP	Φ900RCP	Φ900RCP	Φ900RCP	Φ900RCP	Φ900RCP	Φ900RCP	Φ900RCP	Φ900RCP	Φ900RCP	Φ900RCP
SLOPE 1 IN X		222	88.1	200	200	449	264	362	303	306	248	279	679	797	552	540
DATUM RL.	12.0															
DEPTH TO PIPE INVERT (m)	2.326	2.326	2.154	2.287	2.531	2.473	2.424	2.562	2.568	2.569	2.575	2.603	2.662	2.706	2.767	2.811	2.870	2.870
HYDRAULIC GRADE LINE (m AHD)	21.047	21.012	21.016	20.980	20.609	20.512	20.425	20.417	20.364	20.354	20.296	20.286	20.261	20.256	20.200	20.186	20.144	20.137	20.097	20.086	20.102	20.095	20.094	20.088	20.068	20.061	20.028	20.022	20.003	19.996	19.950	19.944
PIPE INVERT LEVEL (m AHD)	20.763	20.763	20.727	20.727	20.423	20.123	20.029	20.029	19.930	19.930	19.900	19.900	19.850	19.850	19.800	19.800	19.750	19.750	19.700	19.700	19.650	19.650	19.600	19.600	19.581	19.581	19.560	19.560	19.540	19.540	19.490	19.490
FINISHED SURFACE (m AHD)		23.089	22.881		22.710		22.559		22.403		22.324		22.412		22.368		22.319		22.275		22.253		22.262		22.288		22.327		22.351		22.360	
EXISTING SURFACE (m AHD)		22.426	22.473		22.469		22.473		22.433		22.296		22.255		22.207		22.243		22.145		22.230		22.500		22.824		23.213		23.255		23.277	
CHAINAGE (m)	0.000	8.037		34.805		53.661		73.419		86.783		99.977		118.077		133.211		148.514		160.920		174.887		187.594		204.578		215.624		242.615	

1 : 1000
HORIZ 0 10 20 30 40 50m
VERT 0 1 2 3 4 5m
1 : 100

Issue	Description	Date	Approved
B	SECTION UPDATED	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

50mm on Original

Client: BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C653-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE LONGITUDINAL SECTION
SHEET 3

ARCADIS

Drawing No.	Project No.	Issue
C653	AA009732	B

V1

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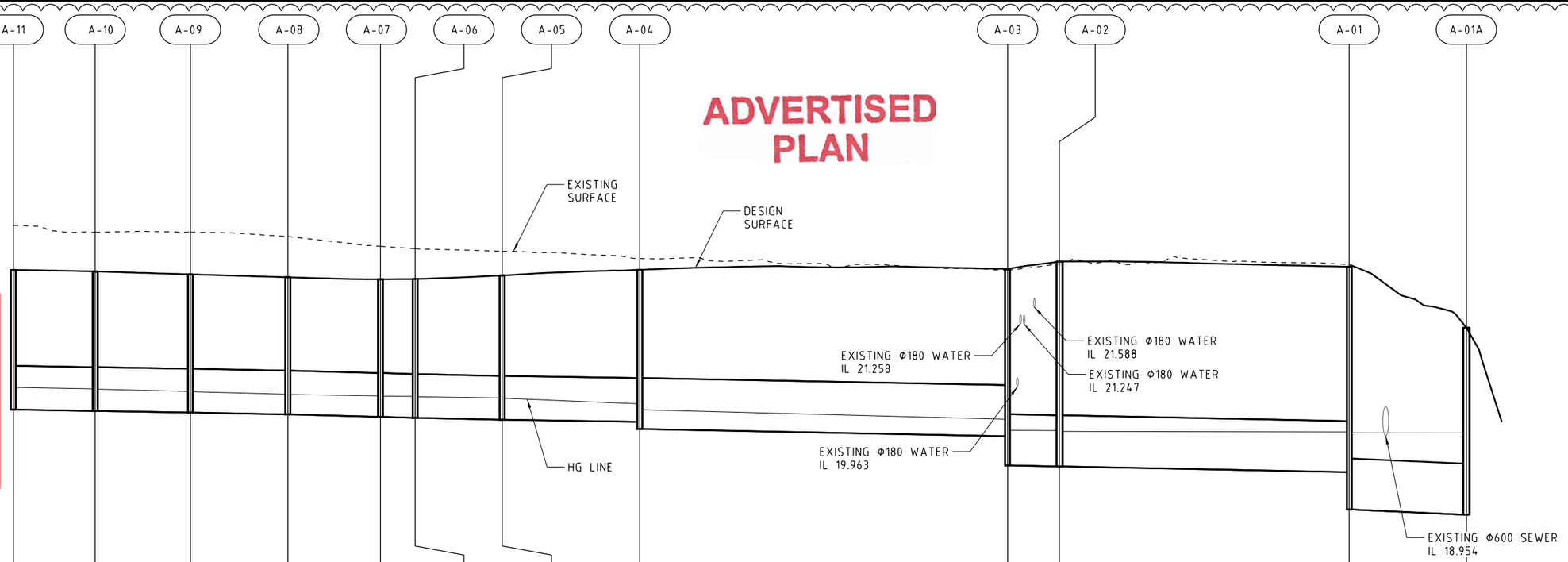

1 IN 10 YR FLOW (m3/s)		0.423	0.419	0.415	0.412	0.408	0.408	0.405	0.399		0.382	0.379	0.365	
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)		0.665	0.659	0.653	0.647	0.642	0.641	0.637	0.461		0.441	0.438	0.422	
PIPE SIZE & TYPE		Φ900RCP	Φ900RCP	Φ900RCP	Φ900RCP	Φ900RCP	Φ900RCP	Φ900RCP	Φ1050RCP		Φ1050RCP	Φ1050RCP	Φ1050RCP	
SLOPE 1 IN X		561	653	501	381	356	447	708	515		500	500	232	
DATUM RL.	12.0													
DEPTH TO PIPE INVERT (m)	2.870	2.870	2.868	2.868	2.840	2.840	2.820	2.820	2.828	2.828	2.854	2.854	2.965	2.965	3.123	3.273	3.437	4.037	4.210	4.210	4.221	4.991	3.844
HYDRAULIC GRADE LINE (m AHD)	19.950	19.944	19.915	19.909	19.863	19.857	19.806	19.800	19.773	19.766	19.760	19.754	19.729	19.721	19.609	19.486	19.293	19.061	19.060	19.039	19.031	19.014	19.010
PIPE INVERT LEVEL (m AHD)	19.490	19.490	19.460	19.460	19.430	19.430	19.390	19.390	19.340	19.340	19.320	19.320	19.280	19.280	19.240	19.090	18.943	18.344	18.323	18.323	18.204	17.434	17.330
FINISHED SURFACE (m AHD)	22.360		22.328		22.270		22.210		22.168		22.174		22.245		22.363		22.381		22.533		22.425		21.174
EXISTING SURFACE (m AHD)	23.277		23.134		23.137		23.046		22.845		22.795		22.745		22.596		22.356		22.484		22.473		21.174
CHAINAGE (m)	0.000		16.825		36.406		56.432		75.476		82.601		100.481		128.781		204.399		215.033		274.596		298.707

1 : 1000
HORIZ 0 10 20 30 40 50m
VERT 0 1 2 3 4 5m
1 : 100

Issue	Description	Date	Approved
B	SECTION UPDATED	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

vicroads

Client: BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C654-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE LONGITUDINAL SECTION SHEET 4

ARCADIS

Drawing No.	Project No.	Issue
C654	AA009732	B

V1

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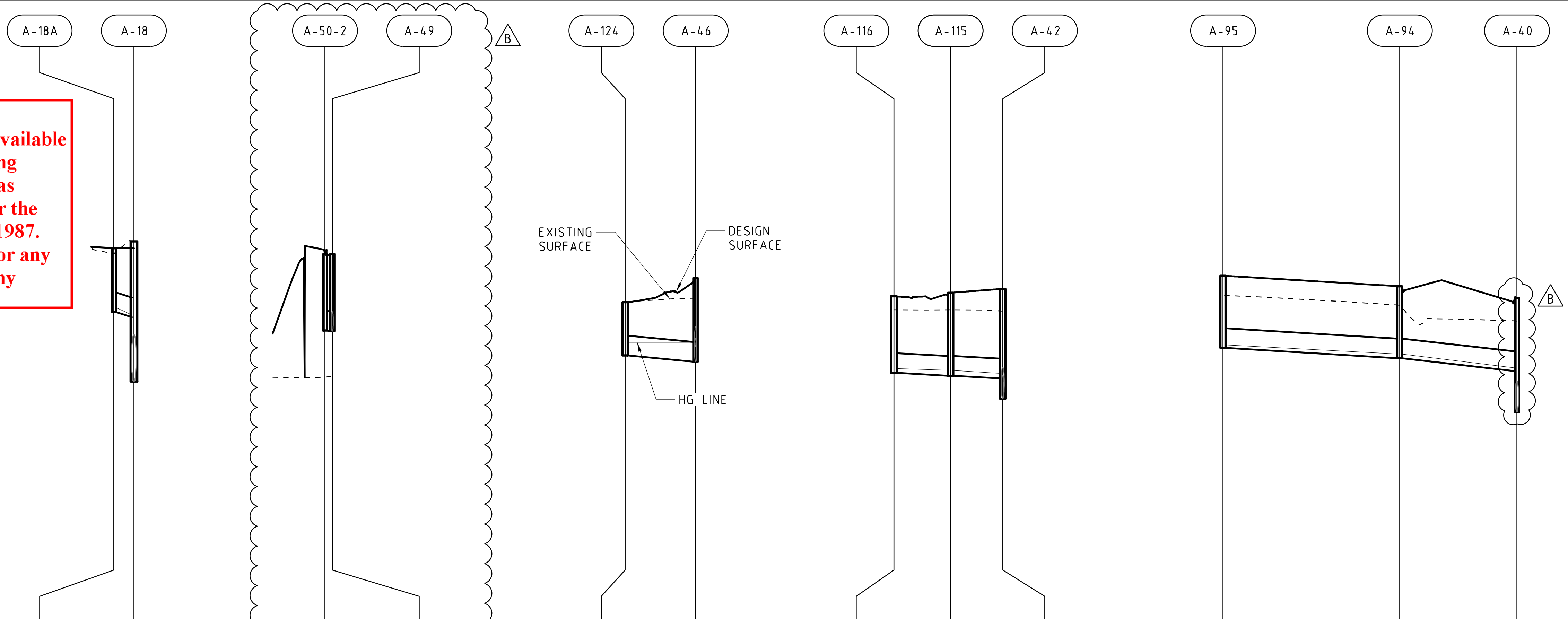

	A-18A	A-18	
1 IN 10 YR FLOW (m3/s)	0.013		
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	2.9		
PIPE SIZE & TYPE	Φ375RCP		
SLOPE 1 IN X	39.2		
DATUM RL.	11.0		
DEPTH TO PIPE INVERT (m)	1.219	1.445	2.575
HYDRAULIC GRADE LINE (m AHD)	21.008	20.880	20.108
PIPE INVERT LEVEL (m AHD)	20.928	20.830	19.700
FINISHED SURFACE (m AHD)	22.040	22.275	
EXISTING SURFACE (m AHD)	22.147	22.145	
CHAINAGE (m)	0.000	3.837	

	A-50-2		A-49	
1 IN 10 YR FLOW (m3/s)		0.023		
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)		0.208		
PIPE SIZE & TYPE		Φ375RCP		
SLOPE 1 IN X		100		
DATUM RL.		16.0		
DEPTH TO PIPE INVERT (m)		1.455	1.475	1.475
HYDRAULIC GRADE LINE (m AHD)		25.912	25.912	25.814
PIPE INVERT LEVEL (m AHD)		25.575	25.561	25.561
FINISHED SURFACE (m AHD)	27.031		27.036	
EXISTING SURFACE (m AHD)	24.683		24.706	
CHAINAGE (m)	0.000		1.394	

	A-124	A-46	
1 IN 10 YR FLOW (m3/s)	0.024		
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	0.221		
PIPE SIZE & TYPE	Φ375RCP		
SLOPE 1 IN X	112		
DATUM RL.	14.0		
DEPTH TO PIPE INVERT (m)	1.014	1.599	1.599
HYDRAULIC GRADE LINE (m AHD)	23.349	23.252	23.350
PIPE INVERT LEVEL (m AHD)	23.100	22.980	22.980
FINISHED SURFACE (m AHD)	24.114	24.579	
EXISTING SURFACE (m AHD)	24.124	24.193	
CHAINAGE (m)	0.000	13.467	

	A-116	A-115	A-115	A-42	
1 IN 10 YR FLOW (m3/s)	0.013		0.021		
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	1.28		1.28		
PIPE SIZE & TYPE	Φ375RCP		Φ375RCP		
SLOPE 1 IN X	200		200		
DATUM RL.	14.0				
DEPTH TO PIPE INVERT (m)	1.464	1.584	1.584	1.709	2.091
HYDRAULIC GRADE LINE (m AHD)	22.847	22.817	22.814	22.758	22.568
PIPE INVERT LEVEL (m AHD)	22.766	22.712	22.712	22.662	22.274
FINISHED SURFACE (m AHD)	24.230	24.296		24.365	
EXISTING SURFACE (m AHD)	23.970	23.971		23.947	
CHAINAGE (m)	0.000	10.814		20.799	

	A-95	A-94	A-94	A-40	
1 IN 10 YR FLOW (m3/s)	0.007		0.013		
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	1.38		1.9		
PIPE SIZE & TYPE	Φ375RCP		Φ375RCP		
SLOPE 1 IN X	172		90.9		
DATUM RL.	14.0				
DEPTH TO PIPE INVERT (m)	1.378	1.373	1.373	1.397	2.180
HYDRAULIC GRADE LINE (m AHD)	23.299	23.127	23.125	22.862	22.327
PIPE INVERT LEVEL (m AHD)	23.242	23.046	23.046	22.800	22.017
FINISHED SURFACE (m AHD)	24.620	24.419		24.197	
EXISTING SURFACE (m AHD)	24.247	24.060		23.756	
CHAINAGE (m)	0.000	33.750		56.117	

1 : 1000
HORIZ 0 10 20 30 40 50m
VERT 0 1 2 3 4 5m
1 : 100

Issue	Description	Date	Approved
B	SECTION UPDATED	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

vicroads

Client: BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C655-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE LONGITUDINAL SECTION
SHEET 5

ARCADIS

Drawing No. C655
Project No. AA009732
Issue B

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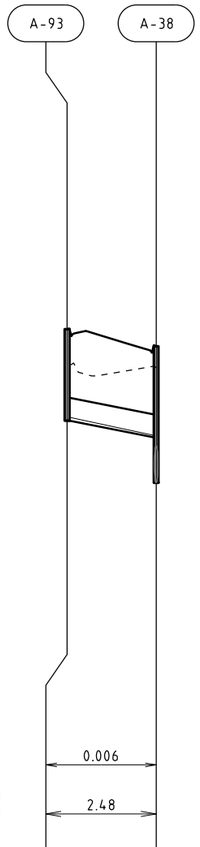

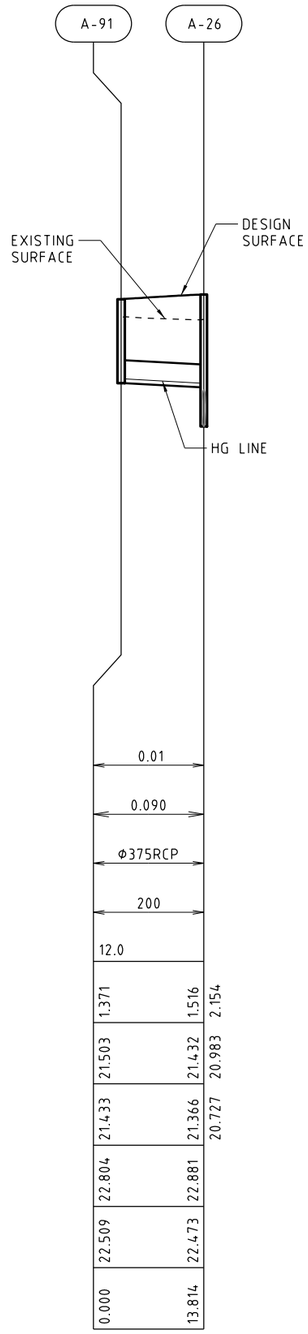

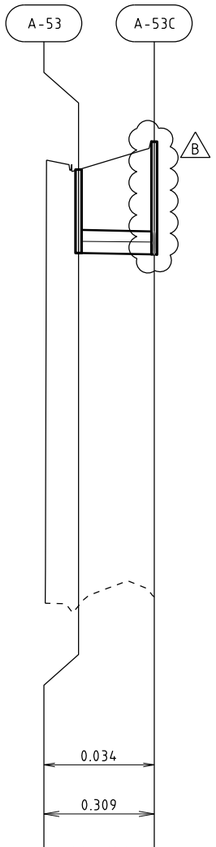

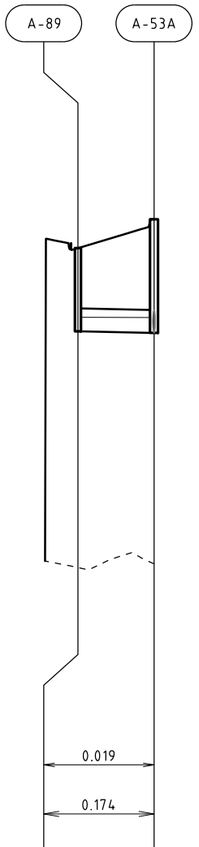

1 IN 10 YR FLOW (m3/s)	0.006		
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	2.48		
PIPE SIZE & TYPE	Φ375RCP		
SLOPE 1 IN X	53.4		
DATUM RL.	14.0		
DEPTH TO PIPE INVERT (m)	1.495	1.487	2.226
HYDRAULIC GRADE LINE (m AHD)	22.871	22.582	22.117
PIPE INVERT LEVEL (m AHD)	22.815	22.543	21.804
FINISHED SURFACE (m AHD)	24.310	24.030	
EXISTING SURFACE (m AHD)	23.658	23.680	
CHAINAGE (m)	0.000	14.521	

1 IN 10 YR FLOW (m3/s)	0.01		
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	0.090		
PIPE SIZE & TYPE	Φ375RCP		
SLOPE 1 IN X	200		
DATUM RL.	12.0		
DEPTH TO PIPE INVERT (m)	1.371	1.516	2.154
HYDRAULIC GRADE LINE (m AHD)	21.503	21.432	20.983
PIPE INVERT LEVEL (m AHD)	21.433	21.366	20.727
FINISHED SURFACE (m AHD)	22.804	22.881	
EXISTING SURFACE (m AHD)	22.509	22.473	
CHAINAGE (m)	0.000	13.814	

1 IN 10 YR FLOW (m3/s)	0.034		
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	0.309		
PIPE SIZE & TYPE	Φ375RCP		
SLOPE 1 IN X	535		
DATUM RL.	20.0		
DEPTH TO PIPE INVERT (m)	1.360	1.841	1.841
HYDRAULIC GRADE LINE (m AHD)	31.741	31.703	31.731
PIPE INVERT LEVEL (m AHD)	31.553	31.530	31.530
FINISHED SURFACE (m AHD)	32.913	33.371	
EXISTING SURFACE (m AHD)	25.795	25.941	
CHAINAGE (m)	0.000	12.354	

1 IN 10 YR FLOW (m3/s)	0.019		
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	0.174		
PIPE SIZE & TYPE	Φ375RCP		
SLOPE 1 IN X	556		
DATUM RL.	19.0		
DEPTH TO PIPE INVERT (m)	1.360	1.852	1.852
HYDRAULIC GRADE LINE (m AHD)	29.502	29.452	29.500
PIPE INVERT LEVEL (m AHD)	29.272	29.250	29.250
FINISHED SURFACE (m AHD)	30.632	31.102	
EXISTING SURFACE (m AHD)	25.420	25.481	
CHAINAGE (m)	0.000	12.413	

1 : 1000
HORIZ 0 10 20 30 40 50m
VERT 0 1 2 3 4 5m
1 : 100

Issue	Description	Date	Approved
B	DRAFTING AMENDMENTS	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

Client

Status
CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C656-AA009732-VCD-00.dgn

Project
THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title
DRAINAGE LONGITUDINAL SECTION
SHEET 6

Drawing No. C656
Project No. AA009732
Issue B

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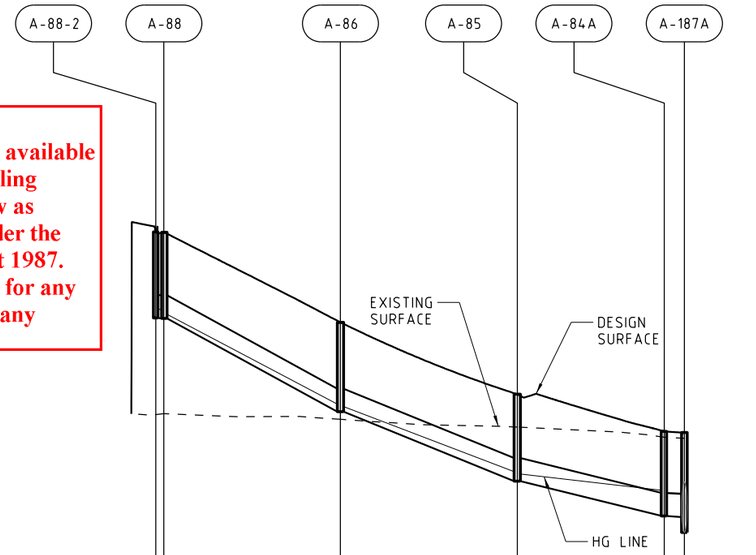

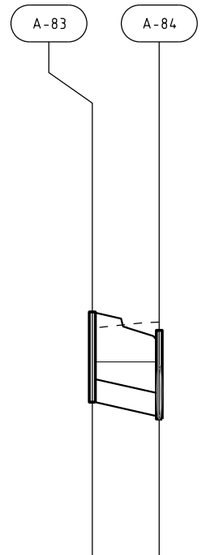

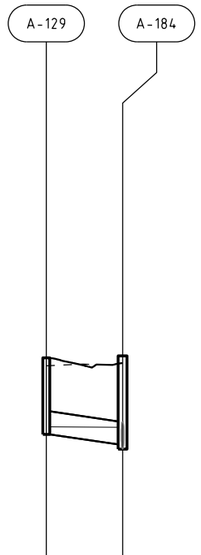

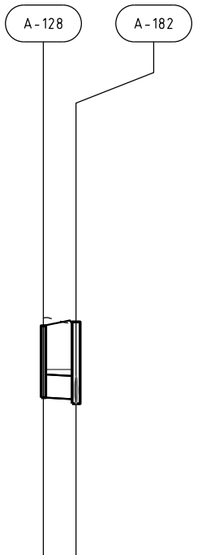

1 IN 10 YR FLOW (m3/s)	0.024	0.039	0.051	0.067	0.093
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	0.218	0.357	0.464	0.609	0.840
PIPE SIZE & TYPE	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP
SLOPE 1 IN X	200	18.9	25.5	42.4	200
DATUM RL.	16.0				
DEPTH TO PIPE INVERT (m)	1.403 / 1.405	1.405 / 1.456	1.456 / 1.416	1.416 / 1.378	1.381 / 1.549 / 1.801
HYDRAULIC GRADE LINE (m AHD)	26.649 / 26.640	26.557 / 25.090	25.054 / 23.990	23.952 / 23.690	23.645 / 23.616 D
PIPE INVERT LEVEL (m AHD)	26.498 / 26.491	26.491 / 24.969	24.969 / 23.838	23.838 / 23.272	23.268 / 23.252 / 23.000
FINISHED SURFACE (m AHD)	27.901 / 27.896		26.426	25.254	24.649 / 24.801
EXISTING SURFACE (m AHD)	24.923 / 24.938		24.845	24.717	24.553 / 24.535
CHAINAGE (m)	0.000 / 1.339		30.128	58.968	82.960 / 86.221

1 IN 10 YR FLOW (m3/s)	0.024	0.016	0.009
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	0.220	0.144	0.080
PIPE SIZE & TYPE	Φ375RCP	Φ375RCP	Φ375RCP
SLOPE 1 IN X	48.4	75.4	213
DATUM RL.	14.0	15.0	14.0
DEPTH TO PIPE INVERT (m)	1.471 / 1.696 / 1.646	1.249 / 1.446 / 1.521	1.171 / 1.260 / 1.335
HYDRAULIC GRADE LINE (m AHD)	23.611 / 23.610 D	23.721 / 23.675 D	23.657 / 23.645 / 23.645 D
PIPE INVERT LEVEL (m AHD)	23.125 / 22.850 / 22.900	23.600 / 23.435 / 23.360	23.200 / 23.175 / 23.100
FINISHED SURFACE (m AHD)	24.597 / 24.546	24.849 / 24.881	24.371 / 24.435
EXISTING SURFACE (m AHD)	24.338 / 24.429	24.719 / 24.765	24.501 / 24.435
CHAINAGE (m)	0.000 / 10.916	0.000 / 12.447	0.000 / 5.326

1 : 1000
HORIZ 0 10 20 30 40 50m
VERT 0 1 2 3 4 5m
1 : 100

Issue	Description	Date	Approved
D	MELBOURNE WATER DRAINAGE NETWORK REVISED	21.02.18	E. H
C	MELBOURNE WATER DRAINAGE NETWORK ADDED	13.12.17	E. H
B	SECTIONS UPDATED	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

vicroads

Client: BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C657-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE LONGITUDINAL SECTION
SHEET 7

ARCADIS

Drawing No.	Project No.	Issue
C657	AA009732	D

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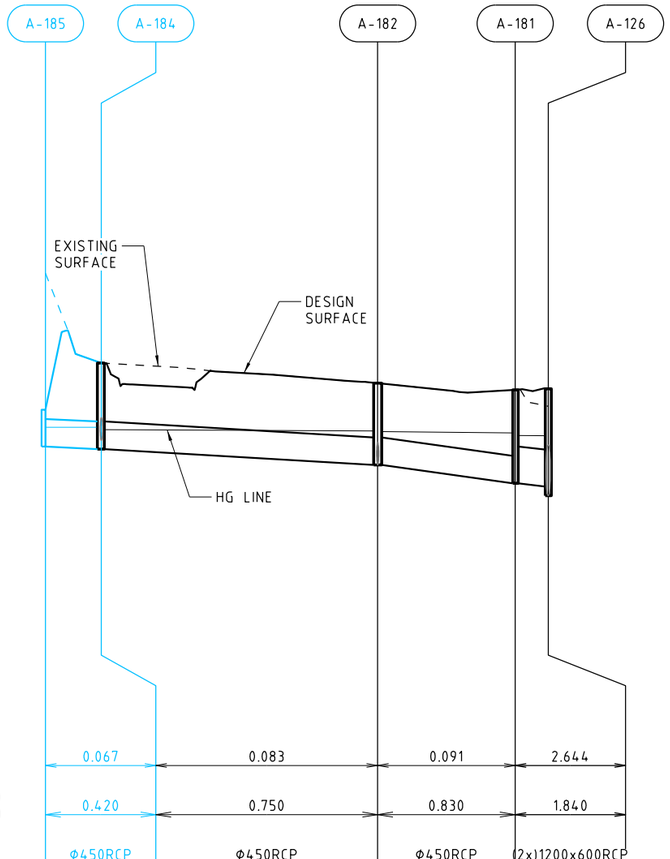

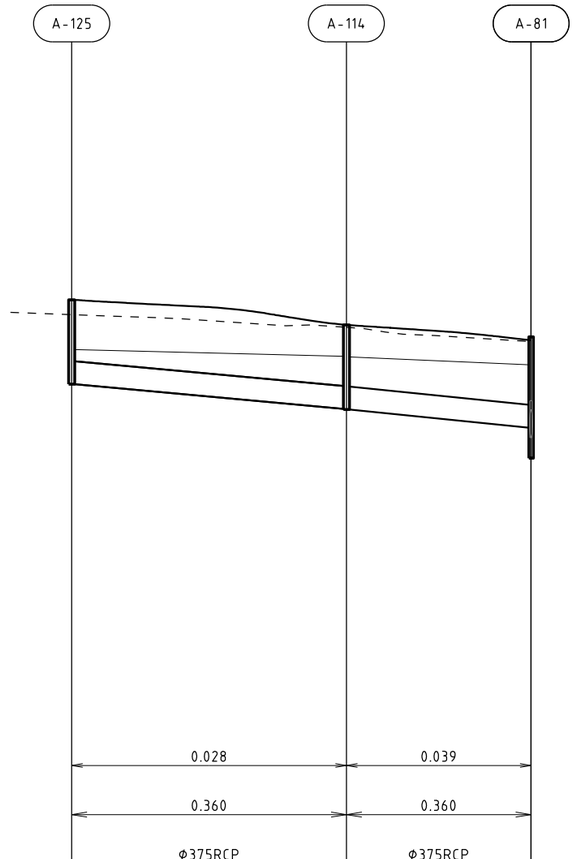

	A-185	A-184	A-182	A-181	A-126
1 IN 10 YR FLOW (m3/s)	0.067	0.083	0.091	2.644	
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	0.420	0.750	0.830	1.840	
PIPE SIZE & TYPE	Φ450RCP	Φ450RCP	Φ450RCP	(2x)1200x600RCP	
SLOPE 1 IN X	228	173	74.8	108	
DATUM RL.	15.0				
DEPTH TO PIPE INVERT (m)	0.600	1.405	1.405	1.335	1.335	1.527	1.527	1.629	1.779
HYDRAULIC GRADE LINE (m AHD)	23.716	23.710	23.675	23.660	23.645	23.620	23.580	23.489	-
PIPE INVERT LEVEL (m AHD)	23.400	23.360	23.360	23.100	23.100	22.800	22.800	22.750	22.600
FINISHED SURFACE (m AHD)	24.000	24.765		24.435		24.327		24.379	
EXISTING SURFACE (m AHD)	26.226	24.765		24.435		24.327		24.342	
CHAINAGE (m)	0.000	9.106		54.171		76.600		81.988	

D

	A-125	A-114	A-81
1 IN 10 YR FLOW (m3/s)	0.028	0.039	
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	0.360	0.360	
PIPE SIZE & TYPE	Φ375RCP	Φ375RCP	
SLOPE 1 IN X	111	100	
DATUM RL.	14.0		
DEPTH TO PIPE INVERT (m)	1.379	1.371	1.381	1.681	1.920
HYDRAULIC GRADE LINE (m AHD)	23.713	23.600	23.592	23.620	23.462
PIPE INVERT LEVEL (m AHD)	23.417	23.015	23.005	22.703	22.216
FINISHED SURFACE (m AHD)	24.796	24.385		24.136	
EXISTING SURFACE (m AHD)	24.552	24.345		24.118	
CHAINAGE (m)	0.000	44.801		74.924	

D

1 : 1000

HORIZ 0 10 20 30 40 50m

VERT 0 1 2 3 4 5m

1 : 100

Issue	Description	Date	Approved
D	MELBOURNE WATER DRAINAGE NETWORK REVISED	21.02.18	E. H
C	MELBOURNE WATER DRAINAGE NETWORK ADDED	13.12.17	E. H
B	SECTION UPDATED AND WORKS BY OTHERS SHOWN AS BLUE	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

vicroads

Client: BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C658-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE LONGITUDINAL SECTION SHEET 8

ARCADIS

Drawing No.	Project No.	Issue
C658	AA009732	D

V1

50mm on Original

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20/02/2018

LONGITUDINAL SECTION
DELETED

C

1 : 1000
HORIZ 0 10 20 30 40 50m
VERT 0 1 2 3 4 5m
1 : 100

Issue	Description	Date	Approved
C	MELBOURNE WATER DRAINAGE NETWORKN ADDED	13.12.17	E. H
B	SECTION UPDATED	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

50mm on Original

Client: vicroads / BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C659-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE LONGITUDINAL SECTION
SHEET 9

ARCADIS

Drawing No.	Project No.	Issue
C659	AA009732	C

V1

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LONGITUDINAL SECTION
DELETED

C

1 : 1000

HORIZ 0 10 20 30 40 50m

VERT 0 1 2 3 4 5m

1 : 100

Issue	Description	Date	Approved
B	MELBOURNE WATER DRAINAGE NETWORK ADDED	13.12.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

50mm on Original

Client: vicroads / BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C660-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE LONGITUDINAL SECTION
SHEET 10

ARCADIS

Drawing No.	Project No.	Issue
C660	AA009732	B

V1

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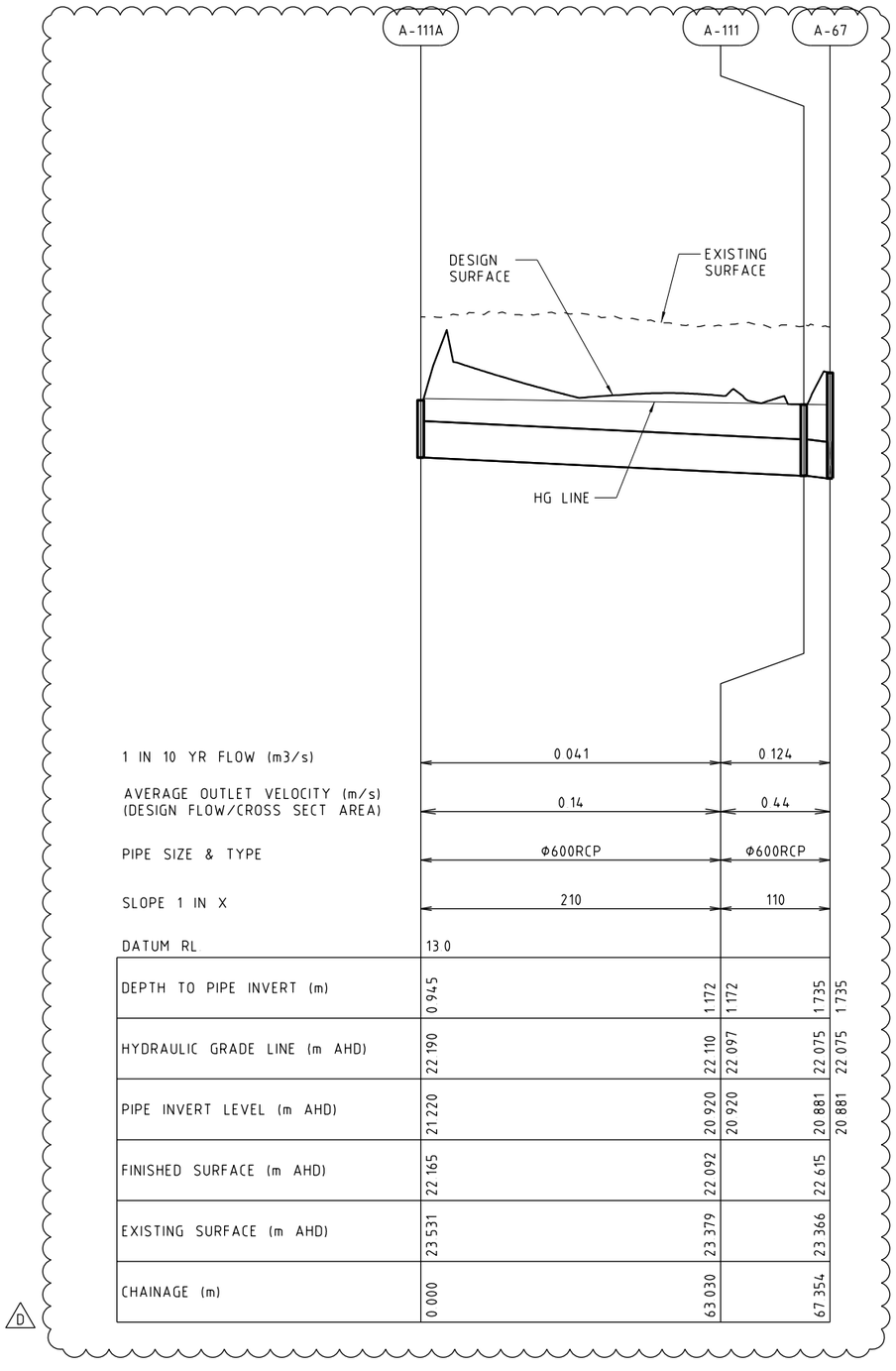
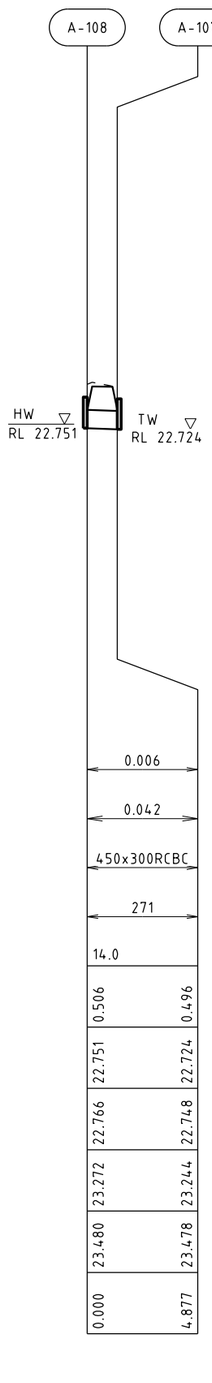
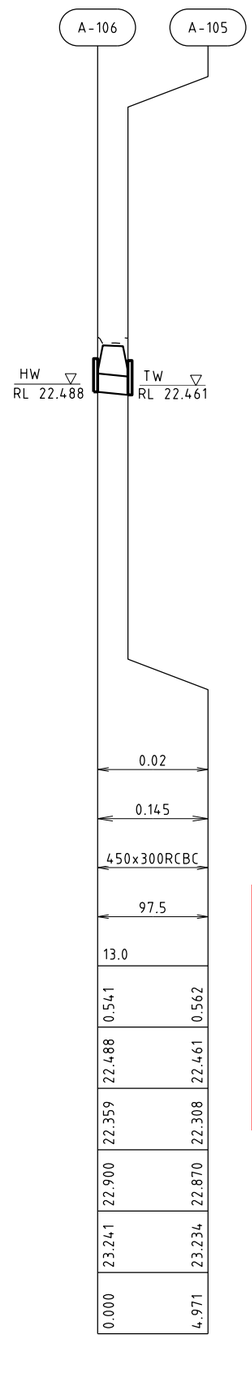


1 IN 10 YR FLOW (m3/s)	0 041	0 124	
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	0 14	0 44	
PIPE SIZE & TYPE	Φ600RCP	Φ600RCP	
SLOPE 1 IN X	210	110	
DATUM RL	13 0		
DEPTH TO PIPE INVERT (m)	0 945	1 172	1 172 1 735 1 735
HYDRAULIC GRADE LINE (m AHD)	22 190	22 110	22 097 22 075 22 075
PIPE INVERT LEVEL (m AHD)	21 220	20 920	20 920 20 881 20 881
FINISHED SURFACE (m AHD)	22 165	22 092	22 615
EXISTING SURFACE (m AHD)	23 531	23 379	23 366
CHAINAGE (m)	0 000	63 030	67 354

△D



0.006		
0.042		
450x300RCBC		
271		
14.0		
0.506		0.496
22.751		22.724
22.766		22.748
23.272		23.244
23.480		23.478
0.000		4.877



0.02		
0.145		
450x300RCBC		
97.5		
13.0		
0.541		0.562
22.488		22.461
22.359		22.308
22.900		22.870
23.241		23.234
0.000		4.971

LONGITUDINAL SECTION DELETED

1 : 1000
HORIZ 0 10 20 30 40 50m
VERT 0 1 2 3 4 5m
1 : 100

Issue	Description	Date	Approved
D	MELBOURNE WATER DRAINAGE NETWORK REVISED	21.02.17	E. H
C	MELBOURNE WATER DRAINAGE NETWORK ADDED	13.12.17	E. H
B	SECTIONS UPDATED	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

vicroads

Client: BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C661-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE LONGITUDINAL SECTION SHEET 11

ARCADIS

Drawing No.	Project No.	Issue
C661	AA009732	D

V1

50mm on Original

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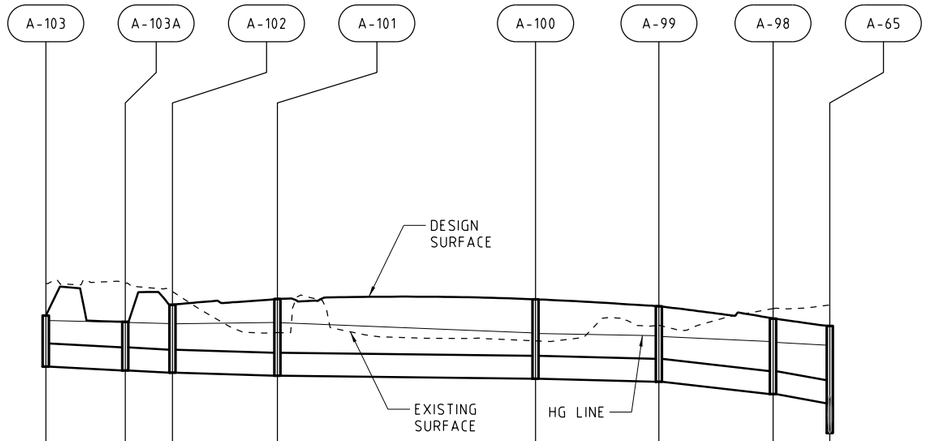
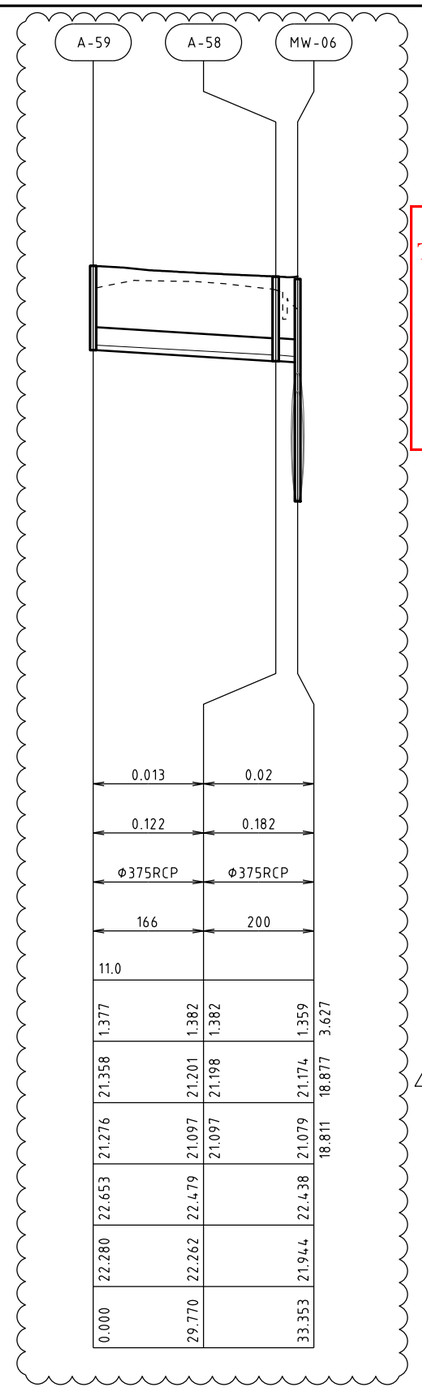


1 IN 10 YR FLOW (m3/s)	0.015		0.013		0.018		0.022		0.024		0.028		0.032	
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	0.135		0.122		0.164		0.203		0.214		0.251		0.290	
PIPE SIZE & TYPE	Φ375RCP		Φ375RCP		Φ375RCP		Φ375RCP		Φ375RCP		Φ375RCP		Φ375RCP	
SLOPE 1 IN X	204		212		342		842		402		93.1		61.7	
DATUM RL.	12.0													
DEPTH TO PIPE INVERT (m)	0.830	0.794	0.794	1.110	1.110	1.252	1.252	1.297	1.297	1.235	1.235	1.234	1.234	1.741
HYDRAULIC GRADE LINE (m AHD)	22.452	22.420	22.420	22.400	22.397	22.420	22.415	22.250	22.240	22.200	22.191	22.110	22.095	22.047
PIPE INVERT LEVEL (m AHD)	21.700	21.636	21.636	21.600	21.600	21.550	21.550	21.500	21.500	21.450	21.450	21.250	21.250	20.619
FINISHED SURFACE (m AHD)	22.530	22.430		22.710		22.802		22.797		22.685		22.484		22.361
EXISTING SURFACE (m AHD)	23.054	23.055		22.925		22.256		22.120		22.372		22.643		22.703
CHAINAGE (m)	0.000	12.968		20.666		37.781		79.890		100.013		118.626		127.885



	0.013	0.02	
	0.122	0.182	
	Φ375RCP	Φ375RCP	
	166	200	
11.0			
	1.377	1.382	1.382	1.359	3.627
	21.358	21.201	21.198	21.174	18.877
	21.276	21.097	21.097	21.079	18.811
	22.653	22.479		22.438	
	22.280	22.262		21.944	
	0.000	29.770		33.353	

E

1 : 1000
HORIZ 0 10 20 30 40 50m
VERT 0 1 2 3 4 5m
1 : 100

Issue	Description	Date	Approved
E	MELBOURNE WATER DRAINAGE NETWORK REVISED (RFI-131-3201-00321)	05.10.18	E. H
D	MELBOURNE WATER DRAINAGE NETWORK REVISED	21.02.18	E. H
C	MELBOURNE WATER DRAINAGE NETWORK ADDED	13.12.17	E. H
B	DESIGN SURFACE AND PIT INVERT LEVEL AMENDED	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

Client: vicroads; BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C662-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE LONGITUDINAL SECTION SHEET 12

ARCADIS

Drawing No.	Project No.	Issue
C662	AA009732	E

V1

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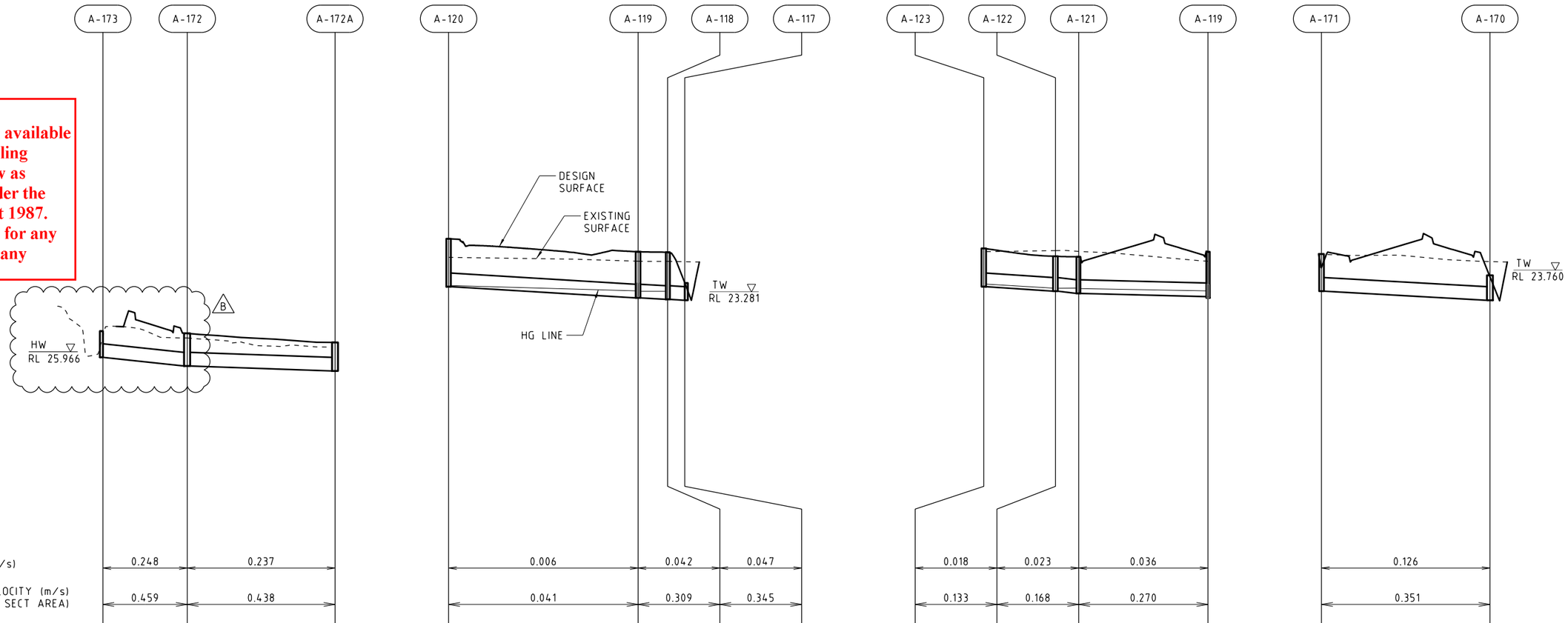

1 IN 10 YR FLOW (m3/s)	0.248		0.237	
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	0.459		0.438	
PIPE SIZE & TYPE	(2x)900x300RCBC		(2x)900x300RCBC	
SLOPE 1 IN X	97		307	
DATUM RL.	18.0			
DEPTH TO PIPE INVERT (m)	0.579	0.720	0.720	0.627
HYDRAULIC GRADE LINE (m AHD)	25.966	25.792	25.775	25.665
PIPE INVERT LEVEL (m AHD)	25.841	25.650	25.650	25.544
FINISHED SURFACE (m AHD)	26.420	26.370		26.171
EXISTING SURFACE (m AHD)	26.298	26.270		26.069
CHAINAGE (m)	0.000	18.579		51.106

1 IN 10 YR FLOW (m3/s)	0.006		0.042		0.047		
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	0.041		0.309		0.345		
PIPE SIZE & TYPE	450x300RCBC		450x300RCBC		450x300RCBC		
SLOPE 1 IN X	167		217		189		
DATUM RL.	14.0						
DEPTH TO PIPE INVERT (m)	1.056	1.019	1.019	1.039	1.039	0.380	0.380
HYDRAULIC GRADE LINE (m AHD)	23.425	23.308	23.296	23.296	23.281	23.281	23.281
PIPE INVERT LEVEL (m AHD)	23.400	23.150	23.150	23.120	23.120	23.100	23.100
FINISHED SURFACE (m AHD)	24.456	24.169		24.159		23.480	
EXISTING SURFACE (m AHD)	24.046	23.959		23.957		23.949	
CHAINAGE (m)	0.000	41.709		48.225		52.001	

1 IN 10 YR FLOW (m3/s)	0.018		0.023		0.036		
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	0.133		0.168		0.270		
PIPE SIZE & TYPE	450x300RCBC		450x300RCBC		450x300RCBC		
SLOPE 1 IN X	158		103		407		
DATUM RL.	14.0						
DEPTH TO PIPE INVERT (m)	0.841	0.769	0.769	0.808	0.808	0.989	1.019
HYDRAULIC GRADE LINE (m AHD)	23.455	23.366	23.364	23.366	23.358	23.296	23.308
PIPE INVERT LEVEL (m AHD)	23.400	23.300	23.300	23.250	23.250	23.180	23.150
FINISHED SURFACE (m AHD)	24.241	24.069		24.058		24.169	
EXISTING SURFACE (m AHD)	24.172	24.194		24.176		23.959	
CHAINAGE (m)	0.000	15.767		20.895		49.353	

1 IN 10 YR FLOW (m3/s)	0.126	
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	0.351	
PIPE SIZE & TYPE	1200x300RCBC	
SLOPE 1 IN X	185	
DATUM RL.	14.0	
DEPTH TO PIPE INVERT (m)	0.820	0.550
HYDRAULIC GRADE LINE (m AHD)	23.771	23.760
PIPE INVERT LEVEL (m AHD)	23.300	23.100
FINISHED SURFACE (m AHD)	24.120	23.650
EXISTING SURFACE (m AHD)	24.114	23.951
CHAINAGE (m)	37.067	0.000

ADVERTISED
PLAN

1 : 1000
HORIZ 0 10 20 30 40 50m
VERT 0 1 2 3 4 5m
1 : 100

Issue	Description	Date	Approved
B	PIPE SLOPE, INVERT LEVEL AND DEPTH AMENDED	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

vicroads

Client
BMD constructions

Status
CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C663-AA009732-VCD-00.dgn

Project
THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title
DRAINAGE LONGITUDINAL SECTION
SHEET 13

ARCADIS

Drawing No.	Project No.	Issue
C663	AA009732	B

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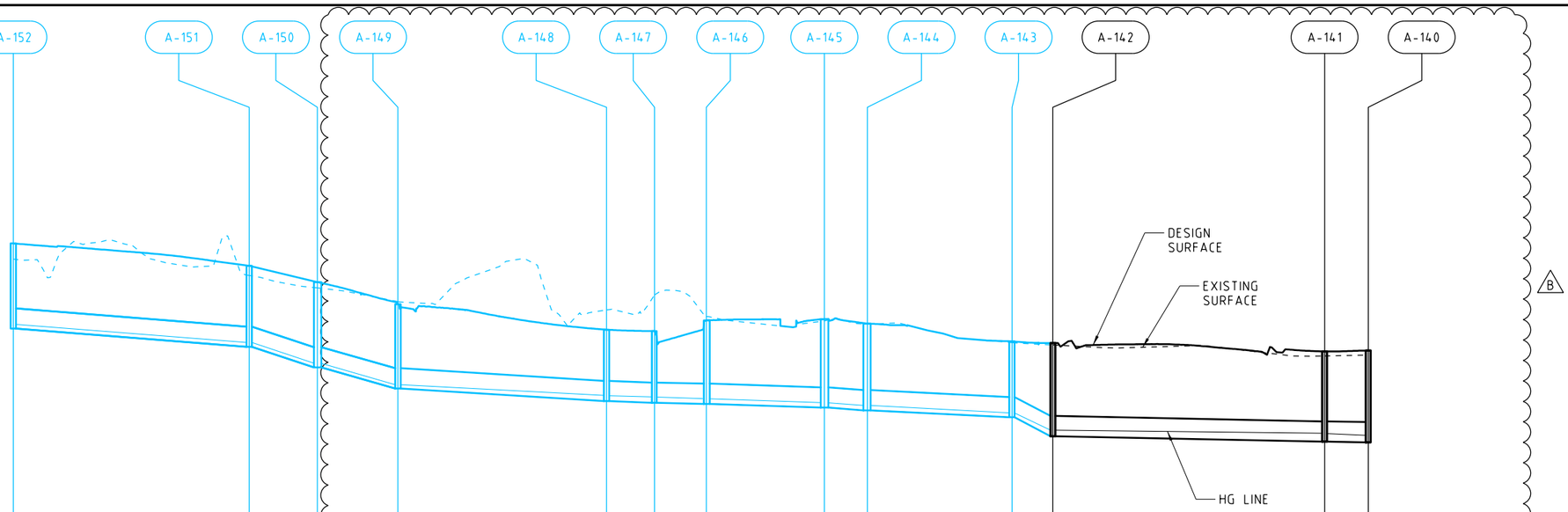
ADVERTISED PLAN



1 IN 10 YR FLOW (m3/s)		0.013	0.013	0.012	0.01	0.02	0.018	0.018	0.017	0.016	0.013	0.02	0.032	
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)		0.115	0.116	0.109	0.086	0.185	0.163	0.159	0.151	0.147	0.118	0.180	0.291	
PIPE SIZE & TYPE		Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	
SLOPE 1 IN X		200	33.1	38.3	164	296	479	313	159	206	21.6	504	622	
DATUM RL.	15.0													
DEPTH TO PIPE INVERT (m)	1.579	1.478	1.478	1.582	1.564	1.326	1.329	1.549	1.642	1.607	1.410	1.727	1.674	1.703
HYDRAULIC GRADE LINE (m AHD)	24.856	24.639	24.638	24.255	23.855	23.658	23.629	23.597	23.523	23.472	23.331	23.016	22.957	22.917
PIPE INVERT LEVEL (m AHD)	24.896	24.558	24.558	24.176	23.786	23.550	23.520	23.500	23.430	23.380	23.250	22.900	22.800	22.787
FINISHED SURFACE (m AHD)	26.475	26.036		25.757	25.350	24.876	24.849	25.049	25.072	24.987	24.660	24.627	24.474	24.490
EXISTING SURFACE (m AHD)	26.186	25.881		25.653	25.397	25.242	25.521	25.120	25.038	24.978	24.637	24.592	24.389	24.405
CHAINAGE (m)	0.000	43.721		56.354	71.280	109.945	118.834	128.418	150.317	158.278	185.122	192.678	243.058	251.147

1 : 1000
HORIZ 0 10 20 30 40 50m
VERT 0 1 2 3 4 5m
1 : 100

Issue	Description	Date	Approved
B	SECTIONS UPDATED	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

50mm on Original

Client: BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C664-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE LONGITUDINAL SECTION
SHEET 14

ARCADIS

Drawing No.	Project No.	Issue
C664	AA009732	B

V1

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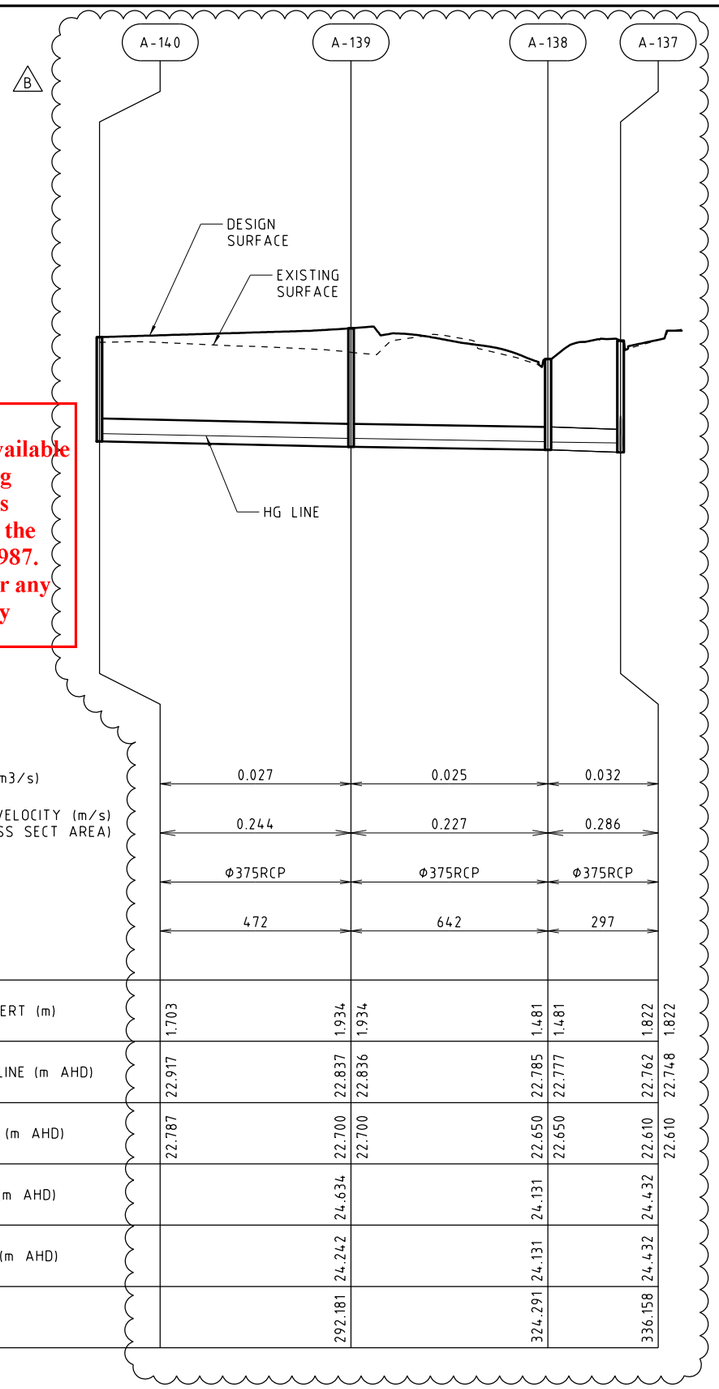
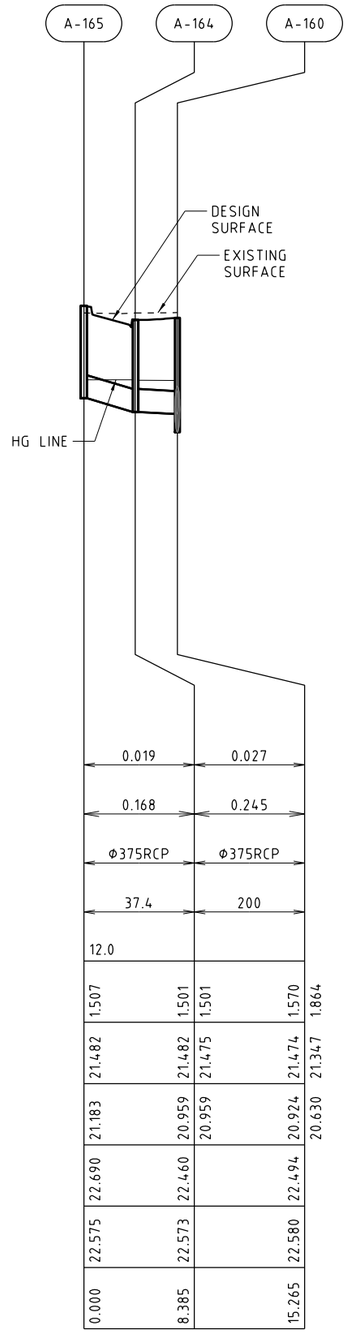
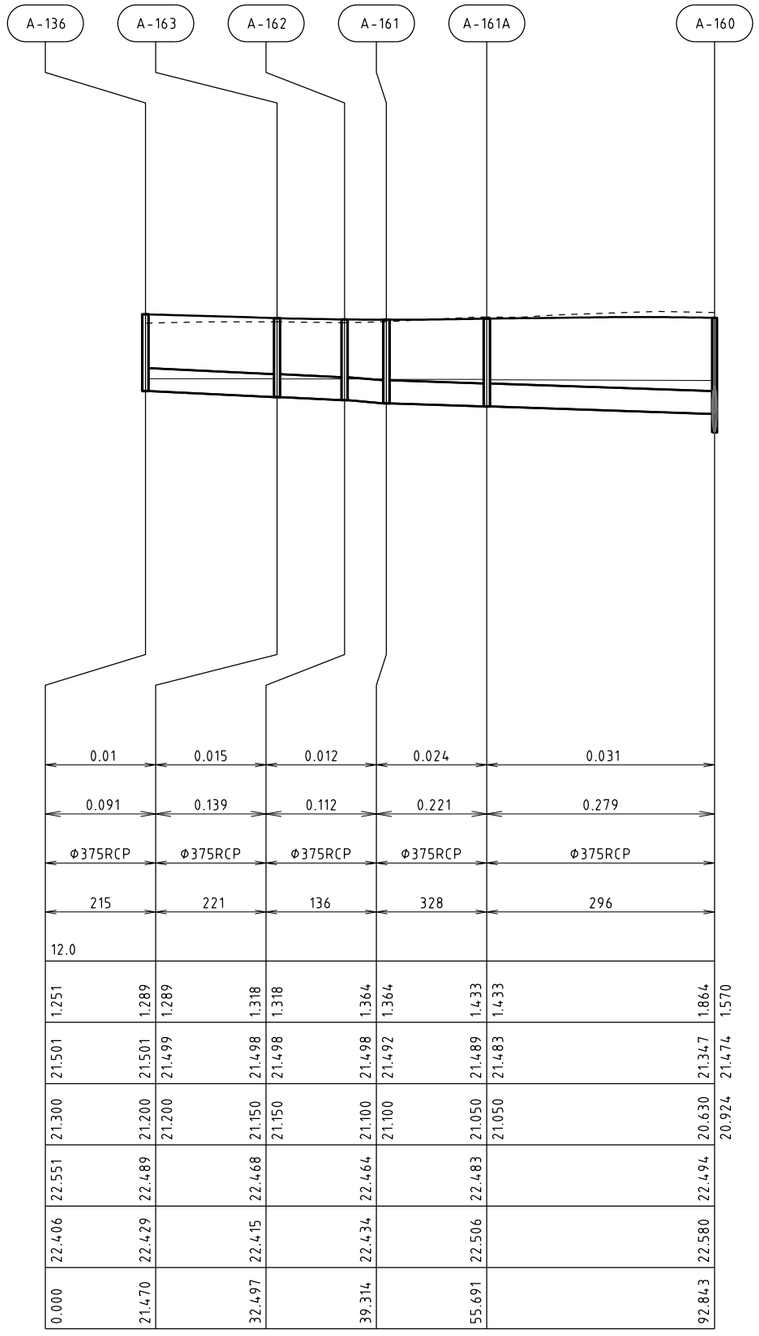


1 IN 10 YR FLOW (m3/s)	0.027	0.025	0.032
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	0.244	0.227	0.286
PIPE SIZE & TYPE	Φ375RCP	Φ375RCP	Φ375RCP
SLOPE 1 IN X	472	642	297
DATUM RL.			
DEPTH TO PIPE INVERT (m)	1.703 1.934	1.934 1.481	1.481 1.822
HYDRAULIC GRADE LINE (m AHD)	22.917 22.837	22.836 22.785	22.777 22.762
PIPE INVERT LEVEL (m AHD)	22.787 22.700	22.700 22.650	22.650 22.610
FINISHED SURFACE (m AHD)	24.634	24.131	24.432
EXISTING SURFACE (m AHD)	24.242	24.131	24.432
CHAINAGE (m)	292.181	324.291	336.158



	0.019	0.027	
	0.168	0.245	
	Φ375RCP	Φ375RCP	
	37.4	200	
12.0			
	1.507 1.501	1.501 1.570	1.864
	21.482 21.482	21.475 21.474	21.347
	21.183 20.959	20.959 20.924	20.630
	22.690 22.460	22.494	
	22.575 22.573	22.580	
	0.000 8.385	15.265	



	0.01	0.015	0.012	0.024	0.031
	0.091	0.139	0.112	0.221	0.279
	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP
	215	221	136	328	296
12.0					
	1.251 1.289	1.289 1.318	1.318 1.364	1.364 1.433	1.433 1.864
	21.501 21.501	21.499 21.498	21.498 21.498	21.492 21.489	21.483 21.347
	21.300 21.200	21.200 21.150	21.150 21.100	21.100 21.050	21.050 20.630
	22.551 22.489	22.468	22.464	22.483	22.494
	22.406 22.429	22.415	22.434	22.506	22.580
	0.000 21.470	32.497	39.314	55.691	92.843

1 : 1000

HORIZ 0 10 20 30 40 50m

VERT 0 1 2 3 4 5m

1 : 100

Issue	Description	Date	Approved
B	SECTIONS UPDATED	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

50mm on Original

Client: vicroads / BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C665-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE LONGITUDINAL SECTION
SHEET 15

ARCADIS

Drawing No.	Project No.	Issue
C665	AA009732	B

V1

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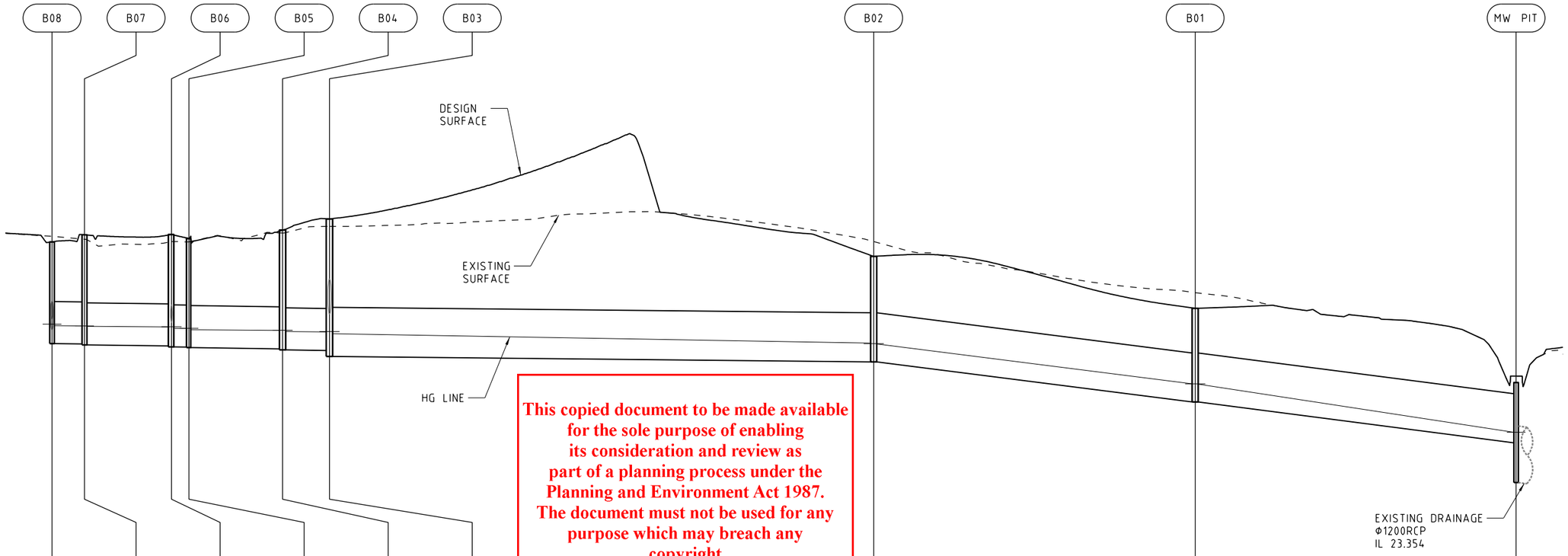

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	B08		B07		B06		B05		B04		B03		B02		B01		MW PIT	
1 IN 10 YR FLOW (m3/s)		0.310		0.313		0.312		0.320		0.315		0.520		0.479		0.469		
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)		0.487		0.492		0.491		0.503		0.496		0.601		0.553		0.542		
PIPE SIZE & TYPE		Φ900RCP		Φ900RCP		Φ900RCP		Φ900RCP		Φ900RCP		Φ1050RCP		Φ1050RCP		Φ1050RCP		
SLOPE 1 IN X		833		833		833		646		782		1000		80.1		78.7		
DATUM RL.		18.0																
DEPTH TO PIPE INVERT (m)	1.876	2.176	2.338	2.358	2.385	2.405	2.325	2.333	2.545	2.565	2.816	2.942	2.258	2.258	2.005	2.005	1.290	2.143
HYDRAULIC GRADE LINE (m AHD)	26.804	26.713	26.706	26.701	26.686	26.658	26.655	26.626	26.612	26.589	26.581	26.540	26.341	26.324	25.468	25.461	24.432	24.432
PIPE INVERT LEVEL (m AHD)	26.630	26.330	26.322	26.302	26.279	26.259	26.255	26.246	26.215	26.195	26.183	26.056	25.940	25.940	25.080	25.080	24.207	23.354
FINISHED SURFACE (m AHD)	28.506		28.660		28.664		28.580		28.761		28.999		28.198		27.085		25.497	
EXISTING SURFACE (m AHD)	28.628		28.562		28.516		28.507		28.697		28.839		28.513		27.421		25.635	
CHAINAGE (m)	324.588		331.538		350.186		353.929		373.961		384.025		500.569		569.410		638.147	

ADVERTISED
PLAN

1 : 1000
HORIZ 0 10 20 30 40 50m
VERT 0 1 2 3 4 5m
1 : 100

Issue	Description	Date	Approved
B	LONG SECTION REVISED	19.05.17	E. H.
A	ISSUED FOR CONSTRUCTION	27.04.17	E. H.

Client

Status
CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	G.CONSTABLE
Original Size	A3	Designed	A. PRASAD
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C666-AA009732-VCD-00.dgn

Project
THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title
DRAINAGE LONGITUDINAL SECTION
SHEET 16

Drawing No. C666
Project No. AA009732
Issue B

50mm on Original

V2

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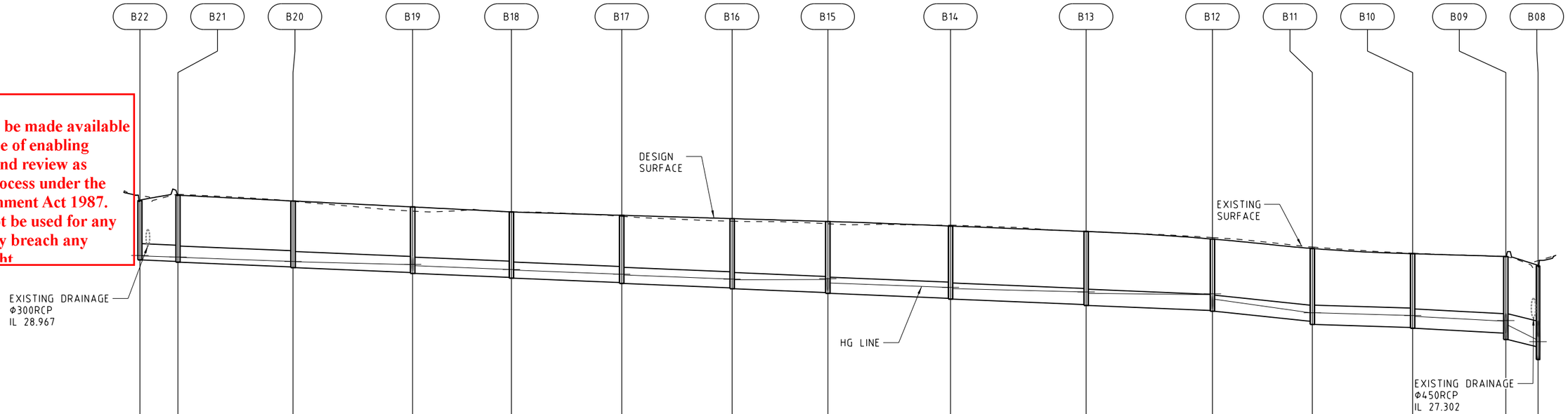
5/18/2017



1 IN 10 YR FLOW (m3/s)		0.016	0.026	0.037	0.059	0.066	0.073	0.080	0.107	0.112	0.117	0.144	0.149	0.154	0.262	
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)		0.148	0.234	0.331	0.536	0.596	0.661	0.720	0.970	1.015	1.062	1.301	0.938	0.967	0.928	
PIPE SIZE & TYPE		Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ450RCP	Φ450RCP	Φ600RCP	
SLOPE 1 IN X		250	250	250	250	250	250	250	250	250	250	100	333	195	44.8	
DATUM RL.	19.0															
DEPTH TO PIPE INVERT (m)		1.377	1.537	1.557	1.531	1.551	1.523	1.543	1.520	1.540	1.564	1.584	1.609	1.629	1.651	1.671	1.679	1.699	1.699	1.719	1.660	1.678	1.691	1.766	1.714	1.732	1.779	1.929	1.876	2.176
HYDRAULIC GRADE LINE (m AHD)		28.738	28.713	28.707	28.611	28.602	28.537	28.511	28.423	28.409	28.314	28.297	28.202	28.183	28.190	28.109	28.008	27.981	27.900	27.871	27.839	27.733	27.417	27.417	27.354	27.333	27.225	27.130	26.804	26.713
PIPE INVERT LEVEL (m AHD)		28.647	28.612	28.592	28.485	28.465	28.354	28.334	28.242	28.222	28.120	28.100	27.997	27.977	27.888	27.868	27.754	27.734	27.608	27.588	27.471	27.453	27.221	27.146	27.076	27.058	26.947	26.797	26.630	26.330
FINISHED SURFACE (m AHD)	30.024		30.149	30.016	29.877	29.762	29.683	29.606	29.539	29.434	29.308	29.131	28.912	28.790	28.726	28.506													
EXISTING SURFACE (m AHD)	30.143		30.173	30.009	29.780	29.762	29.659	29.547	29.488	29.454	29.308	29.165	28.945	28.800	28.724	28.628													
CHAINAGE (m)	0.000		8.831	35.553	63.322	86.247	111.852	137.475	159.704	188.188	219.677	248.995	272.183	295.480	317.110	324.588													

ADVERTISED PLAN

1 : 1000

HORIZ 0 10 20 30 40 50m

VERT 0 1 2 3 4 5m

1 : 100

Issue	Description	Date	Approved
B	LONG SECTION REVISED	19.05.17	E. H.
A	ISSUED FOR CONSTRUCTION	27.04.17	E. H.

vicroads

Client: BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	G.CONSTABLE
Original Size	A3	Designed	A. PRASAD
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C667-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE LONGITUDINAL SECTION
SHEET 17

ARCADIS

Drawing No.	Project No.	Issue
C667	AA009732	B

V2

50mm on Original

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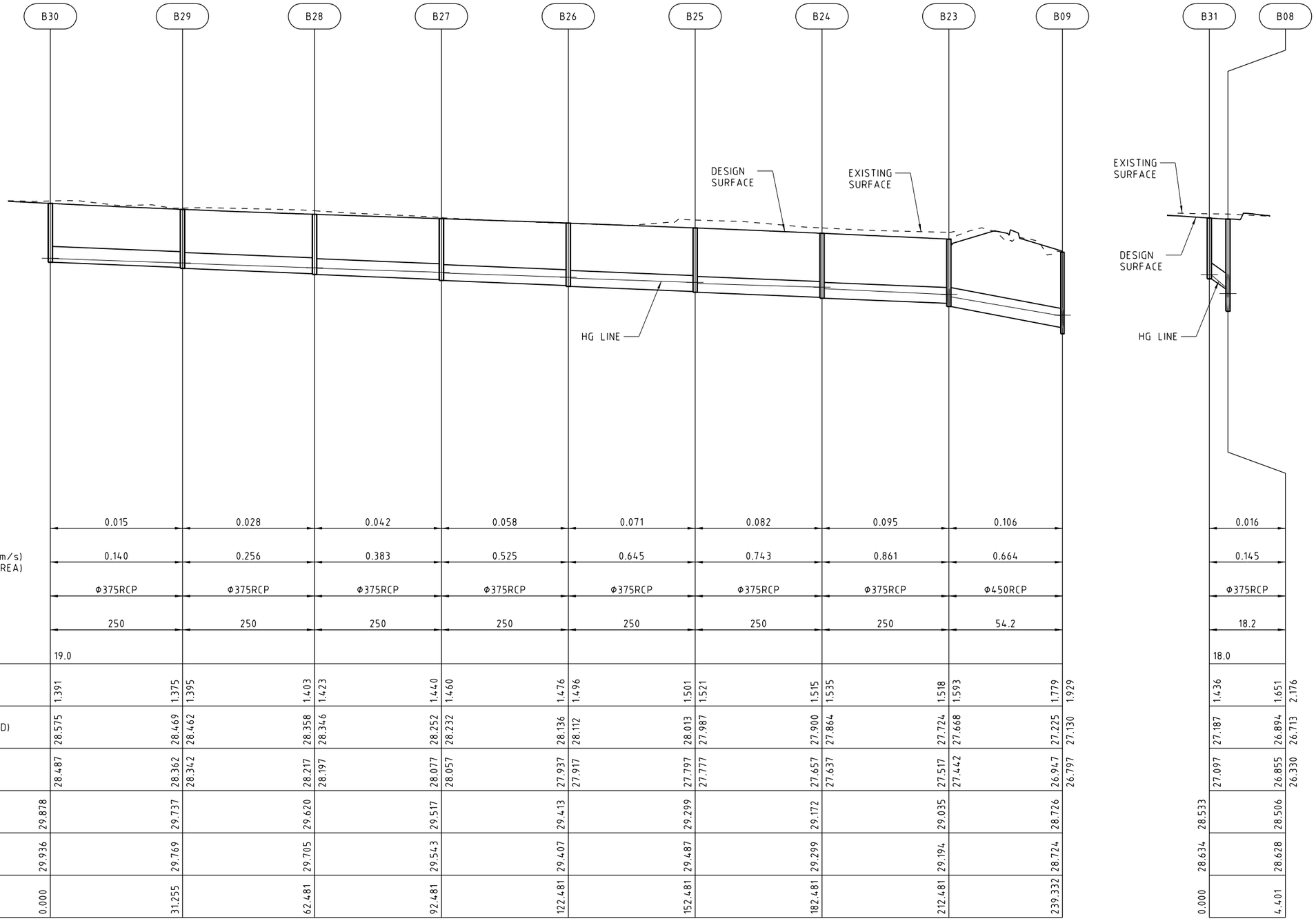

1 IN 10 YR FLOW (m3/s)		0.015	0.028	0.042	0.058	0.071	0.082	0.095	0.106		0.016
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)		0.140	0.256	0.383	0.525	0.645	0.743	0.861	0.664		0.145
PIPE SIZE & TYPE		Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ450RCP		Φ375RCP
SLOPE 1 IN X		250	250	250	250	250	250	250	54.2		18.2
DATUM RL.		19.0									18.0
DEPTH TO PIPE INVERT (m)	1.391	1.375	1.395	1.403	1.423	1.440	1.460	1.476	1.496	1.501	1.521	1.515	1.535	1.518	1.593	1.779	1.929	1.436	1.651	2.176
HYDRAULIC GRADE LINE (m AHD)	28.575	28.469	28.462	28.358	28.346	28.252	28.232	28.136	28.112	28.013	27.987	27.900	27.864	27.724	27.668	27.225	27.130	27.187	26.894	26.713
PIPE INVERT LEVEL (m AHD)	28.487	28.362	28.342	28.217	28.197	28.077	28.057	27.937	27.917	27.797	27.777	27.657	27.637	27.517	27.442	26.947	26.797	27.097	26.855	26.330
FINISHED SURFACE (m AHD)	29.878	29.737	29.620	29.517	29.413	29.299	29.172	29.035	28.726									28.533	28.506	
EXISTING SURFACE (m AHD)	29.936	29.769	29.705	29.543	29.407	29.487	29.299	29.194	28.724									28.634	28.628	
CHAINAGE (m)	0.000	31.255	62.481	92.481	122.481	152.481	182.481	212.481	239.332									0.000	4.401	

1 : 1000

HORIZ 0 10 20 30 40 50m

VERT 0 1 2 3 4 5m

1 : 100

Issue	Description	Date	Approved
B	LONG SECTION REVISED	19.05.17	E. H.
A	ISSUED FOR CONSTRUCTION	27.04.17	E. H.

50mm on Original

Client: vicroads / BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	G.CONSTABLE
Original Size	A3	Designed	A. PRASAD
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C668-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE LONGITUDINAL SECTION SHEET 18

ARCADIS

Drawing No.	Project No.	Issue
C668	AA009732	B

V2

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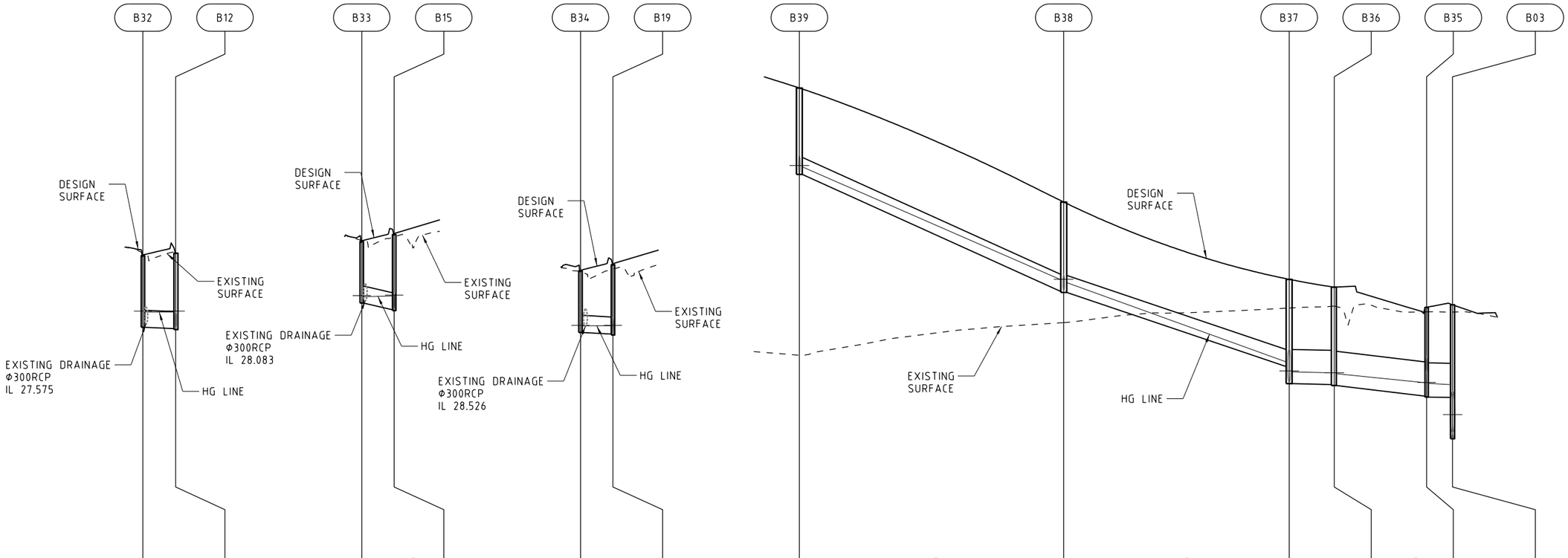

1 IN 10 YR FLOW (m3/s)	0.022	0.025	0.014	0.052	0.087	0.180	0.178	0.222
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	0.200	0.222	0.128	0.469	0.786	0.407	0.404	0.503
PIPE SIZE & TYPE	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ375RCP	Φ750RCP	Φ750RCP	Φ750RCP
SLOPE 1 IN X	250	48.4	191	22.6	30.4	510	86.6	571
DATUM RL.	19.0	19.0	20.0	20.0				

	B32	B12	B33	B15	B34	B19	B39	B38	B37	B36	B35	B03
DEPTH TO PIPE INVERT (m)	1.573	1.658 1.678	1.351	1.651 1.671	1.350	1.523 1.543	1.896	1.963 1.983	1.915 2.290	2.138 2.158	1.948 1.968	2.036 2.942
HYDRAULIC GRADE LINE (m AHD)	27.840	27.839 27.733	28.174	28.190 28.109	28.536	28.537 28.511	32.024	29.547 29.485	27.746 27.527	27.503 27.481	27.289 27.271	27.248 26.540
PIPE INVERT LEVEL (m AHD)	27.502	27.473 27.453	28.035	27.888 27.868	28.391	28.354 28.334	31.859	29.289 29.269	27.641 27.266	27.247 27.227	26.993 26.973	26.963 26.056
FINISHED SURFACE (m AHD)	29.074	29.131	29.386	29.539	29.742	29.877	33.755	31.252	29.556	29.385	28.941	28.999
EXISTING SURFACE (m AHD)	29.135	29.165	29.408	29.488	29.728	29.780	27.890	28.607	28.926	28.968	28.843	28.839
CHAINAGE (m)	0.000	7.193	0.000	7.115	0.000	7.116	0.000	57.995	107.451	117.334	137.604	143.290

HORIZ 1 : 1000 0 10 20 30 40 50m

VERT 1 : 100 0 1 2 3 4 5m

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Issue	Description	Date	Approved
B	LONG SECTION REVISED	19.05.17	E. H.
A	ISSUED FOR CONSTRUCTION	27.04.17	E. H.

50mm on Original

vic roads

Client

BMD constructions

Status
CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	G.CONSTABLE
Original Size	A3	Designed	A. PRASAD
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C669-AA009732-VCD-00.dgn

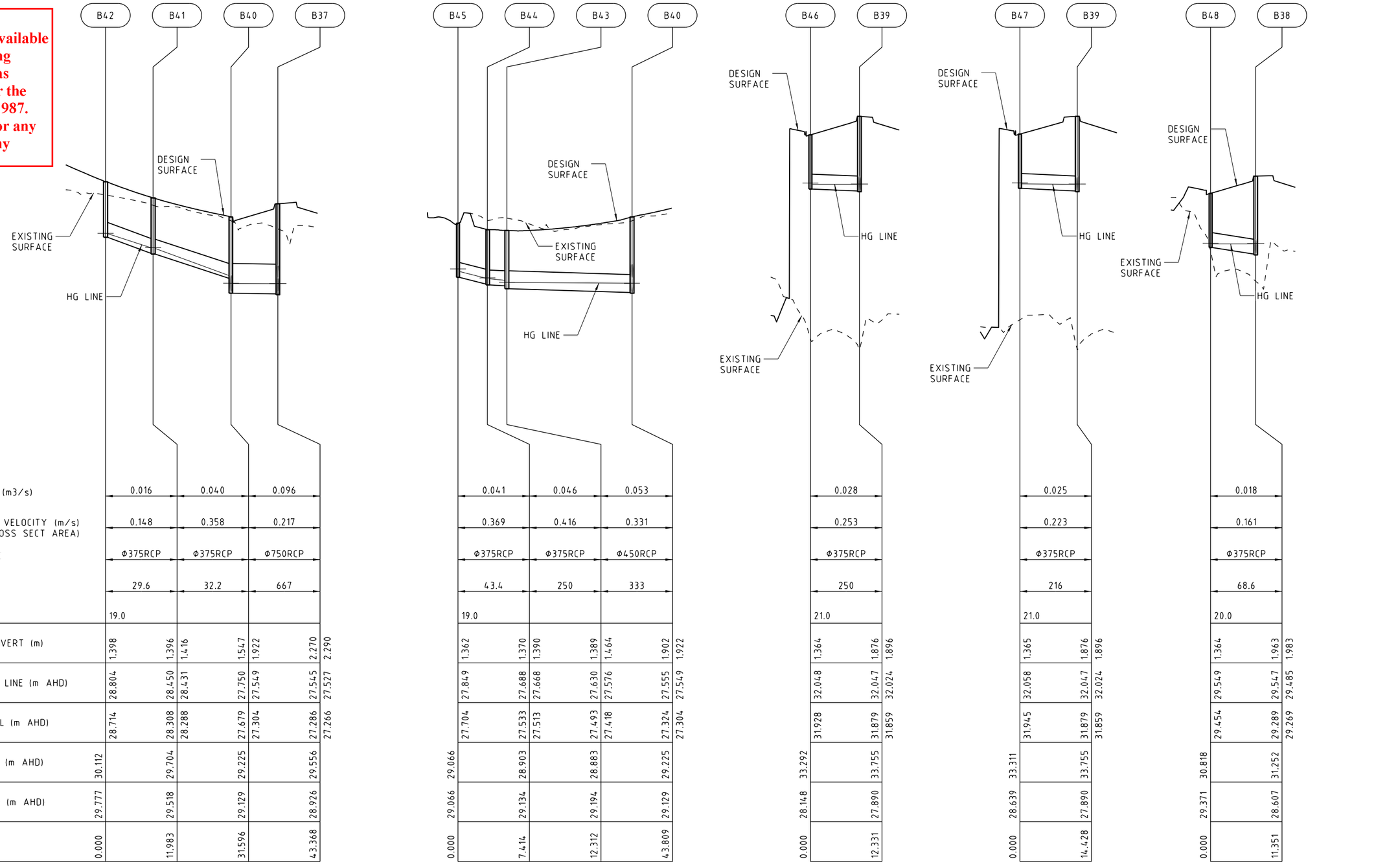
Project
THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title
DRAINAGE LONGITUDINAL SECTION
SHEET 19

ARCADIS

Drawing No. C669
Project No. AA009732
Issue B

V2



1 IN 10 YR FLOW (m3/s)		0.016		0.040		0.096		0.041		0.046		0.053		0.028		0.025		0.018	
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)		0.148		0.358		0.217		0.369		0.416		0.331		0.253		0.223		0.161	
PIPE SIZE & TYPE		Φ375RCP		Φ375RCP		Φ750RCP		Φ375RCP		Φ375RCP		Φ450RCP		Φ375RCP		Φ375RCP		Φ375RCP	
SLOPE 1 IN X		29.6		32.2		667		43.4		250		333		250		216		68.6	
DATUM RL.		19.0						19.0						21.0		21.0		20.0	
DEPTH TO PIPE INVERT (m)		1.398	1.396	1.416	1.547	1.922	2.270	1.362	1.370	1.390	1.389	1.464	1.902	1.364	1.876	1.365	1.876	1.364	1.963
HYDRAULIC GRADE LINE (m AHD)		28.804	28.450	28.431	27.750	27.549	27.545	27.849	27.688	27.668	27.630	27.576	27.555	32.048	32.047	32.058	32.047	29.549	29.547
PIPE INVERT LEVEL (m AHD)		28.714	28.308	28.288	27.679	27.304	27.286	27.704	27.533	27.513	27.493	27.418	27.324	31.928	31.879	31.945	31.879	29.454	29.289
FINISHED SURFACE (m AHD)	30.112		29.704		29.225		29.556	29.066	28.903		28.883		29.225	33.292	33.755	33.311	33.755	30.818	31.252
EXISTING SURFACE (m AHD)	29.777		29.518		29.129		28.926	29.066	29.134		29.194		29.129	28.148	27.890	28.639	27.890	29.371	28.607
CHAINAGE (m)	0.000		11.983		31.596		43.368	0.000	7.414		12.312		43.809	0.000	12.331	0.000	14.428	0.000	11.351

1 : 1000

HORIZ 0 10 20 30 40 50m

VERT 0 1 2 3 4 5m

1 : 100

ADVERTISED PLAN

Issue	Description	Date	Approved
B	LONG SECTION REVISED	19.05.17	E. H.
A	ISSUED FOR CONSTRUCTION	27.04.17	E. H.

50mm on Original

Client: BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	G.CONSTABLE
Original Size	A3	Designed	A. PRASAD
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C670-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE LONGITUDINAL SECTION
SHEET 20

ARCADIS

Drawing No.	Project No.	Issue
C670	AA009732	B

V2

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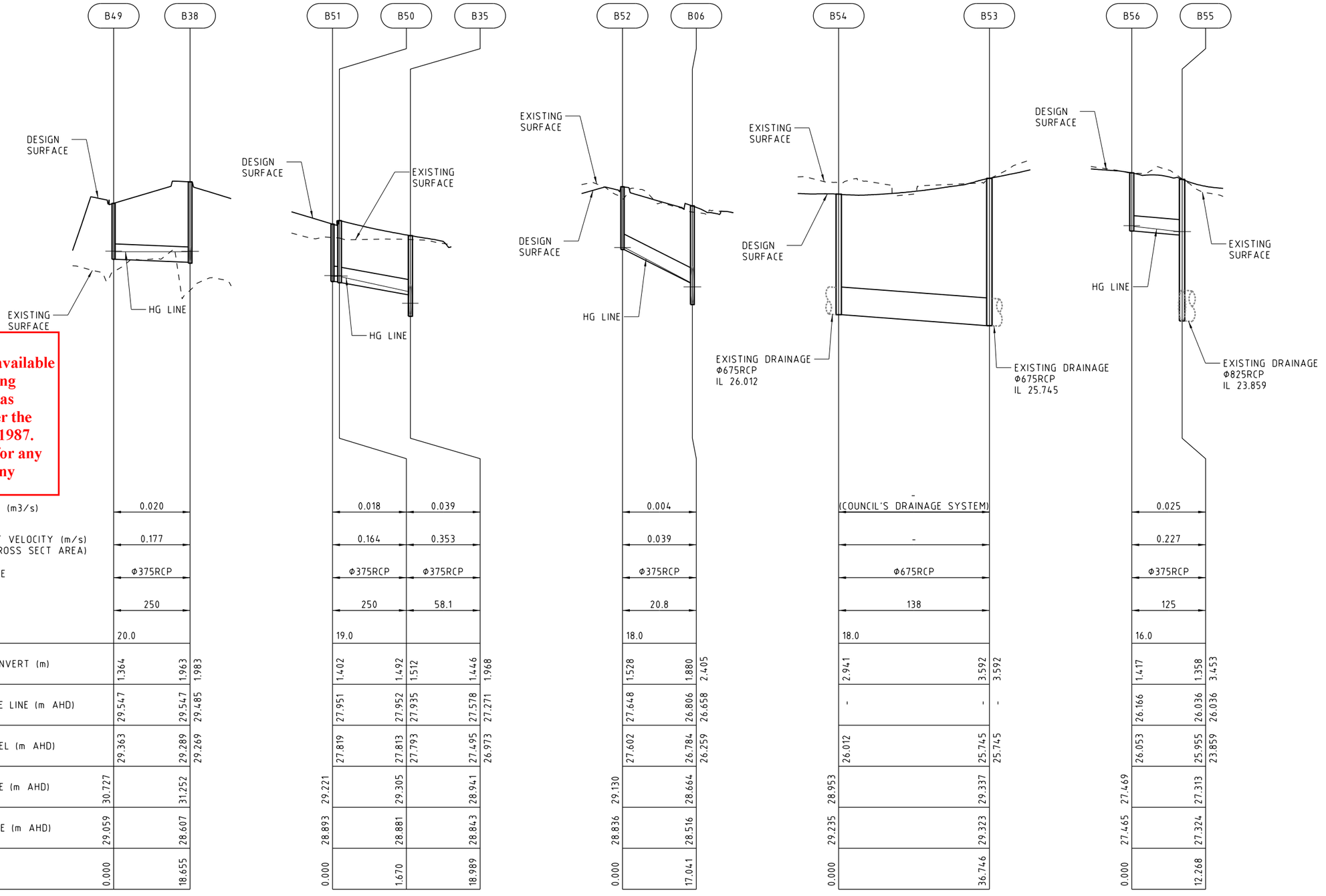
5/18/2017



		B49	B38	
1 IN 10 YR FLOW (m3/s)		0.020		
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)		0.177		
PIPE SIZE & TYPE		Φ375RCP		
SLOPE 1 IN X		250		
DATUM RL.		20.0		
DEPTH TO PIPE INVERT (m)		1.364	1.963	1.983
HYDRAULIC GRADE LINE (m AHD)		29.547	29.547	29.485
PIPE INVERT LEVEL (m AHD)		29.363	29.289	29.269
FINISHED SURFACE (m AHD)	30.727		31.252	
EXISTING SURFACE (m AHD)	29.059		28.607	
CHAINAGE (m)	0.000		18.655	

		B51	B50	B50	B35	
1 IN 10 YR FLOW (m3/s)		0.018		0.039		
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)		0.164		0.353		
PIPE SIZE & TYPE		Φ375RCP		Φ375RCP		
SLOPE 1 IN X		250		58.1		
DATUM RL.		19.0				
DEPTH TO PIPE INVERT (m)		1.402	1.492	1.512	1.446	1.968
HYDRAULIC GRADE LINE (m AHD)		27.951	27.952	27.935	27.578	27.271
PIPE INVERT LEVEL (m AHD)		27.819	27.813	27.793	27.495	26.973
FINISHED SURFACE (m AHD)	29.221		29.305		28.941	
EXISTING SURFACE (m AHD)	28.893		28.881		28.843	
CHAINAGE (m)	0.000		1.670		18.989	

		B52	B06	
1 IN 10 YR FLOW (m3/s)		0.004		
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)		0.039		
PIPE SIZE & TYPE		Φ375RCP		
SLOPE 1 IN X		20.8		
DATUM RL.		18.0		
DEPTH TO PIPE INVERT (m)		1.528	1.880	2.405
HYDRAULIC GRADE LINE (m AHD)		27.648	26.806	26.658
PIPE INVERT LEVEL (m AHD)		27.602	26.784	26.259
FINISHED SURFACE (m AHD)	29.130		28.664	
EXISTING SURFACE (m AHD)	28.836		28.516	
CHAINAGE (m)	0.000		17.041	

		B54	B53	
1 IN 10 YR FLOW (m3/s)		- (COUNCIL'S DRAINAGE SYSTEM)		
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)		-		
PIPE SIZE & TYPE		Φ675RCP		
SLOPE 1 IN X		138		
DATUM RL.		18.0		
DEPTH TO PIPE INVERT (m)		2.941	3.592	3.592
HYDRAULIC GRADE LINE (m AHD)		-	-	-
PIPE INVERT LEVEL (m AHD)		26.012	25.745	25.745
FINISHED SURFACE (m AHD)	28.953		29.337	
EXISTING SURFACE (m AHD)	29.235		29.323	
CHAINAGE (m)	0.000		36.746	

		B56	B55	
1 IN 10 YR FLOW (m3/s)		0.025		
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)		0.227		
PIPE SIZE & TYPE		Φ375RCP		
SLOPE 1 IN X		125		
DATUM RL.		16.0		
DEPTH TO PIPE INVERT (m)		1.417	1.358	3.453
HYDRAULIC GRADE LINE (m AHD)		26.166	26.036	26.036
PIPE INVERT LEVEL (m AHD)		26.053	25.955	23.859
FINISHED SURFACE (m AHD)	27.469		27.313	
EXISTING SURFACE (m AHD)	27.465		27.324	
CHAINAGE (m)	0.000		12.268	

ADVERTISED
PLAN

1 : 1000
HORIZ 0 10 20 30 40 50m
VERT 0 1 2 3 4 5m
1 : 100

Issue	Description	Date	Approved
B	LONG SECTION REVISED	19.05.17	E. H.
A	ISSUED FOR CONSTRUCTION	27.04.17	E. H.

50mm on Original

Client

Status
CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	G.CONSTABLE
Original Size	A3	Designed	A. PRASAD
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C671-AA009732-VCD-00.dgn

Project
THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title
DRAINAGE LONGITUDINAL SECTION
SHEET 21

Drawing No. C671
Project No. AA009732
Issue B

V2

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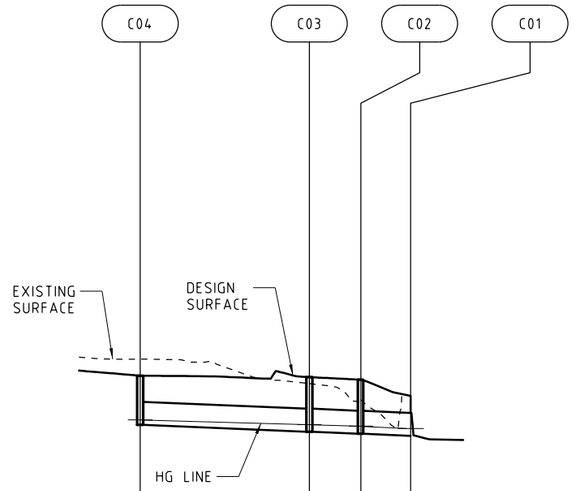

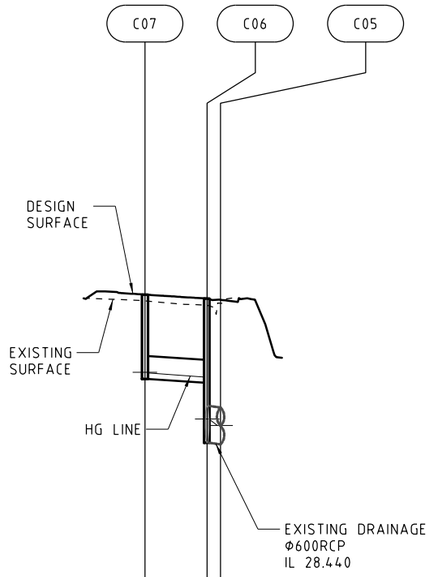

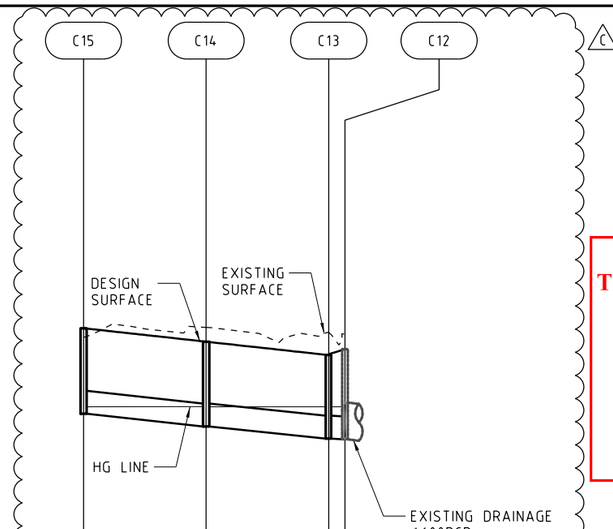

		C04–C03	C03–C02	C02–C01	
		CLASS 4 PIPE	CLASS 4 PIPE		
1 IN 10 YR FLOW (m3/s)		0.012	0.024	0.027	
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)		0.113	0.216	0.241	
PIPE SIZE & TYPE		Φ375RCP	Φ375RCP	Φ375RCP	
SLOPE 1 IN X		250	250	250	
DATUM RL.		21.0			
DEPTH TO PIPE INVERT (m)		0.803 0.890	0.890 0.881	0.881 0.375	0.375
HYDRAULIC GRADE LINE (m AHD)		29.831 29.756	29.751 29.730	29.724 29.691	29.691
PIPE INVERT LEVEL (m AHD)		29.752 29.641	29.641 29.607	29.607 29.575	29.575
FINISHED SURFACE (m AHD)	30.555	30.531	30.489	29.950	
EXISTING SURFACE (m AHD)	30.826	30.426	30.164	29.969	
CHAINAGE (m)	0.000	27.588	36.015	44.131	

		C07–C06	C06–C05	
1 IN 10 YR FLOW (m3/s)		0.019	0.323	
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)		0.176	1.143	
PIPE SIZE & TYPE		Φ375RCP	Φ600RCP	
SLOPE 1 IN X		174	115	
DATUM RL.		20.0		
DEPTH TO PIPE INVERT (m)		1.379 1.372	2.354 2.353	2.353
HYDRAULIC GRADE LINE (m AHD)		29.598 29.531	28.830 28.742	28.742
PIPE INVERT LEVEL (m AHD)		29.499 29.441	28.459 28.440	28.440
FINISHED SURFACE (m AHD)	30.878	30.813	30.793	
EXISTING SURFACE (m AHD)	30.775	30.704	30.736	
CHAINAGE (m)	0.000	10.153	12.339	

	C15–C14	C14–C13	C13–C12	
1 IN 10 YR FLOW (m3/s)	0.007	0.011	0.015	
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	0.065	0.101	0.138	
PIPE SIZE & TYPE	Φ375RCP	Φ375RCP	Φ375RCP	
SLOPE 1 IN X	96.6	100	241	
DATUM RL.	20.0			
DEPTH TO PIPE INVERT (m)	1.393 1.383	1.383 1.368	1.368 1.472	1.472
HYDRAULIC GRADE LINE (m AHD)	29.325 29.327	29.326 29.325	29.323 29.323	29.243
PIPE INVERT LEVEL (m AHD)	29.211 29.004	29.004 28.805	28.805 28.794	28.794
FINISHED SURFACE (m AHD)	30.604 30.387	30.173	30.266	
EXISTING SURFACE (m AHD)	30.467 30.621	30.537	30.510	
CHAINAGE (m)	0.000 20.000	40.000	42.650	

1 : 1000
HORIZ 0 10 20 30 40 50m
VERT 0 1 2 3 4 5m
1 : 100

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3/10/2017

Issue	Description	Date	Approved
C	DRAINAGE ALIGNMENT AMENDED	03.10.17	E. H
B	LONG SECTION REVISED	19.05.17	E. H.
A	ISSUED FOR CONSTRUCTION	27.04.17	E. H.

50mm on Original

vicroads

Client

BMD constructions

Status
CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	G.CONSTABLE
Original Size	A3	Designed	A. PRASAD
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C672-AA009732-VCD-00.dgn

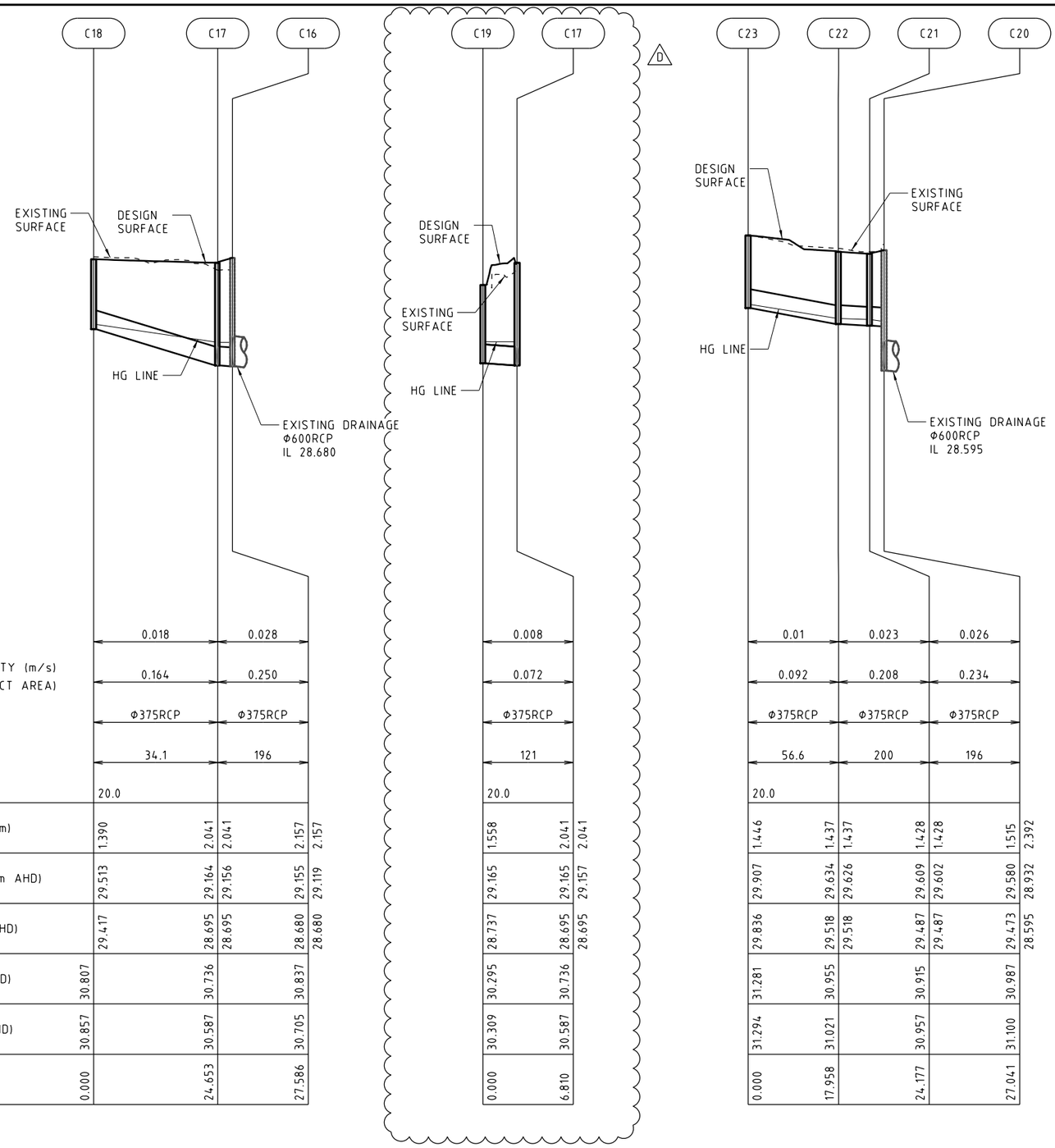
Project
THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title
DRAINAGE LONGITUDINAL SECTION
SHEET 22

ARCADIS

Drawing No. C672
Project No. AA009732
Issue C

V3



1 IN 10 YR FLOW (m3/s)		0.018		0.028			0.008			0.01		0.023		0.026									
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)		0.164		0.250			0.072			0.092		0.208		0.234									
PIPE SIZE & TYPE		Φ375RCP		Φ375RCP			Φ375RCP			Φ375RCP		Φ375RCP		Φ375RCP									
SLOPE 1 IN X		34.1		196			121			56.6		200		196									
DATUM RL.		20.0					20.0			20.0													
DEPTH TO PIPE INVERT (m)	1.390		2.041		2.041	2.157	2.157	1.558		2.041	2.041	1.446		1.437	1.437	1.428	1.428	1.515	2.392				
HYDRAULIC GRADE LINE (m AHD)	29.513		29.164		29.156	29.155	29.119	29.165		29.165	29.157	29.907		29.634	29.626	29.609	29.602	29.580	28.932				
PIPE INVERT LEVEL (m AHD)	29.417		28.695		28.695	28.680	28.680	28.737		28.695	28.695	29.836		29.518	29.518	29.487	29.487	29.473	28.595				
FINISHED SURFACE (m AHD)	30.807		30.736			30.837		30.295		30.736		31.281		30.955		30.915		30.987					
EXISTING SURFACE (m AHD)	30.857		30.587			30.705		30.309		30.587		31.294		31.021		30.957		31.100					
CHAINAGE (m)	0.000		24.653			27.586		0.000		6.810		0.000		17.958		24.177		27.041					

1 : 1000

HORIZ 0 10 20 30 40 50m

VERT 0 1 2 3 4 5m

1 : 100

Issue	Description	Date	Approved
D	PIT C19 REVISED (RFI-131-3201-00307)	21.08.18	E. H.
C	DRAINAGE ALIGNMENT AMENDED	03.10.17	E. H
B	LONG SECTION REVISED	19.05.17	E. H.
A	ISSUED FOR CONSTRUCTION	27.04.17	E. H.

Client: vicroads

Client: BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	G.CONSTABLE
Original Size	A3	Designed	A. PRASAD
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C673-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE LONGITUDINAL SECTION SHEET 23

ARCADIS

Drawing No.	Project No.	Issue
C673	AA009732	D

V1

50mm on Original

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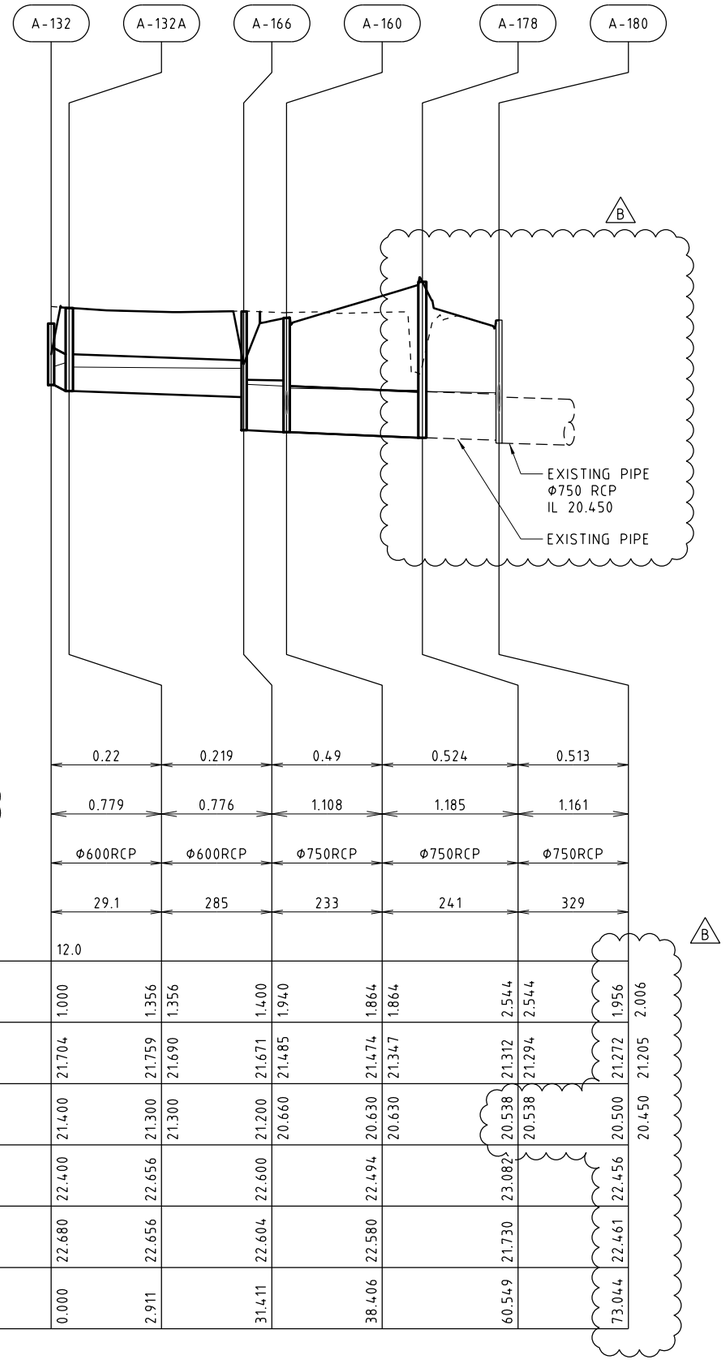

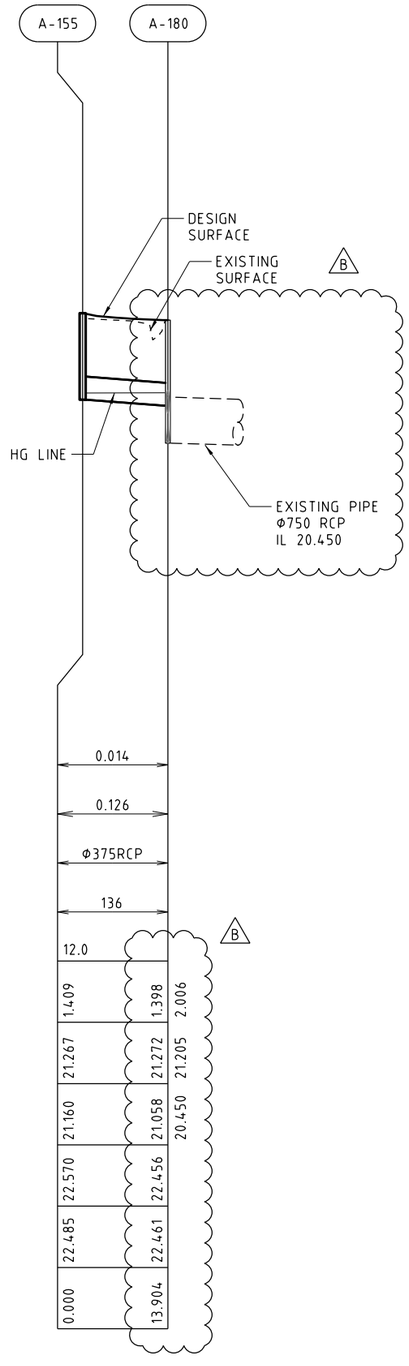

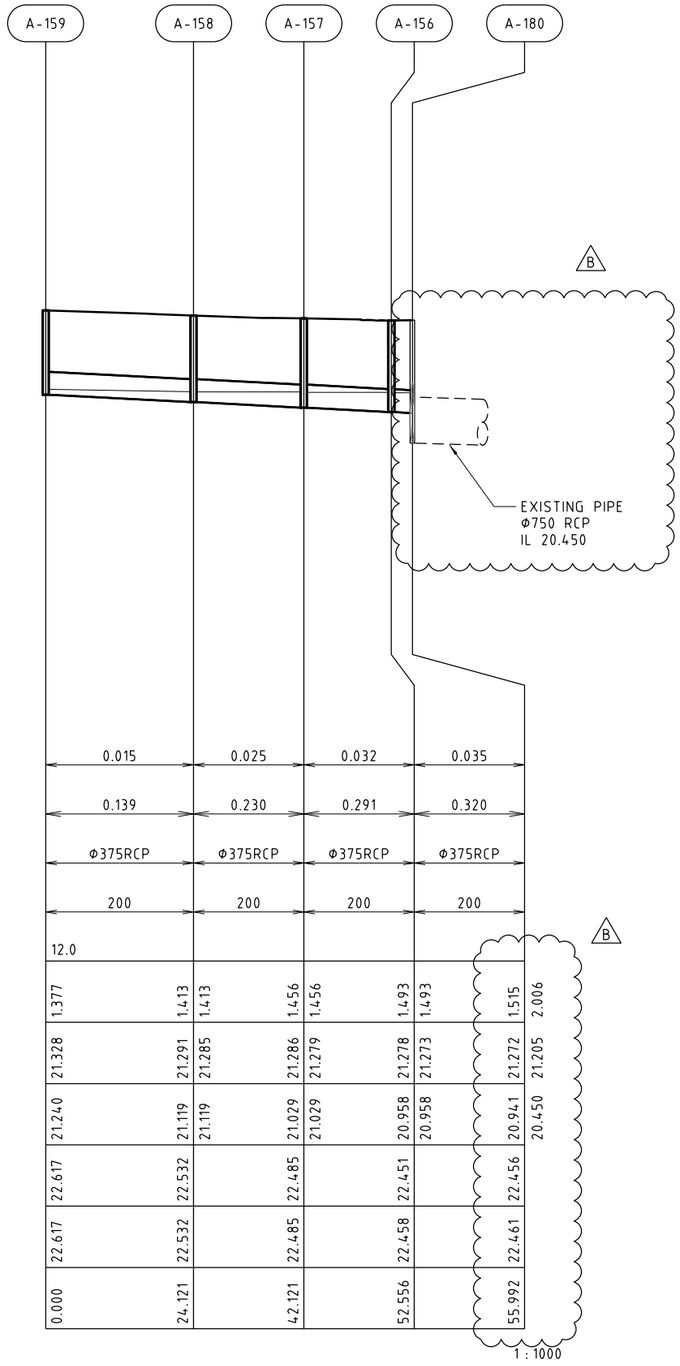

1 IN 10 YR FLOW (m3/s)	0.22		0.219		0.49		0.524		0.513			0.014			0.015		0.025		0.032		0.035		
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	0.779		0.776		1.108		1.185		1.161			0.126			0.139		0.230		0.291		0.320		
PIPE SIZE & TYPE	Φ600RCP		Φ600RCP		Φ750RCP		Φ750RCP		Φ750RCP			Φ375RCP			Φ375RCP		Φ375RCP		Φ375RCP		Φ375RCP		
SLOPE 1 IN X	29.1		285		233		241		329			136			200		200		200		200		
	12.0											12.0			12.0								
DEPTH TO PIPE INVERT (m)	1.000	1.356	1.356	1.400	1.940	1.864	1.864	2.544	2.544	1.956	2.006	1.409	1.398	2.006	1.377	1.413	1.413	1.456	1.456	1.493	1.493	1.515	2.006
HYDRAULIC GRADE LINE (m AHD)	21.704	21.759	21.690	21.671	21.485	21.474	21.347	21.312	21.294	21.272	21.205	21.267	21.272	21.205	21.328	21.291	21.285	21.286	21.279	21.278	21.273	21.272	21.205
PIPE INVERT LEVEL (m AHD)	21.400	21.300	21.300	21.200	20.660	20.630	20.630	20.538	20.538	20.500	20.450	21.160	21.058	20.450	21.240	21.119	21.119	21.029	21.029	20.958	20.958	20.941	20.450
FINISHED SURFACE (m AHD)	22.400	22.656		22.600		22.494		23.082		22.456		22.570	22.456		22.617	22.532		22.485		22.451		22.456	
EXISTING SURFACE (m AHD)	22.680	22.656		22.604		22.580		21.730		22.461		22.485	22.461		22.617	22.532		22.485		22.458		22.461	
CHAINAGE (m)	0.000	2.911		31.411		38.406		60.549		73.044		0.000	13.904		0.000	24.121		42.121		52.556		55.992	

1 : 1000

HORIZ 0 10 20 30 40 50m

VERT 0 1 2 3 4 5m

1 : 100

Issue	Description	Date	Approved
B	EXISTING PIPE ADDED	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

50mm on Original

Client: BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C674-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE LONGITUDINAL SECTION
SHEET 24

ARCADIS

Drawing No.	Project No.	Issue
C674	AA009732	B

V1

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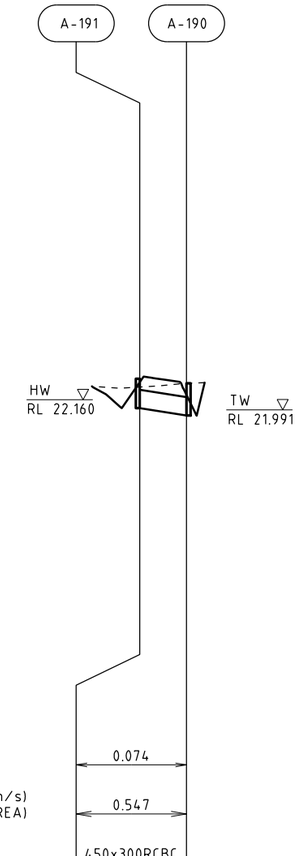

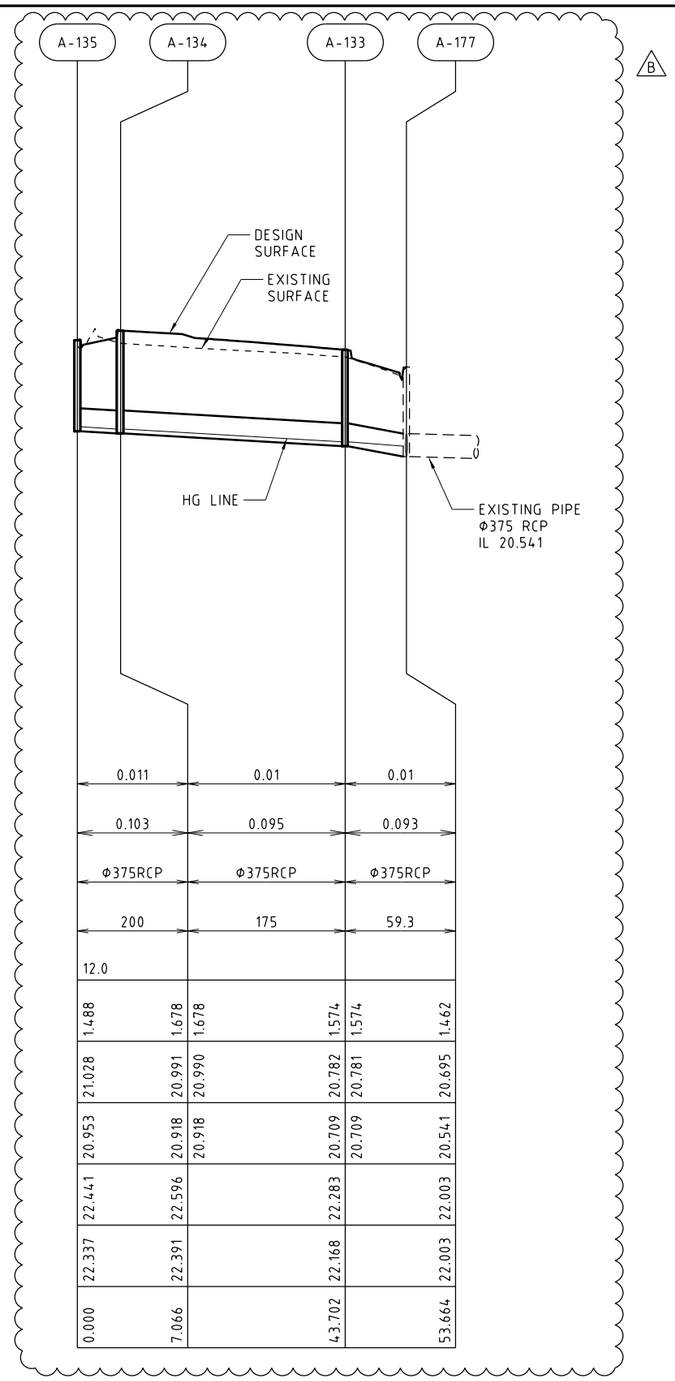

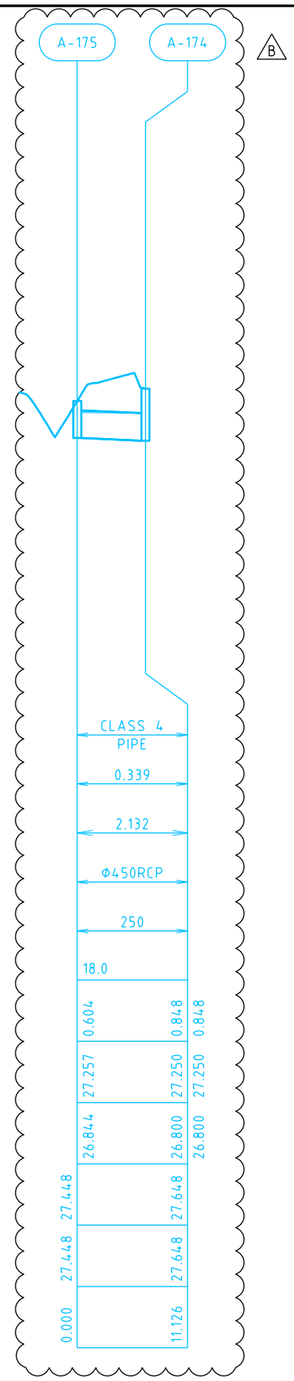

	A-191	A-190
1 IN 10 YR FLOW (m3/s)	0.074	
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	0.547	
PIPE SIZE & TYPE	450x300RCBC	
SLOPE 1 IN X	63.5	
	13.0	
DEPTH TO PIPE INVERT (m)	0.480	0.528
HYDRAULIC GRADE LINE (m AHD)	22.160	21.991
PIPE INVERT LEVEL (m AHD)	22.020	21.900
FINISHED SURFACE (m AHD)	22.500	22.428
EXISTING SURFACE (m AHD)	22.364	22.429
CHAINAGE (m)	0.000	7.621

	A-135	A-134	A-133	A-177
1 IN 10 YR FLOW (m3/s)	0.011	0.01	0.01	
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	0.103	0.095	0.093	
PIPE SIZE & TYPE	Φ375RCP	Φ375RCP	Φ375RCP	
SLOPE 1 IN X	200	175	59.3	
	12.0			
DEPTH TO PIPE INVERT (m)	1.488	1.678 1.678	1.574 1.574	1.462
HYDRAULIC GRADE LINE (m AHD)	21.028	20.991 20.990	20.782 20.781	20.695
PIPE INVERT LEVEL (m AHD)	20.953	20.918 20.918	20.709 20.709	20.541
FINISHED SURFACE (m AHD)	22.441	22.596	22.283	22.003
EXISTING SURFACE (m AHD)	22.337	22.391	22.168	22.003
CHAINAGE (m)	0.000	7.066	43.702	53.664

	A-175	A-174
	CLASS 4 PIPE	
1 IN 10 YR FLOW (m3/s)	0.339	
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	2.132	
PIPE SIZE & TYPE	Φ450RCP	
SLOPE 1 IN X	250	
	18.0	
DEPTH TO PIPE INVERT (m)	0.604	0.848 0.848
HYDRAULIC GRADE LINE (m AHD)	27.257	27.250 27.250
PIPE INVERT LEVEL (m AHD)	26.844	26.800 26.800
FINISHED SURFACE (m AHD)	27.448	27.648
EXISTING SURFACE (m AHD)	27.448	27.648
CHAINAGE (m)	0.000	11.126

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Issue	Description	Date	Approved
B	EXISTING PIPE ADDED, PIT A-153 TO A-137 SECTION REMOVED AND PIT A-175 TO A-174 SECTION AMENDED	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

50mm on Original

vic roads

Client

BMD constructions

Status
CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C675-AA009732-VCD-00.dgn

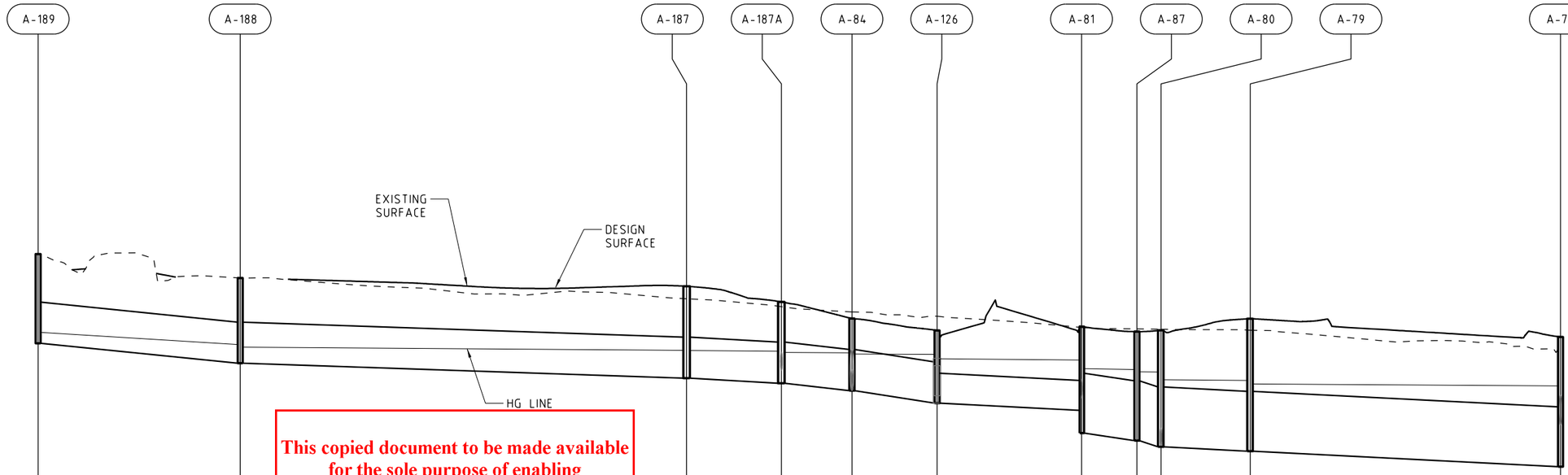
Project
THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title
DRAINAGE LONGITUDINAL SECTION
SHEET 25

ARCADIS

Drawing No.	Project No.	Issue
C675	AA009732	B

V1



1 IN 10 YR FLOW (m3/s)	0.291	0.271	0.319	0.361	0.381	1.472	1.482	1.499	1.509	1.545	
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	2.230	0.970	0.700	0.710	0.710	1.020	1.310	1.330	1.330	1.370	
PIPE SIZE & TYPE	Φ825RCP	Φ825RCP	Φ825RCP	Φ825RCP	Φ825RCP	Φ(2x)1200x600RCP	Φ1200RCP	Φ1200RCP	Φ1200RCP	Φ1200RCP	
SLOPE 1 IN X	101	298	190	141	68.2	200	118	200	200	200	
DATUM RL.	15.0										
DEPTH TO PIPE INVERT (m)	1.328	1.710	1.710	1.843	1.843	1.630	1.630	1.696	1.446	1.458	1.458
	1.681	1.920	1.912	1.912	1.964	2.336	2.658	2.658	2.602	2.602	
HYDRAULIC GRADE LINE (m AHD)	24.020	23.780	23.722	23.660	23.656	23.640	23.616	23.610	23.586	23.580	23.489
	23.460	23.293	23.270	23.228	23.220	23.071	23.060	22.986	22.940	22.777	
PIPE INVERT LEVEL (m AHD)	23.800	23.400	23.400	23.100	23.100	23.000	23.000	22.850	22.850	22.600	22.600
	22.455	22.000	21.850	21.850	21.726	21.726	21.636	21.636	21.326	21.326	
FINISHED SURFACE (m AHD)	25.128	25.110	24.943	24.630	24.296	24.058	24.136	24.035	24.062	24.295	23.928
EXISTING SURFACE (m AHD)	25.588	25.110	24.693	24.535	24.429	24.342	24.118	24.090	24.084	24.061	23.764
CHAINAGE (m)	0.000	40.499	129.975	148.981	163.126	180.173	209.137	220.243	248.613	242.965	305.130

B

1 : 1000

HORIZ 0 10 20 30 40 50m

VERT 0 1 2 3 4 5m

1 : 100

Issue	Description	Date	Approved
B	MELBOURNE WATER DRAINAGE NETWORK REVISED	21.02.18	E. H
A	MELBOURNE WATER DRAINAGE NETWORK ADDED	13.12.17	E. H

vicroads

Client: BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	J. GOULDING
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C676-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE LONGITUDINAL SECTION
SHEET 26

ARCADIS

Drawing No.	Project No.	Issue
C676	AA009732	B

V1

50mm on Original

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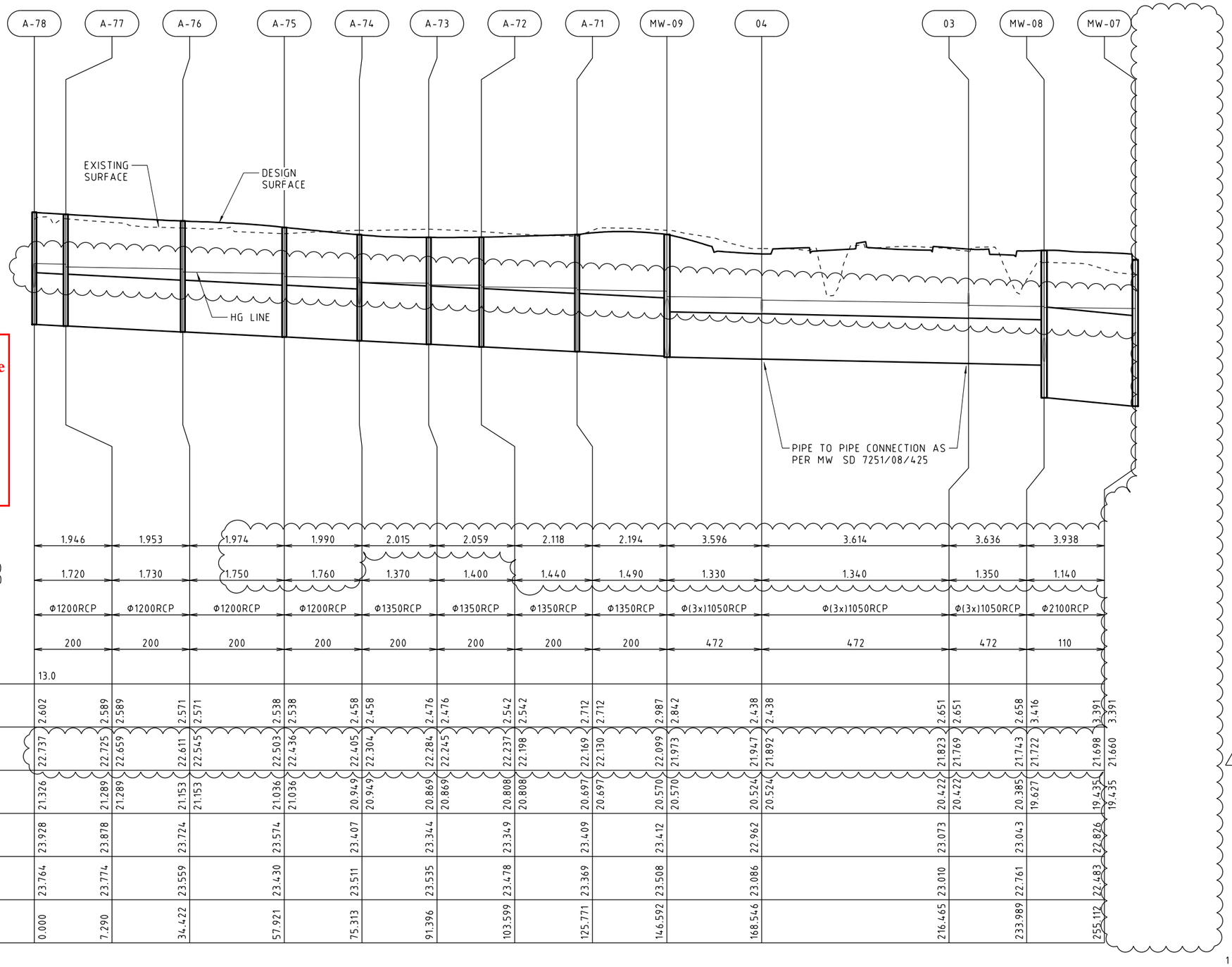

1 IN 10 YR FLOW (m3/s)	1.946	1.953	1.974	1.990	2.015	2.059	2.118	2.194	3.596	3.614		3.636	3.938	
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	1.720	1.730	1.750	1.760	1.370	1.400	1.440	1.490	1.330	1.340		1.350	1.140	
PIPE SIZE & TYPE	Φ1200RCP	Φ1200RCP	Φ1200RCP	Φ1200RCP	Φ1350RCP	Φ1350RCP	Φ1350RCP	Φ1350RCP	Φ(3x)1050RCP	Φ(3x)1050RCP		Φ(3x)1050RCP	Φ2100RCP	
SLOPE 1 IN X	200	200	200	200	200	200	200	200	472	472		472	110	
DATUM RL.	13.0													
DEPTH TO PIPE INVERT (m)	2.602	2.589	2.589	2.571	2.571	2.538	2.538	2.458	2.458	2.476	2.476	2.542	2.542	2.712	2.712	2.987	2.842	2.438	2.438	2.651	2.651	2.658	3.416	3.391	3.391
HYDRAULIC GRADE LINE (m AHD)	22.737	22.725	22.659	22.611	22.545	22.503	22.436	22.405	22.304	22.284	22.245	22.237	22.198	22.169	22.130	22.099	21.973	21.947	21.892	21.823	21.769	21.743	21.722	21.698	21.660
PIPE INVERT LEVEL (m AHD)	21.326	21.289	21.289	21.153	21.153	21.036	21.036	20.949	20.949	20.869	20.869	20.808	20.808	20.697	20.697	20.570	20.570	20.524	20.524	20.422	20.422	20.385	19.627	19.435	19.435
FINISHED SURFACE (m AHD)	23.928	23.878		23.724		23.574		23.407		23.344		23.349		23.409		23.412		22.962		23.073		23.043		22.826	
EXISTING SURFACE (m AHD)	23.764	23.774		23.559		23.430		23.511		23.535		23.478		23.369		23.508		23.086		23.010		22.761		22.483	
CHAINAGE (m)	0.000	7.290		34.422		57.921		75.313		91.396		103.599		125.771		146.592		168.546		216.465		233.989		255.112	

1 : 1000

HORIZ 0 10 20 30 40 50m

VERT 0 1 2 3 4 5m

1 : 100

Issue	Description	Date	Approved
C	MELBOURNE WATER DRAINAGE NETWORK REVISED (RFI-131-3201-00321)	05.10.18	E. H
B	MELBOURNE WATER DRAINAGE NETWORK REVISED	21.02.18	E. H
A	MELBOURNE WATER DRAINAGE NETWORK ADDED	13.12.17	E. H

50mm on Original

Client: BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	J. GOULDING
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C677-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE LONGITUDINAL SECTION
SHEET 27

ARCADIS

Drawing No.	Project No.	Issue
C677	AA009732	C

V1

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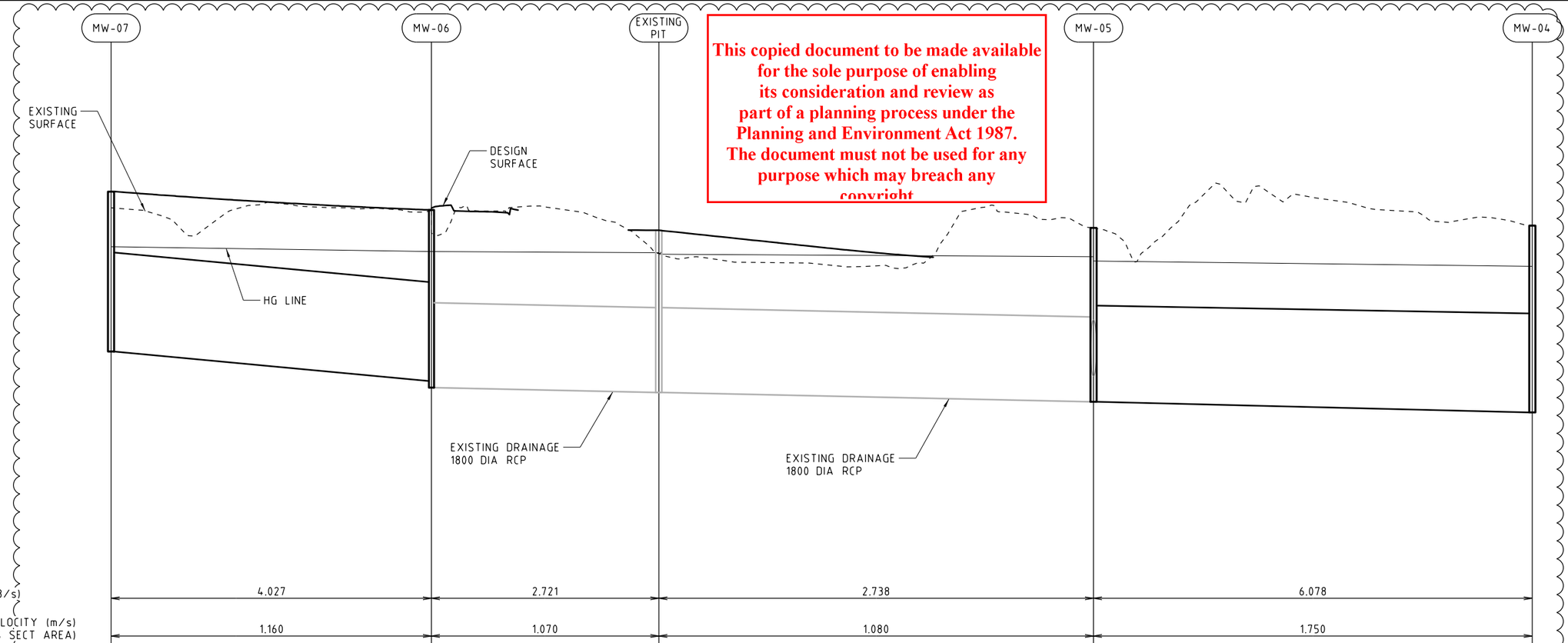

1 IN 10 YR FLOW (m3/s)		4.027	2.721	2.738	6.078
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)		1.160	1.070	1.080	1.750
PIPE SIZE & TYPE		Φ2100RCP	EXISTING Φ1800RCP	EXISTING Φ1800RCP	Φ2100RCP
SLOPE 1 IN X		109	EXISTING	EXISTING	561
DATUM RL.		11.00			
DEPTH TO PIPE INVERT (m)	3.391	3.391	3.768	EXISTING	3.687	3.965
HYDRAULIC GRADE LINE (m AHD)	21.698	21.660	21.603	21.557	21.531	21.499	21.445	21.355	21.243	21.214
PIPE INVERT LEVEL (m AHD)	19.435	19.435	18.670	18.670	EXISTING	EXISTING	18.370	18.370	18.143	18.142
FINISHED SURFACE (m AHD)	22.826	22.438	21.957	22.057	22.108
EXISTING SURFACE (m AHD)	22.483	22.424	21.518	22.057	22.108
CHAINAGE (m)	0.000	67.961	116.191	208.403	301.482

1 : 1000

HORIZ 0 10 20 30 40 50m

VERT 0 1 2 3 4 5m

1 : 100

C

ADVERTISED PLAN

Issue	Description	Date	Approved
C	MELBOURNE WATER DRAINAGE NETWORK REVISED (RFI-131-3201-00321)	05.10.18	E. H
B	MELBOURNE WATER DRAINAGE NETWORK REVISED	21.02.18	E. H
A	MELBOURNE WATER DRAINAGE NETWORK ADDED	13.12.17	E. H

50mm on Original

Client: vicroads; BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	J. GOULDING
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C678-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE LONGITUDINAL SECTION
SHEET 28

ARCADIS

Drawing No.	Project No.	Issue
C678	AA009732	C

V1

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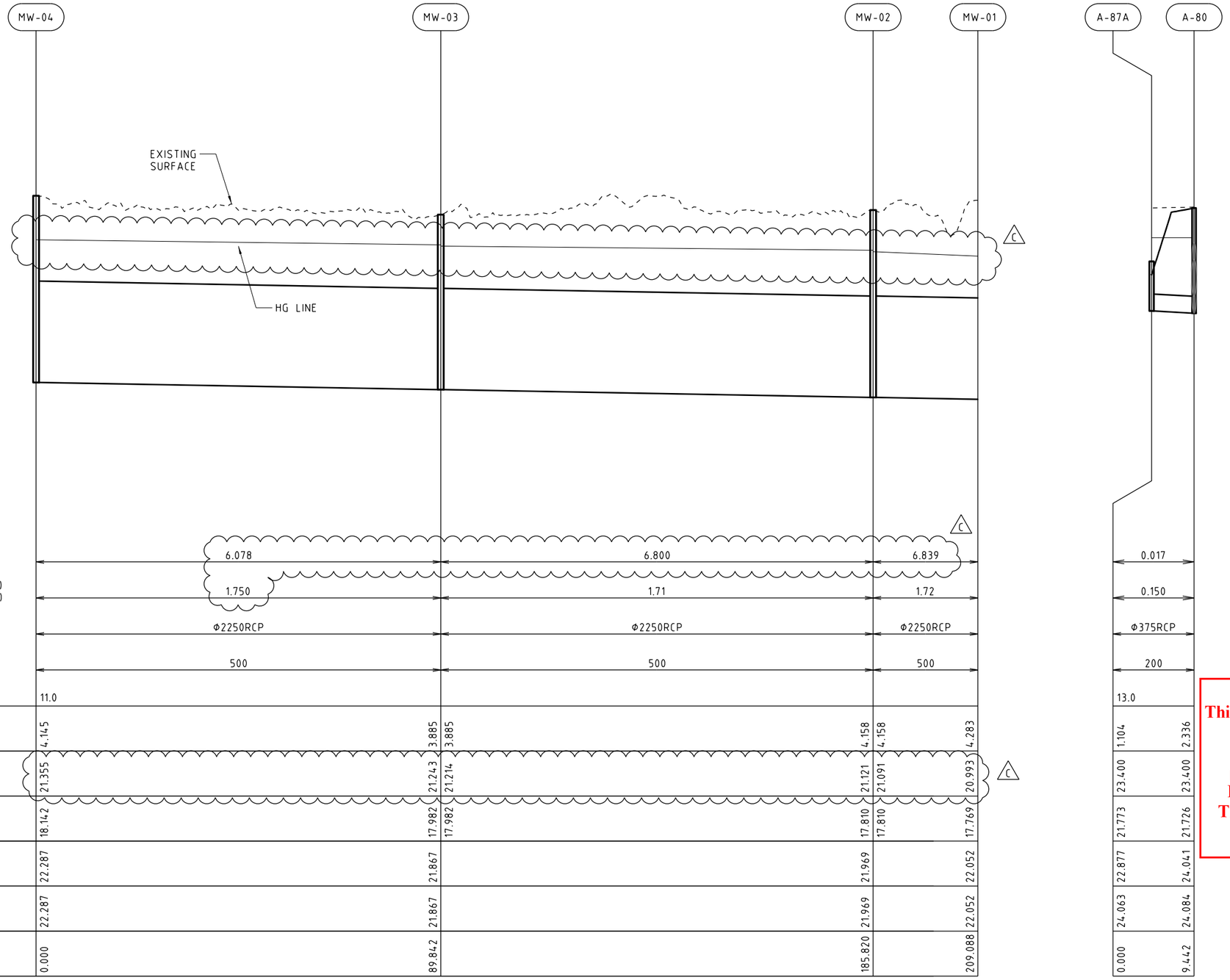

	MW-04		MW-03		MW-02		MW-01	A-87A		A-80	
1 IN 10 YR FLOW (m3/s)		6.078		6.800		6.839			0.017		
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)		1.750		1.71		1.72			0.150		
PIPE SIZE & TYPE		Φ2250RCP		Φ2250RCP		Φ2250RCP			Φ375RCP		
SLOPE 1 IN X		500		500		500			200		
DATUM RL.	11.0							13.0			
DEPTH TO PIPE INVERT (m)	4.145	3.885	3.885	4.158	4.158	4.283		1.104	2.336		
HYDRAULIC GRADE LINE (m AHD)	21.355	21.243	21.214	21.121	21.091	20.993	C	23.400	23.400		
PIPE INVERT LEVEL (m AHD)	18.142	17.982	17.982	17.810	17.810	17.769		21.773	21.726		
FINISHED SURFACE (m AHD)	22.287	21.867		21.969		22.052		22.877	24.041		
EXISTING SURFACE (m AHD)	22.287	21.867		21.969		22.052		24.063	24.084		
CHAINAGE (m)	0.000	89.842		185.820		209.088		0.000	9.442		

1 : 1000

HORIZ 0 10 20 30 40 50m

VERT 0 1 2 3 4 5m

1 : 100

Issue	Description	Date	Approved
C	MELBOURNE WATER DRAINAGE NETWORK REVISED (RFI-131-3201-00321)	05.10.18	E. H
B	MELBOURNE WATER DRAINAGE NETWORK REVISED	21.02.18	E. H
A	MELBOURNE WATER DRAINAGE NETWORK ADDED	13.12.17	E. H

50mm on Original

Client: vicroads; BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	J. GOULDING
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C679-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE LONGITUDINAL SECTION
SHEET 29

ARCADIS

Drawing No.	Project No.	Issue
C679	AA009732	C

V1

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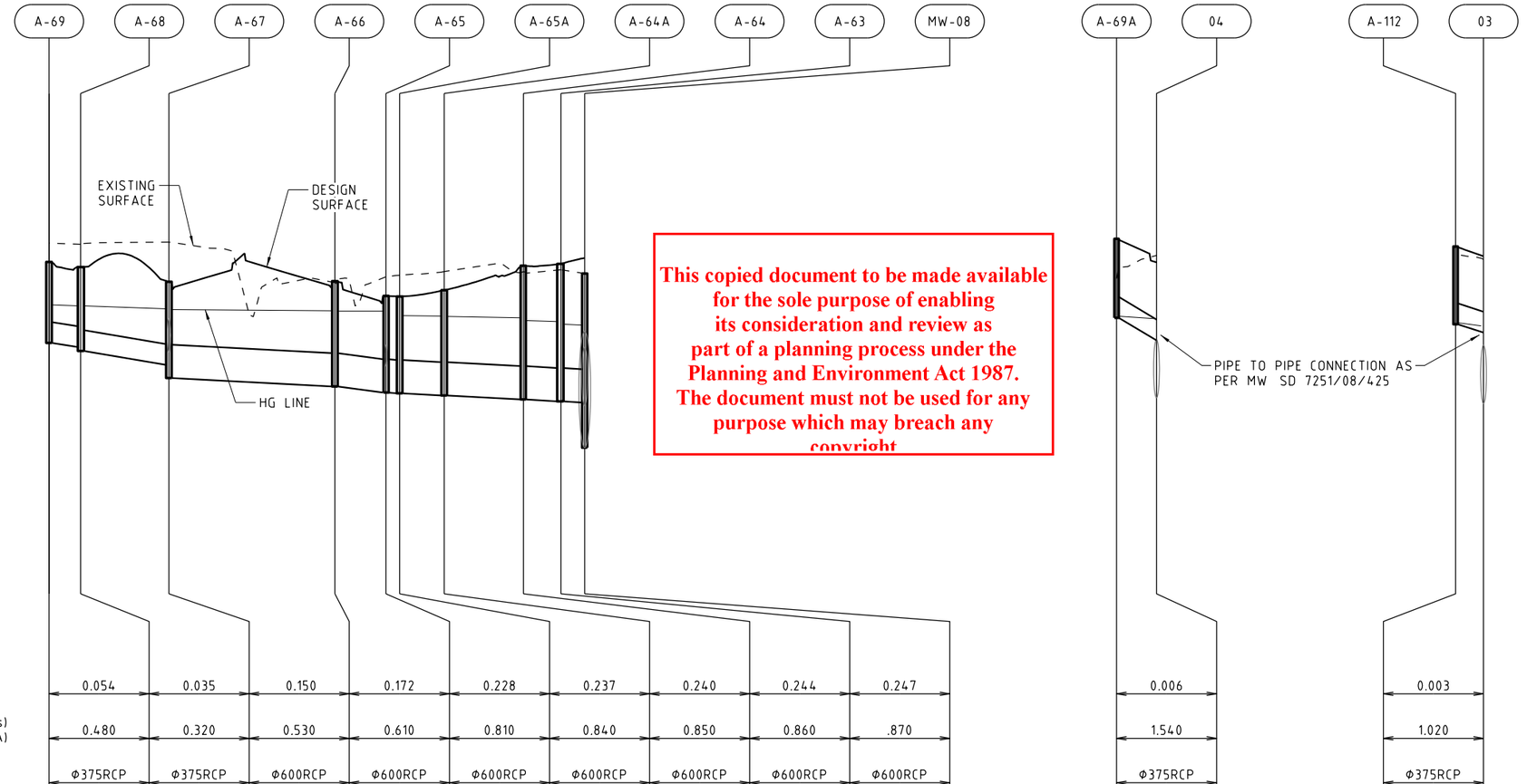

ADVERTISED PLAN

	A-69	A-68	A-68	A-67	A-67	A-66	A-66	A-65	A-65	A-65A	A-65A	A-64A	A-64A	A-64	A-64	A-63	A-63	MW-08	
1 IN 10 YR FLOW (m3/s)	0.054		0.035		0.150		0.172		0.228		0.237		0.240		0.244		0.247		
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	0.480		0.320		0.530		0.610		0.810		0.840		0.850		0.860		.870		
PIPE SIZE & TYPE	Φ375RCP		Φ375RCP		Φ600RCP		Φ600RCP		Φ600RCP		Φ600RCP		Φ600RCP		Φ600RCP		Φ600RCP		
SLOPE 1 IN X	77.4		63.4		200		82.3		200		200		200		200		200		
DATUM RL.	12.0																		
DEPTH TO PIPE INVERT (m)	1.457	1.439	1.510	1.498	1.735	1.893	1.893	1.741	1.741	1.744	1.744	1.895	1.895	2.406	2.406	2.473	2.473	2.380	3.193
HYDRAULIC GRADE LINE (m AHD)	22.160	22.140	22.143	22.090	22.075	22.050	22.047	22.050	21.985	21.980	21.967	21.960	21.952	21.930	21.878	21.860	21.811	21.760	21.760
PIPE INVERT LEVEL (m AHD)	21.512	21.439	21.368	21.117	20.880	20.731	20.731	20.619	20.619	20.607	20.607	20.567	20.567	20.495	20.495	20.462	20.462	20.440	19.627
FINISHED SURFACE (m AHD)	22.969	22.878		22.615		22.624		22.361		22.351		22.461		22.902		22.934		22.820	
EXISTING SURFACE (m AHD)	23.308	23.286		23.325		22.597		22.703		22.731		22.796		22.796		22.829		22.761	
CHAINAGE (m)	0.000	5.667		21.553		51.405		60.570		63.059		71.059		85.329		92.049		96.343	

B

	A-69A	04	
1 IN 10 YR FLOW (m3/s)	0.006		
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	1.540		
PIPE SIZE & TYPE	Φ375RCP		
SLOPE 1 IN X	18.9		
DATUM RL.	12.0		
DEPTH TO PIPE INVERT (m)	1.420	2.692	1.631
HYDRAULIC GRADE LINE (m AHD)	21.994	21.950	21.949
PIPE INVERT LEVEL (m AHD)	21.965	20.524	21.585
FINISHED SURFACE (m AHD)	23.386	23.216	
EXISTING SURFACE (m AHD)	22.672	23.086	
CHAINAGE (m)	0.000	7.184	

	A-112	03	
1 IN 10 YR FLOW (m3/s)	0.003		
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)	1.020		
PIPE SIZE & TYPE	Φ375RCP		
SLOPE 1 IN X	37.1		
DATUM RL.	12.0		
DEPTH TO PIPE INVERT (m)	1.399	1.331	2.623
HYDRAULIC GRADE LINE (m AHD)	21.876	21.820	21.758
PIPE INVERT LEVEL (m AHD)	21.850	21.714	20.422
FINISHED SURFACE (m AHD)	23.249	23.045	
EXISTING SURFACE (m AHD)	23.111	23.010	
CHAINAGE (m)	0.000	5.029	

1 : 1000
HORIZ 0 10 20 30 40 50m
VERT 0 1 2 3 4 5m
1 : 100

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Issue	Description	Date	Approved
B	MELBOURNE WATER DRAINAGE NETWORK REVISED	21.02.18	E. H
A	MELBOURNE WATER DRAINAGE NETWORK ADDED	13.12.17	E. H

50mm on Original

vicroads

Client
BMD constructions

Status
CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	J. GOULDING
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C680-AA009732-VCD-00.dgn

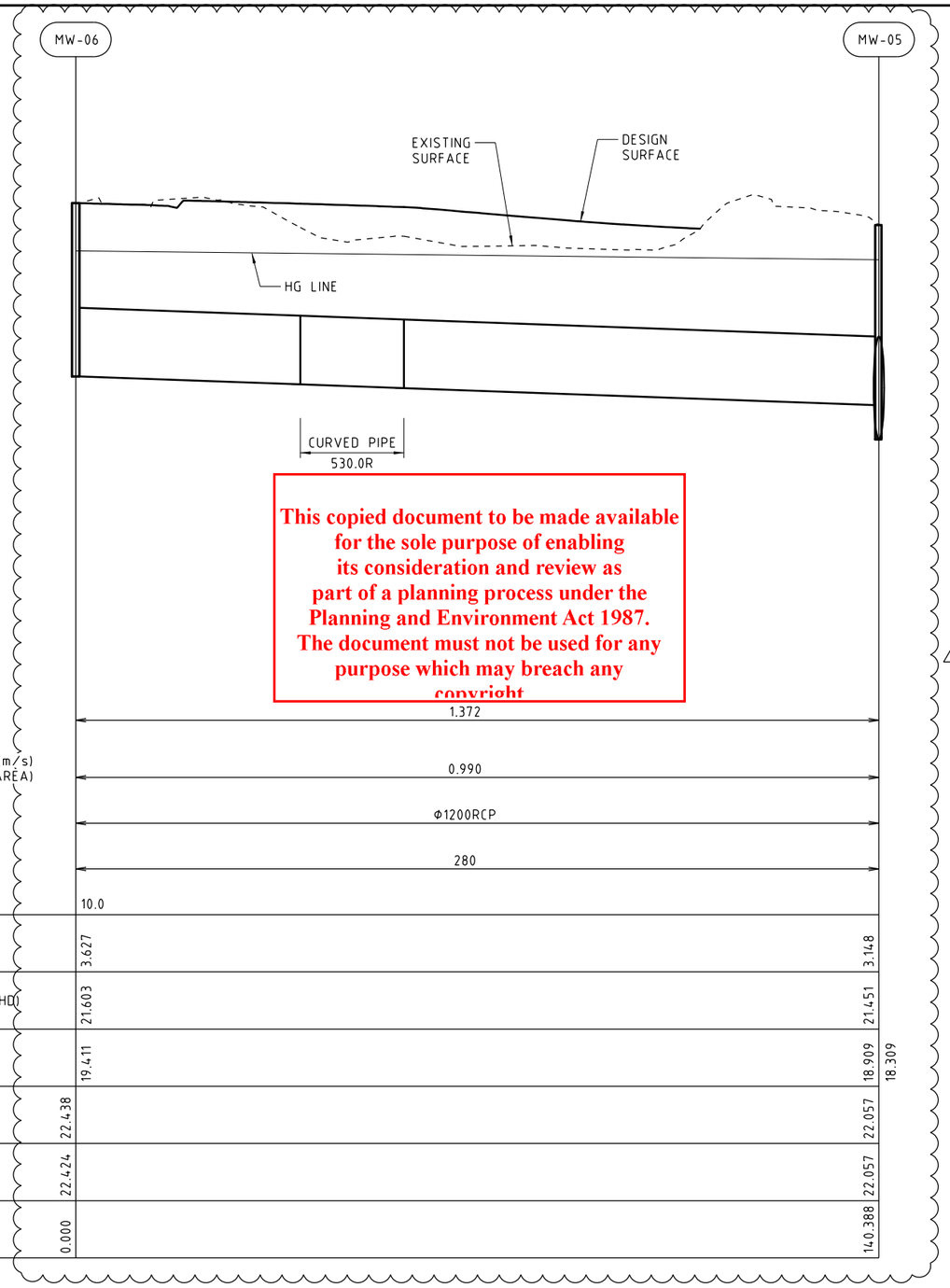
Project
THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title
DRAINAGE LONGITUDINAL SECTION
SHEET 30

ARCADIS

Drawing No.	Project No.	Issue
C680	AA009732	B

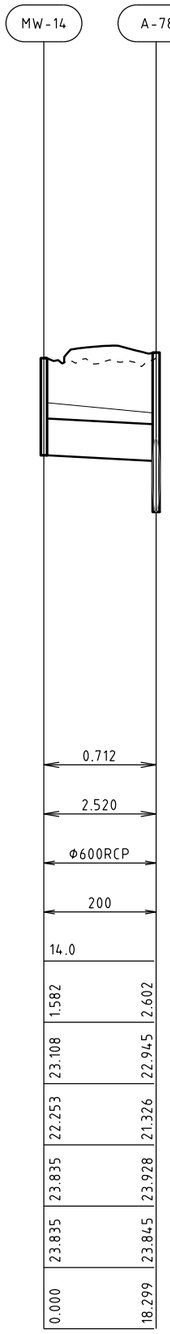
V1



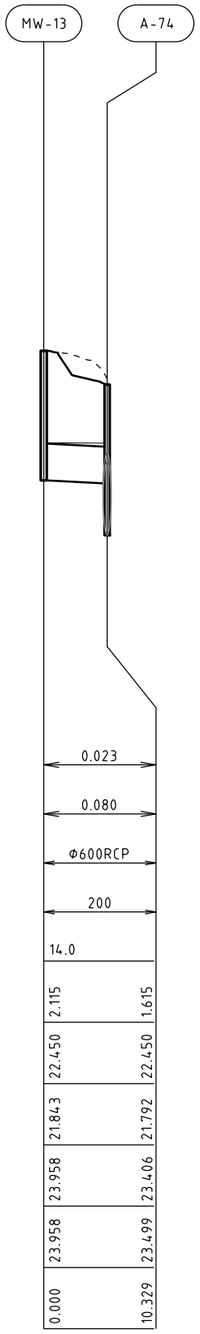
B

1 IN 10 YR FLOW (m3/s)		1.372	
AVERAGE OUTLET VELOCITY (m/s) (DESIGN FLOW/CROSS SECT AREA)		0.990	
PIPE SIZE & TYPE		Φ1200RCP	
SLOPE 1 IN X		280	
DATUM RL.		10.0	
DEPTH TO PIPE INVERT (m)		3.627	3.148
HYDRAULIC GRADE LINE (m AHD)		21.603	21.451
PIPE INVERT LEVEL (m AHD)		19.411	18.909
FINISHED SURFACE (m AHD)	22.438		22.057
EXISTING SURFACE (m AHD)	22.424		22.057
CHAINAGE (m)	0.000		140.388

18.309



	0.712	
	2.520	
	Φ600RCP	
	200	
	14.0	
DEPTH TO PIPE INVERT (m)	1.582	2.602
HYDRAULIC GRADE LINE (m AHD)	23.108	22.945
PIPE INVERT LEVEL (m AHD)	22.253	21.326
FINISHED SURFACE (m AHD)	23.835	23.928
EXISTING SURFACE (m AHD)	23.835	23.845
CHAINAGE (m)	0.000	18.299



	0.023	
	0.080	
	Φ600RCP	
	200	
	14.0	
DEPTH TO PIPE INVERT (m)	2.115	1.615
HYDRAULIC GRADE LINE (m AHD)	22.450	22.450
PIPE INVERT LEVEL (m AHD)	21.843	21.792
FINISHED SURFACE (m AHD)	23.958	23.406
EXISTING SURFACE (m AHD)	23.958	23.499
CHAINAGE (m)	0.000	10.329

HORIZ 1 : 1000 — 0 10 20 30 40 50m

VERT 1 : 100 — 0 1 2 3 4 5m

Issue	Description	Date	Approved
B	MELBOURNE WATER DRAINAGE NETWORK REVISED (RFI-131-3201-00321)	05.10.18	E. H
A	MELBOURNE WATER DRAINAGE NETWORK REVISED	21.02.18	E. H

50mm on Original

Client: vicroads; BMD constructions

Status: CONSTRUCTION — ISSUED FOR CONSTRUCTION

Scales	1:1000H,1:100V	Drawn	J. GOULDING
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C681-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE LONGITUDINAL SECTION
SHEET 31

ARCADIS

Drawing No.	Project No.	Issue
C681	AA009732	B

V1

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PIT ID	PIT TYPE	PIT DIMENSIONS			PIT LEVELS		PIT LEVELS (m AHD)		BEARING OF PIT	REFERENCE DRAWINGS	REMARKS
		LENGTH (m)	WIDTH (m)	DEPTH (m)	INVERT	TOP	EASTING	NORTHING	"LENGTH"		
A-01A	WINGWALL	-	-	3.844	17.330	21.174	346685.419	5783999.786	134°10'25"	SD 1931	ECOSOL TRASH RACK - ETR 105
A-01B	DELETE										△B
A-01C	DELETE										
A-01	JUNCTION	1.000	1.600	5.091	17.334	22.425	346702.712	5783982.984	187°55'51"	SD 1121	
A-02	JUNCTION	2.000	1.300	4.310	18.223	22.533	346761.376	5783972.674	102°41'42"	SD 1121	
A-03	SIDE ENTRY	2.000	1.300	4.137	18.244	22.381	346767.682	5783964.111	98°37'39"	SD 1301	
A-04	SIDE ENTRY	1.000	1.300	3.373	18.990	22.363	346842.116	5783950.786	280°28'19"	SD 1301	
A-05	SIDE ENTRY	1.000	1.200	3.065	19.180	22.245	346869.987	5783945.872	279°59'54"	SD 1301	
A-06	SIDE ENTRY	1.000	1.200	2.954	19.220	22.174	346887.670	5783943.226	278°30'44"	SD 1301	
A-07	SIDE ENTRY	1.000	1.200	2.928	19.240	22.168	346894.730	5783942.271	277°42'01"	SD 1301	
A-08	SIDE ENTRY	1.000	1.200	2.920	19.290	22.210	346913.615	5783939.808	277°25'49"	SD 1301	
A-09	SIDE ENTRY	1.000	1.200	2.940	19.330	22.270	346933.473	5783937.220	277°25'34"	SD 1301	
A-10	SIDE ENTRY	1.000	1.200	2.968	19.360	22.328	346952.890	5783934.689	277°25'34"	SD 1301	
A-11	SIDE ENTRY	1.000	1.200	2.970	19.390	22.360	346969.573	5783932.515	277°25'34"	SD 1301	
A-12	SIDE ENTRY	1.000	1.200	2.911	19.440	22.351	346996.338	5783929.028	277°25'22"	SD 1301	
A-13	SIDE ENTRY	1.000	1.200	2.867	19.460	22.327	347007.291	5783927.599	277°26'03"	SD 1301	
A-14	SIDE ENTRY	1.000	1.200	2.806	19.481	22.288	347024.133	5783925.404	277°25'34"	SD 1301	
A-15	SIDE ENTRY	1.000	1.200	2.762	19.500	22.262	347036.733	5783923.761	277°25'34"	SD 1301	
A-17	SIDE ENTRY	1.000	1.200	2.703	19.550	22.253	347050.583	5783921.956	277°25'34"	SD 1301	
A-18A	INLET CATCH PIT	1.000	0.750	1.212	20.828	22.040	347063.351	5783924.161	99°22'02"	SD 1102	
A-18	SIDE ENTRY	1.000	1.200	2.675	19.600	22.275	347062.885	5783920.353	277°25'34"	SD 1301	
A-19	SIDE ENTRY	1.000	1.200	2.669	19.650	22.319	347078.060	5783918.375	277°25'34"	SD 1301	
A-20	SIDE ENTRY	1.000	1.200	2.668	19.700	22.368	347093.066	5783916.419	277°25'34"	SD 1301	
A-21	SIDE ENTRY	1.000	1.200	2.662	19.750	22.412	347111.136	5783915.361	269°27'34"	SD 1301	
A-22	GRATED SIDE ENTRY	1.000	1.200	2.524	19.800	22.324	347124.305	5783914.562	272°05'50"	SD 1321	
A-23	GRATED SIDE ENTRY	1.000	1.200	2.573	19.830	22.403	347137.610	5783913.301	277°25'34"	SD 1321	
A-24	GRATED SIDE ENTRY	1.000	1.200	2.631	19.929	22.559	347157.202	5783910.747	277°25'34"	SD 1321	
A-25	GRATED SIDE ENTRY	1.000	1.200	2.687	20.023	22.710	347175.900	5783908.310	277°25'34"	SD 1321	
A-26	SIDE ENTRY	1.000	0.900	2.254	20.627	22.881	347202.499	5783911.312	77°25'34"	SD 1301	
A-27	SIDE ENTRY	1.000	0.900	2.426	20.663	23.089	347205.355	5783903.800	277°25'34"	SD 1301	
A-28	SIDE ENTRY	1.000	0.900	2.474	20.747	23.221	347221.868	5783901.648	277°25'34"	SD 1301	
A-29	SIDE ENTRY	1.000	1.000	2.461	20.925	23.386	347257.181	5783896.037	277°25'34"	SD 1301	
A-30	SIDE ENTRY	1.000	0.750	2.132	21.018	23.150	347274.843	5783901.267	347°16'01"	SD 1301	HAUNCHED PIT W = 1.500, L = 1.000, REFER TO DRAWING SD 1021, HEAVY DUTY CLASS D COVER
A-31	SIDE ENTRY	1.000	0.750	2.412	21.093	23.505	347286.088	5783891.260	277°25'34"	SD 1301	HAUNCHED PIT W = 0.800, L = 1.500, REFER TO DRAWING SD 1021
A-32	SIDE ENTRY	1.000	0.750	2.396	21.136	23.532	347294.601	5783890.151	277°25'34"	SD 1301	HAUNCHED PIT W = 0.800, L = 1.000, REFER TO DRAWING SD 1021
A-33	GRATED	1.000	0.750	2.240	21.238	23.478	347314.695	5783886.851	279°19'32"	CITY OF CASEY - S-328	HAUNCHED PIT W = 0.800, L = 1.000, REFER TO DRAWING SD 1021
A-34	GRATED	1.000	0.750	2.212	21.307	23.519	347328.440	5783885.060	277°25'34"	CITY OF CASEY - S-328	HAUNCHED PIT W = 0.800, L = 1.000, REFER TO DRAWING SD 1021
A-35	SIDE ENTRY	1.000	0.750	2.305	21.403	23.708	347347.669	5783883.234	277°25'34"	SD 1301	HAUNCHED PIT W = 0.800, L = 1.000, REFER TO DRAWING SD 1021
A-36	SIDE ENTRY	1.000	0.750	2.303	21.504	23.807	347367.674	5783880.627	277°25'34"	SD 1301	HAUNCHED PIT W = 0.800, L = 1.000, REFER TO DRAWING SD 1021
A-37	SIDE ENTRY	1.000	0.750	2.323	21.604	23.927	347387.416	5783878.053	277°25'34"	SD 1301	HAUNCHED PIT W = 0.800, L = 1.000, REFER TO DRAWING SD 1022
A-38	SIDE ENTRY	1.000	0.750	2.326	21.704	24.030	347407.362	5783876.049	271°31'30"	SD 1301	HAUNCHED PIT W = 0.800, L = 1.000, REFER TO DRAWING SD 1021
A-39	SIDE ENTRY	1.000	0.750	2.266	21.812	24.078	347428.993	5783875.942	274°18'27"	SD 1301	HAUNCHED PIT W = 0.800, L = 1.000, REFER TO DRAWING SD 1021
A-40	SIDE ENTRY	1.000	0.750	2.280	21.917	24.197	347449.771	5783873.456	276°49'22"	SD 1301	HAUNCHED PIT W = 0.800, L = 1.000, REFER TO DRAWING SD 1022
A-41	SIDE ENTRY	1.000	0.750	2.313	22.018	24.331	347469.775	5783870.848	277°25'33"	SD 1301	HAUNCHED PIT W = 0.900, L = 1.000, REFER TO DRAWING SD 1021
A-42	SIDE ENTRY	1.000	0.750	2.191	22.174	24.365	347501.017	5783871.445	77°25'34"	SD 1301	HAUNCHED PIT W = 0.900, L = 1.000, REFER TO DRAWING SD 1021
A-43	SIDE ENTRY	1.000	0.750	2.391	22.212	24.603	347502.953	5783864.003	97°28'51"	SD 1301	
A-44	SIDE ENTRY	1.000	0.750	2.304	22.290	24.594	347518.642	5783864.262	7°25'34"	SD 1301	
A-45	SIDE ENTRY	1.000	0.750	2.309	22.425	24.734	347545.366	5783860.779	2°51'45"	SD 1301	
A-46	SIDE ENTRY	1.000	0.750	1.699	22.880	24.579	347554.941	5783862.857	335°13'29"	SD 1301 △B	HEAVY DUTY CLASS D COVER
A-47	GRATED	1.000	0.750	1.493	23.540	25.033	347572.107	5783853.300	277°28'51"	CITY OF CASEY - S-328	
A-49	GRATED	1.000	0.750	1.575	25.461	27.036	347630.526	5783845.858	278°49'16"	SD 1441	
A-50-2	GRATED	1.000	0.750	1.556	25.475	27.031	347630.727	5783847.172	278°46'27"	SD 1431	REFER TO STANDARD DRAWINGS FOR ORIENTATION OF "LENGTH" AND "WIDTH"
A-53A	JUNCTION	1.000	0.750	1.952	29.150	31.102	347699.239	5783818.943	276°33'46"	SD 1121	
A-53C	JUNCTION	1.000	0.750	1.941	31.430	33.371	347749.677	5783813.074	276°38'11"	SD 1121	
A-50	GRATED	1.000	0.750	1.557	29.069	30.626	347701.250	5783835.036	278°41'57"	SD 1441 △B	

NOTES:

1. PITS DEEPER THAN 1000mm TO BE FITTED WITH STEP IRONS IN ACCORDANCE WITH VICROADS STANDARD DRAWING NUMBER SD1041.
2. PIT INVERT LEVELS ARE SET TO BE USUALLY 100mm BELOW OUTLET PIPE INVERT LEVEL. PROVIDE CONCRETE INFILL TO PIPE INVERT LEVEL AFTER PIPE INSTALLATION.
3. PIT DIMENSIONS SHOWN IN PIT SCHEDULE ARE PIT INTERNAL DIMENSIONS UNLESS NOTED OTHERWISE.
4. ALL RCP SHALL BE INSTALLED WITH TYPE H2 BEDDING SUPPORT IN ACCORDANCE WITH VICROADS STANDARD DRAWING SD1511 UNLESS NOTED OTHERWISE.
5. ALL PIPES ARE TO BE RUBBER RING JOINT (RRJ) CLASS 2 REINFORCED CONCRETE PIPES (RCP) UNLESS NOTED OTHERWISE.
6. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
7. ALL REFERENCE DRAWINGS TO BE VICROADS STANDARD DRAWINGS UNLESS NOTED OTHERWISE.
8. ALL PIT COVERS AND FRAMES WITHIN THE ROAD PAVEMENT ARE TO BE CLASS D. ALL PIT COVERS AND FRAMES OUTSIDE THE ROAD PAVEMENT TO BE CLASS C.
9. EXISTING PIPES TO BE RETAINED TO BE CHECKED IF THEY ARE SUITABLE TO REMAIN IN SERVICE.

Issue	Description	Date	Approved
B	PIT INFORMATION AMENDED	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

Client: vicroads / BMD constructions

Status: CONSTRUCTION — ISSUED FOR CONSTRUCTION

Scales	NTS	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C691-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PIT SCHEDULE
SHEET 1

ARCADIS

Drawing No.	Project No.	Issue
C691	AA009732	B

V1

50mm on Original

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PIT ID	PIT TYPE	PIT DIMENSIONS			PIT LEVELS		PIT LEVELS (m AHD)		BEARING OF PIT	REFERENCE DRAWINGS	REMARKS
		LENGTH (m)	WIDTH (m)	DEPTH (m)	INVERT	TOP	EASTING	NORTHING	"LENGTH"		
A-52	GRATED	1.000	0.750	1.460	31.456	32.916	347751.489	5783828.665	276°37'17"	SD 1441	
A-53	GRATED	1.000	0.750	1.460	31.453	32.913	347748.254	5783800.802	276°37'17"	SD 1441	
A-58	SIDE ENTRY	1.000	0.750	1.482	20.997	22.479	347115.265	5783878.075	97°26'42"	SD 1301	
A-59	SIDE ENTRY	1.000	0.750	1.477	21.176	22.653	347144.783	5783874.218	97°26'42"	SD 1301	
											E
A-63	JUNCTION	1.500	1.000	2.573	20.362	22.934	347199.974	5783861.650	98°00'30"	SD 1301	
A-64	SIDE ENTRY	1.000	0.750	2.506	20.395	22.902	347206.628	5783860.714	167°16'01"	SD 1301	HEAVY DUTY CLASS D COVER
A-64A	SIDE ENTRY	1.000	0.750	1.995	20.467	22.461	347209.774	5783846.794	167°16'01"	SD 1301	
A-65	SIDE ENTRY	1.000	0.750	1.844	20.517	22.361	347212.085	5783836.563	167°16'01"	SD 1301	
A-65A	SIDE ENTRY	1.000	0.750	1.844	20.507	22.351	347211.539	5783838.991	167°16'01"	SD 1301	
A-66	SIDE ENTRY	1.000	0.750	1.992	20.631	22.624	347221.044	5783834.629	187°16'01"	SD 1301	
A-67	SIDE ENTRY	1.000	0.750	1.835	20.781	22.615	347250.892	5783835.089	187°09'06"	SD 1301	
A-68	SIDE ENTRY	1.000	0.750	1.609	21.269	22.878	347261.392	5783847.010	77°25'34"	SD 1301	HEAVY DUTY CLASS D COVER
A-69	SIDE ENTRY	1.000	0.750	1.557	21.412	22.969	347266.923	5783848.244	257°25'34"	SD 1301	
A-69A	SIDE ENTRY	1.000	0.750	1.520	21.865	22.386	347265.204	5783859.846	277°25'34"	SD 1301	
A-71	SIDE ENTRY	1.000	1.650	2.812	20.597	23.409	347305.658	5783853.061	97°25'34"	SD 1021 and 1301	HAUNCHED S.E.P
A-72	SIDE ENTRY	1.000	1.650	2.642	20.708	23.349	347327.644	5783850.195	97°25'34"	SD 1021 and 1301	HAUNCHED S.E.P
A-73	SIDE ENTRY	1.000	1.650	2.576	20.769	23.344	347339.745	5783848.618	277°25'34"	SD 1021 and 1301	HAUNCHED S.E.P
A-74	SIDE ENTRY	1.000	1.650	2.558	20.849	23.407	347355.760	5783847.139	271°07'52"	SD 1021 and 1301	HAUNCHED S.E.P
A-75	SIDE ENTRY	1.000	1.500	2.638	20.936	23.574	347373.152	5783847.198	91°19'23"	SD 1021 and 1301	HAUNCHED S.E.P
A-76	SIDE ENTRY	1.000	1.500	2.671	21.053	23.724	347396.523	5783844.747	97°25'34"	SD 1021 and 1301	HAUNCHED S.E.P
A-77	SIDE ENTRY	1.000	1.500	2.689	21.189	23.878	347423.427	5783841.240	97°25'34"	SD 1021 and 1301	HAUNCHED S.E.P
A-78	SIDE ENTRY	1.000	1.500	2.702	21.226	23.928	347430.655	5783840.298	97°25'34"	SD 1021 and 1301	HAUNCHED S.E.P
A-79	SIDE ENTRY	1.000	1.500	2.758	21.536	24.295	347492.299	5783832.264	97°06'55"	SD 1021 and 1301	HAUNCHED S.E.P
A-80	SIDE ENTRY	1.000	1.500	2.436	21.626	24.062	347505.332	5783819.991	167°17'05"	SD 1021 and 1301	HAUNCHED S.E.P, HEAVY DUTY CLASS D COVER
A-81	SIDE ENTRY	3.000	1.500	2.210	22.026	24.136	347507.789	5783804.270	359°07'55"	SD 1301	HEAVY DUTY CLASS D COVER
A-83	SIDE ENTRY	1.000	0.750	1.575	23.022	24.597	347546.807	5783824.144	97°15'12"	SD 1301	
A-84	SIDE ENTRY	1.000	1.000	1.546	22.750	24.296	347548.427	5783813.349	257°25'34"	SD 1301	HEAVY DUTY CLASS D COVER
A-84A	SIDE ENTRY	1.000	0.750	1.481	23.168	24.649	347563.428	5783816.699	258°04'11"	SD 1301	
A-85	GRATED SIDE ENTRY	1.000	0.750	1.516	23.738	25.254	347587.415	5783817.179	277°22'19"	SD 1321	
A-86	GRATED SIDE ENTRY	1.000	0.750	1.556	24.869	26.426	347616.013	5783813.451	277°19'52"	SD 1321	
A-87	SIDE ENTRY	1.000	1.500	2.012	22.022	24.035	347506.382	5783815.286	172°43'18"	SD 1301	
A-87A	GRATED	1.000	0.750	1.204	21.673	22.877	347496.362	5783817.044	53°39'02"	SD 1411	
A-88-2	GRATED	1.000	0.750	1.503	26.398	27.901	347644.613	5783809.011	271°06'34"	SD 1431	REFER TO STANDARD DRAWINGS FOR ORIENTATION OF "LENGTH" AND "WIDTH"
A-88	GRATED	1.000	0.750	1.505	26.391	27.896	347644.627	5783810.285	271°06'27"	SD 1441	
A-89	GRATED	1.000	0.750	1.460	29.172	30.632	347697.819	5783806.612	276°33'46"	SD 1441	
A-91	SIDE ENTRY	1.000	0.750	1.471	21.333	22.804	347215.661	5783914.248	77°25'34"	SD 1301	
A-93	SIDE ENTRY	1.000	0.750	1.595	22.715	24.310	347405.900	5783861.602	285°40'77"	SD 1301	
A-94	SIDE ENTRY	1.000	0.750	1.473	22.946	24.419	347447.747	5783851.180	97°25'33"	SD 1301	
A-95	SIDE ENTRY	1.000	0.750	1.478	23.142	24.620	347481.214	5783846.818	97°25'33"	SD 1301	
A-98	SIDE ENTRY	1.000	0.750	1.334	21.150	22.484	347214.126	5783827.532	347°16'01"	SD 1301	
A-99	SIDE ENTRY	1.000	0.750	1.335	21.350	22.685	347215.409	5783808.963	356°02'49"	SD 1301	
A-100	SIDE ENTRY	1.000	0.750	1.397	21.400	22.797	347212.907	5783788.996	7°08'36"	SD 1301	
A-101	SIDE ENTRY	1.000	0.750	1.352	21.450	22.802	347207.581	5783747.226	7°16'01"	SD 1301	
A-102	GRATED	1.000	0.750	2.096	20.613	22.710	347203.955	5783730.499	12°13'44"	SD 1301	
A-103A	GRATED	1.000	0.750	0.894	21.536	22.430	347202.297	5783722.981	12°26'22"	SD 1301	
A-103	INLET CATCH PIT	1.000	0.750	0.930	21.600	22.530	347200.405	5783710.152	8°23'27"	SD 1301	
A-105	WINGWALL	-	-	0.562	22.308	22.870	347195.440	5783675.026	7°30'58"	SD 1971	
A-106	DRIVEABLE	-	-	0.541	22.359	22.900	347194.789	5783670.097	7°30'58"	SD 1991	
A-107	WINGWALL	-	-	0.496	22.748	23.244	347185.556	5783601.373	6°37'47"	SD 1971	
A-108	DRIVEABLE	-	-	0.506	22.766	23.272	347184.993	5783596.529	6°37'47"	SD 1991	
A-111	GRATED	1.000	0.750	1.272	20.820	22.092	347254.129	5783832.221	7°09'37"	SD 1411	
A-111A	GRATED	1.000	0.750	1.044	21.120	22.164	347242.446	5783770.284	194°04'31"	SD 1411	
A-112	SIDE ENTRY	1.000	0.750	1.499	21.749	23.249	347217.870	5783867.024	97°25'34"	SD 1301	
A-114	SIDE ENTRY	1.000	0.750	1.481	22.905	24.385	347504.195	5783774.363	6°51'09"	SD 1301	
A-115	SIDE ENTRY	1.000	0.750	1.684	22.612	24.296	347510.762	5783873.619	77°25'34"	SD 1301	HEAVY DUTY CLASS D COVER

NOTES:

1. PITS DEEPER THAN 1000mm TO BE FITTED WITH STEP IRONS IN ACCORDANCE WITH VICROADS STANDARD DRAWING NUMBER SD1041.
2. PIT INVERT LEVELS ARE SET TO BE USUALLY 100mm BELOW OUTLET PIPE INVERT LEVEL. PROVIDE CONCRETE INFILL TO PIPE INVERT LEVEL AFTER PIPE INSTALLATION.
3. PIT DIMENSIONS SHOWN IN PIT SCHEDULE ARE PIT INTERNAL DIMENSIONS UNLESS NOTED OTHERWISE.
4. ALL RCP SHALL BE INSTALLED WITH TYPE H2 BEDDING SUPPORT IN ACCORDANCE WITH VICROADS STANDARD DRAWING SD1511 UNLESS NOTED OTHERWISE.
5. ALL PIPES ARE TO BE RUBBER RING JOINT (RRJ) CLASS 2 REINFORCED CONCRETE PIPES (RCP) UNLESS NOTED OTHERWISE.
6. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
7. ALL REFERENCE DRAWINGS TO BE VICROADS STANDARD DRAWINGS UNLESS NOTED OTHERWISE.
8. ALL PIT COVERS AND FRAMES WITHIN THE ROAD PAVEMENT ARE TO BE CLASS D. ALL PIT COVERS AND FRAMES OUTSIDE THE ROAD PAVEMENT TO BE CLASS C.
9. EXISTING PIPES TO BE RETAINED TO BE CHECKED IF THEY ARE SUITABLE TO REMAIN IN SERVICE.

Issue	Description	Date	Approved
E	MELBOURNE WATER DRAINAGE NETWORK REVISED (RFI-131-3201-00321)	05.10.18	E. H
D	MELBOURNE WATER DRAINAGE NETWORK REVISED	21.02.18	E. H
C	MELBOURNE WATER DRAINAGE NETWORK ADDED	13.12.17	E. H
B	PIT INFORMATION AMENDED	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

Client: vicroads

Client: BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	NTS	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C692-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PIT SCHEDULE
SHEET 2

ARCADIS

Drawing No.	Project No.	Issue
C692	AA009732	E

V1

50mm on Original

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PIT ID	PIT TYPE	PIT DIMENSIONS			PIT LEVELS		PIT LEVELS (m AHD)		BEARING OF PIT	REFERENCE DRAWINGS	REMARKS
		LENGTH (m)	WIDTH (m)	DEPTH (m)	INVERT	TOP	EASTING	NORTHING	"LENGTH"		
A-116	SIDE ENTRY	1.000	0.750	1.564	22.666	24.230	347519.940	5783879.335	215°43'60"	SD 1301	HEAVY DUTY CLASS D COVER
A-117	WINGWALL	-	-	0.379	23.100	23.479	347521.406	5783905.842	261°39'08"	SD 1971	
A-118	SIDE ENTRY	1.000	0.750	1.139	23.020	24.159	347525.142	5783906.390	261°39'08"	SD 1301	
A-119	SIDE ENTRY	1.000	0.750	1.119	23.050	24.169	347525.984	5783912.852	187°25'34"	SD 1301	
A-120	SIDE ENTRY	1.000	0.750	1.156	23.300	24.456	347534.088	5783953.766	195°05'48"	SD 1301	
A-121	SIDE ENTRY	1.000	0.750	0.908	23.150	24.058	347554.274	5783909.766	7°04'33"	SD 1301	
A-122	SIDE ENTRY	1.000	0.750	0.869	23.200	24.069	347554.906	5783914.855	185°27'24"	SD 1301	
A-123	SIDE ENTRY	1.000	0.750	0.941	23.300	24.241	347554.585	5783930.619	180°11'30"	SD 1301	
A-124	SIDE ENTRY	1.000	0.750	1.114	23.000	24.114	347551.816	5783875.957	351°20'29"	SD 1301	
A-125	SIDE ENTRY	1.000	0.750	1.479	23.317	24.796	347498.870	5783729.879	4°49'31"	SD 1301	
A-126	SIDE ENTRY	3.000	1.500	1.879	22.500	24.379	347536.578	5783801.093	7°25'34"	SD 1301	HEAVY DUTY CLASS D COVER (C)
A-128	SIDE ENTRY	1.000	0.750	1.271	23.100	24.371	347533.658	5783778.950	98°16'38"	SD 1301	
A-129	SIDE ENTRY	1.000	0.750	1.349	23.500	24.849	347523.030	5783725.771	190°21'19"	SD 1301	
A-132	INLET CATCH PIT	1.000	0.850	1.100	21.300	22.400	347281.879	5783907.854	294°55'57"	SD 1101	
A-132A	JUNCTION	1.000	1.200	1.456	21.200	22.656	347279.240	5783909.082	349°14'56"	SD 1121	
A-133	SIDE ENTRY	1.000	0.750	1.674	20.609	22.283	347266.319	5784146.558	0°04'20"	SD 1301	
A-134	JUNCTION	1.000	0.750	1.778	20.818	22.596	347263.153	5784110.059	2°00'26"	SD 1121	
A-135	SIDE ENTRY	1.000	0.750	1.588	20.853	22.441	347270.214	5784109.783	359°08'14"	SD 1301	
A-136	SIDE ENTRY	1.000	0.750	1.351	21.200	22.551	347274.232	5784028.284	183°12'59"	SD 1301	
A-138	SIDE ENTRY	1.000	0.750	1.581	22.550	24.131	347577.824	5784000.176	282°21'06"	SD 1301	
A-139	SIDE ENTRY	1.000	0.750	2.034	22.600	24.634	347596.518	5783974.069	148°02'00"	SD 1301	
A-140	SIDE ENTRY	1.000	0.750	1.803	22.687	24.490	347618.242	5783939.257	148°01'07"	SD 1301	
A-141	SIDE ENTRY	1.000	0.750	1.774	22.700	24.474	347622.526	5783932.396	148°01'07"	SD 1301	
A-142	SIDE ENTRY	1.000	0.750	1.827	22.800	24.627	347649.210	5783889.662	148°01'07"	SD 1301	
A-143	SIDE ENTRY	1.000	0.750	1.510	23.150	24.660	347653.212	5783883.254	328°08'02"	SD 1301	STAGE 2 - FUTURE WORKS TO BE DONE BY OTHERS
A-144	JUNCTION	1.000	0.750	1.707	23.280	24.987	347671.789	5783863.876	300°26'17"	SD 1121	STAGE 2 - FUTURE WORKS TO BE DONE BY OTHERS
A-145	JUNCTION	1.000	0.750	1.742	23.330	25.072	347678.936	5783860.369	112°22'48"	SD 1121	STAGE 2 - FUTURE WORKS TO BE DONE BY OTHERS
A-146	JUNCTION	1.000	0.750	1.649	23.400	25.049	347700.425	5783856.151	97°15'35"	SD 1121	STAGE 2 - FUTURE WORKS TO BE DONE BY OTHERS
A-147	SIDE ENTRY	1.000	0.750	1.429	23.420	24.849	347702.116	5783846.717	97°25'34"	SD 1301	STAGE 2 - FUTURE WORKS TO BE DONE BY OTHERS
A-148	SIDE ENTRY	1.000	0.750	1.426	23.450	24.876	347710.930	5783845.568	97°46'35"	SD 1301	STAGE 2 - FUTURE WORKS TO BE DONE BY OTHERS
A-149	SIDE ENTRY	1.000	0.750	1.664	23.686	25.350	347749.239	5783840.336	280°01'38"	SD 1301	STAGE 2 - FUTURE WORKS TO BE DONE BY OTHERS
A-150	JUNCTION	1.000	0.750	1.682	24.076	25.757	347763.311	5783835.359	304°40'53"	SD 1121	STAGE 2 - FUTURE WORKS TO BE DONE BY OTHERS
A-151	SIDE ENTRY	1.000	0.750	1.578	24.458	26.036	347771.880	5783826.077	147°54'53"	SD 1301	STAGE 2 - FUTURE WORKS TO BE DONE BY OTHERS
A-152	SIDE ENTRY	1.000	0.750	1.679	24.796	26.475	347795.104	5783789.034	147°54'53"	SD 1301	STAGE 2 - FUTURE WORKS TO BE DONE BY OTHERS
A-153	SIDE ENTRY	1.000	0.750	1.513	22.896	24.409	347551.715	5784014.148	14°25'21"	SD 1301	
A-155	SIDE ENTRY	1.000	0.750	1.509	21.060	22.570	347230.890	5783926.072	187°17'10"	SD 1301	HEAVY DUTY CLASS D COVER
A-156	SIDE ENTRY	1.000	0.750	1.593	20.858	22.451	347233.124	5783943.267	187°52'11"	SD 1301	
A-157	SIDE ENTRY	1.000	0.750	1.556	20.929	22.485	347234.965	5783957.435	187°40'30"	SD 1301	
A-158	SIDE ENTRY	1.000	0.750	1.513	21.019	22.532	347237.309	5783975.259	187°29'33"	SD 1301	
A-159	SIDE ENTRY	1.000	0.750	1.477	21.140	22.617	347240.454	5783999.175	187°29'33"	SD 1301	
A-160	SIDE ENTRY	1.200	0.750	1.964	20.530	22.494	347267.050	5783935.782	167°41'32"	SD 1301	
A-161A	SIDE ENTRY	1.000	0.750	1.533	20.950	22.483	347268.466	5783972.906	7°16'01"	SD 1301	
A-161	SIDE ENTRY	1.000	0.750	1.464	21.000	22.464	347270.538	5783989.152	7°08'42"	SD 1301	
A-162	SIDE ENTRY	1.000	0.750	1.418	21.050	22.468	347271.386	5783995.916	6°13'59"	SD 1301	
A-163	SIDE ENTRY	1.000	0.750	1.389	21.100	22.489	347272.583	5784006.878	185°31'53"	SD 1301	
A-164	SIDE ENTRY	1.000	0.750	1.601	20.859	22.460	347268.561	5783929.069	347°18'43"	SD 1301	
A-165	SIDE ENTRY	1.000	0.750	1.607	21.083	22.690	347260.345	5783927.398	7°16'01"	SD 1301	
A-166	INLET CATCH PIT	1.000	0.900	2.040	20.560	22.600	347273.923	5783937.081	259°17'46"	SD 1102	
A-170	WINGWALL	-	-	0.550	23.100	23.650	347521.550	5783901.627	97°23'01"	SD 1971	
A-171	INLET CATCH PIT	1.500	0.750	0.920	23.200	24.120	347558.310	5783896.864	97°23'01"	SD 1111	
A-172	JUNCTION	2.500	1.000	0.820	25.550	26.370	347796.148	5783783.857	276°16'50"	SD 1121	
A-172A	WINGWALL	-	-	0.527	25.544	26.171	347763.390	5783787.462	96°35'47"	SD 1971	
A-173	WINGWALL	-	-	0.579	25.841	26.420	347813.456	5783788.884	253°48'19"	SD 1971	
A-174	WINGWALL	-	-	0.848	26.800	27.648	347715.583	5783619.923	114°08'32"	SD 1921	
A-175	WINGWALL	-	-	0.604	26.844	27.448	347713.258	5783609.043	96°10'13"	SD 1921	

NOTES:

1. PITS DEEPER THAN 1000mm TO BE FITTED WITH STEP IRONS IN ACCORDANCE WITH VICROADS STANDARD DRAWING NUMBER SD1041.
2. PIT INVERT LEVELS ARE SET TO BE USUALLY 100mm BELOW OUTLET PIPE INVERT LEVEL. PROVIDE CONCRETE INFILL TO PIPE INVERT LEVEL AFTER PIPE INSTALLATION.
3. PIT DIMENSIONS SHOWN IN PIT SCHEDULE ARE PIT INTERNAL DIMENSIONS UNLESS NOTED OTHERWISE.
4. ALL RCP SHALL BE INSTALLED WITH TYPE H2 BEDDING SUPPORT IN ACCORDANCE WITH VICROADS STANDARD DRAWING SD1511 UNLESS NOTED OTHERWISE.
5. ALL PIPES ARE TO BE RUBBER RING JOINT (RRJ) CLASS 2 REINFORCED CONCRETE PIPES (RCP) UNLESS NOTED OTHERWISE.
6. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
7. ALL REFERENCE DRAWINGS TO BE VICROADS STANDARD DRAWINGS UNLESS NOTED OTHERWISE.
8. ALL PIT COVERS AND FRAMES WITHIN THE ROAD PAVEMENT ARE TO BE CLASS D. ALL PIT COVERS AND FRAMES OUTSIDE THE ROAD PAVEMENT TO BE CLASS C.
9. EXISTING PIPES TO BE RETAINED TO BE CHECKED IF THEY ARE SUITABLE TO REMAIN IN SERVICE.

Issue	Description	Date	Approved
C	MELBOURNE WATER DRAINAGE NETWORK ADDED	13.12.17	E. H
B	PIT INFORMATION AMENDED	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

Client: BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	NTS	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C693-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PIT SCHEDULE
SHEET 3

ARCADIS

Drawing No.	Project No.	Issue
C693	AA009732	C

V1

50mm on Original

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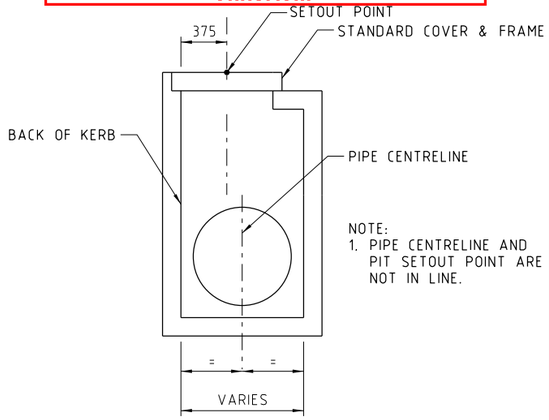
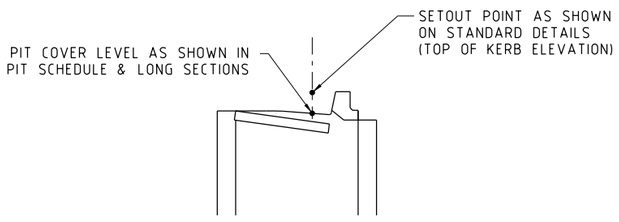
PIT ID	PIT TYPE	PIT DIMENSIONS		PIT LEVELS (m AHD)			PIT COORDINATES		BEARING OF PIT "LENGTH"	REFERENCE DRAWING	REMARKS
		LENGTH (m)	WIDTH (m)	DEPTH (m)	INVERT	TOP	EASTING	NORTHING			
B01	JUNCTION	1.300	1.000	2.105	24.980	27.085	347889.465	5783824.541	276°14'14"	SD 1121	
B02	JUNCTION	1.300	1.000	2.358	25.840	28.198	347957.190	5783812.195	280°19'52"	SD 1121	
B03	JUNCTION	1.300	1.000	3.042	25.956	28.999	348072.682	5783796.569	277°42'19"	SD 1121	
B04	JUNCTION	1.300	1.000	2.665	26.095	28.761	348081.196	5783791.204	110°00'00"	SD 1121	
B05	SIDE ENTRY	1.200	1.200	2.433	26.146	28.580	348101.116	5783789.088	355°14'11"	SD 1301	HEAVY DUTY CLASS D COVER
B06	JUNCTION	1.200	1.200	2.505	26.159	28.664	348102.973	5783785.837	260°56'31"	SD 1121	
B07	SIDE ENTRY	1.000	1.400	2.458	26.202	28.660	348121.584	5783784.666	69°34'40"	SD 1301	
B08	GRATED SIDE ENTRY	1.000	2.000	2.276	26.230	28.506	348128.533	5783784.559	278°21'19"	SD 1322	
B09	GRATED SIDE ENTRY	1.000	0.750	2.029	26.697	28.726	348129.776	5783777.185	278°21'28"	SD 1321	
B10	GRATED SIDE ENTRY	1.000	0.750	1.832	26.958	28.790	348151.176	5783774.041	278°21'31"	SD 1321	
B11	GRATED SIDE ENTRY	1.000	0.750	1.866	27.046	28.912	348174.226	5783770.655	278°21'24"	SD 1321	
B12	GRATED SIDE ENTRY	1.000	0.750	1.778	27.353	29.131	348197.168	5783767.285	278°21'22"	SD 1321	
B13	GRATED SIDE ENTRY	1.000	0.750	1.819	27.488	29.308	348226.174	5783763.024	278°21'27"	SD 1321	
B14	GRATED SIDE ENTRY	1.000	0.750	1.799	27.634	29.434	348257.329	5783758.447	278°21'27"	SD 1321	
B15	GRATED SIDE ENTRY	1.000	0.750	1.771	27.768	29.539	348285.511	5783754.307	278°21'27"	SD 1321	
B16	GRATED SIDE ENTRY	1.000	0.750	1.729	27.877	29.606	348307.504	5783751.076	278°21'27"	SD 1321	
B17	GRATED SIDE ENTRY	1.000	0.750	1.684	28.000	29.683	348332.854	5783747.352	278°21'27"	SD 1321	
B18	GRATED SIDE ENTRY	1.000	0.750	1.640	28.122	29.762	348358.188	5783743.630	278°21'26"	SD 1321	
B19	GRATED SIDE ENTRY	1.000	0.750	1.643	28.234	29.877	348380.869	5783740.298	278°21'26"	SD 1321	
B20	GRATED SIDE ENTRY	1.000	0.750	1.651	28.365	30.016	348408.343	5783736.262	278°21'24"	SD 1321	
B21	GRATED SIDE ENTRY	1.000	0.750	1.657	28.492	30.149	348434.781	5783732.378	278°21'26"	SD 1321	
B22	GRATED SIDE ENTRY	1.000	0.750	1.477	28.547	30.024	348440.991	5783738.657	278°21'26"	SD 1322	
B23	SIDE ENTRY	1.000	0.750	1.693	27.342	29.035	348125.710	5783750.644	278°21'26"	SD 1301	
B24	SIDE ENTRY	1.000	0.750	1.635	27.537	29.172	348155.391	5783746.284	278°21'26"	SD 1301	
B25	SIDE ENTRY	1.000	0.750	1.621	27.677	29.299	348185.073	5783741.923	278°21'26"	SD 1301	
B26	SIDE ENTRY	1.000	0.750	1.596	27.817	29.413	348214.754	5783737.563	278°21'26"	SD 1301	
B27	SIDE ENTRY	1.000	0.750	1.560	27.957	29.517	348244.436	5783733.203	278°21'26"	SD 1301	
B28	SIDE ENTRY	1.000	0.750	1.523	28.097	29.620	348274.118	5783728.842	278°21'26"	SD 1301	
B29	SIDE ENTRY	1.000	0.750	1.495	28.242	29.737	348305.011	5783724.304	278°21'26"	SD 1301	
B30	SIDE ENTRY	1.000	0.750	1.491	28.387	29.878	348335.935	5783719.761	278°21'26"	SD 1301	
B31	GRATED SIDE ENTRY	1.000	0.750	1.536	26.997	28.533	348132.888	5783783.919	278°36'56"	SD 1322	
B32	GRATED SIDE ENTRY	1.000	0.750	1.673	27.402	29.074	348199.247	5783774.171	278°21'19"	SD 1322	
B33	GRATED SIDE ENTRY	1.000	0.750	1.451	27.935	29.386	348286.609	5783761.337	278°21'19"	SD 1322	
B34	GRATED SIDE ENTRY	1.000	0.750	1.450	28.291	29.742	348381.927	5783747.334	278°21'29"	SD 1322	
B35	SIDE ENTRY	1.000	0.750	2.068	26.873	28.941	348071.875	5783790.941	97°43'16"	SD 1301	



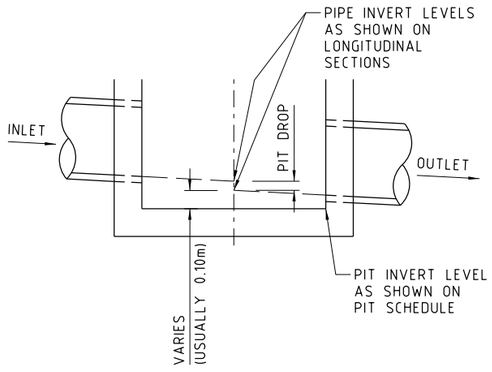
SIDE ENTRY PIT
WIDER THAN 750mm
DEFINITION SKETCH
N.T.S.

NOTES:

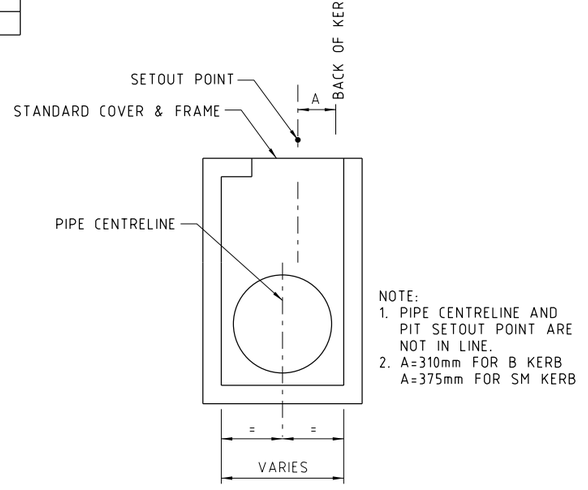
1. PITS DEEPER THAN 1000mm TO BE FITTED WITH STEP IRONS IN ACCORDANCE WITH VICROADS STANDARD DRAWING NUMBER SD 1041.
2. PIT INVERT LEVELS ARE SET TO BE USUALLY 100mm BELOW OUTLET PIPE INVERT LEVEL. PROVIDE CONCRETE INFILL TO PIPE INVERT LEVEL AFTER PIPE INSTALLATION.
3. PIT DIMENSIONS SHOWN IN PIT SCHEDULE ARE PIT INTERNAL DIMENSIONS UNLESS NOTED OTHERWISE.
4. ALL RCP SHALL BE INSTALLED WITH TYPE H2 BEDDING SUPPORT IN ACCORDANCE WITH VICROADS STANDARD DRAWING SD1511 UNLESS NOTED OTHERWISE.
5. ALL PIPES TO BE RUBBER RING JOINT (RRJ) CLASS 2 REINFORCED CONCRETE PIPES (RCP) UNLESS NOTED OTHERWISE.
6. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
7. ALL REFERENCE DRAWINGS TO BE VICROADS STANDARD DRAWINGS UNLESS NOTED OTHERWISE.
8. ALL PIT COVERS AND FRAMES WITHIN THE ROAD PAVEMENT ARE TO BE CLASS D. ALL PIT COVERS AND FRAMES OUTSIDE THE ROAD PAVEMENT TO BE CLASS C.
9. EXISTING PIPES TO BE RETAINED TO BE CHECKED IF THEY ARE SUITABLE TO REMAIN IN SERVICE.



PLAN
VERTICAL SETOUT DETAIL FOR
GRATED SIDE ENTRY PIT
N.T.S.



PIT INVERT LEVELS
N.T.S.



GRATED SIDE ENTRY PIT
WIDER THAN 750mm
DEFINITION SKETCH
N.T.S.

Issue	Description	Date	Approved
B	PIT SCHEDULE REVISED	19.05.17	E. H.
A	ISSUED FOR CONSTRUCTION	27.04.17	E. H.

50mm on Original

Client: BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	NTS	Drawn	G.CONSTABLE
Original Size	A3	Designed	A. PRASAD
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C694-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PIT SCHEDULE
SHEET 4

ARCADIS

Drawing No.	Project No.	Issue
C694	AA009732	B

V2

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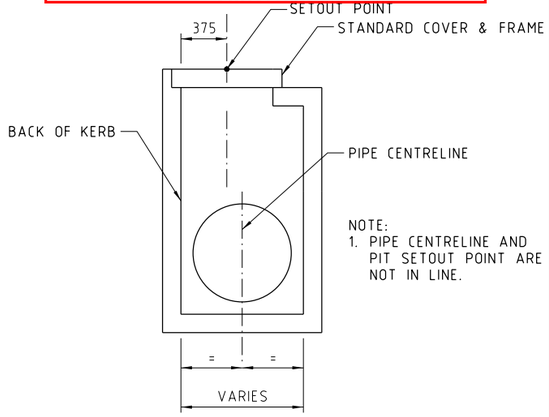
PIT ID	PIT TYPE	PIT DIMENSIONS		PIT LEVELS (m AHD)			PIT COORDINATES		BEARING OF PIT "LENGTH"	REFERENCE DRAWING	REMARKS
		LENGTH (m)	WIDTH (m)	DEPTH (m)	INVERT	TOP	EASTING	NORTHING			
B36	JUNCTION	1.000	1.000	2.258	27.127	29.385	348068.816	5783770.903	98°21'24"	SD 1121	
B37	JUNCTION	1.000	1.000	2.390	27.166	29.556	348059.038	5783772.341	99°07'49"	SD 1121	
B38	JUNCTION	1.000	0.750	2.083	29.169	31.252	348010.132	5783779.697	98°49'35"	SD 1121	
B39	JUNCTION	1.000	0.750	1.996	31.759	33.755	347952.891	5783789.020	98°23'13"	SD 1121	
B40	SIDE ENTRY	1.000	0.750	2.022	27.204	29.225	348057.226	5783760.710	98°51'53"	SD 1301	
B41	SIDE ENTRY	1.000	0.750	1.516	28.188	29.704	348037.747	5783762.998	95°58'28"	SD 1301	
B42	GRATED	0.750	1.000	1.498	28.614	30.112	348025.814	5783764.090	188°48'50"	SD 1431	REFER TO STANDARD DRAWINGS FOR ORIENTATION OF "LENGTH" AND "WIDTH"
B43	SIDE ENTRY	1.000	0.750	1.564	27.318	28.883	348088.388	5783756.127	278°21'60"	SD 1301	
B44	SIDE ENTRY	1.000	0.750	1.490	27.413	28.903	348093.234	5783755.415	278°21'11"	SD 1301	
B45	GRATED	1.000	0.750	1.462	27.604	29.066	348092.588	5783748.029	278°16'06"	SD 1411	
B46	GRATED	1.000	0.750	1.464	31.828	33.292	347951.087	5783776.822	97°46'42"	SD 1441	
B47	GRATED	1.000	0.750	1.465	31.845	33.311	347954.142	5783803.394	91°33'58"	SD 1441	
B48	GRATED	1.000	0.750	1.464	29.354	30.818	348008.224	5783768.507	98°47'16"	SD 1441	
B49	GRATED	1.000	0.750	1.464	29.263	30.727	348012.716	5783798.172	98°14'56"	SD 1441	
B50	GRATED	0.750	1.000	1.612	27.693	29.305	348054.790	5783793.778	188°08'44"	SD 1431	REFER TO STANDARD DRAWINGS FOR ORIENTATION OF "LENGTH" AND "WIDTH"
B51	GRATED	1.000	0.750	1.502	27.719	29.221	348054.558	5783792.124	98°15'15"	SD 1441	
B52	SIDE ENTRY	1.000	0.750	1.628	27.502	29.130	348104.305	5783768.849	278°21'40"	SD 1301	HEAVY DUTY CLASS D COVER
B53	JUNCTION	1.000	0.750	3.692	25.645	29.337	348053.887	5783759.236	278°34'56"	SD 1121	
B54	JUNCTION	1.000	0.750	3.041	25.912	28.953	348090.221	5783753.753	278°34'56"	SD 1121	
B55	JUNCTION	1.000	0.750	3.553	23.759	27.313	347851.731	5783782.563	278°17'08"	SD 1121	
B56	GRATED	1.000	0.750	1.517	25.953	27.469	347863.871	5783780.795	278°17'08"	SD 1411	
C01	ENDPIPE	-	-	-	29.575	-	348482.792	5783734.287	10°24'00"	-	PENETRATE THROUGH THE EXISTING WALL
C02	SIDE ENTRY	1.000	0.750	0.981	29.507	30.489	348481.615	5783726.256	278°12'09"	SD 1301	
C03	SIDE ENTRY	1.000	0.750	0.990	29.541	30.531	348489.950	5783725.021	278°23'09"	SD 1301	
C04	GRATED	1.000	0.750	0.903	29.652	30.555	348517.109	5783720.170	278°26'36"	CITY OF CASEY - S-328	
C06	SIDE ENTRY	1.000	0.750	2.454	28.359	30.813	348545.516	5783716.565	278°12'02"	SD 1301	
C07	SIDE ENTRY	1.000	0.750	1.479	29.399	30.878	348555.564	5783715.112	278°04'19"	SD 1301	
C13	SIDE ENTRY	1.000	0.750	1.468	28.705	30.173	348431.314	5783703.071	98°12'54"	SD 1281	
C14	SIDE ENTRY	1.000	0.750	1.483	28.904	30.387	348451.102	5783700.164	98°12'46"	SD 1281	
C15	SIDE ENTRY	1.000	0.750	1.493	29.111	30.604	348470.889	5783697.257	98°12'51"	SD 1281	
C17	SIDE ENTRY	1.000	0.750	2.141	28.595	30.736	348491.971	5783694.160	98°11'45"	SD 1281	
C18	SIDE ENTRY	1.000	0.750	1.490	29.317	30.807	348516.354	5783690.521	98°20'08"	SD 1281	
C19	GRATED	1.000	0.750	1.658	28.637	30.295	348486.801	5783689.728	99°19'15"	SD 1411	
C21	SIDE ENTRY	1.000	0.750	1.528	29.387	30.915	348540.820	5783687.237	96°27'53"	SD 1282	
C22	SIDE ENTRY	1.000	0.750	1.537	29.418	30.955	348546.995	5783686.495	96°32'07"	SD 1282	
C23	SIDE ENTRY	1.000	0.750	1.546	29.736	31.281	348564.949	5783686.898	89°04'31"	SD 1301	

D

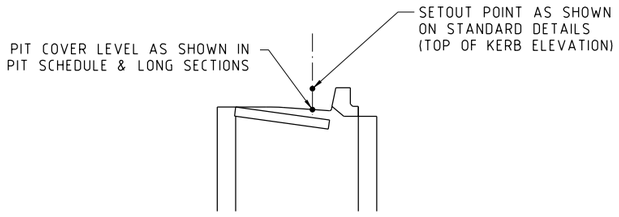


NOTE:
1. PIPE CENTRELINE AND PIT SETOUT POINT ARE NOT IN LINE.

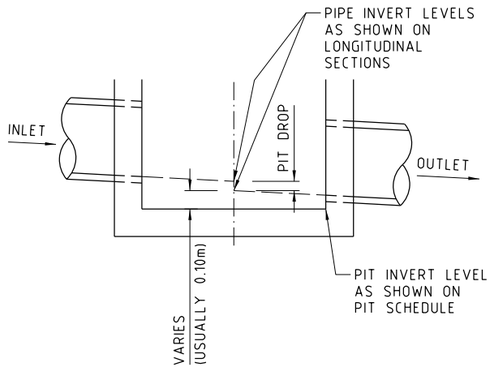
SIDE ENTRY PIT
WIDER THAN 750mm
DEFINITION SKETCH
N.T.S.

NOTES:

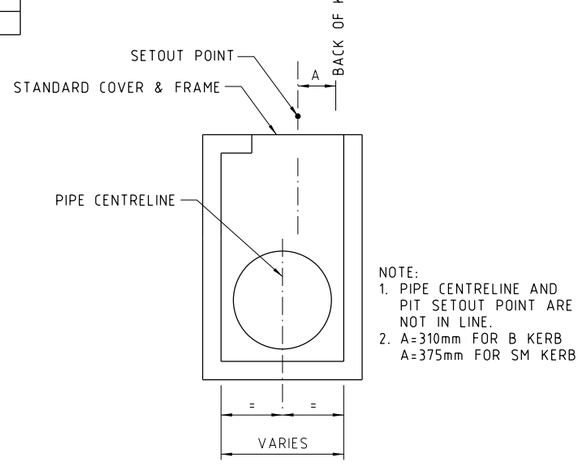
1. PITS DEEPER THAN 1000mm TO BE FITTED WITH STEP IRONS IN ACCORDANCE WITH VICROADS STANDARD DRAWING NUMBER SD 1041.
2. PIT INVERT LEVELS ARE SET TO BE USUALLY 100mm BELOW OUTLET PIPE INVERT LEVEL. PROVIDE CONCRETE INFILL TO PIPE INVERT LEVEL AFTER PIPE INSTALLATION.
3. PIT DIMENSIONS SHOWN IN PIT SCHEDULE ARE PIT INTERNAL DIMENSIONS UNLESS NOTED OTHERWISE.
4. ALL RCP SHALL BE INSTALLED WITH TYPE H2 BEDDING SUPPORT IN ACCORDANCE WITH VICROADS STANDARD DRAWING SD1511 UNLESS NOTED OTHERWISE.
5. ALL PIPES TO BE RUBBER RING JOINT (RRJ) CLASS 2 REINFORCED CONCRETE PIPES (RCP) UNLESS NOTED OTHERWISE.
6. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
7. ALL REFERENCE DRAWINGS TO BE VICROADS STANDARD DRAWINGS UNLESS NOTED OTHERWISE.
8. ALL PIT COVERS AND FRAMES WITHIN THE ROAD PAVEMENT ARE TO BE CLASS D. ALL PIT COVERS AND FRAMES OUTSIDE THE ROAD PAVEMENT TO BE CLASS C.
9. EXISTING PIPES TO BE RETAINED TO BE CHECKED IF THEY ARE SUITABLE TO REMAIN IN SERVICE.



PLAN
VERTICAL SETOUT DETAIL FOR
GRATED SIDE ENTRY PIT
N.T.S.



PIT INVERT LEVELS
N.T.S.



NOTE:
1. PIPE CENTRELINE AND PIT SETOUT POINT ARE NOT IN LINE.
2. A=310mm FOR B KERB
A=375mm FOR SM KERB

GRATED SIDE ENTRY PIT
WIDER THAN 750mm
DEFINITION SKETCH
N.T.S.

Issue	Description	Date	Approved
D	PIT C19 REVISED (RFI-131-3201-00307)	21.08.18	E. H.
C	DRAINAGE ALIGNMENT AMENDED	03.10.17	E. H.
B	PIT SCHEDULE REVISED	19.05.17	E. H.
A	ISSUED FOR CONSTRUCTION	27.04.17	E. H.

Client: vicroads / BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	NTS	Drawn	G.CONSTABLE
Original Size	A3	Designed	A. PRASAD
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C695-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO
SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PIT SCHEDULE
SHEET 5

ARCADIS

Drawing No.	Project No.	Issue
C695	AA009732	D

V1

50mm on Original

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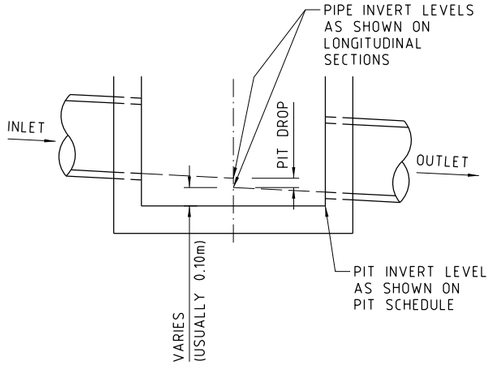
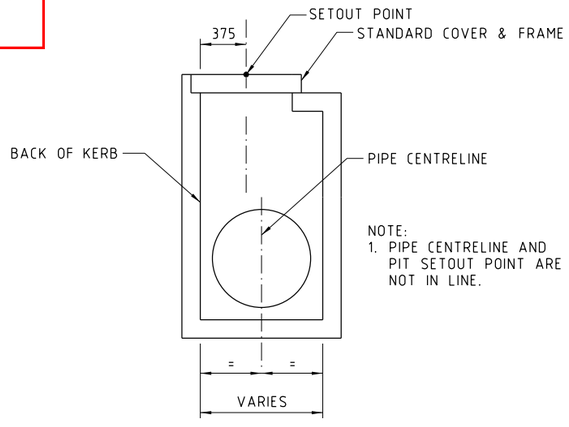
PIT ID	PIT TYPE	PIT DIMENSIONS LENGTH (m)	WIDTH (m)	DEPTH (m)	PIT LEVELS INVERT	TOP	PIT LEVELS (m AHD) EASTING	NORTHING	BEARING OF PIT "LENGTH"	REFERENCE DRAWINGS	REMARKS
A-178	JUNCTION	1.000	0.750	2.644	20.438	23.082	347245.049	5783938.289	277°14'20"	SD 1121	
A-181	GRATED	1.000	0.750	1.627	22.700	24.327	347541.923	5783800.411	277°16'22"	SD 1411	
A-182	JUNCTION	1.000	0.750	1.435	23.000	24.435	347538.929	5783778.183	7°42'56"	SD 1121	
A-184	JUNCTION	1.000	0.750	1.505	23.260	24.765	347532.754	5783733.543	7°52'34"	SD 1121	
A-185	WINGWALL	-	-	0.600	23.400	24.000	347541.081	5783729.859	293°51'40"	SD 1921	
A-187	JUNCTION	1.300	0.900	1.943	23.000	24.943	347581.398	5783810.952	97°38'03"	SD 1121	
A-187A	JUNCTION	1.300	0.900	1.730	22.900	24.630	347562.571	5783813.552	97°51'44"	SD 1121	
A-188	GRATED	1.000	0.750	1.810	23.300	25.110	347670.081	5783799.065	96°52'28"	SD 1411	
A-189	INLET CATCH PIT	1.000	0.750	1.428	23.700	25.128	347710.289	5783794.218	96°52'28"	SD 1101	
A-190	WINGWALL	-	-	0.528	21.900	22.428	347284.277	5784065.032	141°26'42"	SD 1971	
A-191	WINGWALL	-	-	0.480	22.020	22.500	347279.527	5784070.992	141°26'42"	SD 1971	
MW-01	-	-	-	-	-	-	346673.329	5783933.883	-	CS100-DRG-0111	OUTFLOW
MW-02	JUNCTION	0.900	2.950	4.218	17.710	21.929	346696.516	5783935.808	97°23'28"	7251/08/407	MANHOLE
MW-03	JUNCTION	0.900	2.950	4.367	17.882	22.249	346791.697	5783923.461	96°39'56"	7251/08/407	MANHOLE
MW-04	JUNCTION	0.900	3.000	4.066	18.042	22.108	346880.932	5783913.033	98°06'59"	7251/08/414 and 415	JUNCTION PIT
MW-05	JUNCTION	2.400	6.600	3.787	18.270	22.057	346972.537	5783897.344	97°50'25"	7251/08/414 and 415	JUNCTION PIT TO CONNECT TO EXISTING 1800 RCP & DEVELOPMENT PIPE
MW-06	JUNCTION	3.000	6.000	3.868	18.570	22.438	347111.895	5783879.657	98°10'55"	7251/08/407	MANHOLE E
											-
MW-07	SIDE ENTRY	0.750	2.500	3.491	19.335	22.826	347179.447	5783871.962	267°29'59"	SD 1021 and 1301	HAUNCHED SEP
MW-08	JUNCTION	3.000	5.050	3.516	19.527	23.043	347199.691	5783865.934	187°15'12"	7251/08/412 and 413	PARALLEL PIPE SPACING FROM VR SD1931
MW-09	JUNCTION	3.000	5.050	2.942	20.470	23.412	347285.335	5783848.535	187°15'12"	7251/08/412 and 413	PARALLEL PIPE SPACING FROM VR SD1931
MW-13	GRATED	1.000	0.750	2.168	21.743	23.912	347359.449	5783837.492	96°33'53"	SD 1411	
MW-14	GRATED	1.000	0.750	1.715	22.153	23.868	347442.361	5783826.232	97°15'12"	SD 1411	E
03	-	-	-	-	-	-	347216.793	5783862.112	-	7251/08/425	PIPE TO PIPE CONNECTION
04	-	-	-	-	-	-	347263.799	5783852.801	-	7251/08/425	PIPE TO PIPE CONNECTION

NOTES:

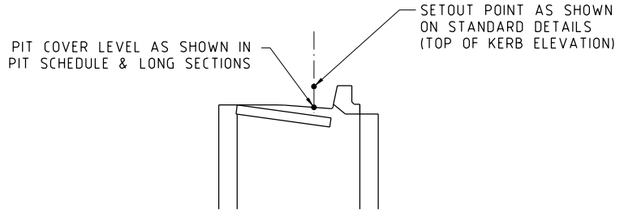
1. PITS DEEPER THAN 1000mm TO BE FITTED WITH STEP IRONS IN ACCORDANCE WITH VICROADS STANDARD DRAWING NUMBER SD1041.
2. PIT INVERT LEVELS ARE SET TO BE USUALLY 100mm BELOW OUTLET PIPE INVERT LEVEL. PROVIDE CONCRETE INFILL TO PIPE INVERT LEVEL AFTER PIPE INSTALLATION.
3. PIT DIMENSIONS SHOWN IN PIT SCHEDULE ARE PIT INTERNAL DIMENSIONS UNLESS NOTED OTHERWISE.
4. ALL RCP SHALL BE INSTALLED WITH TYPE H2 BEDDING SUPPORT IN ACCORDANCE WITH VICROADS STANDARD DRAWING SD1511 UNLESS NOTED OTHERWISE.
5. ALL PIPES ARE TO BE RUBBER RING JOINT (RRJ) CLASS 2 REINFORCED CONCRETE PIPES (RCP) UNLESS NOTED OTHERWISE.
6. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
7. ALL REFERENCE DRAWINGS TO BE VICROADS STANDARD DRAWINGS UNLESS NOTED OTHERWISE.
8. ALL PIT COVERS AND FRAMES WITHIN THE ROAD PAVEMENT ARE TO BE CLASS D. ALL PIT COVERS AND FRAMES OUTSIDE THE ROAD PAVEMENT TO BE CLASS C.
9. EXISTING PIPES TO BE RETAINED TO BE CHECKED IF THEY ARE SUITABLE TO REMAIN IN SERVICE.



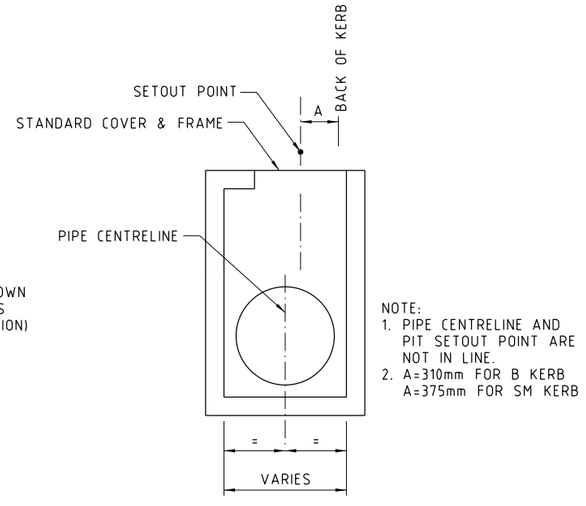
PIT INVERT LEVELS
N.T.S.



SIDE ENTRY PIT WIDER THAN 750mm DEFINITION SKETCH
N.T.S.



PLAN
VERTICAL SETOUT DETAIL FOR GRATED SIDE ENTRY PIT
N.T.S.



GRATED SIDE ENTRY PIT WIDER THAN 750mm DEFINITION SKETCH
N.T.S.

Issue	Description	Date	Approved
E	MELBOURNE WATER DRAINAGE NETWORK REVISED (RFI-131-3201-00321)	05.10.18	E. H
D	MELBOURNE WATER DRAINAGE NETWORK REVISED	21.02.18	E. H
C	MELBOURNE WATER DRAINAGE NETWORK ADDED	13.12.17	E. H
B	PIT INFORMATION AMENDED	30.05.17	E. H
A	ISSUED FOR CONSTRUCTION	18.05.17	E. H

Client: vicroads / BMD constructions

Status: CONSTRUCTION
ISSUED FOR CONSTRUCTION

Scales	NTS	Drawn	C. ABLIS
Original Size	A3	Designed	C. AREVALO
Height Datum	AHD	Checked	P. ATKINSON
Grid	MGA	Approved	E. HERATH

Filename: C696-AA009732-VCD-00.dgn

Project: THOMPSONS ROAD UPGRADE - STAGE ONE
MARRIOTT BOULEVARD TO SOUTH GIPPSLAND HIGHWAY
CONTRACT No. 9262

Title: DRAINAGE PIT SCHEDULE SHEET 6

ARCADIS

Drawing No.	Project No.	Issue
C696	AA009732	E

V1

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Appendix E

Hydraulic Modelling of Existing Thompsons Road Scheme Pipe

ADVERTISED PLAN

CONNECTION TO CULVERTS

THOMPSONS ROAD

EXISTING DRAIN

RAIL LINE

PROPOSED ROAD

EVANS ROAD

VOLK ROAD

MW-01 MW-02 MW-02(3) 0.1047ha MW-03 MW-03(3) 0.1241ha MW-04 MW-04(3) 0.1250ha MW-05 MW-05(3) 0.4462ha MW-06 MW-06(3) 0.1543ha MW-07 MW-07(3) 0.2733ha MW-08 MW-08(3) 3.3039ha MW-09 MW-09(2) 6.3490ha

A-71 A-71(3) 0.3976ha A-72 A-73 A-74 A-75 A-76 A-77 A-78 A-78(3) 0.1483ha A-79 A-79(3) 0.1621ha A-80 A-81 A-81(3) 0.3030ha A-126 A-126(3) 0.2566ha A-181 26.3573ha

2250Ø 2250Ø 2100Ø 1x1800Ø & 1x1200Ø 2100Ø 2100Ø (3x)1050Ø 1350Ø 1200Ø 1200Ø 1200Ø (2x)1200x900Ø 825Ø

MW-03(2) 3.2084ha

MW-04(2) 3.4157ha

MW-05(2) 9.1082ha

N

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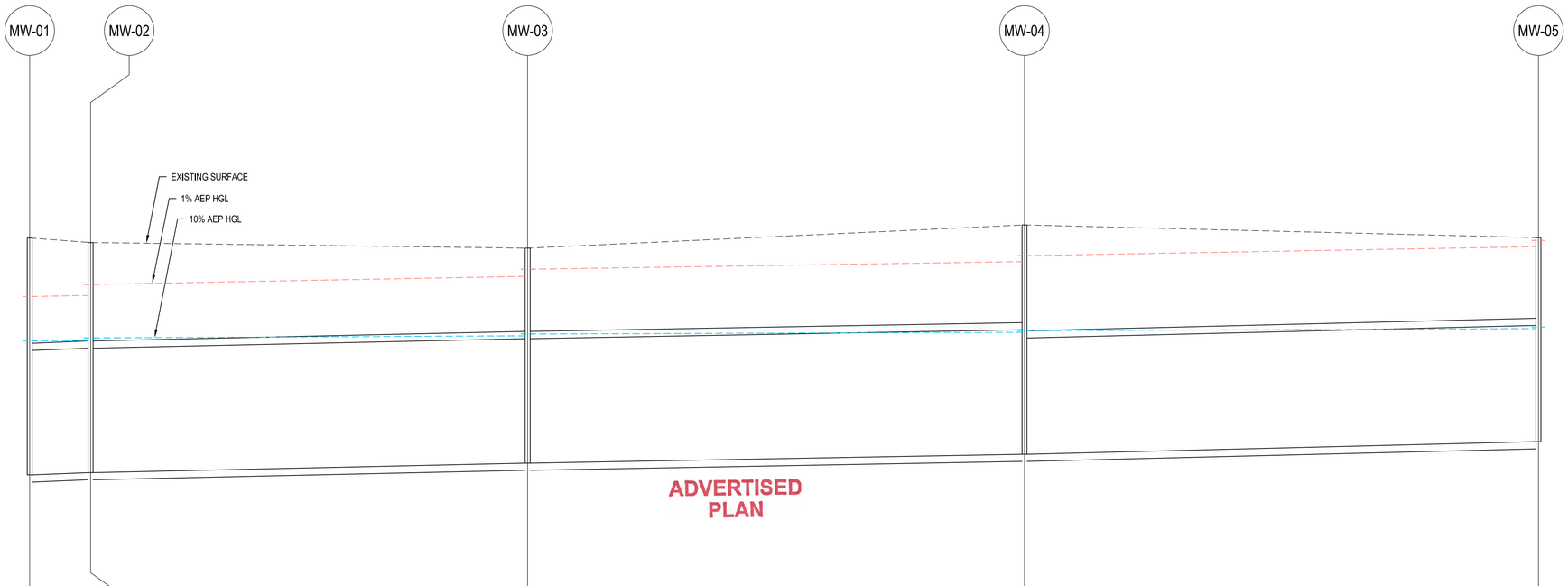
EXISTING DRAINAGE PLAN



10%AEP DESIGN FLOW (m3/s)		4.434		4.507		4.124		3.690	
1%AEP DESIGN FLOW (m3/s)		8.779		8.942		8.160		7.268	
CAPACITY (m3/s)		12.717		9.727		8.799		8.573	
AT GRADE VELOCITY (m/s)		3.2		2.45		2.21		2.48	
PIPE SIZE (mm)		2250Ø		2250Ø		2250Ø		2100Ø	
GRADE		1 in 269		1 in 460		1 in 562		1 in 409	
DATUM	13.0								
DEPTH TO INVERT	4.28 4.28		4.16 4.16		3.89 3.89		4.14 4.14		3.69
INVERT LEVEL	17.769 17.769		17.810 17.810		17.982 17.982		18.142 18.143		18.370
FINISHED SURFACE LEVELS	22.05		21.97		21.87		22.29		22.06
CHAINAGE	0.00	11.02	11.02	79.03	90.05	89.84	179.90	92.94	272.84

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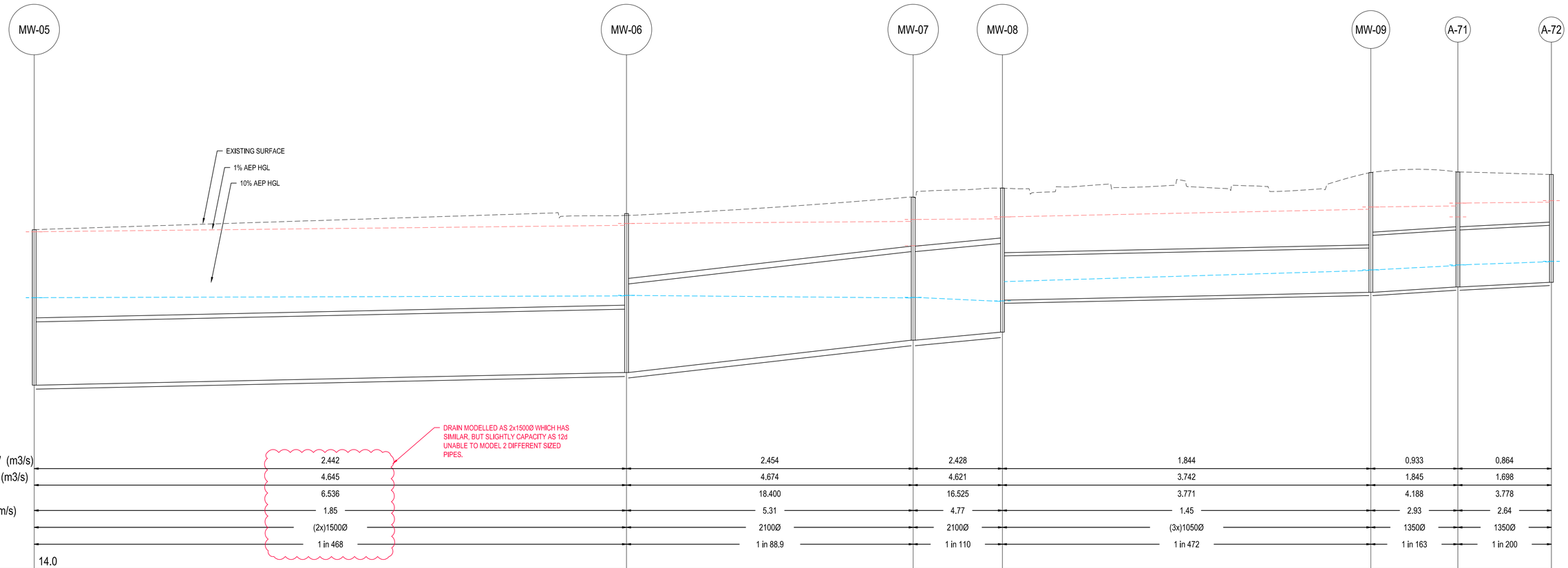
DRAINAGE LONGITUDINAL SECTIONS 1



DRAIN MODELLED AS 2x1500Ø WHICH HAS SIMILAR, BUT SLIGHTLY CAPACITY AS 12d UNABLE TO MODEL 2 DIFFERENT SIZED PIPES.

10%AEP DESIGN FLOW (m3/s)		2.442	2.454	2.428	1.844	0.933	0.864	
1%AEP DESIGN FLOW (m3/s)		4.645	4.674	4.621	3.742	1.845	1.698	
CAPACITY (m3/s)		6.536	18.400	16.525	3.771	4.188	3.778	
AT GRADE VELOCITY (m/s)		1.85	5.31	4.77	1.45	2.93	2.64	
PIPE SIZE (mm)		(2x)1500Ø	2100Ø	2100Ø	(3x)1050Ø	1350Ø	1350Ø	
GRADE		1 in 468	1 in 88.9	1 in 110	1 in 472	1 in 163	1 in 200	
DATUM		14.0						
DEPTH TO INVERT	3.69	3.69 3.77	3.77 3.39	3.39 3.42	2.66 2.84	2.84 2.73	2.73 2.56	
INVERT LEVEL	18.370	18.370 18.670	18.670 19.435	19.435 19.627	20.385 20.570	20.570 20.697	20.697 20.808	
FINISHED SURFACE LEVELS		22.06	22.44	22.83	23.04	23.41	23.42	23.36
CHAINAGE		272.84 140.48	413.31 67.99	481.30 21.16	502.46 87.38	589.84 20.65	610.48 22.17	632.66

ADVERTISED
PLAN

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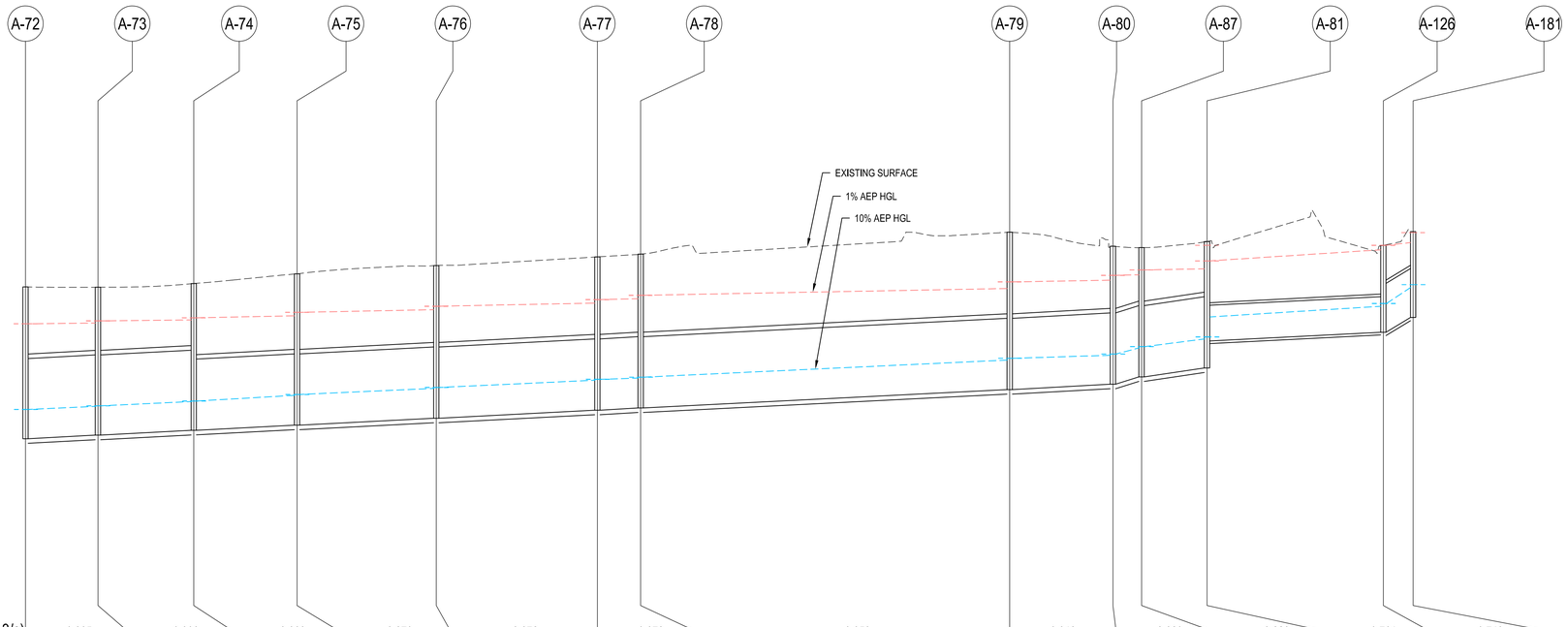
DRAINAGE LONGITUDINAL SECTIONS 2



	A-72		A-73		A-74		A-75		A-76		A-77		A-78		A-79		A-80		A-87		A-81		A-126		A-181
10%AEP DESIGN FLOW (m3/s)		0.865		0.866		0.868		0.870		0.872		0.873		0.850		0.819		0.820		0.820		0.761		0.710	
1%AEP DESIGN FLOW (m3/s)		1.700		1.703		1.707		1.711		1.716		1.718		1.668		1.604		1.604		1.606		1.480		1.370	
CAPACITY (m3/s)		3.775		3.759		2.758		2.754		2.761		2.779		2.754		2.806		6.255		4.549		0.858		3.207	
AT GRADE VELOCITY (m/s)		2.64		2.63		2.44		2.44		2.44		2.46		2.44		2.48		5.53		4.02		1.52		6	
PIPE SIZE (mm)		1350Ø		1350Ø		1200Ø		1200Ø		1200Ø		1200Ø		1200Ø		1200Ø		1200Ø		1200Ø		(2x)600Ø		825Ø	
GRADE		1 in 200		1 in 202		1 in 200		1 in 201		1 in 199		1 in 197		1 in 201		1 in 193		1 in 38.9		1 in 73.5		1 in 205		1 in 20.1	
DATUM		15.0																							
DEPTH TO INVERT	2.56 2.56		2.49 2.49		2.47 2.47		2.55 2.55		2.57 2.57		2.58 2.58		2.59 2.59		2.65 2.65		2.33 2.33		2.18 2.18		2.13 1.67		1.47 1.47		1.45
INVERT LEVEL	20.808 20.808		20.869 20.869		20.949 20.949		21.036 21.036		21.153 21.153		21.289 21.289		21.326 21.326		21.636 21.636		21.726 21.726		21.850 21.850		22.000 22.455		22.600 22.600		22.850
FINISHED SURFACE LEVELS	23.36		23.36		23.42		23.59		23.73		23.87		23.92		24.29		24.05		24.03		24.13		24.07		24.30
CHAINAGE	632.66	12.20	644.86	16.14	661.00	17.40	678.40	23.46	701.86	27.13	728.99	7.29	736.28	62.17	798.44	17.39	815.83	4.82	820.65	11.03	831.68	29.71	861.39	5.01	866.41

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DRAINAGE LONGITUDINAL SECTIONS 3

12D MODEL - HYDROLOGICAL DESIGN SHEET

Node	Setout	Catch	Time	Intensity	Runoff	Area	Full	Full	Full	Partial	Partial	Partial	Approach
Name	RL	ID	Tc	I	C	A	CA	Sum CA	Qc=CIA	CA	Sum CA	Qc=CIA	Flow Qa
(-)	(m)	(-)	(min)	(mm/hr)	(-)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)
MW-01	22.05												
MW-02	21.97	3P	5	173.25	0.89	0.1047	0.0934	0.0934	44.9	0.0934	0.0934	44.9	44.9
MW-03	21.87	2P	11	121.03	0.99	3.2084	3.1635	3.2741	1100.7	1.4379	1.5486	745.2	1100.7
		3P	5	173.25	0.89	0.1241	0.1107			0.1107			
MW-04	22.29	2P	11	121.03	0.99	3.4157	3.3678	3.4794	1169.7	1.5308	1.6424	790.4	1169.7
		3P	5	173.25	0.89	0.125	0.1115			0.1115			
MW-05	22.06	2P	12	115.52	0.99	9.1082	8.9807	9.3787	3009.4	3.742	4.1399	1992.3	3009.4
		3P	5	173.25	0.89	0.4462	0.398			0.398			
MW-06	22.44	3P	5	173.25	0.89	0.1543	0.1377	0.1377	66.3	0.1377	0.1377	66.3	66.3
MW-07	22.83	3P	5	173.25	0.89	0.2733	0.2438	0.2438	117.3	0.2438	0.2438	117.3	117.3
MW-08	23.04	3P	18	91.86	0.89	3.3039	2.947	2.947	752	2.947	2.947	752	752
MW-09	23.41	2P	12	115.52	0.99	6.349	6.2601	6.2601	2008.8	6.2601	6.2601	2008.8	2008.8
A-71	23.42	3P	5	173.25	0.89	0.3976	0.3546	0.3546	170.7	0.3546	0.3546	170.7	170.7
A-72	23.36												0
A-73	23.36												0
A-74	23.42												0
A-75	23.59												0
A-76	23.73												0
A-77	23.87												0
A-78	23.92	3P	5	173.25	0.89	0.1483	0.1323	0.1323	63.7	0.1323	0.1323	63.7	63.7
A-79	24.29	3P	5	173.25	0.89	0.1621	0.1446	0.1446	69.6	0.1446	0.1446	69.6	69.6
A-80	24.05												0
A-87	24.03												0
A-81	24.13	3P	5	173.25	0.89	0.303	0.2702	0.2702	130	0.2702	0.2702	130	130
A-126	24.07	3P	5	173.25	0.89	0.2566	0.2289	0.2289	110.2	0.2289	0.2289	110.2	110.2
A-181	24.3												0

12D MODEL - HYDRAULIC DESIGN SHEET

Pipe	Pipe	Pipe	Pipe	Full Pipe	Pipe	Pipe	Full-area	Full-area	Full-area	Full-area	Part-area	Part-area	Part-area	Part-area	Catchment	Direct Pipe	Pipe	Capacity	Q/Qcap	Full Pipe	Norm Depth	Crit Depth	Capacity Vel	US Node	Pipe	Pipe	DS Node	Cover	Pipe	Pipe	US Node	Pipe	P'head Loss	Pipe	US Node	Pipe	Pipe	DS Node	HGL	HGL	F'board
ID	Type	Length	Size	Area Af	Grade	Grade	Tct	I	Sum CA	Qc=CIA	Tct	I	Sum CA	Qc=CIA	Flow Qc	Flow Qdp	Flow Q	Flow Qcap	Ratio	Vel Vf=Q/Af	Vel Vn=Q/An	Vel Vc=Q/Ac	Vcap=Qcap/Af	Grate RL	US IL	DS IL	Grate RL	Min	DS Bend	DS Drop	Ku	V'head	(Ku.V'head)	T'head Loss	HGL	US HGL	DS HGL	HGL	Grade	Grade	US
(-)	(-)	(m)	(mm)	(sq.m)	(%)	(1 in)	(min)	(mm/hr)	(ha)	(L/s)	(min)	(mm/hr)	(ha)	(L/s)	(L/s)	(L/s)	(L/s)	(L/s)	(-)	(m/s)	(m/s)	(m/s)	(m/s)	(m)	(m)	(m)	(m)	(m)	(deg)	(m)	(-)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(%)	(1 in)	(m)
MW-02 to MW-01	RCP	11.02	2250	3.976	0.37	268.8	22.1	81.33	26.9448	6087.4	14.18	105.34	24.2711	7102.1	7102.1	1677	8779.1	12717.3	0.69	2.21	3.45	3.4	3.2	21.97	17.81	17.77	22.05	1.91	0		0.8	0.25	0.2	0.02	21.21	21.01	20.99	20.99	0.18	564.1	0.76
MW-03 to MW-02	RCP	79.03	2250	3.976	0.22	459.5	21.44	82.82	26.8514	6177.5	13.52	108.18	24.1777	7265.4	7265.4	1677	8942.4	9726.8	0.92	2.25	2.77	3.43	2.45	21.87	17.98	17.81	21.97	1.64	16.7	0	0.5	0.26	0.13	0.15	21.49	21.36	21.21	21.21	0.18	543.6	0.38
MW-04 to MW-03	RCP	89.84	2250	3.976	0.18	561.5	20.69	84.6	23.5773	5540.8	12.77	111.64	20.9035	6482.5	6482.5	1677	8159.5	8798.9	0.93	2.05	2.51	3.31	2.21	22.29	18.14	17.98	21.87	1.64	-0.7	0	0.5	0.21	0.11	0.14	21.73	21.62	21.49	21.49	0.15	653	0.56
MW-05 to MW-04	RCP	92.94	2100	3.464	0.24	409.4	19.91	86.55	20.0979	4831.7	12	115.52	17.4242	5591.1	5591.1	1677	7268.1	8572.8	0.85	2.1	2.78	3.27	2.48	22.06	18.37	18.14	22.29	1.59	3.1	0.001	0.5	0.22	0.11	0.16	22.01	21.89	21.73	21.73	0.18	569.6	0.05
MW-06 to MW-05	RCP	140.48	(2x)1500	3.534	0.21	468.3	18.74	89.71	10.7193	2671	13.47	108.41	9.8561	2968.1	2968.1	1677	4645.1	6536.2	0.71	1.31	2.01	2.48	1.85	22.44	18.67	18.37	22.06	1.4	-2.5	0	0.5	0.09	0.04	0.15	22.2	22.16	22.01	22.01	0.11	927.1	0.24
MW-07 to MW-06	RCP	67.99	2100	3.464	1.13	88.9	18.18	91.34	10.5816	2684.7	12.9	111.02	9.7185	2997.1	2997.1	1677	4674.1	18400	0.25	1.35	4.43	2.79	5.31	22.83	19.43	18.67	22.44	1.16	-0.8	0	0.5	0.09	0.05	0.05	22.3	22.25	22.2	22.2	0.07	1377.3	0.53
MW-08 to MW-07	RCP	21.16	2100	3.464	0.91	110.2	18	91.86	10.3378	2637.9	12.73	111.86	9.4747	2944.1	2944.1	1677	4621.1	16525	0.28	1.33	4.09	2.78	4.77	23.04	19.63	19.43	22.83	1.14	10.7	0	0.5	0.09	0.05	0.02	22.36	22.31	22.3	22.3	0.07	1409	0.68
MW-09 to MW-08	RCP	87.38	(3x)1050	2.598	0.21	472.3	12	115.52	7.3908	2371.6	7.26	148.63	4.9196	2031.1	2371.6	1370	3741.6	3771.1	0.99	1.44	1.65	2.28	1.45	23.41	20.57	20.39	23.04	1.27	-5.8	0.758	0.5	0.11	0.05	0.18	22.59	22.54	22.36	22.36	0.21	479.8	0.82
A-71 to MW-09	RCP	20.65	1350	1.431	0.62	162.6	7.09	150.25	1.1306	471.9	6.84	152.65	1.1193	474.6	474.6	1370	1844.6	4187.8	0.44	1.29	2.83	2.38	2.93	23.42	20.7	20.57	23.41	1.31	-22.5	0	0.8	0.08	0.07	0.02	22.69	22.62	22.59	22.59	0.12	837.9	0.74
A-72 to A-71	RCP	22.17	1350	1.431	0.5	199.7	6.91	152.03	0.776	327.7	6.66	154.5	0.7647	328.2	328.2	1370	1698.2	3778.1	0.45	1.19	2.57	2.31	2.64	23.36	20.81	20.7	23.42	1.13	18.6	0	0.5	0.07	0.04	0.02	22.74	22.71	22.69	22.69	0.1	988.7	0.62
A-73 to A-72	RCP	12.2	1350	1.431	0.5	200.1	6.8	153.04	0.776	329.9	6.56	155.53	0.7647	330.4	330.4	1370	1700.4	3775.2	0.45	1.19	2.57	2.31	2.64	23.36	20.87	20.81	23.36	1.06	0	0	0.5	0.07	0.04	0.01	22.79	22.76	22.74	22.74	0.1	986.1	0.57
A-74 to A-73	RCP	16.14	1350	1.431	0.5	201.8	6.67	154.38	0.776	332.8	6.42	156.93	0.7647	333.3	333.3	1370	1703.3	3759.2	0.45	1.19	2.56	2.31	2.63	23.42	20.95	20.87	23.36	1.03	-2.1	0	0.5	0.07	0.04	0.02	22.85	22.81	22.79	22.79	0.1	982.7	0.58
A-75 to A-74	RCP	17.4	1200	1.131	0.5	199.9	6.52	155.86	0.776	336	6.28	158.46	0.7647	336.6	336.6	1370	1706.6	2758.4	0.62	1.51	2.57	2.42	2.44	23.59	21.04	20.95	23.42	1.2	-6	0	0.5	0.12	0.06	0.03	22.94	22.88	22.85	22.85	0.19	522.4	0.65
A-76 to A-75	RCP	23.46	1200	1.131	0.5	200.5	6.33	157.9	0.776	340.4	6.08	160.57	0.7647	341.1	341.1	1370	1711.1	2754.5	0.62	1.51	2.57	2.42	2.44	23.73	21.15	21.04	23.59	1.28	6.7	0	0.5	0.12	0.06	0.05	23.04	22.98	22.94	22.94	0.19	519.6	0.69
A-77 to A-76	RCP	27.13	1200	1.131	0.5	199.5	6.1	160.33	0.776	345.6	5.86	163.08	0.7647	346.4	346.4	1370	1716.4	2761.5	0.62	1.52	2.57	2.43	2.44	23.87	21.29	21.15	23.73	1.28	1.4	0	0.5	0.12	0.06	0.05	23.15	23.09	23.04	23.04	0.19	516.4	0.72
A-78 to A-77	RCP	7.29	1200	1.131	0.51	197	6.04	161	0.776	347	5.8	163.76	0.7647	347.8	347.8	1370	1717.8	2778.9	0.62	1.52	2.59	2.43	2.46	23.92	21.33	21.29	23.87	1.31	0	0	0.5	0.12	0.06	0.01	23.22	23.17	23.15	23.15	0.19	515.5	0.69
A-79 to A-78	RCP	62.17	1200	1.131	0.5	200.5	5.52	166.89	0.6437	298.4	5.28	169.84	0.6324	298.3	298.4	1370	1668.4	2754.3	0.61	1.48	2.55	2.4	2.44	24.29	21.64	21.33	23.92	1.28	0	0	1	0.11	0.11	0.11	23.45	23.34	23.22	23.22	0.18	546.5	0.84
A-80 to A-79	RCP	17.39	1200	1.131	0.52	193.2	5.38	168.6	0.4991	233.8	5.13	171.61	0.4878	232.5	233.8	1370	1603.8	2806.1	0.57	1.42	2.56	2.37	2.48	24.05	21.73	21.64	24.29	1.03	36.3	0	0.8	0.1	0.08	0.03	23.56	23.48	23.45	23.45	0.17	591.5	0.49
A-87 to A-80	RCP	4.82	1200	1.131	2.57	38.9	5.34	169.09	0.4991	234.4	5.09	172.1	0.4878	233.2	234.4	1370	1604.4	6254.8	0.26	1.42	4.63	2.37	5.53	24.03	21.85	21.73	24.05	0.9	31.9	0	0.8	0.1	0.08	0.01	23.65	23.57	23.56	23.56	0.17	591	0.38
A-81 to A-87	RCP	11.03	1200	1.131	1.36	73.5	5.25	170.2	0.4991	236	5	173.25	0.4878	234.8	236	1370	1606	4548.7	0.35	1.42	3.67	2.37	4.02	24.13	22	21.85	24.03	0.85	7.1	0	1.3	0.1	0.13	0.02	23.8	23.67	23.65	23.65	0.17	589.8	0.33
A-126 to A-81	RCP	29.71	(2x)600	0.565	0.49	204.9	5	173.25	0.2289	110.2	5	173.25	0.2289	110.2	110.2	1370	1480.2	858.3	1.72	2.62	2.62	2.75	1.52	24.07	22.6	22.45	24.13	0.69	-76.5	0.455	0.5	0.15	0.08	0.19	24.07	23.99	23.8	23.8	0.63	158.9	0
A-181 to A-126	RCP	5.01	825	0.535	4.99	20.1										1370	1370	3206.9	0.43	2.56	5.76	2.83	6	24.3	22.85	22.6	24.07	0.49	1	0	0.5	0.34	0.17	0.05	24.28	24.11	24.07	24.07	0.91	109.9	0.02

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DRAINAGE CALCULATIONS - 1% AEP

12D MODEL - HYDROLOGICAL DESIGN SHEET

Node	Setout	Catch	Time	Intensity	Runoff	Area	Full	Full	Full	Partial	Partial	Partial	Approach
Name	RL	ID	Tc	I	C	A	CA	Sum CA	Qc=CIA	CA	Sum CA	Qc=CIA	Flow Qa
(-)	(m)	(-)	(min)	(mm/hr)	(-)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)
MW-01	22.05												
MW-02	21.97	3P	5	97.22	0.74	0.1047	0.0778	0.0778	21	0.0778	0.0778	21	21
MW-03	21.87	2P	11	69.2	0.82	3.2084	2.6373	2.7295	524.6	1.1988	1.291	348.6	524.6
		3P	5	97.22	0.74	0.1241	0.0922			0.0922			
MW-04	22.29	2P	11	69.2	0.82	3.4157	2.8077	2.9006	557.5	1.2762	1.3691	369.7	557.5
		3P	5	97.22	0.74	0.125	0.0929			0.0929			
MW-05	22.06	2P	12	66.26	0.82	9.1082	7.4869	7.8184	1439	3.1196	3.451	932	1439
		3P	5	97.22	0.74	0.4462	0.3315			0.3315			
MW-06	22.44	3P	5	97.22	0.74	0.1543	0.1147	0.1147	31	0.1147	0.1147	31	31
MW-07	22.83	3P	5	97.22	0.74	0.2733	0.2031	0.2031	54.8	0.2031	0.2031	54.8	54.8
MW-08	23.04	3P	18	53.51	0.74	3.3039	2.4548	2.4548	364.8	2.4548	2.4548	364.8	364.8
MW-09	23.41	2P	12	66.26	0.82	6.349	5.2189	5.2189	960.6	5.2189	5.2189	960.6	960.6
A-71	23.42	3P	5	97.22	0.74	0.3976	0.2954	0.2954	79.8	0.2954	0.2954	79.8	79.8
A-72	23.36												0
A-73	23.36												0
A-74	23.42												0
A-75	23.59												0
A-76	23.73												0
A-77	23.87												0
A-78	23.92	3P	5	97.22	0.74	0.1483	0.1102	0.1102	29.8	0.1102	0.1102	29.8	29.8
A-79	24.29	3P	5	97.22	0.74	0.1621	0.1204	0.1204	32.5	0.1204	0.1204	32.5	32.5
A-80	24.05												0
A-87	24.03												0
A-81	24.13	3P	5	97.22	0.74	0.303	0.2251	0.2251	60.8	0.2251	0.2251	60.8	60.8
A-126	24.07	3P	5	97.22	0.74	0.2566	0.1907	0.1907	51.5	0.1907	0.1907	51.5	51.5
A-181	24.3												0

12D MODEL - HYDRAULIC DESIGN SHEET

Pipe	Pipe	Pipe	Full Pipe	Pipe	Pipe	Full-area	Full-area	Full-area	Full-area	Part-area	Part-area	Part-area	Part-area	Catchment	Direct Pipe	Pipe	Capacity	Q/Qcap	Full Pipe	Norm Depth	Crit Depth	Capacity Vel	US Node	Pipe	Pipe	DS Node	Cover	Pipe	Pipe	US Node	Pipe	P'head Loss	Pipe	US Node	Pipe	Pipe	DS Node	HGL	HGL	F'board
ID	Length	Size	Area Af	Grade	Grade	Tct	I	Sum CA	Qc=CIA	Tct	I	Sum CA	Qc=CIA	Flow Qc	Flow Qdp	Flow Q	Flow Qcap	Ratio	Vel Vf=Q/Af	Vel Vn=Q/An	Vel Vc=Q/Ac	Vcap=Qcap/Af	Grate RL	US IL	DS IL	Grate RL	Min	DS Bend	DS Drop	Ku	V'head	(Ku.V'head)	T'head Loss	HGL	US HGL	DS HGL	HGL	Grade	Grade	US
(-)	(m)	(mm)	(sq.m)	(%)	(1 in)	(min)	(mm/hr)	(ha)	(L/s)	(min)	(mm/hr)	(ha)	(L/s)	(L/s)	(L/s)	(L/s)	(L/s)	(-)	(m/s)	(m/s)	(m/s)	(m/s)	(m)	(m)	(m)	(m)	(m)	(deg)	(m)	(-)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(%)	(1 in)	(m)
/-02 to MW	11.02	2250	3.976	0.37	268.8	22.1	47.72	22.4594	2977.3	14.18	60.81	20.2314	3417.4	3417.4	1017	4434.4	12717.3	0.35	1.12	2.91	2.69	3.2	21.97	17.81	17.77	22.05	1.91	0		0.8	0.06	0.05	0	20.25	20.19	20.19	20.19	0.05	2210.8	1.72
/-03 to MW	79.03	2250	3.976	0.22	459.5	21.44	48.55	22.3816	3018.2	13.52	62.34	20.1536	3489.7	3489.7	1017	4506.7	9726.8	0.46	1.13	2.4	2.7	2.45	21.87	17.98	17.81	21.97	1.64	16.7	0	0.5	0.07	0.03	0.04	20.32	20.28	20.25	20.25	0.05	2140.5	1.55
/-04 to MW	89.84	2250	3.976	0.18	561.5	20.69	49.53	19.6522	2703.7	12.77	64.19	17.4241	3106.8	3106.8	1017	4123.8	8798.9	0.47	1.04	2.18	2.63	2.21	22.29	18.14	17.98	21.87	1.64	-0.7	0	0.5	0.05	0.03	0.03	20.37	20.35	20.32	20.32	0.04	2851.2	1.91
/-05 to MW	92.94	2100	3.464	0.24	409.4	19.91	50.6	16.7516	2354.4	12	66.26	14.5235	2673.2	2673.2	1017	3690.2	8572.8	0.43	1.07	2.38	2.59	2.48	22.06	18.37	18.14	22.29	1.59	3.1	0.001	0.5	0.06	0.03	0.04	20.44	20.41	20.37	20.37	0.04	2442.1	1.62
/-06 to MW	140.48	(2x)1500	3.534	0.21	468.3	18.74	52.33	8.9332	1298.5	13.47	62.46	8.2142	1425.2	1425.2	1017	2442.2	6536.2	0.37	0.69	1.71	2.02	1.85	22.44	18.67	18.37	22.06	1.4	-2.5	0	0.5	0.02	0.01	0.04	20.5	20.48	20.44	20.44	0.03	3354.1	1.94
/-07 to MW	67.99	2100	3.464	1.13	88.9	18.18	53.22	8.8185	1303.7	12.9	63.86	8.0995	1436.7	1436.7	1017	2453.7	18400	0.13	0.71	3.69	2.29	5.31	22.83	19.43	18.67	22.44	1.16	-0.8	0	0.5	0.03	0.01	0.03	20.45	20.44	20.5	20.5	-0.09	-1131.8	2.38
/-08 to MW	21.16	2100	3.464	0.91	110.2	18	53.51	8.6154	1280.5	12.73	64.31	7.8965	1410.6	1410.6	1017	2427.6	16525	0.15	0.7	3.41	2.28	4.77	23.04	19.63	19.43	22.83	1.14	10.7	0	0.5	0.03	0.01	0.06	20.37	20.35	20.45	20.45	-0.45	-223	2.68
/-09 to MW	87.38	(3x)1050	2.598	0.21	472.3	12	66.26	6.1607	1133.9	7.26	83.83	4.1005	954.8	1133.9	710	1843.9	3771.1	0.49	0.71	1.44	1.8	1.45	23.41	20.57	20.39	23.04	1.27	-5.8	0.758	0.5	0.03	0.01	0.21	21.1	21.09	20.82	20.37	0.3	331.4	2.31
71 to MW-	20.65	1350	1.431	0.62	162.6	7.09	84.69	0.9418	221.6	6.84	85.97	0.9323	222.7	222.7	710	932.7	4187.8	0.22	0.65	2.35	1.91	2.93	23.42	20.7	20.57	23.41	1.31	-22.5	0	0.8	0.02	0.02	0.12	21.22	21.2	21.1	21.1	0.49	202.6	2.21
-72 to A-7	22.17	1350	1.431	0.5	199.7	6.91	85.64	0.6464	153.8	6.66	86.96	0.6369	153.9	153.9	710	863.9	3778.1	0.23	0.6	2.14	1.87	2.64	23.36	20.81	20.7	23.42	1.13	18.6	0	0.5	0.02	0.01	0.11	21.3	21.29	21.22	21.22	0.33	299.6	2.06
-73 to A-7	12.2	1350	1.431	0.5	200.1	6.8	86.18	0.6464	154.7	6.56	87.51	0.6369	154.8	154.8	710	864.8	3775.2	0.23	0.6	2.14	1.87	2.64	23.36	20.87	20.81	23.36	1.06	0	0	0.5	0.02	0.01	0.06	21.36	21.35	21.3	21.3	0.43	234.7	2
-74 to A-7	16.14	1350	1.431	0.5	201.8	6.67	86.9	0.6464	156	6.42	88.26	0.6369	156.2	156.2	710	866.2	3759.2	0.23	0.61	2.13	1.87	2.63	23.42	20.95	20.87	23.36	1.03	-2.1	0	0.5	0.02	0.01	0.08	21.44	21.43	21.36	21.36	0.44	227.1	1.98
-75 to A-7	17.4	1200	1.131	0.5	199.9	6.52	87.69	0.6464	157.4	6.28	89.09	0.6369	157.6	157.6	710	867.6	2758.4	0.31	0.77	2.16	1.93	2.44	23.59	21.04	20.95	23.42	1.2	-6	0	0.5	0.03	0.02	0.09	21.55	21.54	21.44	21.44	0.55	182	2.03
-76 to A-7	23.46	1200	1.131	0.5	200.5	6.33	88.79	0.6464	159.4	6.08	90.23	0.6369	159.6	159.6	710	869.6	2754.5	0.32	0.77	2.16	1.93	2.44	23.73	21.15	21.04	23.59	1.28	6.7	0	0.5	0.03	0.02	0.12	21.67	21.66	21.55	21.55	0.44	228.7	2.05
-77 to A-7	27.13	1200	1.131	0.5	199.5	6.1	90.1	0.6464	161.8	5.86	91.59	0.6369	162	162	710	872	2761.5	0.32	0.77	2.16	1.93	2.44	23.87	21.29	21.15	23.73	1.28	1.4	0	0.5	0.03	0.02	0.14	21.81	21.79	21.67	21.67	0.45	223	2.06
-78 to A-7	7.29	1200	1.131	0.51	197	6.04	90.46	0.6464	162.4	5.8	91.96	0.6369	162.7	162.7	710	872.7	2778.9	0.31	0.77	2.17	1.93	2.46	23.92	21.33	21.29	23.87	1.31	0	0	0.5	0.03	0.02	0.04	21.85	21.83	21.81	21.81	0.3	330.8	2.07
-79 to A-7	62.17	1200	1.131	0.5	200.5	5.52	93.67	0.5362	139.5	5.28	95.31	0.5268	139.5	139.5	710	849.5	2754.3	0.31	0.75	2.14	1.92	2.44	24.29	21.64	21.33	23.92	1.28	0	0	1	0.03	0.03	0.31	22.16	22.13	21.85	21.85	0.46	216	2.12
-80 to A-7	17.39	1200	1.131	0.52	193.2	5.38	94.62	0.4158	109.3	5.13	96.3	0.4063	108.7	109.3	710	819.3	2806.1	0.29	0.72	2.15	1.9	2.48	24.05	21.73	21.64	24.29	1.03	36.3	0	0.8	0.03	0.02	0.08	22.24	22.21	22.16	22.16	0.3	335	1.82
-87 to A-8	4.82	1200	1.131	2.57	38.9	5.34	94.89	0.4158	109.6	5.09	96.57	0.4063	109	109.6	710	819.6	6254.8	0.13	0.72	3.82	1.9	5.53	24.03	21.85	21.73	24.05	0.9	31.9	0	0.8	0.03	0.02	0.12	22.36	22.34	22.24	22.24	2.13	47	1.67
-81 to A-8	11.03	1200	1.131	1.36	73.5	5.25	95.51	0.4158	110.3	5	97.22	0.4063	109.7	110.3	710	820.3	4548.7	0.18	0.73	3.05	1.9	4.02	24.13	22	21.85	24.03	0.85	7.1	0	1.3	0.03	0.03	0.15	22.52	22.49	22.36	22.36	1.17	85.6	1.61
-126 to A-8	29.71	(2x)600	0.565	0.49	204.9	5	97.22	0.1907	51.5	5	97.22	0.1907	51.5	51.5	710	761.5	858.3	0.89	1.35	1.71	1.88	1.52	24.07	22.6	22.45	24.13	0.69	-76.5	0.455	0.5	0.09	0.05	0.15	23.09	23.04	22.86	22.52	0.61	164.7	0.98
-181 to A-1	5.01	825	0.535	4.99	20.1										710	710	3206.9	0.22	1.33	4.82	2.05	6	24.3	22.85	22.6	24.07	0.49	1	0	0.5	0.09	0.05	0.25	23.4	23.36	23.09	23.09	5.43	18.4	0.89

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DRAINAGE CALCULATIONS - 10% AEP

Appendix F Functional Scheme Pipe Design

ADVERTISED PLAN

CONNECTION TO CULVERTS
EXISTING CRANBOURNE OUTFALL DRAIN
THOMPSONS ROAD
THOMPSONS ROAD
RAIL LINE
RAIL LINE
EVANS ROAD
EVANS ROAD
PROPOSED ROAD
PROPOSED ROAD
AUSNET TRANSMISSION SITE
SITE TO CONNECT DIRECT TO CRANBOURNE OUTFALL DRAIN
VOLK ROAD
VOLK ROAD UPGRADE IN PROG
FLOWS SOUTH OF VOLK ROAD CAPTURED BY VOLK ROAD DRAINAGE
F01
F02
F03
F04
F05
F03 3.4498ha
01
02
03
04
05
06
07
08
09
10
11/12
15 0.0451ha
16 0.1372ha
42 0.0293ha
41 0.1312ha
03(2) 0.7292ha
02 0.0502ha
03 0.0841ha
18 0.0489ha
04(2) 1.0992ha
04 0.0250ha
06(2) 0.5033ha
24(2) 0.5771ha
10 0.0483ha
25(2) 1.0554ha
24 0.0096ha
25 0.1076ha
26(2) 1.3525ha
26 0.0829ha
27 0.0889ha
29 0.1155ha
28 0.0102ha
11 0.0522ha
23 0.0820ha
09 0.0581ha
06 0.0696ha
38 0.0657ha
37 0.0954ha
05 0.0787ha
21 0.1044ha
22 0.0938ha
19 0.0477ha
20 0.0505ha
34 0.0658ha
30 0.0659ha
22(2) 2.0003ha
40 0.9296ha
35 0.0662ha
31 0.0662ha
32 0.1525ha
38(2) 5.2453ha
36 0.1210ha
33(2) 2.9395ha

N

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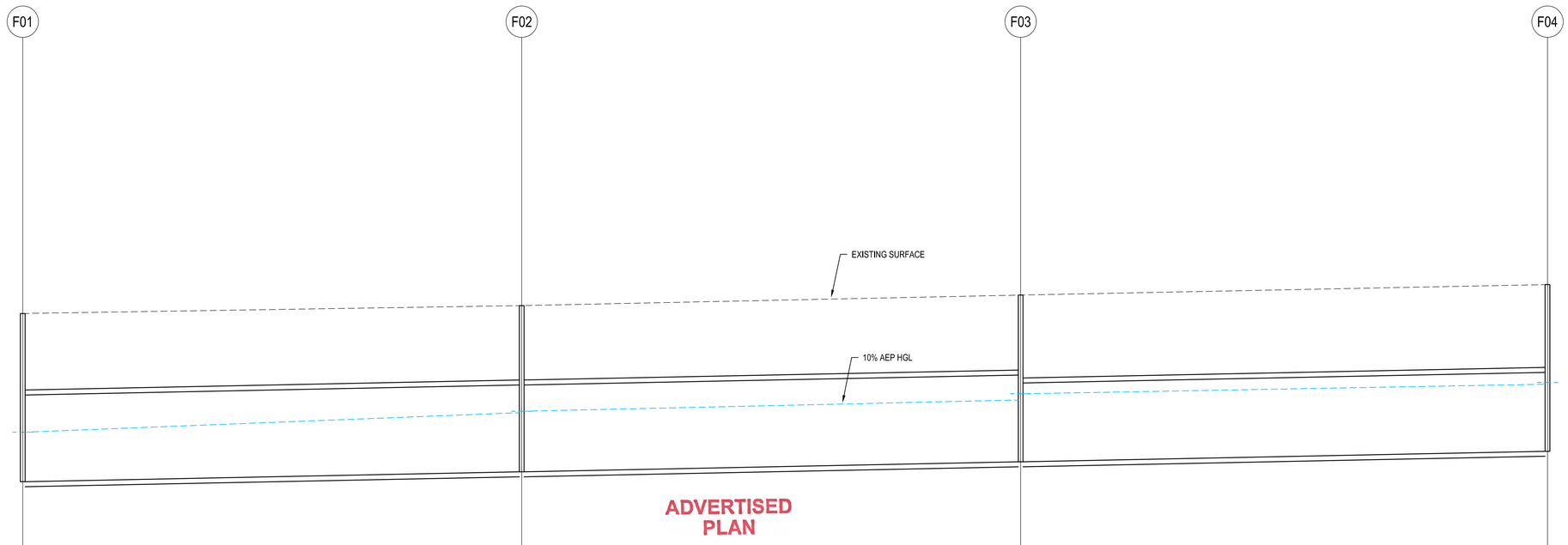
DRAINAGE PLAN



ADVERTISED
PLAN

	F01		F02		F03		F04
DESIGN FLOW (m3/s)		3.482		3.566		3.163	
CAPACITY (m3/s)		4.078		4.078		3.163	
AT GRADE VELOCITY (m/s)		1.91		1.91		1.79	
PIPE SIZE (mm)		1650Ø		1650Ø		1500Ø	
GRADE		1 in 500		1 in 500		1 in 500	
DATUM	16.0						
DEPTH TO INVERT	3.20 3.20		3.16 3.16		3.17 3.17		3.17 3.17
INVERT LEVEL	20.050 20.050		20.240 20.240		20.429 20.429		20.630 20.630
FINISHED SURFACE LEVELS	23.25		23.40		23.60		23.80
CHAINAGE	-425.48	94.86	-330.63	94.86	-235.77	100.15	-135.62

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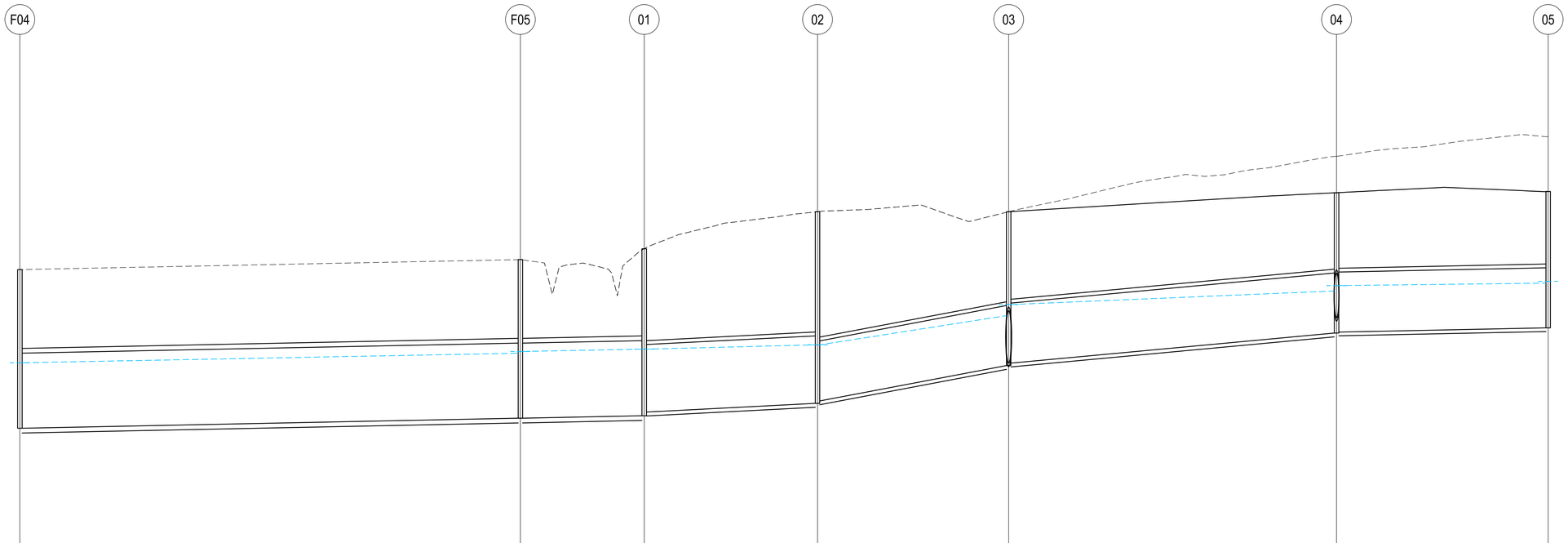
DRAINAGE LONGITUDINAL SECTIONS 1



	F04		F05		01		02		03		04		05
DESIGN FLOW (m3/s)		3.250		3.272		3.305		3.335		2.327		1.323	
CAPACITY (m3/s)		3.163		3.163		3.776		5.298		3.732		1.744	
AT GRADE VELOCITY (m/s)		1.79		1.79		2.64		4.68		3.3		1.54	
PIPE SIZE (mm)		1500Ø		1500Ø		1350Ø		1200Ø		1200Ø		1200Ø	
GRADE		1 in 500		1 in 500		1 in 200		1 in 54.2		1 in 109		1 in 500	
DATUM													
DEPTH TO INVERT	3.17 3.17		3.17 3.17		3.34 3.27		3.83 3.78		3.08 3.03		2.81 2.79		2.72 2.70
INVERT LEVEL	20.630 20.630		20.830 20.830		20.880 20.952		21.126 21.176		21.881 21.931		22.532 22.552		22.637 22.657
FINISHED SURFACE LEVELS	23.80		24.00		24.22		24.96		24.96		25.34		25.36
CHAINAGE	-135.62	100.15	-35.46	24.78	-10.68	34.68	24.00	38.24	62.24	65.61	127.85	42.35	170.20

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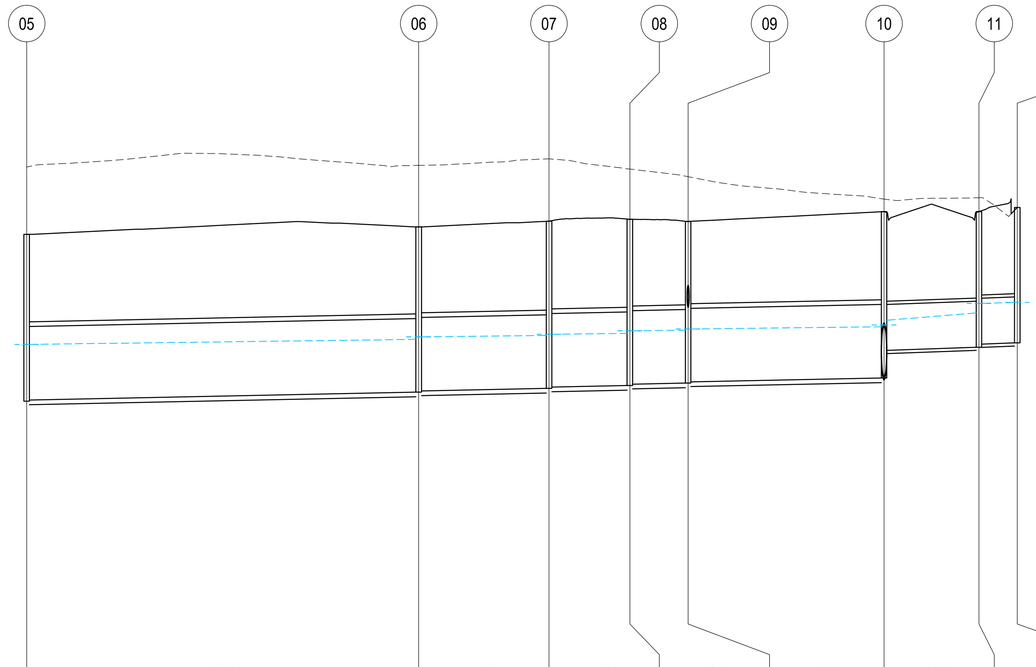
DRAINAGE LONGITUDINAL SECTIONS 2



	05		06		07		08		09		10		11		12
DESIGN FLOW (m3/s)		1.330		1.237		1.241		1.243		1.229		0.630		0.620	
CAPACITY (m3/s)		1.744		1.744		1.744		1.744		1.744		0.643		0.643	
AT GRADE VELOCITY (m/s)		1.54		1.54		1.54		1.54		1.54		1.45		1.45	
PIPE SIZE (mm)		1200Ø		1200Ø		1200Ø		1200Ø		1200Ø		750Ø		750Ø	
GRADE		1 in 500		1 in 500		1 in 500		1 in 500		1 in 500		1 in 300		1 in 300	
DATUM															
DEPTH TO INVERT	2.72 2.70		2.70 2.68		2.73 2.71		2.71 2.69		2.64 2.62		2.71 2.26		2.21 2.16		2.21
INVERT LEVEL	22.637 22.657		22.785 22.805		22.847 22.867		22.894 22.914		22.933 22.953		23.017 23.467		23.518 23.568		23.589
FINISHED SURFACE LEVELS	25.36		25.48		25.57		25.61		25.57		25.73		25.73		25.80
CHAINAGE	170.20	64.00	234.20	21.28	255.48	13.19	268.67	9.51	278.18	31.98	310.16	15.50	325.66	6.25	331.91

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DRAINAGE LONGITUDINAL SECTIONS 3

HYDROLOGY DESIGN SHEET

Node Name	Node Type	Setout Easting	Setout Northing	Setout RL	Catch ID	Time Tc	Intensity I	Runoff C	Area A	Full CA	Full Sum CA	Full Qc=CIA	Partial CA	Partial Sum CA	Partial Qc=CIA	Approach Flow Qa
(-)	(-)	(m)	(m)	(m)	(-)	(min)	(mm/hr)	(-)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)
F01	JP	346793.7	5783578	23.25												
F02	JP	346879.4	5783537	23.4												0
F03	JP	346965	5783496	23.6	2P	10	72.47	0.82	3.4498	2.8358	2.8358	570.9	2.8358	2.8358	570.9	570.9
F04	JP	347064.2	5783482	23.8												0
F05	JP	347163.4	5783469	24												0
1	JP	347187.9	5783465	24.22												0
2	GEP	347222.2	5783460	24.96	1P	5	97.22	0.74	0.0502	0.0373	0.0373	10.1	0.0373	0.0373	10.1	10.1
3	GEP	347260.1	5783455	24.96	1P	5	97.22	0.74	0.0841	0.0625	0.6619	156.6	0.0625	0.4906	132.5	156.6
					2P	7	85.16	0.82	0.7292	0.5994			0.4282			
4	GEP	347325.1	5783446	25.34	1P	5	97.22	0.74	0.025	0.0186	0.9221	218.1	0.0186	0.664	179.3	218.1
					2P	7	85.16	0.82	1.0992	0.9035			0.6454			
5	GEP	347367.1	5783440	25.36	1P	5	97.22	0.74	0.0787	0.0585	0.0585	15.8	0.0585	0.0585	15.8	15.8
6	GEP	347430.5	5783432	25.48	1P	5	97.22	0.74	0.0696	0.0517	0.4655	110.1	0.0517	0.3473	93.8	110.1
					2P	7	85.16	0.82	0.5033	0.4138			0.2955			
7	JP	347451.6	5783429	25.57												0
8	JP	347464.2	5783433	25.61												0
9	GEP	347468.2	5783442	25.57	1P	5	97.22	0.74	0.0581	0.0432	0.0432	11.7	0.0432	0.0432	11.7	11.7
10	GEP	347472.4	5783473	25.73	1P	5	97.22	0.74	0.0483	0.0359	0.0359	9.7	0.0359	0.0359	9.7	9.7
11	GEP	347487.8	5783471	25.73	1P	5	97.22	0.74	0.0522	0.0388	0.0388	10.5	0.0388	0.0388	10.5	10.5
12	GP	347494	5783470	25.8												0
13	EP	347256.6	5783464	23.55												
03a	GEP	347260.1	5783455	24.96												0
15	GP	347242.5	5783770	22.13												
16	JP	347220.7	5783663	23.37												0
17	GP	347199	5783555	23.73	1P	5	97.22	0.74	0.0451	0.0335	0.0335	9.1	0.0335	0.0335	9.1	9.1
18	GEP	347193.7	5783515	24.05	1P	5	97.22	0.74	0.1372	0.1019	0.1019	27.5	0.1019	0.1019	27.5	27.5
19	GP	347198.1	5783486	24.55												0
20	EP	347222.4	5783482	23												0
21	JP	347323.1	5783431	25.35	1P	5	97.22	0.74	0.0489	0.0363	0.0363	9.8	0.0363	0.0363	9.8	9.8
22	GEP	347334.6	5783414	25.62	1P	5	97.22	0.74	0.0477	0.0355	0.0355	9.6	0.0355	0.0355	9.6	9.6
23	GEP	347349	5783412	25.63	1P	5	97.22	0.74	0.0505	0.0375	0.0375	10.1	0.0375	0.0375	10.1	10.1
24	GEP	347365	5783425	25.35	1P	5	97.22	0.74	0.1044	0.0776	0.0776	20.9	0.0776	0.0776	20.9	20.9
25	GEP	347428.5	5783416	25.49	1P	8	80.35	0.74	0.0938	0.0697	1.7139	382.6	0.061	1.7052	403.4	403.4
					2P	7	85.16	0.82	2.0003	1.6443			1.6443			
26	GEP	347483.6	5783440	25.6	1P	5	97.22	0.74	0.082	0.0609	0.0609	16.5	0.0609	0.0609	16.5	16.5
27	GEP	347477.7	5783513	25.93	1P	5	97.22	0.74	0.0096	0.0072	0.4815	113.9	0.0072	0.346	93.4	113.9
					2P	7	85.16	0.82	0.5771	0.4744			0.3388			
28	GEP	347490.6	5783609	25.47	1P	5	97.22	0.74	0.1076	0.0799	0.9474	224.1	0.0799	0.6996	188.9	224.1
					2P	7	85.16	0.82	1.0554	0.8675			0.6197			
29	GEP	347499.5	5783676	25.13	1P	5	97.22	0.74	0.0829	0.0616	1.1733	277.5	0.0616	0.8557	231.1	277.5
					2P	7	85.16	0.82	1.3525	1.1117			0.7941			
30	GEP	347514.9	5783674	25.13	1P	5	97.22	0.74	0.0889	0.0661	0.0661	17.8	0.0661	0.0661	17.8	17.8
31	GEP	347493.1	5783511	25.93	1P	5	97.22	0.74	0.0102	0.0076	0.0076	2	0.0076	0.0076	2	2
32	GEP	347505.9	5783607	25.47	1P	5	97.22	0.74	0.1155	0.0858	0.0858	23.2	0.0858	0.0858	23.2	23.2
33	GEP	347340.5	5783349	26.28	1P	5	97.22	0.74	0.0659	0.049	0.049	13.2	0.049	0.049	13.2	13.2
34	GEP	347332.6	5783289	26.38	1P	5	97.22	0.74	0.0662	0.0492	0.0492	13.3	0.0492	0.0492	13.3	13.3
35	GEP	347324.6	5783230	26.47	1P	5	97.22	0.74	0.1525	0.1133	0.1133	30.6	0.1133	0.1133	30.6	30.6
36	GEP	347316	5783169	26.79	2P	10	72.47	0.82	2.9395	2.4163	2.4163	486.4	2.4163	2.4163	486.4	486.4
37	GEP	347326.1	5783351	26.28	1P	5	97.22	0.74	0.0658	0.0489	0.0489	13.2	0.0489	0.0489	13.2	13.2
38	GEP	347318.2	5783291	26.38	1P	5	97.22	0.74	0.0662	0.0492	0.0492	13.3	0.0492	0.0492	13.3	13.3
39	GEP	347310.2	5783232	26.47	1P	5	97.22	0.74	0.121	0.0899	0.0899	24.3	0.0899	0.0899	24.3	24.3
40	GEP	347257.5	5783435	25.23	1P	5	97.22	0.74	0.0954	0.0709	0.0709	19.1	0.0709	0.0709	19.1	19.1
41	GEP	347219.5	5783439	24.81	1P	5	97.22	0.74	0.0657	0.0488	4.3604	838.1	0.0488	2.0086	542.4	838.1
					2P	11	69.2	0.82	5.2453	4.3116			1.9598			
42	GEP	347186.3	5783432	24.37												0
43	GP	347182.7	5783414	24.47	1P	12	66.26	0.59	0.9296	0.5447	0.5447	100.3	0.5447	0.5447	100.3	100.3
44	2GEP	347187.8	5783441	24.3	1P	5	97.22	0.74	0.1312	0.0975	0.0975	26.3	0.0975	0.0975	26.3	26.3
45	2GEP	347193.9	5783453	24.53	1P	5	97.22	0.74	0.0293	0.0218	0.0218	5.9	0.0218	0.0218	5.9	5.9

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DRAINAGE CALCULATIONS

HYDRAULIC DESIGN SHEET - 10 YR STORM

Pipe	Pipe	Pipe	Full Pipe	Pipe	Pipe	Full-area	Full-area	Full-area	Full-area	Part-area	Part-area	Part-area	Part-area	Catchment	Direct Pipe	Pipe	Capacity	Q/Qcap	Full Pipe	Norm Depth	Crit Depth	Capacity Vel	US Node	Pipe	Pipe	DS Node	Cover	Cover	Pipe	Pipe	US Node	US Node	Pipe	V'head Loss	WSE Loss	Pipe	US Node	Pipe	Pipe	DS Node	HGL	HGL	F'board
ID	Length	Size	Area Af	Grade	Grade	Tct	I	Sum CA	Qc=CIA	Tct	I	Sum CA	Qc=CIA	Flow Qc	Flow Qdp	Flow Q	Flow Qcap	Ratio	Vel Vf=Q/A	Vel Vn=Q/An	Vel Vc=Q/Ac	Vcap=Qcap/Af	Grate RL	US IL	DS IL	Grate RL	Limit	Min	DS Bend	DS Drop	Ku	Kw	V'head	Ku.V'head	V'head) T'	Loss	HGL	US HGL	DS HGL	HGL	Grade	Grade	US
(-)	(m)	(mm)	(sq.m)	(%)	(1 in)	(min)	(mm/hr)	(ha)	(L/s)	(min)	(mm/hr)	(ha)	(L/s)	(L/s)	(L/s)	(L/s)	(L/s)	(-)	(m/s)	(m/s)	(m/s)	(m/s)	(m)	(m)	(m)	(m)	(m)	(m)	(deg)	(m)	(-)	(-)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(%)	(1 in)	(m)
F02 to F01	94.86	1650	2.138	0.2	500	16.28	56.51	17.7334	2783.9	14.76	59.55	17.3008	2861.9	2861.9	620	3481.9	4077.8	0.85	1.63	2.14	2.75	1.91	23.4	20.24	20.05	23.25	1.1	1.51	0		0.2		0.14	0.03		0.24	21.39	21.36	20.99	20.99	0.39	256.3	2.01
F03 to F02	94.86	1650	2.138	0.2	500	15.49	58.04	17.7334	2859.2	13.97	61.3	17.3008	2945.9	2945.9	620	3565.9	4077.8	0.87	1.67	2.15	2.78	1.91	23.6	20.43	20.24	23.4	1.1	1.51	0	0	0.83		0.14	0.12		0.2	21.72	21.6	21.39	21.39	0.23	442.9	1.88
F04 to F03	100.15	1500	1.767	0.2	500	14.65	59.77	14.8976	2473.6	13.15	63.29	14.465	2543	2543	620	3163	3162.6	1	1.79	2.04	2.77	1.79	23.8	20.63	20.43	23.6	1.1	1.67	-17.6	0	0.2		0.16	0.03		0.19	21.94	21.91	21.72	21.72	0.18	549.8	1.86
F05 to F04	100.15	1500	1.767	0.2	500	13.82	61.64	14.8976	2550.9	12.3	65.45	14.465	2629.7	2629.7	620	3249.7	3162.6	1.03	1.84	2.04	2.8	1.79	24	20.83	20.63	23.8	1.1	1.67	0	0	0.2		0.17	0.03		0.19	22.16	22.13	21.94	21.94	0.19	524.4	1.84
01 to F05	24.78	1500	1.767	0.2	500	13.61	62.13	14.8976	2570.9	12.09	66.01	14.465	2652.3	2652.3	620	3272.3	3162.6	1.03	1.85	2.03	2.81	1.79	24.22	20.88	20.83	24	1.1	0.81	0.9	0			0.17			0.05	22.21	22.21	22.16	22.16	0.19	531.3	2.01
02 to 01	34.68	1350	1.431	0.5	200	13.32	62.82	14.8976	2599.6	11.8	66.82	14.465	2684.8	2684.8	620	3304.8	3775.7	0.88	2.31	2.97	2.99	2.64	24.96	21.13	20.95	24.22	1.1	1.86	0.2	0.073			0.27			0.12	22.3	22.3	22.21	22.21	0.25	405.1	2.66
03 to 02	38.24	1200	1.131	1.84	54.2	13	63.61	14.8603	2625.7	11.48	67.74	14.4277	2714.8	2714.8	620	3334.8	5297.8	0.63	2.95	4.95	3.32	4.68	24.96	21.88	21.18	24.96	0.75	1.74	-1.3	0.05	0.5		0.44	0.22		0.67	23.1	22.88	22.3	22.3	1.53	65.5	1.85
04 to 03	65.61	1200	1.131	0.92	109.2	12.46	65.02	9.1031	1644.1	9.66	73.68	8.3378	1706.5	1706.5	620	2326.5	3732.3	0.62	2.06	3.48	2.75	3.3	25.34	22.53	21.93	24.96	0.75	1.53	0	0.05	0.5		0.22	0.11		0.44	23.48	23.37	23.1	23.1	0.41	241.8	1.86
05 to 04	42.35	1200	1.131	0.2	500	9.87	72.93	3.4645	701.9	9.31	74.98	3.3752	703	703	620	1323	1744.3	0.76	1.17	1.7	2.21	1.54	25.36	22.64	22.55	25.34	1.1	1.45	0	0.02	0.5		0.07	0.03		0.06	23.56	23.53	23.48	23.48	0.11	870.8	1.8
06 to 05	64	1200	1.131	0.2	500	9.34	74.87	3.406	708.4	8.77	77.07	3.3166	710	710	620	1330	1744.3	0.76	1.18	1.7	2.22	1.54	25.48	22.78	22.66	25.36	1.1	1.42	0	0.02	0.58		0.07	0.04		0.09	23.69	23.65	23.56	23.56	0.13	789	1.8
07 to 06	21.28	1200	1.131	0.2	500	9.16	75.55	2.9405	617.1	8.6	77.79	2.8512	616.1	617.1	620	1237.1	1744.3	0.71	1.09	1.67	2.16	1.54	25.57	22.85	22.8	25.48	1.1	1.4	0	0.02	0.31		0.06	0.02		0.03	23.73	23.71	23.69	23.69	0.11	926.6	1.85
08 to 07	13.19	1200	1.131	0.2	500	9.05	75.98	2.9405	620.6	8.49	78.25	2.8512	619.7	620.6	620	1240.6	1744.3	0.71	1.1	1.67	2.16	1.54	25.61	22.89	22.87	25.57	1.1	1.44	-25.5	0.02	0.68	0.69	0.06	0.04	0.04	0.02	23.79	23.74	23.73	23.73	0.11	870.2	1.82
09 to 08	9.51	1200	1.131	0.2	500	8.97	76.29	2.9405	623.1	8.41	78.58	2.8512	622.4	623.1	620	1243.1	1744.3	0.71	1.1	1.67	2.17	1.54	25.57	22.93	22.91	25.61	1.1	1.36	-47.2	0.02	0.3		0.06	0.02		0.01	23.81	23.8	23.79	23.79	0.11	901.8	1.76
10 to 09	31.98	1200	1.131	0.2	500	8.7	77.35	2.8364	609.5	8.14	79.73	2.7471	608.4	609.5	620	1229.5	1744.3	0.7	1.09	1.67	2.16	1.54	25.73	23.02	22.95	25.57	1.1	1.34	-17.4	0.02	0.5		0.06	0.03		0.04	23.88	23.85	23.81	23.81	0.12	867.1	1.85
11 to 10	15.5	750	0.442	0.33	300.3	5	97.22	0.0388	10.5	5	97.22	0.0388	10.5	10.5	620	630.5	642.7	0.98	1.43	1.66	2.05	1.45	25.73	23.52	23.47	25.73	0.75	1.27	90	0.45	1.5		0.1	0.16		0.07	24.23	24.08	23.96	23.88	0.77	129.9	1.5
12 to 11	6.25	750	0.442	0.33	300.3										620	620	642.7	0.96	1.4	1.66	2.04	1.45	25.8	23.59	23.57	25.73	0.75	1.3	0	0.05			0.1			0.02	24.25	24.25	24.23	24.23	0.26	388.4	1.55
03a to 13	10.45	1350	1.431	0.46	217.7										3335	3335	3619.1	0.92	2.33	2.87	3	2.53	24.96	22.05	22	23.55	1.1	1.31	0				0.28			0.05	23.06	23.06	22.98	22.98	0.78	127.4	1.9
16 to 15	109.92	600	0.283	0.25	400	6.25	89.22	0.1355	33.6	5.92	91.22	0.1286	32.6	33.6	270	303.6	307.1	0.99	1.07	1.24	1.72	1.09	23.37	21.49	21.22	22.13	0.25	0.26	0		0.2		0.06	0.01		0.32	21.98	21.97	21.58	21.58	0.36	280.5	1.38
17 to 16	109.92	600	0.283	0.25	400	5.34	94.9	0.1355	35.7	5	97.22	0.1286	34.7	35.7	270	305.7	307.1	1	1.08	1.24	1.72	1.09	23.73	21.77	21.49	23.37	0.2	1.05	0	0	0.36		0.06	0.02		0.28	22.28	22.26	21.98	21.98	0.25	398.3	1.45
18 to 17	40.47	600	0.283	0.25	400	5	97.22	0.1019	27.5	5	97.22	0.1019	27.5	27.5	270	297.5	307.1	0.97	1.05	1.24	1.7	1.09	24.05	21.87	21.77	23.73	0.75	1.3	-3.9	0	0.7		0.06	0.04		0.09	22.41	22.37	22.28	22.28	0.22	460.4	1.64
19 to 18	28.82	600	0.283	0.25	400										270	270	307.1	0.88	0.95	1.23	1.64	1.09	24.55	21.94	21.87	24.05	0.45	1.54	-16.3	0	1.59	1.75	0.05	0.07	0.08	0.05	22.54	22.45	22.41	22.41	0.16	621.2	2.01
20 to 19	24.67	600	0.283	0.25	400										270	270	307.1	0.88	0.95	1.23	1.64	1.09	23	22	21.94	24.55	0.2	0.34	-70.7	0	2		0.05	0.09		0.04	22.66	22.57	22.53	22.54	0.16	619.4	0.34
21 to 04	15.29	900	0.636	1.48	67.5	12.33	65.36	4.7166	856.3	8.99	76.19	3.9102	827.6	856.3		856.3	2204.1	0.39	1.35	3.25	2.12	3.46	25.35	23.06	22.83	25.34	0.75	1.19	90	0.3	0.49		0.09	0.05		0.2	23.65	23.6	23.48	23.48	0.81	123.9	1.7
22 to 21	20.09	825	0.535	0.7	142.9	12.16	65.81	4.6803	855.6	8.83	76.86	3.8739	827.1	855.6		855.6	1201.5	0.71	1.6	2.44	2.22	2.25	25.62	23.25	23.11	25.35	1.1	1.37	-42.6	0.05	0.71	0.72	0.13	0.09	0.09	0.14	23.9	23.81	23.65	23.65	0.79	126.3	1.72
23 to 22	14.5	825	0.535	0.7	142.9	12.04	66.15	4.6448	853.4	8.7	77.35	3.8385	824.7	853.4		853.4	1201.5	0.71	1.6	2.44	2.21	2.25	25.63	23.4	23.3	25.62	0.75	1.21	-46.7	0.05	1.61	1.77	0.13	0.21	0.23	0.1	24.19	23.96	23.9	23.9	0.4	251.3	1.44
24 to 23	20.51	600	0.283	0.5	200	8.53	78.05	1.7915	388.4	7.53	82.51	1.7828	408.6	408.6		408.6	434.4	0.94	1.45	1.75	1.94	1.54	25.35	23.62	23.51	25.63	1.1	1.1	-46.7	0.113	0.86	0.86	0.11	0.09	0.09	0.09	24.35	24.26	24.17	24.19	0.44	226	1
25 to 24	64	600	0.283	0.68	146.7	8	80.35	1.7139	382.6	7	85.16	1.7052	403.4	403.4		403.4	507.2	0.8	1.43	1.99	1.93	1.79	25.49	24.1	23.67	25.35	0.75	0.75	46	0.05	5.22		0.1	0.54		0.27	25.12	24.57	24.35	24.35	0.35	286.5	0.38
26 to 09	15.5	300	0.071	1	100	5	97.22	0.0609	16.5	5	97.22	0.0609	16.5	16.5		16.5	96.7	0.17	0.23	1.02	0.83	1.37	25.6	24.35	24.2	25.57	0.75	0.75	72.6	1.265	7		0	0.02		0.15	24.47	24.45	24.28	23.81	1.09	92.1	1.13
27 to 10	40.02	825	0.535	0.2	500	8.37	78.74	2.7617	604.1	7.81	81.23	2.6724	603	604.1		604.1	642.2	0.94	1.13	1.37	1.93	1.2	25.93	23.12	23.04	25.73	1.1	1.82	0	0.02	1		0.07	0.07		0.07	24.02	23.95	23.88	23.88	0.18	565.1	1.91
28 to 27	96.8	825	0.535	0.2	500	7.56	82.37	2.2726	520	7	85.16	2.1833	516.4	520		520	642.2	0.81	0.97	1.34	1.84	1.2	25.47	23.33	23.14	25.93	0.75	1.26	0	0.02	1.75		0.05	0.08		0.12	24.23	24.14	24.02	24.02	0.13	777.2	1.24
29 to 28	67.5	675	0.358	0.2	500	7	85.16	1.2394	293.2	5.13	96.32	0.9423	252.1	293.2		293.2	376.1	0.78	0.82	1.16	1.62	1.05	25.13	23.49	23.35	25.47	0.9	0.93	0	0.02	8.14	8.22	0.03	0.28	0.28	0.08	24.59	24.31	24.23	24.23	0.12	822.8	0.54
30 to 29	15.5	300	0.071	0.33	300.3	5	97.22	0.0661	17.8	5	97.22	0.0661	17.8	17.8		17.8	55.8	0.32	0.25	0.7	0.85	0.79	25.13	23.91	23.86	25.13	0.75	0.75	90	0.375	4.14		0	0.01		0.01	24.61	24.59	24.59	24.59	0.03	2939.6	0.52
31 to 27	15.5	300	0.071	1	100	5	97.22	0.0076	2	5	97.22	0.0076	2	2		2	96.7	0.02	0.03	0.55	0.47	1.37	25.93	24.71	24.56	25.93	0.75	0.75	90	1.441	7		0	0		0.15	24.75	24.75	24.59	24.02	1.02	97.9	1.18
32 to 28	15.5	300	0.071	1	100	5	97.22	0.0858	23.2	5	97.22	0.0858	23.2	23.2		23.2	96.7	0.24	0.33	1.12	0.92	1.37	25.47	24.25	24.1	25.47	0.75	0.75	90	0.766	7		0.01	0.04		0.15	24.41	24.37	24.23	24.23	0.9	110.7	1.06
33 to 23	63.85	825	0.535	1.09	91.4	11.51	67.66	2.8158	529.2	6.12	90	1.5138	378.4	529.2		529.2	1502.3	0.35	0.99	2.57	1.85	2.81	26.28	24.15	23.45	25.63	1.1	1.26	89.3	0.05	0.32		0.05	0.02		0.53	24.6	24.59	24.17	24.19	0.65	153.3	1.68
34 to 33	60	825	0.535	0.2	500	11.01	69.17	2.7179	522.2	5.62	93.06	1.4159	366	522.2		522.2	642.2	0.81	0.98	1.34	1.84	1.2	26.38	24.32	24.2	26.28	1.1	1.19	0	0.05	0.33		0.05	0.02		0.16	24.88	24.86	24.63	24.6	0.38	261.2	1.5
35 to 34	60	825	0.535	0.2	500	10.51	70.76	2.6195	514.9	5.12	96.37	1.3175	352.7	514.9		514.9	642.2	0.8	0.96	1.33	1.83	1.2	26.47	24.49	24.37	26.38	1.1	1.1	0	0.05			0.05			0.14	25.03	25.03	24.88	24.88	0.26	384.5	1.43
36 to 35	61.1	600	0.283	1.05	95.5	10	72.47	2.4163	486.4	10	72.47	2.4163	486.4	486.4		486.4	628.7	0.77	1.72	2.45	2.1	2.22	26.79	25.24	24.6	26.47	0.75	0.77	0.5	0.113	4.51		0.15	0.68		0.64	26.38	25.7	25.03	25.03	1.09	91.9	0.41
37 to 33	14.51	300	0.071	2.58	38.8	5	97.22	0.0489	13.2	5	97.22	0.0489	13.2	13.2		13.2	155.3	0.09	0.19	1.34	0.78	2.2	26.28	25.05	24.67	26.28	0.75	0.76	90.1	0.525	7		0	0.01		0.34	25.15	25.13	24.73	24.6	2.77	36.1	1.14
38 to 34	14.5	300	0.071	2.1	47.7	5	97.22	0.0492	13.3	5	97.22	0.0492	13.3	13.3		13.3	140	0.09	0.19	1.25	0.78	1.98	26.38	25.15	24.84	26.38	0.75	0.75	90	0.525	7		0	0.01		0.28	25.25	25.24	24.91	24.88	2.26	44.2	1.13
39 to 35	14.49	300	0.071	1.61	62	5	97.22	0.0899	24.3	5	97.22	0.0899	24.3	24.3		24.3	122.8	0.2	0.34	1.35	0.93	1.74	26.47	25.25	25.01	26.47	0.75	0.75	89.8	0.525	7		0.01	0.04		0.21	25.41	25.37	25.1	25.03	1.81	55.3	1.06
40 to 03	19.7	1050	0.866	0.33	300.3	12.75	64.24	5.0953	909.3	11.32	68.23	5.0301	953.3	953.3		953.3	1576.5	0.6	1.1	1.91	2.07	1.82	25.23	22	21.93	24.96	0.75	1.91	90	0.05	2.06	2.64	0.06	0.13	0.16	0.02	23.29	23.13	23.1	23.1	0.12	821.3	1.94
41 to 40	38.25	900	0.636	0.33	300.3	12.44	65.08	5.0244	908.3	11	69.2	4.9593	953.2	953.2		953.2	1045.1	0.91	1.5	1.86	2.21	1.64	24.81	22.2	22.07	25.23	0.75	1.64	89.1	0.075	2		0.11	0.23		0.11	23.59	23.36	23.25	23.29	0.28	361	1.22
42 to 41	34.09	525	0.216	0.33	300.3	12.15	65.84	0.664	121.4	5.19	95.89	0.348	92.7	121.4		121.4	248.3	0.49	0.56	1.14	1.32	1.15	24.37	22.33	22.22	24.81	0.75	1.48	-19.5	0.02	1.38	1.45	0.02	0.02	0.02	0.03	23.64	23.62	23.59	23.59	0.08	1255.1	0.73
43 to 42	18.11	375	0.11	1	100	12	66.26	0.5447	100.3	12	66.26	0.5447	100.3	100.3		100.3	175.4	0.57	0.91	1.64	1.39	1.59	24.47	22.56	22.38	24.37	0	1.5	-65.6	0.05	2.91		0.04	0.12		0.06	23.82	23.7	23.64	23.64	0.33	306	0.66
44 to 42	9.2	450	0.159	0.33	300.3	5.11	96.42	0.1192	31.9	5	97.22	0.1187	32.1	32.1		32.1	164.6	0.19	0.2	0.8	0.92	1.03	24.3	22.4	22.37	24.37	0.75	1.4	112.7	0.038	3.3		0	0.01		0	23.65	23.64	23.64	23.64	0.01	7912.5	0.66
45 to 44	13.75	450	0.159	0.33	300.3	5	97.22	0.0218	5.9	5	97.22	0.0218	5.9	5.9		5.9	164.6	0.04	0.04	0.49	0.59	1.03	24.53	22.47	22.42	24.3	0.75	1.4	16.4	0.02	3.61		0	0		0	23.65	23.65	23.65	23.65	0	235459.5	0.88

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