



MACQUARIE VILLAGE

**CORNER OF EPPING ROAD & HERRING ROADS,
MACQUARIE PARK**

Civil Engineering Design Report

Prepared for:

Stamford Property Services

Prepared by:

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1 INTRODUCTION

1.1 Purpose of Report

Meinhardt Infrastructure and Environment Pty Ltd have been engaged by Stamford Property Services Pty Ltd to undertake the design and documentation of the civil engineering works for the proposed redevelopment at the Stamford Grand North Ryde Site, which shall now be known as Macquarie Village.

In accordance with the DGRs issued for the proposed development dated 25 November 2010 and in particular Key Issue No. 10, the civil design shall address drainage/ groundwater/ flooding issues associated with the development and incorporate Water Sensitive Urban Design (WSUD) measures, including a MUSIC model, with reference to the WSUD and Catchment Plans by Macquarie University and Council Requirements.

1.2 The Site

The Macquarie Village development occupies a 2.24 ha site bounded by Epping Road to the South, Herring Road to the East and existing private allotments to the north and west, refer Figure 1 below.

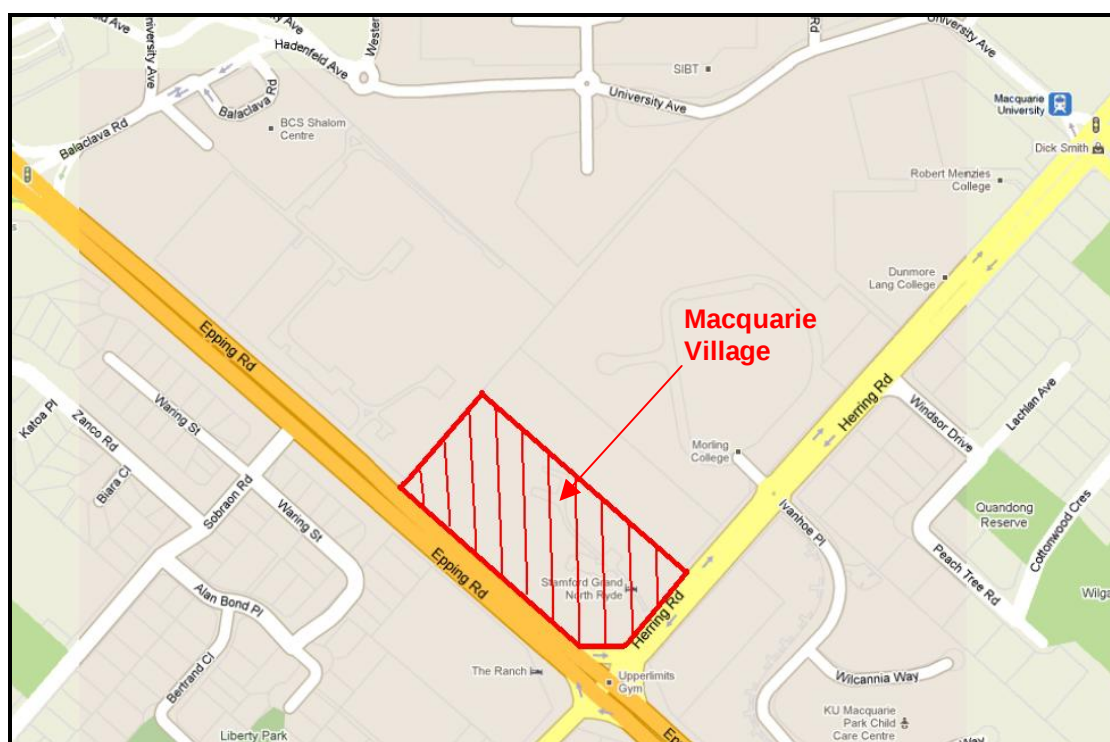


Figure 1 – Locality Plan

1.3 The Development

The project will be assessed under Part 3A of the EP&A Act, and is for a Concept Plan and Stage 1 Project Application. The Concept Plan is for the creation of 7

building envelopes to be constructed in two stages, accommodating approximately 620 one, two and three bedroom residential apartments, commercial (Strata Office, café) and recreation facilities (Gymnasium and resident's function room), with at grade and basement parking. The Part 3A Project Application is seeking consent for the Concept Plan, and a Stage 1 Project Application for four buildings containing 311 apartments.

1.4 Proposed Design

Meinhardt have completed conceptual design of the future Council roads, footpaths and stormwater system within these roadways as well as the internal site road network, On-Site Stormwater Detention (OSD), WSUD and stormwater system to enable spatial planning of the site.

For further information please refer to the drawings attached in Appendix A.

1.5 Staging of Stormwater Infrastructure Works

It is proposed to construct the required Council stormwater drainage infrastructure and WUSD elements for external road network during stage 1 of project to ensure these elements are in place and do not need to be revisited during stage 2 of the project.

Similarly, the OSD tank situated on the western edge of the underground carpark will also be constructed during stage 1 of the project. This will ensure the site's Permissible Site Discharge requirements will be met at an early stage during the development of the site.

1.6 Statutory Requirements & Standards

The Civil works have been designed in accordance with the following relevant legislation, acts, standards and references:

- RTA Road Design Guide, all parts
- AUSTRROADS – Guide to Traffic Engineering Practice
- Australian Standards:
 - AS2890. 1 – Off Street Parking
 - AS2890. 2 – Commercial Vehicle Facilities
 - AS2890. 5 – On-Street Parking
- Australian Rainfall and Runoff (AR&R) 4th Edition.
- Australian Runoff Quality – A Guide to WSUD (2006)
- Managing Stormwater: Soils and Construction 4th Edition Volume 1, Landcom 2004 (Blue Book)
- Managing Urban Stormwater Guidelines, Department of Housing (2004)
- Ryde Council's Development Control Plan 2010, and Engineering Requirements.

2 PROPOSED DESIGN

2.1 Erosion & Sediment Control

The erosion and sediment controls for the development will be designed in accordance with the following documents - "Managing Urban Stormwater – Soils and Construction" NSW Department of Housing (1998), and Ryde City Council's Engineering Requirements.

As a guide the contractor will install the erosion and sediment controls in accordance with the site specific Construction Management Plan (CMP) to be completed by the lead contractor.

It is proposed the following erosion and sedimentation facilities will be provided during construction.

Erosion prevention

- Diversion drains will be provided on the perimeter of the site to divert upstream flows around the site and work area in order to prevent soil loss on site.
- Topsoil stockpile locations will be located to minimise soil loss and will also be surrounded by sediment fences.
- Batter lengths and slopes will be constructed and stabilised to reduce erosion potential.
- Check dams will be used to reduce runoff velocities.
- For existing trees to be retained and protected, refer arborists report.
- Exposed soils will be revegetated.
- Disturbed areas will be revegetated and stabilised according to landscaping details.

Sediment control

- Silt fences around the perimeter of and through the site will be used to minimise soil disturbance and will contain sediment within the site.
- A stabilised site access point including a shaker grid will minimise soil loss from vehicles exiting the site.
- Proposed stormwater inlet pits will be protected with inlet filters.
- Catch drains will be provided on site to direct stormwater runoff to the sediment basin.
- Temporary sediment basins will be provided during construction to reduce the potential for sediment pollution being transported to the adjacent pond.
- Gross Pollutant Traps (GPT) will be installed in the stormwater system so as to reduce litter, sediment and pollutants leaving the development.

2.2 Earthworks

The site generally grades away from Epping Road towards the north western corner of the site.

Bulk earthworks will be undertaken to:

- Remove and reconsolidate uncontrolled fill on site.
- Regrade the site to ensure all stormwater over land flows are directed to the proposed stormwater easement
- Regrade the site to provide effective grades for vehicular, pedestrian movements and disabled access.
- Provide embankments/batters at maximum slope of 1V in 4H for roadways.
- Regrade the site to provide areas suitable for the basement construction

A bulk earthworks model will be provided with the Construction Certificate documentation for each stage, indicating the final cut and fill volumes.

2.3 Stormwater

Site Drainage

All stormwater drainage infrastructure will be designed in accordance with AS3500.3, City of Ryde Council's specifications, Concrete Pipe Association of Australia guidelines and the Australian Rainfall and Runoff publication (ARR).

The site drainage system will comprise a minor / major system in accordance with ARR. In particular the minor system comprises a pit and pipe system whilst the major system relies on surface overland flows within the road cross-section.

The stormwater system for future Council road system will consist of WSUD elements and piped drainage system under kerbs with overland flow paths provided within the road cross-section. Following initial treatment by the proposed WSUD measures the stormwater drainage system will then drain to Hydrodynamic Separator (Humeceptor) prior to being discharged into the proposed stormwater drainage easement.

Flooding

According to catchment wide flood modelling undertaken by Ryde Council, the proposed Macquarie Village site is not subject to Flooding. Refer Council's flood map at Appendix 'B'.

Pit and Pipe system

It is proposed the minor system will collect the surface water from landscaped areas, pavements and roads and convey this to a pit and pipe system which discharges to the proposed stormwater drainage easement.

Pits will comprise concrete inlet and junction pits at all junctions of pipelines. Inlet pits will include a class D (heavy duty) grates and covers in roadway areas and class B

(medium duty) in other lightly trafficked areas. Heel safe grates will be provided in areas subject to pedestrian traffic.

The pipe system will be designed for a 20 year ARI and comprises mostly reinforced concrete pipes for pipes larger than 375mm and UPVC pipes for pipe sizes up to 300mm diameter. Pipelines will be designed for a minimum of 0.5% fall and a minimum cover of 500mm in trafficable areas and 300mm in garden areas.

Connection to Council's System - Easement to Drain Water

Subject to negotiation and approval, the proposed Macquarie Village development will require an 'easement to drain water' to facilitate stormwater connection to Council's system.

Stamford Properties are in the early stages of negotiation with No. 143 Epping Road to obtain an easement down their eastern boundary prior to connection to Council's system.

The stormwater infrastructure and connection to Council's system will be designed to minimise disruption to the downstream property owner's site, existing vegetation and the watercourse.

Council's Catchment Plan

With regards to the 'Catchment Plans by Macquarie University', mentioned in the DGR's, efforts have been made to obtain catchment plans from the University, however they have been unwilling / unable to provide them. However, the drainage system has been designed in accordance with Ryde's DCP and other relevant controls.

On-site Stormwater Detention (OSD)

Following consultation with Council's development engineers we have established that On-site Stormwater Detention is to be provided to on the basis of attenuating to post-development 1 in 100 year ARI site discharge to that of green fields pre-development conditions (Permissible Site Discharge (PSD))

OSD for the development will be provided in the form of a concrete tank on the western edge of the underground carpark between the ground floor slab and first basement level.

The tank will be comprised of an irregular shape to conform with the car-park structure with an approximate surface area of 170m² and internal height of 2.7m. Its final shape, position and configuration will be subject to detailed design at the Construction Certificate stage and coordination with the Architect and Hydraulic consultant.

Refer drawings at Appendix 'A' for OSD details and DRAINS analysis at Appendix 'C' for OSD calculations.

Water Sensitive Urban Design (WSUD)

In order to treat stormwater quality discharging from site it is proposed to install a Humeceptor STC 9 - Hydrodynamic Separator near the northwestern corner of the

site prior to discharge into the proposed drainage easement through the downstream property owners.

The proposed Type 3 road along the site's north eastern boundary will feature a vegetated swale with a bio-retention system at the swale's downstream reaches to assist in the removal of suspended solids, fine and coarse sediment, hydrocarbons and nutrients.

Within the internal road system, the landscaped tree pits between the parking spaces will be set up as rain-gardens to assist in the removal of suspended solids, fine and coarse sediment, hydrocarbons and nutrients.

In accordance with current industry best practise, the Humeceptor, vegetated swale, bio-retention system and rain gardens have been designed in a treatment train configuration for the Treatable Flow Rate (TFR) which is defined as the runoff from the peak storm expected to exceed four times per year (otherwise known as the "3 month return period").

Pollutant reduction objectives outlined in 2006 Australian Runoff Quality (ARQ) were used as a target for this development. The target is 80%, 45% and 45% reduction for TSS, TP and TN respectively.

Pollutant loads for existing and ultimate developed conditions for the proposed development site were calculated in the MUSIC model, refer MUSIC modelling data at Appendix 'D'.

Major System

The major system comprises overland flow paths along roads and pathways and will be designed for storms up to the 100 year ARI.

2.4 Roads

The perimeter roads along the northern and western boundaries of the site (to be dedicated to Council) have been designed as Type 3 roads in accordance with Ryde Councils DCP 2010. The roads have also been designed in accordance with Ryde Council's specifications, RTA and AUSTROADS guidelines.

In general the roads have been designed to comprise:

Minimum trafficable lane width (1 way road)	=	4.2m
Minimum trafficable lane width (2 way road)	=	3.0m
Minimum parking lane width	=	2.5m
Minimum footpath width	=	1.5m
Minimum grade of roads	=	1.0 %
Maximum grade of roads	=	12.5%
Minimum kerb radii	=	6m
Maximum road cross falls	=	3%

In accordance with Council's DCP No. 10 Macquarie Park Corridor – Street Network Structure Plan (Figure 4.5.05), the proposed site perimeter roads at some time in the future may be extended in the following fashion:

- Two-way road along the northern boundary may be extended to the west; and
- Single lane road along the western boundary may be extended to the north

For further details refer Council's DCP No. 10 – Part 4.5 and traffic engineering reports.

2.5 Utility Services

Utility services such as potable water, sewerage, electrical reticulation, gas and telecommunications will be provided in the road reserves in accordance with the relevant authorities requirements.

3 REFERENCES

- RTA Road Design Guide, all parts
- AUSTROADS – Guide to Traffic Engineering Practice
- Australian Standards:
 - AS2890. 1 – Off Street Parking
 - AS2890. 2 – Commercial Vehicle Facilities
 - AS2890. 5 – On-Street Parking
- Australian Rainfall and Runoff (AR&R) 4th Edition.
- Australian Runoff Quality – A Guide to WSUD (2006)
- MUSIC Version 3 – Users Guide (2005)
- Managing Stormwater: Soils and Construction 4th Edition Volume 1, Landcom 2004 (Blue Book)
- Managing Urban Stormwater Guidelines, Department of Housing (2004)
- Ryde Council's Development Control Plan 2010, and Engineering Requirements.

4 APPENDIX A – CIVIL DRAWINGS

MACQUARIE VILLAGE - NORTH RYDE

CIVIL EXTERNAL WORKS DRAWINGS

PROJECT NO. 106038-00

DRAWING LIST

106038-00-MIE000 COVER SHEET & LEGEND

106038-00-MIE010 GENERAL ARRANGEMENT PLAN

106038-00-MIE041 DETAIL CIVIL PLAN - SHEET 1

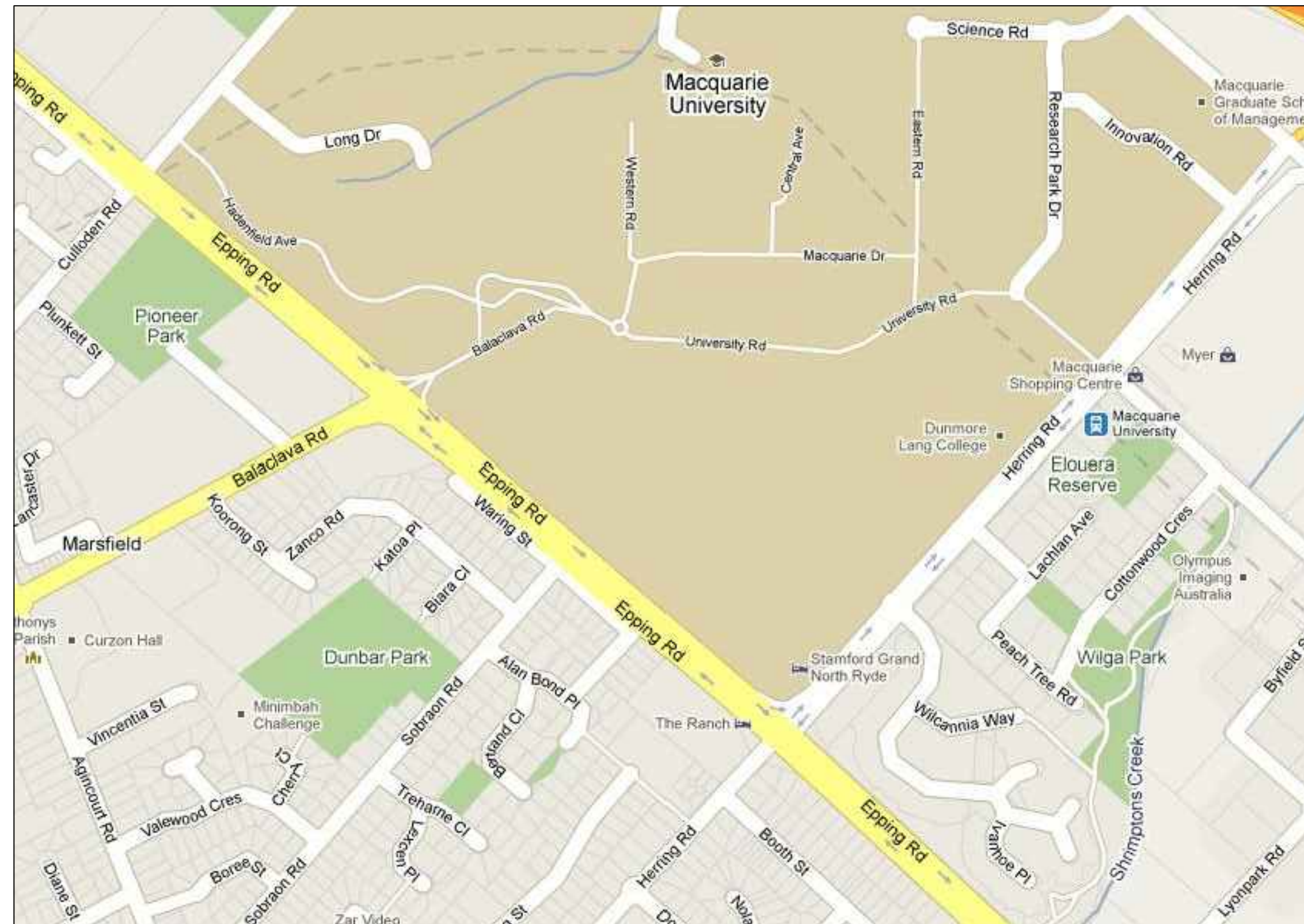
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106038-00-MIE061 ROAD LONG SECTION & TYPICAL CROSS SECTIONS

106038-00-MIE121 DRAINAGE DETAILS

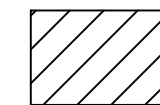
106038-00-MIE122	MISCELLANEOUS DETAILS
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106038-00-MIE123 WSUD DETAILS



LOCALITY SKETCH

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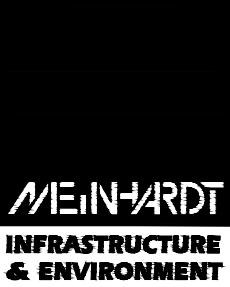
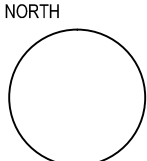


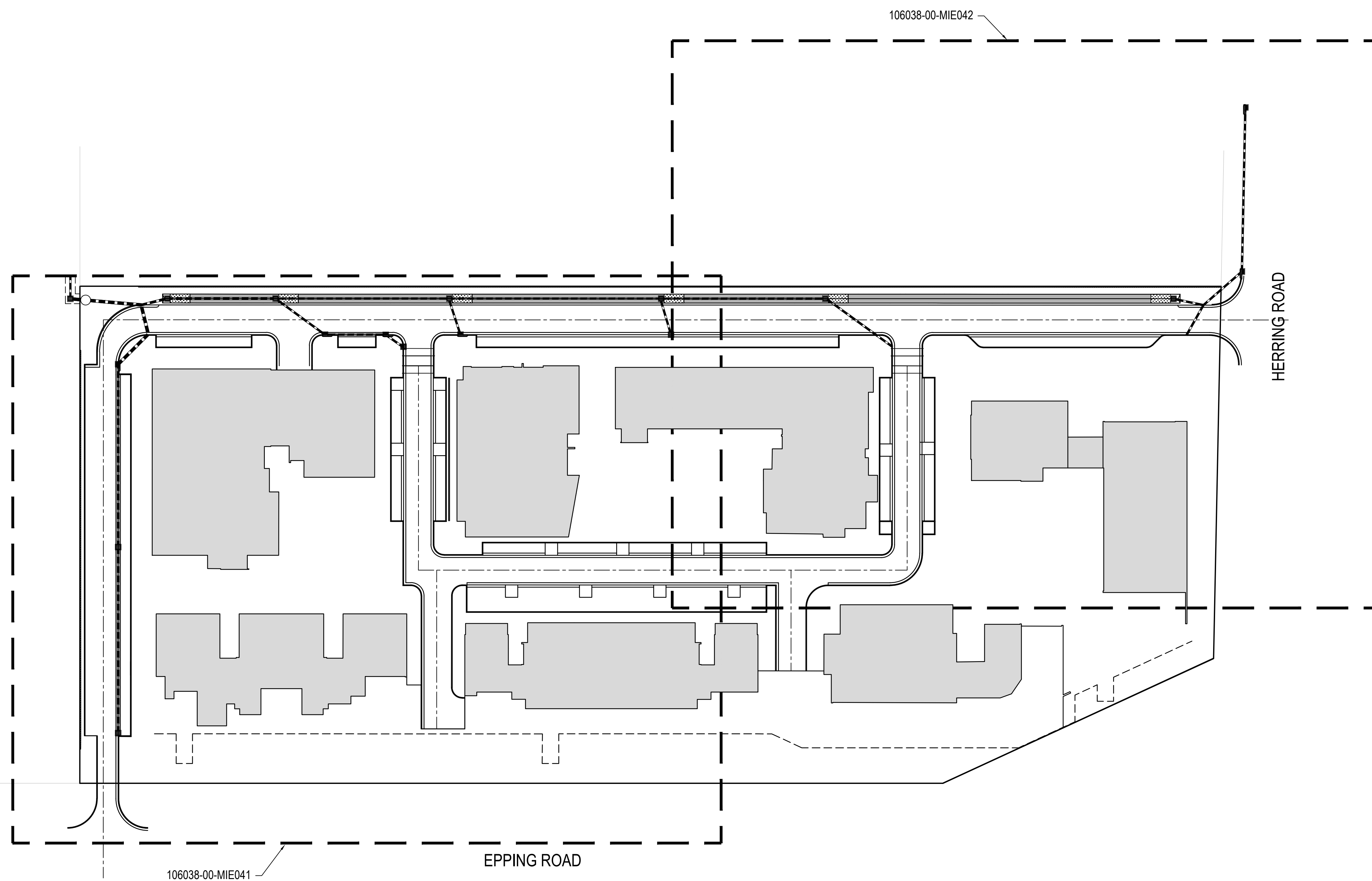
GENERAL 1:200 LEGEND	
SYMBOL	DESCRIPTION
PROPOSED WORKS	
	KERB INLET PIT (KIP)
	GRATED PIT (GP)
	JUNCTION PIT (JP)
	SAG KERB INLET PIT (KIP)
	BIORETENTION SWALE
	PIT NUMBER
	STORMWATER PIPE
	FLUSHPOINT (FP) & SUBSOIL DRAINAGE
	TRENCH GRATE (TG)
	SWALE DRAIN & DIRECTION OF FLOW
	DIRECTION OF OVERLAND FLOW
$x_{FS}: 12.345$	FINISHED SURFACE LEVELS
$x_{EW}: 12.345$	BULK EARTHWORKS LEVEL
	RETAINING WALL (RW)
	KERB ONLY
	KERB AND GUTTER
	DISH DRAIN
	DOLPHIN KERB
	RADIUS TO FACE OF KERB
	BATTERS
	DIMENSION (UNITS - METRES)
EXISTING WORKS	
	FENCE
	EXISTING PIT
	GAS MAIN
	SEWER MAIN
	WATER MAIN
	ELECTRICITY SUPPLY
	TELECOMMUNICATION CABLES
	STORMWATER PIPE
	SERVICE TO BE DECOMMISSIONED
ABBREVIATIONS	
IL	INVERT LEVEL
RL	RELATIVE LEVEL (AHD)
FFL	FINISHED FLOOR LEVEL
VC	VEHICULAR CROSSING
PR	PRAM RAMP
DR	DRIVEWAY
FP	FOOTPATH
CH	CHAINAGE
UNO	UNLESS NOTED OTHERWISE
oDP	DOWNPIPE

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STATUS

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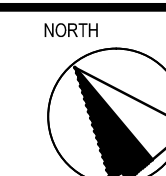


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PROJECT
MACQUARIE VILLAGE
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CIVIL EXTERNAL WORKS DRAWINGS

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TITLE
GENERAL ARRANGEMENT PLAN



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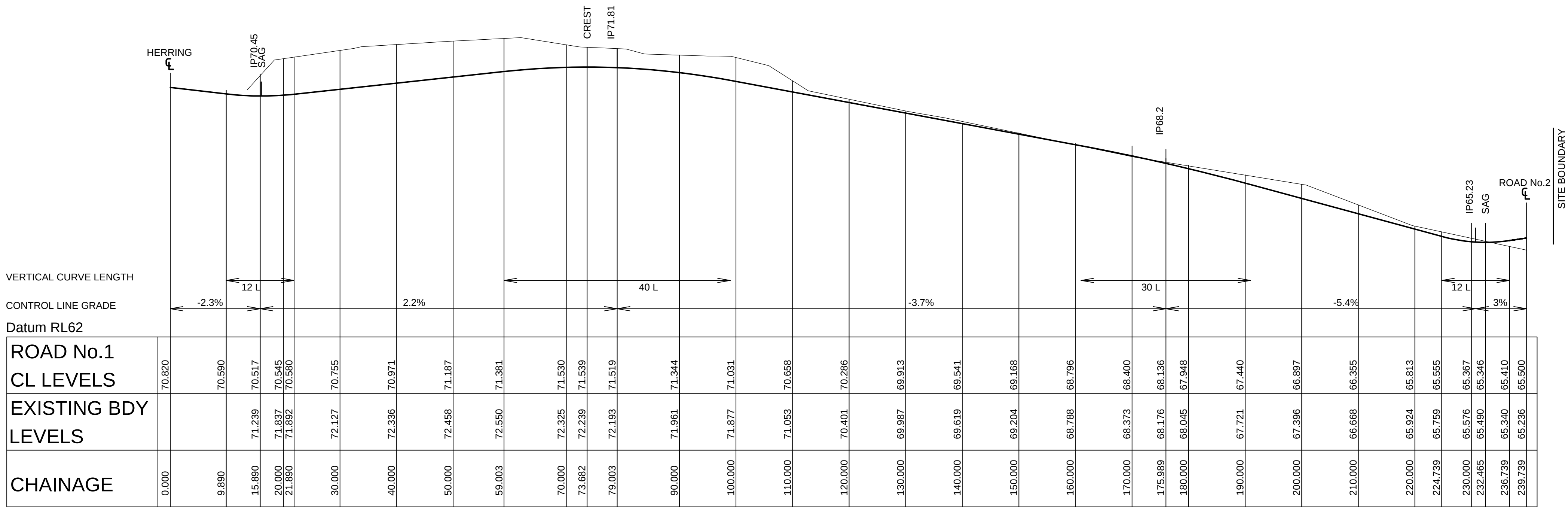
WARNING
BEWARE OF UNDERGROUND SERVICES

THE LOCATIONS OF UNDERGROUND 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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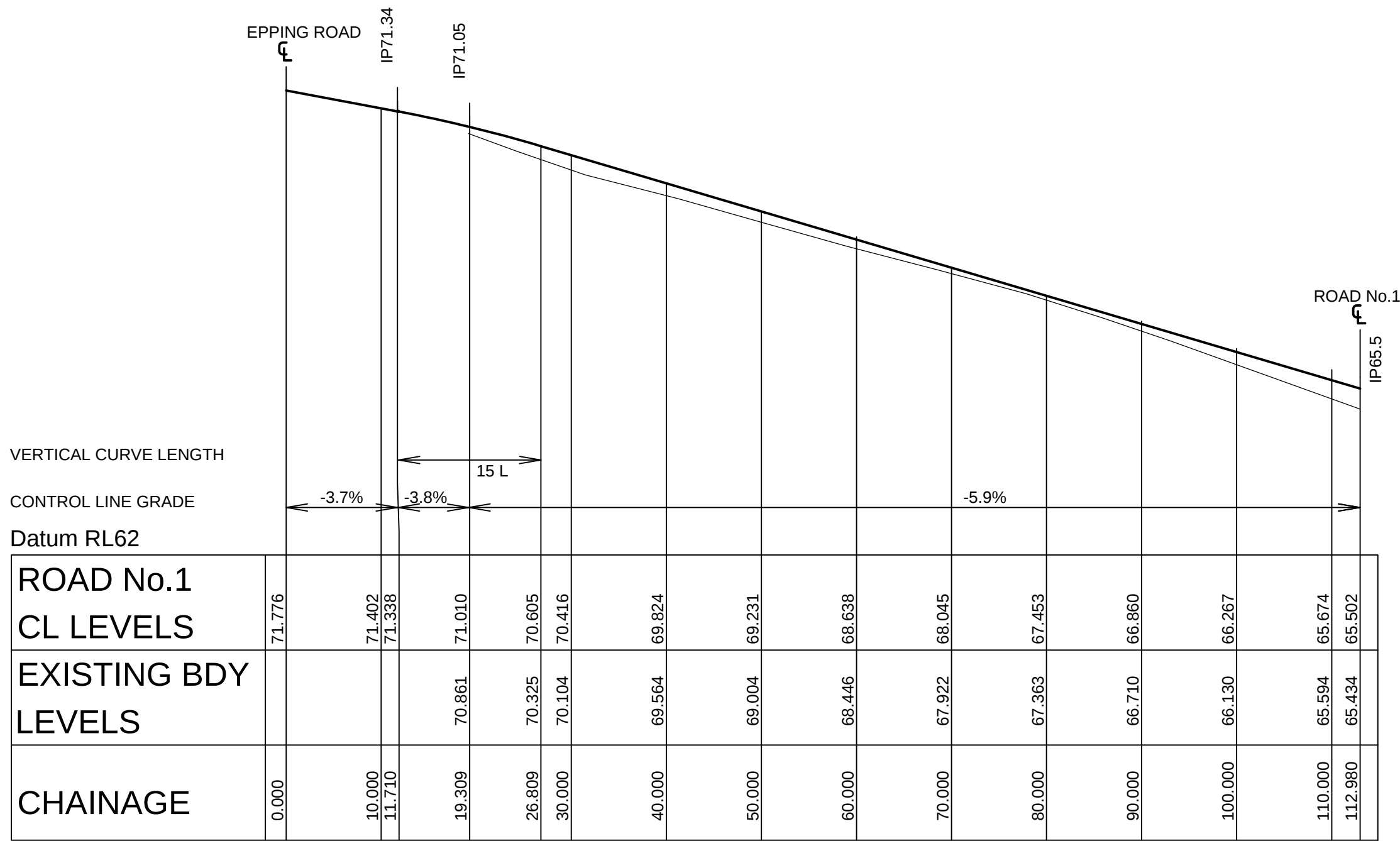
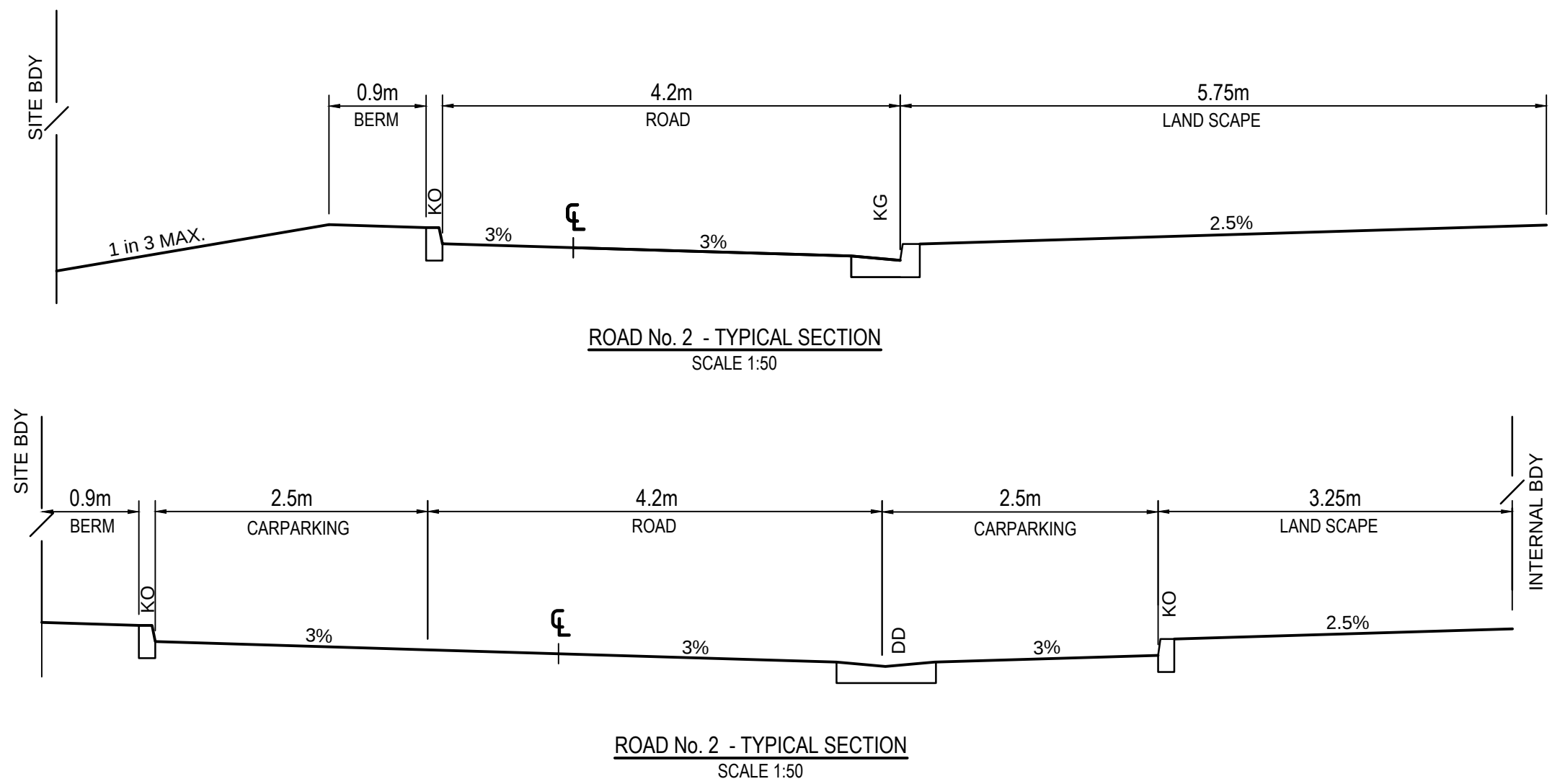
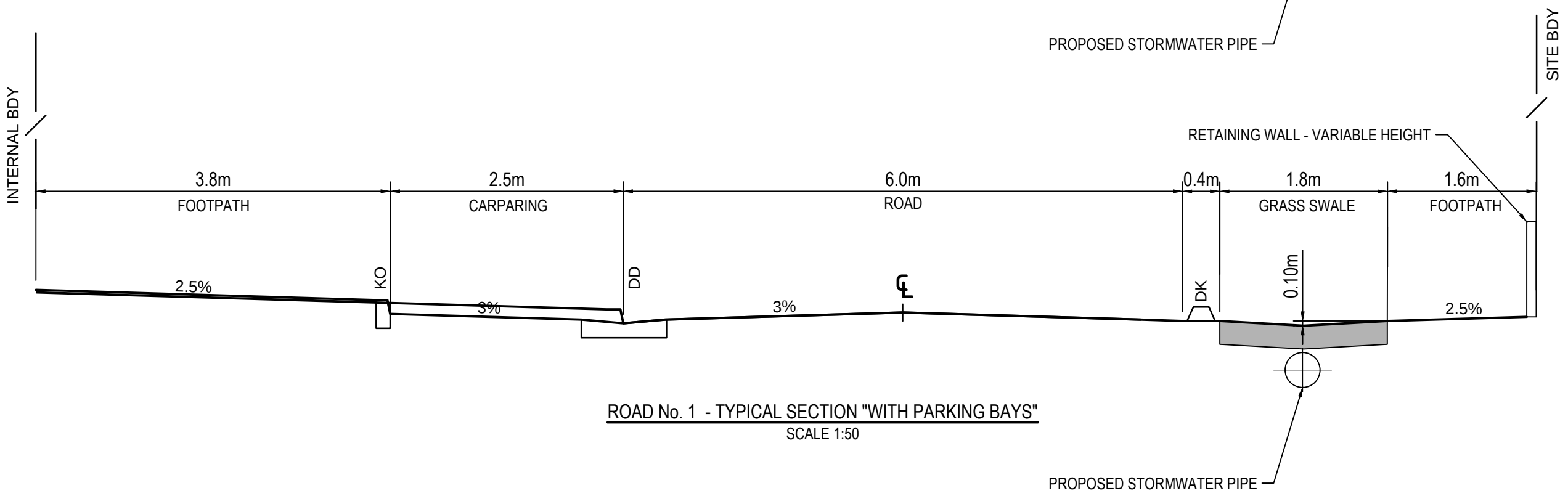
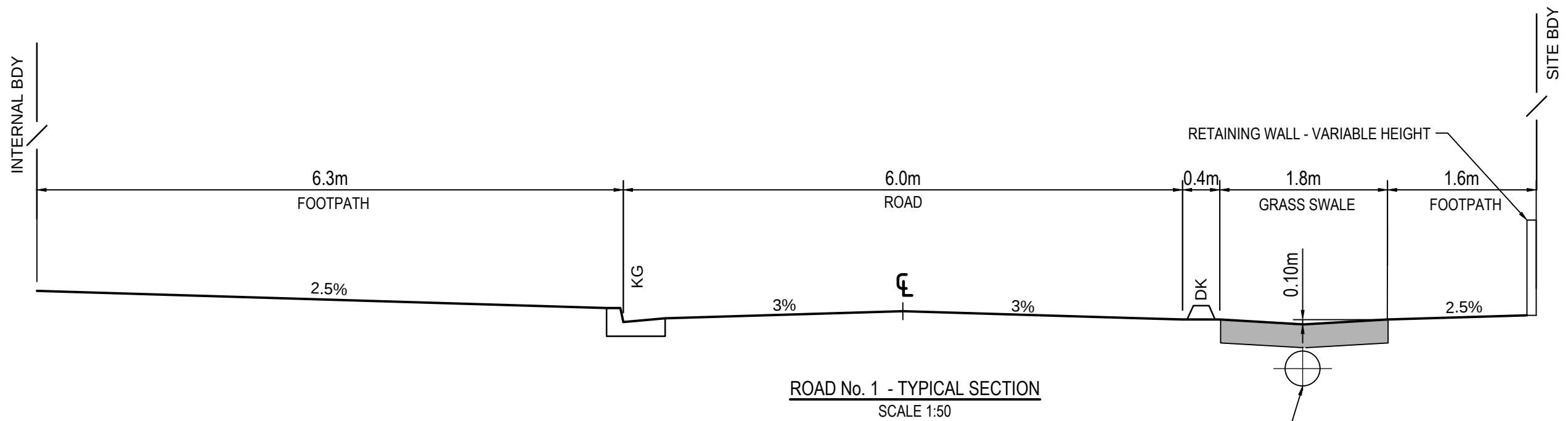
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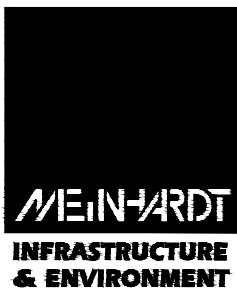
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VERTICAL SCALE 1:100



LONGITUDINAL SECTION ROAD No. 2

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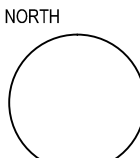


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ROAD LONG SECTIONS & TYPICAL CROSS SECTIONS

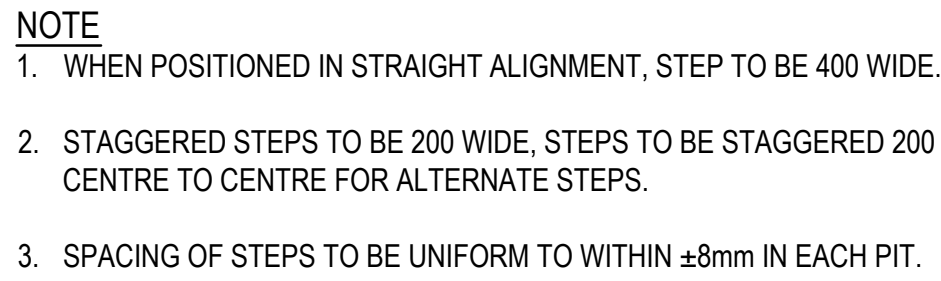


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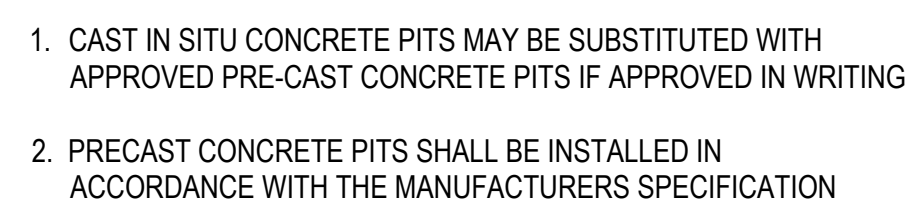
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SECTION



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