LOGAN
WATER INFRASTRUCTURE
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LOGAN
CITY COUNCIL

PLANNING & INVESTIGATION REPORT

CEDAR GROVE WWTP STAGE 1 MATERIAL CHANGE OF USE APPLICATION (EDQ)- ADDITIONAL INFORMATION REPORT

TASK NUMBER: LS-009

OCTOBER 2017

Approval Register

	Date
Submitted by Project Manager: Catriona Sutcliffe	20/9/2017
LoganWIA Internal Review: Scott Francis, David Kretchmann	25/9/2017
Editorial Review: Gerard Brierley	25/9/2017

Controlled Document – Change Register

Revision	Section Changed	Change Description	Initial	Date
A	All	Preparation of draft report for internal review	CS	20/9/2017
B	All	Technical & Editorial Review	CS	25/9/2017
1	All	Preparation of report for distribution	AH	5/10/2017
2				
3				
4				
5				

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TABLES

APPENDICES

ACRONYMS AND ABBREVIATIONS

ADWF	Average Dry Weather Flow
Council	Logan City Council
DEHP	Department of Environment and Heritage Protection
DILGP	Department of Local Government and Planning
DNRW	Department of Natural Resources and Water
EA	Environmental Authority
EDQ	Economic Development Queensland
EP	Equivalent Persons
ERA	Environmentally Relevant Activity
LoganWIA	Logan Water Infrastructure Alliance
MBR	Membrane Bioreactor
MCU	Material Change of Use
SARA	State Assessment and Referral Agency
SILO	Scientific Information for Land Owners
TN	Total Nitrogen
TP	Total Phosphorus
WWTP	Wastewater Treatment Plant

EXECUTIVE SUMMARY

Logan City Council (Council) submitted an application on 27 January 2017 for a PDA Development Permit for a Material Change of Use (MCU) for 'utility infrastructure' related to the construction of Cedar Grove Wastewater Treatment Plant (WWTP). Economic Development Queensland (EDQ) is the assessing authority. Following initial assessment of the application, EDQ requested additional information to support the application. The additional items requested were:

- Information on the detailed design of the WWTP
- A Stormwater Management Plan
- A Traffic Impact Assessment.

A parallel application to undertake an Environmentally Relevant Activity (ERA) 63(1)(e): *Wastewater treatment – operating a sewage treatment with a total daily peak design of more than 10,000 but not more than 50,000 Equivalent Persons* (EP) was submitted to the Queensland Department of Infrastructure, Local Government and Planning (DILGP) State Assessment and Referral Agency (SARA). Following the initial assessment of this application, SARA requested additional information to support the application. Council supplied additional information to SARA including an updated strategy for wastewater management. An environmental authority to undertake ERA 63 was subsequently issued to Council on 20 July 2017.

This additional information report provides a response to the EDQ information request. It also provides an update to the previously submitted MCU application, detailing the changes to the design which are proposed as a result of the ERA 63 approval process. These changes relate to the proposal to offset the mass load of nutrients entering the Logan River by undertaking riparian restoration and improvement at actively eroding sites upstream of the WWTP.

The information provided in the previous application identified that the environmental impacts from the WWTP can be managed through a range of management and control measures. This information request response provides confirmation that:

- Traffic generation for the site will be low, and impacts can be monitored on an ongoing basis, and if required, can be managed with straightforward mitigation measures.
- Any impacts on stormwater quality and quantity can be managed within the site.

The additional information also identifies that the residual impacts arising from discharge of nutrients to the Logan River can be mitigated through offsetting of nutrients discharged to the Logan River using riparian restoration techniques. As such, the revised proposal to operate a WWTP of 20,000 EP capacity with discharge of ultra-low nutrient treated effluent to the Logan River is considered suitable for approval with appropriate conditions.

1. INTRODUCTION

To promote growth of new urban areas and ensure supply of affordable housing, the Queensland Government has designated the Greater Flagstone area as a Priority Development Area (PDA). A number of developers have invested in these areas to meet the Queensland Government's objective of supplying 50,000 new dwellings. It is Economic Development Queensland's (EDQ) responsibility to ensure that that all necessary water and wastewater infrastructure to support this greenfield development is in place in a timely manner to support this development.

1.1 Background

Logan City Council (Council) submitted an application on 27 January 2017 for a PDA Development Permit for a Material Change of Use (MCU) for 'utility infrastructure' related to the construction of Cedar Grove Wastewater Treatment Plant (WWTP). A parallel application was submitted to the Queensland Department of Infrastructure, Local Government and Planning (DILGP) State Assessment and Referral Agency (SARA) to undertake Environmentally Relevant Activity (ERA) 63(1)(e): *Wastewater treatment – operating a sewage treatment with a total daily peak design of more than 10,000 but not more than 50,000 Equivalent Persons* (EP). The proposal consisted of the construction and operation of:

- A membrane bioreactor (MBR) plant of 20,000 EP capacity treating average dry weather flows (ADWF) of 3.3 ML/day
- 10 ha of constructed wetlands with capacity to treat Stage 1 flows up to 5 x ADWF and provide preliminary treatment of up to 6.5 x ADWF
- Effluent discharge pipeline to the Logan River downstream of the Cedar Grove weir
- Continuous discharge of effluent with ultra-low nutrient levels of less than 1 mg/L total nitrogen (TN) and 0.5 mg/L total phosphorus (TP)
- 150 kW photovoltaic solar array for on-site energy generation at the WWTP site
- Local revegetation of 1 km of riparian corridor along the Logan River.

On 3 March 2017 EDQ issued an information request for the following items:

1. Detailed Design of the proposed Wastewater Treatment Plant, including:

a. Site plans

b. Floor plans

c. Elevations plans

d. Sections

e. 3D perspectives

f. Proposed gross floor areas

g. Building materials and colours

h. *Location of all required building services including, but not limited to gas, fire pump rooms and electrical substations*

i. *Proposed access, servicing and car parking arrangements.*

2. Engineering

a. *Site based stormwater management plan that includes an assessment against the SPP Water Quality requirements for Receiving Waters and Water Supply Catchment in South East Queensland.*

3. Traffic engineering report that addresses the following:

a. *Ensure that design vehicle can safely negotiate all intersections up to and including Mount Lindesay Highway*

b. *Demonstrate that the road between the Proposed Access Road to Mt Lindsay Hwy has sufficient road width for two design vehicles travelling in opposite direction.*

The ERA63 application material was referred by SARA to the Department of Environment and Heritage Protection (DEHP) for advice. Following consideration of the application, and further discussions between Council, DEHP and DILGP (EDQ and SARA), a revised nutrient management strategy was prepared for submission, and was subsequently accepted. An environmental authority (EA) approving ERA 63 at the Cedar Grove site was issued to Council on 20 July 2017.

1.2 Scope

This report provides additional information to supplement the PDA Development Permit application material dated 27 January 2017. It details the revised proposal, and includes a response to the information request issued on 3 March 2017. Where information in this Additional Information Report is presented as 'updated', it replaces the information within the original application.

There have been no substantial or material changes to the application, and other than material that is presented in this report, the original application material remains valid.

2. INFORMATION REQUEST RESPONSE

2.1 Detailed design

At the time of responding, detailed design had not been completed for the WWTP. Design has now progressed to concept (30%) design stage, and relevant drawings are attached as Appendix A. However, the design has not been sufficiently progressed to incorporate information items such as perspectives and building materials. It is suggested that EDQ may request further detailed design information by way of condition of approval. It is anticipated that detailed design will be complete by early 2018.

2.2 Stormwater management

A Stormwater Management Plan is attached as Appendix B. This report includes an analysis of stormwater management for the site including stormwater quality and quantity analysis. The assessment is in accordance with the following policies and guidelines:

- *State Planning Policy*, Department of State Development, Infrastructure and Planning (DSDIP), July 2017.
- *MUSIC Modelling Guidelines*, Water by Design, 2010.
- *Water Sensitive Urban Design Technical Design Guidelines for South East Queensland*, Healthy Waterways, June 2006.
- *Queensland Urban Drainage Manual*, Department of Natural Resources and Water (DNRW), 2016.

Detailed modelling of the system has indicated that the bio-retention basin will allow the water quality objectives adopted for the site to be achieved.

Results of the modelling indicate that the proposed detention measures will adequately mitigate the increase in flow caused by the development such that no adverse impacts will be produced downstream of the site.

2.3 Traffic impacts

A Traffic Impact Assessment is attached as Appendix C. This addresses the information request, and includes assessment of road width and intersections between the site and Mount Lindsay Highway. The site will generate very little operational traffic, in the order of 15 two-way trips per week. As a result, traffic conditions will not significantly worsen as a result of the development. The assessment notes that Cedar Grove Road is not currently paved to the full width recommended in the Austroads guidelines, however existing shoulders are in good condition and adequate to accommodate passing of two design vehicles.

3. UPDATED EFFLUENT MANAGEMENT STRATEGY

3.1 Environmental authority negotiations

The effluent management strategy submitted as part of the original application was based on the findings of the Logan Water Infrastructure Alliance (LoganWIA) report *Cedar Grove Wastewater Treatment Plant: Stage 1 Effluent Management Strategy* (LoganWIA, 2017). This report analysed the costs and benefits of a number of effluent management options, including land disposal, nutrient removal and discharge, and nutrient offsets.

The draft EA conditions included some key items which differed from the original proposal submitted. Specifically, these included a requirement to eliminate or offset nutrients from all dry weather discharges to the Logan River, either by offset, irrigation or reuse of effluent. While the ongoing intention for the WWTP is to minimise discharges by taking advantage of any reuse opportunities, it is expected that discharge to the Logan River will continue to form part of the wastewater management strategy. In addition to the production of ultra-low nutrient effluent for discharge, the proposal to offset any nutrients discharged to the Logan River has been added to the proposal to address this condition.

3.2 Nutrient offsets

3.2.1 Background

In 2014, DEHP developed a policy for nutrient offsets (*Flexible options for managing point source water emissions: A voluntary market-based mechanism for nutrient management,* DEHP 2014). The policy outlines the requirements for alternative nutrient reduction actions as an option for managing point source emissions.

The purpose of the nutrient offset mechanism is to provide an alternative investment option for licensed point source operators to meet their water emission discharge requirements under the *Environmental Protection Act 1994,* while delivering an improvement in water quality in the receiving environment. Examples of management actions that may achieve nutrient reductions from diffuse sources include:

- Riparian restoration
- Constructed wetlands
- Fertiliser application management
- Grazing land management
- Water sensitive urban design.

3.2.2 Updated proposal

Following discussions with DEHP in relation to the application by Council to operate an ERA63 at the site, the proposal has been updated to include offset of 100% of the nutrients entering the Logan River due to effluent releases from Cedar Grove WWTP by undertaking riparian restoration and improvement at actively eroding sites upstream of the WWTP.

3.2.3 Analysis

Council has previously undertaken a high level preliminary investigation of nutrient offset sites, of which three were identified as having potential to offset nutrients discharged to the Logan River from Cedar Grove WWTP

through riparian restoration and revegetation. Other opportunities may emerge as Council undertakes further detailed investigations in partnership with key agencies and partners such as Healthy Land and Water.

The three sites are listed in Table 2-1, along with the mass load of nutrient offset which could be provided by each site.

Table 2-1: Offset sites

Site	Description	Offset TN (tonnes/year)	Offset TP (tonnes/year)
1	750 m reach located 15 km upstream of Cedar Grove. Affected by grazing pressure and scour, as well as erosion of inset features. Single landowner.	0.8	1.6
2	250 m reach located 3 km upstream of Cedar Grove. 8 m high actively eroding banks. Currently a dairy farm with irrigated pasture. Banks impacted by scour and slump. Cattle access has worsened the situation.	1.0	2.0
3	Horse farms and irrigated pasture. Several landowners on both sides of the river immediately downstream of the existing QUU offset site. Degraded banks with high rate of retreat anecdotally reported. Eastern bank has owners house near to river bank which may complicate the restoration design. Use of properties for horses is a good indicator of being able to exclude livestock from rehabilitated areas.	2.5	5
Total		**4.3**	**8.6**

In accordance with the current DEHP policy *Flexible options for managing point source water emissions: A voluntary market-based mechanism for nutrient management* (DEHP 2014) (the offset policy), a nutrient reduction ratio of 1.5:1 is applied to allow for any uncertainties, and to ensure that the offset action secures a water quality improvement. A further delivery ratio is also applied with increasing distance from the WWTP discharge, to account for any attenuation or losses between the offset site and the point source discharge. These ratios are included in the offset quantities that are identified in Table 2-1.

The current DEHP offset policy states that the duration of a nutrient reduction action is capped at a maximum of 20 years; however, the assumptions in the report contained in Appendix A include an offset duration of 10 years. The policy has currently only been applied on one pilot project. The objective of restoration of degraded stream bed and banks is to provide a long term reduction in erosion of bed, banks and/or inset features. This erosion is a major source of sediment loads, and consequentially nutrients, in waterways. Revegetation could therefore be considered to effect an ongoing reduction in nutrient inputs, equivalent to the annual input that would be expected without revegetation. It has therefore been assumed that a single project will have an ongoing offset effect.

The offset capacity of a revegetation site is limited by its ability to offset TN. Maximum flows for Stage 1 at a discharge quality of 1 mg TN/L would result in discharge of 1.2 tonnes of TN per year.

There is a total of 4.3 tonnes of TN offset capacity across the three identified sites, which is adequate to offset the nutrients from flows to 2044, assuming a discharge quality of 1mg/L TN.

3.2.4 Delivery mechanism

Based on the current projected flows, offsets would be delivered as presented in Table 2-2. As practical reuse opportunities are identified and become available, and nutrient discharges are thus avoided, delivery dates for each round of offsets could be delayed.

Table 2-2: Offset delivery stages

Stage	Site	TN Offset t/yr	Cumulative EP @ 1mg/L TN	Assumed Delivery Year*
Stage 1A	2	1.0	16,604	2020
Stage 1B	1	0.8	29,888	2026
Future	3	2.5	71,399	2030-2044

*dependent on actual discharges

3.2.5 Long term nutrient management

Further to the above nutrient offset projects, Council is committed to developing a long term nutrient management strategy for the Logan River to improve river health. This strategy will be developed over the coming years and will include the following activities:

- Whole of Logan River catchment study to identify opportunities to improve river health
- Potential regional partnership/s to develop and implement a catchment-wide nutrient management plan
- Water quality monitoring program in fresh water reaches of the River
- Detailed feasibility study for effluent reuse schemes, including likely future users and potential beneficial reuse markets in the Logan South area
- Opportunistic beneficial reuse and developing demand for recycled water
- Substitution of current river extractions for agriculture
- Consideration of emerging wastewater treatment technologies to further reduce nutrient and sediment load into the Logan River (including waste to energy technologies)
- Potential opportunities to transfer effluent into the western corridor recycled water pipeline
- Management of the overall licenced mass loads to the River from Council WWTPs through an integrated strategy to be discussed with DEHP.

It is anticipated that the above will provide better environmental outcomes than would be achieved through mitigation of effluent releases from the site alone.

4. UPDATED LANDSCAPE CONCEPT

Following the development of concept design site layouts, an updated landscape concept plan has been prepared. This updated plan is attached as Appendix D. The landscape plan demonstrates the screening

vegetation that is proposed to be planted around the site boundary and adjacent to the plant and wetlands, and also presents a slightly updated site layout which has been developed during the concept design stage.

5. CONCLUSIONS AND RECOMMENDATIONS

To promote growth of new urban areas and ensure supply of affordable housing, the Queensland Government has designated the Greater Flagstone area as a Priority Development Area. A number of developers have invested in these areas to meet the Queensland Government's objective of supplying 50,000 new dwellings. It is EDQ's responsibility to ensure that that all necessary water and wastewater infrastructure to support this greenfield development is in place in a timely manner to support this development.

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6. REFERENCES

Austroads 2016, *Guide to Road Design Part 3*

Department of Environment and Heritage Protection 2014, *Flexible options for managing point source water emissions: A voluntary market-based mechanism for nutrient management*

Department of Environment and Resource Management, 2007 *Logan River Environmental Values and Water Quality Objectives*

Department of Natural Resources and Water, 2016. *Queensland Urban Drainage Manual*,

Department of State Development, Infrastructure and Planning, July 2017 *State Planning Policy*,.

Water by Design, 2010. *MUSIC Modelling Guidelines*.

Healthy Waterways, June 2006 *Water Sensitive Urban Design Technical Design Guidelines for South East Queensland* .

Logan Water Infrastructure Alliance 2017, *Cedar Grove Wastewater Treatment Plant: Stage 1 Effluent Management Strategy* (Task LS-003)

Appendix A Concept Design Drawings

DWG.CI-0101

Q200 FLOOD LEVEL

EFFLUENT OUTFALL PIPE

WETLANDS STAGE 1
REFER NOTE 1

Q200 FLOOD LEVEL

11kV OVERHEAD POWER

ACCESS ROAD

WETLANDS STAGE 1
REFER NOTE 1

ROGERS ROAD

Q200 FLOOD LEVEL

LOT2 RP25779

LOT1 RP25779

LOT66 RPW3123

ACCESS ROAD

WETLANDS STAGE 1
REFER NOTE 1

SITE ACCESS GATE

CEDAR GROVE ROAD

LOGAN RIVER

CEDAR GROVE WEIR

LOT235 RPW3123

LOT200 RP200030

EFFLUENT OUTFALL PIPE

DENNIS ROAD

N

NOTES
1.WETLAND LAYOUT INDICATIVE ONLY

PLAN
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PRELIMINARY

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DESIGNED BY: D.GRAY
DRAFTED BY: D.GRAY
DRAFTING CHECK BY: F.JESPERSEN
DESIGN CHECKED BY: G.PATTERSON RPEQ
APPROVED BY: RPEQ

REFERENCES
PROJECT No.: LS303-01
FILE REFERENCE:
SHEET SIZE: A1
DATUM : AHD
GDA 94 ZONE 56.

LOGAN WATER INFRASTRUCTURE ALLIANCE

Proudly LOGAN CITY COUNCIL

PROJECT: CEDAR GROVE WWTP

DRAWING TITLE: STAGE 1 - 20,000EP
OVERALL GENERAL ARRANGMENT

DRAWING No.: LS303-01-S-DWG-CI-0100
DESIGN COMPANY.: CARDNO
REV.: A
TECH SERVICES DRG No.:

CONTROL LINE – MC01

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C4	TC IP CT	27.356 49.328 71.273	497050.787 497054.615 497056.530	6918960.400 6918982.037 6919003.927	10°01'57" 7°30'58" 5°00'00"	500.000	43.917	5°01'57"
L4	IP	71.273 216.514	497056.530 497069.189	6919003.927 6919148.615	5°00'00"	-		
C3	TC IP CT	216.514 278.646 334.324	497069.189 497074.604 497034.666	6919148.615 6919210.510 6919258.106	5°00'00" 342°30'00" 320°00'00"	150.000	117.810	45°00'00"
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C2	TC IP CT	597.478 663.304 728.377	496865.514 496823.201 496769.280	6919459.694 6919510.120 6919547.876	320°00'00" 312°30'00" 305°00'00"	500.000	130.900	15°00'00"
L2	IP	728.377 908.601	496769.280 496621.649	6919547.876 6919651.248	305°00'00"	-		
C1	TC IP CT	908.601 935.396 960.961	496621.649 496599.700 496588.376	6919651.248 6919666.617 6919690.901	305°00'00" 320°00'00" 335°00'00"	100.000	52.360	30°00'00"
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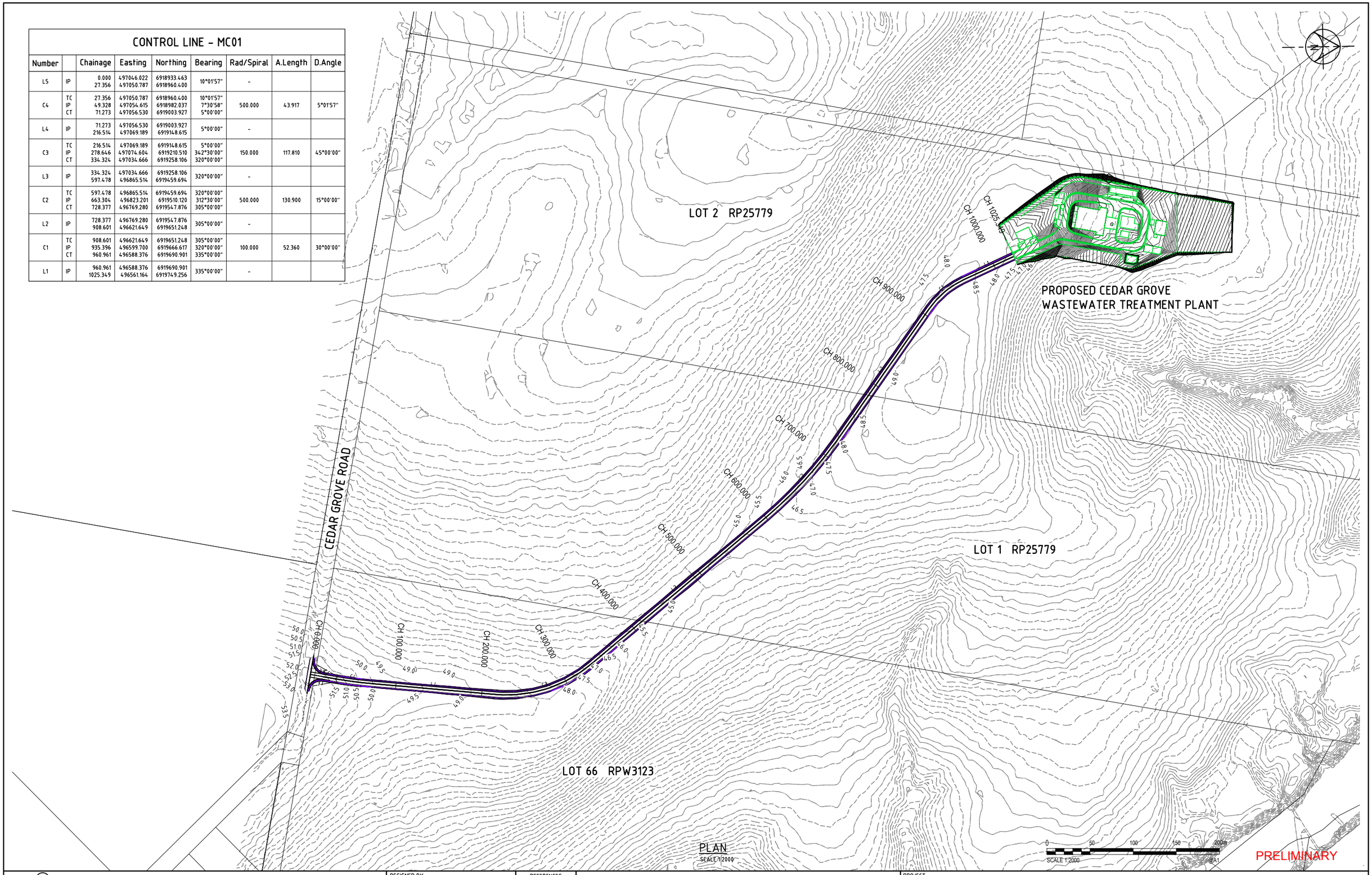

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DRAFTED BY: S.VALES
DRAFTING CHECK BY: F.JESPERSEN
DESIGN CHECKED BY: G.PATTERSON RPEQ
APPROVED BY: RPEQ

REFERENCES
PROJECT No.: LS303-01
FILE REFERENCE:
SHEET SIZE: A1
DATUM : AHD
GDA 94 ZONE 56.

LOGAN WATER INFRASTRUCTURE ALLIANCE
Proudly LOGAN CITY COUNCIL

PROJECT: CEDAR GROVE WWTP

DRAWING TITLE:
ROADWORKS AND EARTHWORKS
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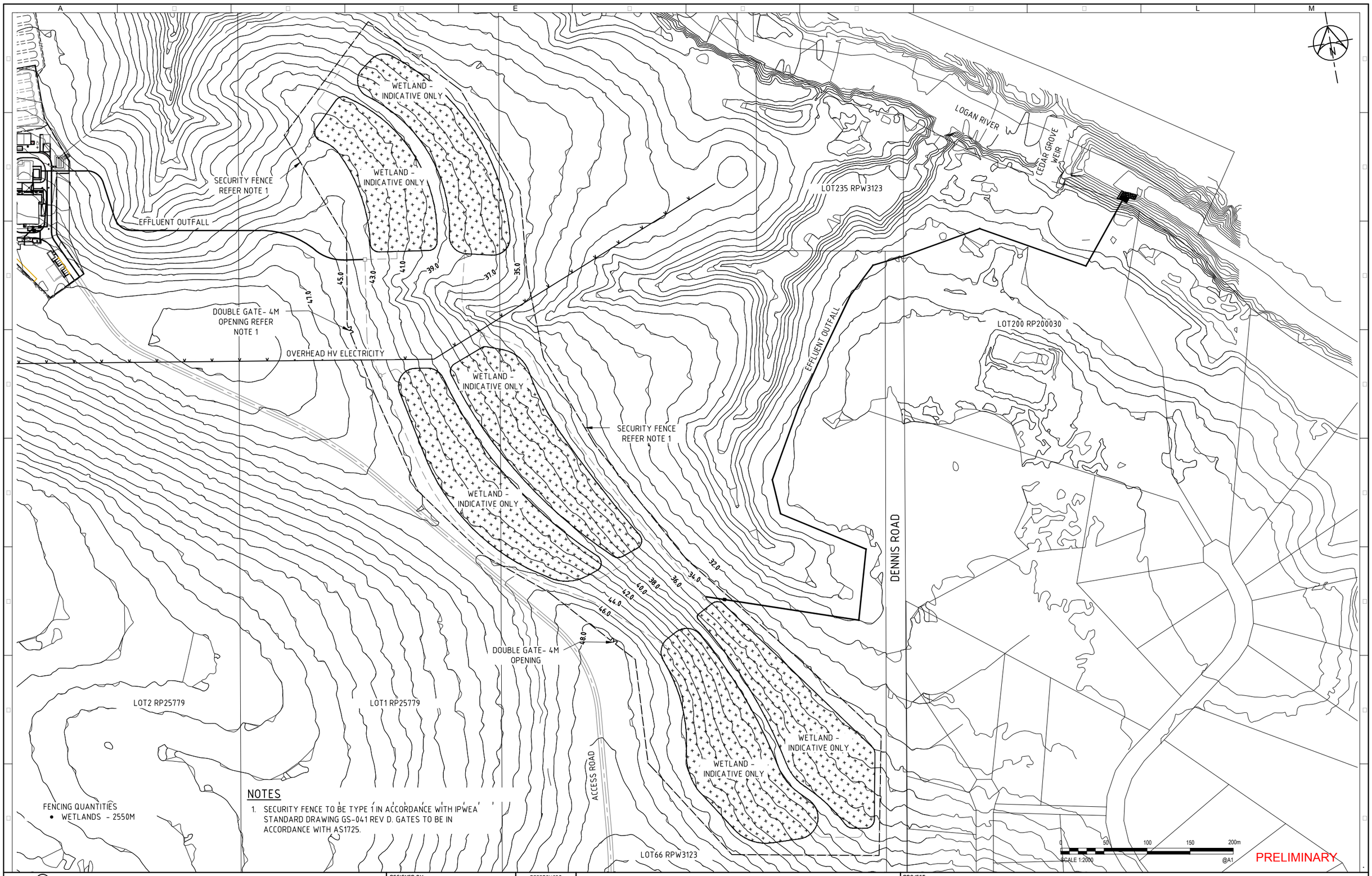

FENCING QUANTITIES
- WETLANDS - 2550M

NOTES

1. SECURITY FENCE TO BE TYPE 1 IN ACCORDANCE WITH IPWEA STANDARD DRAWING GS-041 REV D. GATES TO BE IN ACCORDANCE WITH AS1725.

PRELIMINARY

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DRAFTED BY: D.G. | DRAFTING CHECK BY:
DESIGN CHECKED BY: G.P. | RPEQ
APPROVED BY: RPEQ

REFERENCES
PROJECT No.: LS303
FILE REFERENCE:
SHEET SIZE: A1
DATUM : AHD
GDA 94 ZONE 56.

LOGAN WATER INFRASTRUCTURE ALLIANCE

Proudly LOGAN CITY COUNCIL

PROJECT: CEDAR GROVE WWTP

DRAWING TITLE:
STAGE 1 - 20,000EP
FENCING AND ACCESS PLAN
WETLANDS

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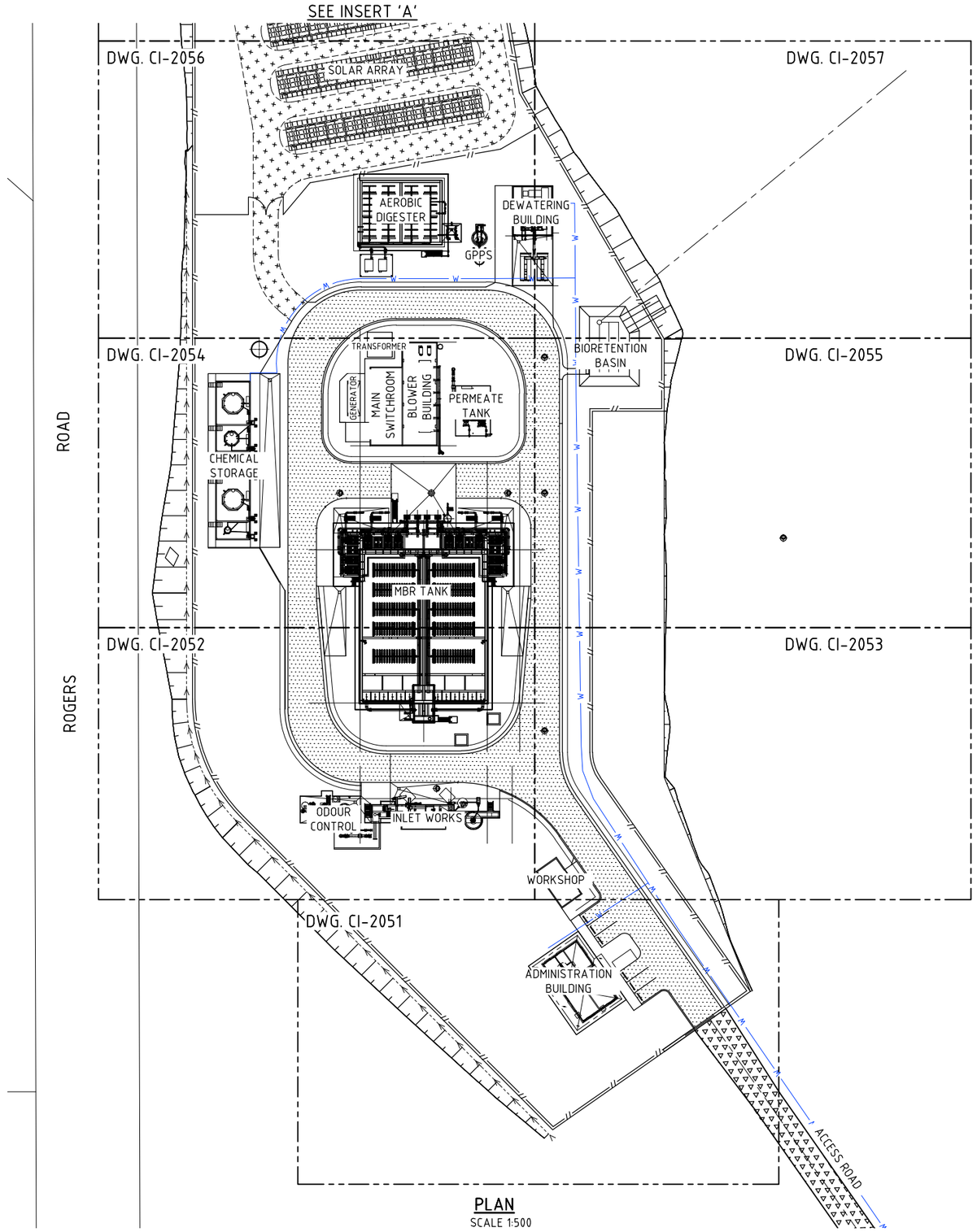

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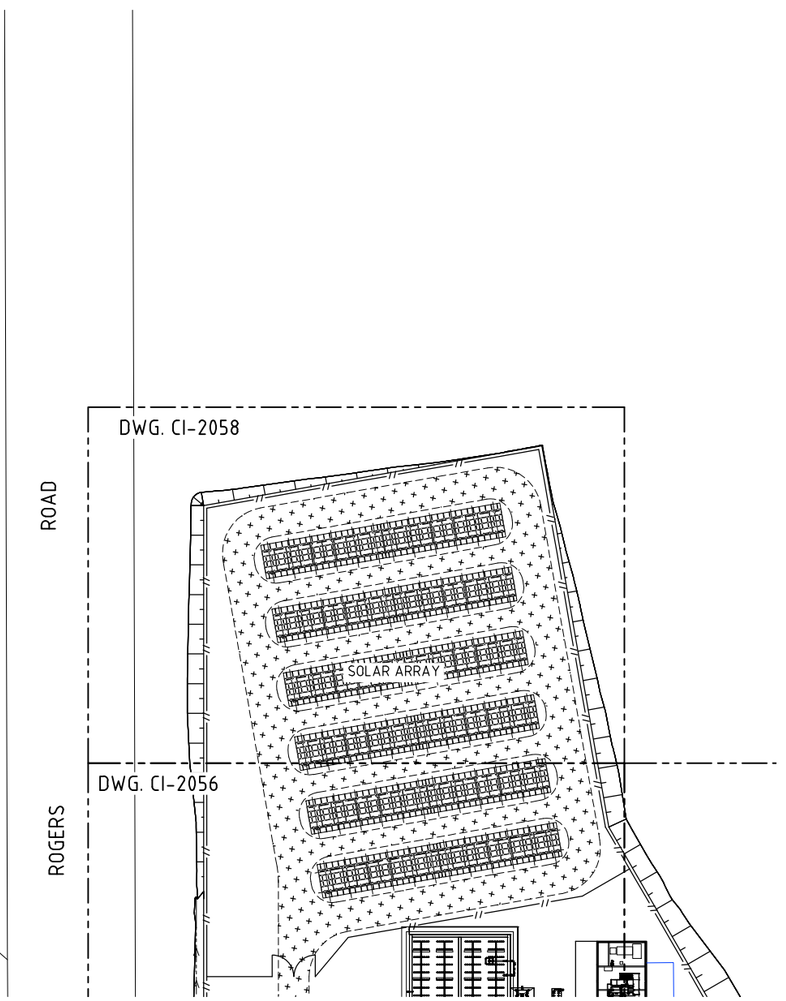

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PRELIMINARY

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DESIGNED BY: D.GRAY
DRAFTED BY: D.GRAY
DRAFTING CHECK BY: F.JESPERSEN
DESIGN CHECKED BY: G.PATTERSON
RPEQ
APPROVED BY: RPEQ

REFERENCES
PROJECT No.: LS303-01
FILE REFERENCE:
SHEET SIZE: A1
DATUM : AHD
GDA 94 ZONE 56.

LOGAN WATER INFRASTRUCTURE ALLIANCE

Proudly LOGAN CITY COUNCIL

PROJECT: CEDAR GROVE WWTP

DRAWING TITLE: ROADWORKS AND EARTHWORKS
WWTP OVERALL LAYOUT

DRAWING No.: LS303-01-S-DWG-CI-2050
DESIGN COMPANY.: CARDNO
REV.: A
TECH SERVICES DRG No.:

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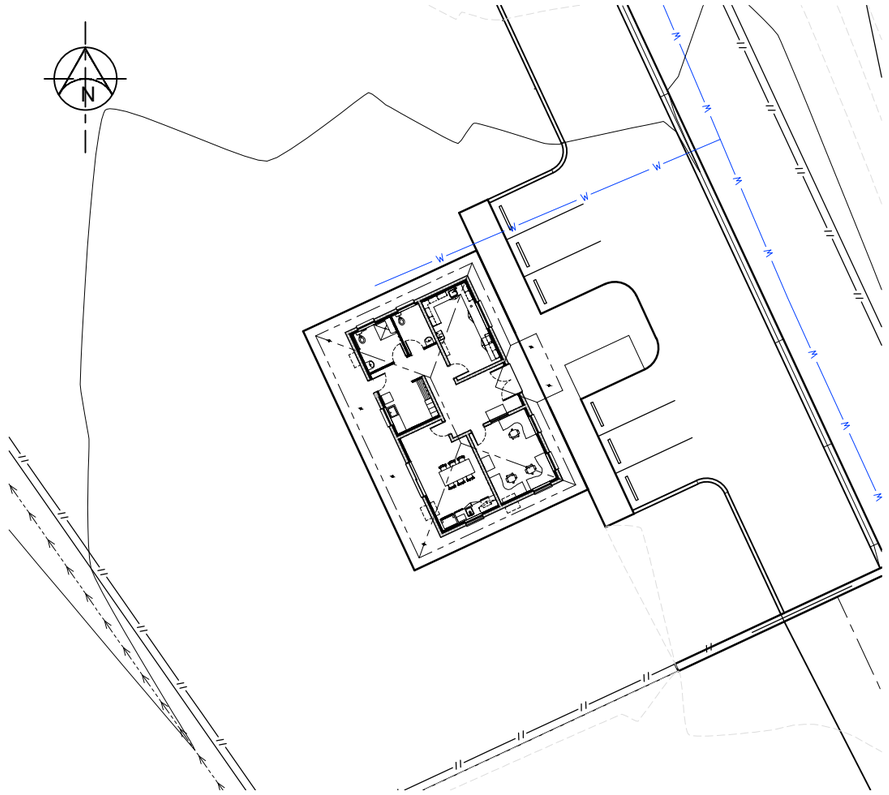
LS	LABORATORY SINK
KS	KITCHEN SINK
L	LOCKERS
A/C	AIR CONDITIONING
WC	WATER CLOSET
FR	FRIDGE
EW	BENCH TOP EYEWASH
WM	PROVISION FOR WASHING MACHINE
MW	MICROWAVE
DW	PROVISION FOR DISHWASHER



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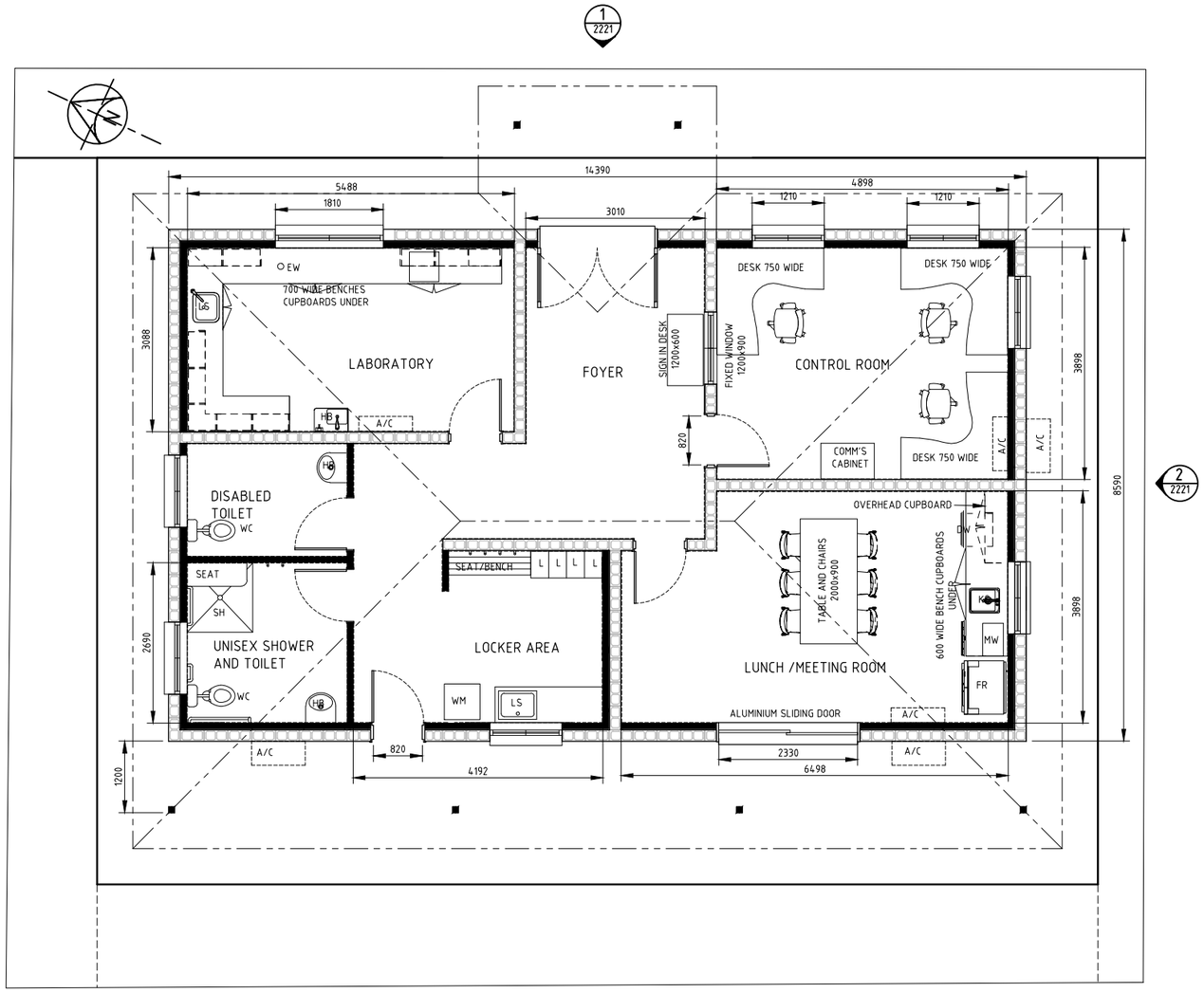

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DATE PLOTTED: 22 September, 2017 - 9:47am

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DRAFTED BY: D.GRAY
DRAFTING CHECK BY: F.JESPERSEN
DESIGN CHECKED BY: RPEQ
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APPROVED BY: RPEQ

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DATUM : AHD
GDA 94 ZONE 56.

LOGAN WATER INFRASTRUCTURE ALLIANCE
Proudly LOGAN CITY COUNCIL

PROJECT: CEDAR GROVE WWTP
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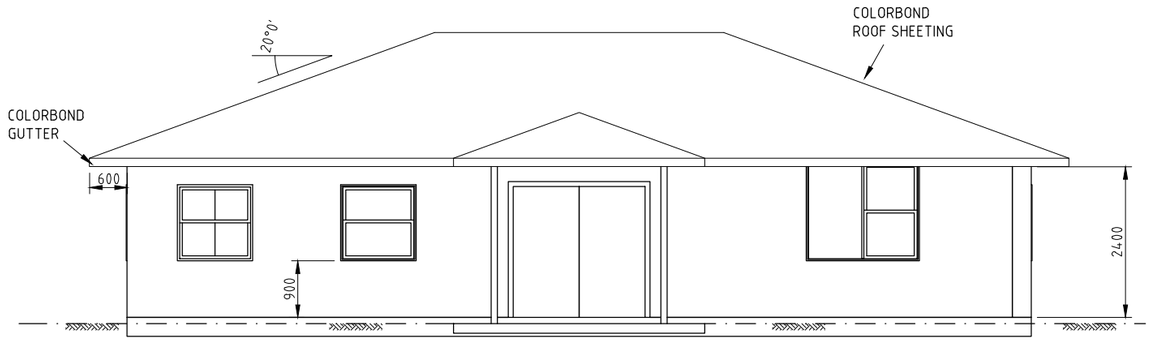

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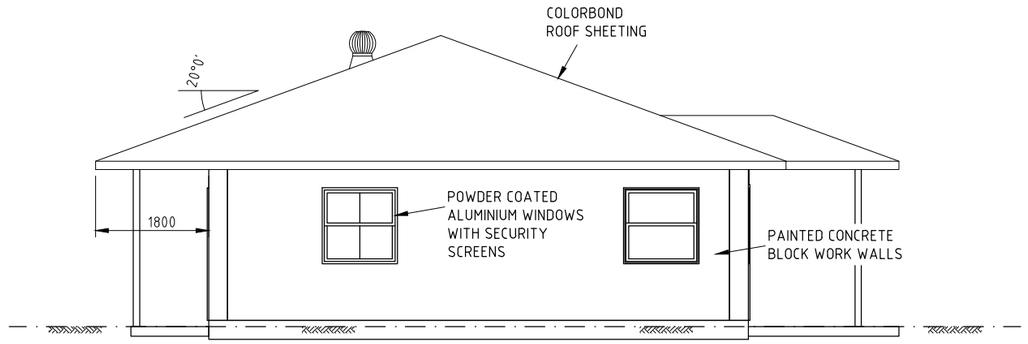

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PRELIMINARY

REV. No.	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE
A	ISSUED FOR 60%DESIGN REVIEW	D.G.	G.P.	INITIALS	22-09-17

DESIGNED BY G.PATTERISON
DRAFTED BY D.GRAY
DRAFTING CHECK BY F.JESPERSEN
DESIGN CHECKED BY RPEQ
-
APPROVED BY RPEQ

REFERENCES
PROJECT No. LS303-01
FILE REFERENCE:
SHEET SIZE A1
DATUM : AHD
GDA 94 ZONE 56.

LOGAN WATER INFRASTRUCTURE ALLIANCE
Proudly LOGAN CITY COUNCIL

PROJECT: CEDAR GROVE WWTP
DRAWING TITLE: ADMINISTRATION & CONTROL BUILDING
SECTIONS - SHEET 1
DRAWING No. LS303-01-S-DWG-CI-2221
DESIGN COMPANY. CARDNO
REV. A
TECH SERVICES DRG No.

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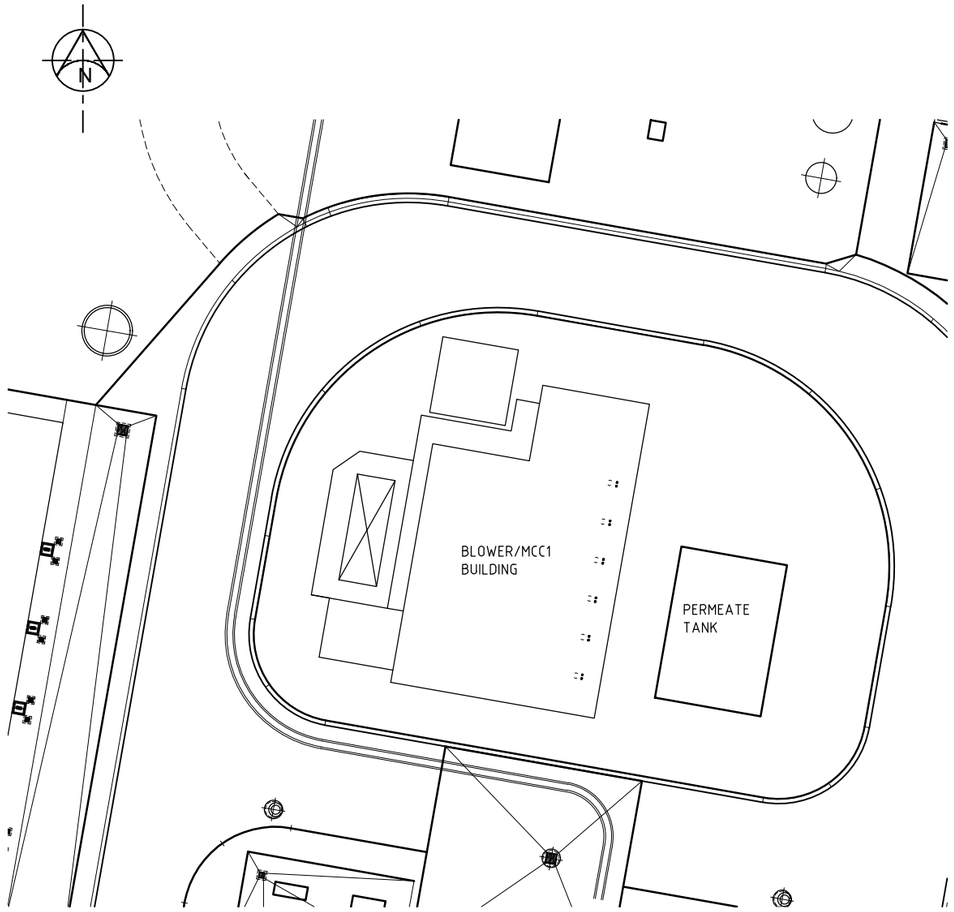
DATE PLOTTED: 22 September, 2017 - 11:48am



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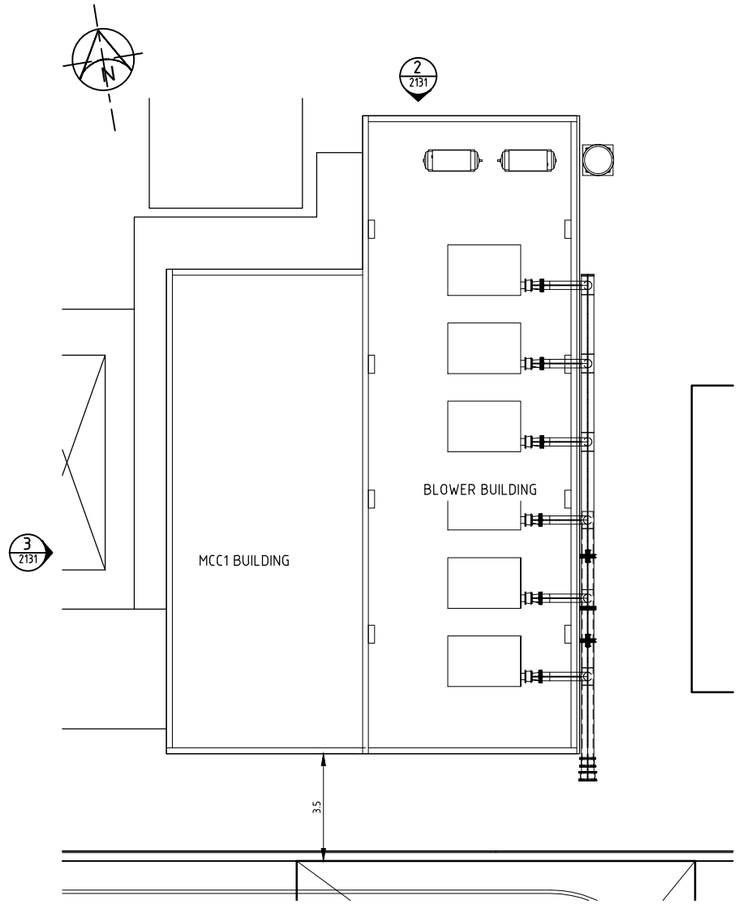

1
2131

PLAN VIEW
SCALE 1:100

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2000

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PRELIMINARY

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DATE PLOTTED: 22 September, 2017 - 12:59pm

REV. No.	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE
A	ISSUED FOR 60% REVIEW	D.G.	G.P.	-	22-09-2017

DESIGNED BY: G.PATTERISON
DRAFTED BY: D.GRAY
DRAFTING CHECK BY: F.JESPERSEN
DESIGN CHECKED BY: -
RPEQ
APPROVED BY: RPEQ

REFERENCES
PROJECT No.: LS303-01
FILE REFERENCE:
SHEET SIZE: A1
DATUM : AHD
GDA 94 ZONE 56.

LOGAN WATER INFRASTRUCTURE ALLIANCE

Proudly LOGAN CITY COUNCIL

PROJECT: CEDAR GROVE WWTP

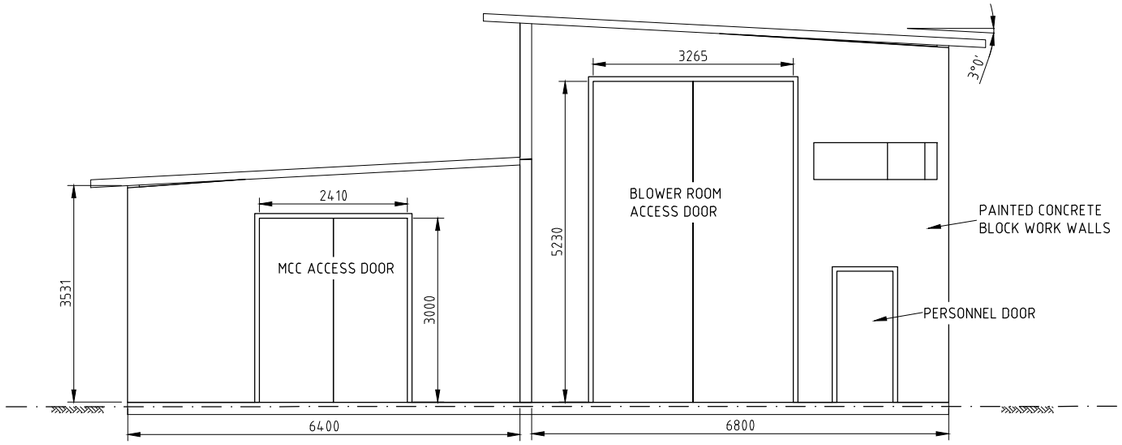
DRAWING TITLE: BLOWER & MCC1 BUILDING
GENERAL ARRANGEMENT

DRAWING No.: LS303-01-S-DWG-CI-2130

DESIGN COMPANY.: CARDNO

REV.: A

TECH SERVICES DRG No.:



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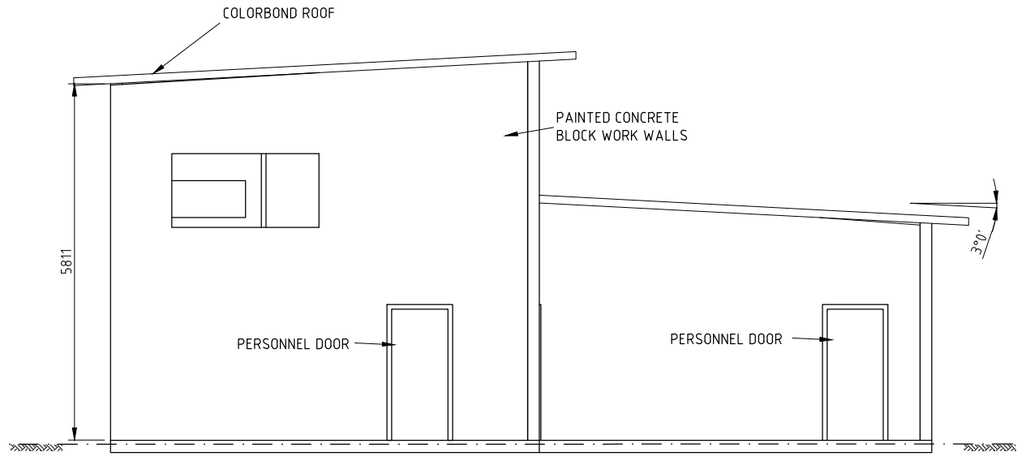

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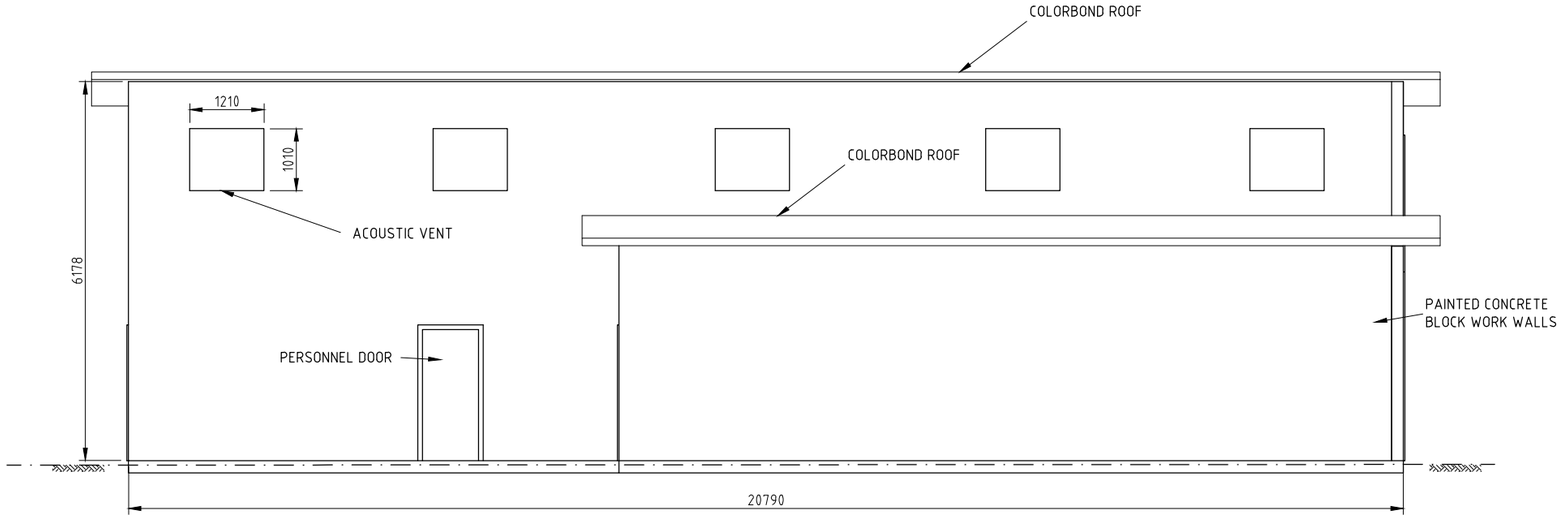

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PRELIMINARY

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DESIGNED BY: G.PATTERSON
DRAFTED BY: G.GRAY
DRAFTING CHECK BY: F.JESPERSEN
DESIGN CHECKED BY: RPEQ
APPROVED BY: RPEQ

REFERENCES
PROJECT No.: LS303-01
FILE REFERENCE:
SHEET SIZE: A1
DATUM : AHD
GDA 94 ZONE 56.

LOGAN WATER INFRASTRUCTURE ALLIANCE
Proudly LOGAN CITY COUNCIL

PROJECT: CEDAR GROVE WWTP
DRAWING TITLE: BLOWER & MCC1 BUILDING
SECTIONS - SHEET 1
DRAWING No.: LS303-01-S-DWG-CI-2131
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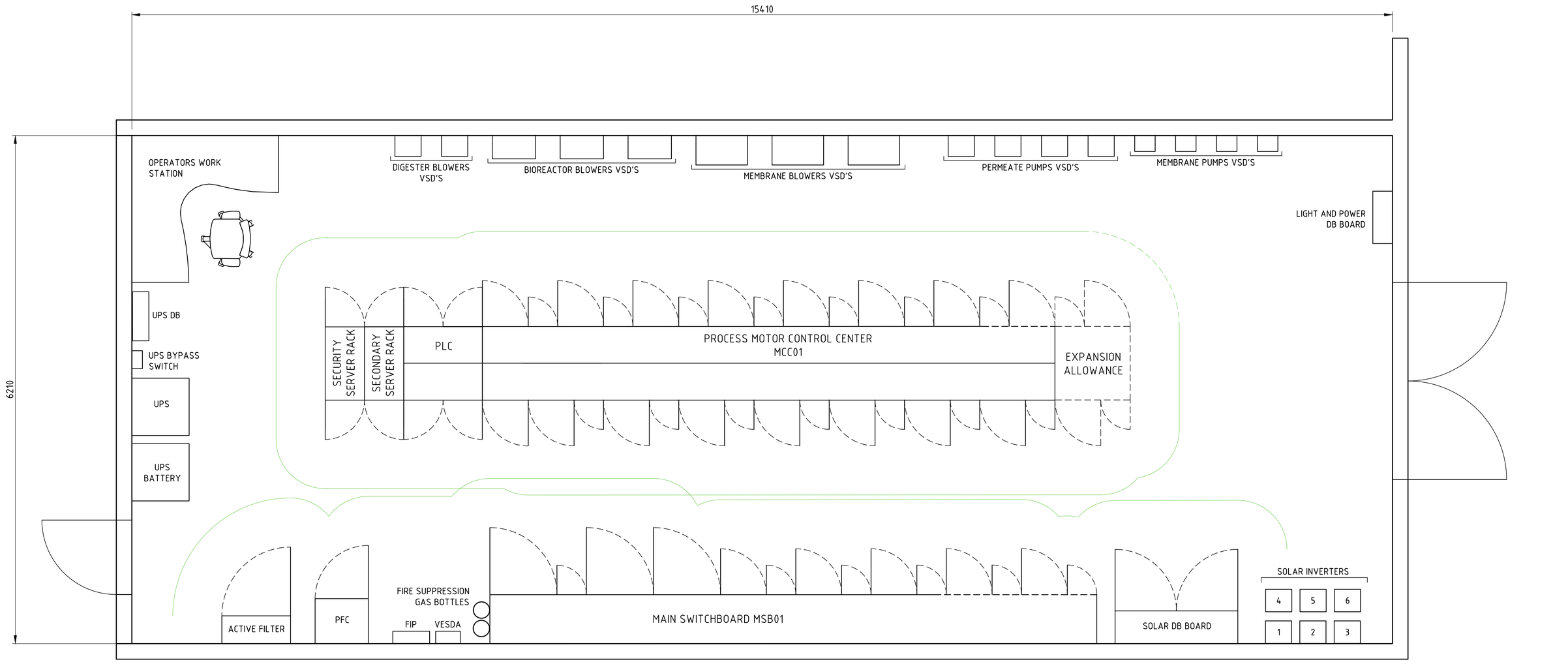
REV.: A
TECH SERVICES DRG No.:



MAIN SWITCHROOM PLAN
SCALE 1:25

1:25 0 500 1000 1500 2000 2500mm
500 250

PRELIMINARY

REV. No.	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE
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B	ISSUED FOR 60% DESIGN	T.C.	J.D.	H.M.	14.09.17
A	PRELIMINARY ISSUE	T.C.	J.D.	H.M.	10.08.17

DESIGNED BY: J.DUBOIS
DRAFTED BY: T.CARSELDINE
DRAFTING CHECK BY: F.JESPERSEN
DESIGN CHECKED BY: H. MICHALKOW RPEQ
APPROVED BY: RPEQ

REFERENCES
PROJECT No.: LS303
FILE REFERENCE:
SHEET SIZE: A1
DATUM : AHD
GDA 94 ZONE 56.

LOGAN WATER INFRASTRUCTURE ALLIANCE
Proudly LOGAN CITY COUNCIL

PROJECT: CEDAR GROVE WASTEWATER TREATMENT PLANT

DRAWING TITLE:
MAIN SWITCHROOM
EQUIPMENT
GENERAL ARRANGEMENT

DRAWING No.: LS303-01-S-DWG-EL-6060
DESIGN COMPANY.: LoganWIA
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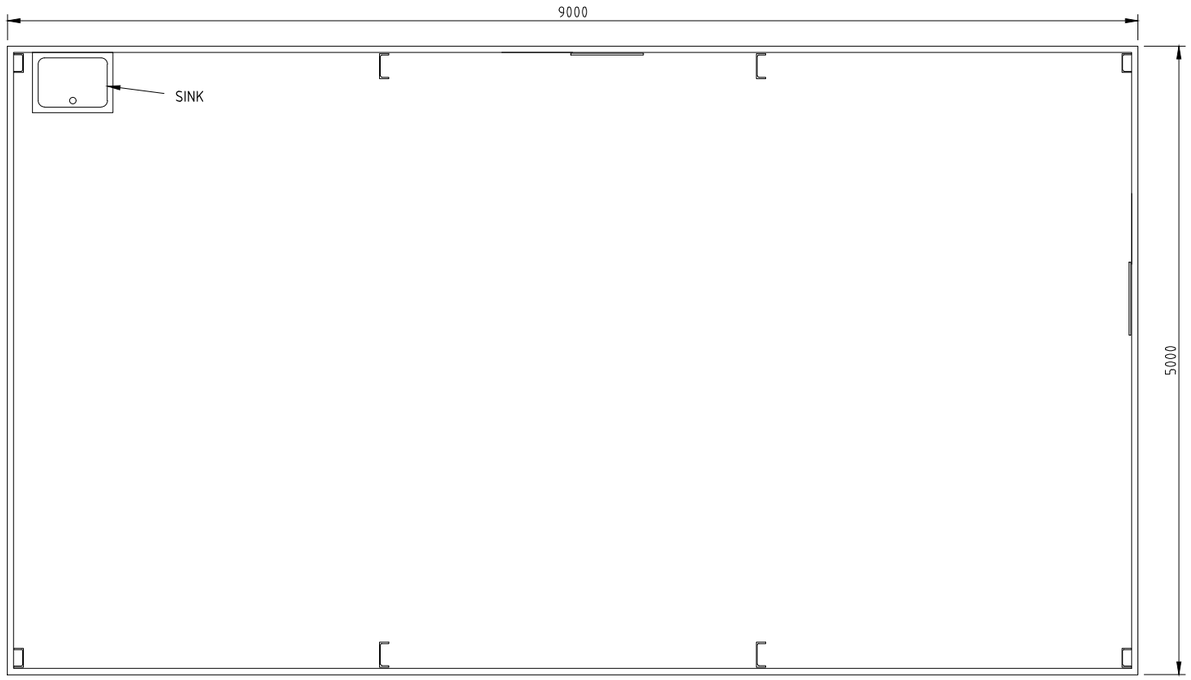

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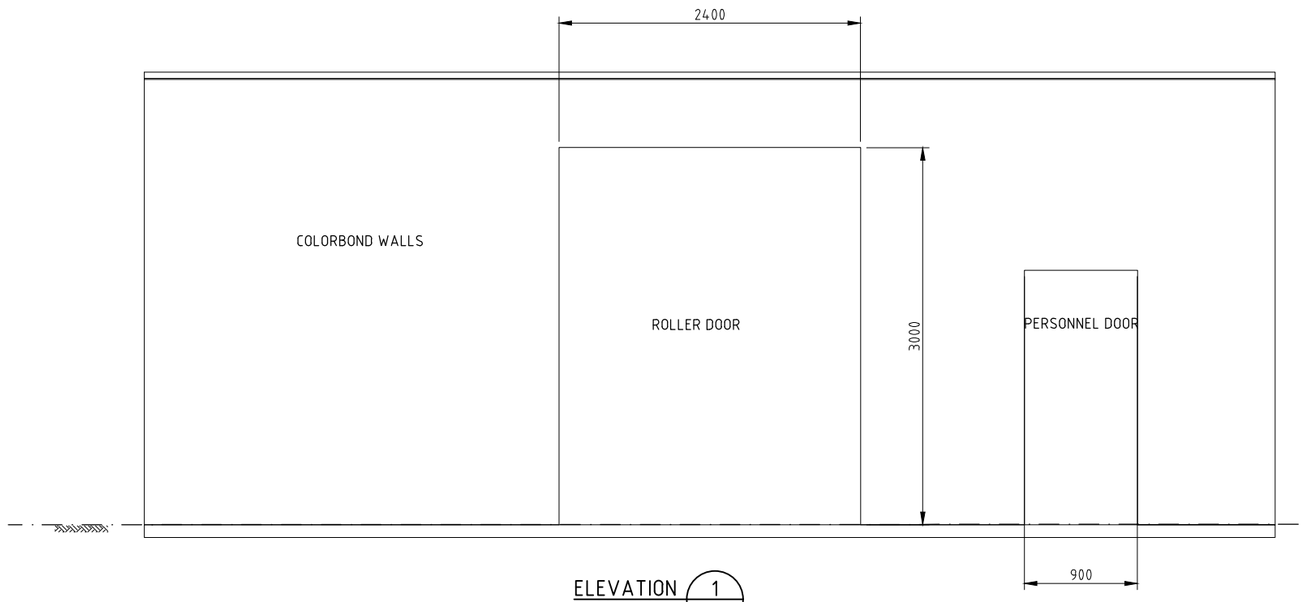
PLAN
SCALE 1:25



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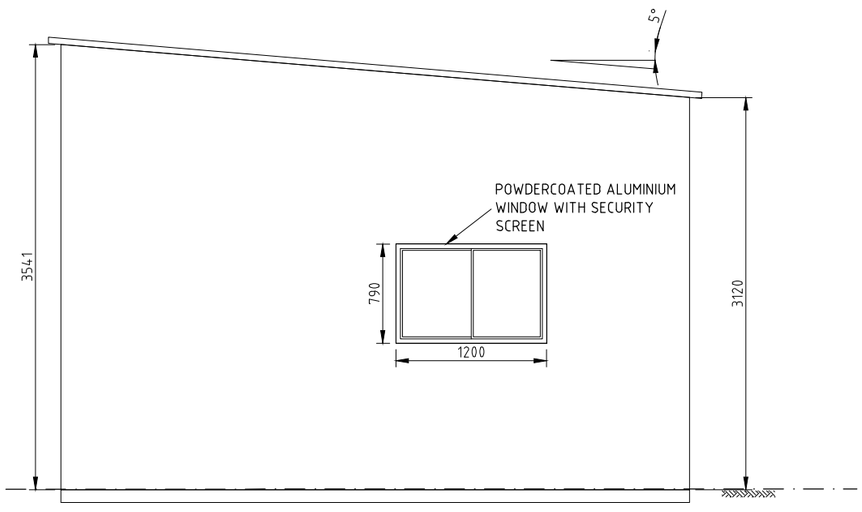
SCALE1:25



ELEVATION 2
SCALE1:25

2
-

NOTES

1. WORKSHOP BUILDING SHALL BE DESIGN AND CONSTRUCT. TYPICALLY RANBUILD, TITAN OR EQUIVALENT

1:25 500 0 500 1000 1500 2000 2500mm

PRELIMINARY

REV. No.	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE
A	ISSUED FOR 60% REVIEW	K.F.	G.P.	-	22-09-2017

DESIGNED BY: G.PATTERSON
DRAFTED BY: K.FOYSTER
DRAFTING CHECK BY: F.JESPERSEN
DESIGN CHECKED BY: RPEQ
APPROVED BY: RPEQ

REFERENCES
PROJECT No.: LS303-01
FILE REFERENCE:
SHEET SIZE: A1
DATUM : AHD
GDA 94 ZONE 56.

LOGAN WATER INFRASTRUCTURE ALLIANCE

Proudly LOGAN CITY COUNCIL

PROJECT: CEDAR GROVE WWTP

DRAWING TITLE: WORKSHOP
PLAN & SECTIONS

DRAWING No.: LS303-01-S-DWG-CI-2230
DESIGN COMPANY.: CARDNO
REV.: A
TECH SERVICES DRG No.:

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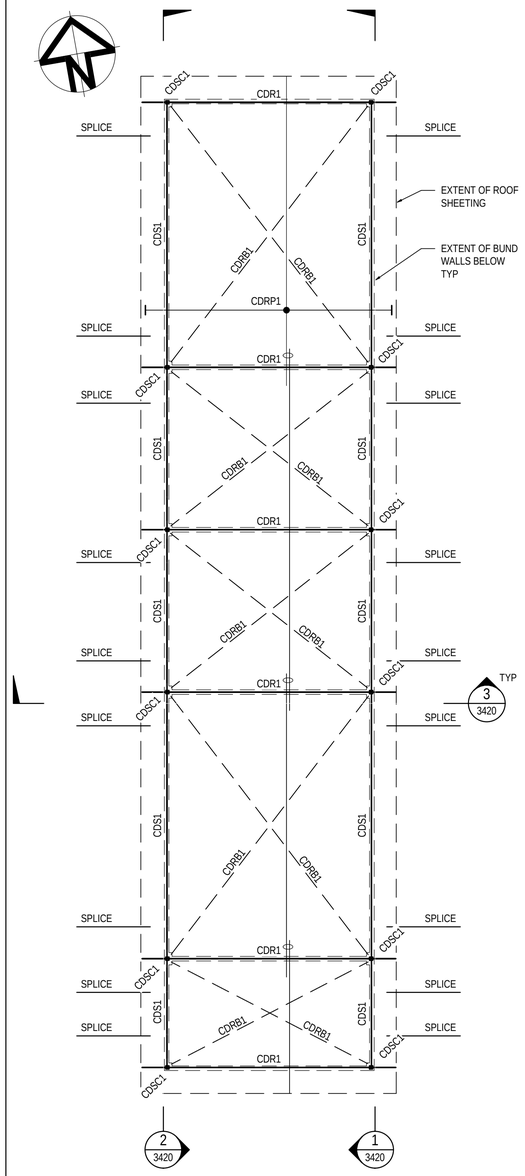
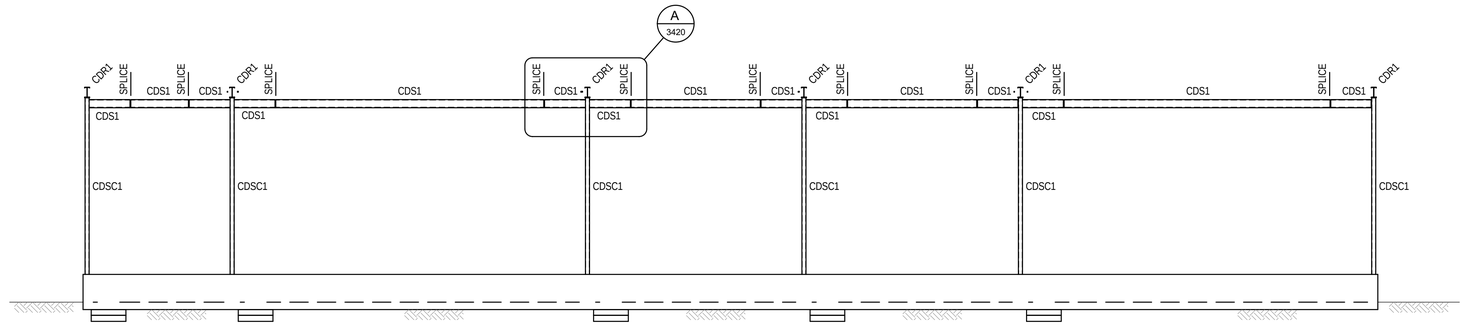


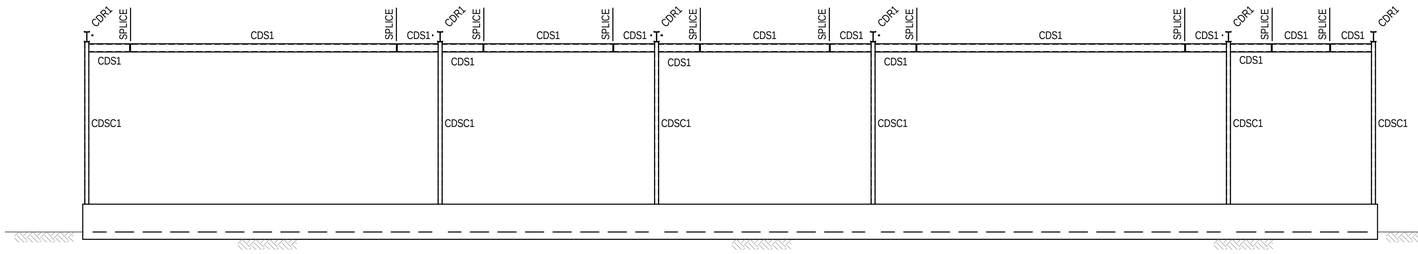
CHEMICAL DOSING BUILDING ROOF FRMAING PLAN

1 : 100

CHEMICAL DOSING STEEL MEMBER SCHEDULE		
MARK	MEMBER SIZE	COMMENTS
CDR1	250UB25.7	
CDRB1	20 DIA THREADED ROD	10 CLEAT EACH END C/W ADJUSTABLE TURNBUCKLE
CDRP1	C15019	10 CLEAT, 2-M12 PURLIN BOLTS
CDS1	200 PFC	
CDSC1	100x100x6.0 SHS	



ELEVATION 1
1 : 75
3420



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1 : 75
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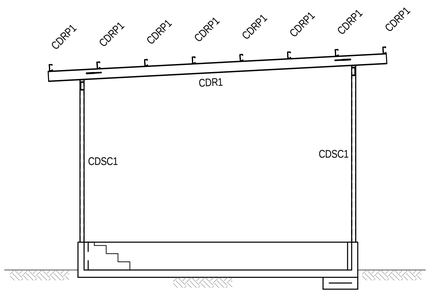

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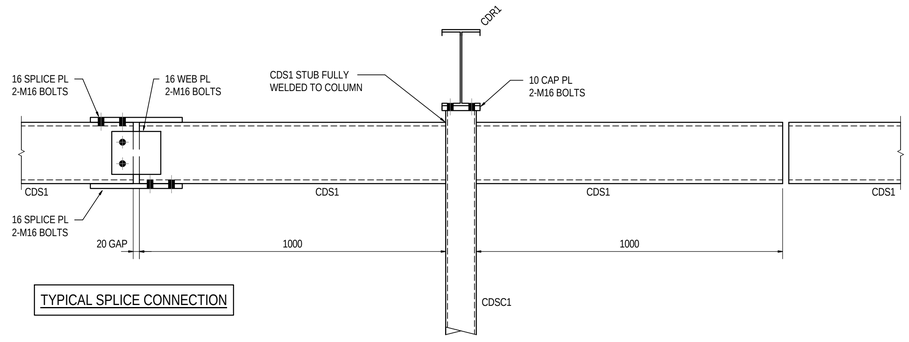

TYPICAL SPLICE CONNECTION

DETAIL A
1 : 10
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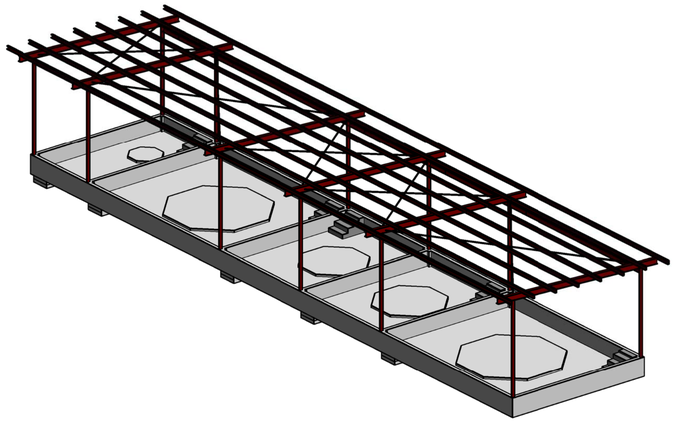


3D VIEW

0 2000 4000 6000 8000 10000

PRELIMINARY

GENERAL NOTES

REFER TO DWG No. 3005 FOR SITE PLAN

ALL DIMENSIONS ARE IN MILLIMETERS

ALL PENETRATIONS SHOWN INDICATIVE ONLY. (TO FUTURE DESIGN)

REFER TO DWG No. 3900 TO 3901 FOR TYPICAL DETAILS

REV. No.	DESCRIPTION	DRAWN	DESIGNED	APPR	DATE
A	ISSUED FOR 30% DESIGN	TD	ST		04.10.17

DESIGNED BY: T. DAUNT
DRAFTED BY: S. THOMPSON
DRAFTING CHECK BY: F. JESPERSEN
DESIGN CHECKED BY: D. SUTCLIFFE — RPEQ
APPROVED BY: Approver — RPEQ

REFERENCES
PROJECT No.: LS303-01
FILE REFERENCE:
SHEET SIZE: A1
DATUM: AHD
GDA 94 ZONE 56

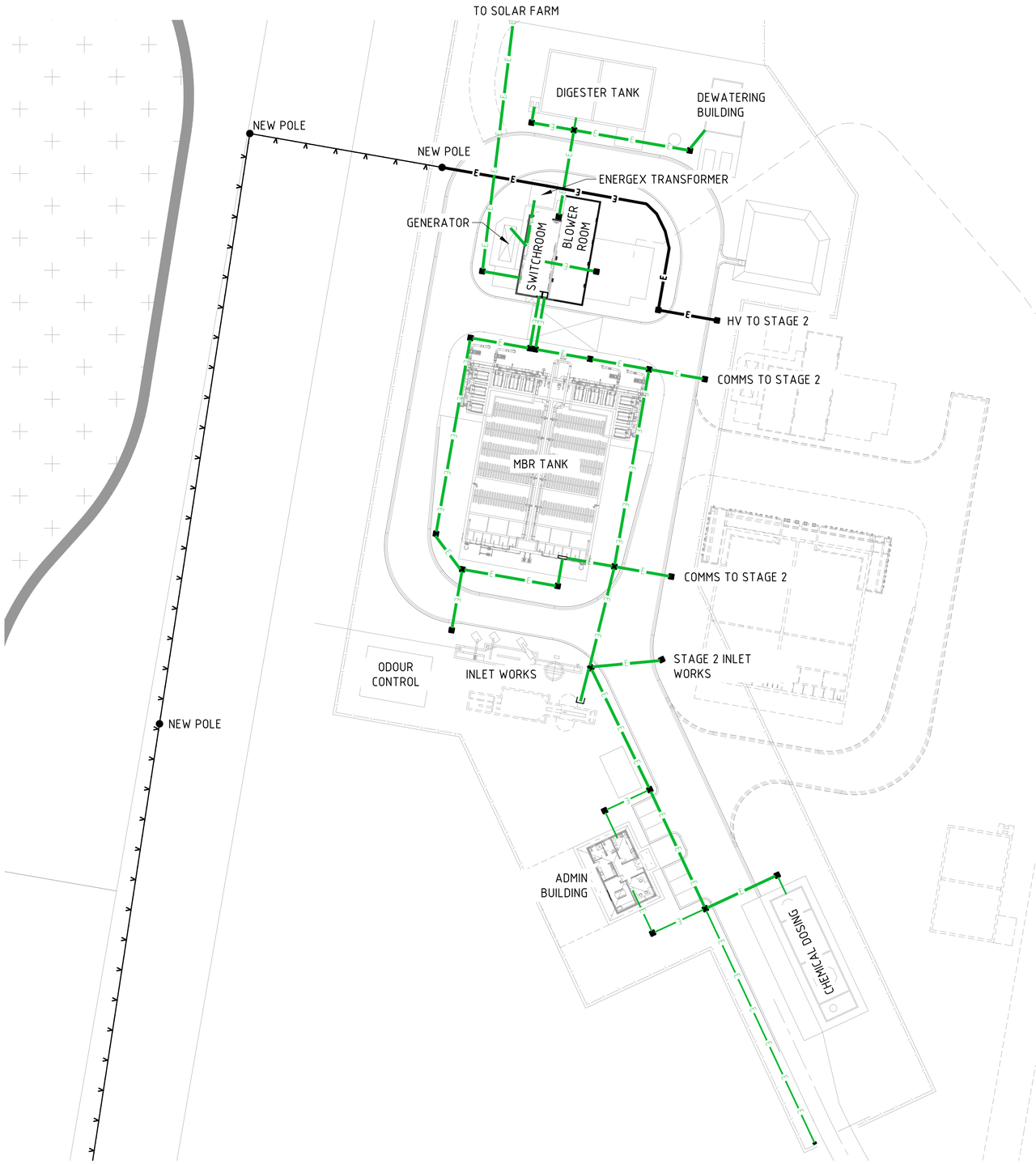
LOGAN WATER INFRASTRUCTURE ALLIANCE

Proudly LOGAN CITY COUNCIL

PROJECT: CEDAR GROVE WWTP

CHEMICAL DOSING BUILDING
STRUCTURAL
CHEMICAL DOSING BUILDING ROOF FRAMING PLAN

DRAWING No.: LS303-01-S-DWG-ST-3420
DESIGN COMPANY.: CARDNO
REV.: A
TECH SERVICES DRG. No.:



LEGEND:

- ELECTRICAL PIT
- OVERHEAD ELECTRICAL LINE
- 11kV UNDERGROUND ELECTRICAL
- LV / COMMS UNDERGROUND ELECTRICAL

SITE PLAN
SCALE 1:500

1:500 0 10 20 30 40 50 m
10 5

PRELIMINARY

REV. No.	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE
A	PRELIMINARY ISSUE	T.C.	J.D.	H.M.	10/08/17

DESIGNED BY: J.DUBOIS
DRAFTED BY: T.CARSELDINE
DRAFTING CHECK BY: J.DUBOIS
DESIGN CHECKED BY: H. MICHALKOW RPEQ
APPROVED BY: RPEQ

REFERENCES
PROJECT No.
FILE REFERENCE:
SHEET SIZE A1
DATUM : AHD GDA 94 ZONE 56.

LOGAN WATER INFRASTRUCTURE ALLIANCE
Proudly LOGAN CITY COUNCIL

PROJECT: CEDAR GROVE WASTEWATER TREATMENT PLANT

DRAWING TITLE: WWTP STAGE 1 UNDERGROUND ELECTRICAL
SITE PLAN

DRAWING No. LS303-01-S-DWG-EL-6075
DESIGN COMPANY. LoganWIA
REV. A
TECH SERVICES DRG No.

Appendix B Stormwater Management Plan

Stormwater Management Plan

Cedar Grove Wastewater Treatment Plant

764015_LS009

Prepared for
Logan Water Infrastructure Alliance

14 September 2017

Cardno
Shaping the Future

Contact Information

Cardno (Qld) Pty Ltd
ABN 57 051 074 992

Level 11 Green Square North Tower
515 St Paul's Terrace
Locked Bag 4006
Fortitude Valley Qld 4006

Telephone: 07 3369 9822
Facsimile: 07 3369 9722
International: +61 7 3369 9822

cardno@cardno.com.au
www.cardno.com.au

Author(s): Geordi Paxton
Engineer

Approved By: Helen Doherty
Senior Engineer

Document Information

Prepared for	Logan Water Infrastructure Alliance
Project Name	Cedar Grove Wastewater Treatment Plant
File Reference	764015_LS009_SMP_V2
Job Reference	764015_LS009
Date	14 September 2017
Effective Date	14 September 2017
Date Approved:	14 September 2017

Document History

Version	Effective Date	Description of Revision	Prepared by:	Reviewed by:
1	6 September 2017	R1V1_SMP	Geordi Paxton	Helen Doherty
2	14 September 2017	Final	Geordi Paxton	Helen Doherty

Table of Contents

Appendices

Tables

Figures

1 Introduction

This Stormwater Management Plan (SMP) has been prepared by Cardno, specialist hydrologic, hydraulic and water quality consultants for the proposed Cedar Grove Water Treatment Plant Development on Cedar Grove Road, Cedar Grove. The site location is shown on Figure 1.

This report includes an analysis of stormwater management for the site including stormwater quality and quantity analysis.

The assessment is in accordance with the following policies and guidelines:

> *'State Planning Policy',* Department of State Development, Infrastructure and Planning (DSDIP), July 2017.

> *MUSIC Modelling Guidelines'*, Water by Design, 2010.

> *'Water Sensitive Urban Design Technical Design Guidelines for South East Queensland',* Healthy Waterways, June 2006.

> *'Queensland Urban Drainage Manual',* Department of Natural Resources and Water (DNRW), 2016.

2 Site Description and Proposed Development

2.1 Site Description

The site is located off Cedar Grove Road, Cedar Grove and is bordered by Dennis Road to the east and the Logan River to the north and west. The development is situated on Lots 1-5 RP25779 and Lot 66 W3 123. Figure 1 displays the site locality.

The site is approximately 204 ha and is currently utilised for agricultural purposes. During major flooding events, significant inundation occurs within the lot boundary from the adjacent Logan River. The proposed Cedar Grove Water Treatment Plant will be developed on the elevated hill formation at the centre of the site. This area is above the 0.5% AEP inundation area, as shown on Council's flood mapping. A plan showing the location of the proposed development and the 0.5% AEP inundation extent is contained in Appendix A.

2.2 Proposed Development

The development consists of a Wastewater Treatment Plant and associated structures and infrastructure. The development footprint is approximately 1.3 ha and is located in the central area of the site on the elevated hill formation so as to remain above the Logan River flood level defined by the Logan City Council (Council). The remainder of the site is to remain undeveloped.

A layout of the proposed development is provided in reference drawing ref. LS303-00-S-SKE-CI-8500, a copy of which is contained in Appendix B.

3 Stormwater Quality – Construction Phase

3.1 Water Quality Objectives

The *State Planning Policy (DSDIP, April 2016)* provides the following construction stormwater management design objectives.

Table 3-1 Construction Phase Design Objectives for Urban Stormwater Management

Issue		Design Objective
Drainage Control	Temporary Drainage Works	1. Design life and design storm for temporary drainage works: • Disturbed area open for <12 months—1 in 2-year ARI event • Disturbed area open for 12–24 months—1 in 5-year ARI event • Disturbed area open for > 24 months—1 in 10-year ARI event 2. Design capacity excludes minimum 150 mm freeboard 3. Temporary culvert crossing—minimum 1 in 1-year ARI hydraulic capacity
Erosion Control	Erosion Control Measures	1. Minimise exposure of disturbed soils at any time 2. Divert water run-off from undisturbed areas around disturbed areas 3. Determine the erosion risk rating using local rainfall erosivity, rainfall depth, soil-loss rate or other acceptable methods 4. Implement erosion control methods corresponding to identified erosion risk rating
Sediment Control	Sediment control measures Design storm sediment control basins Sediment dewatering	1. Determine appropriate sediment control measures using: > potential soil loss rate, or > monthly erosivity, or > average monthly rainfall 2. Collect and drain stormwater from disturbed soils to sediment basin for design storm event: > design storm for sediment basin sizing is 80th% five-day event or similar 3. Site discharge during sediment basin dewatering: > TSS < 50 mg/L TSS, and > Turbidity not >10% receiving waters turbidity, and > pH 6.5–8.5
Water Quality	Litter and other waste, hydrocarbons and other contaminants	1. Avoid wind-blown litter; remove gross pollutants 2. Ensure there is no visible oil or grease sheen on released waters 3. Dispose of waste containing contaminants at authorised facilities
Waterway Stability and Flood Flow Management	Changes to the natural waterway hydraulics and hydrology	For peak flow for the 1-year and 100-year ARI event, use constructed sediment basins to attenuate the discharge rate of stormwater from the site

3.2 Management Plan

During the construction phase, the potential exists for increases in the amount of pollutants, particularly sediment to be exported from the site. It is expected that the construction phase works will comprise of removal and stock piling of topsoil and existing vegetation, bulk earthworks (including the construction of sediment basins), final site trimming and profiling and landscaping and associated drainage.

The pollutants that are to be managed during the construction phase include:

- Litter;
- Sediment; and
- Hydrocarbons (oils and greases).

During the construction stage the management of stormwater runoff from the exposed earthworks surfaces will be based on containment, diversion and retention. Throughout the stages of construction these will include:

- Erosion controls such as sediment fences surrounding stripped earth.
- Sediment fences surrounding stockpiles of soil and debris.
- Construction of perimeter bunding at the toe and/or top of the earthworks batters.
- Catch drains, including check dams, through the site to catch and direct runoff to sediment sumps.
- The containment of runoff from the site into temporary sediment basins.

Plate 6-1 – Sediment Fences

Plate 6-2 – Catch Drain

Plate 6-3 – Sediment Basin

During this period, an Erosion and Sediment Control Plan will be required as part of the overall Environmental Management Plan prepared for the construction phase. It is considered that the completion of construction activities in accordance with an Erosion and Sediment Control Plan (ESCP) developed using the following guidelines will minimise the nature of any adverse impacts during the construction phase. The ESCP would apply throughout the entire construction period.

It is suggested that the requirement to submit an ESCP to Council for approval as part of any subsequent Operational Works application over the site be made a condition of the approval issued for the development. The ESCP must:

- Be prepared by a suitably qualified and experienced professional;
- Be consistent with the Council's Planning Scheme Policy and current best management practice guidelines (such as the IECA Best Practice Erosion and Sediment Control);

- Prescribe non-structural controls where applicable, such as minimising the extent and duration of soil exposure, staging the works, identifying areas for protection and delaying clearing until construction works are imminent;
- For each stage of works detail the types, location, sequence and timing of measures and actions to effectively minimise erosion, manage flows and capture sediment;
- Be consistent with current best management practice standards, taking into account all environmental constraints including erosion hazard, season, climate, soil and proximity to waterways; and
- Be prepared to a sufficient standard and level of detail.

The water quality objectives listed in Table 3-1 will apply to the construction phase of the project.

4 Stormwater Quality – Operational Phase

4.1 Water Quality Objectives

The site will ultimately drain into the Logan River, which is located immediately north of the proposed development. Taking into consideration the importance of these downstream receiving waters, the purpose of this Stormwater Management Plan (SMP) is to ensure that no detriment to the downstream environment is caused by the proposed development. To this end, Water Quality Objectives (WQOs) have been nominated for the project.

The *State Planning Policy (DSDIP, April 2016)* provides the following operational stormwater management design objectives. These are in accordance with Council's *'Section 13.1 - Stormwater Quality Management Guidelines'.*

Table 4-1 Post-Construction Phase Design Objectives for Urban Stormwater Management

Criterion	Design Objective
Stormwater Quality Management	The development is required to achieve the following minimum reductions in total pollutant load, compared with that in untreated stormwater runoff, from the developed part of the site: > 80% reduction in total suspended solids > 60% reduction in total phosphorus > 45% reduction in total nitrogen > 90% reduction in gross pollutants
Waterway Stability Management	Limit the post-development peak one-year average recurrence interval (ARI) event discharge within receiving waters to the pre-development peak.

The intent of the **Stormwater Quality Management** criterion is to reduce the impact of urban development on pollutant loads discharged to receiving waters by achieving the above minimum reductions in total pollutant load compared with that of untreated stormwater runoff.

The required level of pollutant removal matches the load based reduction targets adopted by Brisbane City Council (BCC).

The intent of the **Waterway Stability Management** criterion is to reduce the impact of urban development on channel bed and bank erosion by limiting the post-development one year average recurrence interval event discharge within the receiving waters to the pre-development peak.

4.2 Pollutant Impact Assessment

A detailed pollutant export analysis was carried out using eWater's Model for Urban Stormwater Improvement Conceptualisation (MUSIC) v6.2.0. MUSIC is a computer software program released by eWater for load based water quality analysis and is based on their current research. To assist Council in their assessment of this proposal, all assumptions and modelling techniques are clearly stated in this document. The analysis has been carried out in accordance with the latest pollutant guidelines and data as defined in:

> MUSIC Modelling Guidelines Version 1.0 – 2010', Water by Design (WBD), 2010;

> 'MUSIC by eWater User Manual', eWater, 2012;

> Water Sensitive Urban Design Technical Design Guidelines for South East Queensland', Healthy Waterways, 2006.

4.2.1 Meteorological Data and Rainfall Runoff Parameters

A 6 minute time step was adopted to allow for accurate modelling of treatment measures. The 6 minute rainfall data used in the MUSIC model was sourced from the Bureau of Meteorology (BoM). Data from BoM's 'Greenbank Thompson Rd' (no. 40659) was adopted, with the time period being 1980-1989. Details of the meteorological data used for modelling are provided in Table 4 1.

Table 4-2 MUSIC Model Meteorological Data and Rainfall-Runoff Parameters

Parameter	Source/Data
Rainfall station	*Greenbank Thompson Rd – No. 40659*
Time step	*6 minute*
Modelling period	*1/01/1980 – 31//12/1989*
Mean annual rainfall (mm)	*784*
Evapotranspiration	*Table 3.1 - MUSIC Modelling Guidelines V1.0*
Rainfall runoff parameters	*Table 3.7 – MUSIC Modelling Guidelines V1.0*
Pollutant export parameters	*Industrial Split Catchments (Table 3.8 - Music Modelling Guidelines V1.0)*

4.2.2 Catchment Breakdown

A split land use catchment breakdown was adopted in the MUSIC model. Source nodes were constructed in accordance with the MUSIC Modelling Guidelines. Details of the catchment breakdown and source nodes are provided in Table 4-3 with the details presented on Figure 2. The proposed development consists of two primary catchments. Catchment A reflects the portion of the site which will be graded to drain to the bio-retention system for treatment. Catchment B represents the remainder of the site which is to be contained with bunding and treated via the plants' onsite treatment devices. The bio-retention basin shall be sized to provide sufficient pollutant removal from Catchment A runoff to allow the pollutant reduction goals to be achieved.

Table 4-3 MUSIC Model Catchment Breakdown

MUSIC Node	Description	Area (ha)	Land Use	Imperviousness (%)
Catchment A.1 – Roof	Combined roof area of onsite infrastructure that drains onto road.	0.050	Industrial – Roof	100
Catchment A.2 – Road	Combined area of internal roads.	0.303	Industrial – Road	100
Catchment A.3 – Ground	Combined area of grasses ground area that drains to basin	0.655	Industrial – Ground	10

4.2.3 Treatment Device Design

As stated above, the design allows for the isolation of a portion of the site (Catchment B) due to the potentially high loading associated with these areas generated from the operation of the plant. Runoff from these areas is to be captured and returned to the treatment plants' onsite devices.

The treatment for the remainder of the site (Catchment A), will be provided by a bio-retention basin located in the north-east corner of the development footprint. This system will utilise an appropriate filter medium and maximise stormwater retention. This will allow the stormwater to pass through a filter and a biofilm medium prior to discharge. The systems will improve the water quality by removing:

> Suspended solids

> Nutrients; and

> Metals.

The adopted location of the bio-retention area is shown in Figure 2. Design details for the proposed bio-retention treatment are outlined in Table 4-4.

Table 4-4 Bio-Retention Design Parameters

Design Parameter	Value	Units
Filter Area	90	m^2
Filter Depth	0.5	m
Extended Detention Depth	0.3	m
Saturated hydraulic conductivity	180	mm/hr
TN content of filter media	400	mg/kg
Orthophosphate content of filter media	50	mg/kg

Based on the site layout provided by LWIA, the basin has been designed with a 17m x 18m footprint, battering to a depth of 1m and base area of 9m x 10m

4.2.4 Water Quality Modelling Results

The performance of the proposed treatment measure was determined by comparing the annual pollutant export load of the mitigated scenario incorporating treatment to the same catchment with no treatment.

Table 4-5 below shows the quantities, in kilograms each year, of pollutant exported from the site in the unmitigated and with treatment situations, and the percentage reduction afforded by the treatment device.

Table 4-5 Annual Pollutant Load Reductions

Pollutant	Proposed without treatment (kg/yr)	Proposed with treatment (kg/yr)	Reduction Achieved (%)	Target Reduction (%)
Total Suspended Solids	1270	234	81.5	80
Total Phosphorous	2.7	0.929	65.6	60
Total Nitrogen	11.2	5.93	47.3	45
Gross Pollutants	83.7	0	100	90

Plate 4-1 displays the MUSIC model node setup adopted to represent the proposed water treatment plant.

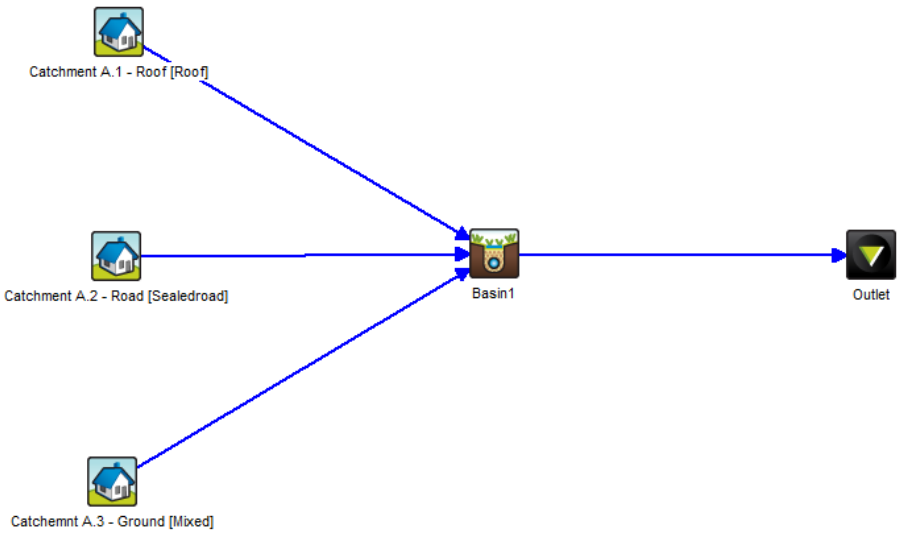


Plate 4-1

As shown in Table 4-5 the proposed bio-retention basin will adequately reduce pollutant load exports to meet the adopted Water Quality Objectives.

5 Stormwater Quantity

In order to confirm that no increase in discharge is caused by the proposed development a WBNM model was created for the pre, post and mitigated development scenarios. The model takes into account a number of AEP events (1% to 63%) and a range of storm durations.

The existing scenario WBNM model was validated against a Rational Method calculation in accordance with QUDM.

It was assumed that the site will be graded to drain towards the onsite bio-retention basin with the exception of the specified bunded areas. The development footprint was therefore treated as a single catchment, discharging into the bio-retention basin. The solar panel areas and driveway to the site were omitted from the model as their minimal increase in discharge is considered negligible. Table 5-1 below provides the pre and post-developed catchment details.

Table 5-1 WBNM Catchment Details

Catchment Parameter	Pre-Developed	Post Developed
Area (ha)	1.39	1.04
Fraction Impervious (%)	0.00	80.00
Initial Losses (mm)	0.00	0.00
Continuing Losses (mm/h)	2.50	2.50

In order to ensure no increase in site discharge is caused by the proposed development, local detention will be provided by the proposed bio-retention basin as detailed previously. The basin has been designed with three 375mm outlet pipes elevated at 0.3m above the base of the basin to achieve the required extended detention depth for the bioretention system as the two devices will be co-located. The maximum required storage volume in the 1% AEP event is 158 m^3 at a depth of 0.9m in the basin.

These detention measures have been incorporated into the post-development WBNM in order to accurately portray the ultimate hydrology of the site.

Table 5-2 WBNM Results

AEP (%)	Pre-Development Discharge (m^3/s)	Post-Development Discharge (m^3/s)	Impact (Pre vs Post) (m^3/s)	Mitigated Development Discharge (m^3/s)	Impact (Mitigated Vs Post) (m^3/s)
1	0.75	0.76	0.01	0.60	-0.15
2	0.66	0.68	0.02	0.54	-0.12
5	0.61	0.63	0.02	0.48	-0.12
10	0.52	0.55	0.03	0.44	-0.08
18	0.45	0.49	0.04	0.40	-0.05
39	0.34	0.39	0.05	0.32	-0.02
63	0.26	0.30	0.04	0.24	-0.02

As shown in Table 5-2 with the proposed detention measures in place, the development will not produce an increase in flows at the discharge point of the site. This table also shows that the waterway stability criteria has been met as the 63% AEP event peak flows are not increased as a result of the proposed development.

It can be noted that it is possible that other outlet/storage combinations will also achieve the same outcome. The calculations conducted to date demonstrate that compliance can be achieved within the footprint available. Different pipe outlet configurations can be explored during detailed design if necessary.

Figure 2 details the discharge location of the site.

6 Conclusion

A Stormwater Management Plan has been prepared for the Cedar Grove Wastewater Treatment Plant.

It is proposed to treat runoff from the site by the inclusion of a bio-retention system in the north-eastern corner of the site.

Detailed modelling of the system has indicated that the bio-retention basin will allow the water quality objectives adopted for the site to be achieved.

A WBNM model has been developed to analyse the stormwater quantity impacts of the site. Results of the model indicate that the proposed detention measures will adequately mitigate the increase in flow caused by the development such that no adverse impacts will be produced downstream of the site.

Cedar Grove Wastewater Treatment Plant

FIGURES

Cardno
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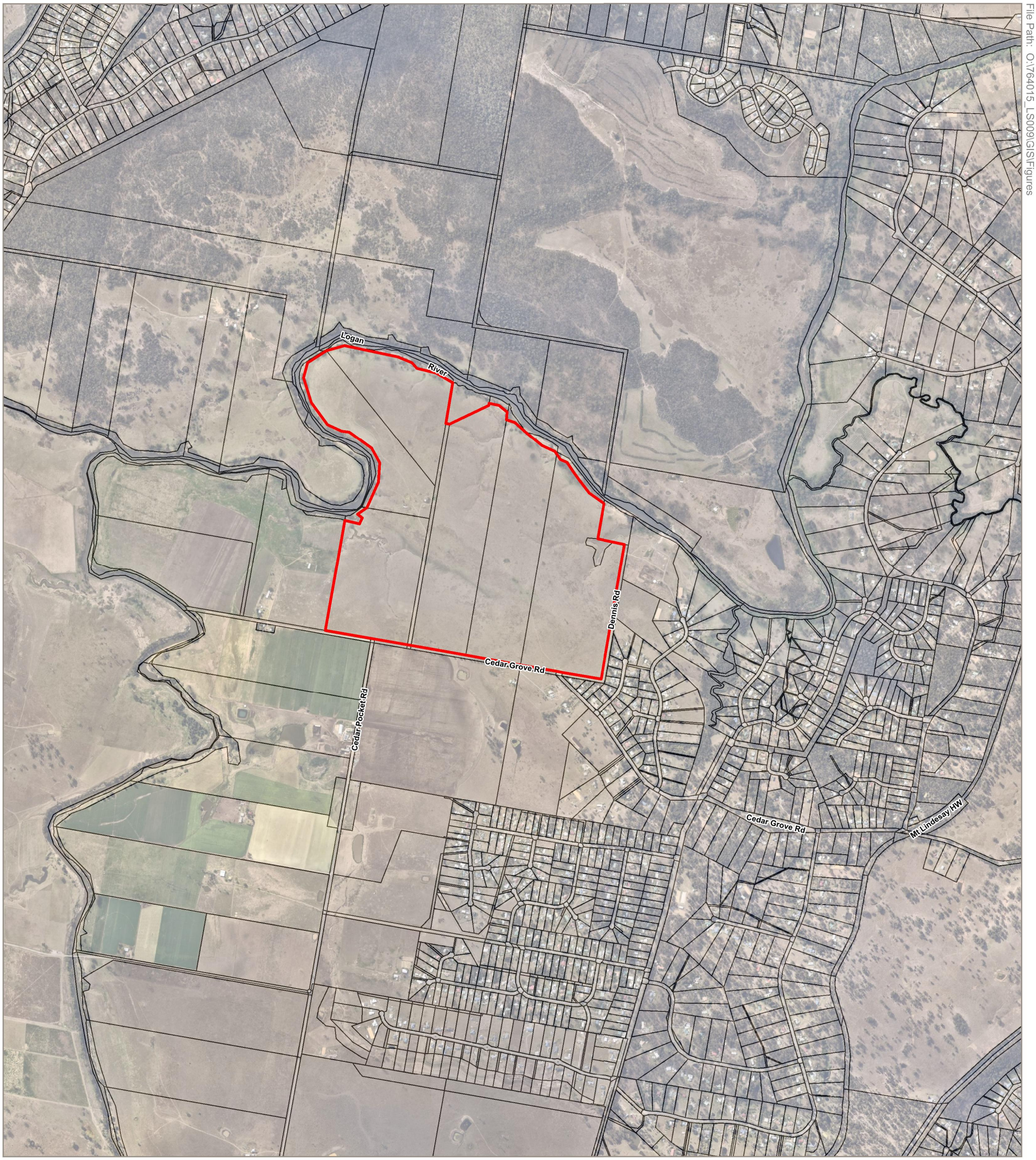
File Path: O:\764015_LS009\GIS\Figures



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Metres

N W E S

SHEET	A3
Project No:	764015_LS009
Date:	18/08/2017
Revision Number:	0
Designed by:	G.Paxton
Client Name:	Logan Water Infrastructure Alliance

LEGEND

Lot Boundary

Figure 1

Site Locality

Cedar Grove Treatment Plant

Cardno
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Cardno (QLD) Pty Ltd | ABN 57 051 074 992
Level 11, North Tower, 515 St Pauls Terrace
Locked Bag 4006, Fortitude Valley QLD 4006
Tel: 07 3369 9822 Fax: 07 3369 9722

File Path: O:\764015_LS009\GIS\Figures

Scale: 1:1,500

15 0 15 30 45

Metres

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W E
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SHEET	A3
Project No:	764015_LS009
Date:	18/08/2017
Revision Number:	0
Designed by:	G.Paxton
Client Name:	Logan Water Infrastructure Alliance

LEGEND

- Site Boundary
- Catchment A - Road
- Catchment A - Ground
- Catchment A - Roof
- Bio-retention Basin (Point of Discharge)
- Catchment B - Bunded Area

Figure 2

Catchment Plan

Cedar Grove Treatment Plant

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Cardno (QLD) Pty Ltd | ABN 57 051 074 992
Level 11, North Tower, 515 St Pauls Terrace
Locked Bag 4006, Fortitude Valley QLD 4006
Tel: 07 3369 9822 Fax: 07 3369 9722

Cedar Grove Wastewater Treatment Plant

APPENDIX A

FLOOD MAPPING

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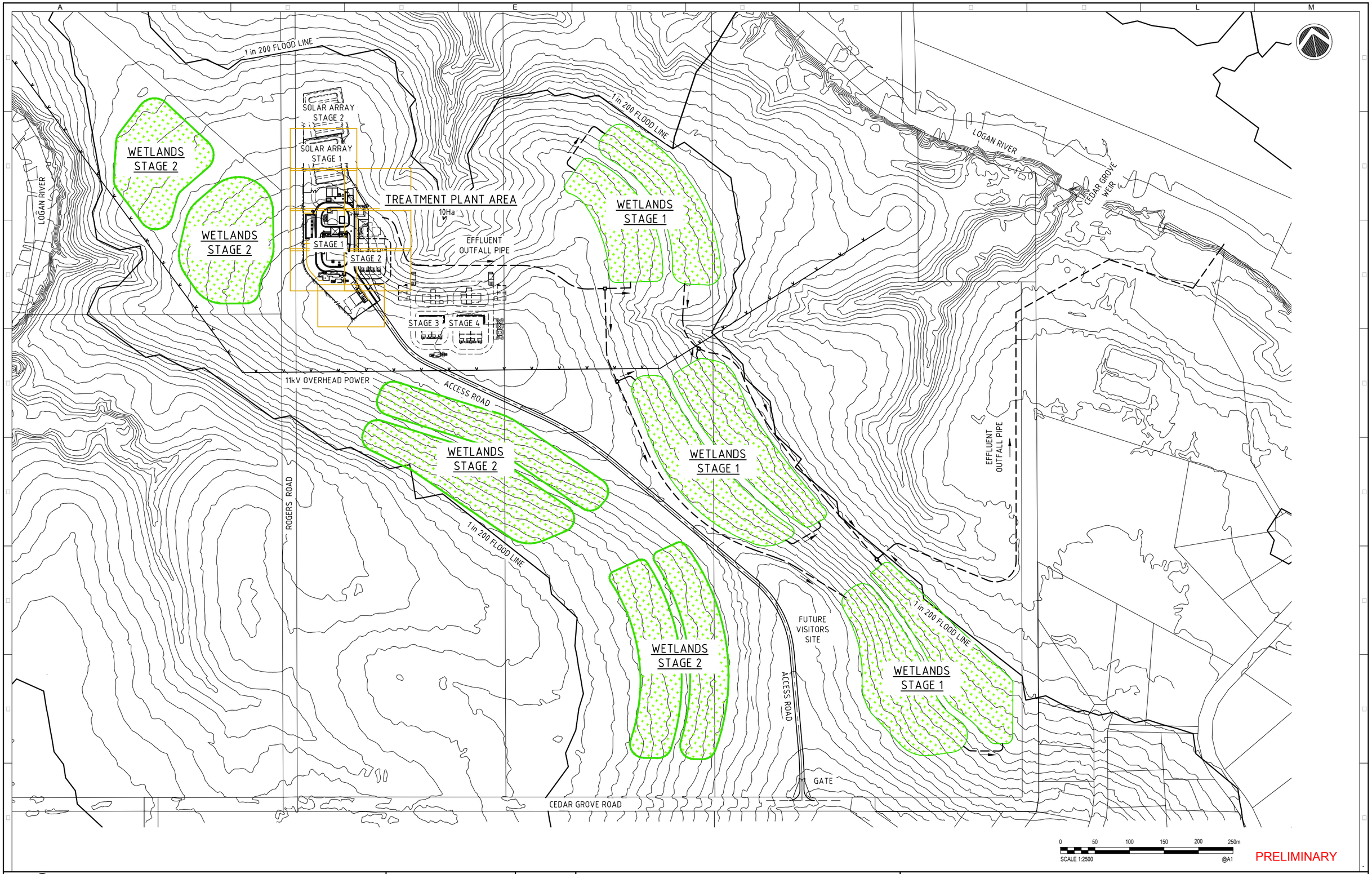


PRELIMINARY

REV. No.	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE
B	1:100 FLOOD LINE REMOVED AND 1:200 FLOOD LINE ADDED	D.G.	D.G/G.P	G.P.	13/09/2017
A	ISSUE FOR 30% DOAR	D.G.	D.G.	G.P.	10/08-2017

DESIGNED BY D.G.
DRAFTED BY D.G. | DRAFTING CHECK BY
DESIGN CHECKED BY G.P. | RPEQ
APPROVED BY | RPEQ

REFERENCES
PROJECT No. 764015-LS303
FILE REFERENCE:
SHEET SIZE A1
DATUM : AHD GDA 94 ZONE 56.

LOGAN WATER INFRASTRUCTURE ALLIANCE
Proudly LOGAN CITY COUNCIL

PROJECT: CEDAR GROVE WWTP
DRAWING TITLE: ULTIMATE WWTP OVERALL LAYOUT
DRAWING No. LS303-00-S-SKE-CI-8600
DESIGN COMPANY. LoganWIA
REV. B
TECH SERVICES DRG No.

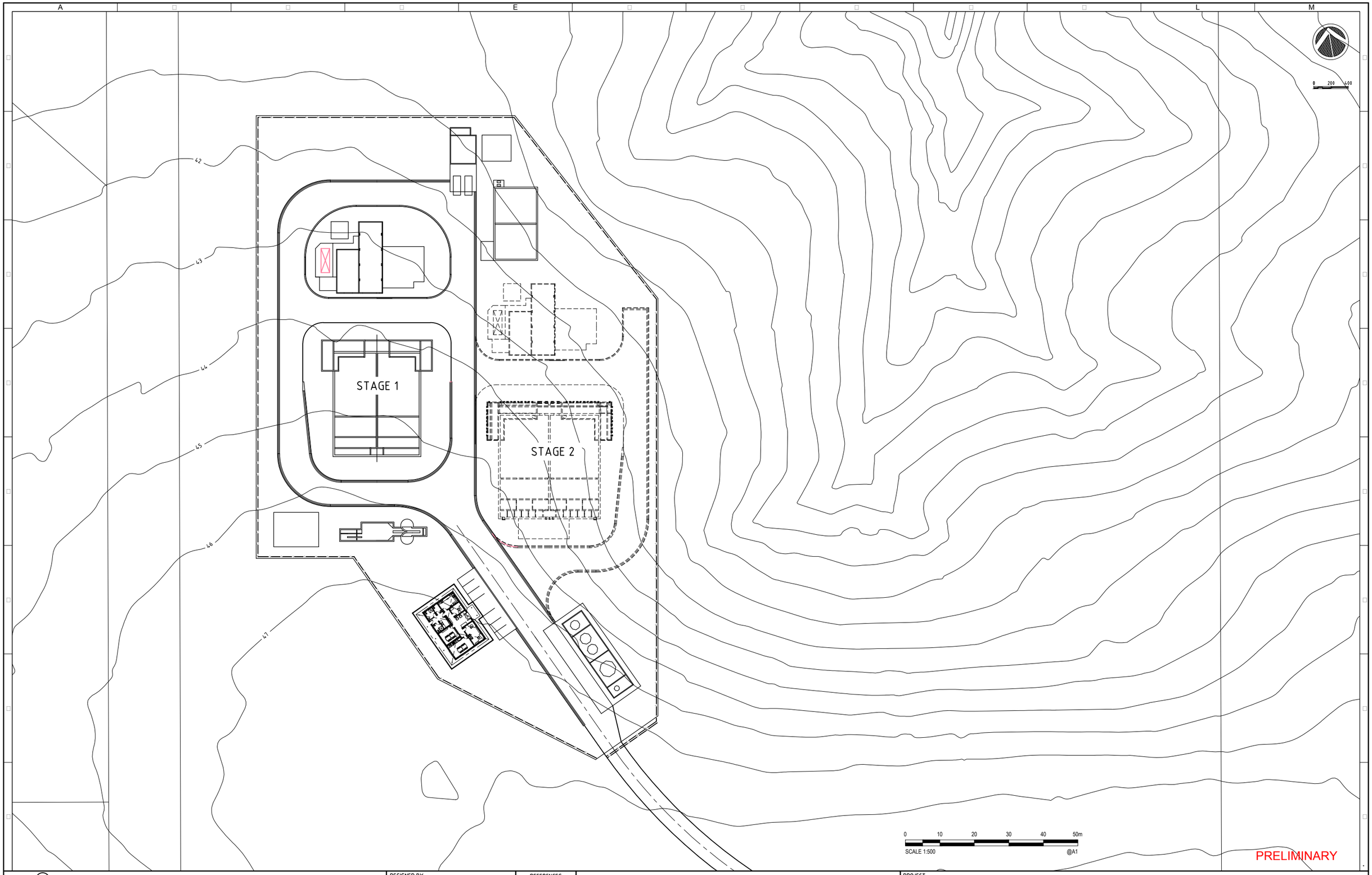
Cedar Grove Wastewater
Treatment Plant

APPENDIX

B

REFERENCE DRAWINGS

Cardno
Shaping the Future



REV. No.	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE

DESIGNED BY: D.G.
DRAFTED BY: D.G. | DRAFTING CHECK BY:
DESIGN CHECKED BY: G.P. | RPEQ
APPROVED BY: | RPEQ

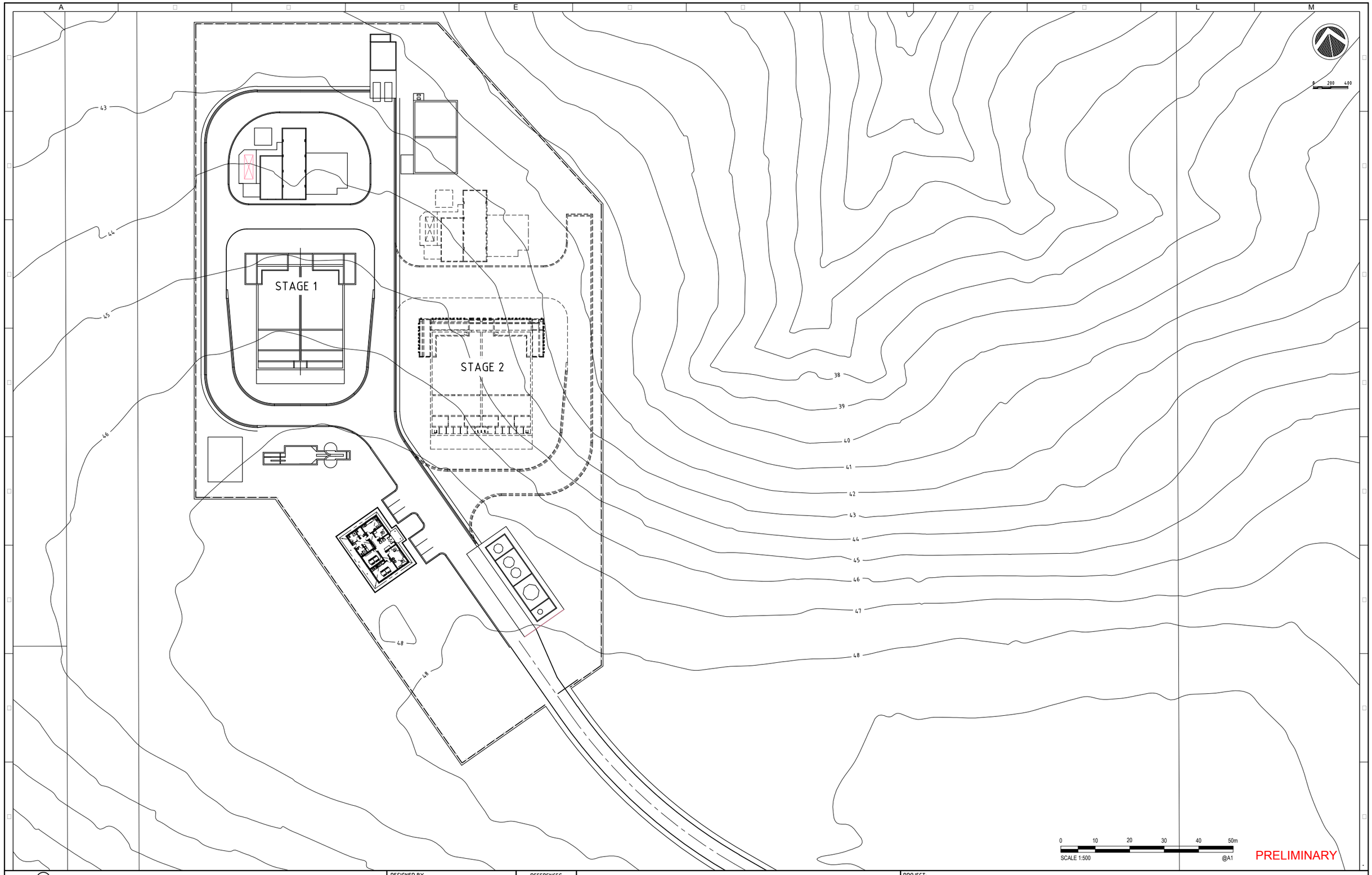
REFERENCES
PROJECT No.
FILE REFERENCE:
SHEET SIZE: A1
DATUM : AHD
GDA 94 ZONE 56.

LOGAN WATER INFRASTRUCTURE ALLIANCE
Proudly LOGAN CITY COUNCIL

PROJECT: CEDAR GROVE WWTP

DRAWING TITLE: TREATMENT PLANT STAGE 1 AND 2 SITE LAYOUT

DRAWING No. LS303-00-S-SKE-CI-8500
DESIGN COMPANY. LoganWIA
REV. A
TECH SERVICES DRG No.



REV. No.	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE

DESIGNED BY	D.G.
DRAFTED BY	D.G.
DRAFTING CHECK BY	
DESIGN CHECKED BY	RPEQ
G.P.	
APPROVED BY	RPEQ

REFERENCES
PROJECT No.
FILE REFERENCE:
SHEET SIZE **A1**
DATUM : AHD
GDA 94 ZONE 56.

LOGAN WATER INFRASTRUCTURE ALLIANCE

Proudly LOGAN CITY COUNCIL

PROJECT: CEDAR GROVE WWTP

DRAWING TITLE: TREATMENT PLANT STAGE 1 AND 2 SITE LAYOUT

DRAWING No. LS303-00-S-SKE-CI-8500

DESIGN COMPANY. LoganWIA

REV. B

TECH SERVICES DRG No.

Appendix C Traffic Impact Assessment

TECHNICAL MEMO

SUBJECT:	Cedar Grove Traffic Impact Assessment		
OUR REF:	2260542A-TPT-RPT-002 RevC.docx		
DATE:	4 October 2017		
PREPARED BY:	Sam Caldwell	**REVIEWED BY:**	Richard Maxwell

1. INTRODUCTION

The Logan Water Infrastructure Alliance (WIA) has proposed to build a wastewater treatment plant (WWTP) on land at Cedar Grove Road, Dennis Road and Rogers Road in Cedar Grove, Logan City. The proposed works include the establishment of a regional WWTP and associated ancillary infrastructure, including an access road, a discharge main and construction of artificial wetlands. Operation of the facility will require regular vehicle traffic for supply delivery, waste removal and maintenance. All of these vehicles are expected to access the site via Cedar Grove Road and Mount Lindesay Highway, coming from the north.

Table 1.1 Cedar Grove WWTP vehicle access

PURPOSE	VEHICLE TYPE	RETURN TRIPS PER WEEK	ORIGIN / DESTINATION
Chemical deliveries	20,000 L tanker	1	Brisbane
Bio-solids removal*	Body truck	5	Various – likely Swanbank, Ipswich
Grit & Screenings	8t truck	1	Swanbank landfill
Operator light vehicles	Ute	8	Logan/Beenleigh

Note: Traffic estimates provided by Logan WIA

A swept path analysis was undertaken for a 3.5 km section of Cedar Grove Road between Mount Lindesay Highway and the proposed access road (approximately 550 m east of Rogers Road). The design vehicle is a 12.5 m single unit truck, as shown in Figure 1.1. This design vehicle was chosen to represent the body truck used for bio-solids removal, the largest of the vehicles required to access the facility.

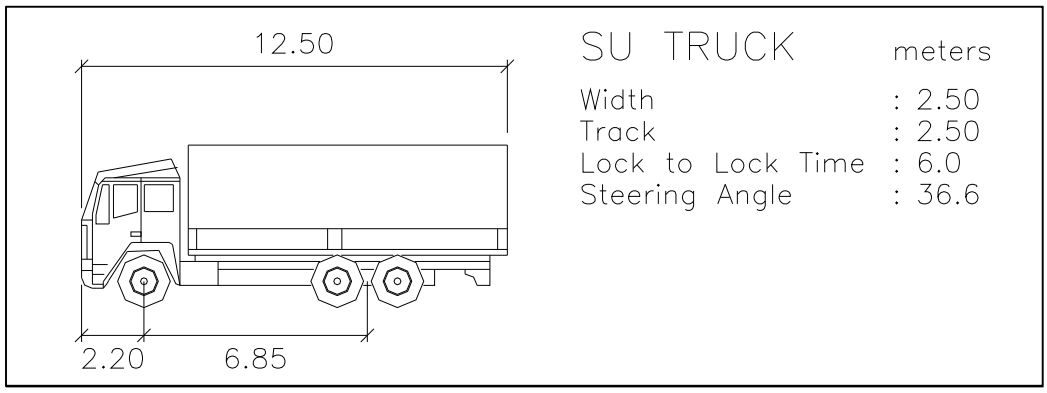


Figure 1.1 Design vehicle details – 12.5 m truck

Level 3, Northbank Plaza,
69 Ann Street
Brisbane QLD 4000
GPO Box 2907
Brisbane QLD 4001

Tel: +61 7 3854 6200
Fax: +61 7 3854 6500
www.wsp.com

2. SWEPT PATH ASSESSMENT

Cedar Grove Road has an existing sealed road width of approximately 6.0 m, with localised widening at some bends and intersections.

2.1 DESIGN STANDARDS

Austroads Guide to Road Design (Part 3, Section 4.2.6) recommends that two lane sealed rural roads with low traffic volumes have a minimum total seal width of 7.2 m to allow adequate width for passing. Figure 2.1 shows an extract from this section of the Austroads guide. The highlighted dimensions are recommended for low traffic, single carriageway rural roads.

Table 4.5: Single carriageway rural road widths (m)

Element	Design AADT				
	1 – 150	150 – 500	500 – 1,000	1,000 – 3,000	> 3,000
Traffic lanes(1)	3.7 (1 x 3.7)	6.2 (2 x 3.1)	6.2 – 7.0 (2 x 3.1/3.5)	7.0 (2 x 3.5)	7.0 (2 x 3.5)
Total shoulder	2.5	1.5	1.5	2.0	2.5
Minimum shoulder seal (2),(3),(4),(5),(6)	0	0.5	0.5	1.0	1.5
Total carriageway	8.7	9.2	9.2 – 10.0	11.0	12.0

Figure 2.1 Austroads extract – Guide to Road Design Part 3 - Table 4.5

2.2 MOUNT LINDESAY HIGHWAY INTERSECTION

Vehicle movements to or from Mount Lindesay Highway south have been excluded from this assessment based on advice from the project team. It is unlikely that vehicles will approach the treatment facility from the Beaudesert area and all other origins / destinations would approach from the north.

2.2.1 EXITING CEDAR GROVE ROAD

The existing intersection does not provide adequate room for the design vehicle to perform a left turn to the left lane of Mount Lindesay Highway (NB). Turning left into the left lane, the swept path crosses over the existing kerb. This corner would require widening of approximately 2 m to allow left turn using a single lane only. However, the left turn can be achieved by using both northbound lanes on Mount Lindesay Highway. Swept paths for both turns are shown in Figure 2.2.

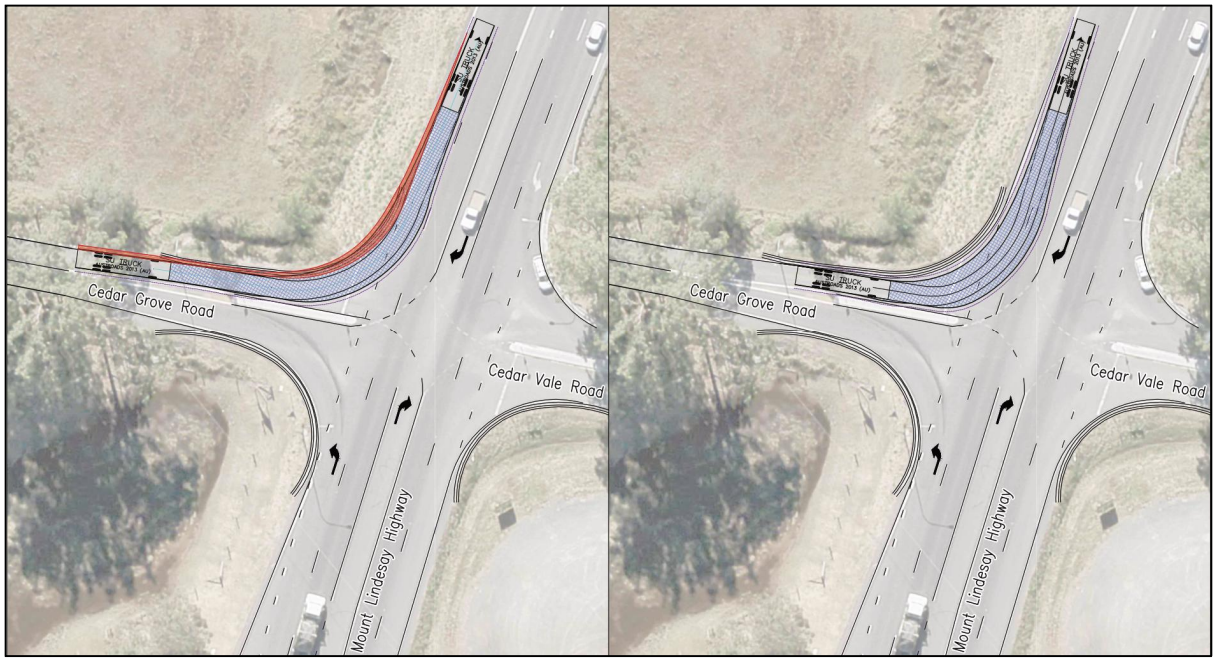


Figure 2.2 Swept paths – Cedar Grove Road left onto Mt Lindesay Highway northbound

2.2.2 ENTERING CEDAR GROVE ROAD

The existing intersection provides adequate room for the design vehicle to perform a right turn from the existing turning lane of Mount Lindesay Highway (SB) into Cedar Grove Road as shown in Figure 2.3.

Figure 2.3 Swept paths – Mt Lindesay Highway southbound right into Cedar Grove Road

2.3 CEDAR GROVE ROAD

Swept paths were assessed along Cedar Grove Road in both directions between Mount Lindesay Highway and the proposed access road. On straight sections for this road type Austroads guidelines recommend a minimum seal width of 7.2 m, greater than the existing 6.0 m.

In order for two design vehicles to pass each other on Cedar Grove Road, one or both vehicles are required to use the shoulder. This is adequate for low volume rural roads where shoulders are in good condition and clear of obstructions. Table 2.1 lists the swept path width for two design vehicles passing each other on curves along Cedar Grove Road, with chainage 0 starting at Mt Lindesay Highway. The existing width is generally below the swept path width, requiring design vehicles to use the shoulder when passing.

Table 2.1 Cedar Grove Road sealed width on bends

CHAINAGE	EXISTING SEALED WIDTH	SWEPT PATH WIDTH FOR 2 DESIGN VEHICLES PASSING
245 m	6.4 m	7.35 m
460 m	8.95 m	7.5 m
765 m	6.0 m	7.2 m
1060 m	6.0 m	7.2 m
1520 m	6.45 m	7.2 m
1940 m	6.3 m	7.3 m
2130 m	7.3 m	7.3 m
2290 m	6.0 m	7.3 m
2500 m	6.0 m	7.25 m
2900 m	6.0 m	7.2 m
3250 m	6.1 m	7.65 m

2.4 PROPOSED ACCESS ROAD

The intersection between Cedar Grove Road and the proposed access road should allow space for the design vehicle to perform right turns in and left turns out as shown in Figure 2.4. It is envisaged that this can be easily accommodated in the access road design.

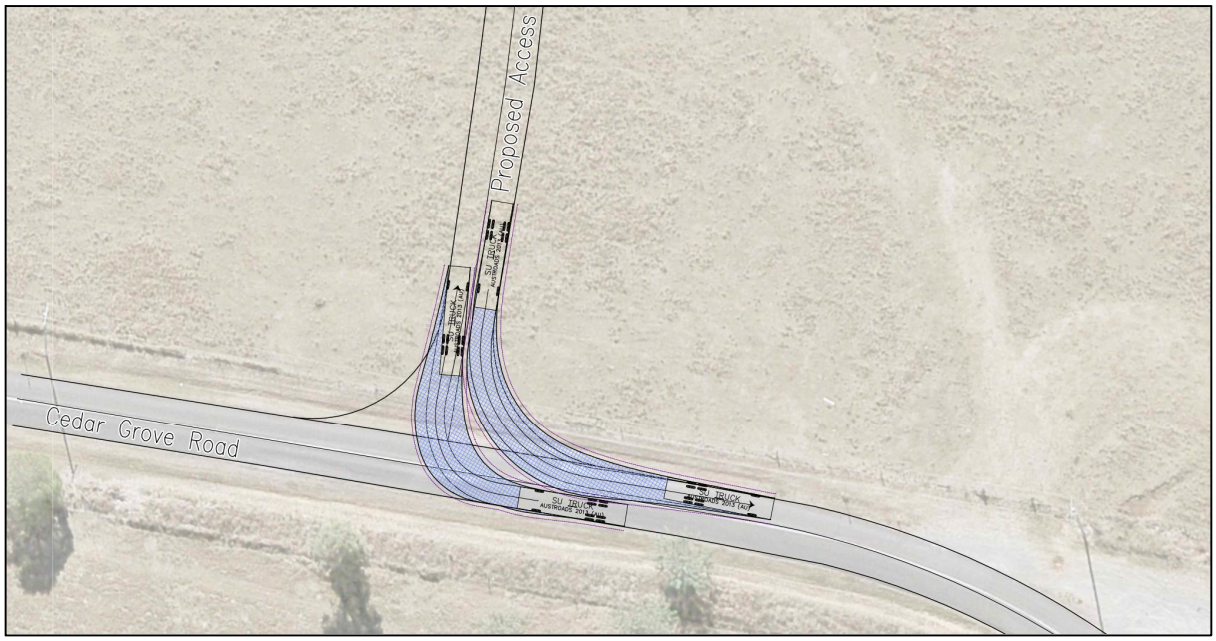


Figure 2.4 Proposed access road intersection

3. CONCLUSION

This assessment only considered vehicles required for the ongoing operation and maintenance of the wastewater treatment plant. It is likely that larger vehicles will be required to access the site during construction. Traffic management and temporary works may be required to accommodate larger vehicles during construction.

The following conclusions can be drawn from the swept path analysis:

- The existing Cedar Grove Road sealed width is not adequate for two 12.5 m trucks to pass each other both physically on the existing pavement and for compliance to Austroads. However, the shoulders can be used to allow the two design vehicles to pass each other.
- Swept paths at the intersection between Cedar Grove Road and Mount Lindesay Highway demonstrate that the design vehicle requires both lanes for the turn exiting Cedar Grove Road to northbound Mount Lindesay Highway.
- Adequate width is available for the design vehicle to perform turns entering Cedar Grove Road from northbound Mount Lindesay Highway.

3.1 RECOMMENDATIONS

It is recommended that regular condition assessments are undertaken to assess the pavement and shoulders to determine if there has been any deterioration. This would then identify areas needing rectification. The recommended condition assessment frequencies are:

- prior to construction commencing,
- 1 / month during construction of the WWTP, and
- 1 / year during operation of the WWTP.

Appendix D Updated Landscape Plan

LEGEND

- STAGE 1 OF THE PROPOSED PROJECT
- STAGE 2 OF THE PROPOSED PROJECT
- A — PROPOSED REVEGETATION OF LOGAN RIVER'S BANKS
- B — PROPOSED SCREENING VEGETATION - 20M WIDE
- C — PROPOSED WETLANDS
- D — RETAINED OPEN GRASSLAND
- E — WASTE WATER TREATMENT PLANT WITH SCREEN PLANTING
- F — PROPOSED SOLAR ARRAYS
- G — POSSIBLE WETLAND COMMUNITY CENTRE
- H — EXISTING SEQWATER PROPERTY
- I — EXISTING WEIR AND PROPOSED OUTFALL FROM WETLANDS
- Q100 FLOOD LINE

REFER A ON PLAN

REFER B ON PLAN

REFER C ON PLAN

REFER F ON PLAN

DRAFT CONCEPT MASTER PLAN

Cardno
Shaping the Future

landscape architecture
urban design
visual assessment
environmentalmanagement

LOGAN WATER INFRASTRUCTURE ALLIANCE CEDAR GROVE MGMT STRATEGY

NTS

DATE	DRAWING NO	ISSUE
13.09.17	SP103001-LA01	B