RIVERMONT, CABOOLTURE WEST PRECINCT 4

STORMWATER QUALITY MANAGEMENT PLAN

VERSION 2

DesignFlow

Prepared for Stockland

March 2026

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1 INTRODUCTION

This report has been prepared to support the Reconfiguring a Lot (RAL) development application for the Stockland Caboolture West development Precinct 4.

The Precinct 4 development is a greenfield development site located within the Caboolture West Emerging Community Area. The development will involve the creation of residential landuse set amongst recreational and open space precincts. The development ultimate drains to Small Creek to the north.

The approved *Caboolture West Development - Stormwater Quality Management Plan to Support Preliminary Approval for Precinct 1 to 6 and RAL for Precinct 4* (DesignFlow, 2022) established the overall stormwater quality strategy for Precincts 1 to 6. This report outlines the detailed Stormwater Quality Management Plan for Precinct 4. The report demonstrates how Precinct 4 development will meet the operational water quality objectives defined in the *State Planning Policy* (2017) and Council Planning Scheme.

The report focuses on stormwater quality management only. Flood / stormwater quantity management is presented in other reports.

2 SITE CHARACTERISTICS

2.1 SITE LOCATION

The proposed Caboolture West Precinct 4 development is located adjacent to the Caboolture River and lies within the proposed Stockland Neighbourhood Development Plan (SNDP). Small Creek flows through the northern portion of the site. Figure 1 shows the location of the site.

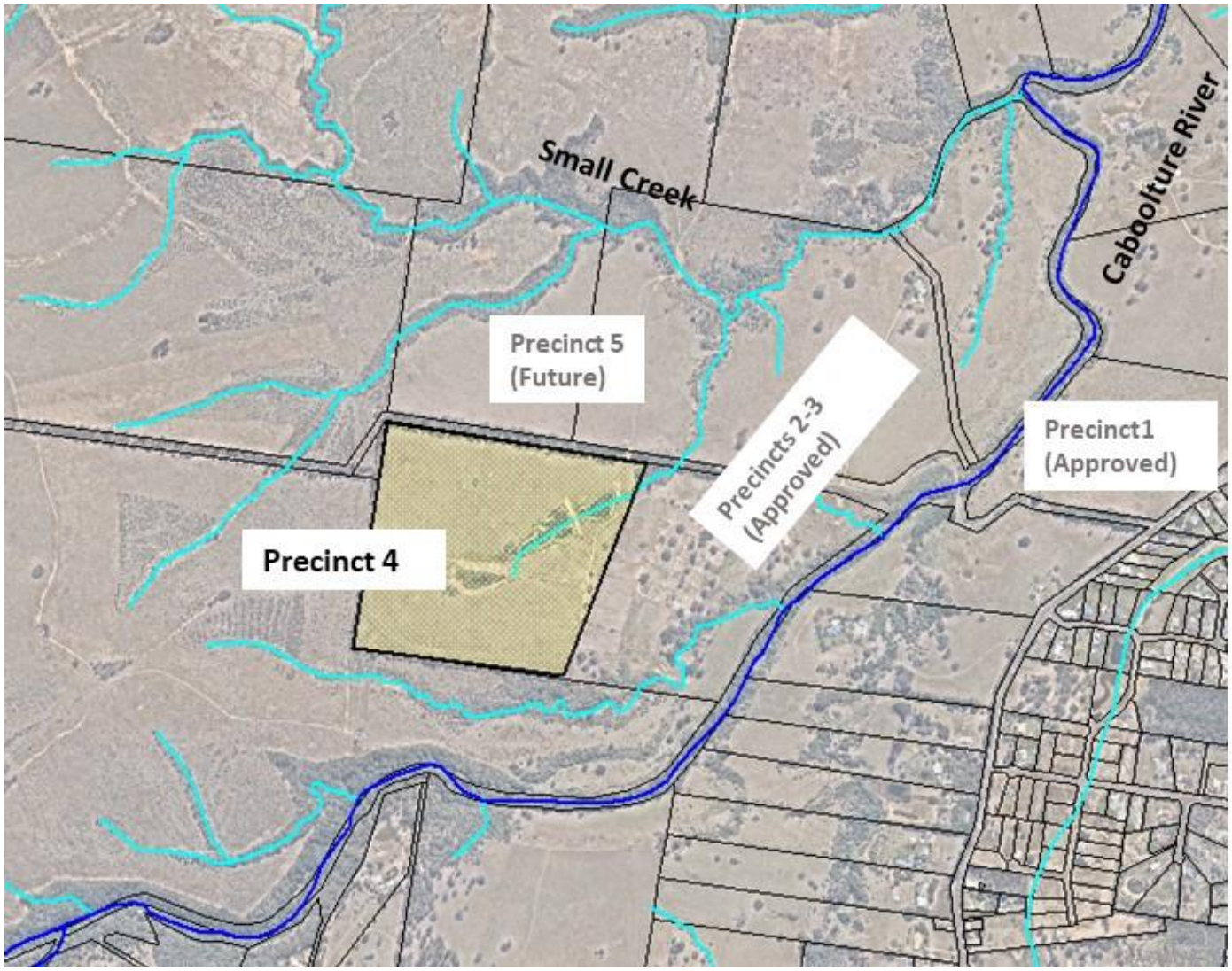


Figure 1: Locality plan – Caboolture West Precinct 4

2.2 CLIMATE

Figure 2 provides a summary of the monthly rainfall and evaporation based on climate statistics for Dayboro Post Office (station No 40584).

The annual average rainfall is 1,245mm, whilst annual evaporation is approximately 1,500mm. The figure clearly indicates the seasonal nature of rainfall and evaporation with lower rainfall and evaporation periods during the winter months.

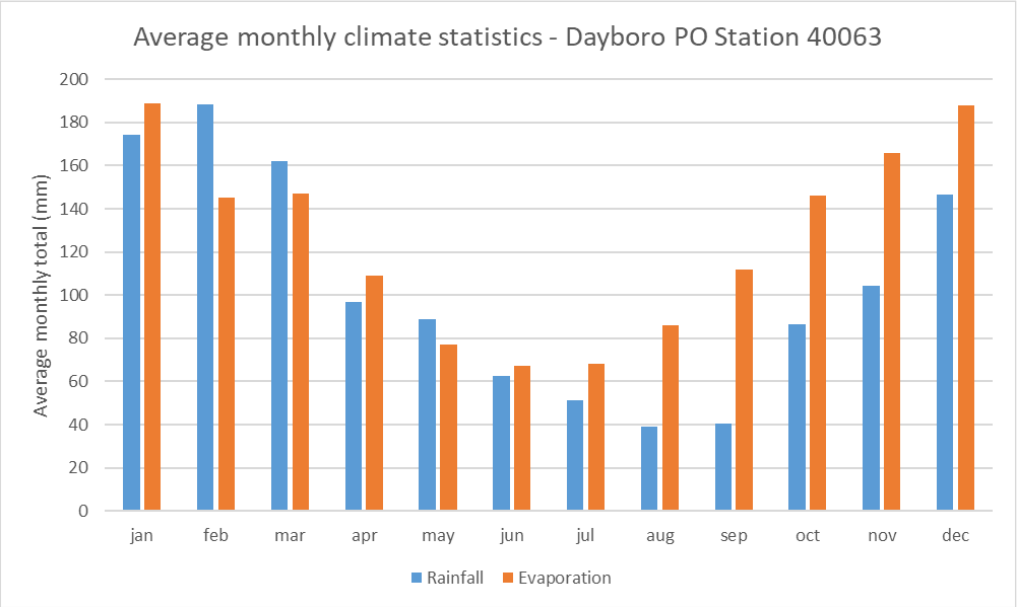


Figure 2: Average monthly climate statistics

2.3 TOPOGRAPHY, CATCHMENTS AND DRAINAGE

Ground levels range from approximately RL45 through the main crest through the site to RL29 at the main discharge to in the north-east corner of the site (refer Figure 3). Slopes vary from moderate to steep grades (generally 3-8%) across the site.

Figure 3 shows the main drainage discharges and catchments across the site. A ridge line run in a circular shape around the west and south of the site creating a series of small catchments which sheet flow from the site. The main catchment drains north-east through two large dams before discharging in the future transport corridor.

The topography of the site supports end of pipe stormwater treatment systems prior to discharge to either Small Creek or Caboolture River. Careful earthworks to divert catchments to deliver water to treatment sites has occurred to integrate with site topography.

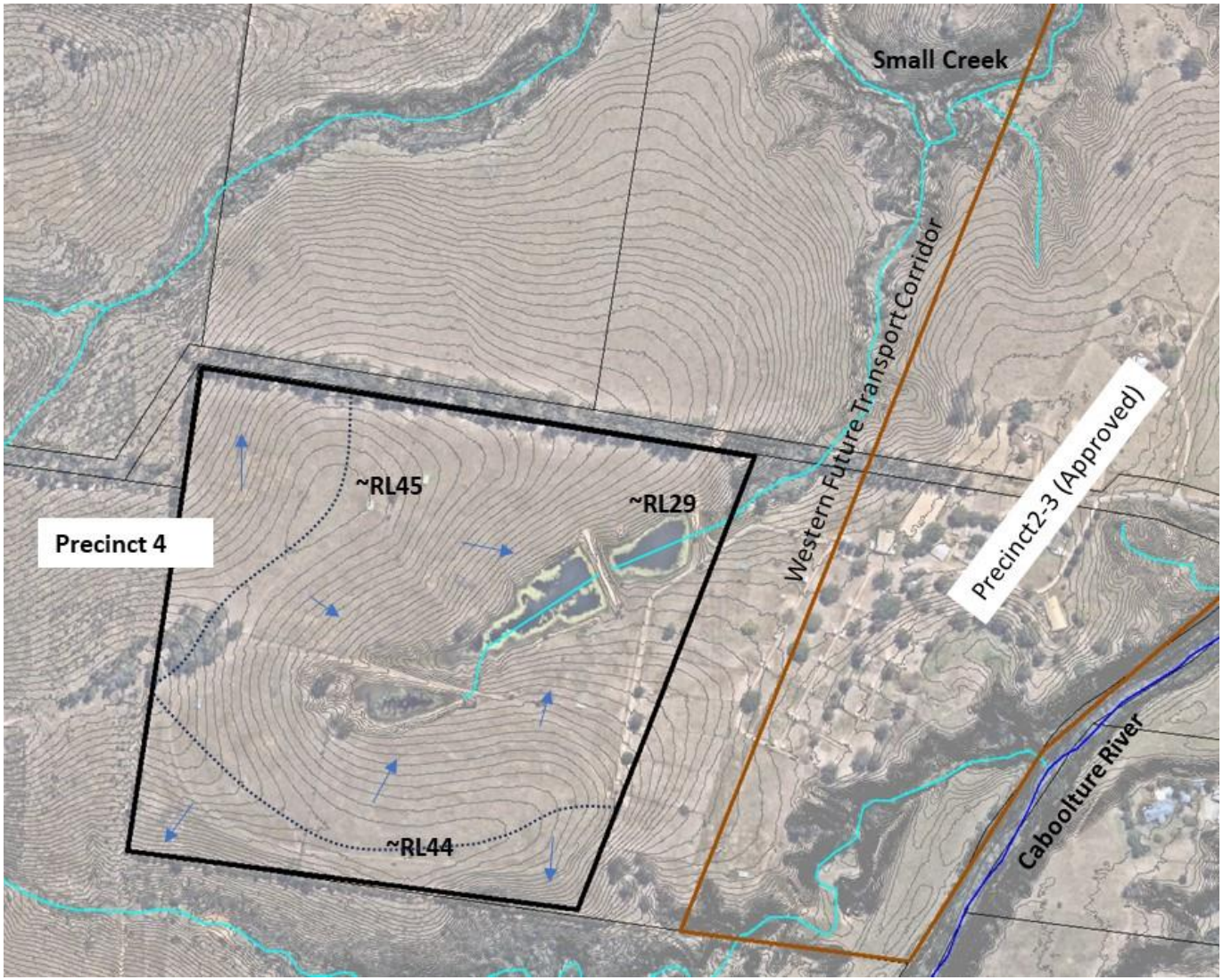


Figure 3: Topography, catchments and drainage

2.4 PROPOSED DEVELOPMENT

The Rivermont Precinct 4 is provided in Figure 4 and consists of the following:

- Residential landsue and roads
- Local parks
- Linear parks (vegetated zones, drainage reserves)

This SQMP focuses on managing stormwater runoff from the urban areas (residential landuse and roads, future retirement facility and local parks) in accordance with the State Planning Policy.

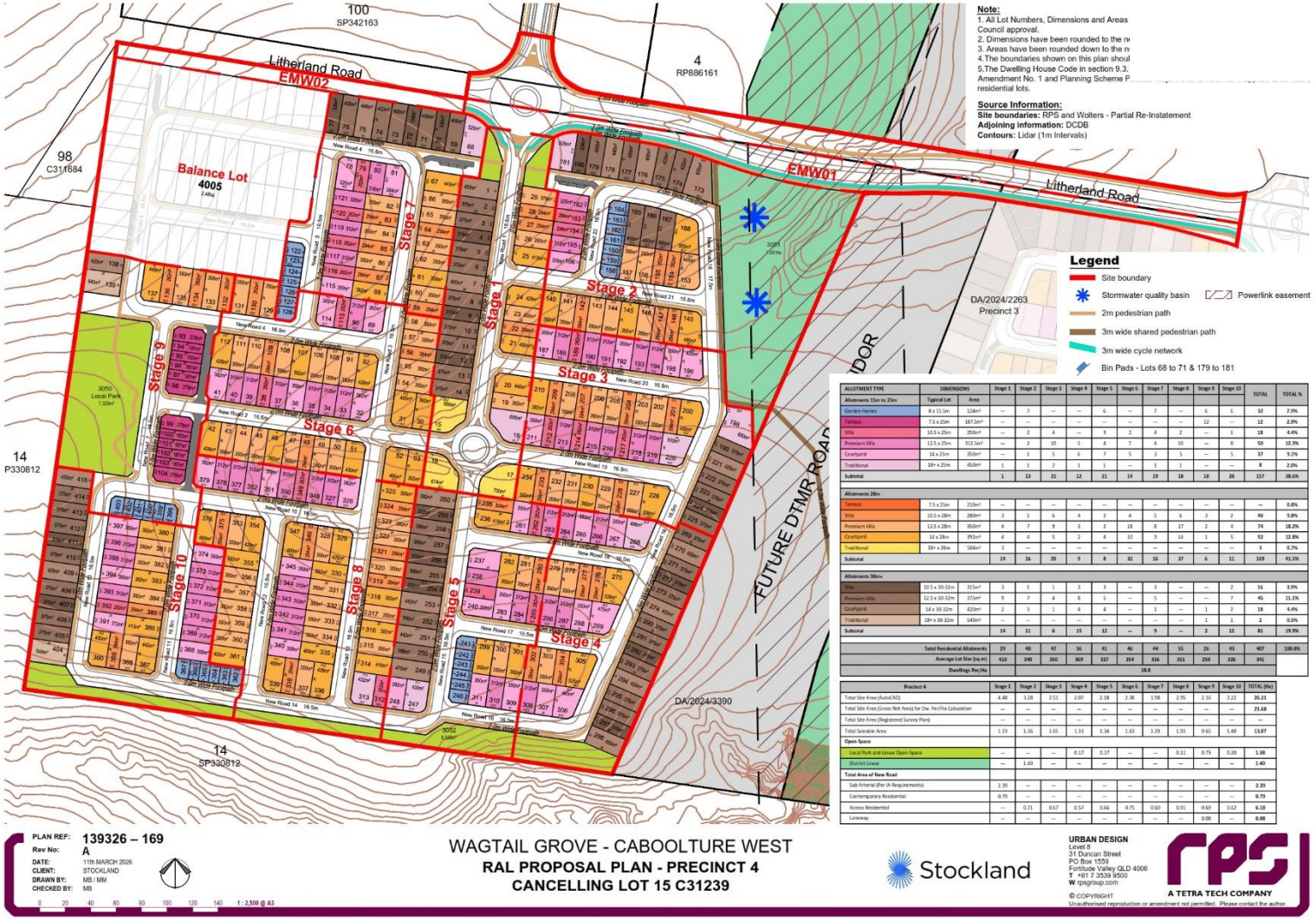


Figure 4: Precinct 4 overall layout (source: RPS)

3 DESIGN OBJECTIVES

In order to protect receiving waterways, relevant state and local planning policies are applied to the development and require water sensitive urban design (WSUD) to comply. These are described in more detail in the following sections.

3.1 CONSTRUCTION PHASE WATER QUALITY

The primary focus of stormwater management during the construction phase is erosion and sediment control. The stormwater management objectives for the construction phase take the form of best-practice concentration-based discharge standards. The performance criteria are limited to those parameters that are directly linked to construction site activities. As the criteria are discharge standards, they apply to runoff events or pumped discharges (during dewatering of siltation basins) from the development site.

The design objectives for stormwater discharged from the site during the construction phase are listed in Table 1 reproduced from Appendix 2 Table A of the State Planning Policy (DILGP, 2017).

Construction phase stormwater management measures will be designed and documented as part of the operational works design or prior to commencement of works on the site.

Table 1 - Construction phase stormwater management design objectives

Issue	Desired outcomes
Drainage control	1. Manage stormwater flows around or through areas of exposed soil to avoid contamination. 2. Manage sheet flows in order to avoid or minimise the generation of rill or gully erosion. 3. Provide stable concentrated flow paths to achieve the construction phase stormwater management design objectives for temporary drainage works (part 2). 4. Provide emergency spillways for sediment basins to achieve the construction phase stormwater management design objectives for emergency spillways on temporary sediment basins (part 3).
Erosion control	1. Stage clearing and construction works to minimise the area of exposed soil at any one time. 2. Effectively cover or stabilise exposed soils prior to predicted rainfall. 3. Prior to completion of works for the development, and prior to removal of sediment controls, all site surfaces must be effectively stabilised[13] using methods which will achieve effective short-term stabilisation.
Sediment control	1. Direct runoff from exposed site soils to sediment controls that are appropriate to the extent of disturbance and level of erosion risk. 2. All exposed areas greater than 2500 metres^2 must be provided with sediment controls which are designed, implemented and maintained to a standard which would achieve at least 80% of the average annual runoff volume of the contributing catchment treated (i.e. 80% hydrological effectiveness) to 50mg/L Total Suspended Solids (TSS) or less, and pH in the range (6.5–8.5).
Litter, hydrocarbons and other contaminants	1. Remove gross pollutants and litter. 2. Avoid the release of oil or visible sheen to released waters. 3. Dispose of waste containing contaminants at authorised facilities.
Waterway stability and flood flow management	1. Where measures are required to meet post-construction waterway stability objectives (specified in table B), these are either installed prior to land disturbance and are integrated with erosion and sediment controls, or equivalent alternative measures are implemented during construction. 2. Earthworks and the implementation of erosion and sediment controls are undertaken in ways which ensure flooding characteristics (including stormwater quantity characteristics) external to the development site are not worsened during construction for all events up to and including the 1 in 100 year ARI (1% AEP).

3.2 OPERATIONAL PHASE WATER QUALITY

The stormwater quality management objectives that apply to the operational phase of the Caboolture West development (refer Table 2) have been established considering the State Planning Policy (DILGP, 2017) and Council policy. Caboolture West development is located in an emerging community zone, which governs the discharge criteria for the site.

Table 2 – Operational phase stormwater quality objectives

Constituent	Discharge criteria
All catchment zones	
Total suspended solids (TSS)	80% reduction in post developed mean annual load
Total phosphorous (TP)	60% reduction in post developed mean annual load
Total nitrogen (TN)	45% reduction in post developed mean annual load
Gross pollutants	90% reduction in post developed mean annual load
Emerging community zone	In the emerging community zone, development is to achieve the greater removal of: a. The above reductions in mean annual load for unmitigated development b. No worsening (no increase in pollutant loads of existing land uses of TSS, TP, TN and gross pollutants)

4 STORMWATER QUALITY MANAGEMENT STRATEGY

A stormwater quality management strategy has been developed for Rivermont, Caboolture West Precinct 4 considering field inspections, confirmation of constraints/opportunities, catchments and topography and integration with the development layout. The proposed strategy has been developed in collaboration with the design team including KN Group (civil engineers) and RPS (urban/landscape planners) to ensure the proposed strategy is well integrated with both engineering and urban design aspects of the design.

When developing the strategy a number of guiding principles were considered:

- achieve obligations under Council conditions and SPP
- ensure treatments chosen are functionally feasible within the constraints of development and drainage levels
- avoid numerous small treatments
- integrate with landscape outcomes particularly how treatments integrate with waterways and the Green Infrastructure Network (GIN)
- avoid impacts on mapped vegetation areas

4.1 ULTIMATE STRATEGY

Figure 5 and Table 3 show the stormwater treatment strategy for Precinct 4. Performance assessments of the proposed treatment strategy are presented in Section 5. Appendix A provides a preliminary earthworks and functional layout for the proposed treatment system to demonstrate functional feasibility within the constraints of the site.

Note: Ultimately catchment 4-2 will drain into Precinct 5 for treatment with end of line systems. The location and size of these systems will be confirmed as part of Precinct 5 and prior to the construction of Stage 16 in Precinct 4. An interim sediment basin will be placed in Stage 16 to treat a small (1.1ha) catchment from Stage 4. This will be decommissioned once the treatment systems in Precinct 5 is conceived and approved by Council.

Table 3 - Treatment strategy Precinct 4

Catchment / Treatment ID	Catchment area (ha)	Treatment	Treatment area (m2)
4-1a	21.54	Sediment basin Bioretention	500 1500
4-1b	0.78	Untreated	-
4-2	3.47	Bioretention (Future system located in precinct 5	350

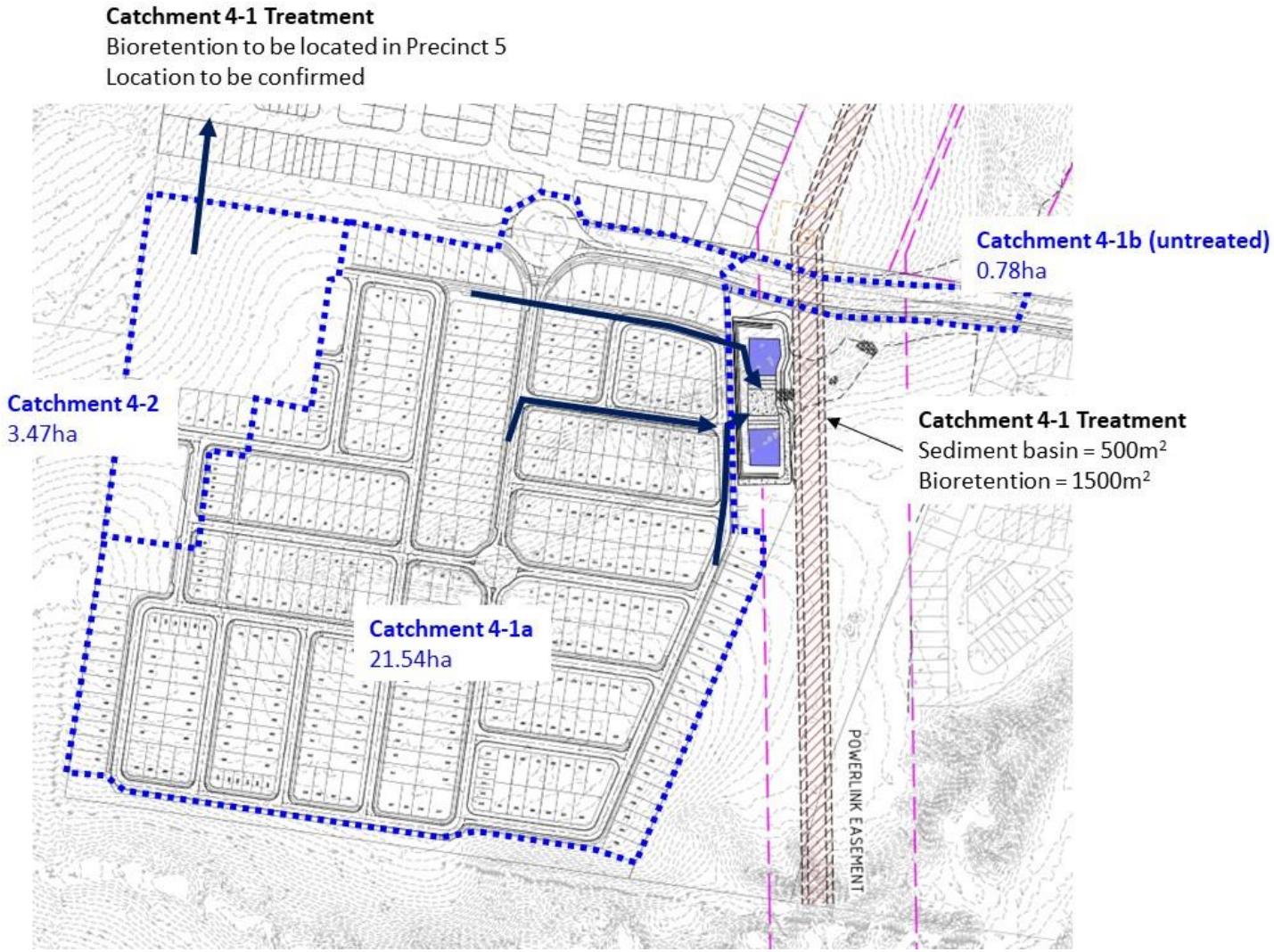


Figure 5: Stormwater quality management strategy – Precinct 4 Ultimate





Figure 6: Bioretention photo examples



Figure 7: Sediment basin photo examples

4.2 INTERIM STRATEGY

Catchment 4-2 can not be developed without suitable stormwater treatment which is to be located in Precinct 5. However, 1.12ha of Stages 4 and 5 is located in Catchment 4-3. To allow these stages to fully develop, an interim stormwater treatment is required for this 1.12ha. This is proposed to be a 300m2 sediment basin. This will be retained until the bioretention proposed in Precinct 5 is located by Stockland and approved by Council.

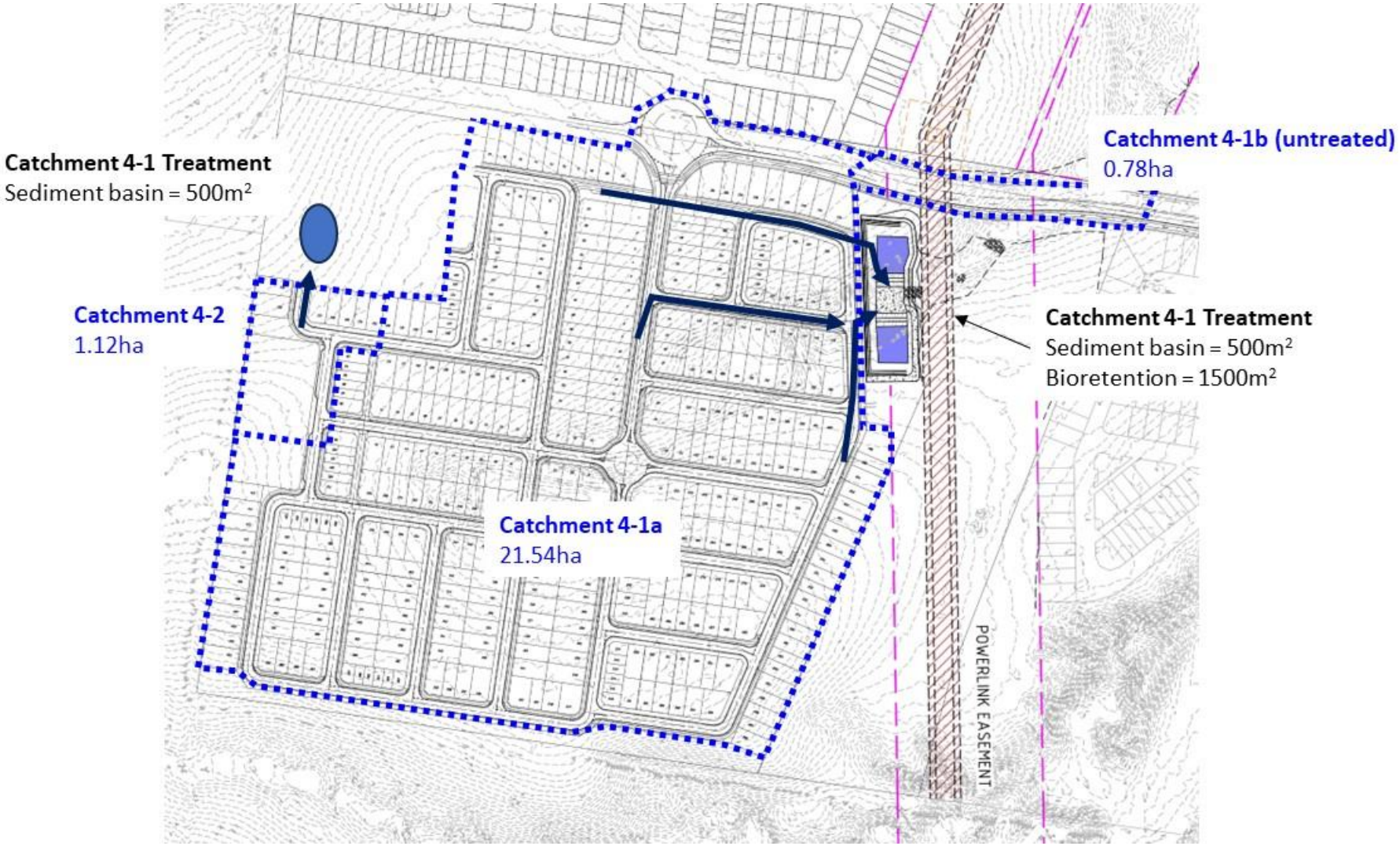


Figure 8: Stormwater quality management strategy – Precinct 4 Interim

5 PERFORMANCE ASSESSMENT

To support the RAL application for Precinct 4 development, MUSIC modelling was conducted to quantitatively assess the stormwater treatment performance of the proposed stormwater strategy. MUSIC version 6.3 was used for the assessment and the parameters have been established in accordance with the MUSIC Modelling Guidelines for South East Queensland (Water by Design, 2010).

Details of the modelling assumptions, parameters used and results are presented in the following sections.

5.1 MODEL STRUCTURE

The structure of the MUSIC model is shown in Figure 9 with the general data upon which the model is based provided in Table 4.

Catchment areas draining to each treatment element have been derived from the proposed urban layout for the development, considering the pipe drainage system that would apply (refer to Figure 5). Catchments contributing include the urban areas, roads, parks and the treatment area. A lumped catchment approach is used, consistent with the MUSIC Modelling Guidelines (HLW,2019, page 17) which states that splitting land use is only required when land use does not reflect a typical land use split or tanks are adopted. Tanks are not adopted and the landuse proposed is typical of that proposed in the MUSIC Modelling Guidelines so the lumped approach is appropriate.

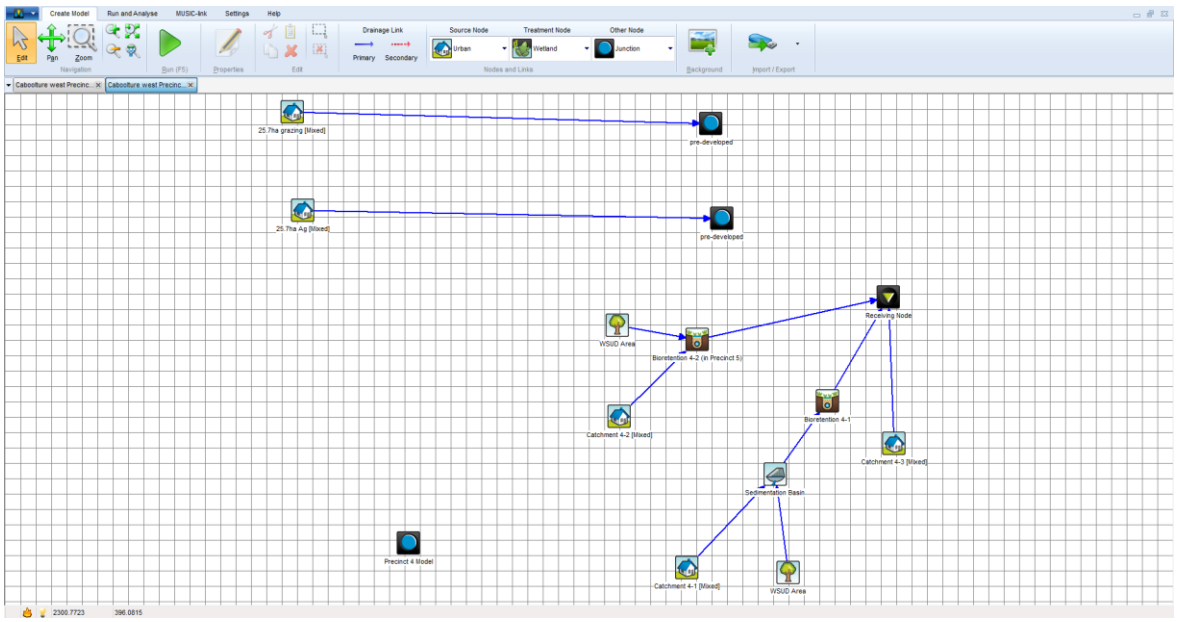


Figure 9: MUSIC model

Table 4 - MUSIC model data summary

Parameter	Value
Source Data	
Rainfall data set	1980-1990 – Dayboro PO Station 40063
Modelled time step	6 minute
Mean annual rainfall 1980-1990	1,256 mm
Potential evapotranspiration	1,502 mm
Soil properties (runoff generation parameters)	Table 3.7 Music Modelling Guidelines for SEQ (as appropriate depending on land use)
Pollutant concentrations (base and storm flow concentration parameters)	Tables 3.8/Table 3.9 Music Modelling Guidelines for SEQ (as appropriate depending on surface type/land use) Arterial road: Table 3.8 urban residential road Urban residential: Table 3.9 urban residential Park/open space: Table 3.9 urban residential with 0% impervious Grazing: Table 3.9 rural residential with 0% impervious Agricultural: Table 3.9 agriculture
Percent impervious	Table 3.6 Music Modelling Guidelines for SEQ (split catchment as appropriate depending on land use)
Treatment Devices	
Bioretention	Filter area – 1500m2 Surface area – 2000m2 (includes storage over sediment pond and bio at extended detention depth) Filter media depth = 0.6 m Extended detention depth = 0.3 m High flow bypass – 2m^3/s (up to 1m^3/s diverted from sediment pond to bio) Overflow weir – 5m Seepage = 0 mm/hr TN content 400 mg/kg Orthophosphate content 30mg/kg
	Surface area = 500m^2 Extended detention depth = 0.01m (extended detention depth combined with bioretention and included as part of bioretention node) Permanent pool = 750m^3 Seepage = 0mm/hr Evaporative loss = 75% of PET Notional detention time = 0.1hr

5.2 RESULTS - ULTIMATE

The results of the MUSIC modelling for each treatment zone are presented in Table 5.

Table 5 - Summary of MUSIC modelling – Ultimate Strategy

Scenario	Pollutant	Inflows (kg/yr)	Outflows (kg/yr)	Reduction achieved (%)	Water quality objective
Predeveloped loads					
Land use grazing	TSS TP TN		38100 36 283		
Land use agricultural	TSS TP TN		41000 43 254		
Developed loads (mitigated)					
Total Development with treatment	TSS TP TN	45200 91 444	8690 24.9 233	81 73 48	80 60 45

The results demonstrate that load based objectives for the combined site pollutant discharges are met and that the post developed combined pollutant discharges from the site are lower than the pre developed pollutant discharges assuming either grazing or agricultural land use.

5.3 RESULTS - INTERIM

The interim strategy was modelled in MUSIC with the results provided in Table 6 which illustrate the stormwater quality objectives are achieved.

Table 6 – Summary of MUSIC modelling – Interim Strategy

Scenario	Pollutant	Inflows (kg/yr)	Outflows (kg/yr)	Reduction achieved (%)	Water quality objective
Development with treatment	TSS TP TN	41800 81 400	7750 22.5 215	81 72 46	80 60 45

6 CONCLUSION

A stormwater treatment strategy has been developed to support the RAL application for Precinct 4. The strategy has been developed to meet the requirements of the State Planning Policy (SPP, 2017) and Council objectives for emerging community zones for stormwater quality management.

The strategy focusses on end of pipe sediment basin and bioretention systems. Site topography supports end of pipe bioretention in all locations to treat catchments. Locations have been chosen to integrate with the topography and space within the power corridor. An interim and ultimate strategy is provided. The strategy provides an integrated best management approach to stormwater quality management and meets the requirements of the State Planning Policy and Council planning scheme.

Appendix A provides a preliminary earthworks and functional layout for the proposed systems to demonstrate the treatment is functionally feasible within the site constraints.

Flood management and stormwater quantity management is dealt with in reporting by others.

7 REFERENCES

Australian Rainfall and Runoff, 1987. *A Guide to Flood Estimation*. Engineers Australia

DesignFlow (2021). *Caboolture West Development – Preliminary Flood Impact Assessment*.

DILGP (2017) *State Planning Policy*

Healthy Land and Water (2018) *MUSIC Modelling Guidelines Version 3*

QUDM, (2007). *Queensland Urban Drainage Manual*. Second Edition 2007. Department of Natural Resources and Water

APPENDIX A: TREATMENT CONCEPTUAL EARTHWORKS



ROADWORKS - LAYOUT PLAN
SCALE 1:2000

SCALE
20 10 0 20 40 60 80 100 120 140 160 180 200m
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DO NOT SCALE THIS DRAWING
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NORTH

LOCALITY PLAN

REVISIONS

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A	FOR IMFORMATION	21.10.2025	AL

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Project

RIVERMONT
PRECINCT 4 - 6

kn group
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www.kngroup.com.au | 07 3017 1900

Approved Director - RPEQ 17544

Approved - RPEQ 14549

Drawing Title

PRECINCT 4 - BIO BASIN
OVERALL LAYOUT

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TOWER BASE

20.00

2 x Ø1200 PIPE CULVERTS

MAINTENANCE ACCESS TRACK 3.0m WIDE. CEMENT TREATED ROAD BASE

BIORETENTION
AREA = 750m²
SURFACE = RL.32.50
BASE = RL.31.50

CSA + 5m ZONE

5.00

5.00

LITHERLAND ROAD

SEPARATE CULVERT TO CONVEY SURFACE RUNOFF FROM DTMR CORRIDOR

PIPE CULVERT OUTSIDE POWERLINK CORRIDOR TO CONVEY RUNOFF FROM PRECINCT 4

ROCK SCOUR PROTECTION AT INLET

ROCK SCOUR PROTECTION AT HEADWALL OUTLET

TURF LINED DRAIN TO CONVEY FLOW TO DOWNSTREAM INFRASTRUCTURE

ROCK SCOUR PROTECTION TO BE INSTALLED ON BATTER FROM BASIN OVERFLOW WEIR

Q100 FROM PRECINCT 4 TO ENTER SEDIMENT POND

SEDIMENT BASIN
AREA = 500m²
WATER LEVEL RL.32.50

DOUBLE TIERED BOULDER RETAINING WALL TO WESTERN SIDE OF BASIN

BIORETENTION
AREA = 750m²
SURFACE = RL.32.50
BASE = RL.31.50

DTMR CORRIDOR

MAINTENANCE ACCESS TRACK 5.0m WIDE. REINFORCED CONCRETE DRIVEWAY

EXTEND ACCESS TO ALLOW POWERLINK ACCESS TO CABLES

B 07

C 07

D 07

G042

ROADWORKS - LAYOUT PLAN

SCALE 1:500

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LOCALITY PLAN

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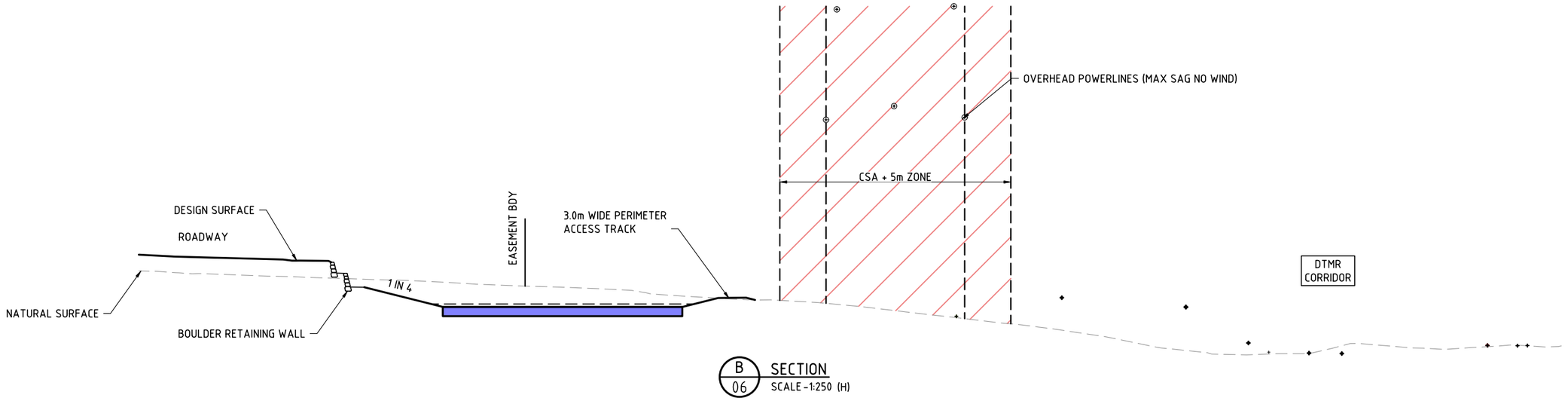
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PRECINCT 4 - BIO BASIN
DETAILED LAYOUT

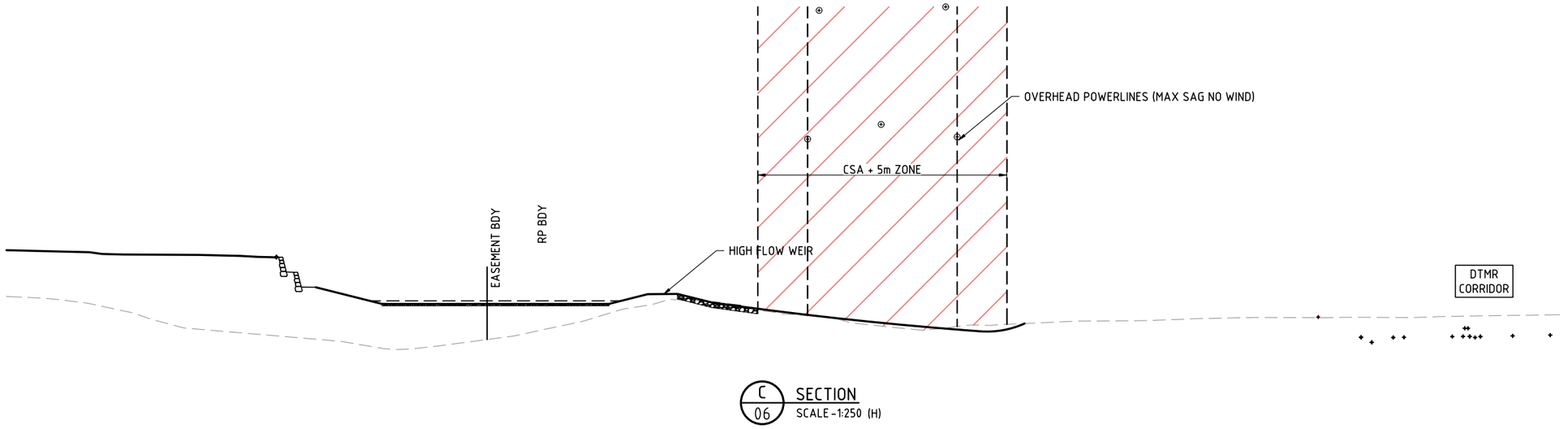
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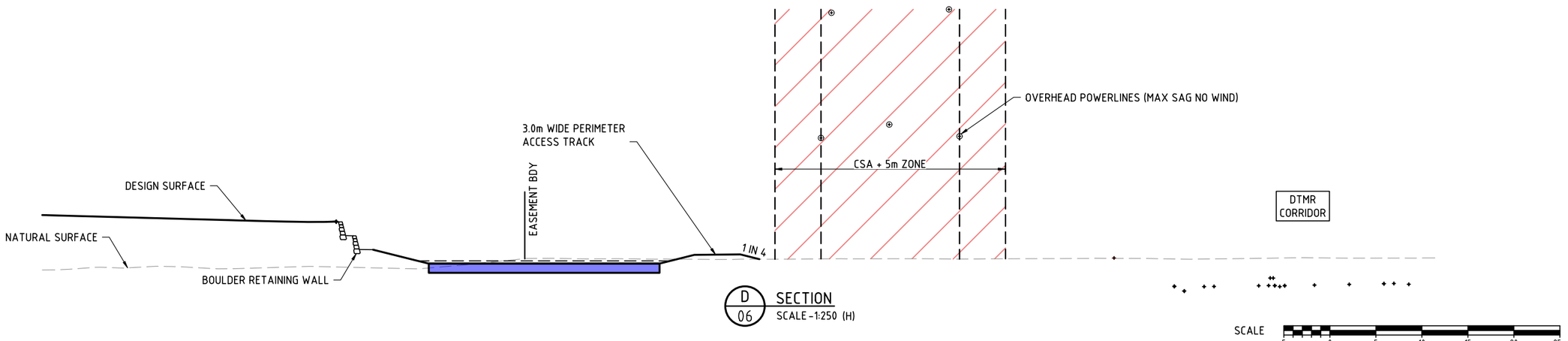
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D 06 SECTION
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LOCALITY PLAN

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PRECINCT 4 - BIO BASIN
SECTIONS SHEET 2

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