Parramatta Light Rail Stage 2 Enabling Works

Project Name: **Parramatta Light Rail Stage 2 Enabling Works**

Contract Number: **PD-22-12894**

Design Package Name: **Stormwater Drainage and Water Quality Design**

Design Package Number: **SD-0001**

Document Title: **Stormwater Drainage Report**

Document Number: **PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001**

Document Details

Project Name	Parramatta Light Rail Stage 2 – Enabling Works		
Document No.	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	**Package No.**	SD-0001
Revision No.	0	**Design Stage**	AFC

Document History and Status

Status Code	Rev	Date	Design Stage	Prepared By	Checked By	Reviewed By	Approved
S4	A	04/12/2024	SDR	[redacted]	[redacted]	[redacted]	[redacted]
S4	B	05/05/2025	PDR	[redacted]	[redacted]	[redacted]	[redacted]
S4	C	19/08/2025	DDR	[redacted]	[redacted]	[redacted]	[redacted]
S4	0	19/11/2025	AFC	[redacted]	[redacted]	[redacted]	[redacted]

Approval Record

Function	Position	Name	Signature	Date
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Approved By	Senior Design Manager	[redacted]	[redacted]	19/11/2025

Table of Contents

1. Introduction 7
1.1. Project Description 7
1.1.1. Project Scope 7
1.1.2. System Breakdown 7
1.2. Scope of this Report 8
1.3. Design Stage 8
1.4. Schedule of Designers 8
2. Design Package 9
2.1. Design Package Scope 9
2.2. Design Package Documentation 9
2.3. Assumptions, Dependencies and Constraints 9
2.4. Design Changes 9
2.4.1. Design Change Orders 9
2.4.2. Design Development 10
3. Design Criteria 13
3.1. Codes and Standards 13
3.2. Functional and Performance Requirements 14
3.3. Derived Requirements 14
4. Design Details 15
4.1. Design Description 15
4.2. Design Inputs 15
4.2.1. Supporting Specialist Design Reports 15
4.2.2. IFD Data 15
4.2.3. Climate Change 16
4.2.4. Tailwater Conditions 17
4.3. Design Methodology 17
4.3.1. Design Software 17
4.3.2. Stormwater Drainage 17
4.3.3. Design Analysis 30
4.3.4. Results 35
5. Design Integration 42
5.1. External Interfaces 42
5.2. Internal Interfaces 42
5.3. Cross Disciplinary Review (CDR) 44
6. Design Consultation 45
6.1. Stakeholder Consultation 45
6.2. Specialist Consultation 45
7. Design Considerations 46
7.1. Constructability 46

7.2. Construction Specifications 46
7.2.1. Procurement Specifications 47
7.2.2. Testing, Commissioning and Acceptance Criteria 47
7.2.3. Hold Points and Witness Points 47
7.3. Operational Considerations 47
7.4. Maintenance Considerations 48
7.4.1. Whole-of-Life (WoL) Considerations 48
7.4.2. Bridge Drainage 48
7.4.3. Track Drainage Maintenance 48
7.4.4. Southern Foreshore Water Quality Treatment Maintenance Access 49
7.5. Connect with Country 49
8. Design Compliance 50
8.1. Environmental Compliance 50
8.2. Sustainability 50
8.2.1. Sustainability in Design 50
8.2.2. Sustainability Requirements 50
8.2.3. Innovation (ISC Inn-1 and SPR Appendix H, Section 9) 56
8.2.4. Outstanding Requirements 56
8.3. Engineering Assurance 56
8.3.1. Systems Engineering 56
8.3.2. Safety Assurance and Safety in Design (SiD) 57
8.3.3. Human Factors (HF) Integration 58
8.3.4. Reliability, Availability, Maintainability (RAM) 59
8.4. Predicted Effects 60
9. Non-Compliances and Concessions 61
9.1. Non-Compliances 61
9.2. Concessions 61
10. Approvals and Certifications 62
10.1. Independent Certifier Review 62
10.2. Proof Engineering Review 62
10.3. Authority Approvals and Status 62
11. Outstanding Issues 63
11.1. Hold Schedule 63
11.2. Other Issues 63
11.3. Requests for Information 64

Appendices

Appendix A Design Drawing List 65
Appendix B Review and Comment Register 68
Appendix C Assumptions, Dependencies and Constraints (ADC) Register 69
Appendix D Specialist Report Excerpts and Supporting Information 70
Appendix E Certifications and Third Party Approvals 73
Appendix F Requirements Compliance 75
Appendix G Project Hazard Log 80
Appendix H Departures 81
Appendix I Concessions 82
Appendix J Dynamic Drainage Results – Design Tailwater 83
Appendix K Catchment Plan 84
Appendix L MUSIC Model Setup, Inputs and Results 85
Appendix M Pipe Strength Class Assessment 86
Appendix N Dynamic Drainage Results – 5%AEP+CC 87
Appendix O Outlet Scour Protection Assessment Calculations 88
Appendix P Maintenance Diary 89
Appendix Q Geotechnical Calculations for Basins 90
Appendix R Water Quality Device Data Sheets 91
Appendix S Structural Calculations 92

Acronyms and Abbreviations

Acronym	Description
ADC	Assumptions Dependencies and Constraints
AEP	Annual Exceedance Probability
AFC	Approved for Construction
CC	Climate Change
CoPC	City of Parramatta Council
DDR	Detailed Design Review
EW	Enabling Works
FRC	Fiber-Reinforced Composites
GRP	Glass Reinforced Plastic
JH	John Holland
MHWS	Mean High Water Spring
PDR	Preliminary Design Review
PLR2	Parramatta Light Rail Stage 2
SiD	Safety in Design
SDR	System Definition Review
SOPA	Sydney Olympic Park Authority
TfNSW	Transport for NSW

1. Introduction

1.1. Project Description

The Parramatta Light Rail Stage 2 (PLR2) will connect local communities in the Greater Parramatta and Olympic Peninsula and bring the vision of a '30-minute city' closer to reality. The Project comprises a new dual light rail track spanning 10 kilometres and 14 accessible stops, connecting Stage 1 and Parramatta's CBD to Sydney Olympic Park via Camellia, Ermington, Melrose Park and Wentworth Point. Around 9.5 kilometres of new active transport links will also be provided between Camellia and the Carter Street precinct in Lidcombe, as well as connections to existing active transport links including to the Parramatta Valley Cycleway at Rydalmere and Melrose Park, and to Louise Sauvage Pathway via the River Walk at Wentworth Point. PLR2 will connect to the Sydney Metro West (under construction) and heavy rail in Parramatta and Sydney Olympic Park, and ferry services at Rydalmere and Sydney Olympic Park.

1.1.1. Project Scope

TfNSW have engaged John Holland to deliver the Parramatta Light Rail Stage 2 Enabling Works (PLR2 – EW) as the first stage in the delivery of PLR2, comprising a new 320-metre long, public and active transport bridge over Parramatta River between Melrose Park and Wentworth Point. The Project includes underpass access for road and active transport, new recreational facilities, and approaches on either side of the river – totalling 1.2km.

A map of the PLR2 – EW is provided in Figure 1-1.

Figure 1-1: Map of the PLR Stage 2 Enabling Works

1.1.2. System Breakdown

The Project system breakdown is defined by the design package structure which aligns with the design elements identified in the SPR Appendix J and is coordinated with the overall delivery strategy for the Project. A series of project-wide reports support the delivery of the design, as detailed in the Systems Engineering, Assurance and Design Management Plan (SEADMP) (PLR2EW-JHGRP-NWW-PM-PLN-000005).

The system breakdown structure is provided in Figure 1-2, which also indicates the design package that is the subject of this report.

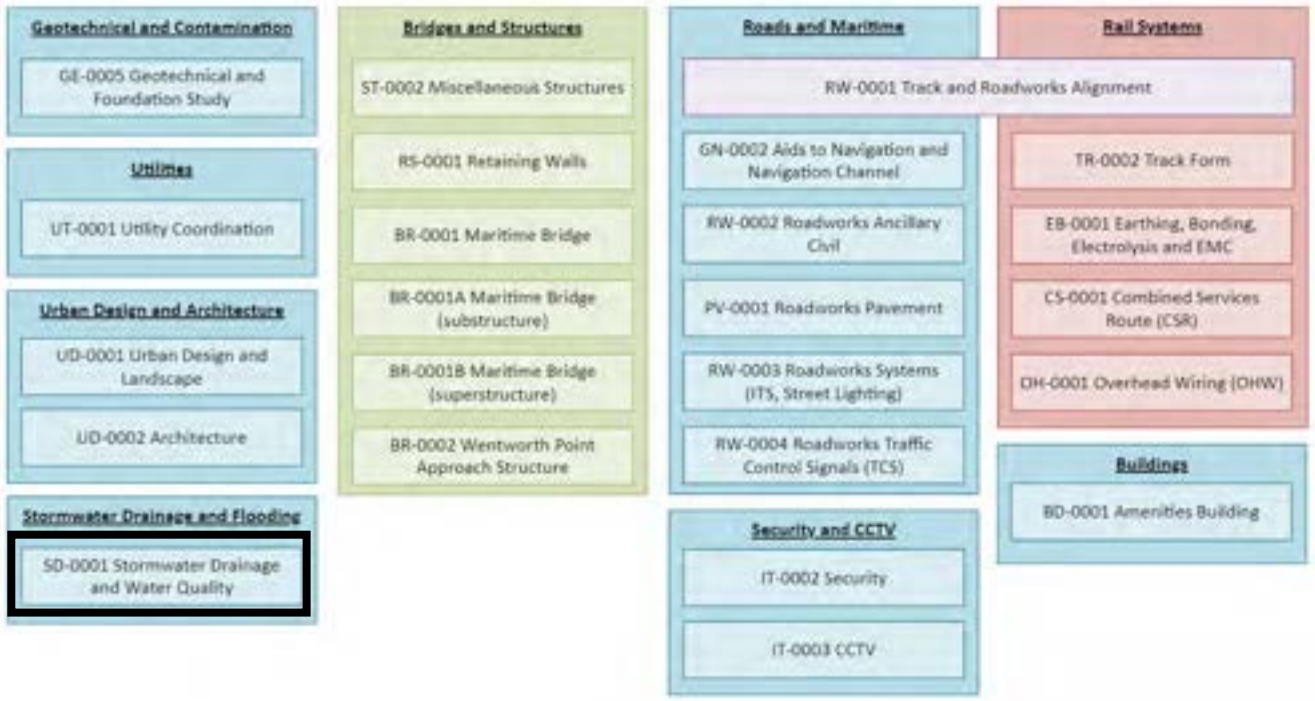


Figure 1-2: System breakdown structure

1.2. Scope of this Report

This report refers to the design package(s) listed in Table 1-1.

Table 1-1: Design Package documented in this report

Package Number	Description
SD-0001	Stormwater Drainage and Water Quality Design

1.3. Design Stage

The Design is currently at Detailed Design Review (DDR). Future submission will include:

- Approved for Construction (AFC).

1.4. Schedule of Designers

Table 1-2 shows the list of designers, reviewers and verifiers who contributed to this design package.

Table 1-2: Schedule of Designers, Reviewers and Verifiers

Name	Title	Role
[redacted]	Civil Engineer	Designer
[redacted]	Senior Drainage Engineer	Designer / Checker
[redacted]	Team Leader - Surface Water & Civil Engineering	Checker
[redacted]	Senior Design Manager	Reviewer

2. Design Package

2.1. Design Package Scope

The stormwater drainage design addresses the scope of SPR Clause 3.3.8(b) and (c). The scope of the stormwater drainage design package include:

- Surface, subsoil (i.e. water quality drainage layers) and underground track drainage design.
- Drainage design of the rail flangeway.
- Drainage design of roadworks and ATL.
- Surface drainage design of all retaining structures.
- Drainage design for the connection of the amenities building and structures within the Project.
- Drainage design of service pits.
- Water quality treatment and integration of WSUD elements per the Planning Approval and relevant Authority Approvals.
- Drainage design of bridges including deck drainage underside of the bridge structure.
- Drainage outlet scour protection design.
- Identifying and consulting with all drainage asset owners that may be impacted by the Project.
- The protection, relocation or adjustment of all existing drainage services which may conflict with the Project Works or in accordance with the relevant Third-Party Agreement.
- Augmenting the existing drainage as required to meet the flood immunity and flood impact performance requirements of the SPR and the Planning Approval.

2.2. Design Package Documentation

Design documentation included in this design package include:

- Drainage works drawings.
- Longitudinal drainage calculations and output.
- Cross drainage calculations and output.
- Hydraulic models.
- Water quality models.
- Catchment Plans.
- Design report.

Refer to **Appendix A: Design Drawing List** for the complete list of design drawings relevant to this Design Report.

A roadmap indicating how this package meets the relevant requirements of SPR Appendix J Design Deliverables is provided in **Appendix F: Requirements Compliance**.

2.3. Assumptions, Dependencies and Constraints

Refer to **Appendix C Assumptions, Dependencies and Constraints (ADC) Register** for an extract of the ADC Register relevant to this Design Package.

2.4. Design Changes

2.4.1. Design Change Orders

The following Table 2-1 outlines the design change orders and notices relevant to this Design Package.

Table 2-1: Change Orders and Notices

Reference	Description	Reason for Change	Approval
SPR Section 7.3.1, 7.4.1, 7.4.8 and Appendix J.	Changes to the Flood Model & Annual Rainfall Intensity standard	Updates to align with the agreed flooding assessment methodology following direction on the use of AR&R2019 Version 4.2 and adoption of the CoPC Flood Model	Principal's acceptance received via PLR2EW-TFNSW-JHGRP-NOT-000053

2.4.2. Design Development

The following tables summarise the difference between each consecutive design stage.

Table 2-2: Difference between Contractor's Outline Design and SDR design stage

Location / Asset Item	Difference	Reason for the Difference
Line 10 outlet	Removal of Box Culvert Drainage	The existing drainage system outlet along Wharf Road is to be retained through refinement of the turning facility. Retention of the outlet does not trigger the requirements for the drainage system to be upgraded as per SPR clause 7.4.8(h). All flows captured from the PLRC and new works will be conveyed to a new outlet from Wharf Road. With the retention of the existing Council drainage system and utilisation of a new outlet for new flows, the RCBC represented in the tender design is not required.
Transverse Drainage BR-01	Eliminated the transverse grated trench from bridge BR01.	The transverse drainage system provided little benefit in flow capture due to the PLRC cross fall, a system just as effective can be provided through longitudinal drainage inlets along the low side of the PLRC.
Line 02	Rationalised the drainage system on the northern side of Waratah Street Stop; the longitudinal ACO Klassik drain was replaced by in-ground pits and pipes	Due to regrading crossfall towards PLRC, longitudinal ACO along the radius bend provided no advantage over sump pit provided in landscaped areas and would be susceptible to blockages.
Line 10 and 16	Rationalised the drainage system around the detention basin	Additional inlet added to the basin and realignment of the drainage system Line 20 to remove the interface with the retaining wall structure.

Table 2-3: Difference between SDR design stage and PDR design stage

Location / Asset Item	Difference	Reason for the Difference
Global	Increased flow to account for climate change.	Move to ARR2019 Version 4.2, which projects an increase in rainfall due to the effects of climate change. This has been applied to both the major and minor design events. Refer to Section 4.2.3 for details.
Line 02	Increase in pipe size.	Allowance for catchment from Mary Street in the future when the PLR creates a high point through the Waratah Street intersection. This redirects stormwater flows to the PLRC drainage system that currently do not drain to that system.

Location / Asset Item	Difference	Reason for the Difference
Line 02	Separation of PLRC drainage from upstream catchment.	Addressing SDR comment.
Archer Park Basin	Modified Archer Park Basin	Layout aligned with SDR package UD-0001.
Hill Road Drainage Arrangements	Consolidated Drainage connection points.	Modified to reduce the number of connections to Council's drainage system and to only connect to existing pits.
Line 51	Detached from Line 10	To address surcharge issue in the design event.
Line 14 GPT	Relocated within the Southern Foreshore	Repositioned to a location for improved maintenance access (sucker truck).

Table 2-4: Difference between PDR design stage and DDR design stage

Location / Asset Item	Difference	Reason for the Difference
WQ Basin 1 Layout and associated drainage inlets and outlets.	Relocated.	Relocated to avoid a clash with the revised separated Path alignment in Archer Park.
WQ Basin 2 Layout and associated drainage inlets and outlets.	Modified Layout	Modified to manage the final levels within Archer Park and mitigate the need for fences.
Maritime Bridge Drainage	Adjusted to be a box gutter channel rather than pipes.	To address comments raised by the DRP regarding the visibility of the drainage pipes.
Pit 02-06 and 02-07	Moved out of the Track Slab	To avoid the need for complex structural detailing of the edge of the track slab.
Pit 02-05	Pit Moved out of Footpath	Better Urban Design outcome.
Pit 41-1	Removal of Pit 41-1 in Wharf Road.	Pit was not required on review of the PDR Design.
Pit 10-2, 10-3 and 10-4	Pits relocated out of revised ATL path	Better Urban Design outcome.
Drainage Line 17	Pipe Drainage system moved from attached to the bridge to placed in ground.	Change in pipe material due to FRC availability, makes the weight of the pipe drainage too large for connection to the bridge, therefore it was placed into the ground below the bridge.
Drainage Line 19	Drainage line relocated from under Bridge BR-02 to adjacent to.	The construction methodology and retention of earthworks means that the drainage system will not be accessible, relocation provides visual inspection and maintenance access feasible to the is drainage system
Pit 29-2	The invert of the outlet pipe from the Jellyfish has been lifted by approximately 450mm to RL1.8mAHD which is the projected MHWS 2130.	To provide a more resilient system to the impacts of climate change, and inundation of the water quality system in future projected tide level increase.
WQ Basin 3 Layout	Modified Layout	Modified to tie into the retained temporary piling platform material under Bridge BR02.
Pit 25-1 and associated pipework	Removed	Regrading of the kerbing removed the sag point it was previously draining.

Table 2-5: Difference between PDR and AFC

Location / Asset Item	Difference	Reason for the Difference
General	Identification of TfNSW and CoPC Drainage Assets.	Updating design to demarcate asset ownership.
Drainage Line 19	Relocated under the PLRC.	Address comments raised on the DDR Submission on the location of Drainage Line 19 adjacent to the PLRC structure.
Drainage Line 52	New Drainage line added.	To address a point discharge of flow across the carriageway at a super elevation development along Wharf Road approach to the new car park entrance.
Derailment Channels	Added drainage outlet detail for the derailment channel.	To address comments raised on BR-0002 regarding the draining of the Derailment Channel.

3. Design Criteria

3.1. Codes and Standards

Table 3-1 lists the standards and guidelines that apply to this design package.

Table 3-1: List of applicable standards and guidelines

Document Number	Document Title	Version
TS 00127	TfNSW R0200 Stormwater Drainage Series	0.00
TS 01638	TfNSW Track Drainage	0.00
TS 01641	TfNSW Track Drainage Manual	1.00
AS/NZS 3725	Design for installation of buried concrete pipes	2007
AS/NZS 3600	Concrete structures	2018
AS/NZS 4058	Precast concrete pipes (pressure and non-pressure)	2007
AS/NZS 5100.1	Bridge design Part 1: Scope and general principles	2017
AS/NZS 5100.4	Bridge design Part 4: Bearings and deck joints	2017
-	City of Ryde Stormwater and Floodplain Management Technical Manual	2015
-	City of Parramatta Council Standard Drawings	2023
-	City of Parramatta Development Engineering Design Guidelines	June 2018
-	NSW Flood Risk Management Manual (Floodplain Development Manual)	June 2023
-	TfNSW Water Sensitive Urban Design Guideline	June 2023
-	TfNSW Sustainable Design Guidelines	4.0
SSI 10035	Parramatta Light Rail Stage 2 Conditions of Approval	February 2024
-	Australian Rainfall and Runoff Guideline	4.2
TS 02642	TfNSW Supplement to Austroads Guide to Road Design	1.0
AGRD05-23	Guide to Road Design Part 5: Drainage – General and Hydrology Considerations	4.0
AGRD05A-23	Guide to Road Design Part 5A: Drainage: Road Surface, Networks, Basins and Subsurface	2.1
AGRD05B-23	Guide to Road Design Part 5B: Drainage – Open Channels, Culverts and Floodway Crossings	1.2
AGBT08-18	Guide to Bridge Technology Part 8: Hydraulic Design of Waterway Structures	2.0
-	City of Ryde Development Control Plan 2014 Part: 8.2 Stormwater Management Technical Manual	2014
IS v2.1 TM	Infrastructure Sustainability Technical Manual	V2.1

Refer to **Appendix D Specialist Report Excerpts and Supporting Information** for the Basis of Design.

3.2. Functional and Performance Requirements

The design described in this report has been prepared in accordance with the Project Deed and SPR. Refer to **Appendix F Requirements Compliance** for the SPR compliance table for this design package.

3.3. Derived Requirements

Derived requirements include derived safety requirements developed from the systems engineering and assurance processes, in particular the safety requirements derived from the safety assurance processes documented in Section 8.3.2. These requirements are included in the Requirements Verification Traceability Matrix (RVTM) in **Appendix F Requirements Compliance.**

4. Design Details

4.1. Design Description

The drainage system has been separated into the following sections:

- Northern section of Parramatta River (Melrose Park):
  - Mary Street intersection (Ch 6920) to Ch 7135.
  - Melrose Park Development.
  - Between Ch 7135 and the crest of bridge 1 (Ch 7460).
- Southern section of Parramatta River (Wentworth Point):
  - Between the crest of bridge BR01 (Ch 7460) to Ch 7940.
  - Overflow at the Sekisui's development interface.
  - Hill Road intersection (Ch 7940 to Ch 8100).
- Bridge drainage.
- Track drainage.

The drainage system complies with the guidelines and standards specified in Section 3.1.

4.2. Design Inputs

- LiDAR and detailed existing survey.
- IFD data.
- Tailwater Levels
- CoPC MUSIC link.

4.2.1. Supporting Specialist Design Reports

Project wide reports and specifications relevant to this Design Package are listed in Table 4-1.

Table 4-1: Specialist Design Reports

Document Number	Document Description
PLR2EW-JHGRP-LRPEWRC-SD-RPT-100002	Flood Modelling Report
PLR2EW-JHGRP-LRPEWRC-DY-RPT-100001	Durability Report

Refer to **Appendix D Specialist Report Excerpts and Supporting Information** for excepts of supporting information that have not yet been issued as standalone deliverables.

4.2.2. IFD Data

Table 4-2 provides the rainfall intensities which have been used in the development of the design. This has been obtained from the Bureau of Metrology website for location latitude -33.8125 and longitude 151.0625.

Table 4-2: IFD data

Annual Exceedance Probability (AEP)							
Mins	63.2%AEP (1EY)	50%AEP	20%AEP	10%AEP	5%AEP	2%AEP	1%AEP
1	135	149	195	226	256	297	328
2	111	121	152	174	196	226	250
3	103	112	142	164	185	214	236

Annual Exceedance Probability (AEP)							
Mins	63.2%AEP (1EY)	50%AEP	20%AEP	10%AEP	5%AEP	2%AEP	1%AEP
4	96.9	106	136	157	178	206	228
5	91.7	101	131	151	171	198	219
10	72.5	80.7	106	123	140	163	180
15	60.4	67.2	88.5	103	117	136	150
20	52	57.7	75.9	88.2	100	116	128
25	45.8	50.8	66.5	77.2	87.7	101	112
30	41.1	45.5	59.4	68.8	78.1	90.3	99.7
45	32	35.2	45.5	52.5	59.5	68.8	76.1
60	26.5	29.1	37.3	43.1	48.7	56.5	62.5
90	20.3	22.2	28.3	32.6	36.9	42.8	47.5
120	16.8	18.3	23.3	26.9	30.5	35.5	39.4
180	12.9	14.1	18	20.8	23.7	27.6	30.9
270	10	11	14.1	16.4	18.8	22.1	24.7
360	8.42	9.26	12	14.1	16.1	19.1	21.4
540	6.63	7.34	9.73	11.5	13.3	15.8	17.8
720	5.61	6.26	8.42	9.99	11.6	13.9	15.7

4.2.3. Climate Change

SPR 7.4.1(c)(iii) requires for the drainage system to be resilient to the effects of climate change as a result of rainfall intensity increase, sea level rise and storm surge up to year 2130. TfNSW responded to PLR2EW-JHGRP-RFI-040 about the update in standard (Australian Rainfall and Runoff) and instructed John Holland via PLR2EW-TFNSW-JHGRP-NOT-000046 and PLR2EW-TFNSW-JHGRP-NOT-000053 to adopt Version 4.2. The methodology to apply updated climate change uplift is described in the technical memo PLR2EW-JHGRP-NWW-DR-MEM-000002, attached in **Appendix D**.

The revised Australian Rainfall and Runoff adopts the latest climate science and best practices to improve flood estimation and water management. This includes integrating findings from the Intergovernmental Panel on Climate Change (IPCC) and other recent research.

The design was developed, based on this adoption, with the following changes to rainfall:

- 1%AEP: Applied for the design of drainage outlet scour protection, an 86% increase in rainfall intensity for storm durations up to one hour.
- 20% AEP: Applied to the design of the PLRC corridor drainage system, an 86% increase in rainfall intensity for storm durations up to one hour.
- 63.2% AEP (1EY): Applied for the cleansing velocity check, an 86% increase in rainfall intensity for storm durations up to one hour.
- 98.17% AEP (4EY): Applied to the design and assessment of water quality improvement devices a 0% increase in rainfall intensity.

The same approach has been adopted for the DDR design development.

4.2.4. Tailwater Conditions

SPR 7.4.8(e) requires tailwater level to be applied to the drainage system for road, pavement and track for the purpose of minor storm capacity must be 150mm below the surface where the downstream conduit capacity is less than the 5% AEP including climate change.

Discharges to the Parramatta River have adopted local catchment water level under the 5% AEP storm event including climate change. Tailwater conditions for outlets are summarised in Table 4-3 for reference.

Mean High Water Spring Level of 1.60m AHD has been adopted from the 2025 NSW Tidal Chart for Sydney Port Jackson adjusted using Table 3.1 from the Manly Hydraulics Lab (-0.925) to convert to mAHD

Table 4-3: Tailwater Conditions

Outlet locations	Level (mAHD)	Justification
Discharging to existing Hill Road intersection drainage	1.803	Set at 150mm below the lowest kerb invert level at pit 36-2
01-4 (Parramatta River – Archer Park) Discharging to Basin	0.675	Parramatta River MHWS
02-10 (Parramatta River – Archer Park)	0.675	Parramatta River MHWS
Discharging point to Parramatta River (Wharf Road)	0.675	Parramatta River MHWS
46-2 (Parramatta River – Archer Park)	0.675	Parramatta River MHWS
07-03 (Parramatta River - Archer Park)	0.675	Parramatta River MHWS
10-11 (Parramatta River – Archer Park)	0.675	Parramatta River MHWS
41-3 (Parramatta River – Archer Park)	0.675	Parramatta River MHWS
14-21 (Parramatta River – Wentworth Point)	0.675	Parramatta River MHWS

4.3. Design Methodology

4.3.1. Design Software

Table 4-4 shows the software and versions used to design this package.

Table 4-4: Design Software

Software	Version
12d Model	14.0C2m
MUSICX	1.10.0.12491
DRAINS	2023.11.8714.23040
CPAA PipeClass	2.0.23

4.3.2. Stormwater Drainage

4.3.2.1. Melrose Park (Ch 6920 to Ch 7460)

The northern drainage system consists of three main sections:

- Mary Street intersection (Ch 6920) to future Waratah station Ch 7135
- Existing Transverse Drainage Modifications

- Between the future Waratah station (Ch 7135) and crest of Bridge 1 (Ch 7460)

4.3.2.1.1. Mary Street intersection (Ch 6920) to Ch 7135

The drainage network consists of inlet sumps, in-ground pipes and transverse grated trenches.

The track slab and footpath catchments will be collected by transverse drainage and a longitudinal pipe drainage system. The transverse grated trenches are provided at a maximum 50m interval as per SPR requirement 7.4.9(d).

Typically, transverse grated trenches are spaced between in 28 to 35m intervals, additional transverse grated trenches were provided where there were aquaplaning risks as well as specific locations based on SPR clause 7.4.9 (e) ii such as upstream of longitudinal sags and at upstream of the future Waratah station. The network ultimately discharges to the Parramatta River via a new transverse 1050mm RCP pipe at about Ch 7030.

The design allows for the external catchment on the northern side of Mary Street. A stub connection is provided within pit located near Mary Street southbound kerb return to enable future connection for drainage network from northbound.

A separate transverse drainage pipe is provided to separate the external upstream catchment from the new water quality treatment device. This pipe conveys the catchment area from the upstream catchment via a 600mm stub connection. The upstream flow into the system has been determined in accordance with the existing ground topography and cadastral boundaries. A pipe cover of 1.1m has been adopted to set the pipe level at the tie-in point. Refer to section 4.3.2.1.2 for further details.

The footpath has been graded towards the track slab and runoff will be captured via pits between footpaths and track slab, discharging into in-ground pipe system, to minimise nuisance flow onto the upstream property boundary.

The basis of the design for the drainage between Ch 7025 and Ch 7135 is similar to Ch 6920 to 7025. Several vee-shaped drains are provided along the eastern side of the project boundary along footpaths to discharge external catchment flows to the in-ground drainage networks.

4.3.2.1.2. Existing Transverse Drainage Modifications

There are two existing outfalls to the Parramatta River within Archer Park which need to be replaced to enable crossing PLRC at suitable levels and alignments. SPR clause 7.4.8(h) requires these crossings be upgraded to cater for a 1% AEP + climate change scenario.

The Melrose Park Urbak Renewal Precinct DCP identifies that development is planned for the northeast side of the project area and a portion of this catchment area will be drained through these outlets. The specific details of this development are currently unknown. Existing flow splits have been maintained and determined that approximately 2.31 ha of developed catchment will discharge into Drainage Line 07, while 0.874 hectares will discharge into Drainage Line 01.

This catchment split is estimated based on topographical data and the Planning Proposal document available on the City of Parramatta Council website. These flows will be directed to the Parramatta River via transverse pipes crossing PLRC corridor. Table 4-5 provides further details the flows through these systems.

Table 4-5: Summary of outfall descriptions catering for inflows from Melrose Park Development tie-in points

Drainage Line	Catchment Area (ha)	Imperviousness Percentage (%)	1% AEP + CC Flowrate (m^3/s)	Pipe Diameter (mm)	Pipe Stub Invert Level (at tie in) mAHD
07	2.31	70	2.530	1050	3.43
01	0.874	70	0.719	600	3.77

Scour protection will be installed at the drainage network outfalls. Rip rap chutes will also be provided between outlet headwalls and the toe of the embankment where drainage discharges above the batter toe. Refer to Section 4.3.3.2 for scour protection details.

The alignment design presented in Package RW-0001 positions the sag adjacent to Drainage Line 02 diverting and major overland flows towards the Parramatta River through Archer Park.

The location of the existing pit at Melrose Park Boundary on Drainage Line 07 is shown in Figure 4-1.

Figure 4-1: Existing drainage pits (in foreground) at the Melrose development boundary (Drainage Line 07) (Image source: Google Street view)

4.3.2.1.3. Between the crest of Bridge 1 (Ch 7460) and future Waratah station (Ch 7135)

The drainage network in this area collects runoff from the Bridge BR01, the trailer carparking area and the PLRC catchment areas.

Along the main alignment on the northern section of Bridge BR01, runoff will be collected via longitudinal grated trench drains, spaced to control flow width on the PLRC. Collected runoff will be discharged to the bioretention basin at Archer Park via in-ground pipes.

Transverse grated trench drains are provided at the upstream section of the future Waratah station, as per SPR clause 7.4.9 (d) ii requirements.

Along bridge BR01, 150mm diameter scuppers are provided, typically at 10.2m intervals (centre to centre) for the PLRC and 150mm diameter scuppers with a grated inlet tray are provided in 5.1m intervals (centre to centre) for the ATL, to align to the Bridge BR01 segmentation.

The ATL catchment over the navigation channel will discharge to the Parramatta River directly via scuppers. Refer to bridge drainage section 4.3.2.2.4 for the further details. The transverse grated trench drains proposed in the SPR design for Bridge 01 were removed in the PDR design as per Technical Memo “PLR2EW-JHGRP-NWW-DR-MEM-000001.” This arrangement is maintained in the DDR Design. Refer to track drainage Section 4.3.2.4 for further details about the grated trench drain arrangement.

In addition to scuppers, 2m lengths of ACO DRAIN TD300 (or equivalent) are provided at a typical spacing of 20.4m along the PLRC, to capture bypass flows from scuppers and manage the ponding depths and flow width.

Within the new carparking area, stormwater will be collected by TfNSW standard ‘SO type’ pits on the southern side kerb line. A 5.3m wide pervious catchment along the carpark has been considered when determining the catchment imperviousness for the carpark area.

The outfall to Parramatta River (new Drainage Line 10) is separated from the existing 600mm diameter drainage line from Wharf Road. Scour protection will be provided to the new outlet into the Parramatta River.

The pipe class assessment has been undertaken for operational loading only, the construction loading is to be assessed by the construction team, specifically for Drainage Line 10 where limited pipe cover is available.

4.3.2.2. Wentworth Point (Ch 7460 to Ch 8100)

4.3.2.2.1. The crest of Bridge BR01 (Ch 7460) to Ch 7940

The southern section of Bridge BR01, Bridge BR02 and the southern section of the PLRC up to Ch 7940 will discharge to the Parramatta River via scuppers and in-ground pipes along the Sekisui development boundary.

The surface runoff from this section will be collected by the transverse grated trench drains along Bridge BR02, the transverse grated trench section will be retained as per SPR requirements.

4.3.2.2.2. Overflow at the Sekisui House development's land interface

A catchment area of 0.238 ha from the southern section of Bridge BR02 and the southern end of the alignment discharges to the sag point in front of the Sekisui development. This catchment generates a flow rate of 0.19 m³/s in the design case for a 1% AEP + CC storm event.

At the sag point, the flow generated by the project work, up to a 1% AEP storm event + CC, will be collected by transverse grated trenches. This flow will then be conveyed via a series of suspended pipes underneath Bridge BR02, fixed to the structural piers and outletting into in-ground pits along a 450mm diameter pipeline, and ultimately discharged into the Parramatta River. Refer to the long section of Drainage Line 17 in the drawings set. This approach complies with SPR requirements to prevent concentration of overland flows at the adjacent development.

4.3.2.2.3. Hill Road intersection (Ch 7940 to Ch 8100)

Generally, the run-off from southern end of the PLRC, from the crest at Ch 7915, will be collected via transverse grated trench drains and piped along the southern side of the BR02 structure.

The flow will outlet to a combined bioretention/detention basin (Basin 3) before discharging to the existing CoPC 2x600mm diameter existing trunk drainage along Hill Road.

A detention basin is required to attenuate the post upgrade peak flow rate to pre upgrade flow. There is an increase in impervious area directed towards Hill Road and the basin storage will reduce the peak flowrate into the existing drainage system to no more than the pre-upgrade flowrate. This will provide compliance to the environmental condition of approval E142.

The outflow of the new detention basin has considered the uncontrolled discharge from the new left turn lane on Hill Road and reduced the basin discharge, accordingly. Refer to Table 4-6 for pre and post-upgrade discharge flowrates.

Table 4-6: Assessment of Basin Design Discharge Flowrates

AEP Storm Event	Pre-upgrade flowrate to Council System (m³/s)	Post-upgrade flowrate from Basin (m³/s)	Uncontrolled flowrate at Hill Road intersection (m³/s)	Total Post-upgrade flowrate from Basin (m³/s)
20%	0.242	0.112	0.119	0.231
10%	0.241	0.114	0.123	0.237
5%	0.301	0.133	0.162	0.294
2%	0.399	0.144	0.202	0.338
1%	0.491	0.141	0.239	0.382

Due to the high tailwater level (SPR requires the tailwater level 150mm below ground), the detention basin is to be located above ground by constructing a bund. The detention basin is situated on the existing substation footprint to the west of the alignment. Design parameters are summarised in Table 4-7.

An overflow weir is provided to ensure controlled discharge of excess flow from the basin under the Year 2100 SSP 5-8.5 climate change scenario. The peak flow for the 1% AEP + CC is 0.551 m³/s,

resulting in a flow depth of 100 mm over the weir. The top of the basin is designed to accommodate the ponding depth in the basin, allowing safe discharge in response to long-term impacts due to climate change as per SPR requirements. The overflow weir specifications are detailed in Table 4-7.

Table 4-7: Detention basin specifications

Items	Specifications
Basin base level	2.1 mAHD
Storage volume at top of basin	440m^3
1% AEP water level	2.56 mAHD
Overflow weir RL	2.6 mAHD
Overflow weir length	6m
Water level over weir in Year 2100 (SSP 5-8.5)	2.7 mAHD
Top of basin level	2.8 mAHD
Outlet pipe size	375mm

4.3.2.2.4. Drainage Swale Reinstatement

Figure 4-2 highlights an existing drainage swale that runs between the new Sekisui development and the Ausgrid 132 KV alignment from approximately Chainage 7860 to the Parramatta River. The existing drainage swale is located partly within AL-12 and TL-06. As part of the contractors' activities this swale will be filled and require reinstatement. As agreed in consultation with SOPA the existing swale is proposed to be reinstated within TL-06 to be clear of the BR-02 Wentworth Point Approach Structure substructure elements.

Figure 4-2: Existing Swale Locality

Peak flow for this channel has been extracted from the projects overland flow model (package FL-0001) and used to determine the minimum swale size to be reinstated as summarised in Table 4-8.

Table 4-8: Drainage Swale Details

Items	Specifications
Peak Flow	0.9m³/s
Base Width	1m
Side Slope	1 in 4
Flow Depth	0.45m
Total Depth	0.6m (150mm freeboard)
Swale Slope	0.5%
Lining	Grass

4.3.2.3. Bridge drainage

The assessment of the bridge deck drainage has been conducted using 12d Model and DRAINS software applications. The flow spread is assessed based on the typical cross section of the bridge and rail corridor, based on the current alignment design. As per Table 5.1 in AGRD Part 5A, the allowable flow spread for a 10% AEP storm event is 1.3 metres. The findings for the scupper specifications are shown in Table 4-9.

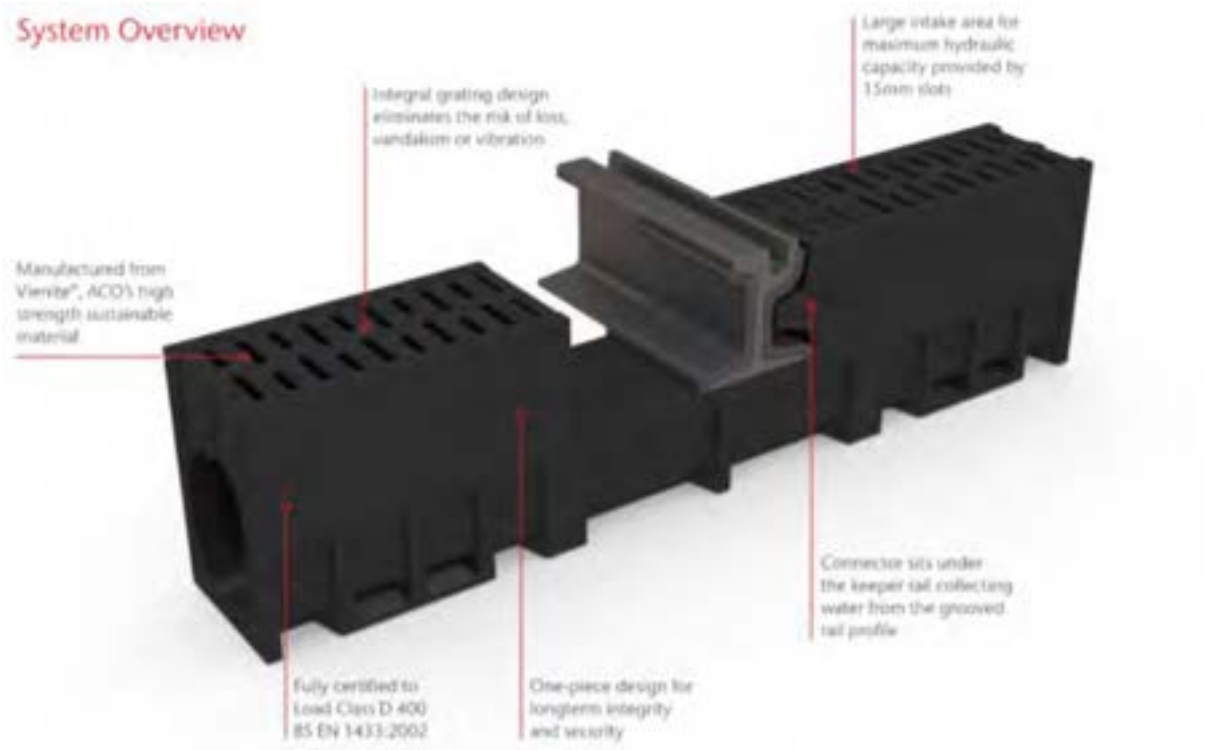
Table 4-9: Bridge deck drainage specifications

Items	Specifications
Scupper size	150mm
Bridge 1 scupper intervals	10.2m (centre) (SPR 7.7.2.2(j)(iii))
Bridge 2 scupper intervals	8m (centre) (SPR 7.7.2.2(j)(iii))
Bridge 1 Typical longitudinal pipe size	225mm (SPR 7.7.2.2(k)(iv)). A 250mm wide by 150mm deep box section has been used in lieu of the pipe based on the outcomes of Urban design discussion with TfNSW.
Bridge 1 Pipe material	Stainless Steel (SPR 7.7.2.2(k)(iv) – corrosion and fire resistant), additional materials may be proposed by the Contractor under TS 03254.2 (R11) provided all requirements are met to the satisfaction of the Principal and suitable hold points for approval provided. Grade 316 stainless steel (seam welding to AS/NZS 1554.6) to be provided, in accordance with the durability report findings.
Scupper blockage factor	50% (SPR 7.7.2.2(j)(ii))

In Bridge BR02, surface runoff will typically be collected by transverse grated trenches. Scuppers are provided at minimum spacing as defined in the SPR to collect runoff from a narrow strip of catchment between the nearside rail and the kerb line.

4.3.2.4. Track drainage

SPR 7.4.9 (d) requires transverse track drainage at minimum every 50m interval. It also prohibits utilising a removable grate as specified in SPR 7.4.8(g). In the Australian market, options are limited for supply of transverse grated trench drains without removable grates. One of the options is ACO TramDrain 200, which would be supplied from the UK. ACO have confirmed that TramDrain 200 can be customised to be compatible with 51R1 (Ri52) grooved rail, to provide drainage of the rail flangeway.



Product Code	Description	Length mm	Width Overall mm	Height Overall mm	Weight kg
TramDrain 200					
T00039	TramDrain 200 Drainage unit 500mm LG	500	260	400	54.2
T00017	TramDrain 200 R59/60 Rail connector unit *	205	260	175	10.9
32620	TramDrain 200 41GPU Rail connector unit *	205	260	200	9.8
T00023	TramDrain 200 Culvert unit 600mm LG	600	260	200	21.4
T00040	TramDrain 200 Access unit 500mm LG	500	260	400	56.4
T00041	TramDrain 200 Closing end cap	25	260	500	5.4
33108	TramDrain 200 Outlet end cap	150	260	400	3.8

* Connector units compatible with R59/60 or 41GPU rails

Figure 4-3: TramDrain 200 datasheet (source: ACO website)

There is an alternative product available, known as MEA TramDrain, which can be supplied in Australia by Hydro Construction Products, based on their standard 'MEA TRAFFIC' polymer drainage channel. The MEA TRAFFIC off-the-shelf product has an overall height of 320mm, which is currently the shallowest. The manufacturer has advised that they are able to design the drainage system to suit our rail boot profile.

In addition, another product from MEA polymer drain system is approved by TfNSW as per their website https://www.transport.nsw.gov.au/operations/roads-and-waterways/business-and-industry/partners-and-suppliers/products-and-0/modular.

Transverse grated trench drainage for each section of the project is described in the following sections.

4.3.2.4.1. Archer Park (Between Mary Street intersection and BR01)

Transverse monolithic grated trench is provided at maximum intervals and at either side of future Waratah station as per SPR requirement 7.4.9(e)(i).

A 200mm wide rectangular shape channel has sufficient capacity for the largest expected flowrate, in 5% AEP + CC storm event. Considering the rail height and rail boot thickness, the grated trench drain

total internal dimensions are 281mm (depth) x 200mm (width). Products such as ACO TramDrain 200 or DM2000 from MEA are suitable.

4.3.2.4.2. Bridge 01

In the Technical Memo PLR2EW-JHGRP-NWW-DR-MEM-000001, it was demonstrated that a 50mm ponding depth and compliant flow width (to SPR and Austroads GTRD Part 5A), can be achieved without the need for transverse grated trenches. As a result, transverse grated trenches have been eliminated from the design. Instead, the design proposes a 0.3m wide longitudinal grated trench drain, 2m in length, at varying intervals between 28 and 35m along the low side of the track slab. This is in addition to scuppers at 12m intervals. Refer to the Technical Memo PLR2EW-JHGRP-NWW-DR-MEM-000001 for more details.

Flows over the bridge expansion joints will be collected by a 200mm x 150mm high stainless steel drainage trough and discharges to the drainage system. The details of this drainage element are captured within Package BR-0001.

4.3.2.4.3. Bridge BR02

The design for deck drainage on Bridge BR02 comprises two sections of transverse monolithic grated trench drain (ACO TramDrain or an equivalent product) at 32m intervals in the track 4 foot. The monolithic grated trench drain will extend beyond the four-foot section on the low side of the track slab, up to a maximum of 300mm from the edge of the track slab. Scuppers will also be installed at 8m intervals. The flow width of 1.2m is achieved in a 10% AEP + CC storm event at the low side of the track slab.

4.3.2.5. Water Quality

4.3.2.5.1. General

The design parameters for the Water Quality treatment train have been developed to comply with the requirements of the SPR Clause 7.4.12. The SPR identifies two requirements to establish the design criteria which are discussed within this section:

- The quality of all stormwater and groundwater discharge must comply with the Planning Approval – Section 4.3.4.2.
- The quality and quantity of all stormwater and groundwater discharge must comply with the TfNSW Sustainable Design Guidelines, unless approved otherwise by the Principal.

Condition of Approval E138 identifies that the drainage system must be designed to maintain the NSW Water Quality Objectives where they are being achieved as at the date of this approval, and contribute towards achievement of the NSW Water Quality Objectives over time where they are not being achieved as at the date of this approval, unless an EPL in force in respect of the Critical State significant infrastructure (CSSI) contains different requirements in relation to the NSW Water Quality Objectives, in which case those requirements must be complied with.

A review of the existing Parramatta River Water Quality parameters against the Water Quality Guidelines was undertaken utilising the information contained within the EIS Technical Paper 10 Section 4.9, for Site 2 immediately upstream of the new bridge crossing, refer to Figure 4-4 below, the EIS concluded that the baseline water quality within the Parramatta River is not achieving the Water Quality Objectives, and exceed trigger values in both wet and dry weather events. As a result, the project is not required to achieve the Water Quality Objectives but rather demonstrate that it is contributing to improvement.

Table 4-7 Summary of existing water quality data

Parameter (Average)	Trigger Value or Criteria (ANZG 2018)	Site 1- Upstream of Duck River confluence	Site 2 - Ermington Bay
Chlorophyll-a (µg/L)	4	38.2	9.6
Dissolved Oxygen (DO)	80%-110%	76.6	78.9
Turbidity (NTU)	0.5 to 10	23	215.7
pH	7-8.5	7.4	7.5
Conductivity (µS/cm) Comp 25 C	125-1200	26,665.3	34,750.8

Shaded cells indicate exceedance of the ANZECC (2000) and ANZG (2018) applicable guidelines.

Figure 4-4: Water Quality Test Parameters verse Trigger Criteria

4.3.2.5.2. Water Quality Objective

This sections outlines:

- The Water Quality Objectives of the Sydney Harbour and Parramatta River Catchment.
- Describes the source of pollutants from the PLRC project that could be generated and their relationship of contribution to the Objectives.
- Outlines the limitations of the assessment tools in measuring parameters.
- Outlines the Target Pollutants for each objective that can be measured within the Water Quality Modelling software (MUSIC).
- For Parameters that are outside the ability of the modelling tools, and a qualitative relationship between the pollutants, reliance on proprietary product information will be provided to demonstrate that the pollutant can be reduced by that product.
- Describes the Methodology of compliance.

Sydney Harbour and Parramatta River Catchment

A review of the Parramatta and Sydney Harbour Water Quality Objectives was undertaken to further appreciate the Water Quality Objectives specific to this section of the catchment. The Objective location was determined using the map in Figure 4-5 and identified Upper Estuary objectives as the target.

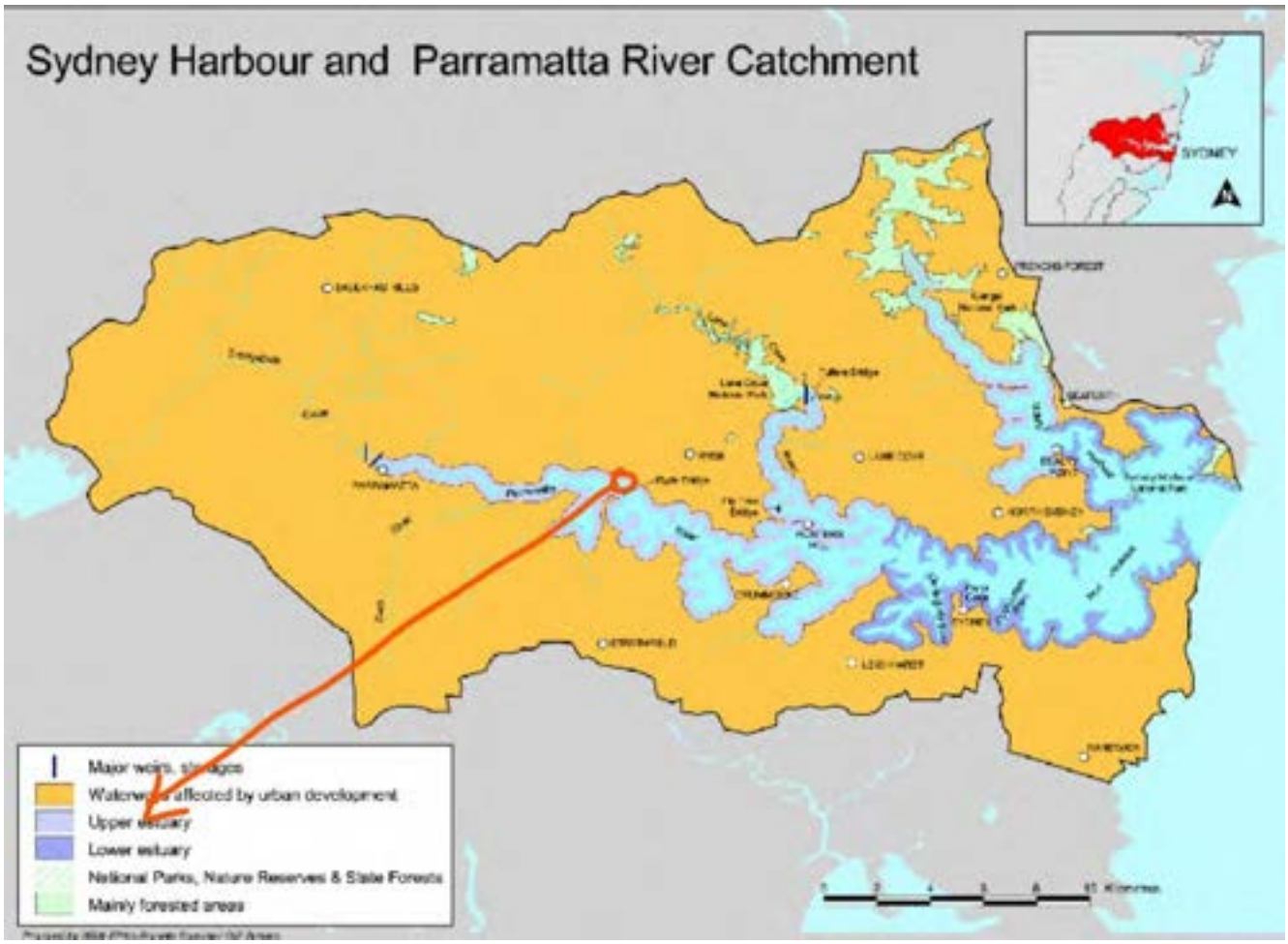


Figure 4-5: NSW Water Quality and River Flow Objectives Catchment Map

For this region of the Parramatta River the following objectives have been established for Upper Estuary Catchments:

- Protection of:
  - Aquatic Ecosystems: Refer to Table 4-10.
  - Visual Amenity: All Flows discharged from the new PLRC corridor that are trafficked are captured and discharged through a water quality device to mitigate impact.
  - Secondary contact recreation: Contribution through the targeting TP/TSS/TN and GP will improve all measures that are contributed by the mechanisms outlined in Table 4-9.
  - Primary contact recreation: Contribution through the targeting TP/TSS/TN and GP will improve all measures that are contributed by the mechanisms outlined in Table 4-10.
  - Aquatic Foods(cooked):
- River flow Objectives (reefer to FL-0001):
  - Maintain wetland and floodplain inundation
  - Manage groundwater Ecosystems
  - Minimise Effects of weirs and other structures
  - Maintain or rehabilitate estuarine processes and habitats.

Pollutants of Concern

The protection of aquatic ecosystems identifies the water quality objectives for the catchment. Table 4-10: Water Quality Objectives below summarises the Water Quality Objective, the potential source

and mode of degradation and that subsequent target pollutant in the Water Quality Strategy for surface water of the PLRC to contribute to the overall catchment health.

Table 4-10: Water Quality Objectives

Water Quality Objective	Contributing Pollutant Source from the PLRC
Total phosphorus	Nutrients: Runoff from roads can carry nutrients like phosphorus from vehicle emissions, and other sources.
Total nitrogen	Nutrients: Runoff from roads can carry nutrients like nitrogen from, vehicle emissions, and other sources.
TSS Aquatic Foods(cooked):	Erosion and sediment carried on bus wheels can contribute to increased sediments in the Parramatta River.
Chlorophyll-a	Possible Sources from the PLRC include: Nutrients: Runoff from roads can carry nutrients like nitrogen and phosphorus vehicle emissions, and other sources. These nutrients can promote the growth of algae, including those that produce Chlorophyll-a, leading to algal blooms Sediments: Erosion and sediment carried on bus wheels can contribute to increased sediments in the Parramatta River. These sediments can carry attached nutrients and pollutants, which can enhance algal growth and increase Chlorophyll-a levels Organic Matter: Leaves, grass clippings, and other organic debris can be washed into the parramatta River from Maintenance activities of be wind blown onto the PLRC. The decomposition of this organic matter releases nutrients that can fuel algal growth Temperature: Runoff from hot pavement can increase the temperature of river water. Warmer water can enhance the metabolic rates of algae, potentially increasing Chlorophyll-a production
Turbidity	Possible Sources from the PLRC include: Sediments: Erosion and sediment carried on bus wheels can contribute to increased sediments in the Parramatta River Organic Matter: Leaves, grass clippings, and other organic debris washed into rivers from roads can contribute to turbidity. As this organic matter decomposes, it can release smaller particles that further increase turbidity
Salinity (electrical conductivity)	No anticipated pollutant source from the PLRC.
Dissolved oxygen	Possible Sources from the PLRC include: Nutrients: Runoff from roads can carry nutrients like nitrogen and phosphorus. These nutrients can lead to algal blooms, which consume large amounts of oxygen when they decompose, reducing DO levels. Sediments: Sediments can smother aquatic habitats and reduce light penetration, affecting photosynthesis and thus oxygen production. Organic Matter: Leaves, grass clippings, and other organic debris from maintenance of the Archer Park Foreshore could be washed into the Parramatta River The decomposition of this organic matter by bacteria consumes oxygen, lowering DO levels. Temperature: Runoff from hot pavement can increase the temperature of river water. Warmer water holds less dissolved oxygen, which can stress aquatic organisms
pH	Decomposing organic matter, such as leaves and grass clippings washed into rivers can produce organic acids. These acids can lower the pH of the water.
Temperature	Runoff from hot pavement can increase the temperature of river water.
Chemical contaminants or toxicants	Oil, grease, from Bus Vehicles can enter the Parramatta River through stormwater runoff.

Water Quality Objective	Contributing Pollutant Source from the PLRC
Biological assessment indicators	The objective is related to management goals for ecosystem protection are being achieved (e.g. maintenance of a certain level of species diversity, control of nuisance algae below a certain level, protection of key species, etc). This is not directly impacted through the stormwater treatment Package.

Design Model Limitations

The assessment of the Water quality design has been undertaken using MUSIC model, refer to Section 4.3.3.3 for further details.

MUSIC will be able to assess the following pollutants of concern and demonstrate that the water quality treatment train provided will achieve a reduction in these pollutants post upgrade:

- Total Nitrogen.
- Total Phosphorous.
- Total Suspended Solids.
- Gross Pollutants.

Based on the above Table 4-11 provides a summary of how the reduction of each objective will be provided.

Table 4-11: Assessment Method for Each Water Quality Objective

Water Quality Objective	Measure	Artefact for Compliance
Total phosphorus	TP	MUSIC Model Results
Total nitrogen	TN	MUSIC Model Results
TSS Aquatic Foods(cooked):	TSS	MUSIC Model Results
Chlorophyll-a	TN, TP, TSS and Gross Pollutants	MUSIC Model Results
	oil	Oil removal cannot be measured in MUSIC, Supplier details on product ability to remove oil provided in Appendix R.
Turbidity	TSS	Turbidity is not a direct output from MUSIC that assess water quality design. As Identified in Table 4-9, TSS is the contributing pollutant from the project runoff that contributes to this measure and so a demonstrated reduction in TSS will provide evidence that the project treatment train will contribute to an improved catchment concentration. MUSIC Model Results Appendix L.
Salinity (electrical conductivity)	Not Measurable	There is no pollutant source on the PLRC runoff that is considered to contribute to this Objective.
Dissolved oxygen	TN, TP, TSS and Gross Pollutants	MUSIC Model Results
	Chemical Pollutants: Oil.	Oil removal cannot be measured in the tool, Supplier details on product ability to treat provided in Appendix R.
	Temperature	There is no measure to demonstrate this measure.
pH	Gross Pollutants	General Reduction of Gross pollutants in the system, will capture vegetation and prevent it from discharge to the Parramatta River. MUSIC Model Results Appendix L.

Water Quality Objective	Measure	Artefact for Compliance
Temperature	Not Measurable	There is no measure to demonstrate this measure.
Chemical contaminants or toxicants	Not Measurable	Oil removal cannot be measured in MUSIC, Supplier details on product ability to remove oil to be provided
Biological assessment indicators	Not Impacted	Not Impacted by this Package

Design Methodology

Based on this the Project has set out to contribute to the objectives over time by contributing to an improved catchment pollutant load discharge and adopting the TfNSW Sustainable Guidelines removal efficiency targets.

The TFNSW sustainable design guidelines (ID-PLR-REF-6-DMS-SD-106) Table 4 Appendix B, target the following pollutant removal efficiencies which have been targeted in the design of the WSUD strategy:

- Total Suspended Solids (TSS): 85%.
- Total Phosphorus (TP): 65%.
- Total Nitrogen (TN): 45%.
- Gross Pollutant (GP): Not specified but will be reported.

The pollutant reduction targets were applied to the entire site. The overall performance of proposed water quality treatments provided for the enabling work site achieves the TfNSW Water Quality objectives for the new PLRC corridor, and slightly less when applied to the entire project scope. The project's overall pollutant reduction percentage is presented in the section 4.3.4.2. Additionally, the outlet concentration levels of TP and TN have been reported for each outlet of the treatment train system to demonstrate that the treatment train will achieve a reduction on concentration compared to the existing.

Based on the review of data and documents reduction of the post upgrade pollutant loadings will demonstrate compliance against condition E138, through contribution to achieving the water quality objectives.

4.3.2.5.3. Bioretention basin

The bioretention filter media surface area is specified in the basin at Archer Park Table 4-9. The extended detention depth is 0.3m. The filter media surface level is 2.4 mAHD which is higher than the Parramatta River water level. The flood modelling suggests the flood water depth is between 0.75m to 1m in a 5% AEP storm event (water level will be approx. 1.25 to 1.5 mAHD). Therefore, the filter media and performance of the water quality treatment system will not be impacted by the 5% AEP storm event.

Based on Geotechnical Design packages GE0002A/B and GE-0003A/B the groundwater level at the bioretention basin location is approx. 1.5mAHD. Only, the base of bioretention basin (drainage layer) will be exposed to the groundwater, therefore a HDPE liner is provided to isolate the system from the groundwater. Geotechnical investigations are still ongoing to inform this element of the design.

Figure 4-6: Bioretention basin configuration at Archer Park

4.3.2.6. Drainage Grates

The following Drainage grates and lids have been used for each element of the drainage System:

- PLRC other than trench drains: Grated Pits Class D, Mascot Engineering 'GKE94D' or similar.
- ATL Bridge BR01: New scuppers fitted with Class B heel-safe grates and frames.
- Council Road: Nominated TfNSW drainage pits fitted with Class D grates and frames.
- In Public Footpaths / ATL: Class B heel-safe grates and frames.
- In Cycleway: Bicycle-safe Class B grates and frames.

4.3.3. Design Analysis

4.3.3.1. Stormwater Drainage

A 12d model was established and HGL analysis completed for pipe networks using the ILSAX hydrology, refer to Section 4.3.3.1.2 for ILSAX parameters.

For hydrology parameters and pit loss parameters refer to **Appendix J Dynamic Drainage Results**. The pit loss parameters are configured in 12d using Missouri/Hare Chart. The analysis results are also provided in **Appendix J Dynamic Drainage Results**. The catchment Plan is provided in **Appendix K Catchment Plan.**

4.3.3.1.1. Drainage Design Software

The 12d Drainage design model was utilised as it can meet the drainage design requirements outlined in the SPR Clause 7.4.1(d) to:

- Assess a number of storm durations and use the storm duration that produces the largest peak discharge specific to that location for the given AEP.
- Assess the entry capacity of each pit, pit losses of the drainage system.
- Assess the by-pass flow from each pit to the next pit in the drainage system and route them to the next downstream pit.
- Determine widths of flow and any depression pondage of the drainage system that might impact on trafficable widths or pavement utilising the project design surface.

4.3.3.1.2. Design Loss Model

12d Drainage model has been established using the ILSAX hydrology model with the following Horton losses applied to each surface type as summarised in Table 4-12. Antecedent Moisture Condition (AMC) 3 and 3.5 were used for minor and major events respectively. Soil type C was used in the analysis.

Table 4-12: Horton Loss Model Parameters

Soil Type	Interpolation Number	Initial Loss mm/hr	Final Loss mm/hr	Decay Rate	AMC1	AMC2	AMC3	AMC4
A-High infil-Sand gravel	1	250	25	2	0	50	100	150
B-Mod well drained	2	200	13	2	0	38	75	100
C-Slow infiltration	3	125	6	2	0	25	50	75
D-Very slow-clays	4	75	3	2	0	18	38	50

The Hill Road Detention Basin has been modelled in DRAINS using RAFTS IL/CL hydrology with the following initial and continuing losses applied:

- PLRC / paved surfaces and Road Pavement:
  - Initial Loss: 1 mm
  - Continuing Loss: 0 mm/hr
- Vegetated Park
  - Initial Loss: 33 mm
  - Continuing Loss: 0.72 mm/hr

The DRAINS model hydrology for the detention basin design included a preburst rainfall depth of 39.48mm.

4.3.3.1.3. Design Blockage

The following blockage factors were applied to the drainage inlets:

- Sag Pits: 50%
- On Grade: 20%
- Scuppers (on grade and sag): 50%

4.3.3.2. Outlet Scour Protection

The outlet scour protection rock size has been determined using the methodology set out in AGRD Part 5B section 3.13, and summarised below in Table 4-13 and calculations attached in **Appendix O**. Refer to Figure 4-7 for a graphical representation of the rip rap apron dimensions outlined in Table 4-13. The values for 'La' are shown on the drawings as 'L'.

Table 4-13: Outlet Scour Protection Summary

Outlet ID	1% AEP + CC flow velocity (m/s)	Pipe diam. (mm)	Min. D50 rock size (mm) AGRD 5B Fig. 3.15	Minimum thickness of Rock pad (mm)	Minimum length (m) AGRD 5B Fig. 3.16		Minimum width at end of HW apron (m)	Minimum width at end of rip rap apron (m)
					L	La		
01-3*	1.62	1050	200	400	3.2	0.3	5.4	5.5
07-3**	1.79	1200	200	400	4.8	2.4	5.2	6.2
10-11	2.00	750	200	400	4.5	3.3	2.7	4.0

Outlet ID	1% AEP + CC flow velocity (m/s)	Pipe diam. (mm)	Min. D50 rock size (mm) AGRD 5B Fig. 3.15	Minimum thickness of Rock pad (mm)	Minimum length (m) AGRD 5B Fig. 3.16		Minimum width at end of HW apron (m)	Minimum width at end of rip rap apron (m)
					L	La		
19-7	1.68	450	100	200	2.7	2.1	1.6	2.5
26-2	1.57	375	100	200	1.5	1.1	1.3	1.8
44-2	1.64	375	100	200	1.5	1.1	1.9	2.3

* Scour protection width has been extended along the full length for structural stability purposes and not as a requirement for protection of the downstream environment against scouring from the pipe outlet. Rock has been extended to the boundary for structural stability purposes and exceeds the minimum requirement for scour protection.

** Rock length has been extended to meet the boundary and exceed the minimum requirements for scour protection.

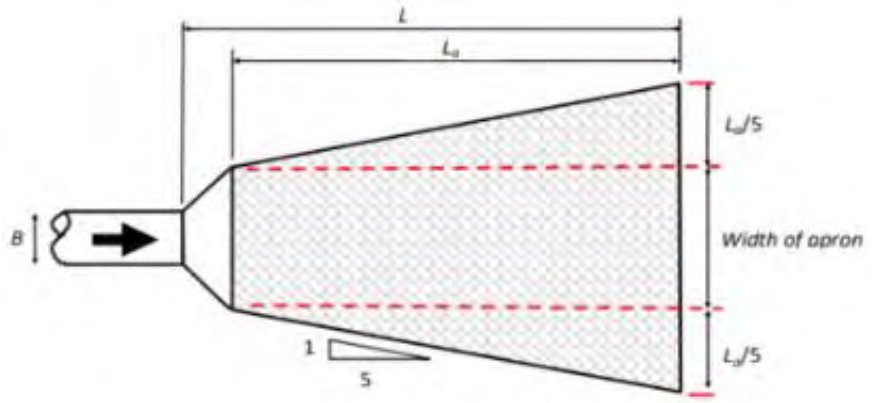


Figure 4-7: Rock apron detail for single pipe outlet (Austroads Guide to Road Design Part 5B, Figure 3.16)

The following outlets do not require rock scour protection as the outlet velocity is low (<1.5m/s, which is the limit of pipe outlet velocity for scouring of sandy or silty clay, as per Austroads GRD Part 5B Table 3.1) in the minor and major design storm events. Suitable vegetation provided downstream of the outlet will provide adequate protection against erosion.

- 05-4 outlet to bioretention Basin 1
- 12-2 outlet to bioretention Basin 2
- 16-2 outlet to bioretention Basin 2
- 14-21 outlet to Parramatta River at Wentworth Point
- 20-2 outlet to bioretention Basin 3
- 24-2 outlet to bioretention Basin 3
- 41-2 outlet to Parramatta River at Wharf Road

Outlet from headwall 46-2 will require a batter chute and scour protection pad at the base of the embankment. A detail has been provided in the drainage drawing set, based on the guidance set out in the Catchments and Creeks Fact Sheet 'Rock Sizing for Batter Chute Outlets'.
Refer to **Appendix O** for further information.

4.3.3.3. Water Quality Analysis

The assessment of pre and Post Upgrade pollutant loadings has been undertaken using the MUSIC software. The MUSIC model was established using the CoPC MUSIC-link.

Parramatta Council worked with eWater to simplify the process of developing Stormwater Treatment Strategies within the Parramatta Council LGA. The use of MUSIC-link simplifies the development and assessment of MUSIC models within the LGA.

Adopting the MUSIC -Link provides locally specific WSUD modelling parameters and as a result is considered appropriate for demonstrating compliance of the design against the water quality objectives of the project.

4.3.3.3.1. MUSIC Model Establishment

Water quality devices are sized for a 4EY storm event. A MUSIC model was established utilising CoPC MUSIC link.

The rainfall data is based on City of Parramatta Stormwater Quality Assessment 1988 to 1977 6min rainfall data.

The catchment sizes input into the MUSIC model have been determined from the design documentation and are summarised in Table 4-14.

Table 4-14: Catchment areas

Pit ID	Catchment Area					
	Bridge (ha)	Impervious percentage (%)	Road (ha)	Impervious percentage (%)	Urban Mixed (ha)	Impervious percentage (%)
Northern section of Parramatta River (Ch 6920 to 7460)						
02-10	-	-	0.15	90	0.072	0
46-2	-	-	0.194	100	-	-
26-1	0.51	100	0.57	75	-	-
Southern section of Parramatta River (Ch 7460 to Ch 7910)						
14-3	0.67	100	-	-	-	-
19-4	-	-	0.19	100	-	-
22-1, 36-1, 37-1	-	-	0.11	90	-	-

Table 4-15: Treatment System Bypass Catchment Areas

PIt ID	Catchment Area					
	Bridge (ha)	Impervious percentage (%)	Road (ha)	Impervious percentage (%)	Urban Mixed (ha)	Impervious percentage (%)
Northern section of Parramatta River (Ch 6920 to 7460)						
45-2 (JF)	-	-	-	-	-	-
46-1 (Bioretention Basin)	-	-	-	-	0.087	53
26-1 (Bioretention Basin)	0.069	100	0.008	100	0.053	20
Southern section of Parramatta River (Ch 7460 to Ch 7910)						
29-2 (JF)	0.065	100	-	-	-	-
38-1 (Bioretention Basin)	-	-	-	-	-	-

4.3.3.3.2. Treatment Train Development

The water quality treatment train summarised below in Table 4-16.

Table 4-16: Water Quality Treatment Train

Pit ID	Water Quality Treatment System	Description
Northern section of Parramatta River (Ch 6920 to 7460)		
45-2	JellyFish (or equivalent system)	Smaller footprint water quality device is adopted because of space proofing constraints due to presence of utilities services. This system will treat the rail corridor catchment.
46-1	Bioretention (filter area: 95m^2)	A bioretention system is proposed at the existing hard surface footprint towards southern side of the alignment. This system will treat the rail corridor catchment.
26-1, 23-1	GPT + Bioretention (filter area: 107m^2)	A bioretention system is proposed at the southern side of the trailer carpark. The GPT is provided to prevent the gross pollutant and the sediment discharging towards the bioretention basin, mitigating filter media blockage. This system mainly treats the Bridge 1 catchment in addition to the trailer carpark and the rail corridor catchment. There are sections of the catchment between the bioretention and Wharf Road which bypass the treatment system, to offset the bypass catchment area.
Southern section of Parramatta River (Ch 7460 to Ch 7910)		
29-1, 29-2	GPT + JellyFish Unit	These devices are located to the immediate eastern side of the Bridge 1 alignment. These water quality devices are proposed due to smaller footprint to minimise the adjustment to the project boundary. This system treats the catchment from Bridge BR01 and Bridge BR02.
38-1	Bioretention (filter area: 200m^2)	A bioretention system is proposed at the existing substation footprint at Hill Rd intersection. Due to the potential impact on the existing channel batter stability the relocation of basin towards the eastern side of the alignment isn't feasible. This system will treat the rail corridor catchment.
22-1, 25-1A, 36-1, 36-2, 37-1, 37-2	Ocean Guard	Gully Pit Insert for those pits that are not treated by the Bio-retention system.

4.3.3.4. Pipe Class Assessment

For pipes subject to loading by the PLRC a Pipe class assessment was undertaken to validate that the pipes where suitable, a copy of the output is attached in **Appendix M**.

It is noted that most of the pipes are not subject to vehicle loading and have been assessed for minimum and maximum cover depths for each side to validate that the pipes class nominated on the long sections is appropriate.

4.3.4. Results

4.3.4.1. Stormwater Drainage

Dynamic drainage analyses results are presented in **Appendix J Dynamic Drainage Results**.

4.3.4.1.1. Assessment of Self-Cleaning Velocity

Clause 7.4.4(a) notes "All pipes/culverts of the drainage system including oversized detention pipes must be self-cleansing except where flow velocity is constrained due to catchment size."

A number of pipes failed to achieve the self-cleansing velocity in 1EY, being located at the very upstream of the network and constrained by the low flow rate discharging into these pipes. The locations identified are as follows:

- Line 05 pipe runs 01, 02, and 03.
- Line 08 pipe runs 01 and 02.
- Lines 09A, 09B, 09C, 09D and 09E pipe run 01.
- Line 12 pipe run 01.
- Line 13 pipe run 02.
- Line 13D pipe run 01.
- Line 14 pipe runs 01 and 02.
- Line 16 pipe rum 01.
- Line 18 pipe run 01A.
- Line 19 pipe run 01.
- Line 20 pipe run 01.
- Line 22A pipe run 01.
- Line 25 pipe run 01.
- Line 36 pipe run 01.
- Line 37 pipe runs 01 and 02.
- Line 41 pipe run 01.
- Line 47 pipe run 01.
- Line 51 pipe run 01.

4.3.4.1.2. Parramatta Flood Sensitivity Assessment on PLRC Drainage Performance

Tailwater Assessment

Whilst the design of the drainage system has been undertaken using downstream tailwater tidal levels to allow for a design of drainage elements below the Parramatta River Flood levels, an assessment was undertaken to demonstrate that even in a 5% AEP flood event + CC projected for 2130, the PLRC drainage system will comply with the SPR. The design was rerun with a Tailwater level of 2.55mAHD which was obtained from the contractor's flood model and reported in package FL-0001.

A summary of the assessment is provided Table 4-17. Detailed calculations for the flood sensitivity assessment are provided in **Appendix N Dynamic Drainage Results – 5%AEP+CC**.

Table 4-17: Assessment of Parramatta Flood Levels on PLRC Drainage Performance

Drainage Line	Invert Level at outlet (mAHD)	Comment
01	1.882	Assessment considers 100 Year tailwater of RL 2.98 mAHD, this tailwater is lower than the obvert of the incoming pipe at Pit 01-02.

Drainage Line	Invert Level at outlet (mAHD)	Comment
02	1.882	Pit 02-09 invert level is above the 5% AEP + CC Parramatta Flood level so no impact on system performance is anticipated.
07	1.851	Assessment considers 100 Year tailwater of RL 2.98 mAHD, this tailwater is lower than the obvert of the incoming pipe at Pit 07-02, and not sufficient to submerge the 1050mm outlet pipe completely.
10	0.000	Wharf Road is below the 5% AEP +CC event, impacts of the downstream tailwater will be dissipated by Pit 10-03, having no impact on the performance of the PLRC drainage system. design beyond pit 10-3.
14	0.844	Outlet will be submerged as will the southern foreshore in the projects 5%AEP + CC event. Impact on system performance will not extend to the PLRC which connects to this system at RL 8.384 mAHD.
22	0.191	Outlet to Existing CoPC drainage system in Hill Road. Tailwater 150mm below surface level has been applied as per the SPR.
25	0.600	Outlet to Existing CoPC drainage system in Hill Road. Tailwater 150mm below surface level has been applied as per the SPR.
38	0.250	Outlet to Existing CoPC drainage system in Hill Road. Tailwater 150mm below surface level has been applied as per the SPR.
41	0.253	Outlet to Existing CoPC drainage system in Hill Road. Tailwater 150mm below surface level has been applied as per the SPR.Wharf Road is below the 5% AEP +CC event, and this system does not connect to the PLRC.
46	2.844	Outlet is above the 5% AEP +CC Flood Level, so no impact.

Storm Surge

Storm surge impacts are considered to be lower than those assessed than the 5% AEP Flood event referenced above. Storm Surge considerations along the Parramatta River will likely be largely due to Barometric and wind setup which could be in the range of 0.2 to 0.6m increase in tailwater levels (Sea Level Rise Science and Synthesis for NSW, NSW Office of Environment and Heritage's Coastal Processes and Responses Node - Technical Report, 2016), when applied to the MHWS this would account for a downstream water level of 2.41mAHD which is lower than the climate change Riverine flooding tailwater assessment undertaken, which demonstrated that the performance of the PLRC track drainage was not compromised.

4.3.4.1.3. Pit Placement

The following pits have not been able to be located within grassed areas adjacent to footpaths due to clashes with other infrastructure being provided to support the project. Where this has not been feasible, the pits have been located to a side of the path to limit the impact on users. Pits identified include:

- Pit 02-05: Located in Archer Park and located clear of underground CSR Route, required to thread drainage behind the OHW structures.
- Pit 01-01: Located in Archer Park and located to intersect upstream catchments through the site and run to drainage Line 01.
- Pit 02-3 to 02-6: Located in Archer Park and located clear of underground CSR Route, ITS and Electrical route.
- Pit 01-02: Located adjacent to the 'Jellyfish' water quality device, to be accessible by a sucker truck.

- Pit 04-1: Located to allow for future connection of the Waratah Street Station roof drainage, path is adjacent to the platform in this location.
- Pit 07-1A: Located within the Archer Park to facilitate connection of CSR drainage pits.
- Pit 9-7 and 10-4 to 10-8: There is no soft landscaping area in this area to facilitate the placement of pits for change in direction and connection, therefore the pits are located within the plaza area.

4.3.4.2. Water Quality – Treatment Train Effectiveness

4.3.4.2.1. New Pavement Assessment – SDG Section 6.7 Compliance

The Treatment train effectiveness for the new impervious Pavement assessment is reported from the SDG Compliance Node in the MUSIC model, this reports against the new effective impervious area as required by SDG Section 6.7. The summary in Table 4-18 demonstrates that this requirement has been met.

Table 4-18: SDG Compliance for New Effective Impervious Area

Variable	Sources	Residual Load	% Reduction	WSUD Target
Total suspended solids (kg/yr)	6217	786	87	85%
Total phosphorus (kg/yr)	10.53	3.323	68	65%
Total nitrogen (kg/yr)	44.72	22.54	49	45%
Gross pollutants (kg/yr)	473	29.67	93	90%

4.3.4.2.2. Catchment Assessment

The treatment train effectiveness for the treatment system is presented in this design package has been summarised in this section Table 4-19 provides a summary of the pollutant reduction percentage for overall site meets the target specified in TfNSW WSUD guideline, note this includes all elements such as local roads and parkland works in the project.

Table 4-19: Treatment effectiveness

Variable	Sources	Residual Load	% Reduction	WSUD Target
Flow (ML/yr)	20.29	19.47	4	N/A
Total suspended solids (kg/yr)	6556	1104	83	85%
Total phosphorus (kg/yr)	11.09	3.849	65	65%
Total nitrogen (kg/yr)	47.74	25.53	47	45%
Gross pollutants (kg/yr)	506	52.22	90	N/A

A comparison between the existing case and design case mean concentration is provided in Table 4-20. As shown in the table, the design improves the existing concentration significantly, therefore, it is contributing to achieving NSW Water Quality Objectives over time.

Table 4-20: Comparison between existing and design case concentration

	Existing Case Concentration (µg/L)			Design Case Concentration (µg/L)		
	Mean TSS	Mean Total Nitrogen	Mean Total Phosphorus	Mean TSS	Mean Total Nitrogen	Mean Total Phosphorus

	Existing Case Concentration (µg/L)			Design Case Concentration (µg/L)		
Northern section of Parramatta River	25565	1020	131	2067	565	57
Southern section of Parramatta River	14385	1093	127	2927	342	38
Total Catchment	25820	1137	143	6039	673	73

4.3.4.2.3. Free Draining ATL Scuppers

Table 4-19 provides evidence that the project will adequately meet the Condition of approval, and includes the impacts associated with the free draining scupper of the ATL from the Maritime Bridge high point to Melrose Park.

4.3.4.2.4. Climate Change Impact Assessment

A review of the new stormwater quality treatment train devices and the downstream receiving water levels was undertaken to determine what impact, if any that climate change projected sea level rise may have on the device effectiveness. It is noted that the affected drainage systems have all been provided with a non-return Valve (Duck Bill Type arrangement) and this will mitigate the impact of brackish water back up the system and into the filter materials.

The assessment included reviewing the present-Day MHWS level projected to 2130 by increasing the level by 1.132m to 1.807mAHD.

Table 4-21: Assessment of Climate Change Projected Water Levels

Location Reference	Treatment Device Invert Level (mAHD)	Present Day MHWS (mAHD)	Projected MHWS 2130 (mAHD)	Comment
Northern section of Parramatta River (Ch 6920 to 7460)				
Pit 45-1 (GPT)	3.013	0.675	1.807	GPT will be above the projected 2130 MHWS in the Parramatta River.
Pit 45-2 (JellyFish)	3.013	0.675	1.807	JellyFish is above the projected 2130 MHWS.
Pit 46-1 (Bioretention)	3.80 (Basin Base) 3.20 (Filter Base)	0.675	1.807	Basin will be above the projected 2130 MHWS in the Parramatta River.
Pit 26-1 (GPT)	3.141	0.675	1.807	GPT will be above the projected 2130 MHWS in the Parramatta River.
Pit 23-1 (Bioretention)	2.10 (Basin Base) 1.70 (Filter Base)	0.675	1.807	The Basin will be below the projected 2130 MHWS. The outlet of the pipe is to be fitted with a non-return system (Duck Bill) to prevent the ingress of brackish water during time of potential tidal inundation.
Southern section of Parramatta River (Ch 7460 to Ch 7910)				
Pit 29-1 (GPT)	1.98	0.675	1.807	The GPT system will be below the projected 2130MHWS. The outlet of the pipe is to be fitted with a non-return system (Duck Bill) to prevent the ingress of brackish water during time of potential tidal inundation.
Pit 29-2 (JellyFish)	1.807	0.675	1.807	The Jellyfish system will be below the projected 2130MHWS. The outlet of the pipe is to be fitted with a non-return system (Duck Bill) to prevent the ingress of brackish water during time of potential tidal inundation.
38-1 (Bio Retention)	1.939 (Basin Base) 1.339 (Filter Base)	0.675	1.807	The Basin Filter will be below the projected 2130 MHWS. It is assumed that this basin will be removed once successful funding for Stage 2 is received and that this will be unlikely to be operational.

The assessment demonstrates fitting the drainage system outlets to the Parramatta River will provide a mitigation to the penetration of brackish water back up the drainage system and into the water quality treatment devices located below the projected 2130 MHWS level.

4.3.4.2.5. Outlet Impacts Habitat

Condition E144 (B) requires the drainage design to document the impacts that the discharge will have on the surrounding vegetation and aquatic habitat. The drainage design has been developed to retain existing outlet locations where feasible and provide new outlets into the parramatta river typically within the footprint of the bridge works.

Table 4-22 below identifies each outlet and how the placement of the element considers the downstream conditions.

Table 4-22: Outlet Considerations into the Parramatta River

Location Reference	Comment
01-3	This outlet is an upgrade of the existing Council system to provide 100 Year Capacity for future development and provide discharge of the new works from Mary Street to the Future Waratah Station Stop. The location and placement of the outlet is within the project boundary and will maintain discharge to a similar location as the existing headwall, retaining existing flow patterns.
46-2	This is a new outlet from Bio Retention Basin 2. The outlet has will discharge treated water only and is contained within the project footprint. The outlet and the associated scour protection will not impact any vegetation not already impacted by the Contractors temporary works.
07-03	This outlet is an upgrade of the existing Council system to provide 100 Year Capacity for future development. This outlet discharges no flows from the PLRC and is a retention of existing flow patterns.
10-11 and 41-3	These two new outlets will discharge under the new bridge into the Parramatta River. The location of the discharge is where the contractor's temporary works will already result in the removal of vegetation; these outlets and the associated outlet scour protection do not result in additional vegetation or habitat removal. All water from the PLRC will be diverted through the GPT and Bio-Retention 1 achieving a high level of pollutant removal.
14-21	This new outlet will discharge under the new bridge into the Parramatta River. The location of the discharge is where the contractor's temporary works will already result in the removal of vegetation; these outlets and the associated outlet scour protection do not result in additional vegetation or habitat removal. All water from the PLRC will be diverted through the GPT and JellyFish achieving a high level of pollutant removal.

4.3.4.3. Durability Considerations

This section covers the durability requirements of stormwater drainage pipes within the PLR-EW project location.

The project wide Durability Assessment Plan (DU-0001) has subdivided the PLR2-EW project alignment into four zones based on geographic locations:

- 1. Zone A: Northern Foreshore of Parramatta River (Control Line MC00 Ch 6920 – 7270)
- 2. Zone B: Within Maritime and Parramatta River, including the riverbanks (Control Line MC00 Ch 7270 – 7620)
- 3. Zone C: Southern Foreshore of Parramatta River excluding Woo-La-Ra Landfill (Control Line MC00 Ch 7620 – 7840)
- 4. Zone D: Woo-La-Ra landfill (Control Line MC00 Ch 7840 – 8120)

A section within the Durability Report (PLR2EW-JHGRP-LRPEWRC-DY-RPT-100001) has been provided for the Durability Requirements for Drainage Structures. That report summarises the exposure class, suggested materials, durability and maintenance requirements for stormwater drainage pipes located in abovementioned zones. Refer to that report for more details regarding exposure class assessment.

4.3.4.4. Groundwater Interaction Consideration at Basin 3 (Hill Road)

The basin has been provided with a HDPE line below the drainage layer in the bioretention system to mitigate any intersection with the surrounding groundwater system. The risk of basin interaction with the groundwater system is considered low because:

- The basin will not hold permanent water; it is designed to temporarily hold and drain flow once a rainfall event has passed.
- The basin is provided with a drainage layer and subsoil drainage system to aid in the collection and discharge of stormwater captured by the basin.
- The basin is provided with a HDPE liner below the drainage layer to prevent groundwater interaction.

Figure 4-8 below provide the typical section provided at each of the water quality basins.

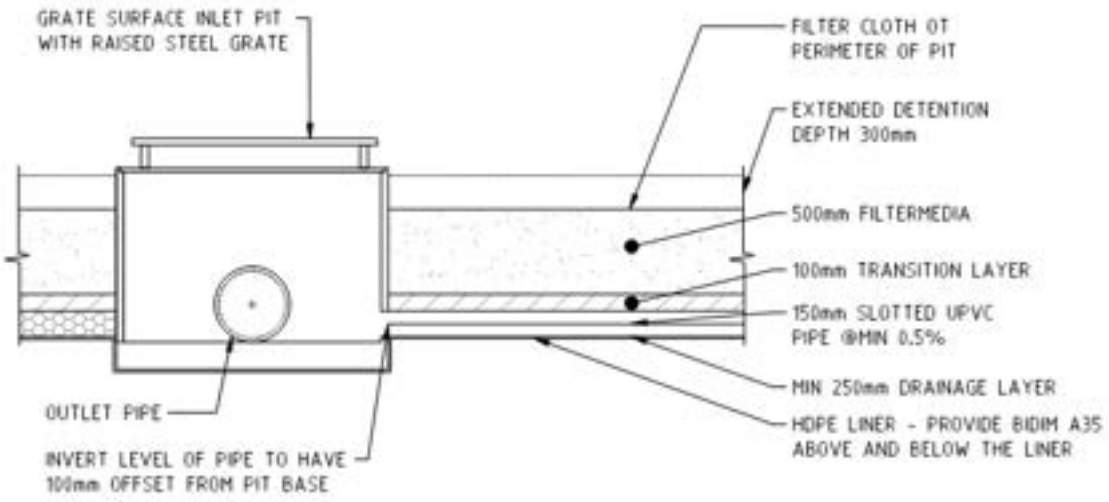


Figure 4-8: Bioretention basin Filter Arrangement

Groundwater levels obtained from the geotechnical investigations (BH 1039 and BH 1035) for the Basin at Hill Road identified groundwater. Groundwater was found to be 2.0m below the surface level at the time of investigation, which is below the basin filter layers.

5. Design Integration

5.1. External Interfaces

Refer to 4.3.2.2.2 and 4.3.2.2.3.

The following external interfaces apply to this package:

- CoPC for the following Items:
  - Hill Road drainage connection (Pits 34-1, EX37-5, EX38-3)
  - Archer Park drainage for catchment outside of the PLRC (Lines 3 and 4).
  - West side of Wharf Road drainage and adjustment to existing pits (Lines 51, 52 and existing drainage line between Lines 10 and 41).
  - Melrose Park transverse drainage design, to align with future requirements (Line 7).
- City of Ryde Council for the following items:
  - New pit and pipe outlet on Wharf Road (Line 41)
  - Wharf Road drainage adjustment to existing pits (existing drainage line between Line 10 and Line 41).
- SOPA for the following Items:
  - Reinstatement of the existing swale filled by the Contractors Temporary Works activities.

5.2. Internal Interfaces

Table 5-1 lists all the interfaces with other Design Packages.

Table 5-1: Description of internal interfaces

Package No.	Package Name	Interface Description
GE-0001	Geotechnical Investigation Plan (GIP)	N/A
GE-0002A	Geotechnical Factual Report (GFR) excluding AL-12	N/A
GE-0002B	Geotechnical Factual Report (GFR) including AL-12	Groundwater Level
GE-0003A	Geotechnical Interpretative Report (GIR) excluding AL-12	N/A
GE-0003B	Geotechnical Interpretative Report (GIR) including AL-12	Groundwater Level
GE-0005	Geotechnical and Foundation Study and Design	N/A
FL-0001	Flood Modelling Report	Tailwater level is adopted based on flood modelling results
SD-0001	Stormwater Drainage and Water Quality Design	This package
UT-0001	Utility Coordination Report and Design	Avoid utility clashes and providing sufficient clearances
UD-0001	Urban Design and Landscape	Enabling tree pits drainage and coordination for lift shaft location
UD-0002A	Architectural Design (Amenities Building)	Connection of amenities building with drainage
UD-0002B	Architectural Design (Bridge Rest Area)	Connection of rest area shelter with drainage
BR-0001	Maritime Bridge Design	Scupper locations and levels are coordinated with bridge deck slab surface level

Package No.	Package Name	Interface Description
BR-0001A	Maritime Bridge Design (substructure)	Rainhead tanks which collect water from the deck drainage and expansion joint drainage trough to be attached to the abutment wall. Coordination required with this package for levels for the drainage trough. Penetrations for pipes though the abutment walls are to be coordinated for size and location. Fixing details for drainage elements are required to be specified in this package.
BR-0001B	Maritime Bridge Design (superstructure)	Scuppers and longitudinal grated drains are located within the deck and associated pipes penetrate girder flanges. Drainage boxes collect water from scuppers and are attached to the underside of the girder flanges. Fixing details for drainage elements are required to be specified in this package.
BR-0002	Wentworth Point Approach Structure Design	Scuppers type and locations are coordinated with derailment kerb. Transverse grated trenches depth is coordinated with the track slab.
ST-0002	Miscellaneous Structures Design	In-ground pits and pipes locations are coordinated with ATL piers' locations, and drainage elements on the ATL ramps.
RS-0001	Retaining Walls Design	Avoid clashes with retaining wall
DU-0001	Durability Report	Marine grade pipes are utilised for harsh groundwater environment.
RW-0001	Track and Roadworks Alignment Design	transverse grated trench locations and sizes are coordinated with the track slab cross fall. Pipe covers at crossings are coordinated with the track slab's level
RW-0002	Roadworks Ancillary Civil Design	Coordinate in-ground pits and pipes location with the road furniture
RW-0003	Roadworks Systems Design	Coordinate in-ground pits and pipes MFP locations and facilitate connection of ITS pits to the drainage system.
RW-0004	Roadworks Traffic Control Signals (TCS) Design	The drainage system positively drains all TCS pits connecting to the formal piped drainage system as required in 7.4.13(a)(iii)
PV-0001	Roadworks Pavement Design	Pipes covers are coordinated with the pavement thickness
GN-0001	Hydrodynamic Study and Report	N/A
GN-0002	Aids to Navigations and Navigation Channel Design	N/A
CS-0001	Combined Services Route (CSR) Design	CSR pit positive drainage is coordinated with track drainage and bridge drainage system. Drainage pit and pipe locations are coordinated with CSR design elements
OH-0001	Overhead Wiring (OHW) Design	In-ground pits and pipes locations were coordinated with MFP piles and their footing locations

Package No.	Package Name	Interface Description
TR-0002	Track Form Design	Track drainage system is coordinated with the track form design
EB-0001	Earthing and Bonding, Electrolysis, and EMC Design	N/A
IT-0002	Security Risk Report and Design	N/A
IT-0003	CCTV Design	N/A
BD-0001	Amenities Building Design	Drainage networks enable connection from roof drainage.
EN-0001	Environmental, Sustainability and Planning Approval Design Review Report	The design review report provides references to specific sections in this Design Report that contain the relevant detail to demonstrate compliance to environment, sustainability and planning requirements.
EN-0002	Rehabilitation Strategy for Native Plant Community (NCT)	N/A
SU-0001	Climate and Natural Hazards Report	Climate risks for this package have been identified, assessed and adaptations implemented as appropriate to de-escalate risk to an appropriate level
SU-0002	Resource Efficiency Plan	Resource efficiency measures have been pursued where relevant to this package
SU-0003	Resilience Plan	Resilience treatment options have been embedded where relevant in this package
SU-0004	Energy and Carbon Model and Report	Material efficiency initiatives identified have been included in this package
SU-0005	Water Balance Model and Report	N/A, no water efficiency or replacement initiatives noted in this package

5.3. Cross Disciplinary Review (CDR)

A Cross Discipline Review (CDR) has been undertaken on this design package by design and construction team members to verify appropriate integration of other disciplines' design components prior to submission to TfNSW and the IC. Outcomes from the CDR have been considered in the development of this design report and informed the interfaces identified in Table 5-1 above.

Table 5-2 below summarises design interface checks and reviews undertaken for this package.

Table 5-2: Cross Disciplinary Review summary

Date	Review
05/11/2024	Internal GHD Inter Disciplinary Check (IDC) by all GHD delivered disciplines – SDR
21/11/2024	John Holland CDR and other design entities managed by John Holland – SDR
26/03/2025	Internal GHD Inter Disciplinary Check (IDC) by all GHD delivered disciplines – PDR
07/04/2025	John Holland CDR and other design entities managed by John Holland – PDR
08/07/2025	Internal GHD Inter Disciplinary Check (IDC) by all GHD delivered disciplines – DDR
16/07/2025	John Holland CDR and other design entities managed by John Holland – DDR

6. Design Consultation

Refer to **D-2** PLR2EW-JHGRP-NWW-DR-MEM-000002_Australian Rainfall and Runoff 2019 Version 4.2 Impact on Drainage Design

Certifications and Third Party Approvals for a record of consultation with stakeholders and specialists.

6.1. Stakeholder Consultation

The stakeholder consultation required for this Design Package is outlined in Table 6-1.

Table 6-1: Stakeholder Consultation

Stakeholder	Consultation Status
City of Parramatta Council (CoPC)	CoPC has provided comments on this package and a subsequent meeting was held on 17 January 2025 to review those comments. Please refer to the comment register in Appendix B Review and Comment Register.
City Of Ryde (CoR)	City of Ryde (CoR) has been consulted as part of the Community Stakeholder Reference Group (CSRG). It is noted that this is limited to interface works on Wharf Road with Andrew Street within CoR's West Ward.
Planning Ministerial Corporation (PMC)	Consultation will be undertaken as part of design development in accordance with the Third Party Agreement (Deed of Agreement dated 5th August 2024). No comments have been received from PMC on the SDR and PDR design stages.
Sydney Olympic Park Authority (SOPA)	SOPA has provided comments on this package please refer to the comment register in Appendix B Review and Comment Register. Consultation has been undertaken to present overland flows and confirm reinstatement conditions for SOPA Reinstatement Area 1 in accordance with the Third Party Agreement. A meeting was held on the 2nd July 2025 and follow-up site visit 4th August 2025.

6.2. Specialist Consultation

Specialist consultation has been carried out with the suppliers of the track drainage systems to confirm sizes and interface details with the track slab as per section 4.3.2.4.

7. Design Considerations

7.1. Constructability

The following constructability elements have been considered in the development of the DDR drainage:

- Interface of the new drainage with reinforced soil wall straps.
- Relocating drainage Line 10 clear of the Reinforced Soil wall to mitigate instability during construction due to undermining the foundation during trench installation.
- Elimination of box culvert structures under Wharf Road to minimise constructability issues and risks associated in working under the existing Wharf Road.
- John Holland have advised that supply of FRC pipes is no longer available in the market, the PDR design was updated accordingly. The DDR design reflects the material changes on long sections.

This package does not consider the impact of the Contractors temporary works on existing retained infrastructure; any potential impacts of the Contractors methodology would be assessed by the appropriate temporary works design assessment by others.

7.2. Construction Specifications

Construction specifications applicable to this package are included in Table 7-1.

Table 7-1: Construction specifications

Reference	Title
TS 03254.2	TfNSW DC Specification R11 Stormwater Drainage
TS 03257.2	TfNSW DC Specification R23 Plastic Flexible Pipes
TS 02158.2	TfNSW DC Specification R44 Earthworks
TS 03264.2	TfNSW DC Specification R53 Concrete for General Use
TS 02167.2	TfNSW DC Specification R63 Geotextiles (Separation and Filtration)

TfNSW standard drawings applicable to this package are nominated in Table 7-2.

Table 7-2: TfNSW Standard Drawings

Reference	Title
TS 02447	R0220-01: Gully Pit Type SA pipe diameter up to 450mm
TS 02450	R0220-03: Precast Concrete Lintels for Type SA Gully Pits
TS 02451	R0220-04: SA Grate and Frame
TS 02468	R0220-21: Gully Pit Type SO
TS 02470	R0220-23: SO Grate and Frame
TS 02475	R0220-28: Gully Pit Widening for Pipes greater than 450mm dia
TS 02476	R0220-29: Drainage Junction Box
TS 02477	R0220-30: Depressed Median Gully Pits
TS 02482	R0220-35: Inspection Pit with Single or Double Cast Iron Frame and cover
TS 02483	R0220-36: Inlet Sump with Raised Steel Grate
TS 02486	R0220-39: Detail of Inspection Pit
TS 02492	R0220-45: Individual-Rung Ladder for Drainage Pits

Reference	Title
TS 02418	R0210-01: Concrete Headwalls Single Cell 300mm to 900mm with Concrete Apron
TS 02419	R0210-02: Concrete Headwalls Single Cell 300mm to 900mm with Rock Mattress Protection
TS 02446	R0210-28: Cast-in-situ Curtain Wall for use with Precast Headwalls Pipe Diameter up to 1200mm
TS 02491	R0220-44: Detail of Pipe Connection to Precast Box Culvert
TS 02492	R0220-45: Individual-Rung Ladder (Step Irons) for Drainage Pits
TS 02511	R0240-01: Installation of Buried Concrete Pipes Type HS3 Support

Table 7-3: CoPC Standard Drawings

Reference	Title
DS24	Grated Sag Pit
DS25	Surface Inlet Pit

7.2.1. Procurement Specifications

Procurement specifications applicable to this package are included in Table 7-4.

Table 7-4: Procurement specifications

Reference	Title
ACO Tram Drain 200	Manufacturers Specification
Ocean Protect – Jelly Fish	Manufacturers Specification
Ocean Protect – Ocean Save	Manufacturers Specification
Ocean Protect – Ocean Guard	Manufacturers Specification

7.2.2. Testing, Commissioning and Acceptance Criteria

Table 7-5 contains elements that require testing, commissioning and acceptance criteria over and above those nominated in the design drawings and Construction Specifications nominated in Table 7-1.

The testing, commissioning and acceptance criteria will be included in the relevant Inspection and Test Plans (ITPs) which will be approved by the relevant TAO designer as applicable.

Table 7-5: ITPs

Element	Reference Document
Bioretention Filter Media	Drawing LR2EW-JHGRP-LRPEWRC-SD-DRG-100015 (Biofiltration Media Notes)

7.2.3. Hold Points and Witness Points

The Hold Points and Witness Points applicable to this design package are nominated within the Construction Specifications listed in Table 7-1. Where required, additional Hold Points and Witness Points are nominated by the Designer on the drawings.

7.3. Operational Considerations

According to SPR requirement section 7.14.2 Table 13, drainage structures accessible for refurbishment are designed for a 50-year design life whereas drainage structures inaccessible for refurbishment are design for a 100-year design life.

7.4. Maintenance Considerations

All elements of the design contained within this package are to TfNSW standards or type approved and present no new or novel maintenance elements.

A Maintenance access strategy is being developed, and the proposed access plan was provided in RW-0001 design report PLR2EW-JHGRP-LRPEWRC-RW-RPT-100001, Appendix D-4 Maintenance Access Strategy, the strategy identifies:

- Assets that require maintenance access.
- Method of inspection and maintenance vehicle access requirements.
- Access routes that have been space proofed for the relevant maintenance vehicle.
- Turn points for maintenance vehicles.
- Access points for maintenance vehicles off the public road network.

7.4.1. Whole-of-Life (WoL) Considerations

As per the Systems Engineering, Assurance and Design Management Plan, whole-of-life cycle requirements are addressed in this design package by considering the WoL principles outlined in Table 7-6 below.

Table 7-6: Whole-of-Life principles

WoL principle	Design package consideration
Selecting durable materials that meet the Asset Design Life nominated in Clause 7.14.2 of the SPR	Materials selected for this design package meet the Asset Design Life specified in Clause 7.14.2 of the SPR
Where possible, selecting components and materials that are readily available in the Australian market to enable efficient procurement of replacement parts as per Clause 4.5(a) of the SPR	All components and materials selected in this design package are readily available in the Australian market, except for TRAMDRAIN 200 monolithic channel, which can be made to order by ACO.
"Elimination", "Minimisation" and "Facilitation" of maintenance activities as part of design development	▪ Accessible drainage pits provided for maintenance of the drainage system. Where pits cannot be provided for smaller pipes (e.g. bridge drainage elements), 45-degree bends provided to allow rodding from the nearest access point. ▪ Maintenance pathways provided to access water quality basins.

The anticipated whole-of-life and asset maintenance regime associated with the materials and components selected in this design package is documented in **Appendix P Maintenance Diary**. This includes details and frequency intervals of the required inspection, maintenance and replacement activities for the nominated assets.

7.4.2. Bridge Drainage

Bridge Drainage will be accessible for cleaning from the deck surface via the scuppers to achieve the minimum 30m cleanout spacing.

7.4.3. Track Drainage Maintenance

The monolithic grated trench drains will require routine visual inspection and flushing by a pressure washer from the surface or the closest pit in the event of observed blockage, due to the monolithic nature of the drainage system.

7.4.4. Southern Foreshore Water Quality Treatment Maintenance Access

At the southern foreshore, the maintenance access for GPT and JellyFish devices is provided through the ATL. The sucker trucks will need to be fitted with a boom and have a sucker height capability of 12m.

For more irregular maintenance associated with the removal and replacement of cartridges equipment will need to be brought down from the deck area to the jelly fish cartridges, these cartridges weigh between 50kg and 60kg and can be removed with portable tripod and winch set up, with connection available from the supplier to fix to the cartridge lifting lugs, and then cartridges trolleyed to the deck for loading onto a vehicle.

7.5. Connect with Country

Consideration for Connecting with Country has been integrated across the design development process for the PLR2 – EW. The project approach to integration of Aboriginal community inputs, cultural narratives, principles and values is detailed within UD-0001 Urban Design and Landscape.

8. Design Compliance

8.1. Environmental Compliance

The Project is required to comply with the environmental and sustainability requirements contained within the NSW Conditions of Approval, EPBC Conditions of Approval and the Updated Mitigations Measures. Compliance with environmental and sustainability requirements is presented in EN-0001 Environmental, Sustainability and Planning Approval Design Review.

An extract of the compliance statements relevant to this Design Package is included in **Appendix F Requirements Compliance**.

8.2. Sustainability

PLR2 – EW is targeting a minimum 'Silver Rating' for Design and As-Built using the Infrastructure Sustainability (IS) v2.1 Rating tool by the Infrastructure Council (ISC). The following sections will detail how the Project seeks to meet the requirements of the targeted IS v2.1 credits and the relevant sustainability requirements in the SPR.

8.2.1. Sustainability in Design

The Sustainability in Design solution for this package is informed by the activities undertaken to develop the following sustainability design reports:

- SU-0001: Climate and Natural Hazards Report
- SU-0002: Resource Efficiency Plan
- SU-0003: Resilience Plan
- SU-0004: Energy and Carbon Model and Report
- SU-0005: Water Balance Model and Report

This DDR phase represents the following activities:

- Finalisation of the climate change risk assessment to ensure all extreme and high priority risks have been de-escalated to an appropriate level in line with SPR Appendix H Section 4 (c).
- External consultation for resource efficiency objectives and resilience risks and treatment options.
- Updated compliance commentary for sustainability design controls and initiatives where relevant.
- Acceptance or rejection of identified high impact initiatives based on multicriteria analyses (MCA) conducted.

8.2.2. Sustainability Requirements

This package addresses the IS Requirements for the relevant categories as indicated in Table 8-1.

Table 8-1: IS Categories

Place / Legacy	Resilience	Energy and Carbon	Environmental Impact	Resource Efficiency	Water	Heritage
X	X		X	X		

Innovation is applicable for all Design Packages; refer to Section 8.2.3. Best practice initiatives will be embedded within the credit category sections below.

The following tables outline the controls that have been put in place within this design package to assure achievement of the relevant sustainability design requirements. Refer to EN-0001 Environmental, Sustainability and Planning Approval Design Review Report and the Sustainability Design Reports (SU-0001, SU-0002, SU-0003, SU-0004, and SU-0005) for holistic compliance against the relevant IS and SPR Appendix H design requirements.

8.2.2.1. Climate Change

PLR2-EW is committed to the identification of all extreme and high priority climate change direct and indirect risks, and the development of treatment options for extreme and high priority climate change risks in line with SPR Appendix H Section 4 (c). After treatment, all extreme and high-priority direct and indirect risks will be reduced to an acceptable level. PLR2-EW will take the following approach to Resilience Planning in line with AS 5334-2013 and the TfNSW Climate Risk Assessment Guidelines. A multidisciplinary internal team has participated in the identification of risks.

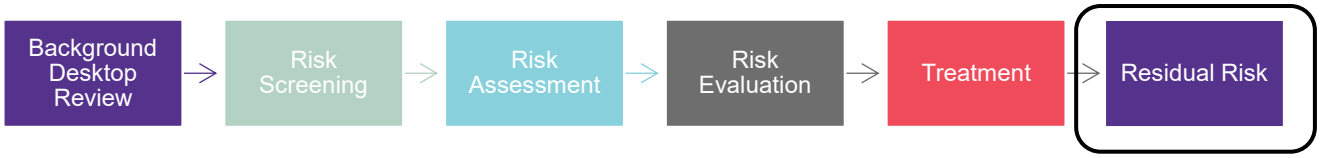


Figure 8-1: PLR2-EW Climate Change Risk Assessment Process (DDR activities circled)

Activities undertaken at this DDR Stage include:

- External Engagement
  - Engagement with affected and interested community groups and other impacted local facilities and assets to identify, assess and treat direct and indirect risks
- Treatment Review
  - Confirmation of treatment options for all extreme and high priority direct and indirect risks to reduce risks to an acceptable level.

Refer to SU-0001 Climate Change and Natural Hazards Report (SDR, PDR, DDR) for details on the Project's climate response.

Table 8-2 identifies all extreme and high priority direct and indirect risks that are relevant to this package.

Table 8-2: Relevant extreme and high priority direct and indirect climate change risks

Risk ID	Risk Description	Direct/ Indirect	Max Risk Rating
F-5	Flooding that isolates the Enabling Works bridge from surrounding roads and floods nearby properties	Indirect	High
S-3	Sea level rise causing negative impact on biofiltration and water sensitive urban design.	Direct	High

These risks have all been de-escalated to a medium rating or below. Treatment options to reduce extreme and high priority risks to an acceptable level have been identified, assessed and implemented as detailed in Table 8-3. Consideration has been given to:

- Scale and timing of implementation (near term implementation vs long term)
- Required governance measures (e.g. action plans)
- Potential negative consequences of treatment measures (e.g. construction of a sea wall may displace natural habitat)
- Cost and benefit of addressing climate and natural hazard risk.

Table 8-3: Adaptation / treatment for climate risks, shocks, and stressors

Risk ID	Adaptation	Status	Implementation	Max Residual Risk Rating
F-5	Design new drainage connections to limit standing water to 50 mm above the finished rail level in a 5% AEP event inclusive of climate change.	Implemented	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Appendix D	Low
	Replace all existing City of Parramatta Council outfalls within Archer Park to cater for 1% AEP inclusive of climate change.		PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Section 4.3.2.1.2	
	Increase size of piping.		PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Table 2-3	
	Move outlets upstream to prevent inundation.		PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Table 2-3	
	Implement transverse grated drainage at Sekisui House / Project Boundary interface to convey flow away from sag point.		PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Section 4.3.2.2.2	
	Space transverse grated trenches at less than 50 metre intervals (28-35 metre intervals)		PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Section 4.3.2.1.1	
	Provide additional transverse grated trenches where there is an aquaplaning risk.		PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Section 4.3.2.1.1	
	Grade footpath towards the track slab to promote runoff capture via pits to avoid nuisance flow to property boundaries.		PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Section 4.3.2.1.1	
	Install V-shaped drains to promote discharge into the in-ground drainage networks.		PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Section 4.3.2.1.1	
	Provide a stub connection for the Mary Street southbound kerb for future connection to the northbound drainage network.		PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Section 4.3.2.1.1	
	Install a detention basin to attenuate post upgrade peak flow rate		PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Section 4.3.2.2.3.	
	Install an outflow weir on the detention basin to ensure controlled discharge of excess flow for the SSP5-8.5 climate scenario.		PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Section 4.3.2.2.3.	
S-3	Installation of non-return valve to stop brackish water entering sediment basin.	Implemented	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Section 4.3.2.2.	Medium
	Installation of HDPE liner to avoid ingress of groundwater from base of basin.		PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Section 4.3.5.3.	
	Separate external upstream catchment from installed water quality treatment devices using a separate transverse drainage pipe.		PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Section 4.3.2.1.1	

8.2.2.2. Resilience Planning

Priority shocks and stressors have been identified in ID-PLR-REF-48 Resilience Plan. Treatment options for priority shocks and stressors as relevant to this design package have been included below. A PLR2-EW Resilience Plan (SU-0002) will be developed at DDR.

Table 8-4: Treatment options for priority shocks and stressors

ID	Treatment	Status	Shock	Stress	Implementation Reference
11	Drainage designed to accommodate increased rainfall intensity from climate change.	Implemented	Rainfall flooding	Climate Change (sea level rise)	PLR2EW-JHGRP-LRPEWRC-SD-RPT-10001 Appendix J & Appendix N.
14	Project team to consult with City of Parramatta Council and communicate perceived risks to inundation of surrounding local drainage system.	Implemented	Rainfall flooding	Climate Change (sea level rise)	PLR2EW-JHGRP-LRPEWRC-SD-RPT-10001Section 6.1
23	Review drainage requirements to ensure allowance is made for increased sediment load from erosion during extreme rainfall and/or drought.	Implemented	Rainfall flooding Drought	Climate Change (sea level rise)	Bioretention and GPT refer to Drawings: ▪ Bio-Retention: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100451, 100452, 100453 ▪ GPT: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100002, 100112 and 100114 TSS Removal of treatment train refer to PLR2EW-JHGRP-LRPEWRC-SD-RPT-10001 Section 4.3.4.2.

8.2.2.3. Place/Legacy

Table 8-5: Requirements and Controls for Place/Legacy

Requirement ID	Requirement	Control(s)	Evidence
Pla-2	▪ Green infrastructure integration, including water urban sensitive design.	▪ Water Sensitive urban design features. ▪ Maintenance schedule	▪ Bio-Retention: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100451, 100452, 100453

Requirement ID	Requirement	Control(s)	Evidence
	▪ Implementation of biophilic design elements and associated outcomes.	▪ Net improvement of existing water quality	▪ GPT: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100002, 100112 and 100114 ▪ Maintenance Schedule: . PLR2EW-JHGRP-LRPEWRC-SD-RPT-10001 Appendix P. ▪ MUSIC Model: PLR2EW-JHGRP-LRPEWRC-SD-RPT-10001 Section 4.3.3.3.

8.2.2.4. Environmental Impact

Table 8-6: Requirement and Controls for Environmental Impact

Requirement ID	Requirement	Control(s)	Evidence
Env-1 / TfNSW Sustainable Design Guidelines	1. SMART water discharge and receiving water quality goals have been identified. 2. Modelling for receiving water quality impacts has been developed for operation of the project 3. Water discharge and receiving water quality impacts identified via modelling must be established for operation. 4. Measures to achieve the water discharge and receiving water quality goals during operation have been identified and implemented	▪ MUSIC model ▪ TfNSW SDG water quality goals adopted ▪ WSUD Controls Implemented	▪ TfNSW SDG WQ Goals: Section 4.3.2.5.2. ▪ MUSIC Model: Section 4.3.3.3. ▪ WSUD elements: Section 4.3.3.3.2

8.2.2.5. Resource Efficiency

Table 8-7: Requirements and Controls for Resource Efficiency

Requirement ID	Requirement	Control(s)	Evidence
Rso-1 / SPR Appendix H Section 3	Feasible opportunities from the Resource Efficiency Plan must be implemented in design documentation.	The use of recycled glass as drainage bedding has been rejected as an opportunity due to pricing constraints. This will be updated in the Sustainability R&O register..	N/A

Requirement ID	Requirement	Control(s)	Evidence
Rso-2 / Rso-3 / Rso-4 / SPR Appendix H Section 7	Opportunities to minimise waste and/or reuse wastes have been identified and implemented during design.	▪ Elevated drainage on bridges rather than trenched excavation. ▪ Shallow grated trenches on southern end of Project where contaminated	▪ Elevated Drainage Drawing Plans: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100106 to 100108. ▪ Elevated Drainage Long Sections: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100215 to 100218. ▪ Grated Trenches not implemented.
2ew-	Opportunities in design to facilitate easier long-term maintenance, disassembly, and adaptation and resource recovery at end of life must be identified.	▪ GPT and Jellyfish unit situated closer to accessible location to allow for easy maintenance access ▪ Higher exposure class for concrete and Jellyfish unit will be selected to extend design life	▪ Section 7.4.
Rso-6 / SPR Appendix H Section 3	Opportunities to minimise material use and/or use alternative materials have been identified.	▪ Removal of transverse drainage resulted in a reduction in track slab thickness and reduction in materials ▪ Optimisation of drainage infrastructure removing the need for box culverts.	▪ Transverse Drainage Removal on Bridge BR-0001 Appendix E. ▪ Box Culvert: Section 2.4.2 Table 2-2 row 1.

Requirement ID	Requirement	Control(s)	Evidence
Rso-6 / SPR Appendix H Section 3	Minimum Material Standards	▪ Use reusable formwork, where practicable. ▪ Maximise supplementary cementitious materials (SCM) content in concrete. ▪ Natural DGB20 must be replaced with recycled concrete DGB compliant with TS 03315.1 (TfNSW specification 3051). ▪ Unless otherwise approved by the Principal, the Contractor must achieve a minimum of 90% Australian steel. ▪ Polyvinyl chloride (PVC) must be compliant with the Green Building Council of Australia (GBCA) 'Best Practice Guidelines for polyvinyl-chloride (PVC) in the built environment'.	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100015.

8.2.3. Innovation (ISC Inn-1 and SPR Appendix H, Section 9)

Original market transformation initiative "use of recycled glass in drainage bedding" has been abandoned due to pricing constraints. This will be reflected in the Sustainability R&O register.

8.2.4. Outstanding Requirements

N/A.

8.3. Engineering Assurance

Systems engineering and safety assurance for this phase of design has been undertaken in accordance with the processes defined by the Systems Engineering, Assurance and Design Management Plan (SEADMP) (PLR2EW-JHGRP-NWW-PM-PLN-000005).

8.3.1. Systems Engineering

The Subsystem Requirements Specification - Requirements Verification Traceability Matrix (SSRS-RVTM) in **Appendix F Requirements Compliance** is the primary artifact for managing the Verification & Validation (V&V) of system requirements allocated to this design package and is being managed progressively throughout the system lifecycle. The SSRS-RVTM schema complies with TfNSW standard AMB TS 01498 and TfNSW's SSRS-RVTM template. At DDR, design verification is completed or otherwise justified. This includes completion of the following for each allocated requirement:

- Design Verification Method
- Proposed Production Verification Method
- Proposed Production Verification Test Type
- Proposed Validation Method
- Proposed Validation Test Type
- Design Verification Evidence

- Design Compliance Status
- Remarks / Comments (optional, where appropriate)
- Traceability to the Project Hazard Log; and
- Traceability to departures (shall be justified).

8.3.2. Safety Assurance and Safety in Design (SiD)

8.3.2.1. Design Safety Verification Review at DDR

At DDR, a Design Safety Verification Review (DSVR) has been undertaken to provide confirmation that the safety activities in support of the achievement of safe design have been completed, building upon those undertaken at SDR and PDR. It has considered the following items:

- Impact of any design changes, concessions and departures
- Management of hazard logs and the status of hazards
- Status of safety controls and design verification of safety requirements
- Status of Assumptions, Dependencies and Constraints (ADCs)
- SFAIRP argument and residual risk.

A copy of the completed DSVR checklist with details of the review can be found in **Appendix F Requirements Compliance**.

8.3.2.2. Project Hazard Log

The Project Hazard Log has been completed for this Design Report with an extract of relevant hazards provided in **Appendix G Project Hazard Log**.

Not all hazards may be marked as "Resolved for Design". These hazards typically have multiple Design Package owners and cannot be marked as such until the other Design Packages have been completed. However, all aspects of the hazards relevant to this package have been addressed.

8.3.2.3. Safety Controls and Requirements

Existing safety controls within the Project Hazard Log have been traced to requirements captured in the Project's Requirements Management Database (DOORS). Refer to Section 8.3.2.

New safety requirements that are derived from the additional safety controls that have been adopted have been uploaded into the Requirements Management Database. A unique requirement ID has been allocated for each new safety requirement.

The Subsystem Requirements Specification - Requirements Verification Traceability Matrix (SSRS-RVTM) in **Appendix F Requirements Compliance** includes the resultant safety requirements associated with the scope of this Design Report and is the primary artifact for managing the Verification & Validation of these safety requirements.

8.3.2.4. SFAIRP Demonstration

In accordance with the SEADMP, a SFAIRP argument has been developed and finalised against each identified hazard that has not been eliminated. Details of the draft SFAIRP arguments are presented in **Appendix G Project Hazard Log**.

8.3.2.5. Residual Risk Ranking

Table 8-8 presents the number of hazards documented in **Appendix G Project Hazard Log** and their initial and residual ranking.

Table 8-8: Initial and residual risk ranking

Initial Risk Ranking	Number of Hazards	Residual Risk Ranking	Number of Hazards
A	0	A	0
B	1	B	0
C	5	C	5
D	0	D	1
Total	6	Total	6

8.3.2.6. Construction SiD

The scope of this Design Report has been subject to construction SiD workshops in Table 8-9.

Table 8-9: Construction SiD workshops

Workshop Title	Date	Workshop Minutes
PLR2 EW - Construction SiD – SDR Hazard Transfer Workshop	25/11/2024	PLR2EW-JHGRP-NWW-SF-MIN-000008

During DDR, the Construction Risk Register has been updated to ensure feedback, including from sub-contractors, has been addressed, and to finalise constructability input ready for transfer to the Construction Team for ongoing management.

8.3.3. Human Factors (HF) Integration

Design package development is conducted in consultation with the project's HF Officer. Human Factors involvement with appropriate technical disciplines ensures that end-user impacts are identified and addressed (AS 7470), which are captured and recorded in the PRL2 EW Project Hazard Log (PHL). Refer **Appendix G Project Hazard Log** for the extract relevant to the scope of this Design Report.

The applicable HF activities as outlined in the Human Factors section (6.6.5) of the SEADMP have been undertaken throughout the design process. This includes design package subject matter expert (SME) reviews, updating and maintaining the HF content of the PHL, and input into Safety in Design (SiD), Hazard Analysis, and other safety-related workshops as documented in Section 8.3.2.

The end-user groups impacted by this design package and any associated activities and deliverables are assessed in Table 8-10.

Table 8-10: End-user groups impacted by the Design Package Scope

End-User Group	Impacted by this package?	Is impact BAU or Managed by Standard / Specification?	Is Impact Safety Critical?	HF Activities and Deliverables (as required or N/A)
Passengers	☐ Yes ☒ No	☐ Yes ☐ No ☒ N/A	☐ Yes ☐ No ☒ N/A	HF SME attendance at all project stage Safety Workshops HF SME Internal Review: N/A to Light Rail Passengers.
Road Users	☐ Yes ☒ No	☐ Yes ☐ No ☒ N/A	☐ Yes ☐ No ☒ N/A	HF SME attendance at all project stage Safety Workshops HF SME Internal Review: N/A to Road Users
Members of the Public	☐ Yes ☒ No	☐ Yes ☐ No ☒ N/A	☐ Yes ☐ No ☒ N/A	HF SME attendance at all project stage Safety Workshops HF SME Internal Review: N/A to Members of the Public
Operational Staff	☐ Yes ☒ No	☐ Yes ☐ No ☒ N/A	☐ Yes ☐ No ☒ N/A	HF SME attendance at all project stage Safety Workshops HF SME Internal Review: N/A to Transport Operators
Maintenance Staff	☒ Yes ☐ No	☒ Yes ☐ No	☐ Yes ☐ No	HF SME attendance at all project stage Safety Workshops HF SME Internal Review: BAU to Maintainers, addressed in Design Report (section 7.4).
Emergency Services	☐ Yes ☒ No	☐ Yes ☐ No ☒ N/A	☐ Yes ☐ No ☒ N/A	HF SME attendance at all project stage Safety Workshops HF SME Internal Review: N/A to Emergency Services

Review of the Detailed Design has identified no additional safety-critical impacts beyond those that are considered BAU by the asset owner and/or asset operator as part of this work package. The work package end-user impacts have been appropriately addressed by the design and safety processes. Human Factors input into existing safety processes are deemed sufficient to address the HF considerations associated with this work package.

8.3.4. Reliability, Availability, Maintainability (RAM)

For civil and structural elements, the traditional reliability analysis (applicable to random failures) of determining statistical distributions, failure rates and confidence levels is not possible due to the unavailability of element/ asset times to failure data. Instead, each element/ asset is designed specifically to meet PLR2 specifications, including durability and design life.

PLR2 assets have been designed with provision for its intended function to be performed throughout the respective design and as such, the design complies with the standards and technical performance requirements.

For specialised assets such as traffic signals and controllers, marine signalling systems, explosion prevention devices and the like, they are governed by strict standards and there will be very limited opportunities for the application of RAM activities. Usually, these components are managed by specialist contractors with strict maintenance regimes aimed at reducing the occurrence of failures with high severity consequences.

8.4. Predicted Effects

The predicted effects of the upgrade have been described in the following sections of the Design report:

- Section 4.3.3.3: Describes the outcomes of the Water quality assessment and summarises the post upgrade reductions in pollutant loads into the catchment.
- Section 4.3.2.2.3: Outlines the Impacts of flow on the receiving drainage system in Hill Road.
- Section 4.3.2.1: Outlines the Upgraded Drainage elements to mitigate impacts on upstream catchments.

9. Non-Compliances and Concessions

9.1. Non-Compliances

The design has been developed to comply with the SPR. However, in some instances the design may not satisfy all design criteria.

Table 9-1 summarises all departures that relate to this package.

Table 9-1: SPR Departures

Item	Details of Departure	Impact and Reason for Departure	Proposed Solution	Status
1	Non-compliance with requirement for provision of grated trench drains every 50m along the PLRC	Minor impact to flow depths, however compliance for aquaplaning will be achieved. Reason is to reduce whole of life maintenance requirement.	Remove grated trench drains where flow depths remain compliant. Refer to RFI-010	Closed

Further details are included in **Appendix H Departures**.

9.2. Concessions

Table 9-2 summarises all concessions that have been sought that relate to this package. There are currently no concessions at the DDR stage.

The design concessions have been reviewed and discussed with TfNSW during the detailed design with the objective of gaining acceptance prior to seeking formal approval prior to issue of the final design. All concessions will be documented and submitted separately in accordance with *TfNSW TS 00003.1:1.0 Concessions to Transport Standards Part 1 – Concessions Process*.

Table 9-2: Concessions

Item	Details of Concession	Impact and Reason for Concession	Proposed Solution	Status
Nil				

Further details are included in **Appendix I Concessions**.

10. Approvals and Certifications

10.1. Independent Certifier Review

Refer to **Appendix B Review and Comment Register** for all comments from the Independent Certifier and responses on design documentation for this Design Package.

10.2. Proof Engineering Review

Not applicable for this design package.

10.3. Authority Approvals and Status

The following Authority Approvals are applicable to this Design Package:

- Planning Approval granted as per the determined SSI 10035.
- EPBC Act Approval granted as per EPBC ref 2022/09300.
- Transitway Declaration No. 8013 granted as per NSW Government Gazette No 349 of 06 September 2024.
- Route Declaration (2024 No 388) granted through Transport Administration (General) Amendment (Parramatta Light Rail) Regulation 2024 (NSW) as per NSW Government Gazette No 317 of 16 August 2024.
- A Remediation Action Plan (RAP) prepared by the Principal, final dated 5 July 2024 for the design and delivery of PLR2 – EW works over the Triangle Transport Landfill (TTL) and approved by SOPA (letter dated 19/09/2024) and NSW EPA (letter 18/09/2024).
- CoPC for the connection of the new drainage in Hill Road to the connection of the existing system

Table 10-1 summarises the Principal's approval required under the SPR applicable to this package.

Table 10-1: Principal's approval required under the SPR

Requirement Reference	Requirement Subject	Teambinder RFI reference	Status	Teambinder Notice reference
SPR Clause 7.4.9(d)	Alternate approach to transverse track drainage	PLR2EW-JHGRP-RFI-000010	TfNSW – No objections	PLR2EW-TFNSW-JHGRP-NOT-000075
SPR Clause 7.7.2.2(k)(i)	Free draining scuppers on the ATL	PLR2EW-JHGRP-RFI-000124	RFI has been raised, awaiting TfNSW response	PLR2EW-JHGRP-RFI-000124

11. Outstanding Issues

11.1. Hold Schedule

Table 11-1 provides an extract of all design items on 'Hold' for this design package.

Table 11-1: Hold Schedule

Item	Reason for the Hold	Status
Nil		

11.2. Other Issues

Table 11-2 outlines all other outstanding issues that may impact the design.

Table 11-2: Outstanding Issues

Item	Issue Description	Status
Scour protection length and rock size at drainage outlets	Was completed for PDR design submission	Completed
SPR Clause 7.7.2.2(i): Principal approval for free draining scuppers	Design presents the compliance to the environmental conditions, formal request will be made with the PDR submission for the approval of free draining scuppers, as allowed under other references of the SPR. Closeout Note: Approved subject to demonstration of no bridge deck staining, achieved through extension of the scupper beyond the bridge soffit.	Completed
Availability of FRC pipes	Suppliers have informed the contractor that FRC pipe material will no longer be available in the market. PDR design has nominated alternate materials and revised design strategy in some locations due to this issue. Contractor investigating alternate product Glass Reinforced Concrete pipe in parallel to design development and will engage with the Principal for approval. Closeout Note: The design has utilised Stainless steel pipes for drainage attached to the bridge and updated the design to place drainage in ground once the stainless steel sizes have been exceeded.	Completed
Southern Foreshore Suspended Drainage to Inground	Due to the FRC pipe availability an alternative drainage solution of the drainage line 17 from the Sekisui bend to the Southern Foreshore is in development to underground the drainage line rather than support it from the BR02 Wentworth Point Approach Structure. This will allow the use of RCP pipes underground in an embankment installation (under the soffit of the bridge) and allow the adoption of a single large pipe rather than multiple stainless-steel options supported on the Bridge. Closeout Note: The design has utilised Grade 316 stainless steel pipes for drainage attached to the	Completed

Item	Issue Description	Status
	bridge and updated the design to place drainage in ground once the stainless steel sizes have been exceeded	
Existing Council Pit Modifications	Two existing inlet pits will be converted from a SA type pit arrangement to a GSIP. Final Construction details will be presented at DDR. Closeout Note: Pit modification details included in this submission for Hill Road..	Completed
Integrated retaining wall and headwall at outlet to Line 03	The headwall outlet for Line 03 will be integrated into a retaining wall. Construction details will be included in the drawings for the DDR Final submission. Closeout: Documented in this submission	Completed

11.3. Requests for Information

Table 11-3 shows a list of RFIs associated with this Design Package.

Table 11-3: Requests for Information

RFI Number	Subject	Design Discipline	Owner	Status
PLR2EW-JHGRP-RFI-000021	Adoption of ARR2019 Version 4.2	FL-0001	GHD	Closed
PLR2EW-JHGRP-RFI-000010	SPR Clause 7.4.9(d) Assessment of Transverse Track Drainage	SD-0001	GHD	Closed
PLR2EW-JHGRP-RFI-000112	Clarification on SPR Clause 7.4.9(b) no restriction on wider drainage system	SD-0001	GHD	Closed
PLR2EW-JHGRP-RFI-000124	SPR Clause 7.7.2.2(k)(i): Approval for free draining scuppers.	SD-0001	GHD	Closed
PLR2EW-JHGRP-RFI-000159	Stormwater Drainage Asset Ownership	SD-0001	GHD	Closed

Further details are included in **Appendix E Certifications and Third Party Approvals.**

Appendix A Design Drawing List

Drawing Number	Drawing Title	Revision
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001	COVER SHEET	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100005	DRAWING INDEX	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100011	KEY PLAN	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100015	GENERAL NOTES	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101	PLAN SHEET 1	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102	PLAN SHEET 2	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100103	PLAN SHEET 3	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104	PLAN SHEET 4	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100105	PLAN SHEET 5	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100106	PLAN SHEET 6	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100107	PLAN SHEET 7	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100108	PLAN SHEET 8	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109	PLAN SHEET 9	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110	PLAN SHEET 10	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100111	PLAN SHEET 11	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100112	PLAN SHEET 12	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100113	PLAN SHEET 13	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100114	PLAN SHEET 14	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151	SCHEDULE	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100152	SCHEDULE	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100153	SCHEDULE	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100154	SCHEDULE	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100155	SCHEDULE	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100156	SCHEDULE	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100157	SCHEDULE	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100158	SCHEDULE	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201	LONGITUDINAL SECTIONS	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100202	LONGITUDINAL SECTIONS	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100203	LONGITUDINAL SECTIONS	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100204	LONGITUDINAL SECTIONS	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100205	LONGITUDINAL SECTIONS	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100206	LONGITUDINAL SECTIONS	0

Drawing Number	Drawing Title	Revision
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100207	LONGITUDINAL SECTIONS	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100208	LONGITUDINAL SECTIONS	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100209	LONGITUDINAL SECTIONS	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100210	LONGITUDINAL SECTIONS	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100211	LONGITUDINAL SECTIONS	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100212	LONGITUDINAL SECTIONS	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100213	LONGITUDINAL SECTIONS	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100214	LONGITUDINAL SECTIONS	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100215	LONGITUDINAL SECTIONS	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100216	LONGITUDINAL SECTIONS	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100217	LONGITUDINAL SECTIONS	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100218	LONGITUDINAL SECTIONS	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100219	LONGITUDINAL SECTIONS	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100220	LONGITUDINAL SECTIONS	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100221	LONGITUDINAL SECTIONS	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100222	LONGITUDINAL SECTIONS	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100401	TYPICAL DETAIL	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100402	TYPICAL DETAIL	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100403	TYPICAL DETAIL	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100404	TYPICAL DETAIL	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100405	TYPICAL DETAIL	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100406	TYPICAL DETAIL	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100407	TYPICAL DETAIL	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100408	TYPICAL DETAIL	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100409	TYPICAL DETAIL	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100410	TYPICAL DETAIL	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100411	TYPICAL DETAIL	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100421	HEADWALL DETAIL	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100422	HEADWALL DETAIL	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100423	HEADWALL DETAIL	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100424	HEADWALL DETAIL	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100451	BIORETENTION BASIN 1 PLAN AND DETAIL	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100452	BIORETENTION BASIN 2 PLAN AND DETAIL	0

Drawing Number	Drawing Title	Revision
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100453	BIORETENTION BASIN 3 PLAN AND DETAIL	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100454	BIORETENTION BASIN 1 SECTIONS	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100455	BIORETENTION BASIN 2 SECTIONS	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100456	BIORETENTION BASIN 2 SECTIONS	0
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100457	BIORETENTION BASIN WALL DETAILS	0

Appendix B Review and Comment Register

Parramatta Light Rail - Stage 2 Enabling Works
Contract No. IPD 22-12894

DESIGN REVIEW RECORD (DRR)

Contract:	PLR 2 - ENABLING WORKS CONTRACT
DP Ref:	SD-0001
Design Package Title:	Stormwater Drainage and Water Quality Design
Design Report:	As per transmittal
Drawing List:	As per transmittal

ISSUED FOR REVIEW			
SUBMISSION	**NO. OF DWGS**	**TB REFERENCE**	**DATE ISSUED**
SDR	-	PLR2EW-JHGRP-TX-000092	Friday, 6 December 2024
PDR	-	PLR2EW-JHGRP-TX-000399	Monday, 6 May 2024
PDR	-	PLR2EW-JHGRP-TX-000503	Thursday, 19 June 2025
DDR	-	PLR2EW-JHGRP-TX-000631	Wednesday, 20 August 2025
DDR	-	PLR2EW-JHGRP-TX-000704	Wednesday, 24 September 2025
DDR	-	PLR2EW-JHGRP-TX-000750	Wednesday, 15 October 2025
Post-DDR	-	PLR2EW-JHGRP-TFNSW-CORR-000162	Monday, 3 November 2025
AFC	-	PLR2EW-JHGRP-TX-000828	Friday, 21 November 2025

<====== TO BE COMPLETED BY IC

COMPLIANCE STATUS LEGEND
O Observation / Comment
N Non-Compliant (must provide reference to a Project Deed / SWTC requirement)

TO BE COMPLETED BY IC======>

RESPONSE STATUS LEGEND
O Open
C Closed
CS Closed SUBJECT TO additional action / information

FOR IC USE ONLY
L Certification Limitation
H Drawings or part thereof on HOLD

IC Use Only	DRR TEAMBINDER REF:	
DRR REV	**DRR STATUS**	**DATE**

No.	Stage	PACKAGE	Rev	Reviewer Name	Initial Comment Date	Discipline	Organisation	Document Reference	Reviewer Initial Comment	Project Deed ref	Compliance Status	Contractor Response	Initial Response Date	Response Status	Reviewer Comment Closeout	Date Comment Closed
1	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101	A virtual site visit suggests that there are roof drainage outlets to the surface and the contours indicate that the design did not account for the catchment on the northern side of Mary Street. The catchment plan does not include the external catchment on Mary Street. This comment is raised as an Observation at this design stage as compliance is currently unable to be determined. [redacted]2/25 This comment will be closed subject to additional information at the PDR stage. [redacted]6/05/25 Comment closed.	SPR Main Body cl 7.4.1 (f) [940731]	O	[redacted]GHD]: The northern external catchment discharging to Mary Street's northern kerbline will be considered into the PDR design, provided that the northern kerbline is graded towards the project site.	30-Jan-2025	C		16-May-2025
2	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102	There are a few drainage inlet pits situated in the pedestrian path, such as Pit 02-6, Pit 01-1, and Pit 04-1. The SPR states that the contractor must, where possible, avoid locating grates and drains in primary pedestrian routes. It has been assumed that conformance with this requirement will be demonstrated at the next design stage. [redacted]7/2/25 This comment will be closed subject to additional information at the PDR stage. [redacted]6/05/25 Comment closed.	SPR Main Body cl 7.6.2.7.6 [941036]	O	[redacted]GHD]: Except 02-06, other pits are junction pits and won't require grates. Pit 02-06 location is contraint by the rail corriodor, the grate will slightly enchroaches to the footpath and a suitable grate for pedestrians will be utilised for PDR Design.	30-Jan-2025	C		16-May-2025
3	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102	It appears that there is an existing drainage pipe connecting to Pit 02-6 however, the flows have been applied to Pit 01-01. Please confirm the pipe between Pit 02-6 and Pit 01-1 has sufficient capacity. This comment is raised as an Observation at this design stage as compliance is currently unable to be determined. [redacted]2/25 This comment will be closed subject to additional information at the PDR stage. [redacted]6/05/25 Comment closed.	SPR Main Body cl 7.4.1 (f) [940731]	O	[redacted]GHD]: Line 02 will be adjusted to allow lateral connection from eixisting pipe.	30-Jan-2025	C		16-May-2025
4	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102 &100103 PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Section 4.3.2.1.2	Noting Section 4.3.2.1.2 and the design assumption specified in the report (PLR2EW-ADC-046), please provide further information in the report regarding the following at the next submission: -There is a vegetated catchment adjacent to the existing southbound carriageway of Waratah Road that will sheet flow to the project. This means the current design underestimates the surface flows on the pedestrian path and the Down PLR2 by injecting flows directly into the pipes (Pit 01-01 and Pit 07-02). Please confirm how the flood immunity and flow width requirements will be met prior to the Melrose Park South Development. -The drainage system (pits and pipes) for a development is generally designed to handle a minor event. Please confirm how the current design captures and conveys the overland flows from the development sites for the 1% AEP event. -A GPT and Jellyfish have been proposed for Drainage Line 01. The report shows that external catchments have been excluded from the MUSIC modelling. Please confirm that this will be updated in the next submission. This comment is raised as an Observation at this design stage as compliance is currently unable to be determined. [redacted]6/05/25 Comment closed.	SPR Main Body cl 7.4.1 (f) [940731] SPR Main Body cl 7.4.1 (g) [940732]	O	[redacted]GHD]: 1) Predominantly footpaths are elevated relative to the existing ground, therefore sheet flow won't enter the footpath. 2) Melrose Park future development drawings aren't available at this stage to consider the interface with road's layout or drainage system. Therefore,the future development will have to develop the drainage system as such that overland flows are managed. 3) The transvers crossing shave been designed for the 100 year Flows refere to the lojngitudinal sections(TS). The treatment system designed as such that the pollutant loads generated by sites are treated to meet removal targets.	30-Jan-2025	C	6/2/25 1) Please confirm how the runoff from the existing batter trapped behind the footpath captured in the system. The catchment plan suggests that the catchment from the existing batter has been lumped into the connection point. 2) It is recommended to refererence the approved DAs in the report to validate the design assumption as per 7.3.1 (940686) 3) Long sections only contain 1EY velocity and 5% AEP flows. 4) The external catchments need to be included in the MUSIC model to account for the high-flow bypass of the proprietary product. Inclusion of the external catchments in a WSUD will increase the peak flows. If the increased peak flows exceed the high-flow bypass capacity of the product, the flows will bypass the unit untreated.	16-May-2025
5	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104	There is a low point between the path and RSW (MR71). A new pit will be required unless it is designed out. [redacted]7/2/25 This comment will be closed subject to additional information at the PDR stage. [redacted]6/05/25 Comment closed.	SPR Main Body cl 7.4.1 (b) [940715]	O	[redacted]GHD]: This interface is subject to further design development during the PDR phase, if the depression is retained then it will be connected to the drainage system.	30-Jan-2025	C		16-May-2025
6	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104	There is an existing pipe near Pit 28-1. Please confirm if this pipe will be retained.	SPR Main Body cl 7.4.8 (c) [940776]	O	[redacted]GHD]: Confirmed This pipe will be retained	30-Jan-2025	C		04-Feb-2025
7	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100106, 100107, 100108 and 100109	There are a number of grated trench drains (track drainage) and pits on BR0002. Please confirm that these drainage assets are coordinated and feasible to be integrated into the bridge structure.	SPR Main Body cl 7.4.10 (b) [940809]	O	[redacted]GHD]: The interface between Tramdrains and bridge BR-02 structure is coordinated and it's feasible to integrae Tramdrains to the sturcture.	30-Jan-2025	C		04-Feb-2025
8	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100107 and 100108	There are a few trapped low points under BR-0002. Please confirm if a positive drainage system will be provided in the next submission.	SPR Main Body cl 7.4.1 (a) [940714]	O	[redacted]GHD]: Temporary works design is currently being develop by JH and these will be retained earthworks under the BR02 alignment. Any permenant retained works by the contractor retained will be checked for compliance to the SPR, trapped water under the bridge due to natural terain is not required to be drained or fixed, and will not impact the structures pile design	30-Jan-2025	C		04-Feb-2025
9	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100108	There is a TramDrain without downstream connection.	SPR Main Body cl 7.4.9 (b) [940793]	O	[redacted]GHD]: The Tramdrain is connected to longitudinal grated trench along the edge of PLRC corridor.	30-Jan-2025	C		04-Feb-2025
10	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109	Track drainage outlet 19-4 will be directly under the future track. 6/2/25 [redacted] As discused at EAD Meeting #15 the designer has confirmed that the removal of outlet 19-4 and the relocation of detention basin will need to be part of the future PLR2 scope because of the significant redesign to the wider council drainage that would be required for these future works, Please confirm TfNSW agrees with this interpretation, that the drainage system is not "a restriction on the performance of the wider drainage Authority drainage system if a future upgrade is undertaken" the discussion was not minuted in the meeting minutes.	SPR Main Body cl 7.4.9 (b) [940793]	N	[redacted]GHD]: Correct, any extension of the PLRC (as part of the PLR2 Main Works) will need to collect this discharge point and include it into its drainage system, this is not uncommon in staged construction projects. GHD Challenge the IC use of a non conformance as the clause is not related to a staged delivery but rather to another drainage authorities asset, these assets are retained TfNSW asset. [redacted]HG] 18/06/25: RFI has now been raised and responded to. Refer PLR2EW-JHGRP-RFI-000112.	30-Jan-2025	C	[redacted]2/05/25 Awaiting RFI to be raised for TfNSW to confirm that the drainage system is not "a restriction on the performance of the wider drainage Authority drainage system if a future upgrade is undertaken" as discussed at the meeting on 27/02/25 [redacted]0/06/025 RFI 112 confirmed TfNSW acceptance that the drainage is not "a restriction on the performance of the wider drainage Authority drainage system if a future upgrade is undertaken"	30-Jun-2025
11	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110 PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.2.3	The proposed detention and bioretention basin is located within the future PLRC alignment. The SPR states that the PLR Stage 2 Early Works must be suitable for future expansion as part of PLR Stage 2, and the drainage system must not become a restriction on the performance of the wider drainage system if a future upgrade is undertaken. The proposed basin would be a restriction for the future PLR Stage 2 alignment. This SD-0001 SDR submission does not address the interface of the basin and the future PLR Stage 2 alignment. 6/2/25 [redacted] As discused at EAD Meeting #15 the designer has confirmed that the removal of outlet 19-4 and the relocation of detention basin will need to be part of the future PLR2 scope because of the significant redesign to the wider council drainage that would be required for these future works, Please confirm TfNSW agrees with this interpretation, that the drainage system is not "a restriction on the performance of the wider drainage Authority drainage system if a future upgrade	SPR Main Body cl 3.2 (a) (i) [952542] SPR Main Body cl 7.4.9 (b) [940793]	N	[redacted]GHD]: See comment #10 above. GHD challenges the IC interpretation of this requirment.the design does not become a restriction, but the future design needs to consider the combined impacts of all works on Hill Road Drainage if it discharges to that system ultimately, it is possible that in the PLRC extension drainage flows can be managed to ot require OSD, as the future PLRC requires the relocation of the Council Drainage system, and an upgarde at that time to the outlet into the Narawang Wetlands. [redacted]HG] 18/06/25: RFI has now been raised and responded to. Refer PLR2EW-JHGRP-RFI-000112.	30-Jan-2025	C	[redacted]2/05/25 Awaiting RFI to be raised for TfNSW to confirm that the drainage system is not "a restriction on the performance of the wider drainage Authority drainage system if a future upgrade is undertaken" as discussed at the meeting on 27/02/25 [redacted]0/06/025 RFI 112 confirmed TfNSW acceptance that the drainage is not "a restriction on the performance of the wider drainage Authority drainage system if a future upgrade is undertaken"	30-Jun-2025
12	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110	A spillway needs to be provided for the basins to enable safe overtopping flows downstream. [redacted]7/2/25 This comment will be closed subject to additional information at the PDR stage.	SPR Main Body cl 7.4.8 (b) [940775]	O	[redacted]GHD]: Details of the basin operation and elements such as spillways will be documented in the PDR design. 18/06/2025 [redacted]GHD): Wier will be added to the DDR design submission noting that for Basin 1 and 2 the inlet pit will be the main outlet for basin overflows, and Basin 3 will have a weir control in the event of blockage of the outlet to control overflow. 15/09/2025 [redacted] We will add the concrete baffle to control leakage of flow. This will be included in next revision of the drawing.	30-Jan-2025	C	[redacted]16/05/25 Sheet 100453 does not include details for a spillway. The plan drawing refers to Sheet 100455 for additional details, however this drawing was not issued. [redacted]27/08/2025: Weir detail is now included on drawing DRG-100456, however, the detail shows the 230mm reno mattress extended to the top of the bio filter area. This arrangement will will allow the water to seep through the reno mattress and won't allow to filter through the filter material. The spillway must have an impervious material on the pond side. [redacted] 02/10/2025: Comment will be closed when the drawing is updated.	10-Nov-2025

DESIGN REVIEW RECORD (DRR)

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DP Ref:	SD-0001
Design Package Title:	Stormwater Drainage and Water Quality Design
Design Report:	As per transmittal
Drawing List:	As per transmittal

ISSUED FOR REVIEW			
SUBMISSION	**NO. OF DWGS**	**TB REFERENCE**	**DATE ISSUED**
SDR	-	PLR2EW-JHGRP-TX-000092	Friday, 6 December 2024
PDR	-	PLR2EW-JHGRP-TX-000399	Monday, 6 May 2024
PDR	-	PLR2EW-JHGRP-TX-000503	Thursday, 19 June 2025
DDR	-	PLR2EW-JHGRP-TX-000631	Wednesday, 20 August 2025
DDR	-	PLR2EW-JHGRP-TX-000704	Wednesday, 24 September 2025
DDR	-	PLR2EW-JHGRP-TX-000750	Wednesday, 15 October 2025
Post-DDR	-	PLR2EW-JHGRP-TFNSW-CORR-000162	Monday, 3 November 2025
AFC	-	PLR2EW-JHGRP-TX-000828	Friday, 21 November 2025

<======= TO BE COMPLETED BY IC

COMPLIANCE STATUS LEGEND
O Observation / Comment
N Non-Compliant (must provide reference to a Project Deed / SWTC requirement)

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RESPONSE STATUS LEGEND
O Open
C Closed
CS Closed SUBJECT TO additional action / information

FOR IC USE ONLY
L Certification Limitation
H Drawings or part thereof on HOLD

IC Use Only	DRR TEAMBINDER REF:	
DRR REV	**DRR STATUS**	**DATE**

No.	Stage	PACKAGE	Rev	Reviewer Name	Initial Comment Date	Discipline	Organisation	Document Reference	Reviewer Initial Comment	Project Deed ref	Compliance Status	Contractor Response	Initial Response Date	Response Status	Reviewer Comment Closeout	Date Comment Closed
13	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100204	The drainage report states that the tailwater level of the discharging point to Parramatta River is RL 1.35 or obvert levels of the outlet (10-13) whichever is higher. The obvert level is lower than RL 1.35 m. Please confirm the proposed pipes have sufficient capacity. This comment is raised as an Observation at this design stage as compliance is currently unable to be determined. [redacted]2/25 This comment will be closed subject to additional information at the PDR stage. [redacted] 6/05/25 Comment closed.	SPR Main Body cl 7.4.8 (d) [940778]	O	[redacted] TWL will be updated based on the project latest flood modelling results. 28/03/2025 [redacted] GHD): Tailwater conditions fr the design scenarion have been provided withb an updated Section 4.2.4 and an assessment of flood levels on PLRC system performance provided in Section 4.3.4.1.2.	30-Jan-2025	C		16-May-2025
14	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.2.3	Please confirm the performance of the bioretention basin. The filter media would be submerged based on the assumed tailwater level. This comment is raised as an Observation at this design stage as compliance is currently unable to be determined. [redacted] 6/05/25 Comment open - please confirm if flood gates are provided where filter media gets submerged during high tailwater.	SPR Main Body cl 7.4.12 (a) [940816]	O	[redacted] GHD]: A flood gate is provided at the discharging point to the downstream network to prevent backwater towards the filter media. [redacted] 28/03/2025: Application of a flood event tailwater is not applicable to the water quality design that relies on residence time and treatment prior to discharge, tailwater conditions appropriate are tidal and have been provided in Section 4.2.4. 15/09/2025 (TS): The outlets that require the Duckbill have been nominated in the Pit Schedule under the Notes Section example Outlet 10-11 on Drawing 1000152	30-Jan-2025	C	6/2/25 Please confirm that the tailwater level for the 1EY event is lower than the perforated pipe invert level. If the 1EY tailwater level is higher than the flood gate and the perforated pipe invert, the bioretention basin cannot be drained. 30/06/25 [redacted] Please confirm if flood gates will be provided, currently none are shown on the drawings [redacted] 27/08/2025: Please confirm flood gate is required and if required where is documented. [redacted] 03/09/25 Table 8-3 Treatment for climate risks ID 34 notes that non return valves have been included but not found on the drawings. Noted provided in wording on schedules for 10-11 and 14-21, would it be possible to show on the layouts to make it clearer?	02-Oct-2025
15	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.4.2	Please confirm that there are no obstructions in the rail groove and surface throughout the bridge, including the transverse bridge joints and approaching slabs, to ensure 'free drainage' as per the requirement. 6/2/25 Please confirm the detail of the drainage at the rail expansion joints [redacted] 6/05/25 Comment closed.	SPR Main Body cl 7.4.9 (b) (i) [940794]	O	[redacted] GHD]: Please refer to Tramdrain Tech Memo. Surface runoff will discharge along the rail groove through bridge vertical grade. Refer to Technical memo "SPR Clause 7.4.9(d) Assessment of Transverse Track Drainage" for further details. 28/03/2025 [redacted] (GHD): The drainage of the expansion Joint is described in this package report Section 4.3.2.4.2, and documented on the drawings in package BR-0001.	30-Jan-2025	C		16-May-2025
16	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.3	Please provide evidence of compliance with Clause 7.7.2.2 (j) (i). Rudimentary calculations suggest that the flow width on the pedestrian path on the bridge exceeds 0.5 m if the scupper spacing is 12 m. [redacted] 6/05/25 Comment closed.	SPR Main Body cl 7.7.2.2 (j) (i) [941411]	N	[redacted] GHD]: All assessments are undertaken in 12d and flow widths assessed, unsure what the IC calculations were as they have not been provided unclear if they adopted MP10 grades of MC00. It is noted that the spacing of scuppers are being realigned to bridge segment joints and reducing in the PDR design. 28/03/2025 [redacted] GHD): The PDR Design has revisited the spacing of scuppers on Bridge BR01 ATL, and revised them to approx. 5.1m to align to bridge segment lengths, this spacing satisfies the flow width requirements.	30-Jan-2025	C	6/2/25 The following parameters adopted for a hand calculations for flow width. - ATL crossfall: 2% and longitudinal grade: 4.25% - 20% AEP, 5 min duration intensity: 131 mm/hr - Catchment size = 6 m x 12 x = 72 m2 (please note that this width does not include the back of the barrier which slopes towards the ATL. - Peak flow = approx. 2.4 L/s Using the manning's equation (the same method as 12d rational method flow width cals), the flow width is 690 mm, which exceeds 500 mm. To achieve the 500 mm flow width requirement, the approach flow needs to be 1L/s. This indicates that the scupper spacing would need to be 4 to 5 m to account for 50% blockage.	16-May-2025
17	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.5.2	Please confirm that the flood depth specified in this section is not the maximum ponding depth in the basin. If the depth is 0.75 m it will exceed the hazard classification of H1, which is unsafe for pedestrians. This comment is raised as an Observation at this design stage as compliance is currently unable to be determined.	ARR19 Book 6 Chapter 7	O	[redacted] GHD]: Confirmed - the flood depth is related to Parramatta River.	30-Jan-2025	C		04-Feb-2025
18	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.3.1	Please provide additional information on modelling parameters such as [redacted]onfig etc. [redacted]7/2/25 This comment will be closed subject to additional information at the PDR stage. [redacted]16/05/25 Comment closed.		O	[redacted] GHD]: Ku values are provided in Appendix J. ILSAX parameters will be provided.	30-Jan-2025	C		16-May-2025
19	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.4.1.1	Pipes with non-conforming self-cleaning velocities need to be documented in Section 9 of the report. [redacted]6/05/25 Comment closed.	SPR Main Body cl 7.4.4 (a) [940746]	O	[redacted] GHD]: The pipes are located in the upstream section of the network, where self-cleansing velocity was not achieved because the catchment area discharging into these pipes is small. According to SPR Main Body clause 7.4.4(a), the self-cleansing velocity requirement does not apply to pipes where the catchment size imposes constraints.	30-Jan-2025	C	No objection to self cleansing velocities at the pits with small catchments (~5 L/s for 5% AEP event). However, there are pipes such as Line 20 and Line 22 contrained by the high tailwater level. Those pipes have significantly larger flows but do not achieve the self cleansing velocity.	16-May-2025
20	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.3.2	External catchments (from direct connection points for developments) need to be considered as part of the water quality assessment. [redacted]6/05/25 Comment closed.	SPR Main Body cl 7.4.12 (a) [940816]	O	[redacted] GHD]: At the time of this design there are no approved upstream developments, that need to be considered. The mixed water at line 01 Will be revested in PDR to see if separation of the systems is feasible. 28/03/2025 [redacted] GHD): The Upstream Catchment of the GOT on Line 02, has been separated from the PLRC drainage system and no longer discharged through treatment train.	30-Jan-2025	C	The external catchments need to be included in the MUSIC model to account for the high-flow bypass of the proprietary product. Inclusion of the external catchments in a WSUD will increase the peak flows. If the increased peak flows exceed the high-flow bypass capacity of the product, the flows will bypass the unit untreated.	16-May-2025
21	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Appendix D.1	Bridge slopes of 4% and 2% have been used to assess the flow widths. Please confirm if the flatter grades near the crest have been assessed. [redacted]7/2/25 This comment will be closed subject to additional information at the PDR stage.	SPR Main Body cl 7.4.1 (d) (iv) [940727]	O	[redacted] GHD]: Will be confirmed during PDR phase. 28/03/2025 [redacted] GHD): Refer to the calculation in Appendix J demonstrating the flow path assessment.	30-Jan-2025	C	[redacted]16/05/25 Comment closed.	16-May-2025
22	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	The SPR states that the hydrology needs to be upscaled to match FFA peak flows. Please confirm this has been done or will be completed in the next submission. [redacted]7/2/25 This comment will be closed subject to additional information at the PDR stage. [redacted]6/05/25 Comment closed.	SPR Main Body cl 7.4.1 (c) (i) [940717]	O	[redacted] GHD]: This is a flood study comment not relevant to the SD package and has been subject to numerous meetings with TfNSw and there flood experts, this response will be updated once the outcome and direction on the adoption of CoPC flood model is finalised, and is anticipated that this requirement will be removed from the SPR. 28/03/2025 [redacted] GHD): The flood model package has adopted scaled hydrology to ARR2019 Version 4.2	30-Jan-2025	C		16-May-2025
23	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	The effects of climate change due to increased rainfall intensity have been considered and incorporated into the design. However, the tailwater levels do not account for sea level rise and storm surge up to the year 2130. Please confirm that these will be considered in the next design stage. [redacted]7/2/25 This comment will be closed subject to additional information at the PDR stage. [redacted] 6/05/25 Comment closed.	SPR Main Body cl 7.4.1 (c) (i) [940718]	O	[redacted] GHD]: This comment is subject to the outcome of the flood model discussions currently in play and cannot be responded to at this times. However the tailwater level will be an output of the GHD flood model developed for the project, with consideration of climate change. 28/03/2025 [redacted] GHD): Discussion on the direction to adopt ARR 2019 Version 4.2.3 and impacts on increased rainfall intensity for the different AEP covered by this package.	30-Jan-2025	C		16-May-2025
24	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	20-Dec-2024	Flooding Interface	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201	Headwall 07-4: HGL at outlet (2.5 m AHD) is lower than 5% AEP 2130 SDR flood level (2.73 m AHD). Please increase tailwater.	SPR Main Body cl 7.4.8 (e)	N	[redacted] GHD]: The SDR design submitted did not document the 5% AEP SDR flood level, so it is unclear how the source of the referenced level to identify that the Tailwater level is not compliant to the requirements of the SPR. Further more the referenced clause for the non-compliance is not related to freely discharging outlets to a watercourse but rather to and insufficient downstream drainage system, so it is unclear what the basis of the non-compliance raised is. 28/03/2025 [redacted] GHD): Design has been undertaken using the Tailwater conditions outlined in Section 4.2.4, and the PLRC assessed for a regional flood tailwater in the Parramatta River, noting the later is not a requirement of the SPR, but demonstrates the resilience of the system to Climate Change.. 23/05/2025 [redacted]closed.	30-Jan-2025	C	The 5% AEP 2130 flood level was documented in the FL-0001 SDR Flood Modelling submission TUFLOW results (PLR2EW-JHGRP-LRPEWRC-SD-MOD-100010). IC acknowledges designer's observation that SPR Main Body cl 7.4.8 (e) only applies to downstream drainage system. However, in the absence of SPR requirements on which tailwater to assign to outlets to watercourses, CoPC Development Engineering Design Guidelines section 5.5 states that the flood level for the design ARI must be used as the tailwater where pipes discharge into watercourses (in this case, 5% AEP plus climate change up to 2130).	
25	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	20-Dec-2024	Flooding Interface	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100213	Headwall 41-3: HGL at outlet (1.35 m AHD) is lower than 5% AEP 2130 SDR flood level (2.71 m AHD). Please increase tailwater.	SPR Main Body cl 7.4.8 (e)	N	[redacted] GHD]: The SDR design submitted did not document the 5% AEP SDR flood level, so it is unclear how the source of the referenced level to identify that the Tailwater level is not compliant to the requirements of the SPR. Further more the referenced clause for the non-compliance is not related to freely discharging outlets to a watercourse but rather to and insufficient downstream drainage system, so it is unclear what the basis of the non-compliance raised is. 28/03/2025 [redacted] GHD): Design has been undertaken using the Tailwater conditions outlined in Section 4.2.4, and the PLRC assessed for a regional flood tailwater in the Parramatta River, noting the later is not a requirement of the SPR, but demonstrates the resilience of the system to Climate Change.. 23/05/2025 [redacted]closed.	30-Jan-2025	C	The 5% AEP 2130 flood level was documented in the FL-0001 SDR Flood Modelling submission TUFLOW results (PLR2EW-JHGRP-LRPEWRC-SD-MOD-100010). IC acknowledges designer's observation that SPR Main Body cl 7.4.8 (e) only applies to downstream drainage system. However, in the absence of SPR requirements on which tailwater to assign to outlets to watercourses, CoPC Development Engineering Design Guidelines section 5.5 states that the flood level for the design ARI must be used as the tailwater where pipes discharge into watercourses (in this case, 5% AEP plus climate change up to 2130).	
26	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	20-Dec-2024	Flooding Interface	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Table 4-3	Quoted 5% AEP Parramatta River flood level in table does not match 5% AEP 2130 flood level in TUFLOW model (~2.7 m AHD).	SPR Main Body cl 7.4.8 (e)	O	[redacted] GHD]: The 5% AEP flood level reported by the IC did not form part of our documented submission, refer to the SD-0002 flood report, reliance on it in making comments is an interpretation by the IC and not part of the design submission, as a result we cannot respond to interpretations of the IC. 28/03/2025 [redacted] GHD): Design has been undertaken using the Tailwater conditions outlined in Section 4.2.4, and the PLRC assessed for a regional flood tailwater in the Parramatta River, noting the later is not a requirement of the SPR, but demonstrates the resilience of the system to Climate Change.. 23/05/2025 [redacted]closed.	30-Jan-2025	C	The 5% AEP 2130 flood level was documented in the FL-0001 SDR Flood Modelling submission TUFLOW results (PLR2EW-JHGRP-LRPEWRC-SD-MOD-100010).	

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No.	Stage	PACKAGE	Rev	Reviewer Name	Initial Comment Date	Discipline	Organisation	Document Reference	Reviewer Initial Comment	Project Deed ref	Compliance Status	Contractor Response	Initial Response Date	Response Status	Reviewer Comment Closeout	Date Comment Closed
27	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	20-Dec-2024	Flooding Interface	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100204	Headwall 10-13: HGL at outlet (0.696 m AHD) is lower than 5% AEP 2130 SDR flood level (2.71 m AHD). Please increase tailwater.	SPR Main Body cl 7.4.8 (e)	N	[redacted][GHD]: The SDR design submitted did not document the 5% AEP SDR flood level, so it is unclear how the source of the referenced level to identify that the Tailwater level is not compliant to the requirements of the SPR. Further more the referenced clause for the NCR is not related to freely discharging outlets to a watercourse but rather to and insufficient downstream drainage system, so it is unclear what the basis of the non-compliance raised is. 28/03/2025 [redacted][GHD]: Design has been undertaken using the Tailwater conditions outlined in Section 4.2.4, and the PLRC assessed for a regional flood tailwater in the Parramatta River, noting the later is not a requirement of the SPR, but demonstrates the resilience of the system to Climate Change.. 23/05/2025 [redacted]Closed.	30-Jan-2025	C	The 5% AEP 2130 flood level was documented in the FL-0001 SDR Flood Modelling submission TUFLOW results (PLR2EW-JHGRP-LRPEWRC-SD-MOD-100010). IC acknowledges designer's observation that SPR Main Body cl 7.4.8 (e) only applies to downstream drainage system. However, in the absence of SPR requirements on which tailwater to assign to outlets to watercourses, CoPC Development Engineering Design Guidelines section 5.5 states that the flood level for the design ARI must be used as the tailwater where pipes discharge into watercourses (in this case, 5% AEP plus climate change up to 2130).	
28	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	20-Dec-2024	Flooding Interface	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100213	Headwall 14-9: HGL at outlet (1.35 m AHD) is lower than 5% AEP 2130 SDR flood level (2.63 m AHD). Please increase tailwater.	SPR Main Body cl 7.4.8 (e)	N	[redacted], [GHD]: The SDR design submitted did not document the 5% AEP SDR flood level, so it is unclear how the source of the referenced level to identify that the Tailwater level is not compliant to the requirements of the SPR. Further more the referenced clause for the non-compliance is not related to freely discharging outlets to a watercourse but rather to and insufficient downstream drainage system, so it is unclear what the basis of the non-compliance raised is . 28/03/2025 [redacted][GHD]: Design has been undertaken using the Tailwater conditions outlined in Section 4.2.4, and the PLRC assessed for a regional flood tailwater in the Parramatta River, noting the later is not a requirement of the SPR, but demonstrates the resilience of the system to Climate Change 23/05/2025 [redacted]Closed.	30-Jan-2025	C	The 5% AEP 2130 flood level was documented in the FL-0001 SDR Flood Modelling submission TUFLOW results (PLR2EW-JHGRP-LRPEWRC-SD-MOD-100010). IC acknowledges designer's observation that SPR Main Body cl 7.4.8 (e) only applies to downstream drainage system. However, in the absence of SPR requirements on which tailwater to assign to outlets to watercourses, CoPC Development Engineering Design Guidelines section 5.5 states that the flood level for the design ARI must be used as the tailwater where pipes discharge into watercourses (in this case, 5% AEP plus climate change up to 2130).	
29	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	20-Dec-2024	Flooding Interface	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104	Headwall 10-13: No details in report or drawings on the flood gate and what it aims to achieve. Flood gate will not help the [redacted] at the end of Wharf Road achieve 5% AEP (100	SPR Main Body cl 7.3.2 (a)	N	[redacted][GHD]: It will prevent the ingress of brackish water to the bio-retention basin. We do not consider this to be a non-compliance. [redacted], the referenced clause 7.3.2(a) is applicable to track drainage performance and not roads and carpark.	30-Jan-2025	C		03-Feb-2025
30	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	14-Jan-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	The Contractor should demonstrate within this report compliance with CoPC MOU requirements.	Exhibit I - CoPC MoU (Dated 25 June 2024)	N	[redacted][GHD]: The detailed RVTM is PDR deliverable and will provide the relevant documentation references to demonstrate compliance. [redacted]2025 Tim Snape (GHD): Detailed RVTM has been attached to the PODR Submission in Appendix F [redacted][HG] 17/06/25: All technical requirements in the CoPC MOU have been allocated to the relevant design packages in the RVTMs. Where requirements have been duplicated in the SPR, the MOU has been traced to the identical SPR requirement with the "Derives to child/Derives from parent" attribute in the SRS RVTM. At time of PDR submission, no requirements within the CoPC MOU were identified as relevant to SD-0001. Allocation of Annexure A Table 3 - CoPC Standards is being reviewed following confirmation of applicability for the CoPC Paved Public Works Assets in response to PLR2EW-JHGRP-RFI-000105. The RVTM incorporates applicable AMB standards and Third Party Agreements in accordance with MR Annexure 3 clause 4.2(d). This does not include guidelines by CoPC and SOPA unless specifically listed within the Third Party Agreements. Notwithstanding, it is noted that CoPC Development Engineering Design Guidelines are included in Table 3-1 of the design report that lists applicable standards and guidelines. Compliance with UMM W1 is demonstrated through FL-0001. [redacted][HG] 22/09/25: Appendix F-2 compliance statement against UMM W2 will be updated accordingly in response to the outcome of Comment no. 49. All CoPC MOU Technical requirements are either allocated to relevant design packages or "Addressed" elsewhere. Full traceability of package allocation and compliance evidence is in the SRS RVTM. Please advise what compliance needs to be demonstrated against the CoPC MOU in this package RVTM if the IC believes this is missing. 14/11/2025 TS (GHD): W2 has been updated with the following: Design Report PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 3.1 outlines the standards applied to the assets. the drainage drawings PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101 to 100114 identify the asset ownership between CoPC and TfNSW. Design Report PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section and drawing PLR2EW-JHGRP-LRPEWRC-SD-DRG-100015 outlines the specifications applicable to the assets in construction. 05/12/2025 TS (GHD): As per EADM discussion on the 02/12 the following drawings have been revised to Rev 01 to capture the ownership: 1) PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109 2) PLR2EW-JHGRP-LRPEWRC-SD-DRG-100112 3) PLR2EW-JHGRP-LRPEWRC-SD-DRG-100113	30-Jan-2025	CS	6/2/25 [redacted]the RVTM in Appendix F does not currently appear to include the CoPC dated 25 June MoU requirements 22/05/25 [redacted]Appendix F RVTM still does not include any CoPC MoU requirements such as Council standards for drainage. Or CoPC Development Engineering design guidelines or SOPA Stormwater management as per CoA W1. 30/06/25 [redacted]pologies for the typo, should have noted compliance to UMM W2 should be provided in SD-0001. Appendix F-2 UMM W2 incorrectly states that all drainage is a TfNSW asset,won't drainage at the boat ramp car park be handed back to CoPC? Please demonstrate compliance to CoPC Development Engineering design guidelines and SOPA Stormwater management (where applicable) 03/09/25 [redacted]Comment not addressed Appendix F RVTM does not included any CoPC requirements and Appendix F-2 UMM W2 still notes all drainage is a TfNSW asset, but pits 10-9 and 10-10, 18-1 and 18-1A, 19-6 will be CoPC asset. Please demonstrate compliance with CoPC MoU requirements 2/10/25 As per response provided on 22/05/25 CoPC Development Engineering design guidelines. Will reassess when it's clear what will and won't be maintained by COPC (only pits or pipelines too) [redacted]9/11/25 RFI-159 confirming asset ownership response from TfNSW has not been provided ot the IC, there is now a new drainage line 52 that is shown as a CoPC asset, please confirm compliance to CoPC Development Engineering design guidelines and CoPC installation standards. [redacted]1/12/25 The asset ownership mark up received from TfNSW via email in response to RFI-159 does not align with the AFC submission (line 01-01 to 01-03 should be all CoPC and not part TfNSW, lines 27-1 to 10-1A and 16-1 to 16-2 should be CoPC.	
31	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	09/12//2024	Systems Engineering	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-REG-100001 (RVTM)	Suggest that the Client IDs for Requirements 2980591, 2980592, and 2980593 be changed to 946938. Note, where [redacted]		O	[redacted][HG]: JHG shall update client identifiers for table rows with the parent clause client identifier.	30-Jan-2025	C	[redacted]04/02/2025: Closed subject to future update as noted.	
32	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	09/12//2024	Systems Engineering	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-REG-100001 (RVTM)	For the following requirements derived from the SPR, please ensure that they are worded appropriately in the "Context" and "Description" fields as verifiable Technical Requirements with Essential Criticality; 3687258, 3687259, 3680913, 2980591, 2980592, and 2980593.	Exhibit A Management Requirements Annexure 3 Section 4.2(f) T MU AM 06004 ST - Requirements Schema, Section 6.2	N	[redacted][HG]: JHG shall update incorrect classification of requirements. [redacted][HG] 30/05/25: Requirement ID 3680913 does not exist in the SRS/RAATM and has not been used in the DOORS requirement history for this project. Classification of requirements in the SD-0001 RVTM have been reviewed and updated as required. Request for comment to be closed.	30-Jan-2025	C	[redacted]04/02/2025: Closed subject to future update addressing this non-compliance. [redacted]2/05/25: The requirement 3680913 has been deallocated from the SD-0001 Design Package RVTM. The requirement is also not present in the SRS/RAATM shared via Gen correspondence PLR2EW-JHGRP-TFNSW-CORR-000067. Please clarify where this requirement 3680913 is now allocated. Comment to remain CS.	
33	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	09/12//2024	Systems Engineering	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-REG-100001 (RVTM)	Requirement 2981971, 2981972, 2981973, 2981974, should have its "Requirement type" field set to "Process" Requirements with source "SPR Appendix J -Design Deliverables" are considered "Process Requirements". Please ensure the Requirement Type field is set to "Process" against these requirements. In general, please ensure that Process requirements have been properly identified in the RVTM as per the RVTM Schema guidance: "Process requirement: an action or step taken to deliver the product (that does not exist within the finished product)"	Exhibit A Management Requirements Annexure 3 Section 4.2(f) T MU AM 06004 ST - Requirements Schema, Section 6.2	N	[redacted][HG]: JHG shall review the classification of requirements in accordance with the RVTM Schema guidance and reallocate as appropriate. The Requirement Type for requirements with source "SPR Appendix J - Design Deliverables" will be updated consistent with the definition in the RVTM Schema guidance for Process requirements.	30-Jan-2025	C	[redacted]04/02/2025: Closed subject to future update addressing this non-compliance. [redacted]2/05/25: It is understood from the SRS/RAATM shared via Gen correspondence PLR2EW-JHGRP-TFNSW-CORR-000067, that requirements with source "SPR Appendix J -Design Deliverables" have been deallocated from the SD-0001 Design Package RVTM. The requirements now reside as process requirements in the SRS/RAATM. Comment can be Closed.	
34	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	09/12//2024	Systems Engineering	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-REG-100001 (RVTM)	The RVTM is missing the Requirement's "Compliance Status" column which demonstrates the contractor's requirement compliance against each requirement on the basis of requirement fulfillment and whether the solution can be achieved to meet the requirement intent. This attribute needs to be incorporated as part of the contractor's RVTM schema, and is complimented by the downstream attributes agreed of "Design Compliance Status", "Production Compliance Status" and "Validation Compliance Status", which are determined as the solution develops, and is constructed, tested and commissioned. If a Requirement's "Compliance Status" is set to "Non-Compliant", "Compliant with concession", or "Partially compliant", an explanation should be provided in the "Remarks/comments" attribute for the requirement, which details any agreed departures from the requirement.	Exhibit A Management Requirements Annexure 3 Sections 4.2(f), 4.2.2 (b)(iv)(A)(B)(C) T MU AM 06004 ST - Requirements Schema, Section 6.2	N	[redacted], JHG: JHG provides "Design Compliance Status" in column AB of the RVTM. Overall compliance status shall be provided in the SRS RVTM. Where the solution is not Compliant, justification shall be provided.	30-Jan-2025	C	[redacted]31/01/2025: Closed subject to update of SRS RVTM at the next stage/next submission of SRS RVTM. [redacted]2/05/25: Comment can be Closed based on implementation in the SD-0001 Design Package RVTM.	
35	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	09/12//2024	Systems Engineering	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-REG-100001 (RVTM)	It has been noted by TfNSW that the General requirements 2982027, 2982056 and 2982100 are examples of requirements within this RVTM which have been duplicated in the RVTMs of other Design Packages. Within JHG's role as Systems Integrator, TfNSW requests JHG to provide an overarching consolidated System-level RVTM , which is able to show the "1 to many" allocations of requirements to Design Packages. This will be a consolidated RVTM appropriate for each of the CM gates so as to comply with Exhibit A - MR_Annex 03- Section 4.2.2 (c)(h).	Exhibit A Management Requirements Annexure 3 Section 4.2.2(c) (h)	N	[redacted][GHD]: A copy of the Master RVTM was provided at the SDR stage for information (refer LR2EW-JHGRP-APP-CORR-000004) that includes the consolidated allocation of requirements across all the individual Design Package. As per the SEADMP and MR Annexure 3, an up-to-date copy of the consolidated RVTM will be provided for each of the CM Gates. JHG shall also provide a SRS RVTM issued for information attached to the Monthly Report.	30-Jan-2025	C	[redacted]31/01/2025 Comment addressed.	
36	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Sustainability	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Section 8.2	Section 8.2 would benefit from referencing other relevant sustainability design reports e.g., Energy and Carbon, Water etc. in the text under Section 8.2 or text under Section 8.2.1.	Exhibit B Scope and Performance Requirements, Appendix H, section,1 (d)	O	[redacted][JHG]: Noted. As discussed a new Section 8.2.1 Sustainability in Design has been added to the design report template for Preliminary Design Review (PDR) including a table that lists the relevant sustainability reports, activities undertaken to inform these reports and the gates at which each report will be submitted. Further detail has also been provided for what level of detail is being provided at the current design gate.	30-Jan-2025	C	[redacted]31/01/2025: Closed subject to update in PDR submission. [redacted]23/5/25: Closed	
37	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Sustainability	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Section 8.2	Section 8.2 would benefit from an overarching table detailing what sustainability aspects are related to this design package with an X e.g., Energy, Carbon, Climate, Water, Materials, Waste etc. These aspects can then be detailed in Table 8-1 and linked back to contract requirements e.g., Materials and Resource Use -> Achieve or exceed ISC IS v2.1 Rso-6 Level 1 and a 30% reduction in IS EnviroPoints.	Exhibit B Scope and Performance Requirements, Appendix H, section,1 (d)	O	[redacted][JHG]: This has been amended in the design report template to include categories (e.g. Place and Legacy, Resilience, Energy and Carbon, Environmental Impact, Resource Efficiency, Water, and Heritage) with an "x" demarking what categories are relevant to the design report.	30-Jan-2025	C	[redacted]31/01/2025: Closed subject to update in PDR submission. [redacted]23/5/25: Closed	
38	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Sustainability	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Section 8.2	Suggest revising the table columns for Table 8-1 to include Requirement, Initiative (control) description, Initiative (control) Impact/Contribution to Targets, Status (Adopted, Under consideration, Abandoned etc.), Design Evidence (i.e., section in design report or design drawings). Table 8-1 can link back to the relevant sustainability aspects identified as applicable to the design package e.g., Energy, Water, Materials etc. Suggest that Section 8.2 would benefit from separate subsections for each aspect i.e., Materials, Energy, Resources etc. rather than including all information in Table 8-1 format.	Exhibit B Scope and Performance Requirements, Appendix H, section,1 (d)	O	[redacted][JHG]: Suggestion accepted. Table 8-1 removed and categories listed in response with subsections as suggested to allow further detail to be provided regarding compliance with relevant IS and contract requirements.	30-Jan-2025	C	[redacted]31/01/2025: Closed subject to update in PDR submission. [redacted]23/5/25: Closed	
39	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Sustainability	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Section 8.2	Section 8.2 would benefit from a reference to the Sustainability Initiatives Register.	Exhibit B Scope and Performance Requirements, Appendix H, section,1 (d)	O	[redacted][JHG]: A reference to the Sustainability Initiatives Register has been included in the revised design report template for PDR.	30-Jan-2025	C	[redacted]31/01/2025: Closed subject to update in PDR submission. [redacted]23/5/25: Closed	

DESIGN REVIEW RECORD (DRR)

Contract:	PLR 2 - ENABLING WORKS CONTRACT
DP Ref:	SD-0001
Design Package Title:	Stormwater Drainage and Water Quality Design
Design Report:	As per transmittal
Drawing List:	As per transmittal

ISSUED FOR REVIEW

SUBMISSION	NO. OF DWGS	TB REFERENCE	DATE ISSUED
SDR	-	PLR2EW-JHGRP-TX-000092	Friday, 6 December 2024
PDR	-	PLR2EW-JHGRP-TX-000399	Monday, 6 May 2024
PDR	-	PLR2EW-JHGRP-TX-000503	Thursday, 19 June 2025
DDR	-	PLR2EW-JHGRP-TX-000631	Wednesday, 20 August 2025
DDR	-	PLR2EW-JHGRP-TX-000704	Wednesday, 24 September 2025
DDR	-	PLR2EW-JHGRP-TX-000750	Wednesday, 15 October 2025
Post-DDR	-	PLR2EW-JHGRP-TFNSW-CORR-000162	Monday, 3 November 2025
AFC	-	PLR2EW-JHGRP-TX-000828	Friday, 21 November 2025

<======= TO BE COMPLETED BY IC

COMPLIANCE STATUS LEGEND

O Observation / Comment

N Non-Compliant (must provide reference to a Project Deed / SWTC requirement)

TO BE COMPLETED BY IC======>

RESPONSE STATUS LEGEND

O Open
C Closed
CS Closed SUBJECT TO additional action / information

FOR IC USE ONLY
L Certification Limitation
H Drawings or part thereof on HOLD

IC Use Only	DRR TEAMBINDER REF:	
DRR REV	DRR STATUS	DATE

No.	Stage	PACKAGE	Rev	Reviewer Name	Initial Comment Date	Discipline	Organisation	Document Reference	Reviewer Initial Comment	Project Deed ref	Compliance Status	Contractor Response	Initial Response Date	Response Status	Reviewer Comment Closeout	Date Comment Closed
40	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Sustainability	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Section 8.2	Suggest a separate sub-section on Climate Change and Resilience is included in Section 8.2 detailing the overarching climate change and resilience process undertaken and pointing to the Climate and Natural Hazards Report for specific details on risks, ratings and adaptation measures adopted as a minimum and resilience measures in line with the Resilience Plan noting this is a key requirement. Additional details should be included in this section e.g., a summary of climate change risks/ adaptation measures and resilience measures and outcomes relevant to the specific design package.	Exhibit B Scope and Performance Requirements, Appendix H, section,1 (d) and Section 4 (e)	O	[redacted]JHG]: Noted. A new subsection 8.2.2.2 Resilience will be added in the design report for PDR with the following text: "PLR2-EW is committed to the identification of climate change direct and indirect risks, and the development of adaptations to reduce all extreme and very high risks to an acceptable level. PLR2-EW will take the following approach to Resilience Planning in line with AS 5334-2013 and the TfNSW Climate Risk Assessment Guidelines. Table 8 10 identifies all high and very high risks that are relevant to this package. These risks have all been de-escalated to a moderate rating or below. Refer to SU-0001 Climate Change and Natural Hazards Report and SU-0002 Resilience Planning for full details on the Project's climate response." [redacted]JHG] 16/06/2025: Section 8.2.1 wording and Figure 8-1 will be amended at DDR to emulate wording of "extreme and high priority" as per SPR Appendix H, Section 4(c).	30-Jan-2025	C	[redacted]1/01/2025: Closed subject to update in PDR submission. [redacted]23/5/25: Treatment in Figure 10 refers to (H, VH, E). Section 8.2.2."Treatment Review - Multi-disciplinary assessment and development of preliminary treatment pathway for high, very high, and extreme direct and indirect risks.". "Table 8-2 identifies all high, very high, and extreme risks that are relevant to this package". "Table 8-2: Relevant high and very high climate change risks, shocks, and stressors" Please amend [redacted]23/6/25: Closed subject to update in DDR	
41	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Sustainability	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Table 8-1, Env-1	Suggest responses to Env-1 criteria specifically reference sections in the design report that demonstrate the relevant operational water quality outcomes are achieved i.e. Table 4-14 rather than a general overview. SMART operational WQ goals must be established and reviewed by an SQP against requirements listed in DL1.3. Suggest commentary on this is included if not captured elsewhere.		O	[redacted]JHG]: Agreed. A new subsection has been added under Section 8.2.2 Sustainability Requirements for each category for further discussion on the requirements, controls and initiatives to achieve the nominated credit level as they relate to the design package. More specific detail will be included for the Evidence as suggested.	30-Jan-2025	C	[redacted]04/02/2025 Comment Closed	
42	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Sustainability	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Section 4.3.2.2 Water Quality	Note that it has been assumed that ATL catchment can directly discharge to the Parramatta River and hence excluded from the water quality assessment. This conflicts with Env-1 criteria that require "Modelled impacts to incorporate all work activities proposed to be used through the construction and operation of the project that could result in impacts on water discharge and receiving water quality." **IC notes that this comment relates to Comment No. 59 by TfNSW and acknowledge that this comment will therefore be closed when the related comment is closed subject to agreement by all reviewers.**		O	[redacted]GHD]: The water quality assessment model (MUSIC) will be updated to include the free draining scupper catchment in PDR submission and reporting updated accordingly.	30-Jan-2025	C	[redacted]4/02/2025 Comment Closed	
43	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Sustainability	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Table 8-1, Rso-6	As noted in other design packages, there are inconsistencies regarding where the design report's materials calculations will be located. Please ensure consistency across design packages and reports.		O	[redacted]JHG]: Consistency will be reviewed. Calculations will be shown in the Energy and Carbon Model and Report, whilst the outputs (% impact) will be shown in each individual design report where relevant for initiatives.	30-Jan-2025	C	[redacted]31/1/25: Closed subject to update in PDR as noted. [redacted]23/5/25: Closed. Noted outputs are now consolidated in the Energy and Carbon Model Report.	
44	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Sustainability	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, General	Compliance with UMMs W2 and W3 is not sighted within the report. Please amend and revise to demonstrate compliance.	PLR2 Enabling Works Contract Schedule 11 (UMMs W2 and W3)	N	[redacted]GHD]: The SDR submission for EN-0001 provides the allocation of the environmental requirements to the relevant design packages. At PDR, the evidence will be documented against the requirement in a similar format to a RVTM with cross reference to specific section/s of the design report that demonstrate compliance. CoA UMMs as follows: W2 - Drainage and flood management infrastructure will be designed with regard to relevant drainage design requirements and guidelines, including the Development Engineering Design Guidelines (City of Parramatta Council, 2018) and Sydney Olympic Park Authority Policy–Stormwater Management and Water Sensitive Urban Design (Sydney Olympic Park Authority, 2016). W3 - The location and specification of water quality treatment measures will be determined with reference to the NSW and project-specific water quality objectives and existing water quality. 01/04/25[redacted]GHD): Appendix F2 contains the environmental compliance RVTM outlining what sections in the design documentation provide evidence of compliance. [redacted]GHD) 30/05/2025: Condition W1 is not applicable to the SD-0001 package. It is covered by FL-0001 flood model design report. This comment should be closed as the initial comment is in regard to W2 and W3 which the comment notes as addressed. 17/09/2025[redacted]: It is unclear from the comment what has not been complied with, W1 as previously articulated in the response is a flooding item and not covered in this package it is covered in FL-0001, and is not attached to this package in the Appendix F-2 RVTM .	30-Jan-2025	C	[redacted]6-Feb-25): The Planning Approval Requirements are not suitably addressed by EN-0001. This should be clearly articulated in the PDR submission including development of the Flood Management Strategy required by W1 [redacted]7/05/2025: W1 has not been addressed in this PDR design package. Additionally, not all the relevant CoAs, UMMs have been identified and addressed or addressed adequately in this PDR or Appendix F-2. [redacted]7/06/2025 to remain CS pending DDR. [redacted]9/09/25 - Not updated - comment is changed to open. [redacted]9/09/25 - comment closed as W1 to be covered in FL-0001	
45	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	17-Dec-2024	Road Design	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100103 - 104	It appears that the rainwater discharge happening out of the headwalls 01-4, 07-4, 10-13, 41-3 is being released into Parramatta river without being treated. Is a bio-retention basin being built?		O	[redacted]GHD]: 01-04: Low flow generated by site is treated by a Jellyfish 07–04: Conveys external flow, it's no required to treat the flow generated by the external catchments 10-13: The outflow from bioretention discharges via this outfall to Parramatta River. There is only a small catchment in Wharf Road which bypass bioretention basin. The Water Quality assessment considers this bypass catchment. 41-3: A small Wharf Road catchment discharges via this outfall. Water Quality assessment considered this bypass catchment. 01/04/2025: MUSIC modelling updated for PDR design submission and model construction is described in the design report Section 4.3.3.3 and results summarised in Section 4.3.4.2 and Appendix L. [redacted]18/06/2025: Their are outlets that discharge to the Parramatta River without treatments noted in the previous responses, these outlets do not drain the PLRC and are too low to have water quality treatment when considering the future levels they would need to be relative to the HAT+CC, there is no intention to provide any further water quality treatment at those outlets. 15/09/2023 [redacted]: The pits identified do not drain the PLRC they drain Archer Park area. There is a retaining wall between Archer Park and the PLRC in this location.	30-Jan-2025	C	06/02/202[redacted]: Package owner response accepted for outlets 01-4 and 07-4. Evidence required that Outlets 10-13 and 41-3 and catchments are considered in the design of water quality treatment systems. [redacted]27/05/25: Comment to remain CS provision on evidence required that the by-pass catchments are considered in the design of water quality treatment systems. [redacted]27/06/2025: Comment to remain CS on the provision evidence that the by-pass catchments are considered in the design of water quality treatment systems. 01/09/202[redacted]: Headwall 10-11 appears to drain the PLRC. Please confirm that the bypass flow between 10-2 and 10-3 is minor to justify being not treated. SS 26/09/25[redacted]: Closed noting Contractor's response	
46	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	12-Dec-2024	Road Design	TfNSW	PLR2EW-JHGRP-PLRPEWRC-SD-DRG-100107	Errant 225mm label chainage 7677.561.		O	[redacted]GHD]: The label belongs to pipe 31-7 to 17-22.	30-Jan-2025	C	[redacted]04/02/2025 Comment can be closed.	
47	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	16-Dec-2024	Environment	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, General	Condition E144(b) in regards to impacts on surrounding vegetation and aquatic ecology has not been addressed in this report.	Conditions of Approval E144(b)	N	[redacted]JHG]: Condition E144 has been allocated to SD-0001 package in the Environmental, Sustainability and Planning Approval Design Review Report (EN-0001) at the SUR stage. During PDR, EN-0001 will be updated with a specific cross-reference to where the evidence for compliance with this CoA is provided. [redacted]JHG] 16/06/25: For PDR, an extract for relevant compliance statements for each package has also been included at Appendix F2. [redacted]JHG] 22/09/25: Evidence in Appendix F2 will be updated to refer to the relevant report section/s where this is addressed. 14/11/2025 TS (GHD): Added the following additional elements to Appendix F-2 E144 (b) Existing Systems: Design Report PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.1.2 details the modified transverse drainage system design. New Systems: a) Design Report PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.2.3 provides details of OSD system implemented in to the design at the only connection to an existing Drainage system. b) i) Scour PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.3.2 and Appendix O. b) ii) Flooding: Refer to PLR2EW-JHGRP-LRPEWRC-SD-RPT-100002 b) iii) Water Quality: PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.4.2. b) v) Riparian Vegetation: PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.3.2 outlines the determination of outlet velocities to mitigate impacts to downstream vegetation. b) vi) Aquatic Ecology: PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.5.2 describes the mechanism of impact from stormwater discharge and how mitigation of pollutants mitigates the impacts. b) vii) Propoerty: Refer to PLR2EW-JHGRP-LRPEWRC-SD-RPT-100002 c) There are no instances of cross drainage systems connecting to an existing council or Sydney Water System. d) All pits are standard TfNSW or CoPC in Ground as documented in PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151 to 100158, further details on Maintenance considerations in the design are provided in PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 7.4.	30-Jan-2025	C	[redacted]6/02/2025: This document fails to provide evidence of addressing Condition E143, which is associated with Condition E144, which states "All new or modified drainage systems associated with the CSSI must be designed to:". At this stage of the design process, it's expected this would be addressed or evidence showing how it will be addressed. Or if this condition is not applicable in any capacity, it still needs to be addressed. Additionally, the SD-001 Environmental, Sustainability and Planning Approval Design Review Report does not address this specific condition and therefore is not at this stage compliant. [redacted]05/2025: Comment remain open and will be reviewed in the EN-0001 Environmental, Sustainability and Planning Approval Design Review Report, as noted in JH comments. [redacted]27/06/2025: The initial comment has not been addressed in either EN-0001 or this report. Please revise and address. REMAINS OPEN [redacted]09/2025: Section 4.3.2.1.2 reviewed, only scour addressed. Suggest discussion is added within the relevant section of Appendix F2, as to: -identify that the additional flow volumes will not worsen scour, flooding, water quality, riparian vegetation, aquatic ecology or property and provide evidence of this; OR - explain what steps were taken to minimise the impact of additional flow volumes in relation to scour, flooding, water quality, riparian vegetation, aquatic ecology or property and provide evidence of this. [redacted]0/9/2025: [redacted]Comment above remains CS. Provide reference to updated relevant sections when addressed. [redacted]21/10/2025: JHG noted updates will be included in next revision. [redacted]9/11/25: Evidence in F2 is yet to be updated [redacted]27/11/25: Closed	27/11/2025
48	SDR	Stormwater	A	[redacted]	16-Dec-2024	Environment	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT-	This report does not reference any Environmental Conditions	PLR2 Enabling Works Contract	N	[redacted]GHD): Will be updated in PDR stage, water quality design and the basis of the WQ objectives is in the SSR design report section 4.3.2.5 with reference to	30-Jan-2025	C	[redacted]2/2025: Comment noted and PDR is expected to provided more detail. It's suggested that including specific conditions applicable to this	
49	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	18-Dec-2024	Interface	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, General	Please ensure that design would include identification of drainage line ownership for subsequent handover of drainage assets to relevant asset owners	Exhibit B Scope and Performance Requirements, Section 7.14.4	O	[redacted]GHD]: This is currently being developed in consultation with the Principal and should be available to accompany the PDR submission. 01/04/2025[redacted]GHD): All assets currently designed as TfNSW owned as they serve the PLRC, TfNSW have been developing asset ownership but not yet provided to the Contractor to validate. [redacted]18/06/2025 (GHD): Utilising the TfNSW asset principles provided we will identify asset ownership and include as an appendix in the design report. 16/09/2025 [redacted]: The design drawings will be updated to highlight which pipes are CoPC, RFI to be submitted first to confirm which can be attached to SD-0001 13/10/2025[redacted]JH): As discussed in the comment closeout meeting held on 13/10/2025, TfNSW will provide a response to the RFI "PLR2EW-JHGRP-RFI-000159", the comment can be closed subject to review of the updated asset ownership details in the report.	30-Jan-2025	C	[redacted]2/25: Can be closed subject to PDR Submission as noted [redacted]5/25 - To remain open - drainage line and its ownership to be validated. Asset delineation principles were shared with the Contractor via PLR2EW-TFNSW-TX-000662 [redacted]4/06/25 - Can be closed subject to identification of asset ownership in the design report. [redacted]9/9/25 - appears that asset ownership has not been identified in the report. CS status to remain. [redacted]29/09/25 - Noted. CS status to remain and can be closed following provision of asset ownership in the SD-0001 package. [redacted]1/10/ 25 - Noted to be closed and actioned in accordance with RFI 000159.	

DESIGN REVIEW RECORD (DRR)

Contract:	PLR 2 - ENABLING WORKS CONTRACT
DP Ref:	SD-0001
Design Package Title:	Stormwater Drainage and Water Quality Design
Design Report:	As per transmittal
Drawing List:	As per transmittal

ISSUED FOR REVIEW

SUBMISSION	NO. OF DWGS	TB REFERENCE	DATE ISSUED
SDR	-	PLR2EW-JHGRP-TX-000092	Friday, 6 December 2024
PDR	-	PLR2EW-JHGRP-TX-000399	Monday, 6 May 2024
PDR	-	PLR2EW-JHGRP-TX-000503	Thursday, 19 June 2025
DDR	-	PLR2EW-JHGRP-TX-000631	Wednesday, 20 August 2025
DDR	-	PLR2EW-JHGRP-TX-000704	Wednesday, 24 September 2025
DDR	-	PLR2EW-JHGRP-TX-000750	Wednesday, 15 October 2025
Post-DDR	-	PLR2EW-JHGRP-TFNSW-CORR-000162	Monday, 3 November 2025
AFC	-	PLR2EW-JHGRP-TX-000828	Friday, 21 November 2025

<======= TO BE COMPLETED BY IC

COMPLIANCE STATUS LEGEND

O Observation / Comment

N Non-Compliant (must provide reference to a Project Deed / SWTC requirement)

TO BE COMPLETED BY IC=======>

RESPONSE STATUS LEGEND

O Open
C Closed
CS Closed SUBJECT TO additional action / information

FOR IC USE ONLY
L Certification Limitation
H Drawings or part thereof on HOLD

IC Use Only	DRR TEAMBINDER REF:	
DRR REV	DRR STATUS	DATE

No.	Stage	PACKAGE	Rev	Reviewer Name	Initial Comment Date	Discipline	Organisation	Document Reference	Reviewer Initial Comment	Project Deed ref	Compliance Status	Contractor Response	Initial Response Date	Response Status	Reviewer Comment Closeout	Date Comment Closed
50	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	18-Dec-2024	Technical	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 SD-0001	The Design Package (SD-0001) does not appear to consider sea level rise or storm surge up to the year 2130 in it's design. This is particularly important as it may impact the material selected for drainage infrastructure (i.e., marine grade pipes) and also dictate viability and/or invert levels for water quality measures (e.g., bioretention basins and Oceanguard and JellyFish proprietary items). Specific items for consideration a[redacted]flagged as observations below. **Refer to Comment No. 51, 52 and 53 (references added by IC).**	Exhibit B Scope and Performance Requirements, Section 7.4.1 (c) (iii)	N	[redacted]GHD]: The comment is acknowledged and agreed that the comment responses to 51, 52 and 53 outline the elements that have been introduced into the system to consider the impacts of sea level rise to projected climate change. The locations of any marine grade pipes will be further defined on the long sections, based on the aligned sea level rise projection currently being developed through the FL-0001 package in consultation with TfNSW 01/04/2025[redacted]GHD]: Discussion around the potential impacts associated with increase in downstream tailwater levels on elements such as the water quality infrastructure has been included in the PDR Design Report, refer to Section 4.3.4. 30/05/2025[redacted] GHD]: It is noted that the PDR Design report included the following a summary table of the assessment in section 4.3.4.1.2, which outlined the impacts that a 100 year +CC of 5 Year +CC Parramatta river level would have on system performance, and outputs from those models runs in Appendix N to demonstrate the impacts summarised, it is unclear what the omitted calculations are.	30-Jan-2025	C	[redacted]06/02/2025: Comment can be closed, subject to PDR documentation providing adequate consideration of Scope and Performance Requirements, Section 7.4.1 (c) (iii). [redacted]3/05/2025: The Design Report does not include relevant information/calculations for storm surge. Comment remains Open [redacted]27/06/2025: Comment open, refer explanation from Comment 52 (24/06/2025) [redacted]28/08/2025: Comment Closed.	
51	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	18-Dec-2024	Technical	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 PLR2EW-JHGRP-LRPEWRC-SD-DRG-100210	Highest astronomical tide (HAT) is 1.1175 m AHD. Review of long-sections indicate that the invert of the proposed JellyFish water quality device outlet is below HAT. Consideration should be given to the effectiveness of the JellyFish filter when exposed to brackish sea water on a regular basis. Other aspects such as maintenance and durability should also be considered.	Exhibit B Scope and Performance Requirements, Section 7.4.1 (c) (iii)	O	[redacted]GHD]: Jelly Fish outlet DS IL is 1.302mAHD and is set to be higher than HAT level. Therefore, there won't be backwater impact to JF device. 01/04/2025[redacted]GHD]: Discussion around the potential impacts associated with increase in downstream tailwater levels on elements such as the water quality infrastructure has been included in the PDR Design Report, refer to Section 4.3.4. 18/06/202[redacted]GHD]: This drainage line is currently being reviewed in DDR with the change to an inground system, as identified in the PDR design report as an outstanding issue. We believe we will be able to improve the IL of the WQ devices on the southern foreshore and potentially get them above the MHWS level plus CC.	30-Jan-2025	C	[redacted]06/02/2025: Whilst the Jellyfish outlet is located above HAT, the invert of the proposed Jellyfish would still be subject to inundation from storm tides on a semi-regular basis. Please investigate options to locate the device so that it does not become an ongoing maintenance/durability concern for TfNSW. This comment will remain open until it is demonstrated that the devices have adequately considered the requirements of Scope and Performance Requirements, Section 7.4.1 (c) (iii). [redacted]23/05/2025: The outlet of Jellyfish (29-2) is below projected MHWS 2130 level by 0.5m. Based on SLR predictions, we can expect from 2090 for the device to be inundated twice daily (during high tide). Prior to 2090, we can inspect inundation occurring more and more frequently from 2030 due to: rising Highest High Water Spring Tide Solstices, storm tide, storm surge, and flood levels in the Parramatta River. As per the manufacturers Design Guide "It is also necessary to consider the impacts that tail water/submergence has on all stormwater treatment devices. In the case of the Jellyfish®, tailwater can adversely affect the long term cartridge operation. As such measures should be implemented during design to ensure that the system can operate effectively." With consideration to the above, and no-change to stormwater network ILs from SDR to PDR, the drainage system has not demonstrated "resilience" to the effects of climate change as a result of sea level rise or storm surge up to year 2130. Compliance status has been updated to "Non-compliant". [redacted]4/06/2025: Comment open. Compliance and response status to be reviewed following potential changes at DDR. [redacted]8/08/2025: Comment closed, JellyFish outlet has been raised to 2.091m AHD, demonstrating resilience to ingress of water in to the asset.	
52	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	18-Dec-2024	Technical	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 PLR2EW-JHGRP-LRPEWRC-SD-DRG-100210 PLR2EW-JHGRP-LRPEWRC-SD-DRG-100213	Preliminary calculations of storm surge tide + climate change have been estimated for Fort Denison, Sydney. 2100 is estimated at 2.25m AHD and 2130 is estimated at 2.61m AHD. Review of long-sections indicate that the invert of bioretention basin (outlet ID 23-1) and bioretention basin (outlet ID 38-1) would be below the storm surge estimate for 2130 and/or 2100. Basin filtration media and basin outlet inverts are at or below HAT. Consideration should be given to the effectiveness of bioretention when exposed to brackish sea water. Other aspects such as maintenance and durability should also be considered.	Exhibit B Scope and Performance Requirements, Section 7.4.1 (c) (iii)	O	[redacted]GHD]: Flood gate is installed at the outfall to Parramatta River to prevent backwater impact to the drainage network and bioretention basin. 01/04/2025[redacted]GHD]: Discussion around the potential impacts associated with increase in downstream tailwater levels on elements such as the water quality infrastructure has been included in the PDR Design Report, refer to Section 4.3.4. 30/05/2025[redacted]GHD]: The design documentation has identified the impacts of the storm surge in Appendix N and Section 4.43.4.1.2, assessed the water quality assets at risk from brackish water inundation due to sea level rise and documented the use of the duck bill outlets to assist in mitigating those impacts. The durability elements are covered in Appendix D it is unclear what Omission is .	30-Jan-2025	C	[redacted]28/08/2025: Section 4.3.4.1.2. has been updated to include some discussion on storm surge. Whilst not providing storm tide calculations (for reference, CSIRO Canute 3 - https://shiny.csiro.au/Canute3_0/), it is noted and agreed that storm surge is less than the applied tailwater conditions for SLR - for which the drainage network performance is analysed against. Comment closed.	
53	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	18-Dec-2024	Technical	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	As above **(Comment No. 51 - reference added by IC)**, HAT is 1.1175m AHD and storm surge tidal levels could potentially reach up to 2.61mAHD under climate change conditions to 2130. It is noted that RCP Class 4 pipes are selected for a large number of lines (01, 07, 10, 12, 14, 22, 28, 29, 37, 38, 41, 51, 52), which would be regularly subject to contact with brackish water. It is recommended that the selection of pipe material be reviewed and updated to reflect marine grade conditions for stormwater networks that are at or below the calculated storm surge + climate change 2130 level.	Exhibit B Scope and Performance Requirements, Section 7.4.1 (c) (iii)	O	[redacted]GHD]: Pipe material will be specified in further details for PDR. 01/04/2025[redacted]GHD]: section 4.3.4.3 has been added to the design report to cover off the durability requirements for the stormwater drainage. 30/05/2025[redacted]GHD]: Agreed long sections will be updated at DDR to identify which pipes are to be marine grade in line with the recommendations of the Durability assessment.	30-Jan-2025	C	[redacted]06/02/2025 Comment can be closed, subject to pipe material being specified as part of the PDR documentation. [redacted]3/05/2025: Marine grade pipes are not specified on the Design Drawings. It is acknowledged that reference to the use of Marine Grade pipes is specified in Section D-2 of the Design Report, however these should be stated on the drawings. Comment updated to "Open" [redacted]4/06/2025: Comment closed, subject to update of Design Drawings at DDR. [redacted]28/08/2025: DDR Drawings updated to include "marine grade". Comment closed	
54	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	18-Dec-2024	Technical	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109	ACO from pit 39-1 and 19-3 crosses bus-lane and may be an ongoing durability and maintenance concern. Confirm if ACO is required at this location.	Exhibit B Scope and Performance Requirements, Section 7.4.8 (g)	N	[redacted]GHD]: The need for the ACO at this location will be reviewed for PDR with consideration of maintenance. 30/05/2025[redacted]GHD]: Due to the co planer requirement and removal of any cross fall as required by comments on RW-0001 the MEA-DRAIN is required. 15/09/2025 [redacted] 1) X-fall has been established in RW-0001 and the departure already accepted, and documented in Appendix E1 of that report. 2) The Linear Drain is required and confirmed by JHG to be ACO Tramdrain, all references to MEA Drain will be removed from the final AFC and reflect the Contractors selected product. The drains have been noted as monolithic and are compliant to the reference clause, the design as presented is compliant to the clasue against a N has been raised.	30-Jan-2025	C	[redacted]06/02/2025: Comment can be closed, subject to provision of updated drawings at PDR. [redacted]3/05/2025: ACO from pit 19-3 and 19-2 still crosses live traffic lane. Comment updated to "Open" [redacted]27/06/2025: Comment open. Designers explanation not clear. [redacted]8/08/2025: ACO Tram DRAIN still noted to cross traffic lane (TD 19.5D and TD24-1B). Designer to confirm need for ACO to cross the bus-lane. 0% cross-fall on bus lane pavement is also undesirable, and it is not clear why this is required. [redacted]9/09/2025: Comment Closed.	
55	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	18-Dec-2024	Technical	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109	Significant length of ACO KLASSIKDRAIN is shown along bend from CH7830 to CH7900. As per SPR, grated trench drains must use straight linear runs.	Exhibit B Scope and Performance Requirements, Section 7.4.5 (c) (i)	N	[redacted]GHD]: The need for the ACO KLASSDRAIN at this location will be reviewed for PDR considering also the geometry next to Sekisui House development. 01/04/202[redacted]GHD]: The drainage design in this location has been amended to align with the updated alignment and removed this drain from the design.	30-Jan-2025	C	[redacted]6/02/2025: Comment can be closed, subject to provision of updated drawings at PDR. [redacted]23/05/2025: Comment closed	
56	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	18-Dec-2024	Technical	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109	ACO from pit 19-2 at CH8035 crosses bus-lane and may be an ongoing durability and maintenance concern. Confirm if ACO is required at this location.	Exhibit B Scope and Performance Requirements, Section 7.7.3.2 (a)	O	[redacted]GHD]: ACO drain will be shorten to avoid encroaching the Bus lane.	30-Jan-2025	C	[redacted]06/02/2025: Comment response noted and can be closed.	
57	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	18-Dec-2024	Technical	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100204	Line 10 from Pit 10-10 to 10-11 is shown as a 525 dia RCP however long-section shows this as a 600dia RCP. Please confirm correct size and update.	PLR2 Enabling Works Contract, Clause 4.1	O	[redacted]GHD]: 600mm diameter is correct. 01/04/2025[redacted]GHD]: All pipe size have been revisited as part of the 2019 ARR update.	30-Jan-2025	C	[redacted]06/02/2025: Noted. Please update the drawings to reflect long-section diameter of 600mm [redacted]23/05/2025: Comment closed	
58	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	[redacted]	18-Dec-2024	Environment & Sustainability	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Sections 4.3.2.5.1, 4.3.4.2	The Design Report does not demonstrate full alignment to how the design with contribute to the achievement of the NSW Water Quality Objectives noting that the only water quality improvement documented is in relation to gross pollutants, where it would be suitable to document the benefits of the Bioretention Basin in alignment with the Water Quality Objectives. The Parramatta River Catchment objectives also need to consider Biological Assessment Indicators, Chemical contaminants & toxicants, Temperature, pH, Dissolved Oxygen, Salinity, Chlorophyll-a, Algae/coliforms &bacteria etc. Therefore, the design does not meet the Planning Approval requirements "*The CSSI must be designed, constructed and operated so as to... contribute towards achievement of the NSW Water Quality Objectives over time where they are not being achieved as at the date of this approval.*" It is anticipated that a full water quality assessment would be provided and that treatment devices would align with the required Water Quality Objectives to demonstrate full compliance with the Planning Approval.	PLR2 Enabling Works Contract Schedule 11 Part 1B - Condition E138	N	[redacted]GHD]: SDR complies with Condition E138 by adopting the approach outlined in section 6.2.1 of Technical Paper 10 in EIS. This approach uses MUSIC models to demonstrate compliance with NSW WQOs for TSS, TP and TN. For other pollutants, SDR also compliant with factors stated in EIS without any changes. A statement will be included in the design report within the PDR to clarify. 01./04/2025[redacted]GHD]: The design report now includes a comparison of the pre upgrade and post upgrade pollutant concentrations from the study area, and demonstrates that the discharge from site will be improved through the treatment train presented in the design package. 05/06/2025[redacted]GHD]: The existing water quality is not met so under the condition what is being requested is not required, this is already articulated in the Design Report and justified.	30-Jan-2025	C	[redacted]06/02/2025: Demonstration of water quality outcomes against the to be provided with design report to demonstrate compliance with Planning Approval requirements as summarised in the original comment. [redacted]26/05/2025: Acknowledge the inclusion of the Pre and post pollutant concentration tables. However, I see no clear demonstration of compliance with the Planning Approval as summarised in the original comment. Please show how compliance is met or include an expert justification why a water quality objective cannot be met. Additionally, Table 4-9 Water Quality Objectives – Biological assessment indicators is part of the stormwater drainage conditions and is outlined in CoA E144 (b), Exhibit B – SPR Appendix G 11 (a). [redacted]7/06/2025: Comment acknowledged. Please provide the referenced section of "The existing water quality is not met so under the condition what is being requested is not required, this is already articulated".	

DESIGN REVIEW RECORD (DRR)

Contract:	PLR 2 - ENABLING WORKS CONTRACT
DP Ref:	SD-0001
Design Package Title:	Stormwater Drainage and Water Quality Design
Design Report:	As per transmittal
Drawing List:	As per transmittal

ISSUED FOR REVIEW

SUBMISSION	NO. OF DWGS	TB REFERENCE	DATE ISSUED
SDR	-	PLR2EW-JHGRP-TX-000092	Friday, 6 December 2024
PDR	-	PLR2EW-JHGRP-TX-000399	Monday, 6 May 2024
PDR	-	PLR2EW-JHGRP-TX-000503	Thursday, 19 June 2025
DDR	-	PLR2EW-JHGRP-TX-000631	Wednesday, 20 August 2025
DDR	-	PLR2EW-JHGRP-TX-000704	Wednesday, 24 September 2025
DDR	-	PLR2EW-JHGRP-TX-000750	Wednesday, 15 October 2025
Post-DDR	-	PLR2EW-JHGRP-TFNSW-CORR-000162	Monday, 3 November 2025
AFC	-	PLR2EW-JHGRP-TX-000828	Friday, 21 November 2025

<======= TO BE COMPLETED BY IC

COMPLIANCE STATUS LEGEND

O Observation / Comment

N Non-Compliant (must provide reference to a Project Deed / SWTC requirement)

TO BE COMPLETED BY IC======>

RESPONSE STATUS LEGEND

O Open
C Closed
CS Closed SUBJECT TO additional action / information

FOR IC USE ONLY
L Certification Limitation
H Drawings or part thereof on HOLD

IC Use Only	DRR TEAMBINDER REF:	
DRR REV	DRR STATUS	DATE

No.	Stage	PACKAGE	Rev	Reviewer Name	Initial Comment Date	Discipline	Organisation	Document Reference	Reviewer Initial Comment	Project Deed ref	Compliance Status	Contractor Response	Initial Response Date	Response Status	Reviewer Comment Closeout	Date Comment Closed
59	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	M Haberley	18-Dec-2024	Environment & Sustainability	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.3.2	The Design Report notes that it has been assumed the ATL can directly discharge to the Parramatta River and has therefore been excluded from the Water Quality Assessment. However, the assumption is unsubstantiated and is not aligned with the requirements of the Planning Approval which applies to the delivery of the CSSI in full. Can the Contractor clearly and effectively substantiate why the ATL would not impact water quality and is therefore suitable for direct discharge to Parramatta River? This must demonstrate compliance with the requirements of the Planning Approval. **IC notes that this comment relates to Comment No. 42 by TfNSW and acknowledge that this comment will therefore be closed when the related comment is closed subject to agreement by all reviewers.** **IC (TM) 28/05/25 This comment is now separate to comment 42**	PLR2 Enabling Works Contract Schedule 11 Part 1B - Condition E138	N	Sophie Afraz [GHD]: Refer to response #42. 05/06/2025 Tim Snape (GHD): The existing water quality is not met so under the condition what is being requested is not required, this is already articulated in the Design Report and justified.	30-Jan-2025	C	MH 06/02/2025: Updated Water Quality assessment (MUSIC) to be provided with PDR Design Report demonstrating full compliance with the Planning Approval requirements. KM 26/05/2025: Acknowledge the inclusion of the Updated Water Quality Assessment (MUSIC), however there still appears to be no clarity on the project's compliance with all Water Quality Objectives. Additionally, if any Water Quality Objectives cannot be proven to comply through models or systems alike, demonstration of why this cannot be achieved is required, or statement of reason. Under 4.3.2.5.2. Water Quality Objective - Aquatic Foods is missing details of how the project will improve or manage this objective. Please include details. KM 27/06/2025: Comment acknowledged. Please provide the referenced section of "The existing water quality is not met so under the condition what is being requested is not required, this is already articulated".	
60	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	M Haberley	18-Dec-2024	Environment & Sustainability	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102 to 4	The scour protection for outlets to the Parramatta River are not substantiated with a clear understanding of sizing to prevent impacts to the mangroves, while assessing on balance a reduction of impacts to the mangrove zones as far as reasonably possible. The Design Report states this will be completed at PDR Stage. This proposal is not supported by the Principal as this does not comply with the Planning Approval requirements that must be "*assessed at each design phase*". The Principal anticipates that the Contractor would respond with a demonstration of outlet scour protection sizing in an SDR revision such as via the use of the FLUME tool or similar to demonstrate compliance with the Planning Approval requirements	PLR2 Enabling Works Contract Schedule 11 Part 1B - Conditions E2 and E6, Part 1C - BD1	N	Sophie Afraz [GHD]: The intent of the SDR is to minimise impacts on mangroves by proposing outfalls located near existing outfalls and designing them in a way that either eliminates the need for scour protection or limits it to minimal sizes. This approach will be further investigated during the PDR stage. Assessment of outlet scour protection will be documented in the PDR submission to clarify the design basis around outlet scour protection. 01/04/2025 Tim Snape (GHD): The Deign Report has been updated to include the outlet scour protection assessment undertaken in the PDR Deign Stage in Section 4.3.3.2. 30/05/2025 Tim Snape (GHD): Scour assessment at each outlet was included in the PDR Design Submission Section 4.3.2.2 and Appendix O scour protections identified on the plans align to those report references. 15/09/2025(TS): Please refer to Section 4.3.2.2 with the chart in Appendix O, this methodology is as per AGRD Part 5B Section 3.13, as noted in the referenced Section of the design report. The bed outlet velocity is nominated in that section for the report as 1.5m/s and the reference for that velocity nominated. The Chart attached in Appendix O is Figure 3.15 from Austroads. It is unclear what element of the design the reviewer does not believe has been undertaken as per AGRD Part 5B when those references are provide din the design report. There is no extensions beyond the boundary required. 13/10/2025 EF(JHG): As discussed in the comment closeout meeting held on 13/10/2025, TS confirmed that the scour protection calculation are all updated in the design revision and no scour protection is required outside of the Planning Approval boundary. No update to the submitted DDR is required. MH will review the comment closeout response and advice if the comment can be closed. 14/11/2025 TS (GHD): As discussed there scour calcs in Appendix O are correct and are not updated. for clarification we have added the additional column to Table 4-13 to demonstrate the total L is correct, the La demonstartes that the minimum length of rock protection downstream of the concrete has been provided and in some cases more than the minimum from Appendix O..	30-Jan-2025	C	MH 06/02/2025: Due to the Planning Approval requirements of the Conditions and Mitigation Measures, compliance must be demonstrated "at each design phase". If the Contractor is seeking to modify the Planning Approval this should be completed per the terms of Exhibit A – Management Requirements, Annexure 6- Environmental and Sustainability Management Requirements, Cl. 1.1. This comment can be closed with an assessment of scour potential and associated mitigation measures. Please update the design report with the required assessment. KM 23/05/2025: How will the scour protection be implemented and managed inside the planning approval boundary? The Contractor must demonstrate either the scour protection can fit inside the boundary or that they will be responsible for modifying the Planning Approval including any additional offset requirements. KM 27/06/2025: It is noted in drawings that some of the scour protection extend right to the project boundary. Based off the dimensions, particularly the length, some of these scour protections will extend past the project boundary. Noted outlets in question are 01-3, 07-3. In addition, it appears in the drawings that outlet 10-11, does not have proposed scour protection. Please address. Noting this might be at this stage incomplete, like outlet 14-21. Observation, in the drawings outlet 41-3 is identified as the end with scour protection. When in table 4-12 it states outlet 41-2. Is this a typo? MH 05/09/2025: The scour protection requirements have been significantly altered since PDR per section 4.3.3.2 and the design drawings, however the methodology remains the same. Appendix O presents the original scour calculations of the PDR. It can only be concluded that Section 4.3.3.2 and the Drawings have been revised to "make the scour protection fit" inside the Planning Approval Boundary. This methodology requires independent review and it does not seem a suitable practice, nor would it meet the Planning Approval requirements. Per the comment above it is recommended that the Contractor implement the scour protection estimated by the methodology set out in AGRD Part 5B section 3.13, and the Contractor seek the necessary approvals for any required extensions outside of the Planning Approval boundary. JR 30/09/2025: MH comments above remain open. Section 4.3.3.2 does not match the calculations table provided in Appendix O. MH 22/10/25: Comment close subject to review of the updated report. TM: 6/11/25: App O and 4:13 are yet to be updated TM: 27/11/25: Closed.	27-Nov-2025
61	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	M Haberley	18-Dec-2024	Environment & Sustainability	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100106	There is an outlet to the southern bank of the Parramatta River without scour protection, it is assumed this is on the basis of a deeper outlet point on the southern side of the river. Can the Contractor provide assurance that the outlet would not cause scour or impacts to the emerging Mangrove community at this point in the river? It is noted that areas of current native vegetation must be rehabilitated at the end of construction and the design should anticipate this along with the other relevant requirements of the Planning Approval.	PLR2 Enabling Works Contract Schedule 11 Part 1C - LP10, BD14	N	Sophie Afraz [GHD]: Refer to response #60. 30/05/2025 Tim Snape (GHD): Scour assessment at each outlet was included in the PDR Design Submission Section 4.3.2.2 and Appendix O scour protections identified on the plans align to those report references. Outlet 14-21 is incomplete to be integrated with the step wall in the ST-0002 Package, and will be shown within the DDR submission, but given it will not extend beyond the project boundary. 15/09/2025(TS):See response above the design has provided all requisite information to demonstrate compliance, yes teh design has been modified to respond to the changes in layout of paths in Archer Park from PDR to DDR. 13/10/2025 EF(JHG): As discussed in the comment closeout meeting held on 13/10/2025, TS confirmed that the scour protection calculation are all updated in the design revision and no scour protection is required outside of the Planning Approval boundary. MH will review the comment closeout response and advice if the comment can be closed. 14/11/2025 TS (GHD): As discussed there scour calcs in Appendix O are correct and are not updated. for clarification we have added the additional column to Table 4-13 to demonstrate the total L is correct, the La demonstartes that the minimum length of rock protection downstream of the concrete has been provided and in some cases more than the minimum from Appendix O..	30-Jan-2025	C	MH 06/02/2025: Due to the Planning Approval requirements of the Conditions and Mitigation Measures, compliance must be demonstrated "at each design phase" regarding scour and the rehabilitation requirements are recommended for consideration at this design phase. If the Contractor is seeking to modify the Planning Approval this should be completed per the terms of Exhibit A – Management Requirements, Annexure 6- Environmental and Sustainability Management Requirements, Cl. 1.1. This comment can be closed with an assessment of scour potential and associated mitigation measures. Please update the design report with the required assessment and discussion on how scour protection will be achieved along with the rehabilitation requirements of the Planning Approval KM 22/05/2025: How will the mitigation measures will be implemented inside the planning approval boundary and compliant with the Rehabilitation Strategy. No discussion in the design report in reference to Rehabilitation Strategy. Additionally, section 5.2 Internal Interfaces expresses no interaction with the Rehabilitation Strategy for Native Plant Community. However, the Rehabilitation Strategy addresses the rehabilitation and landscaping for the project. Areas were scour protection mitigation measures occur will not be able to be rehabilitated. The Contractor must demonstrate either the scour protection can fit inside the boundary or that they will be responsible for modifying the Planning Approval including any additional offset requirements. KM 27/06/2025 to remain CS pending DDR. MH 05/09/2025: See comment above, the scour calculations have changed from those in PDR and are inconsistent with the calculations. It is the Contractor's responsibility to provide scour protection and seek Planning Approval modifications where their design extends beyond the Planning Approval boundary. JR 30/09/2025: Comments above remain open, scour impacts remain undetermined as Section 4.3.3.2 does not align with the calculations table provided in Appendix O. MH 21/10/2025: JHG Meeting confirmed confidence in the scour protection calculations. To be closed subject to Appendix O calculations being updated to those earlier in the document as used in the design. TM: 6/11/25: App O and 4:13 are yet to be updated TM: 27/11/25: Closed	27-Nov-2025
62	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Harry Cheung	19-Dec-24	Technical - Bridge	TfNSW	PLR2EW-JHGRP-LRPEWRCEWB-BR-DRG-200022 TYPICAL TRACK LEVEL CROSS SECTION LHS. PLR2EW-JHGRP-LRPEWRCEWB-BR-DRG-200024 & DRG-200025 ELEVATION PIER 1A & 1B; 2A & 2B LHS	**Transferred from BR-0001 SDR comment 140** FREE DRAINING DECK SCUPPER PLR2 EW SPR_FINAL Section 7.7.2.2(k)(i) states that "free draining scuppers through decks must not be used unless approved by the Principal". Please clarify whether this has been approved and provide evidence.	Exhibit B Scope and Performance Requirements Section 7.7.2.2(k)(i)	N	Responded by JY(GHD): Your comment is acknowledged. SPR Clause 7.4.10 *Bridge Drainage* subclause (b) states "*The drainage system must collect runoff from bridge decks except for the ATL on the bridge between Melrose Park and Wentworth Point, where free-draining scuppers may be used subject to meeting the project's conditions of approval. [940809]*". Free draining scuppers for the ATL are permitted under the SPR and are compliant with the project's conditions of approval. We do not consider this to be a non-conformance. JHG LL / GHD CC 04/04: SD-0001 will address compliance with CoA E138 in contributing towards the achievement of the Water Quality Objectives. Assessment and evidence of Principal's approval will be documented in SD-0001. Request for the IC to transfer this comment to SD-0001 Stormwater Drainage and Water Quality Design and please update Response Status in this register to "C1".	30-Jan-2025	C	HC 05/02/2025: SPR Clause 7.4.10 Bridge Drainage subclause (b) states "free-draining scuppers may be used subject to meeting the project's conditions of approval." Please clarify If this approval is given. NC 14/02/2025 As agreed at the *Discussion of TfNSW open comments on BR-001 and BR-002 SDR submission* session on 13/02/2025, JH agreed to submit an RFI for TfNSW approval with consideration of the Water Quality objectives being satisfied in line with the CoA. Changed to CS. NC 28/04/2025 comment remains CS. Noted that this is not to be addressed as part of the BR-0001 package so should be transferred to SD-0001. IC (TM) see comment 72, which raises the same issue so this comment can be closed	
63	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Gajendra Dimo	09/12//2024	Systems Engineering	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Appendix F1, F2	The SPR Appendix G & H requirements should not be managed separately to the SRS/RAATM but also allocated to the EN-0001 RVTM.		O	Lily Liu [JHG]: Confirming the SPR Appendix G and H requirements are not being managed separately to the SRS RVTM and are allocated to EN-0001 (Environmental, Sustainability and Planning Approval Design Review Report). Request for comment to be transferred to EN-0001 and closed.	16-Jun-2025	C	23/06/25 GD: Allocation of SPR Appendix G and H requirements to EN-0001 is confirmed within the SRS RVTM submitted as part of NAC Gate 2 Submission (Transmittal PLR2EW-JHGRP-TX-000500). Comment can be Closed.	
64	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Gajendra Dimo	09/12//2024	Systems Engineering	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Table 2-1 PLR2EW-JHGRP-LRPEWRC-SD-REG-100001 (RVTM)	Table 2-1 within the Design report states that Option 1 in Schedule 25 of the deed has been incorporated within the SD-0001 Design Package. However, the SD-0001 RVTM does not list any requirements from Option 1. Please ensure any applicable requirements from Option 1 are incorporated within the SD-0001 RVTM.		O	Lily Liu [JHG]: Option 1 in Schedule 25 relates to the construction of intersection upgrades at Hill Road and Footbridge Boulevard to facilitate bus only connection to the Enabling Works. All technical requirements relating to Option 1 have been included in the SRS/RAATM and allocated to relevant packages. There are no applicable requirements from Option 1 to be incorporated within the SD-0001 RVTM. Lily Liu [JHG] 22/09/25: Option 1 will be removed from Table 2-1 in the report.	16-Jun-2025	C	23/06/25 GD: If there are no applicable requirements from Option 1 to be included within the SD-0001 RVTM, then Option 1 should be removed from Table 2-1. Closed subject to this update being provided within the Design report. 11/09/25 GD: Comment has not been addressed. 24/09/25 GD: Closed Subject to verification of the change in the Design Report. 04/11/25 GD: Proposed change verified in Version D of the Design Report. Comment can be Closed.	04-Nov-2025
65	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Carla Kendall	21-May-2025	Urban Design	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100401	All access covers and grates must be consistent with the requirements of SPR section 7.4.5, and section 7.6.2.7.6. Please confirm all covers and grates documented are compliant.	Exhibit B Scope and Performance Requirements, Section 7.4.5 & 7.6.2.7.6	N	Tim Snape (GHD): All access covers are consistent with the requirements to the SPR and details captured in the pit schedules, It is acknowledged that the urban design layout within the Archer Park area has undergone significant adjustment in PDR and the DDR drainage will need to be updated to reflect those changes including some changes to the grate type where pits cannot be moved out of pedestrian locations. 15/09/25 (TS) Jellyfish 45-02 will no longer be located in a shared path due to realignment to provide DDA compliance as part of the RW-0001 comment closeout.	30-May-2025	C	CK 27.06.2025: Closed subject to documentation of review at DDR. Please ensure all requirements of the relevant SPR sections are addressed including (but not limited to) covers, infill paving lid treatments, alignment with paths and paving set out, slip ratings etc. For infill lids please also consider the required method of access (1 person/2 person lift) and ensure infill does not exceed weight restrictions - lesson learned from stage 1. CK 26.08.2026: Please confirm Jellyfish filter, pit ID 45-2, which is currently located in a shared path, will meet the required slip rating and access cover requirements. Comment can close on confirmation, or if new path arrangement means filter access point is no longer on a path. CK 25.09.2025: Closed.	
66	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	DR	23-May-2025	Sustainability	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Table 8-3	Table 8-3 Max residual risk rating is High for both Risk ID 9 and 34. Could JHG please confirm if this risk is still High after implementation of treatment options? Text under Table 8-2 says "These risks have all been de-escalated to a medium rating or below".		O	Saji Srivelan [JHG]: At time of issue of SD-0001 package risks it had not been confirmed that risk had been de-escalated, however, it has been confirmed in the SU-0001 Design Package that risk has been re-labelled F-5 and has been de-escalated to "Low". Saji Srivelan [JHG] 22/09/2025: The Contractor confirms that this is a typo and this will be updated at AFC.	16-Jun-2025	C	DR 23/6/25: Closed subject to update in DDR DR 4/9/25: Max residual rating is still listed as High. DR 25/9/25: Closed subject to update. DR 20/10/25: Closed subject to update. DR 6/11/25: Closed	06-Nov-2025
67	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	DR	23-May-2025	Sustainability	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Section 4.3.2.5.2	Section 4.3.2.5.2, Design Methodology "The project's overall pollutant reduction percentage is presented in the section 4.3.4.2.2." but this section is 4.3.4.2.2. Climate Change Impact Assessment". Please amend the reference.		O	Tim Snape (GHD): Reference will be updated for DDR Submission. 16/09/25 (TS): Reference will be updated for resubmission of the Design Report.	18-Jun-2025	C	DR 23/6/25: Closed subject to update in DDR DR 4/9/25: Reference not updated. DR 25/9/25: Closed subject to update. DR 20/10/25: Closed subject to update. DR 6/11/25: Closed	06-Nov-2025
68	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Amogh Deshpande	26-May-2025	Technical	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100015	Refer Biofiltration Media notes, Note 4. Please amend correct stakeholder required to do the works.		O	Tim Snape (GHD): The first four words of the note will be removed to clarify it is only the testing rate, the note is not intended to create a stakeholder element only the rate of testing of the media.	30-May-2025	C	AD 23/06/2025: Closed subject to review of amended drawing at DDR submission. AD 09/09/2025: Closed.	
69	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Amogh Deshpande	26-May-2025	Technical	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101 to 109	The drainage drawings do not show positive drained piped connection system from CSR pits to the relevant drainage pits. Contractor to provide plan and long sections for all connections from CSR pits to Drainage pits.	Exhibit B Scope and Performance Requirements, Section 7.4.13	N	Tim Snape / Carol Schreiber (GHD): Unclear why the CSR comment is attached to the surface drainage strategy, utility package will document their method of meeting the package requirements, as those elements do not serve a surface drainage purpose. It is a requirement that the design is coordinated and if CSR pits are lower than the drainage design, it would be expected that the drainage should be adjusted to allow the CSR to meet project requirements	30-May-2025	C	AD 23/06/2025: Response is noted, however neither package provides details on how the drainage pipe from CSR pit is connected to the nearest drainage pit. Pipe plan and long sections with invert levels at either end is expected to be shown in the Drainage package. Closed subject to review of amended drawings at DDR submission. AD 09/09/2025: Closed. Any comments related to CSR pit drainage will be captured in the CSR package.	
70	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Amogh Deshpande	26-May-2025	Technical	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102 to 4	Contractor to confirm if flows from the future Waratah stop are considered in the drainage model. Contractor to nominate the pits which can take the flows from the future stop.	Exhibit B Scope and Performance Requirements, Section 7.4.1 d (ii)	O	Tim Snape(GHD): Reference is made to Appendix K Catchment Plans that shows the delineation of discharge of the future station catchments to the drainage system.	30-May-2025	C	AD 23/06/2025: Response is noted, however unclear which drainage pit takes the flows from the future stop and should be nominated on the drawings for the future contractor to connect to correct drainage pit. Closed subject to review of amended drawings at DDR submission. AD 09/09/2025: Closed.	

DESIGN REVIEW RECORD (DRR)

Contract:	PLR 2 - ENABLING WORKS CONTRACT
DP Ref:	SD-0001
Design Package Title:	Stormwater Drainage and Water Quality Design
Design Report:	As per transmittal
Drawing List:	As per transmittal

ISSUED FOR REVIEW

SUBMISSION	NO. OF DWGS	TB REFERENCE	DATE ISSUED
SDR	-	PLR2EW-JHGRP-TX-000092	Friday, 6 December 2024
PDR	-	PLR2EW-JHGRP-TX-000399	Monday, 6 May 2024
PDR	-	PLR2EW-JHGRP-TX-000503	Thursday, 19 June 2025
DDR	-	PLR2EW-JHGRP-TX-000631	Wednesday, 20 August 2025
DDR	-	PLR2EW-JHGRP-TX-000704	Wednesday, 24 September 2025
DDR	-	PLR2EW-JHGRP-TX-000750	Wednesday, 15 October 2025
Post-DDR	-	PLR2EW-JHGRP-TFNSW-CORR-000162	Monday, 3 November 2025
AFC	-	PLR2EW-JHGRP-TX-000828	Friday, 21 November 2025

<======= TO BE COMPLETED BY IC

COMPLIANCE STATUS LEGEND

O Observation / Comment

N Non-Compliant (must provide reference to a Project Deed / SWTC requirement)

TO BE COMPLETED BY IC=======>

RESPONSE STATUS LEGEND

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L Certification Limitation
H Drawings or part thereof on HOLD

IC Use Only	DRR TEAMBINDER REF:	
DRR REV	DRR STATUS	DATE

No.	Stage	PACKAGE	Rev	Reviewer Name	Initial Comment Date	Discipline	Organisation	Document Reference	Reviewer Initial Comment	Project Deed ref	Compliance Status	Contractor Response	Initial Response Date	Response Status	Reviewer Comment Closeout	Date Comment Closed
71	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Amogh Deshpande	27-May-2025	Technical	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102	The Bio retention basin shown is behind the future Waratah Stop with the shared path in between could be a safety hazard for patrons using the shared path especially during wet weather days, when the bioretention basin is full. Contractor to review the overall design in this area and address in DDR submission. Solutions like separation between Shared path and Bioretention basin or relocation of Bioretention basin could be potentially explored.	Exhibit B Scope and Performance Requirements, Section 7.8.1.15 (b)	N	Tim Snape(GHD):The Basin cannot be relocated as it needs to be in a location that can be reached by the maintenance paths of travel, and due to the topography I the location. It is noted that the max depth of ponding in this basin is 300mm, which is acceptable and that the basin is separated by a 1.0m verge and then batter. No change is proposed to the basin, all elements of separation are compliant to standards so unclear what the N is raised against. Please provide details of the exact non compliance associated with the location. 16/09/2025 (TS): Where the ATL is running parallel to the Basin the path has been separated by a vegetation buffer 1m wide to provide the separation of the two elements, the suggestion of fencing as presented in 5.5.3 is desirable as noted in Austroads and not mandatory. The design provide clear delineation and separation of the elements and believed to comply. As the ATL diverges to the west to the crossing facility of Wharf Road the cyclist routed deviates away from the passing and the connective path to the toilet facilities is provided only and not subject to the separation considerations attributed to cyclists. This is further reinforced through the differential pavers implemented in UD-0001.	30-May-2025	C	AD 23/06/2025: Response is noted, that the basin cannot be relocated, however some form of separation between Shared path and Bioretention basin like plantation or localised fencing can be considered. Contractor to review the design and provide update at DDR submission. AD 09/09/2025: Contractor to review and provide some form of separation between Shared path and Bioretention basin like plantation or localised fencing. Contractor to review the design and provide update at AFC submission. Also Refer Austroads Guide to Road Design Part 6A: Paths for Walking and Cycling Section 5.5.3 for further details on type of treatment that is feasible. AD 01/10/2025: Closed noting vegetation planting acts as separation barrier.	
72	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Amogh Deshpande	27-May-2025	Technical	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104/105/106	Principal approval is required for the use of free draining scuppers. Contractor to provide evidence of approval by Principal at DDR submission. **IC (TM) similar to IC comment 128, UD aspects to also be considered.**	Exhibit B Scope and Performance Requirements, Section 7.7.2.2 (k) (i)	N	Tim Snape (GHD): Agreed that this comment is duplicated above, agree that formal approval needs to be requested for the free draining scuppers.	30-May-2025	C	AD 23/06/2025: Closed, noting comment is duplicate.	
73	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Amogh Deshpande	27-May-2025	Technical	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100214	Line 36, Pit 36-1 and 22-2 appear to be overflowing or under capacity. Contractor to review the design and update as required at DDR submission		O	Tim Snape (GHD): Pit 22-2 HGL is below the surface level and is noted in the text boxes below to not be overflowing.	30-May-2025	C	AD 23/06/2025: Closed.	
74	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	SFROUDE	23-May-2025	Technical	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100212	Design surface levels shown on drainage drawings appear to reference pre-development surface levels (i.e., survey) or the wrong design level (i.e., the bridge deck level). One example is Line 29-1 to 14-2 which states the design surface level is the bridge deck level. Please update Drawings.	Exhibit A Management Requirements Annexure 3 Section 7.3.5.1(b)(i)	N	CAS (GHD) - Design levels for long sections to be reviewed and corrected to report the Setout design surface for the next submission, noting that the levels of the pits have been set off the lower level as evidenced in the pit schedules.	02-Jun-2025	C	SF 27/06/2025 Comment can be closed, subject to update of PDR documentation. SF 28/08/2025: DDR Drawings updated to relevant levels. Comment closed	
75	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	SFROUDE	23-May-2025	Technical	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100452 PLR2EW-JHGRP-LRPEWRC-SD-DRG-100453	Setout points for Bioretention Basin 2 and Bioretention Basin 3 not provided on the drawings.	Exhibit A Management Requirements Annexure 3 Section 7.3.5.1(b)(i)	N	CAS (GHD) -All construction Setout information for Basins will form part of the DDR design submission	02-Jun-2025	C	SF 27/06/2025 Comment can be closed, subject to update of PDR documentation. SF 28/08/2025: Comment Closed	
76	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	SFROUDE	23-May-2025	Technical	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Section 7.4 PLR2EW-JHGRP-LRPEWRC-RW-RPT-100001, Appendix D-4	The maintenance access strategy shown in PLR2EW-JHGRP-LRPEWRC-RW-RPT-100001, Appendix D-4 does not identify the Bioretention Basins, GPTs or Jellyfish units proposed in the PDR SD-001 submission. It is unclear whether stuffiest access is available for the design vehicles which typically undertake this service. It is acknowledged that this strategy is incomplete, and that this information may be provided at a later submission.	Exhibit B Scope and Performance Requirements, Section 7.4.12 (c)	N	CAS (GHD) - PLR2EW-JHGRP-LRPEWRC-RW-RPT-100001 to be updated to include the maintenance access strategy for the water quality devices. 16/09/2025 (TS): Noted that the comment has retained as open as the reviewer has not been provided with additional packages to allow review, this seems like a TfNSW action?	02-Jun-2025	C	SF 27/06/2025 Comment can be closed, subject to update of PDR documentation. SF 28/08/2025: DDR update of PLR2EW-JHGRP-LRPEWRC-RW-RPT-100001 not available for review to confirm if strategy has been updated appropriately. SF29/09/2025: Comment Closed.	
77	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	SFROUDE	23-May-2025	Technical	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Section 7.4 PLR2EW-JHGRP-LRPEWRC-RW-RPT-100001, Appendix D-4	The maintenance access strategy shown in PLR2EW-JHGRP-LRPEWRC-RW-RPT-100001, Appendix D-4 shows access to the GPT (29-1) and Jellyfish (29-2) occurring from the River Walk. However it is not clear if this route will be viable as it is reliant on subsequent development of the River Walk.	Exhibit B Scope and Performance Requirements, Section 7.4.12 (c)	N	TS (GHD): Comment is acknowledged a similar comment was raised on the maintenance access strategy and is to be resolved for all asset requiring access such as lighting. Formal RFI will need to be raised to confirm completion access arrangement with Tens 16/09/2025 (TS): Noted that the comment has retained as open as the reviewer has not been provided with additional packages to allow review, this seems like a TfNSW action? 13/10/2025 EF(JH): As discussed in the comment closeout meeting held on 13/10/2025; SF to review for close out of the comment, access from bridge is provided. 14/11/2025 TS(GHD): An additional paragraph has been added to the report Section 7.4.4 regarding teh type of tools required for the more irregular maintenance associated with Cartirgde removal, the cartridges themsels are in teh order of max 60kg whihch can be winched by a tripod winch setp either manual or electricla and the pods replaced and trollied up to the deck. Further the Maintenance activities from teh supplier have been attached into Appendix xx behind teh data sheet, the maintennace is feasible.	04-Jun-2025	C	SF 27/06/2025 Comment can be closed, subject to update of PDR documentation. SF 28/08/2025: DDR update of PLR2EW-JHGRP-LRPEWRC-RW-RPT-100001 not available for review to confirm if strategy has been updated appropriately. SF29/09/2025: Comment can be closed subject to formal instrument of agreement for maintenance access via the River Walk. SF21/10/2025: The viability of the WSUD infrastructure at its current location depends on its maintainability. If maintenance is not feasible, the infrastructure may deliver no WSUD benefit and result in negative sustainability outcomes. This comment can be closed out once a documented maintenance strategy is provided, detailing procedures for cleaning and replacing key Jellyfish/GPT components. Sections 7.4 of PLR2EW-JHGRP-LRPEWRC-RW-RPT-100001 and 7.4.4 of PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 should be updated to include the proposed ongoing maintenance strategy. SF/NC 28/11/2025 Comment closed.	28-Nov-2025
78	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Usama A	26-May-2025	Technical	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100103	The direction of flow of water from pit 09-5 to 13A-5 (and similar) is pointing in the wrong direction.		O	CAS (GHD) - Design to be reviewed and corrected for the next submission	02-Jun-2025	C	UA 23/06/25: Can be closed subject to review of the DDR Submission. UA 09/09/25: Comment addressed.	
79	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Usama A	26-May-2025	Technical	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104	How does the pit 13A-1 and 13-20 in Abutment A aligns with the RSW straps, possible conflict	Exhibit A Management Requirements Annexure 3 Section 1.3(b)(iii)	N	CAS (GHD) - RSW straps will need to be designed and set out to go around the pits. This will be coordinated with the RSW supplier (as they set out the strap locations) during the next design phase for the RSW package.	02-Jun-2025	C	UA 23/06/25: Can be closed subject to review of the DDR Submission. UA 09/09/25: Comment addressed in RS-0001.	
80	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Usama A	26-May-2025	Technical	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100113	Please check how the existing pit surface levels would work with the elevated platform on Wharf road (Drawing Grid reference D-4).	Exhibit A Management Requirements Annexure 3 Section 1.3(b)(iii)	N	TS(GHD): The existing pit needs to have a new pit lid and surround built up. The construction detail of this pit modification is to be provided in the DDR design submission. 16/09/2025 (TS): This is shown on drawing 100403, annotation shall be updated to capture the reference.	04-Jun-2025	C	UA 23/06/25: Can be closed subject to review of the DDR Submission. UA 09/09/25: Comment not addressed, the contractor to provide reference of the pit modification detail to the relevant pits. Can be closed subject to review of the updated documents. UA 25/9/25: Closed subject to update. UA 21/10/25: Closed subject to reviewing the updated drawings. UA 06/11/25: Closed can be closed.	06-Nov-2025
81	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Usama A	26-May-2025	Technical	TfNSW	General	The contractor to provide drainage for derailment channels and check the interface with BR-0002.	Exhibit B Scope and Performance Requirements, Section 7.4.9 (b)(ii)	N	TS (GHD) - Derailment channels will be drained through a direct outlet connection to the BR-0002 drainage system the specification and outlet arrangement will be added to the pit schedule in the DDR Design submission. 15/09/2025: The derailment channel intersects with the transverse drain and connects to that. The derailment channel, is not a drainage feature and is documented in BR-0002 package. There is no additional outlet and connection to the drainage system other than the interface with the transverse elements. 13/10/2025 EF(JH): As discussed in the comment closeout meeting held on 13/10/2025; the drawings will be updated with the details on the drainage connection, comment was agreed in the meeting to be CS. 14/11/2025 TS(GHD): Connections have been added to the plans and schedule.	02-Jun-2025	C	UA 23/06/25: Can be closed subject to review of the DDR Submission. UA 09/09/25: Comment not addressed. Can be closed subject to review of the updated documents. UA 30/09/25: Comment Open, the contractor to provide details on the drainage connection. as it was also raised by AMB in the meeting held on 9/24/2025 on how derailment channel will be drained and maintained. UA 21/10/25: Closed subject to reviewing the updated drawings. UA 06/11/25: Further detail is required to clarify, eg discharge points and long sections. UA 27/11/25: Comment closed.	27-Nov-2025
82	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	KM	26-May-2025	Environment & Sustainability	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001, Section 8.1 and Appendix F-2	Specific conditions applicable to this document will improve the readability of this document. Again, there is no mention of Conditions such as E138, E139, E140, E142, E143, E144. Appendix F2 does not provide evidence of compliance with each CoA identified. Please provide details on how each Condition identified are compliant. Additionally, there are CoAs and UMMs missing from the Appendix F-2. Suggest revising all relevant stormwater drainage and water quality conditions and mitigation measures and Exhibit B SPR Appendix G	Conditions of Approval Updated Mitigation Measures Exhibit B -SPR, Appendix G - Environmental Requirements	N	Lily Liu [JHG]: Appendix F2 of the design report includes all the conditions listed in the comment apart from E139 which is a construction-related requirement. The "Evidence of design compliance" column specifies where in the design report this detail is provided. The allocation of relevant design CoAs and UMMs to design packages was undertaken in the SDR submission of EN-0001 and continuously refined during subsequent design stages. Further, no technical requirements in SPR Appendix G were identified as relevant to SD-0001. Can the reviewer please advise what CoAs/UMMs are believed to be missing from Appendix F-2 and this can be addressed in the next design submission to ensure full demonstration of design compliance.	17-Jun-2025	C	KM 27/06/2025: Comment can be closed.	
83	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	N Cameron	26-May-2025	Technical	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT - Appendix C	As per comment 49, asset delineation principles had not been addressed prior to finalisation of this design package, then surely there would be assumed asset ownership that would be captured in the ADC register?	Exhibit A - Management Requirements, Annexure 3 Section 7.3.5.2 (b) (x) (w)	N	TS (GHD): It is acknowledged that the asset delineation principles is now finalised and can be determined, but noting the order precedence of design standards all design has been undertaken both TfNSW standards. There is no ADC as no assumption had been required on the criteria for design as: 1) TfNSW standard is the requirement. 2) TfNSW standard is higher or equivalent to the Council design standard. So from a design perspective no ADC was required. 16/09/25 (TS): This is a duplicate of Comment 49, refer to that comment for proposed action	04-Jun-2025	C	NC 27/06/2025: Closed subject to this being addressed at the next stage with the relevant standards being applied to ensure all relevant assets can be approved by CoPC and certified by the IC. NC 09/09/2025 : Noting that comment 49 has not been addressed then so unclear if previous action has been addressed. NC 30/09/2025: Comment closed on the basis #49 will be addressed.	
84	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Marcos Camara	26-May-2025	Digital Engineering	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-CER-100103 and 100104 - Model Validation Certificate Drainage Model	Item 5, Ref 9: Please confirm which location codes are required and send asset request form asap. Item 7: risks to be reviewed and discussed at fortnightly DE Meeting. Appendix A: missing Model property check results. Appendix B: missing Clash detection report		O	MJ [GHD] Noted we will send through the code request form for additional codes for DDR deliverable. this will include relevant SD elements we require. Clash detection will be provided by JH at the end of the PDR delivery as a whole against all disciplines.	18-Jun-2025	C	NC 27/06/2025_Comment will be considered closed, provided it is received prior to the final PDR submission. MC 04/09/2025 Comment Closed.	
85	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Marcos Camara	26-May-2025	Digital Engineering	TfNSW	Drawings 100151 to 100453	tbLocality (Asset Location Description) is incorrect. Replace "CITY OF PARRAMATTA" WITH "ENABLING WORKS RAIL CORRIDOR" as per CAD Schema		O	MJ [GHD] Noted, Drgs to be updated to match the CAD schema	18-Jun-2025	C	NC 27/06/2025_Comment will be considered closed, provided this updated as noted as part of the DDR submission. MC 04/09/2025 Comment Closed.	
86	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Marcos Camara	26-May-2025	Digital Engineering	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-M2D-199999, PLR2EW-JHGRP-LRPEWRC-SD-M3D-199999, PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	Zip files should not be transmitted; individual files should be issued instead. All documents within the zip file must be uploaded individually to Teambinder. All three model formats (native, IFC, and NWC) should be attached to a single entry in Teambinder.		O	Edoardo Fusina [JHG]: The individual dwg files have been transmitted with the relevant PDF in the Teambinder Document register. For DDR the model files will be attached as a single entry in Teambinder.	18-Jun-2025	C	NC 27/06/2025_Comment will be considered closed, provided it is completed as noted for the DDR submission. MC 04/09/2025 Comment Closed.	
87	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Marcos Camara	26-May-2025	Digital Engineering	TfNSW	PLR2EW-JHGRP-LRPEWRC-DE-REG-100001 - TIDP	TIDP not part of TfNSW scope and DE deliverables. Please issue MIDP utilizing TfNSW Template provided.		O	Edoardo Fusina [JHG]: The MIDP will be submitted once for PDR Design Stage once all design packages are submitted.	18-Jun-2025	C	NC 27/06/2025_Comment will be considered closed, provided it is received prior to the final PDR submission. MC 04/09/2025 Comment Closed.	

DESIGN REVIEW RECORD (DRR)

Contract:	PLR 2 - ENABLING WORKS CONTRACT
DP Ref:	SD-0001
Design Package Title:	Stormwater Drainage and Water Quality Design
Design Report:	As per transmittal
Drawing List:	As per transmittal

ISSUED FOR REVIEW			
SUBMISSION	**NO. OF DWGS**	**TB REFERENCE**	**DATE ISSUED**
SDR	-	PLR2EW-JHGRP-TX-000092	Friday, 6 December 2024
PDR	-	PLR2EW-JHGRP-TX-000399	Monday, 6 May 2024
PDR	-	PLR2EW-JHGRP-TX-000503	Thursday, 19 June 2025
DDR	-	PLR2EW-JHGRP-TX-000631	Wednesday, 20 August 2025
DDR	-	PLR2EW-JHGRP-TX-000704	Wednesday, 24 September 2025
DDR	-	PLR2EW-JHGRP-TX-000750	Wednesday, 15 October 2025
Post-DDR	-	PLR2EW-JHGRP-TFNSW-CORR-000162	Monday, 3 November 2025
AFC	-	PLR2EW-JHGRP-TX-000828	Friday, 21 November 2025

<======= TO BE COMPLETED BY IC

COMPLIANCE STATUS LEGEND

O Observation / Comment

N Non-Compliant (must provide reference to a Project Deed / SWTC requirement)

TO BE COMPLETED BY IC=======>

RESPONSE STATUS LEGEND

O Open
C Closed
CS Closed SUBJECT TO additional action / information

FOR IC USE ONLY
L Certification Limitation
H Drawings or part thereof on HOLD

IC Use Only	DRR TEAMBINDER REF:	
DRR REV	**DRR STATUS**	**DATE**

No.	Stage	PACKAGE	Rev	Reviewer Name	Initial Comment Date	Discipline	Organisation	Document Reference	Reviewer Initial Comment	Project Deed ref	Compliance Status	Contractor Response	Initial Response Date	Response Status	Reviewer Comment Closeout	Date Comment Closed
88	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Marcos Camara	26-May-2025	Digital Engineering	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-M3D-100101 and PLR2EW-JHGRP-LRPEWRC-SD-M3D-100102	All three model formats (native, IFC, and NWC) should be attached to a single entry in Teambinder. Missing some TfNSW Location and Asset mandatory attributes. Please refer to BIM Schema and make sure 100% compliance for DDR. Can the TfNSW Project attributes be applied to project level instead of object level? This is a requirement to comply with DE Framework version 4.1.		**O**	Edoardo Fusina [JHG]: Noted, for DDR the model files will be attached as a single entry in Teambinder using the correct TfNSW Project Attributes.	18-Jun-2025	**C**	NC 27/06/2025_Comment will be considered closed, provided it is completed as noted for the DDR submission. MC 04/09/2025 Comment Closed.	
89	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Marcos Camara	26-May-2025	Digital Engineering	TfNSW	MIDP and MPDT	MIDP and MPDT are missing from the submission, should be issued with every work package to help the review process.	Exhibit A Management Requirements, Annexure 14, Section 1.1.4 (b) (vi)	**O**	Edoardo Fusina [JHG]: As per the DEXP, the MIDP will be submitted once for PDR Design Stage once all design packages are submitted.	18-Jun-2025	**C**	NC 27/06/2025_Comment will be considered closed, provided it is received prior to the final PDR submission. MC 04/09/2025 Comment Closed.	
90	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Marcos Camara	26-May-2025	Digital Engineering	TfNSW	GIS deliverables	Please clarify when the GIS special datasets and associated data will be submitted relative to the PDR submission of this package (or collective packages).	Exhibit A Management Requirements, Annexure 14, Section 1.1.5 (h)	**O**	MJ [GHD] Noted GIS datasets to be submitted at end of PDR by JH	18-Jun-2025	**C**	NC 27/06/2025_Comment will be considered closed, provided it is received prior to the final PDR submission. MC 04/09/2025 Comment Closed.	
91	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Marcos Camara	26-May-2025	Digital Engineering	TfNSW	Model Property Check	Has the Model Property check been completed, Can JH please issue the details as part of the next submission?		**O**	MJ [GHD] Noted, these will be supplied in the DDR phase using the validation certificate template	18-Jun-2025	**C**	NC 27/06/2025_Comment will be considered closed, provided it is received prior to the final DDR submission. MC 04/09/2025 Comment Closed.	
92	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Marcos Camara	26-May-2025	Digital Engineering	TfNSW	Clash Detection Report	The design package review would benefit hugely with the submission of a work in progress (WIP) version clash detection report with each design package.	PLR2EW-JHGRP-NWW-PM-PLN-000006 DEXP Table 4 & Table 17	**O**	Edoardo Fusina [JHG]: As per Table 17 of the DEXP, the Clash Detection Report will be submitted once for PDR and this will be once all PDR design packages are submitted.	18-Jun-2025	**C**	NC 27/06/2025_Comment will be considered closed, provided it is received prior to the final PDR submission. MC 04/09/2025 Comment Closed.	
93	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	N Cameron	26-May-2025	Technical	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-RPT - Appendix C	What happened to all the assumptions noted in the SDR documentation? Evidence of acceptance or validation is required for trackability.	Exhibit A - Management Requirements, Annexure 3 Section 7.3.5.2 (b) (x) (xi)	**N**	Tim Snape (GHD): ADC will be updated for the DDR with the Validation cell populated to clearly identify the traceability of closure for PDR 2 only had been closed and both on the basis of updated survey information (ADC 45 and 46).	18-Jun-2025	**C**	NC 27/06/2025 Comment closed subject to ADC register providing trackability. NC 09/09/2025 Comment Closed.	
94	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Min Kang	19-May-2025	Drainage	IC	General	Connection details for MEA to a drainage system have not been provided. The connecting pit is not part of the manufacturer's details. Additional details are required.	SPR Main Body cl 7.4.1 a) [940714]	**O**	CAS (GHD) - Design for the MEADRAIN connections to the pipe and pipe network will be detailed for the next submission, the pit is a nominated connection point from a schedule perspective not an actual pit, the MEADRAIN connections are nominated in the schedule with the construction detail pending DDR submission.	02-Jun-2025	**C**		27/08/2025
95	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Min Kang	19-May-2025	Drainage	IC	General	There are different sizes for the MEA drains. The minimum size of the unit needs to be specified.	SPR Main Body cl 7.4.1 a) [940714]	**O**	CAS (GHD) - Design for the MEADRAIN connections to the pipe and pipe network will be detailed for the next submission. The Stormwater Drainage Schedule will specify the minimum channel sizing.	02-Jun-2025	**C**		27/08/2025
96	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Min Kang	19-May-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102	Please confirm whether the CoPC standard is wide enough to accommodate the upstream pipe. The Council's standard drawing indicates that this side of the pit is 460 mm wide.	SPR Main Body cl 7.4.1 a) [940714]	**O**	CAS (GHD) - The length and width of pit 01-1 can be variable as per the CoPC standard drawing sheet 2 of 2.	02-Jun-2025	**C**	30/06/25 MK Pit internal dimensions and grate size as well as heel proof grate are to be included in the schedule.	27/08/2025
97	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Min Kang	19-May-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102 and 100401	The scour protection for outlet 01-03 appears to be substentially shorter than the length specified in Table 4-12 in the design report. It should be longer than the nominated length of the proposed scour protection. TM All outlet scour lengths detailed in scour protection table on SD-DRG-100401 appear to be less than those specified in Table 4-12 Will the correct scour lengths result in scour protection outside the project boundary?	SPR Main Body cl 7.4.7 a) [940765]	**N**	CAS (GHD) - Scour protection lengths noted in the Report Table 4-12 are inclusive of the headwall apron length, as per the detail from Austroads Guide to Road Design Part 5B, Figure 3.16, (which was included in the report appendix O for reference). The lengths reported in the schedule on Drg SD-DRG-100401 are the calculated values for 'La' from Figure 3.16. The length of scour protection for outlet 01-3 is an average of approximately 1.7m. The headwall will be rotated to provide a consistent length of scour protection to the boundary. Scour lengths will be reviewed and confirmed as not crossing the boundary for the next design submission.	02-Jun-2025	**C**	30/06/25 TM: noted the scour protection table on SD-DRG-100401 'L' is 'La' (excld apron length) from Figure 3.16 in Appendix O and Table 4-12 provides L (incld apron length). Confirmation that scour does not extend beyound boundary to be reviewed at DDR AK 27/08/25 Comment closed TM 12/09/25 Appendix O has been updated showing vel less than 1.5 m/s so scour protection not required at some outlets.	27/08/2025
98	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Min Kang	19-May-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102	Please confirm the concentrated flow outlet 46-02 does not scour the existing embankment.	SPR Main Body cl 7.4.7 a) [940765]	**O**	CAS (GHD) - The outlet location for Line 46 will be reviewed for the next submission. A scour pad and/or level spreader will be provided to minimise concentration of flows and scouring at the discharge point.	02-Jun-2025	**C**	TM 30/06/25 And also confirm compliance to CoA E144 (b) minimise impacts on the receiving environment resulting from any additional flow volume (.... impacts on riparian vegetation, aquatic ecology and property); AK 27/08/25 Comment closed TM 12/09/25 Noted Vel provided in Appendix O at 46-02 and rock batter chute provided, so comment closed. Could add discussion under Appendix F-2 CoA E144b or in referred section 4.3.2.1.2 regarding how impacts have been minimised.	12/09/2025
99	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Min Kang	19-May-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102	Please confirm how the filter media and slotted pipes can be replaced when no maintenance access is provided to the base of the basin.	SPR Main Body cl 7.4.1 l) [940737]	**O**	TS(GHD): This basin location and batter slopes have been reviewed during the DDR design stage to address Council UD design comments and access path requirements. Side Slope off the path has been reduced to 1 in 3 Maintenance access is facilitated off the adjoining calipash and the basin set with a shallower level. Full media replacement and subsoil drain replacement would be envisaged to be an excavator activity which will be able performed by an excavator from the level above given the shallow depth and offset from the path.	04-Jun-2025	**C**	30/06/25 MK	30/06/2025
100	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Min Kang	19-May-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102	Scour protection hatches for Outlets 05-4 and 44-2 should be shown on the plan to be consistent with the scour protection schedule.	SPR Main Body cl 7.4.7 a) [940765]	**O**	CAS (GHD) -Agreed hatch will be added as per the calculations in the DDR design documentation.	02-Jun-2025	**C**		28/08/2025
101	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Min Kang	19-May-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100103	Scour protection hatches for the pavement drainage outlets to Basin 2 should be shown on the plan to be consistent with the scour protection schedule. Please confirm whether the filter media area considered the the area taken out by the scour protection.	SPR Main Body cl 7.4.7 a) [940765]	**O**	CAS (GHD) - The filter media area includes the area covered with scour protection. Velocity and Froude values are low for the outlets to Basin 2 and therefor rip rap is not required.	02-Jun-2025	**C**	30/06/25 MK	30/06/2025
102	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Min Kang	19-May-2025	Drainage	IC	General SD-DRG-100401 PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.4	SPR Main Body cl 7.4.8 g states that the proposed grated trench drain to be transverse to the direction of travel of buses / emergency vehicles, removable grate covers are not permitted. Please raise a departure. TM - And include in section 9.1 and Appendix H	SPR Main Body cl 7.4.8 g) [940780]	**N**	CAS (GHD) - The transverse drainage product proposed is a monolithic grated channel with no removable parts. No departure is required for the use of this product.	02-Jun-2025	**C**	30/06/25 MK	30/06/2025
103	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Min Kang	19-May-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104	The downpipe details at Node 47-19 need to be provided. Please confirm the additional details will be provided in the bridge package.	SPR Main Body cl 7.4.1 a) [940714]	**O**	TS (GHD): No these construction details will be provided in the SD package.	04-Jun-2025	**C**		28/08/2025
104	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Min Kang	19-May-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100106	The downpipe details at Node 14-18 need to be provided. Please confirm the additional details will be provided in the bridge package.	SPR Main Body cl 7.4.1 a) [940714]	**O**	TS (GHD): No these construction details will be provided in the SD package.	04-Jun-2025	**C**	AK 29/08/2025: This comment is iclosed, new comments provided related to this location.	29/08/2025
105	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Min Kang / A Kandiah	19-May-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100107	The downpipe details at Node 17-22 need to be provided. Please confirm the additional details will be provided in the bridge package.	SPR Main Body cl 7.4.1 a) [940714]	**O**	TS (GHD): No these construction details will be provided in the SD package. 15/09/2025 (TS): Detail was no longer required in the DDR design as the pipe run is in ground.	04-Jun-2025	**C**	AK 29/28/2025: Details not included, add refernce drawing number to the note.	2/10/2025
106	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Min Kang / A Kandiah	19-May-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100108	It appears that a change of direction occurs at each scupper to accommodate the small horizontal radius of the bridge. Please confirm whether this change of direction can be accommodated. The scupper downpipe may clash with the pipe fitting required to allow the change in direction.	SPR Main Body cl 7.4.1 a) [940714]	**O**	TS(GHD): The design use of the pipe scupper is under review and may be converted to a box section fixed to the bridge, pending resolution between UD and the DRP. If it retained as a pipe the nominated deflection angle of the stainless steel pipe will be documented in the pit schedule for fabrication. 17/09/2025 (TS):Angles were turned on the longsections to show the defections through the junction but did not capture the longitudinal run only the side pipe connection, we will update the longsection profiles to further capture the longitudinal deflection angles.	04-Jun-2025	**C**	AK 29/08/2025: Drawing shows pipe is proposed, however, deflection angle is not nominated as in the response. AK: 02/10/2025: Comment will be closed when the drawing is updated	11/11/2025
107	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Min Kang	19-May-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100214	Drainage lines (Line 36 and Line 37) that connect to the existing drainage system does not have sufficient capacity. TM Does not meet requirements of E144 " meet the capacity constraints of any council's or Sydney Water's drainage system to receive and convey the proposed flows from the CSSI,*	SPR Main Body cl 7.4.8 d) [940777] CoA E144 a)	**N**	TS(GHD): These outlets are fixed with a downstream tailwater condition as per the SPR Clause 7.4.8(e), we will review the connection point of theses drainage pits as the tailwater level is generating the HGL issue not the capacity of the drainage pipe. In regards to E144 the new flow from the these pits was considered in the pre V post upgrade assessment of discharge to the Council Drainage system documented in Section 4.3.2.2.3 of the design report.	04-Jun-2025	**C**		31/08/2025
108	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Min Kang	19-May-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100453	Basin setout points (similar to DRG-100451) need to be provided. The design report indicates there is a spillway however, it has not been detailed yet.	SPR Main Body cl 7.4.1 a) [940714]	**O**	CAS (GHD) - Construction Setout for Basin 2 and 3 will be detailed for the next submission. Spillway details will also be provided, where applicable, and not set within the Discharge control pit of the basin.	02-Jun-2025	**C**		29/08/2025
109	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Min Kang	19-May-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	Table 4-7 (detention basin specs) should include the top of the outlet pit level. The drawing indicates the top of the pit level is RL 2.25, which indicates the extended detention depth of 150 mm not 300 mm. The reported 1% AEP water level is only 150 mm higher than the top of the pit level. Please confirm that the any storage below the top of the outlet pit level was not included in the storage volume calculations.	SPR Main Body cl 7.4.1 a) [940714]	**O**	TS (GHD): Comment is noted the Table 4-7 will be updated to align to the design documentation. The extended detention depth nominated in the section is the 300mm water quality storage, the section will be updated with the full basin sections to show the WQ Storage and OSD operating water levels in the DDR submission. We can confirm that the WQ storage volume does not form the OSD storage volume. it is assumed that WQ storage is full at the time of a storm. A review of the OSD DRAINS model indicates that the level of the outlet control pit is correctly established at RL2.4, but as noted by the IC the initial water level has not been aligned to the same level, this will be rectified and calculations updated for the DDR submission.	04-Jun-2025	**C**		31/08/2025
110	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Min Kang / A Kandiah	19-May-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	Table 4-7 indicates that the water level can build up approximately 500 mm. Please confirm if a security fence is required.	SPR Main Body cl 7.4.1 a) [940714]	**O**	Tim Snape (GHD): Fencing is likely required with the ponding depths noted in the design and will be updated in the DDR design submission. 16/09/25(TS): The fencing is shown and setout provided within RW-0002 refer to the following drawings for the details: 1) Fence in Plan: PLR2EW-JHGRP-LRPEWRC-FN-DRG-100110 2) Fence Setout: PLR2EW-JHGRP-LRPEWRC-FN-DRG-100202	18-Jun-2025	**C**	AK 29/08/2025: Fencing not shown	2/10/2025

DESIGN REVIEW RECORD (DRR)

Contract:	PLR 2 - ENABLING WORKS CONTRACT
DP Ref:	SD-0001
Design Package Title:	Stormwater Drainage and Water Quality Design
Design Report:	As per transmittal
Drawing List:	As per transmittal

ISSUED FOR REVIEW			
SUBMISSION	**NO. OF DWGS**	**TB REFERENCE**	**DATE ISSUED**
SDR	-	PLR2EW-JHGRP-TX-000092	Friday, 6 December 2024
PDR	-	PLR2EW-JHGRP-TX-000399	Monday, 6 May 2024
PDR	-	PLR2EW-JHGRP-TX-000503	Thursday, 19 June 2025
DDR	-	PLR2EW-JHGRP-TX-000631	Wednesday, 20 August 2025
DDR	-	PLR2EW-JHGRP-TX-000704	Wednesday, 24 September 2025
DDR	-	PLR2EW-JHGRP-TX-000750	Wednesday, 15 October 2025
Post-DDR	-	PLR2EW-JHGRP-TFNSW-CORR-000162	Monday, 3 November 2025
AFC	-	PLR2EW-JHGRP-TX-000828	Friday, 21 November 2025

<======= TO BE COMPLETED BY IC

COMPLIANCE STATUS LEGEND
O Observation / Comment
N Non-Compliant (must provide reference to a Project Deed / SWTC requirement)

TO BE COMPLETED BY IC=======>

RESPONSE STATUS LEGEND
O Open
C Closed
CS Closed SUBJECT TO additional action / information

FOR IC USE ONLY
L Certification Limitation
H Drawings or part thereof on HOLD

IC Use Only	DRR TEAMBINDER REF:	
DRR REV	**DRR STATUS**	**DATE**

No.	Stage	PACKAGE	Rev	Reviewer Name	Initial Comment Date	Discipline	Organisation	Document Reference	Reviewer Initial Comment	Project Deed ref	Compliance Status	Contractor Response	Initial Response Date	Response Status	Reviewer Comment Closeout	Date Comment Closed
111	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Min Kang	19-May-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	Section 4.3.2.5.2 Water quality objective. Compliance against Table 17.1 in EIS Chapter 17 has not been demonstrated against project specific requirements.	SPR Main Body cl 3.3.8 b) vii) [940405] Co A E138	**O**	TS (GHD): EIS Table 17 .1 is not related to COA E138, the report has demonstrated that the water quality pre verse post is improved and thus contributes to the catchment working towards meeting the NSW Water objectives, the referenced table is not a requirement.	04-Jun-2025	**C**	MK 30/06/25 Comment closed based on evidence provided in PDR design report that although Water Quality Objections are not being met (as per wording of E138) because there are not being met at the date of the approval of the CSSI.	
112	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Min Kang	19-May-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	Section 4.3.3.1.2 Design Loss Model Please note that the probability neutral burst initial loss values should be used in all instances unless a detailed Monte Carlo assessment of pre-burst and losses has been carried out. Please confirm the probability neutral burst inital loss has been considered. https://data.arr-software.org/nsw_specific.	SPR Main Body cl 7.4.1 c) i) [940717]	**O**	CAS (GHD) - The drainage design has been developed using ILSAX hydrology which combines storage losses for the impervious portion of a catchment and Hortons Loss model for pervious portion. In this regard, the probability neutral initial loss is not applicable. Refer to ARR 2019 Book 5 Chapter 3.5.3.4. In developing the DRAINS model for the detention storage design, the hydrology model has considered the probability neutral losses as per the NSW specific advice.	02-Jun-2025	**C**	30/06/25 MK	
113	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Min Kang / A Kandiah	19-May-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	Appendix N of the design report indicates that significant bypass flows at Pit 52-1 and Pit 10-10 are lost. Noting that these are sag pits, overtopping flows from Pit 52-1 should discharge to Pit 10-10. Please confirm that the overtopping levels have been modelled correctly to ensure that total flows are accurately captured within the system.	SPR Main Body cl 7.4.1 a) [940714]	**O**	TS (GHD): This is to be expected as those pits are below the 5%AEP +CC projected flood level in the Parramatta River. This appendix is provided to demonstrates that in a flood event in the Parramatta River the PLRC will continue to adequately drain and not be impacted by the riverine flood levels, however pits below the flood level as per the two cited examples would be expected to surcharge. 16/09/2025 (TS): As per the response the downstream pits are submerged under the Parramatta River so the surcharge is into the river flow.	04-Jun-2025	**C**	30/06/25 MK They are expected to surcharge;\ however, downstream receiving pits need to be assigned to ensure it is contained within the system. AK 29/08/2025: Please confirm the receiving downstream reciving pits assigned to receive the surcharge water as per previous commnet 30/06/25.	2/10/2025
114	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Madeline Harty	23-May-2025	Flooding	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Table 4-3	Table mentions 01-4 but drawings say 01-3.. please review		**O**	CAS (GHD) - 01-3 is the outlet for Line 01. Report Table 4-3 to be updated	02-Jun-2025	**C**	MH 27/06/2025: Closed subject to report update MH 3/9/2025: Closed	
115	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Madeline Harty	23-May-2025	Flooding	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 4.3.4.1.2	Please clarify if Tailwater level of 2.55mAHD is based on the latest CoPC 2024 flood model, noting the flood modelling approach has been updated since SDR.		**O**	TS (GHD): No it is based on the Projects teams flood model, which is developed based on CoPC but with updates made to meet the requirements of the SPR, for detailed discussion on flood model updates referee to SD-0002..	04-Jun-2025	**C**	MH 27/06/2025: Closed - matches 5% AEP + 2130 flood level in PDR FL-0001 handover.	
116	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Madeline Harty	23-May-2025	Flooding	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Table 4-16	*Assessment considers 100 Year Tailwater of 2.98, this tailwater is lower than the invert of the incoming pipe at Pit 01-03.* - should this say Pit 01-2?		**O**	CAS (GHD) - 01-3 is the outlet for Line 01 so there are no 'outgoing' pipes past this node. The wording should state 01-2 and noted. 16/09/2025 (TS): Updated	02-Jun-2025	**C**	MH 27/06/2025: Closed subject to report update MH 3/9/2025: Comment not yet closed, report table still says 01-3 MH 24/9/2025: Closed.	
117	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Madeline Harty	23-May-2025	Flooding	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Table 4-16	*Assessment consider 100 Year Tailwater of 2.98, this tailwater is lower than the invert of the incoming pipe at Pit 07-03* - Pit 07-3 is the outlet, no incoming pipe there or anywhere along Line 07, please review		**O**	TS (GHD) - Correct 07-03 should read 07-02, the text will be updated in the DDR submission. 16/09/2025 (TS): Updated	04-Jun-2025	**C**	MH 27/06/2025: Closed subject to report update MH 3/9/2025: Comment not yet closed, report table still says 07-3 MH 24/9/2025: Closed.	
118	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Madeline Harty	23-May-2025	Flooding	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100113	end of Line EX1 covered over by wipeout in drawing		**O**	TS (GHD) - There is a wipeout blocking out the contours but not the extent of the existing retained drainage line, will review the Wipeout placement in DDR to show the existing surface terrain.	04-Jun-2025	**C**	MH 27/06/2025: Closed subject to drawing update MH 3/9/2025: Closed	
119	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Madeline Harty	23-May-2025	Flooding	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104	5% AEP + CC river flood event will back up from Parramatta River into Bioretention 1 and 2 basin slotted pipes - causing filter media to get submerged. The same will happen to Basin 3 when the HGL in the downstream COP trunk drainage system is elevated above the invert of the Basin 3 subsoil pipes. Please confirm a flood gate or similar will be provided in these locations to prevent sea water ingress to basin, causing vegetation to die. Raised as an observation, given there is no specific AEP requirement for water quality basin flood immunity.		**O**	TS(GHD): Confirmed we have proposed that duck bill style flood gates are used on the outlets to the Parramatta River for this reason, and will review the other basin near Hill Road, given it connects to the council system which I believe already has a flood gate at the outlet to the Parramatta River. 16/09/23 TS): They are nominated in the schedule as per the comment acknowledgement, comment should be closed, the schedule is a logical location to capture this and there is no TfNSW standard that states this is unacceptable.	04-Jun-2025	**C**	MH 27/06/2025: Closed subject to drawing update MH 3/9/2025: Comment not yet closed, drawings do not show non-return valve at these outlets. TM 12/09/25 Only detailed on the schedules and so not easily identified on the drgs. MH 24/9/2025: Closed.	
120	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Madeline Harty	23-May-2025	Flooding	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100451	Pit outlet labels in Bioretention Details (DRG 451-453) do not match the pit names in the plans (DRG 101-114)		**O**	CAS (GHD) - Pit labels to be updated for drawings 451-453	02-Jun-2025	**C**	MH 27/06/2025: Closed subject to drawing update MH 3/9/2025: Closed	
121	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Kingsley Opoku	26-May-25	Durability	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Appendix D-2 Table	Noted that "normal" grade pipe RCP has been specified for buried pipes in zone A. Please provide basis for nominating "normal" grade pipe in this zone and include assessment undertaken to demonstrate that the 100-year will be achieved.	SPR Clause 7.14.2	**O**	S Saleh/ M Ali [GHD]: It is suggested that the RCPs be designed as per AS4058. Soil in Zone A has a minimum pH of 5.2, maximum chloride of 190 ppm, and a maximum sulfate of 310 ppm. The concentration of impurities are within the limit suggested in Table E1 of AS4058. Hence, as per clause 1.3.2.8 of AS4058, a 'normal environment' is applicable. Additionally, AS4058 Clause 1.3.2.9 defines Marine environment as "An underground environment for a pipe where the interior surface of the pipeline is also subject to tidal flow", which is not the case zone RCPs within zone A. Furthermore, Preface of AS4058 states, "Based on past experience of concrete pipe installations, a service life of 100 years could be expected when pipes are manufactured in accordance with this Standard and installed in accordance with AS/NZS 3725 in a 'normal environment' and 'marine environment', as defined in this Standard". Hence, GHD believes that "normal" grade pipes as per AS4058 is satisfactory for a design life of 100 years.	18-Jun-2025	**C**	KO 26/06/2025: Comment closed	
122	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Kingsley Opoku	26-May-25	Durability	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Appendix D-2 Table	Please include durability requirements for drainage pits and gratings in the table.	SPR Clause 7.14.2	**O**	S Saleh/ M Ali [GHD]: This drainage element will be added in the table at the next submission stage	18-Jun-2025	**C**	KO 26/06/2025: To be reviewed at the next submission stage. KO 3/09/2025: Closed based on updates sighted in DY-0001	
123	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Kingsley Opoku	26-May-25	Durability	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Appendix D-2 Table	Noted that coated MSCL and Cast iron pipes have been nominated as suitable drainage pipes in zone B. Please include evidence or assessment undertaken to demonstrate that these pipes are suitable for a 100-year design life.	SPR Clause 7.14.2	**O**	TS (GHD): These pipe types are not proposed for use in this project and their reference will be removed from this appendix.	04-Jun-2025	**C**	KO 26/06/2025: To be reviewed at the next submission stage. KO 3/09/2025: Updates in DY-0001 noted. Comment closed.	
124	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Kingsley Opoku	26-May-25	Durability	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Appendix D-2 Table	Please include durability requirements for bridge scuppers in the table.	SPR Clause 7.14.2	**O**	S Saleh/ M Ali [GHD]: This drainage element will be added in the table at the next submission stage	18-Jun-2025	**C**	KO 26/06/2025: To be reviewed at the next submission stage. KO 3/09/2025: Updates in DY-0001 noted. Comment closed.	
125	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Kingsley Opoku	26-May-25	Durability	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Appendix D-2 Table	Section 4.3.2.4 of report notes that ACO TramDrain 200 has been nominated for track drainage.Please include this drainage element in the table and provide design life and assessment undertaken to confirm that this design life will be achieved.	SPR Clause 7.14.2	**O**	S Saleh/ M Ali [GHD]: This drainage element will be added in the table at the next submission stage	18-Jun-2025	**C**	KO 26/06/2025: To be reviewed at the next submission stage. KO 3/09/2025: Updates in DY-0001 noted. Comment closed.	
126	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Kingsley Opoku	26-May-25	Durability	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Appendix D-2 Table	For zone D, no coating has been specified for pipes with design life of 50 years. Noting that the pipes will be exposed to aggressive landfill environment, please include chemical composition of landfill and assessment undertaken to confirm that the 50-year design life will be achieved without protective coating to the exterior surface of the pipe.	SPR Clause 7.14.2	**O**	S Saleh/ M Ali [GHD]: Zone D of the TTL has been reclassified into subzones D1 and D2 (Refer to DU-0001). For Zone D1 within TTL, the below-ground exposure classification has been downgraded to B2, based on the recent soil and groundwater aggressivity testing reported in GE-0001. The results indicate relatively benign conditions, with minimum pH of 5.2, maximum chloride of 2910 ppm, and maximum sulfate of 680 ppm under Soil Condition B. These impurity concentrations fall within the acceptable limits specified in Table E1 of AS 4058, and in accordance with Clause 1.3.2.8, the interior surface of the pipeline may be considered to be in a 'normal environment' (as it is not exposed to tidal flow). Nonetheless, a 'marine environment' classification has been conservatively adopted for design purposes. In light of this, the use of SR (sulfate-resisting) Portland cement or an equivalent is recommended, as a conservative measure. It is important to note that extreme aggressivity values within the TTL, pH below 4 and sulfate up to 9700 ppm, were observed in *historical test results* only in two soil samples taken from a single borehole, out of a total of 20 samples within Zone D1. The latest aggressivity results indicate a B1 exposure class for zone D1. Hence, these outliers are considered anomalies and do not reflect the general soil condition in this zone. Refer to DU-0001 Durability Report for details. In accordance with AS 4058, no additional protective coating or surface treatment is required, even under conservative assumptions, for RCPs in such environment.	18-Jun-2025	**C**	KO 26/06/2025: Comment closed	
127	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Kingsley Opoku	26-May-25	Durability	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100015	Please confirm where the durability requirements for reinforced concrete pipes and drainage pits have been specified on the drawings. Also, please confirm where the material requirements for scuppers, drainage grating etc has been specified.	SPR Clause 7.14.2	**O**	TS (GHD): The nominate pipe material and class, is nominated on the drainage long sections. The grate types are nominated in the pit schedules through the nominated reference drawings, specific drawings noted below: 1) Pipe: DWG 201 to 218. 2) Pits: DWG 151 to 155. These elements are consistent with the assessment described in the design report and no further durability annotation is required on the drawings them selves.	04-Jun-2025	**C**	KO 26/06/2025: Noted. Comment closed	
128	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	T Matkovich	22-May-2025	Technical	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.4.2.1 and PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104 and to 100106	Free draining scuppers must not be used unless approved by the Principal. Please confirm this approval has been received form TfNSW in writing. Noted this is listed in 11.2 Outstanding items. Although the designer has provided evidence for requirements of CoA ie contributing to achieving the NSW Water Quality Objectives over time), the free draining scuppers from the ATL still require approval because of possible UD aspects of water drainage from the bridge into the Parramatta River. 28/05/25 Noted this is similar to TfNSW comment 62 and 72 and therefore can be closed	SPR 7.7.2.2 (k)(i) SPR 7.4.10 (b) (c)	**O**			**C**	28/05/25 Noted this is similar to TfNSW comment 72 and therefore can be closed	28/05/2025
129	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	T Matkovich	22-May-2025	Technical	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100015	General note 4. Refers to TfNSW spec R11 only, CoPC pits (and pipes, if relevent) should be in accordance with CoPC standards	CoPC MoU	**O**	CAS (GHD) - Drawing notes will be updated to reflect CoPC requirements (and associated standards) for CoPC pits. All pipes fall under R11. 16/09/2025: CoPC Pits are nominated in the schedule for the location, Note 4 is specific to pipe installation.	02-Jun-2025	**C**	TMat 27/06/2025: Closed subject to drawing update TMat: 3/9/25 Note 4 not updated to ref CoPC req for pits	2/10/2025
130	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	T Matkovich	22-May-2025	Technical	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 9.1	Please include removal of grated trench drains every 50m in Section 9.1 as a departure, refer TfNSW acceptance of RFI-010 Assessment of Transverse Track Drainage if flow depths are compliant.	SPR CL 7.4.9 (d)	**O**	TS (GHD) - Agreed will update for completeness and traceability of the that approval as requested. 16/09/25 (TS): Will be updated for report resubmission.	04-Jun-2025	**C**	TMat 27/06/2025: Closed subject to drawing update TMat 3/9/55 Section 9.1 not updated TMat 2/10/25 Update will be reviwed	10/11/2025

DESIGN REVIEW RECORD (DRR)

Contract:	PLR 2 - ENABLING WORKS CONTRACT
DP Ref:	SD-0001
Design Package Title:	Stormwater Drainage and Water Quality Design
Design Report:	As per transmittal
Drawing List:	As per transmittal

ISSUED FOR REVIEW			
SUBMISSION	**NO. OF DWGS**	**TB REFERENCE**	**DATE ISSUED**
SDR	-	PLR2EW-JHGRP-TX-000092	Friday, 6 December 2024
PDR	-	PLR2EW-JHGRP-TX-000399	Monday, 6 May 2024
PDR	-	PLR2EW-JHGRP-TX-000503	Thursday, 19 June 2025
DDR	-	PLR2EW-JHGRP-TX-000631	Wednesday, 20 August 2025
DDR	-	PLR2EW-JHGRP-TX-000704	Wednesday, 24 September 2025
DDR	-	PLR2EW-JHGRP-TX-000750	Wednesday, 15 October 2025
Post-DDR	-	PLR2EW-JHGRP-TFNSW-CORR-000162	Monday, 3 November 2025
AFC	-	PLR2EW-JHGRP-TX-000828	Friday, 21 November 2025

<======= TO BE COMPLETED BY IC

COMPLIANCE STATUS LEGEND
O Observation / Comment
N Non-Compliant (must provide reference to a Project Deed / SWTC requirement)

TO BE COMPLETED BY IC======>

RESPONSE STATUS LEGEND
O Open
C Closed
CS Closed SUBJECT TO additional action / information

FOR IC USE ONLY
L Certification Limitation
H Drawings or part thereof on HOLD

IC Use Only	DRR TEAMBINDER REF:	
DRR REV	**DRR STATUS**	**DATE**

No.	Stage	PACKAGE	Rev	Reviewer Name	Initial Comment Date	Discipline	Organisation	Document Reference	Reviewer Initial Comment	Project Deed ref	Compliance Status	Contractor Response	Initial Response Date	Response Status	Reviewer Comment Closeout	Date Comment Closed
131	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	T Matkovich	23-May-2025	Technical	IC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Appendix F2	UMM LP2 consultation with CoPC, SOPA refers to Section 6.1 which details the submiisson of packages for review. However no details of specific consultation to resolve re-occuring open comments from CoPC regarding impact of outlets to mangrove areas (01-3) and (46-2) and from SOPA impact of bioretention basin 3 on Triangle Transport Landfill. Include ref to SOPA in Section 5.1.	UMM LP2 and W2 Exhibit G TTL RAP Item 11	**O**	TS (GHD): The referenced section as noted refers to the comment register details provided by stakeholders and captures any subsequent closeout meetings held with those stakeholders to close the delivery phase consultation piece. It is noted that all previous comments from CoPC have been closed.	04-Jun-2025	**C**	TMat 27/06/2025: The previous SDR comments have been closed by the IC as agred with TfNSW. It's understood that the Contractor has held specific consultation with both CoPC and SOPA and not just submission of the design pakcages, details of these meetings should be provided. 3/9/25 Consultation details with SOPA provided in Table 6-1, comment closed	
132	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Michelle Damasio	21-May-2025	Sustainability	IC	Section 4.2.3	Technical Memo '*PLR2EW-JHGRP-NWW-DR-MEM-000002*' (RFI-0021 followed up by RFI-0040) which provides the methodology used by the contractor to apply climate change uplift has not been provided, as per stated. Please provide the tech memo as well as include details of RFI-00040 within section 11.3 and Appendix E.	SPR 7.4.1(c)(iii)	**N**	CAS (GHD) - PLR2EW-JHGRP-NWW-DR-MEM-000002 to be provided for review, as well as details of RFI-00040 within section 11.3 and Appendix E	02-Jun-2025	**C**	MD 25/06/2025: closed subject to compliance demonstration within DDR submission. MD 27/08/2025: comment closed.	
133	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Michelle Damasio	21-May-2025	Sustainability	IC	Table 4-10	MUSIC Model Results are referred multiple times (Section xx) as the artefact for compliance, however results have not been provided. Please provide outputs from the model.	Appendix J Cl 4.1 (a) (v) [946938]	**N**	CAS (GHD) - MUSICX model results are presented in the Report Section 4.3.4.2, Table 4-17 of the design report.	02-Jun-2025	**C**	Currently, Table 4-10 does not provide appropriate referencing to Section 4.3.4.2 as per comment reply. Additionally, the requirement explicitly requests that: *"The Design Documentation submission for each design review stage will include: water quality models (MUSIC unless otherwise agreed with the Principal)."* MD 27/08/2025: comment not addressed. Closed subject to compliance demonstration within AFC submission. TM 03/09/25 MUSIC model provided with submission, comment closed	
134	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	~~Michelle Damasio~~ / Neda Nematollahi	21-May-2025	Sustainability	IC	Section 4.3.2.5.2	*"The pollutant reduction targets were applied to the entire site. The overall performance of proposed water quality treatments provided for the enabling work site achieves the TfNSW Water Quality objectives for the new PLRC corridor, and slightly less when applied to the entire project scope. The project's overall pollutant reduction percentage is presented in the section 4.3.4.2.2."* Referenced Section 4.3.4.2.2 is the 'climate change impact assessment' and does not provide details re project's overall pollutant reduction. Please provide further details re project areas that do not meet TfNSW WQO and clarify how overall pollutant reduction is met.	Appendix J Cl 4.1 (a) (v) [946938]	**N**	CAS (GHD) - Reference will be updated to show 'Section 4.3.4.2, Table 4-17". 4/6/2025 TS (GHD)The areas that do not achieve the water quality objectives are those low lying areas adjacent to the Parramatta River that do not drain to a water quality basin such as Wharf Road and the new Boat cleaning facility. Given the proximity of these features to the Parramatta River it is not feasible to provide water quality devices that will operate efficiently as they will generally be below tide levels all the time, note other comments from S Froude regarding proximity to the current system and the proximity to future tidal levels. Other areas include: 1) Archer Park West vegetated areas down stream of the new basin. 2) Southern Foreshore Catchment downstream of the WQ device. All of the PLRC itself is drained through a water quality treatment system. 15/09/2025 (TS): The 85% removal requirement is to the new pavement area only, not the entire catchment. We can remove these low lying areas of Wharf Road for instance as this is an existing impervious catchment, and report to a node above it, This will demonstrate the 85% removal for the new pavement as required by the SDG. It is not feasible to remove elements such as the boat and trailer carpark for example, as they are routed through the treatment train and as such removing them will overestimate pollutant removal of the new impervious catchment (PLRC), on the basis that the entire catchment achieved 84%, it is evident that removal of the existing impervious area will easily achieve the 85% TSS removal for new pavement.	02-Jun-2025	**C**	MD 25/06/2025: IC acknowledges the contractor's response, however, this level of detail must be included in the design report to demonstrate compliance. In case this information is stated elsewhere in the report, appropriate reference must be included. Closed subject to compliance demonstration within DDR submission. MD 27/08/2025: comment not addressed. Closed subject to compliance demonstration within AFC submission. TM: Ref to 4.3.4.2 not provided in section 4.3.2.5.2 (4.3.4.2.2 incorrectly referenced) and additional detail provided in repsonse to comment 134 is not included in the report NN 01/10/2025: Comment not addressed and still incorrectly referenced to the Climate Change section. Required response information has not been included in the report. Closed subject to compliance being demonstrated within the AFC submission. TM 17/10/25 As per close out meeting on 13/10/25, the details provided in the response to the comment will be provided in the report. TMat 11/11/25 JH has not provided an updated response but Section 4.3.4.2.1 clarifies that the 85% removal req is for the new pavement area only, comment closed.	11/11/2025
135	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	~~Michelle Damasio~~ / Neda Nematollahi	21-May-2025	Sustainability	IC	Table 4-17	Please provide outputs from MUSIC modelling. Additionally, the % reduction presented for TSS does not meet the target.	Appendix J Cl 4.1 (a) (v); [946938]; 7.4.1 (k) [940736]	**N**	CAS (GHD) - MUSICX model results are presented in the Report Section 4.3.4.2, Table 4-17 of the design report. Results should be read in connection to the comment 134 above, for the PLRC itself and the new infrastructure targets are met, when the additional parkland restoration and Wharf Road realignment is introduced the target is not achieved. Further Table 4-18 highlights the significant reduction I TSS load Pre V post upgrade demonstrating how the project will contribute to the overall catchment reductions which is the Environmental requirement. 16/09/2025 (TS): Regarding SDG compliance refer to comment 134. TS 14/11/2025: reference added to Append ix F-2 Condition 138.	02-Jun-2025	**C**	MD 25/06/2025: IC acknowledges the response given in comment 134 above, however, this level of detail must be included in the design report and not *"read in connection to the comment"*. It is the contractor's responsibility to provide adequate level of information and appropriate reference within the design report to demonstrate compliance. Additionally, it is noted the TSS reduction load, however requirement states that: *"The drainage system must comply with the TfNSW Sustainable Design Guidelines and Planning Approval."* MD 27/08/2025: comment not addressed. Closed subject to compliance demonstration within AFC submission. NN 01/10/2025: The IC acknowledges the response provided to Comment 134 above; however, the required detail has not been incorporated into the design report. The report must also demonstrate compliance with the 85% TSS removal requirement in accordance with the TfNSW Sustainable Design Guidelines. Comment not addressed. Closed, subject to compliance being demonstrated within the AFC submission. T Mat 17/10/25 As per close out meeting on 13/10/25, the details provided in the response to the comment will be provided in the report. T Mat 11/11/25 Confirmation of compliance to E138 is provided in Section 4.3.4.2 but this is not ref in Appendix F-2 Env Compliance T Mat 1/12/25 Closed	
136	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Michelle Damasio	21-May-2025	Sustainability	IC	Table 8-3	Please provide reference of design implementation for adaptation/ treatment for climate risks. Currently, Table 8-3 lacks evidence to demonstrate that risks have been de-escalated.		**O**	TS(GHD): This table needs to be read with the rest of the report for context the two adaptions nominated provide: 1) ARR 2019: this increases the projected rainfall intensity increases above previous projections, meaning the new drainage system will be more reliable and still perform as intended up to 2100, both in the capture and conveyance of storm flows from the PLRC to the Parramatta River. 2) The implementation of the Non return valves is covered in the water quality sections as an implementation to mitigate the risk of brackish water projection up the system in the future.	04-Jun-2025	**C**	MD 25/06/2025: IC acknowledges the contractor's response, however, this level of detail must be included in the design report to demonstrate compliance. In case this information is stated elsewhere in the report, appropriate reference must be included. Closed subject to compliance demonstration within DDR submission. MD 27/08/2025: comment not addressed. Closed subject to compliance demonstration within AFC submission. TM 03/09/25 : Non return valves not shown covered in comment 14, but ref needed, covered in comment 137, closed on behalf	
137	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	~~Michelle Damasio~~ / Neda Nematollahi	21-May-2025	Sustainability	IC	Table 8-4	Please provide appropriate pinpoint reference of design implementation for treatment options for priority shocks and stressors.		**O**	TS(GHD): Pinpoint drawings references will be added to the table for DDR. 16/09/2025 (TS): Based on the response I am interpreting that we are to nominate the specific drawing for example that has a bioretention basin or Water Quality device on it, we did provide references to specific sections of the design report in DDR, but can include the additional for report resubmission.	04-Jun-2025	**C**	MD 25/06/2025: closed subject to compliance demonstration within DDR submission. MD 27/08/2025: Table 8-4 not updated as per detailed provided in comment 136. Closed subject to compliance demonstration within AFC submission. NN 01/10/2025: For implementation evidence, please provide more detailed references to relevant sections, including drawing numbers and section numbers. Closed, subject to compliance being demonstrated within the AFC submission. T Mat 11/11/25 Comment closed	11/11/2025
138	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	~~Michelle Damasio~~ / Neda Nematollahi	21-May-2025	Sustainability	IC	Table 8-5 (Pla-2)	Design drawings do not seem to provide integration of OSD to the urban and landscape plan. Design drawings PLR2EW-JHGRP-LRPEWRC-SD-DRG-100454 to 456 and direct outputs from the MUSIC models have not been provided.		**O**	TS (GHD): The Hill Road OSD basin presented in the Drainage PDR is taken from the DDR design development of model from RW-0001, it is noted this was an issue after the UD package and the UD package will update to reflect the further OSD basin batter modelling that had been undertaken between the submission of these packages. 16/09/2025 (TS): The reviewer comment response is not in relation to the original comment raised. The issue raised in the original comment is regarding integration of the basin with UD, not MUSIC modelling and design report. This comment should be closed and the reviewers comment either made into a new comment or copied to the correct comment cell that it is in relation to. Saji Srivelan [JHG] 22/09/2025: Table 8-5 will be updated for AFC.	04-Jun-2025	**C**	MD 25/06/2025: closed subject to compliance demonstration within DDR submission although no comment response has been provided re MUSIC Model evidence reference, as per noted in comment 133. MD 27/08/2025: Table 8-5 not updated; comment not addressed. Closed subject to compliance demonstration within AFC submission. TM: And review of UD-0001 DDR when received. NN 01/10/2025: MUSIC model results have not been correctly referenced within the table. Closed, subject to compliance being demonstrated within the AFC submission. TM 11/11/25 MUSIC model has been provided in the submission so comment closed	11/11/2025
139	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	~~Michelle Damasio~~ / Neda Nematollahi	21-May-2025	Sustainability	IC	Table 8-6 (Env-1)	Section 4.3.2.5 does not provide details of water quality baseline sampling undertaken by the Project. Also, it does not seem that Project specific WQO have been delineated.		**O**	Saji Srivelan [JHG]: 1. Water Quality Objectives are identified under Figure 6. *" Protection of:* *- Aquatic Ecosystems: Refer to Table 4-9.* *- Visual Amenity: All Flows discharged from the new PLRC corridor that are trafficked are captured and discharged through a water quality device to mitigate impact.* *- Secondary contact recreation: Contribution through the targeting TP/TSS/TN and GP will improve all measures that are contributed by the mechanisms outlined in Table 4-9.* *- Primary contact recreation: Contribution through the targeting TP/TSS/TN and GP will improve all measures that are contributed by the mechanisms outlined in Table 4-9.* *- Aquatic Foods(cooked):* *- River flow Objectives (reefer to FL-0001):* *- Maintain wetland and floodplain inundation* *- Manage groundwater Ecosystems* *- Minimise Effects of wiers and other structures* *- Maintain or rehabilitate estuarine processes and habitats."* Clearer indication with a delineated heading to be provided at DDR. 2. Baseline pollutant loads are shown in Table 4-17 showing that baseline studies have been undertaken to allow pollutant reduction loads to be calculated Saji Srivelan [JHG] 22/09/2025: Comment relating to water quality objectives addressed. Comment relating to baseline studies - it has been confirmed that the Project is using the EIS Technical Paper 10 as the baseline study as per Section 4.2.3.5.1. For further detail on basline studies, please see the EIS Technical Paper 10, this report summarises the outcomes of the baseline studies completed (Table 4-7).	16-Jun-2025	**C**	MD 25/06/2025: 1. IC acknowledges contractor's comment response however, it doesn't seem to be clearly stated that WQO identified under Figure 6 are the Project's WQO. Additionally it's noted that IS 2.1 TM requests that: *"SMART water discharge and receiving water quality goals must be established for the project … Documentation for goals must outline: The intended outcome/s (measurable/quantifiable)."* Currently, WQO seems to be qualitative rather than quantitative. 2. Please clarify baseline data source. MD 27/08/2025: comment not addressed. Closed subject to compliance demonstration within AFC submission. NN 01/10/2025: comment not addressed. Closed subject to compliance demonstration within AFC submission. TM 2/10/25 Comment closed on behalf	2/10/2025
140	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	~~Michelle Damasio~~ / Neda Nematollahi	21-May-2025	Sustainability	IC	Table 8-7 (Rso-1)	Please clarify how climate change considerations into the storm water drainage design is a control for assessing feasibility of the Resource Efficiency Plan opportunities.		**O**	Saji Srivelan [JHG] 16/06/2025: Control for climate change has been incorrectly placed against Rso-1. This will be rectified for DDR and reallocated to Res-1 response. Saji Srivelan [JHG] 22/09/2025: This will be updated at AFC.	16-Jun-2025	**C**	MD 25/06/2025: closed subject to compliance demonstration within DDR submission. MD 27/08/2025: Table 8-7 not updated; comment not addressed. Closed subject to compliance demonstration within AFC submission. NN 01/10/2025:Will be reviewed when update provided TM 11/11/25 Control for climate change removed, comment closed	11/11/2025
141	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	~~Michelle Damasio~~ / Neda Nematollahi	21-May-2025	Sustainability	IC	Table 8-7 (Rso-2, 3, 4)	Please pinpoint appropriate reference for control evidence.		**O**	Tim Snape GHD: Exact drawing reference will be provided in the DDR Design Report submission. 16/09/2025 (TS): Based on the comment we will elaborate on the followings to provide the exact drawing references : 1) RSO-6: Exact drawing range of the longsection as opposed to simply stateing Drainage Longsections. 2) RSO-2: Identify specific plans that have leevated drainage. All others are specific to the design report reference or drawing number.	18-Jun-2025	**C**	MD 25/06/2025: closed subject to compliance demonstration within DDR submission. MD 27/08/2025: Table 8-7 not updated; comment not addressed. Closed subject to compliance demonstration within AFC submission. NN 01/10/2025: Will be reviewed when update provided TM 11/11/25 Specific refs added, comment closed'	11/11/2025
142	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Michelle Damasio	21-May-2025	Sustainability	IC	Table 8-7 (Rso-5)	Section 7.4 is provided as control evidence for Rso-5. However, the section states that a Strategy is still being developed. Additionally, is noted that no maintenance access is provided to the base of the basin.		**O**	Saji Srivelan [JHG]: Accepted. The maintenance access strategy is included in RW-0001; Rso-5 requirement will be re-allocated to RW-0001.	16-Jun-2025	**C**	MD 25/06/2025: closed subject to compliance demonstration within DDR submission. MD 27/08/2025: comment closed.	

DESIGN REVIEW RECORD (DRR)

Contract:	PLR 2 - ENABLING WORKS CONTRACT
DP Ref:	SD-0001
Design Package Title:	Stormwater Drainage and Water Quality Design
Design Report:	As per transmittal
Drawing List:	As per transmittal

ISSUED FOR REVIEW			
SUBMISSION	**NO. OF DWGS**	**TB REFERENCE**	**DATE ISSUED**
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DDR	-	PLR2EW-JHGRP-TX-000704	Wednesday, 24 September 2025
DDR	-	PLR2EW-JHGRP-TX-000750	Wednesday, 15 October 2025
Post-DDR	-	PLR2EW-JHGRP-TFNSW-CORR-000162	Monday, 3 November 2025
AFC	-	PLR2EW-JHGRP-TX-000828	Friday, 21 November 2025

<======= TO BE COMPLETED BY IC

COMPLIANCE STATUS LEGEND
O Observation / Comment
N Non-Compliant (must provide reference to a Project Deed / SWTC requirement)

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RESPONSE STATUS LEGEND
O Open
C Closed
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DRR REV	**DRR STATUS**	**DATE**

No.	Stage	PACKAGE	Rev	Reviewer Name	Initial Comment Date	Discipline	Organisation	Document Reference	Reviewer Initial Comment	Project Deed ref	Compliance Status	Contractor Response	Initial Response Date	Response Status	Reviewer Comment Closeout	Date Comment Closed
143	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	~~Michelle Damasio~~ / Neda Nematollahi	21-May-2025	Sustainability	IC	Table 8-7 (Rso-6)	Appendix E is provided as control evidence for Rso-6. However, the appendix provides "Certifications and Third Party Approvals". It is noted that, other controls have been included within the incorrect column. These controls should be included in Project's specs to provide further detail on the sustainability notes and how future contractor will achieve these requirements.		**O**	TS (GHD): 1) The reference to Appendix E will be removed. 2) The material selection notes on the drawings are read in connection to the DC Specifications, they do not require an update on those specifications to use the nominated materials. The ITP would be the appropriate location to identify the source documentation for acceptance of lot to site. 16/09/2025 (TS): Based on the comment we will elaborate on the followings to provide the exact drawing references : 1) RSO-6: Exact drawing range of the longsection as opposed to simply stating Drainage Longsections. 2) RSO-2: Identify specific plans that have elevated drainage. All others are specific to the design report reference or drawing number.	04-Jun-2025	**C**	MD 25/06/2025: closed subject to compliance demonstration within DDR submission. MD 27/08/2025: Table 8-7 not updated; comment not addressed. Closed subject to compliance demonstration within AFC submission. NN 01/10/2025: Will be reviewed when update provided TM 11/11/25 Although GHD's response provided on 16/09/25 is incorrect (cut and paste from comment 141 and not relevent,) the evidence for rso-6 has been updated to provdie specific ref to BR-0001 appendix E and section for box culvert removal so comment closed	11/11/2025
144	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Michelle Damasio	21-May-2025	Sustainability	IC	Appendix F (RVTM)	RVTM states that requirement ID PLR-S2-EW-2981966 *"water quality treatment and integration of WSUD elements per the Planning Approval and relevant Authority Approvals: "* is compliant. However, sections provided as design verification evidence does not seem to provide appropriate evidence to demonstrate compliance against the requirement; additionally provided design drawing is the drawings set cover sheet and does not seem to address the [illegible]	SPR Main Body cl 3.3.8 (b) (vii) [940405]	**N**	TS (GHD): The design documents that the treatment train developed will improve the catchment pollutant loads that can be measured within the design software, therefore demonstrating contribution to an improvement. The design is considered compliant.	04-Jun-2025	**C**	MD 25/06/2025: contractor's response to this comment seems to contradict response given on comment 138. Please also note comment's response provided within the non-compliances (comments 133 and 135). MD 27/08/2025: comment not addressed. Closed subject to compliance demonstration within AFC submission. TM 03/9/25 Understood the designer's position is their are compliant but evidence has not been seen by IC (UD-0001 not yet received for review). Comment closed on behalf.	
145	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Michelle Damasio	21-May-2025	Sustainability	IC	Appendix F (RVTM)	RVTM states that requirement ID PLR-S2-EW-2981974 *"augmenting the existing drainage as required to meet the flood immunity and flood impact performance requirements of section 7.3 and the Planning Approval." However, section provided as design verification evidence does not seem to be included within the Report; additionally provided design drawing is the drawings set cover sheet and does not seem to address the requirement.*	SPR Main Body cl 3.3.8 (c) (iv) [940413]	**N**	TS (GHD): Agreed the actual reference is Section 4.3.2.1.2 not 4.3.2.1.3.2. This section discusses the upgrade of the Council Transvers Drainage system.	04-Jun-2025	**C**	MD 25/06/2025: closed subject to compliance demonstration within DDR submission. MD 27/08/2025: comment closed.	
146	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Michelle Damasio	21-May-2025	Sustainability	IC	Appendix F (RVTM)	RVTM states that requirement ID PLR-S2-EW-2982100 *"i) The Contractor must use components and materials that minimise whole of life costs. Where possible these components and materials must be readily available in the Australian market to enable efficient procurement of replacement parts"* is compliant. However, Section 7.2 provided as design verification evidence provides a list of construction specs rather than whole of life costing processes/ triggers thresholds for significant project initiatives, potential impacts on procurement of components and materials and what not. Additionally provided design drawings does not seem to address the requirement either.	SPR Main Body cl 4.5 (a) [940541]	**N**	TS (GHD): The products nominated in the documentation is standard materials that have to perform to the material specifications in the DC R11, further type approved only drainage materials are nominated, there are no new or novel drainage elements associated with the drainage system other than the MEA Drain and this is the only product available in the market that meet s the projects very prescriptive requirements for drainage elements that transverse the PLRC. A statement to that effect can be added to the design report, but is noted.	04-Jun-2025	**C**	MD 25/06/2025: justification to be included within next design stage for clarity. Comment closed subject to compliance demonstration within DDR submission. MD 07/08/2025: please provide updated Whole of Life section as per proforma agreed after discussion with TfNSW and IC on 4th Aug. Closed subject to compliance demonstration within AFC submission. MD 27/08/2025: RVTM not updated; comment not addressed. Closed subject to compliance demonstration within AFC submission. TM 03/09/25 Table 7-6 updated to demonstrte WOL compliance as agreed format with TfNSW, comment closed on behalf	
147	PDR	Stormwater Drainage and Water Quality Design (SD-0001)	B	Michelle Damasio	21-May-2025	Sustainability	IC	Appendix F (RVTM)	RVTM states that requirement ID PLR-S2-EW-2982270 and 2982278 are compliant. However, the methodology to apply updated climate change uplift is described in Technical memo PLR2EW-JHGRP-NWW-DR-MEM-000002, which has not been provided within PDR submission.	SPR Main Body cl 7.3.3 (a) [940711] SPR Main Body cl 7.4.1 (c) (iii) [940719]	**N**	TS (GHD): The actual memo will be attached to the design report for reference, but it is noted that the formal Teambinder references are provided and the information was within the system for IC or TfNSW access.	04-Jun-2025	**C**	MD 25/06/2025: comment closed subject to compliance demonstration within DDR submission. Please note that RVTM assigned requirements must be addressed within the design package documentation. MD 27/08/2025: comments closed.	
148	DDR	Stormwater Drainage and Water Quality Design (SD-0001)	C	Anton Kandiah	01-Sep-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100106	Note provided to node RH30-17A states 'Connection to 14-17A'; however, no details or reference drawing number provided.		**O**	16/09/2025 (TS): The pit is on the Ground level and shown on Drawing PLR2EW-JHGRP-LRPEWRC-SD-DRG-100114	16-Sep-2025	**C**		2/10/2025
149	DDR	Stormwater Drainage and Water Quality Design (SD-0001)	C	Anton Kandiah	01-Sep-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100106	Note provided at node RH14-17A "connection to 14-17" is that correct? Can't see 14-17 in plan		**N**	16/09/2025 (TS): The pit is on the Ground level and shown on Drawing PLR2EW-JHGRP-LRPEWRC-SD-DRG-100114	16-Sep-2025	**C**		2/10/2025
150	DDR	Stormwater Drainage and Water Quality Design (SD-0001)	C	Anton Kandiah	01-Sep-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100107	Note at SC17-23.A states 'downpipe outlets into pit 17-23' however, pit 17-23 not shown.		**O**	16/09/2025 (TS):Reference to be updated to 17-24	16-Sep-2025	**C**	AK: 02/10/2025: Comment will be closed when the drawing is updated.	10/11/2025
151	DDR	Stormwater Drainage and Water Quality Design (SD-0001)	C	Anton Kandiah	01-Sep-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100208	Line 14B not shown on plan		**O**	16/09/2025 (TS): The Line is on the Ground level behind the abutment and shown on Drawing PLR2EW-JHGRP-LRPEWRC-SD-DRG-100114	16-Sep-2025	**C**		2/10/2025
152	DDR	Stormwater Drainage and Water Quality Design (SD-0001)	C	Anton Kandiah	01-Sep-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100406	Longitudinal Section Detail: Section show 375mm pipe through the abutment, however, the plan show 300mm pipe through northen side of the bridge.		**O**	16/09/2025 (TS): Both the longsection and the plan show SS 315mm.	16-Sep-2025	**C**	AK: 02/10/2025: Drawing PLR2EW-JHGRP-LRPEWRC-SD-DRG-100406 shows 375 pipe TM 17/10/25 As discussed at the close out meeting will show the correct dim in the checkprint	10/11/2025
153	DDR	Stormwater Drainage and Water Quality Design (SD-0001)	C	Anton Kandiah	01-Sep-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100411	Will the embankment condition of line 17 affect any overland paths.	SPR 7.4.1	**O**	16/09/2025 (TS): No the line is below Bridge Structure BR-02 and adjacent to the Sekisui development which align with the deck levels, the channel to the west of the drainage line is reinstated as part of the works and serves catchments to the west of the project alignment.	16-Sep-2025	**C**	TM: 02/10/2025: overland flow paths will be reviewed in FL-0001 DDR, TM 17/10/25 as per the close out meeting on 13/10/25 the overland flow path will be assessed in FL-0001, comment to be transferred to FL-0001 **AD (IC): 28/10/2025 - comment has been transferred to package FL-0001 as comment number 164.**	28/10/2025
155	DDR	Stormwater Drainage and Water Quality Design (SD-0001)	C	T Matkovich	03-Sep-2025	Drainage	IC	Section 4.3.4.2.1 and Table 11-2 Outstanding	Noted that RFI-124 - free drainage scuppers have been approved by the Principal, on the condition that no staining of the soffit and substruction can be demonstrated.	SPR 7.7.2.2 (i)	**O**	16/09/2025 (TS): Correct the scuppers will be extended 75mm clear of the bridge soffit which is consistent with the recommendations of HEC 21 Section 6.5, Section a-a which call for a 3 inch extension.	16-Sep-2025	**C**	TM 2/10/25 Comment closed	2/10/2025
156	DDR	Stormwater Drainage and Water Quality Design (SD-0001)	C	T Matkovich	03-Sep-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100107	Incorrect drawing ref to pipe installation pit (should be DRG-1004117) and not 1004105		**O**	16/09/25(TS): Should be 100405.	16-Sep-2025	**C**	TM: 02/10/2025: Comment will be closed when the drawing is updated.	10/11/2025
157	DDR	Stormwater Drainage and Water Quality Design (SD-0001)	C	K Opoku	03-Sep-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100404 notes under "Concrete Bandage at New Pipe Penetration in Existing Pit"	Noted that the cut concrete surface will be coated with a minimum of 3 mm Megapoxy P1. Please provide evidence or demonstrate that the proposed treatment/repair will provide the required design life of the pit.	SPR 7.14.2	**O**	16/09/25 (CC): The proposed treatment involves coating any exposed reinforcement of the existing pit with Nitoprime Zincrich, an anti-corrosion primer, followed by Megapoxy P1, a TfNSW-approved gap-filling adhesive. A reinforced bandage or collar will then be cast in place against the existing pit structure. This double-layer protection does not reduce the design life of the existing pit.	16-Sep-2025	**C**		30/09/2025
158	DDR	Stormwater Drainage and Water Quality Design (SD-0001)	C	K Opoku	03-Sep-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100423 General Notes	Under note 4, concrete cover has been specified as "nominal" 45 mm. This is inconsistent with the requirements of AS 5100.5, which stipulates the cover to be specified as "required cover" 45 mm. Please update to ensure compliance.	AS 5100.5 SPR 7.14.2	**N**	16/09/25 (TS): Note will be updated as requested.	16-Sep-2025	**C**	KO 30/09/2025: Closed subject to review of proposed updates. TM 8/11/25 Closed on behald, note updated	10/11/2025
159	DDR	Stormwater Drainage and Water Quality Design (SD-0001)	C	DR	04-Sep-2025	Sustainability	TfNSW	Table 4-18: Treatment effectiveness	Compliance with TfNSW SDG WQ Goals is not demonstrated as TSS % reduction is 84% and requirement is 85%.	SPR Main Body, Section 7.4.12 (b)	**N**	16/09/2025(TS): In reference to compulsory element 6 the 85% removal of TSS is for all new effective impervious area only, the project is reporting against the compliance to demonstrate improvement in discharge water quality for the catchment includes all areas including existing pavements. It is not really feasible to remove the existing pavement areas from the model as some of these like for like replacement such as the carpark, are routed through WQ devices and removal of those areas would skew the pollutant removal efficiently of those devices. It is feasible to remove the bypass areas of Hill Road and Wharf Road which are existing and demonstrate the 85% removal for the new effective impervious area, whilst still containing some of the existing, given the project is 0.8% short with all catchment this will demonstrate overcompliance against the SDG. 13/10/2025 EF(JH): As discussed in the comment closeout meeting held on 13/10/2025;Comment can be closed subject to achieving water quality objectives are met and report to be updated.	16-Sep-2025	**C**	NC 30/09/2025: Comment closed subject to further justification provided on how compliance is achieved. NC 21/10/2025: Comment closed subject to reviewing the updated documents. DR 6/11/25: Closed	06-Nov-2025
160	DDR	Stormwater Drainage and Water Quality Design (SD-0001)	C	SFROUDE	28-Aug-2025	Technical	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110	Drawing PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110 has note "TRENCH DRAIN TO CAPTURE FLOWS FROM END OF TRACK. CONNECT TO DRAINAGE PIT " at LOW / Pit 19-6. No trench drain is specified in drainage legend, and there is no trench drain identified on plan. Please nominate appropriate trench drain to be used at this location.	PLR2 Enabling Works Contract, Clause 4.1	**N**	16/09/2025 (TS): Drawing will be updated it is actually a gutter section for interim drainage to discharge to pit 19-6.	16-Sep-2025	**C**	SF 29/09/2025: Comment can be closed subject to updated design drawings. SF 04/11/2025: Comment closed.	04-Nov-2025
161	DDR	Stormwater Drainage and Water Quality Design (SD-0001)	C	Shannon Souksavong	04-Sep-2025	Network Management	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101	Please undertake a clash check based on the design kerb alignment of Mary Street as there is a potential clash of the future TCS loop of standard length with transverse drain TD02-3.B and the track terminal anchors.	Exhibit B Scope and Performance Requirements Appendix C	**N**	16/09/2025 (TS): The comment is not clear in what element if Appendix C is non compliant, the comment is on future signalised scopes that are not within the design requirements and not documented within the referenced SPR Requirement. Further the request is asking for a coordination of a design against an unknown Appendix C provides no information related to the comment and should be removed or a TCS design provided by the Principal for coordination. 13/10/2025 EF(JHG): As discussed in the comment closeout meeting held on 13/10/2025;The loops in question are to be deleted, are not in scope of works, SS to discuss with the project team and advise.	16-Sep-2025	**C**	SS 26/09/25 - In the *Intersection functional layout* section of SPR Appendix C, it states that the design work is to consider the impacts and requirements for a number of design elements to which one of them includes the TCS design requirements. The contractor statement that the comment is *"asking for a coordination of a design against an unknown"* is incorrect as the comment specifically calls out TCS loops, which is provided in the RW-0003 design package. Comment remains open. SS 22/10/25 Comment can be closed.	22-Oct-2025
162	DDR	Stormwater Drainage and Water Quality Design (SD-0001)	C	Shannon Souksavong	04-Sep-2025	Network Management	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109	Please undertake a clash check as the future TCS loop appears to likely clash with transverse drain TD19-4.B and potentially with TD24-1.B.	Exhibit B Scope and Performance Requirements Appendix B	**N**	16/09/2025 (TS): The comment is raised against the SPR appendix for the signalised Intersection of Hill Road and Footbridge Boulevard. There is no non compliance that could exist at Mary Street against this requirement. Further it is unclear what information has been used to determine the clash. If there is a future design to be coordinated against it must be supplied, or the comment should be closed. 13/10/2025 EF(JHG): As discussed in the comment closeout meeting held on 13/10/2025;The Violation loop to be moved further south to avoid clash with the drainage, RW-0003 be updated to suit the comment can be closed. Comment to be tranferred to RW-0003.	16-Sep-2025	**C**	SS 26/09/25 - The site refers to the merge/diverge site off Hill Rd/Footbridge Blvd and not Mary Street. TCS loops are provided in RW-0003 and a draft TCS plan had provided in RW-0003 and RW-0004. Comment remains open. NC 22/10/25: Comment to be transferred to RW-0003 and the comment can be closed for this package. **AD (IC): 28/10/2025 - comment has been transferred to package RW-0003 as comment number 245.**	

DESIGN REVIEW RECORD (DRR)

Contract:	PLR 2 - ENABLING WORKS CONTRACT
DP Ref:	SD-0001
Design Package Title:	Stormwater Drainage and Water Quality Design
Design Report:	As per transmittal
Drawing List:	As per transmittal

ISSUED FOR REVIEW			
SUBMISSION	**NO. OF DWGS**	**TB REFERENCE**	**DATE ISSUED**
SDR	-	PLR2EW-JHGRP-TX-000092	Friday, 6 December 2024
PDR	-	PLR2EW-JHGRP-TX-000399	Monday, 6 May 2024
PDR	-	PLR2EW-JHGRP-TX-000503	Thursday, 19 June 2025
DDR	-	PLR2EW-JHGRP-TX-000631	Wednesday, 20 August 2025
DDR	-	PLR2EW-JHGRP-TX-000704	Wednesday, 24 September 2025
DDR	-	PLR2EW-JHGRP-TX-000750	Wednesday, 15 October 2025
Post-DDR	-	PLR2EW-JHGRP-TFNSW-CORR-000162	Monday, 3 November 2025
AFC	-	PLR2EW-JHGRP-TX-000828	Friday, 21 November 2025

<======= TO BE COMPLETED BY IC

COMPLIANCE STATUS LEGEND

O Observation / Comment

N Non-Compliant (must provide reference to a Project Deed / SWTC requirement)

TO BE COMPLETED BY IC======>

RESPONSE STATUS LEGEND

O Open
C Closed
CS Closed SUBJECT TO additional action / information

FOR IC USE ONLY
L Certification Limitation
H Drawings or part thereof on HOLD

IC Use Only	DRR TEAMBINDER REF:	
DRR REV	**DRR STATUS**	**DATE**

No.	Stage	PACKAGE	Rev	Reviewer Name	Initial Comment Date	Discipline	Organisation	Document Reference	Reviewer Initial Comment	Project Deed ref	Compliance Status	Contractor Response	Initial Response Date	Response Status	Reviewer Comment Closeout	Date Comment Closed
163	DDR	Stormwater Drainage and Water Quality Design (SD-0001)	C	N Cameron	10-Sep-2025	Technical	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109	Drainage run 19-1 to 19.6 now sits outside the permanent works (positioned within the residual temporary works associated with the haul road/piling platform). If temporary works (as noted) are to be used as means of maintenance access to the stormwater assets, this would be deemed as permanent works and would be subject to the assurance processes associated with permanent works.	Exhibit B Scope and Performance Requirements, Sections 7.14.3(c) (d) & 7.4.1(l)	**N**	16/09/2025 (TS): Agreed this line will be moved under the alignment	16-Sep-2025	**C**	NC 30/09/2025: Comment Closed subject to this being updated as part of the documentation update. NC 07/11/2025 Further discussion required. NC 28/11/2025 Comment closed	28-Nov-2025
164	DDR	Stormwater Drainage and	C	N Cameron	10-Sep-2025	Technical	TfNSW	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109	Please confirm the proposed updated stormwater design does not preclude connection to any future PLR Stage 2		**O**	16/09/2025 (TS): We do not believe that the drainage design presented precludes any extension to a future drainage system underneath any future extension of the	16-Sep-2025	**C**	NC 30/09/2025: Comment Closed	30/09/2025
164	AFC Ck Prnt	Stormwater Drainage and Water Quality Design (SD-0001)	C01	Anton Kandiah	10-Nov-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100152	Reference drawing does not specify 600x600 pit . Should be 762x762		**O**	TS(GHD): Pit Schedule should say R0220-36. 05/12/2025 TS (GHD): Pit is retained as an MSGS (R0220-30) and the dimensions were updated, The Rev 1 drawing notes to not provide the grate.	14-Nov-2025	**O**	TM 1/12/25 Ref to TfNSW std R0220-36. drg not corrected.	
165	AFC Ck Prnt	Stormwater Drainage and Water Quality Design (SD-0001)	C01	Anton Kandiah	10-Nov-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100408	Add 350x150 to the table for Line 14		**O**	TS (GHD): Line 14 is alrady in the table and the dimensions	14-Nov-2025	**C**	TM 1/12/25 Closed on behalf	
166	AFC	Stormwater Drainage and Water Quality Design (SD-0001)	C02	T Matkovich	11-Nov-2025	Drainage	IC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110	Following FL-0001 close out meeting held on 28/11/25 there is an additional pipe required to alleviate flows under the piling platform which will remain in place permanently at BR-0002 end / Hill Rd location.		**O**	TS (GHD): The additional flood storage balancing pipe of 450mm (Line 54) has been added to drawing set: 1) Plan: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109 2) Schedule: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100153 3) Longsection: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100222 - There is no flow associated with the pipe as it is provided only to allow major flows to balance out the flood storage areas from Pre Upgrade.		**O**		

Parramatta Light Rail - Stage 2 Enabling Works
Contract No. IPD 22-12894

DESIGN REVIEW RECORD (DRR)

Contract:	PLR 2 - ENABLING WORKS CONTRACT
DP Ref:	SD-0001
Design Package Title:	Stormwater Drainage and Water Quality Design
Design Report:	As per transmittal
Drawing List:	As per transmittal

ISSUED FOR REVIEW			
SUBMISSION	**NO. OF DWGS**	**TIME ISSUED**	**DATE ISSUED**
SDR	-		Friday, 6 December 2024

<====== TO BE COMPLETED BY IC

COMPLIANCE STATUS LEGEND

O Observation / Comment

N Non-Compliant (must provide reference to a Project Deed / SWTC requirement)

TO BE COMPLETED BY IC======>

RESPONSE STATUS LEGEND

O Open
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DRR REV	**DRR STATUS**	**DATE**

No.	Stage	PACKAGE	Rev	Reviewer Name	Initial Comment Date	Discipline	Organisation	Document Reference	Reviewer Initial Comment	Project Deed ref	Compliance Status	Contractor Response	Initial Response Date	Response Status	Reviewer Comment Closeout	Date Comment Closed
1	SDR	Stormwater Drainage and Water Quality Design	A	Jim Tsom	18-12-2025	Stormwater Drainage	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	Section 4.2.3 Climate Change - Recommend that projected rainfall increase extend be changed from 2130 to 2150 and that most latest Australian Rainfall and Runoff 2019 Version 4.2, Book1, Chapter 6 be used. **IC notes that the recommendation to extend the rainfall increase to 2150 is not in line with SPR MB cl 7.4.8 (d), which specifically states 2130, noting that this comment has been raised as an observation. It is noted that ARRF versions are currently being resolved through the RFI process.**	Australian Rainfall and Runoff 2019.	O	Tim Snape [GHD]: Adoption of ARR 2019 Version 4.2 is subject to direction from TfNSW.	30-Jan-2025	C	IC (TM) Request to increase projected rainfall extent from 2130 to 2150 is not in accordance with the Enabling Works Deed SPR or Exhibit I MoU PLR2EW between TfNSW and CoPC but is subject to agreement between TfNSW and the Contractor and therefore comment has been closed	06-Feb-2025
2	SDR	Stormwater Drainage and Water Quality Design	A	Jim Tsom	18-12-2025	Stormwater Drainage	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	Section 4.2.4 Tailwater Conditions - Recommend that the 2024 Parramatta River Flood Study be used in determining tailwater levels. **IC notes that the nominated flood study is not included as a Reference Document in the Project Deed, noting that this comment has been raised as an observation. It is noted that use of the various flood models and inputs available is currently being resolved through the RFI process.**	Parramatta River Flood Study, Dated 2024, Prepared by Stantec.	O	Tim Snape [GHD]: The project will undertake a flooding assessment to determine the impact of the new bridge, and the tailwater levels from the aligned climate projection increases for intensity sea level rise and this will inform the design tailwater level conditions adopted for the project.	30-Jan-2025	C	IC (TM) The Flood Study is not nominated in the Exhibit I MoU PLR2EW but the flood assessment is currently subject to agreement between TfNSW and the Contractor and therefore comment has been closed	06-Feb-2025
3	SDR	Stormwater Drainage and Water Quality Design	A	Jim Tsom	18-12-2025	Stormwater Drainage	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	Section 4.3.2.1.3 - Further detail is required regarding the eisting 600 mm Stormwater Pipe (line 10) and its disconecction to Parramatta River and impact to council's system due to the PLR 2 project. **IC has amended this to an observation noting that design details are still to be developed / resolved. Compliance to be assessed at the next submission.** 6/02/25 IC (TM) notes the designers' confirmation that the existing s/w pipe to Parramatta River will remain but with a reduced catchment discharge and a new outlet will be provided for the PLR2 discharge, therefore comment can remain CS to review at the next stage	MOU, Schedule 2, 1C	O	Sophie Afraz [GHD]: This report statement refers to a design change from the tender stage. Initially, line 10 was integrated with the existing Wharf Road Council drainage system. However, during the SDR design stage, it was decided to provide a new outlet to the Parramatta River for the PLRC discharge instead. This change preserves the performance of the existing Wharf Road drainage system, which will be retained with a reduced catchment discharge.	30-Jan-2025	C	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all CoPC comments from previous design stage to be closed if not a non compliance to the CoPC MoU, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
4	SDR	Stormwater Drainage and Water Quality Design	A	Jim Tsom	18-12-2025	Stormwater Drainage	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	Section 4.3.2.2.3 Hill Road Intersection - Further details on the proposed detention basin and design are required together with flood modeling analysis of the hydraulic performance of the basin due to high tailwater conditions and flood impacts of the wider Hill Road catchment area. **IC has amended this to an observation noting that design details are still to be developed / resolved. Compliance to be assessed at the next submission.**	MOU, Schedule 2, 1C	O	Sophie Afraz [GHD]: Tailwater levels for connections to the existing Council drainage system follow the SPR requirements, with basin storage volume designed to be located above TWL.	30-Jan-2025	C	IC (TM) the proposed detention basin is TfNSW works and not Public Works and therefore not part of the MoU. Therefore this comment has been closed. The impacts of the basin on the exisitng council drainage will be assessed in the next submission of the design.	07-Feb-2025
5	SDR	Stormwater Drainage and Water Quality Design	A	Jim Tsom	18-12-2025	Stormwater Drainage	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	Section 4.3.2.2.3 Hill Road Intersection - TFNSW Contractor to seek advice from Dam Safety NSW to confirm if this basin will need to be treated as a declared dam. Due to the proposal to use bunds above ground surface levels a Dam break study will need to be undertaken to determine the impact of the population at risk downstream of the basin. Confirmation required as to the ownership of this basin. Further details of basin design required before further comment from council can be provided. Details of fencing preventing unauthirised access around detention basing to be provided in design drawings. **IC has amended this to an observation noting that design details are still to be developed / resolved. Compliance to be assessed at the next submission.**	Dam Safety NSW Regulations, MOU, Schedule 2, 1C	O	Sophie Afraz [GHD]: The basin will be a TfNSW asset and further integration with the PLR2 Main Works drainage solution will be undertaken following PLR2EW. Dam safety requirements for the detention basin will be further reviewed during the PDR stage.	30-Jan-2025	C	IC (TM) the proposed detention basin is a TfNSW asset and not Public Works and therefore not part of the MoU. Therefore this comment has been closed. The dam safety requirements will be assessed at the next design stage.	08-Feb-2025
6	SDR	Stormwater Drainage and Water Quality Design	A	Jim Tsom	18-12-2025	Stormwater Drainage	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	4.3.3.1. Design Analysis - Stormwater Drainage - All council pit and pipe drainage should be designed using DRAINS model. All pit and pipe system designed for the 5% AEP event with climate change and allowance of 50% blockage of pits in sag and 20% blockage of pits on grade. A safe overland flow path to be designed for the 1% AEP event with climate change. **IC has amended this to an observation noting that design details are still to be developed / resolved. Compliance to be assessed at the next submission.**	Development Engineering Design guideline, June 2018. Section 3.3	O	Sophie Afraz [GHD]: 1. All drainage has been designed in 12d, as the SPR does not mandate specific design software. CoPC DCP Section 4, Clause 3.1, requires a "runoff routing model," which 12d uses for analysis. 2. All drainage under Council ownership will be designed to the specified standards, aligned with the project SPR and detailed in the submitted design report.	30-Jan-2025	C	IC (TM) The comment can be closed, not a requirement of the MoU, however the requirements noted will be met as per the SPR. If items are identified by the IC that are a departure to Exhibit B Scope and Performance Requirements this will be raised as a non confirmance in review of the next design phase.	06-Feb-2025
7	SDR	Stormwater Drainage and Water Quality Design	A	Jim Tsom	18-12-2025	Stormwater Drainage	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	Section 4.3.4.1.1 Assessment of Self-Cleansing Velocities - Further information on likely impacts of those pipelines identified that have failed to achieve self-cleansing velocities.	MOU, Schedule 2, 1C	N	Sophie Afraz [GHD]: The locations where self-cleaning is not achieved are TfNSW assets on the bridge at the upstream section of the network, not Council assets, which are typically located downstream part of network. Not achieving self-cleaning results in the need for more frequent visual inspections and routine debris clearing for these pipes.	30-Jan-2025	C	IC (TM) As confirmed by the designer the location of the self cleansing velocities is not on Council assets and so this item is closed. If items are identified by the designer or IC that are a departure to Exhibit B Scope and Performance Requirements during the design process that impact Council assets this will be discussed and agreed with Council.	06-Feb-2025
8	SDR	Stormwater Drainage and Water Quality Design	A	Jim Tsom	18-12-2025	Stormwater Drainage	CoPC	SD-0001-STORMWARER DRAINAGE DESIGN - DRAWINGS	All Council stormwater draingage pipes shall be Reinforced Concrete Rubber Ring Spigot and Socket Joint pipe, Class a or greater to meet required loading. Minimum pipe size to be 375 mm diameter. **IC notes that MOU Schedule 3 does not contain a Table 3 and that Table 3 in Annexure A does not include DS24. This comment has been amended to an observation noting that asset ownership still needs to be defined, which will inform compliance with asset owner requirements.**	MOU, Schedule 3, Table 3, DS24, MOU, Schedule 2, 1C	O	Sophie Afraz [GHD]: Council assets are typically located within road reserves or carpark areas, where RCP pipes are specified. The SDR submission's long sections indicate pipe size and type. Smaller pipes on the bridge and FRC pipes within the rail are not Council assets.	30-Jan-2025	C	IC (TM) CoPC MOU 25 June 24 in Exhibit I does not stipulate that RCP pipes are required but as per the designers response are likely to be used for council assets. This comment can be closed.	06-Feb-2025
9	SDR	Stormwater Drainage and Water Quality Design	A	Jim Tsom	18-12-2025	Stormwater Drainage	CoPC	SD-0001-STORMWARER DRAINAGE DESIGN - DRAWINGS	All Council stormwater drainage pipes shall be designed with grades not less than 1%. **IC has been amended this to an observation noting that asset ownership still needs to be defined, which will inform compliance with asset owner requirements.**	Development Engineering Design guideline, June 2018. Section 3.3	O	GHD (TS): Grading of pipes to be handed over to Council will be reviewed once the asset ownership is aligned with the Principal. CoPC assets will be updated to be designed to CoPC standards. The design has been developed on the bais of TfNSW asset ownership to date, but we note this may be amended.	30-Jan-2025	C	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all CoPC comments from previous design stage to be closed if not a non compliance to the CoPC MoU, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
10	SDR	Stormwater Drainage and Water Quality Design	A	Jim Tsom	18-12-2025	Stormwater Drainage	CoPC	SD-0001-STORMWARER DRAINAGE DESIGN - DRAWINGS	All Council stormwater drainage pits and pipes shall have a CCTV condition assessment report provided to council prior to handover. **IC notes that CCTV condition assessments do not appear to be referenced under the MOU. However, CCTV assessment of stormwater assets is required under TfNSW R11.**	MOU, Section 8C.	O	JHG(EF): Noted, CCTV will be undertaken for stormwater drainage pits and pipes as per TfNSW D&C R11 prior to handover.	30-Jan-2025	C	IC(TM) Acknowledged that CCTV condition assessment is a requirement under R11 and so the comment can be closed.	06-Feb-2025

Parramatta Light Rail - Stage 2 Enabling Works
Contract No. IPD 22-12894

DESIGN REVIEW RECORD (DRR)

Contract:	PLR 2 - ENABLING WORKS CONTRACT
DP Ref:	SD-0001
Design Package Title:	Stormwater Drainage and Water Quality Design
Design Report:	As per transmittal
Drawing List:	As per transmittal

ISSUED FOR REVIEW			
SUBMISSION	**NO. OF DWGS**	**TIME ISSUED**	**DATE ISSUED**
SDR	-		Friday, 6 December 2024

<====== TO BE COMPLETED BY IC

COMPLIANCE STATUS LEGEND

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11	SDR	Stormwater Drainage and Water Quality Design	A	Jim Tsom	18-12-2025	Stormwater Drainage	CoPC	SD-0001-STORMWARER DRAINAGE DESIGN - DRAWINGS	All Council stormwater drainage pits to be designed in accordance with council's Standard Drawings.	CoPC DS 19-37	O	Sophie Afraz [GHD]: CoPC standard pits are adopted for Wharf Road. The specific pit types will be added to schedules during the PDR stage.	30-Jan-2025	C	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all CoPC comments from previous design stage to be closed if not a non compliance to the CoPC MoU, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
12	SDR	Stormwater Drainage and Water Quality Design	A	Jim Tsom	18-12-2025	Stormwater Drainage	CoPC	SD-0001-STORMWARER DRAINAGE DESIGN - DRAWINGS	Design drawing to identify which stormwater drainage assets are proposed to be new Council Assets.	Council Design Requirements	O	Tim Snape [GHD]: The project is currently working with the Prinicpal to define the asset ownership, it is envisaged that this will be avilable with the PDR submission.	30-Jan-2025	C	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all CoPC comments from previous design stage to be closed if not a non compliance to the CoPC MoU, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
13	SDR	Stormwater Drainage and Water Quality Design	A	Jim Tsom	18-12-2025	Stormwater Drainage	CoPC	SD-0001-STORMWARER DRAINAGE DESIGN - DRAWINGS	Drawing No. ## 100106 - Identify vehicular access area and provide details for cleaning Jelly Fish and GPT devices.	Council Design Requirements	O	Tim Snape [GHD]: Maintenance plans and strategy are being developed for future submissions.	30-Jan-2025	C	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all CoPC comments from previous design stage to be closed if not a non compliance to the CoPC MoU, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
14	SDR	Stormwater Drainage and Water Quality Design	A	Jim Tsom	18-12-2025	Stormwater Drainage	CoPC	SD-0001-STORMWARER DRAINAGE DESIGN - DRAWINGS	Drawing to include pit register identifying pit type, details and asset ownership.	MOU, Schedule 2, 1C	O	Sophie Afraz [GHD]: The pit schedule will be provided with the PDR design stage.	30-Jan-2025	C	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all CoPC comments from previous design stage to be closed if not a non compliance to the CoPC MoU, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
15	SDR	Stormwater Drainage and Water Quality Design	A	Nazanin Azimipanah	16.12.24	Urban Design	CoPC	UD-0001, DRG-301102 & 103	"Stormwater design in Archer Park On the western side of the corridor, there are three stormwater outlets with headwalls that will release water into the Archer Park open space and planting area. Based on the drainage design, these outlet points collect water from the road, track, and biofiltration zone. Considering the sensitive nature of the park's vegetation along the river foreshore and the amount of usable space in the park, there is a lack of consideration in the stormwater drainage design for the existing vegetation and the quality of the park's open areas outside of the projects boundary." **IC notes that this comment refers to the UD-0001 design package. The commentary is considered relevant to this SD-0001 package.**	EIS Design Place and Movement Supplementary Report : TfNSW - April 2023: 2.6 Ecology - all the Archer Park existing planting along the river are threatened species or communities.Also they're under Coastal Management ACT (2016).	N	Sophie Afraz [GHD]: Outfalls Line 01 and 07 are located close to the existing outfall and will be designed to minimise the impact on vegetation. The bioretention basin outlet has a diameter of only 375mm and discharges clear water to the surrounding area.	30-Jan-2025	C	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all CoPC comments from previous design stage to be closed if not a non compliance to the CoPC MoU, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open. See PDR comment 29.	21-May-2025
16	SDR	Stormwater Drainage and Water Quality Design	A	D. Eastment	12.12.24	Urban Design	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100103	Cycleway stub connection to the PVC westwards (towards George Kendall Park) Does this connection need to be accessible? It is currently shown at a gradient of about 1:10. Contractor to confirm. **IC notes that this comment relates to the gradient / alignment of the MP35 cycleway on DRG-100102 and should therefore be transferred to the RW-0001 package.**	AS 1428	O	Edoardo Fusina [JHG]: The gradient for this connection will be reviewed at the PDR Design Stage in line with the maintenance access requirements. As per the IC comment, this comment is to be transferred to the RW-0001 package.	30-Jan-2025	C	IC (TM) MP35 cycleway is a TfNSW asset and not Public Works and therefore not part of the MoU. Therefore this comment has been closed.	06-Feb-2025
17	SDR	Stormwater Drainage and Water Quality Design	A	D. Eastment	12.12.25	Urban Design	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101	New Stormwater Drainage in Mary Street Proposed SW drainage tie in work in Mary Street to be designed to suit proposed kerb realignments in Mary Street.		O	Sophie Afraz [GHD]: Drainage pits are located along the new kerbline on Mary Street.	30-Jan-2025	C	IC (TM) Drainage pits will be aligned with new kerbline on Mary St, therefore comment closed. In addition the pits are a TfNSW asset and not Public Works and therefore not part of the MoU.	06-Feb-2025
18	PDR	SD-0001_Stormwater drainage & WQD		Bishwa Mishra	20/05/2025	Catchment Section/Flooding and Draianage	CoPC	Appendix K- Catchment Plan, PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101-Rev B	The catchment plan provided in the appendix shows external flows from Mary St only, and the full upstream catchment at this location must be considered and included in the drainage design to confirm the current stormwater drainage system is adequate as per Council's current standard (5%AEP with 20% blockage at on-grade pits, 50% blockage at sag pits with safe overland flow path up to 1% AEP with climate change). Further, upstream of this intersection along the Waratah St there is a sag location, it should also be demonstrated that ponding depth is within the safe limit at design storm events.	MoU clause 7(a)(iii) and industry practice (full contributing area)	N	TS (GHD) - The catchment plan provided is for all the drainage catchments coming through to the PLRC site. The sag beyond this site on Warath street has not been designed to flow though the intersection and is not going to pond and spill into this catchment. There is no changes to that location as part of teh early works and so no requirments to assess how that independnt drainage system operates. There is no existing Pavement drainage system in Mary Street that needs to be assesssed and conveyed, the catchment has been inserted into the system to allow for teh future connection by others if the system is upgraded.	05-Jun-2025	C	IC (TM) 3/9/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all CoPC comments from previous design stage to be closed if addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	03-Sep-2025
19	PDR	SD-0001_Stormwater drainage & WQD		Bishwa Mishra	20/05/2025	Catchment Section/Flooding and Draianage	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110 Rev B	It is understood that the proposed basin attenuates flow to the pre-dev situation prior to discharging into the CoPC Hill Road trunk drainage. However, for connection into the CoPC Hill Road trunk drainage, demonstration of adequate capacity is required as it seems trunk drainage capacity is inadequate and there are regular flooding issues in Hill Road. Maximizing the detention storage might help to improve Hill Road drainage situation. The council is currently undertaking investigation and opportunities to improve the flooding situation. SDR comments said this matter would be addressed at PDR - but seems it has not been.		O			C	IC (TM) 21/05/25 The CoPC MoU does not require the Hill Rd drainage situation to be improved. This comment can be closed.	26-May-2025
20	PDR	SD-0001_Stormwater drainage & WQD		Bishwa Mishra	20/05/2025	Catchment Section/Flooding and Draianage	CoPC	Drawing sheet 6 to 10 in drawing PLR2EW-JHGRP-LRPEWRC-SD-DRG-100011	There is an existing swale in between Sekisui development and PLR2 alignment. Majority of the swales drain westward and then northward along the perimeter of the Sekisui development. It is not clear that this swale is still preserved and upgraded. This swale may have the opportunity to reduce flooding issues at Hill Road by allowing overland flow path. We request to have full assessment of the overland flow paths and flooding so that it is ensured that PLR design does not limit any opportunities to alleviate existing flooding issues in Hill Road and also not creating blockage of existing overland flow paths through out full section of the design.		O			C	IC (TM) 21/05/25 This comment is not regarding the Public Works as per the CoPC MoU and so can be closed.	26-May-2025

Parramatta Light Rail - Stage 2 Enabling Works
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DESIGN REVIEW RECORD (DRR)

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Design Package Title:	Stormwater Drainage and Water Quality Design
Design Report:	As per transmittal
Drawing List:	As per transmittal

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21	PDR	SD-0001_Stormwater drainage & WQD		Bishwa Mishra	20/05/2025	Catchment Section/Flooding and Draianage	CoPC	For review of full drainage design	We request a hydological model for the full stormwater design to confirm the proposed drainage design is adequate and meet CoPC's current design criteria. In additon, we also request the model for review of impact on oveland flow paths and flooding issues. Similarly, a water quality model is required to be provided for review. **IC (TM) 28/05/25 As per CoPC MoU Sch 2 1 (c) CoPC may request additional information regarding CoPC assets only.**	MoU- Schedule 2, Part 1(c)	O	TS (GHD): A 12d design model was provided with the design package submission to John Holland as a deliverable to TfNSW.	05-Jun-2025	C	IC (TM) The contractor has informed the IC the model was issued with the PDR and DDR submission issued to CoPC	03-Sep-2025

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22	PDR	SD-0001_Stormwater drainage & WQD		Bishwa Mishra	20/05/2025	Catchment Section/Flooding and Draianage	CoPC	General Council Requirement	Council notes that a proprietry water quality system is to be placed in Archer Park, and advises this is not a CoPC asset because it is not specified in Annexure A of the MoU and only drains runoff from TfNSW assets.		O			C	IC (TM) This water quality system is not an CoPC asset and so this comment can be closed	26-May-2025
23	PDR	SD-0001_Stormwater drainage & WQD		Bishwa Mishra	20/05/2025	Catchment Section/Flooding and Draianage	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102 and PLR2EW-JHGRP-LRPEWRC-SD-DRG-100103	Full flows from two 375 pipes are connected to the bio-retention basin-1, we recommend diverting high flows and only treatable flows to the bio-retention basin for better performance and less maintenance in future. Similar consideration should be given to Bio-retention basin 2.		O			C	IC (TM) These pipes are not a CoPC asset and so this comment can be closed	26-May-2025
24	PDR	SD-0001_Stormwater drainage & WQD		Bishwa Mishra	20/05/2025	Catchment Section/Flooding and Draianage	CoPC	General Council Requirement	All Council Pipes should be minimum of 375mm dia pipes RCP with rubber ring and socket joints to prevent pipe disjointment, maintain pipe integrity and intended asset design life.	Council design standards	N			C	IC (TM) 21/05/25 Smaller pipe sizes shown on the bridge are not Council assets. CoPC MoU does not stipulate RCP pipes are required but as per the designer's response to SDR comment are likely to be used for Council assets, no specific non compliance has been identified. This comment can be clsoed.	26-May-2025
25	PDR	SD-0001_Stormwater drainage & WQD		Bishwa Mishra	20/05/2025	Catchment Section/Flooding and Draianage	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110 and other drawings if dedicated to council in future	All drainage pits to be handed back as CoPC asset are to as per council standard standards or otherwise remain as TfNSW assets. **IC (TM) 26/05/25 amended to an observation. No specific non compliance has been identified.** **The Contractor is to confirm all CoPC assets meet CoPC standards**	Council design standards	O	CAS (GHD) - CoPC standard drainage drawings are referenced for drainage elements to handed back as CoPC assets. CoPC specifications to be added to the drawing notes, where relevant and applicable. TfNSW have provided guidance on asset ownership and the DDR design should provide further clarification to CoPC on what assets will be CoPC.	05-Jun-2025	C	IC (TM) 03/09/25 CoPC assets not clearly identified, COPC specifications not included, see IC comment raised, therefore this comment closed	03-Sep-2025
26	PDR	SD-0001_Stormwater drainage & WQD		Bishwa Mishra	20/05/2025	Catchment Section/Flooding and Draianage	CoPC	For review	The design report mentions the attachment of "PLR2EW-JHGRP-NWW-DR-MEM-000002" for Climate Change approach which is not attached. Please share this technical memo to understand the approach taken.	Required for review	O	CAS (GHD) - PLR2EW-JHGRP-NWW-DR-MEM-000002 will be attached to Appendix E as requested.	05-Jun-2025	C	IC (TM) 03/09/25 Memo attached	03-Sep-2025
27	PDR	Stormwater Drainage and Water Quality Design	B	Nazanin Azimipanah	20-May-25	Urban Design		PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102 & 103	Embankments design gradiant as part of the SDR documents review discussions between the Council and TfNSW team, we asked for some of the steep embankments on the western edge of the corridor to be replaced by retaining walls. These changes are not shown in this package. The Council is extremely worried that the level transitions and steep embankments as in these plans it's not possible to assess the designed levels due to the lack of imformation and inacqueracy of the drawings **IC (TM) 21/05/25** **This is not a NC against this package – already raised and addressed as part of UD-0001 – observation stands as the drawings do not indicate the tiered solution and JH should address the comment.** **Linked to comment 31 in UD-0001 and RW-0001 comment 16**		O	TS (GHD) : The design has captured this consultation at the DDR design stage and all batters have been flattened in the RW-0001 design package submission.	05-Jun-2025	C	IC (TM) 03/09/25 design amended with sandstone retaining walls or reduced batter slopes	03-Sep-2025
28	PDR	Stormwater Drainage and Water Quality Design	B	Nazanin Azimipanah	20-May-25	Urban Design	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100451, 100452	Bioretention basin design there no levels on tom and bottom of these basing or cross sections showing the depth of these bains. As they're right against the cycleway and pedestrian paths it is important to show this detail. Also contours don't reflect the design. These drawings are inaccurate and CoP has serious concerns about the lack of enough information at this stage of documentation.		O			C	IC (TM) The bioretention basin is not a CoPC asset and so this comment can be closed	26-May-2025
29	PDR	Stormwater Drainage and Water Quality Design	B	Nazanin Azimipanah	20-May-25	Urban Design	CoPC	UD-0001, DRG-100113	"Stormwater design in Archer Park the same as previous comment number 15 there are stormwater outlets on the southern side of the park next to the river edge. number 10-11 is shown right in th proposed mangrove regeneration works. What mitigation measures have been considered to deal with the polluted run offs into the sensitive vegetation areas?	EIS Design Place and Movement Supplementary Report : TfNSW - April 2023: 2.6 Ecology - all the Archer Park existing planting along the river are threatened species or communities.Also they're under Coastal Management ACT (2016).	O			C	IC (TM) 26/05/25 The stomrwater outlets referred to are not a CoPC asset or part of the Public Works and so this comment can be closed. The Contractor is required to address the issue raised as part of the CoA.	26-May-2025
30	DDR	SD-0001		S Joyia	29-Aug-2025	Catchment Management	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001 to PLR2EW-JHGRP-LRPEWRC-SD-DRG-100457	Council notes the stormwater system near the intersection of Wattlebird Street is currently over capacity and subject to downstream tidal influences, which may result in surcharging during peak conditions. To ensure proper assessment and mitigation of these impacts, Council formally requests the provision of a detailed drainage model. This model should evaluate the effects of the PLR2 East-West proposal on Council's stormwater infrastructure and inform any required design modifications		O			C	IC (TM) 04/09/25 The drainage model was provided to CoPC in transmittal PLR2EW-JHGRP-TX-000629 on 20/08/25 It's not clear where CoPC is identifying the stormwater system is over capacity, the IC did identify and issue at PDR but this has been rectified for DDR, see drawing SD-DRG-100214 and section 4.3.2.2.3 in the report (IC comment 107) In additoin this is not part of the Public Works and therefore this comment can be closed.	04-Sep-2025
31	DDR	SD-0001		S Joyia	29-Aug-2025	Catchment Management	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001 to PLR2EW-JHGRP-LRPEWRC-SD-DRG-100457	Wattlebird Intersection - Further details on the proposed detention basin and design are required together with flood modelling analysis of the hydraulic performance of the basin due to high tailwater conditions and flood impacts of the wider Hill Road catchment area.		O			C	IC (TM) 04/09/25 Refer to comment 30, this is not part of the Public Works and therefore comment has been closed.	04-Sep-2025
32	DDR	SD-0001		S Joyia	29-Aug-2025	Catchment Management	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001 to PLR2EW-JHGRP-LRPEWRC-SD-DRG-100457	Seek advice from Dam Safety NSW to confirm if this basin will need to be treated as a declared dam. Due to the proposal to use bunds above ground surface levels a Dam break study will need to be undertaken to determine the impact of the population at risk downstream of the basin. Confirmation required as to the ownership of this basin. Further details of basin design required before further comment from council can be provided. Details of fencing preventing unauthorised access around detention basing to be provided in design drawings		O			C	IC (TM) 04/09/25 - the proposed detention basin is a TfNSW asset and not Public Works and therefore not part of the MoU. Therefore this comment has been closed. Details of the basin provided in DDR drawings, but agree fencing has not been detailed, the IC has raised this comment.	04-Sep-2025

Parramatta Light Rail - Stage 2 Enabling Works
Contract No. IPD 22-12894

DESIGN REVIEW RECORD (DRR)

Contract:	PLR 2 - ENABLING WORKS CONTRACT
DP Ref:	SD-0001
Design Package Title:	Stormwater Drainage and Water Quality Design
Design Report:	As per transmittal
Drawing List:	As per transmittal

ISSUED FOR REVIEW			
SUBMISSION	**NO. OF DWGS**	**TIME ISSUED**	**DATE ISSUED**
SDR	-		Friday, 6 December 2024

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COMPLIANCE STATUS LEGEND

O Observation / Comment

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RESPONSE STATUS LEGEND

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DRR REV	**DRR STATUS**	**DATE**

No.	Stage	PACKAGE	Rev	Reviewer Name	Initial Comment Date	Discipline	Organisation	Document Reference	Reviewer Initial Comment	Project Deed ref	Compliance Status	Contractor Response	Initial Response Date	Response Status	Reviewer Comment Closeout	Date Comment Closed
33	DDR	SD-0001		S Joyia	29-Aug-2025	Catchment Management	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001 to PLR2EW-JHGRP-LRPEWRC-SD-DRG-100457	CoP requests that the swale's full drainage function is either preserved or replaced with an equivalent engineered solution, particularly at the western and southern boundaries of the Sekisui site or make an allowance for the swale. From preliminary and survey plans it appears as the swale has been made redundant. PLR2 would need to work with Sekisui development to invistigate and reinstate the existing SOPA swale.		O			C	IC (TM) 04/09/25 This comment is not regarding the Public Works as per the CoPC MoU and so can be closed. However it is understood that the Contractor is liasing with SOPA to ensure the existing swale is reinstated so that the overland flow paths are not impacted, the IC has requested confirmation that overland flows are not impacted, see comment 153.	04-Sep-2025
34	DDR	SD-0001		S Joyia	29-Aug-2025	Catchment Management	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001 to PLR2EW-JHGRP-LRPEWRC-SD-DRG-100457	The swale identified within the PLR2 enabling works corridor has the potential to redirect surface water runoff from adjacent landfill areas toward Hill Road, thereby increasing the risk of flooding. Any obstruction to this swale may undermine the City of Parramatta's overarching flood mitigation strategy for the locality.		O			C	IC (TM) 04/09/25 This comment is not regarding the Public Works as per the CoPC MoU and so can be closed. However it is understood that the Contractor is liasing with SOPA to ensure the existing swale is reinstated so that the overland flow paths are not impacted, the IC has requested confirmation that overland flows are not impacted, see comment 153.	04-Sep-2025
35	DDR	SD-0001		S Joyia	29-Aug-2025	Catchment Management	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001 to PLR2EW-JHGRP-LRPEWRC-SD-DRG-100457	There are several overland flowpaths from Hope St towards the River. The design should demonstrate that overland flowpaths are designed and incorporated as per the current standard i.e safe for 1%AEP with climate change and adequate for higher storm events and 100% blockage scenario.		O			C	IC (TM) 04/09/25 This comment is not regarding the Public Works as per the CoPC MoU and so can be closed. In addition only non compliances may be raised as DR design stage.	04-Sep-2025
36	DDR	SD-0001		S Joyia	29-Aug-2025	Catchment Management	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001 to PLR2EW-JHGRP-LRPEWRC-SD-DRG-100457	It is understood that current limit of the work is from intersection of Waratah St and Mary St. However, the full upstream catchment at this location should be considered and included in the drainage design to confirm, stormwater drainage system is adequate as per Council's current standard (5%AEP with 20% blockage at on-grade pits, 50% blockage at sag pits with safe overland flow path up to 1% AEP with climate change). Further, upstream of this intersection along the Waratah St there is a sag location, it should also be demonstrated that ponding depth is within the safe limit at design storm events and above this limit safe overland flowpath is available. The catchment plan provided in the appendix shows external flows form Mary St only.		O			C	IC (TM) 04/09/25 As per Contractor's response to comment 18 TS (GHD) - The catchment plan provided is for all the drainage catchments coming through to the PLRC site. The sag beyond this site on Warath street has not been designed to flow though the intersection and is not going to pond and spill into this catchment. There is no changes to that location as part of teh early works and so no requirments to assess how that independnt drainage system operates. There is no existing Pavement drainage system in Mary Street that needs to be assesssed and conveyed, the catchment has been inserted into the system to allow for teh future connection by others if the system is upgraded.	04-Sep-2025
37	DDR	SD-0001		S Joyia	29-Aug-2025	Catchment Management	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001 to PLR2EW-JHGRP-LRPEWRC-SD-DRG-100457	It is understood that the proposed basin attenuates flow to the pre-dev situation prior to discharging into the CoPC Hill Road trunk drainage. However, for connection into the CoPC Hill Road trunk drainage, demonstration of adequate capacity is required as it seems trunk drainage capacity is inadequate and there are regular flooding issues in Hill Road. Maximizing the detention storage might help to improve Hill Road drainage situation. The council is currently undertaking investigation and opportunities to improve the flooding situation		O			C	IC (TM) 04/09/25 This comment is not regarding the Public Works as per the CoPC MoU and so can be closed.	04-Sep-2025
38	DDR	SD-0001		S Joyia	29-Aug-2025	Catchment Management	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001 to PLR2EW-JHGRP-LRPEWRC-SD-DRG-100457	There is an existing swale in between Sekisui development and PLR2 alignment. Majority of the swales drain westward and then northward along the perimeter of the Sekisui development. It is not clear that this swale is still preserved and upgraded. This swale may have the opportunity to reduce flooding issues at Hill Road by allowing overland flow path. We request to have full assessment of the overland flow paths and flooding so that it is ensured that PLR design does not limit any opportunities to alleviate existing flooding issues in Hill Road and also not creating blockage of existing overland flow paths through out full section of the design. This swale is critical for conveying overland flow from SOPA-owned land west of Hill Road around the Woolara landfill area. The swale/swales are contained within section 6 to 11.		O			C	IC (TM) 04/09/25 This comment is not regarding the Public Works as per the CoPC MoU and so can be closed. However it is understood that the Contractor is liasing with SOPA to ensure the existing swale is reinstated so that the overland flow paths are not impacted, the IC has requested confirmation that overland flows are not impacted, see comment 153.	04-Sep-2025
39	DDR	SD-0001		S Joyia	29-Aug-2025	Catchment Management	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001 to PLR2EW-JHGRP-LRPEWRC-SD-DRG-100457	All stormwater system should be owned and maintained by TfNSW being in the vicinity of railway track. It will also ensure the track serviceability is achieved as required. Smaller section in Hill Road (37-1, 37-2, 36-1, 22-2,22-1 and 25-1) should be Council assets and designed as per council standard drawings and design criteria. **IC (TM) 8/9/25 All assets within or serving the Public Works areas (only) will be transferred to CoPC in accordance with the MoU. Any drainage assets that serve the PLRC will be owned and maintained by TfNSW.** **It's understood 37-1, 37-2, 36-1, 22-2,22-1 and 25-1 will be TfNSW assets, Contractor to confirm and indicate ownership clearly on the**		O	Lily Liu [JHG]: An RFI will be submitted first to confirm which assets are TfNSW and CoPC.	22-Sep-2025	C	IC (TM) 1/12/25 See IC comment 30 for resolution of TfNSW instructed ownership of drainage asset in RFI-159, therefore this comment can be closed	01-Dec-2025
40	DDR	SD-0001		S Joyia	29-Aug-2025	Catchment Management	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001 to PLR2EW-JHGRP-LRPEWRC-SD-DRG-100457	Proprietary products are proposed for water quality treatment; Council does not support proprietary products except GPT if it is Council asset.		O			C	IC (TM) 04/09/25 Water quality treatment products are TfNSW assets, comment can be closed	04-Sep-2025
41	DDR	SD-0001		S Joyia	29-Aug-2025	Catchment Management	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001 to PLR2EW-JHGRP-LRPEWRC-SD-DRG-100457	Full flows from two 375 pipes are connected to the bio-retention basin-1, we recommend diverting high flows and only treatable flows to the bio-retention basin for better performance and less maintenance in future. Similar consideration should be given to Bio-retention basin 2. **IC (TM) 04/09/25 Although this basin is a TfNSW asset and therefore not for CoPC to maintain, Contractor address comment**		O	Tim Snape (GHD): The two outlets serve the carpark area only, and represent a relatively small catchment into the basin compared tho the PLRC, the pipes are not running full.	22-Sep-2025	C	IC (TM) 1/12/25 This comment is not regarding the Public Works as per the CoPC MoU and so can be closed.	01-Dec-2025

Parramatta Light Rail - Stage 2 Enabling Works
Contract No. IPD 22-12894

DESIGN REVIEW RECORD (DRR)

Contract:	PLR 2 - ENABLING WORKS CONTRACT
DP Ref:	SD-0001
Design Package Title:	Stormwater Drainage and Water Quality Design
Design Report:	As per transmittal
Drawing List:	As per transmittal

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42	DDR	SD-0001		S Joyia	29-Aug-2025	Catchment Management	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001 to PLR2EW-JHGRP-LRPEWRC-SD-DRG-100457	All council pits should be as per council standard drawings and not TfNSW pits. **IC (TM) 04/09/25 Contractor to respond, asset ownership not clear and council stds are not referenced**		O	Lily Liu [JHG]: An RFI will be submitted first to confirm which assets are TfNSW and CoPC.	22-Sep-2025	C	IC (TM) 1/12/25 See IC comment 30 for resolution of TfNSW instructed ownership of drainage asset in RFI-159, the Contractor has referenced CoPC standrads in Section 3.1 therefore this comment can be closed	01-Dec-2025
43	DDR	SD-0001		S Joyia	29-Aug-2025	Catchment Management	CoPC	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001 to PLR2EW-JHGRP-LRPEWRC-SD-DRG-100457	The design report mentions the attachment of "PLR2EW-JHGRP-NWW-DR-MEM-000002" for Climate Change approach which is not attached. Please share this technical memo to understand the approach taken.		O			C	IC (TM) 04/09/25 Memo is included in Appendix D-2 in DDR, comment can be closed	04-Sep-2025

Parramatta Light Rail - Stage 2 Enabling Works
Contract No. IPD 22-12894

DESIGN REVIEW RECORD (DRR)

Contract:	PLR 2 - ENABLING WORKS CONTRACT
DP Ref:	SD-0001
Design Package Title:	Stormwater Drainage and Water Quality Design
Design Report:	As per transmittal
Drawing List:	As per transmittal

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1	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Kerry Darcovich	12-Dec-2024	Senior Manager Environment & Ecology Sydney Olympic Park Authority	SOPA	drawing 100106.A.S4.A.01			O	Edoardo Fusina [JHG]: Reinstatement of the SOPA lands within the site will be undertaken in accordance with the Reinstatement Area requirements of the SOPA Development Agreement requirements. Furter details will be provided in the next design stage submissions.	30-Jan-2025	C	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all Third Party comments from previous design stage should be closed if not a non compliance to the SOPA Development Agreement, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
2	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100011			O	Sophie Afraz [GHD]: The LGA boundary can be added to the key plan in future submissions.	30-Jan-2025	C	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all Third Party comments from previous design stage should be closed if not a non compliance to the SOPA Development Agreement, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
3	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101	NA / Parramatta council LGA			Noted	30-Jan-2025	C	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all Third Party comments from previous design stage should be closed if not a non compliance to the SOPA Development Agreement, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
4	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102	NA / Parramatta council LGA			Noted	30-Jan-2025	C	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all Third Party comments from previous design stage should be closed if not a non compliance to the SOPA Development Agreement, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
5	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100103	NA / Parramatta council LGA			Noted	30-Jan-2025	C	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all Third Party comments from previous design stage should be closed if not a non compliance to the SOPA Development Agreement, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
6	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104	NA / Parramatta council LGA			Noted	30-Jan-2025	C	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all Third Party comments from previous design stage should be closed if not a non compliance to the SOPA Development Agreement, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
7	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100105	NA / Parramatta council LGA			Noted	30-Jan-2025	C	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all Third Party comments from previous design stage should be closed if not a non compliance to the SOPA Development Agreement, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
8	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100106	1- Review pit numbers 14-18 and 14-19; they should be updated to 14-17 and 14-18 as per the Longitudinal Section (LS). 2- In the next stage, include details of the integration with the proposed development and ensure it does not obstruct overland flow. 3- Show existing services. 4- Show details of JP with pipe inlets/outlets at 14/4 in the next submission		O	Sophie Afraz [GHD]: 1.Pit Numbers will be reviewed at the next design stage 2.The grated trench/scuppers are located at the low side of track slab and won't include any component above the track slab. Refer to Bridge structural package for bridge cross section and the interface with the bridge drainage sustem 3.Noted will be shown at the next design stage 4.This is a grated trench with vertical outlet connecting to the longitudinal drainage.	30-Jan-2025	C	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all Third Party comments from previous design stage should be closed if not a non compliance to the SOPA Development Agreement, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
9	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100107	1- In the next stage, include details of the integration with the proposed development and ensure it does not obstruct overland flow. 2- Show existing services.		O	Tim Snape [GHD]: The PLRC drainage has no interface with or reliance upon other developments drainage, and like wise Sekisui will not have the ability to discharge stormwater onto the PLRC.	30-Jan-2025	C	IC (TM) Comment to be closed, no drainage connection from other devleopments into PLR2EW drainage and vice versa.	06-Feb-2025
10	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100108	1- In the next stage, include details of the integration with the proposed development and ensure it does not obstruct overland flow. 2- Show existing services.		O	Tim Snape [GHD]: The PLRC drainage has no interface with or reliance upon other developments drainage, and like wise Sekisui will not have the ability to discharge stormwater onto the PLRC.	30-Jan-2025	C	IC (TM) Comment to be closed, no drainage connection from other devleopments into PLR2EW drainage and vice versa.	06-Feb-2025
11	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109	Show existing services		O	Tim Snape [GHD]: Combined services are shown within package UT-00001; services applicable to the drainage design will be documented as designs are progressed and the existing services potholing is completed.	30-Jan-2025	C	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all Third Party comments from previous design stage should be closed if not a non compliance to the SOPA Development Agreement, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
12	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110	1- Update pit numbers for Line 37 (use 37-2 and 37-3 instead of 36-…). 2- Show existing services. 3- Confirm if there is sufficient capacity in the CoPC trunk drainage for the additional connection. 4- Ensure outside pipe barrel at pit is at least 150mm from the internal pit corners eg. Pit 22/1 5- Provide new junction pit at 37/3 6- From page 135 of the design report, the sag point at the north west kerb return of the signalised intersection appears to be located closer to Hill Rd 7- Consider providing a bike safe grated kerb inlet pit upstream of the kerb ramp 8- Ensure sag points at the kerb returns of the intersection have sag pits and ensure pits and lintel locations are not in conflict with kerb ramps		O	Sophie Afraz [GHD]: 1.Noted - will be updated 2.Noted - will be updated 3.detention basin is provided to attenuate desing case peak flow rate to the existing case peak flow rate at the discharging point to CoPC system. 4.Noted. 5. 375mm pipe is 3 size smaller than existing 600mm pipe and can be directly conntected to the existing pipe. The CoPC who is the asset owner didn't raise any concern about this connection. 6.The drawings are reflecting the latest design. 7.Noted. 8.Noted.	30-Jan-2025	C	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all Third Party comments from previous design stage should be closed if not a non compliance to the SOPA Development Agreement, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
13	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100111	NA / Parramatta council LGA			Noted	30-Jan-2025	C	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all Third Party comments from previous design stage should be closed if not a non compliance to the SOPA Development Agreement, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025

Parramatta Light Rail - Stage 2 Enabling Works
Contract No. IPD 22-12894

DESIGN REVIEW RECORD (DRR)

Contract:	PLR 2 - ENABLING WORKS CONTRACT
DP Ref:	SD-0001
Design Package Title:	Stormwater Drainage and Water Quality Design
Design Report:	As per transmittal
Drawing List:	As per transmittal

ISSUED FOR REVIEW			
SUBMISSION	**NO. OF DWGS**	**TIME ISSUED**	**DATE ISSUED**
SDR	-		Friday, 6 December 2024

<====== TO BE COMPLETED BY IC

COMPLIANCE STATUS LEGEND

O Observation / Comment

N Non-Compliant (must provide reference to a Project Deed / SWTC requirement)

TO BE COMPLETED BY IC======>

RESPONSE STATUS LEGEND

O Open
C Closed
CS Closed SUBJECT TO additional action / information

FOR IC USE ONLY
L Certification Limitation
H Drawings or part thereof on HOLD

IC Use Only	DRR TEAMBINDER REF:	
DRR REV	**DRR STATUS**	**DATE**

No.	Stage	PACKAGE	Rev	Reviewer Name	Initial Comment Date	Discipline	Organisation	Document Reference	[redacted]	Project Deed ref	Compliance Status	Contractor Response	Initial Response Date	Response Status	Reviewer Comment Closeout	Date Comment Closed
14	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201	NA / Parramatta council LGA			Noted	30-Jan-2025	**C**	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all Third Party comments from previous design stage should be closed if not a non compliance to the SOPA Development Agreement, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
15	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100202	NA / Parramatta council LGA			Noted	30-Jan-2025	**C**	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all Third Party comments from previous design stage should be closed if not a non compliance to the SOPA Development Agreement, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
16	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100203	NA / Parramatta council LGA			Noted	30-Jan-2025	**C**	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all Third Party comments from previous design stage should be closed if not a non compliance to the SOPA Development Agreement, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
17	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100204	NA / Parramatta council LGA			Noted	30-Jan-2025	**C**	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all Third Party comments from previous design stage should be closed if not a non compliance to the SOPA Development Agreement, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
18	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100205	NA / Parramatta council LGA			Noted	30-Jan-2025	**C**	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all Third Party comments from previous design stage should be closed if not a non compliance to the SOPA Development Agreement, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
19	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100206	Provide pit schedule in next stage		**O**	Sophie Afraz [GHD]: The pit schedule will be provided in the PDR submission.	30-Jan-2025	**C**	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all Third Party comments from previous design stage should be closed if not a non compliance to the SOPA Development Agreement, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
20	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100207	Provide pit schedule in next stage		**O**	Sophie Afraz [GHD]: The pit schedule will be provided in the PDR submission.	30-Jan-2025	**C**	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all Third Party comments from previous design stage should be closed if not a non compliance to the SOPA Development Agreement, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
21	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100208	For long section of line-17, pits are shown at regular interval however there are no pits shown on the plan, please clarify. Provide pit schedule in next stage		**O**	Sophie Afraz [GHD]: These are scuppers not pits.	30-Jan-2025	**C**	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all Third Party comments from previous design stage should be closed if not a non compliance to the SOPA Development Agreement, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
22	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100209	For long section of line-17, pits are shown at regular interval however there are no pits shown on the plan, please clarify. Provide pit schedule in next stage		**O**	Sophie Afraz [GHD]: These are scuppers not pits.	30-Jan-2025	**C**	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all Third Party comments from previous design stage should be closed if not a non compliance to the SOPA Development Agreement, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
23	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100210	Provide pit schedule in next stage		**O**	Sophie Afraz [GHD]: The pit schedule will be provided in the PDR submission.	30-Jan-2025	**C**	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all Third Party comments from previous design stage should be closed if not a non compliance to the SOPA Development Agreement, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
24	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100211	NA / Parramatta council LGA			Noted	30-Jan-2025	**C**	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all Third Party comments from previous design stage should be closed if not a non compliance to the SOPA Development Agreement, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
25	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100212	Provide pit schedule in next stage		**O**	Sophie Afraz [GHD]: The pit schedule will be provided in the PDR submission.	30-Jan-2025	**C**	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all Third Party comments from previous design stage should be closed if not a non compliance to the SOPA Development Agreement, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
26	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100213	Line 38 -connects directly to trunk drainage. Please show the size of trunk drainage on plan & verify if direct conneciton can be made. Provide pit schedule in next stage		**O**	Tim Snape [GHD]: 1) PDR Submission will document details of the existing pipe sizes as suggested. 2) Direct connection of the referenced line is subject to approval of the asset owner, but is the current proposal. The design will be reviewed during PDR to reflect the outcome of any consultation.	30-Jan-2025	**C**	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all Third Party comments from previous design stage should be closed if not a non compliance to the SOPA Development Agreement, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
27	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100214	NA / Parramatta council LGA			Noted	30-Jan-2025	**C**	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all Third Party comments from previous design stage should be closed if not a non compliance to the SOPA Development Agreement, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025

Parramatta Light Rail - Stage 2 Enabling Works
Contract No. IPD 22-12894

DESIGN REVIEW RECORD (DRR)

Contract:	PLR 2 - ENABLING WORKS CONTRACT
DP Ref:	**SD-0001**
Design Package Title:	**Stormwater Drainage and Water Quality Design**
Design Report:	As per transmittal
Drawing List:	As per transmittal

ISSUED FOR REVIEW			
SUBMISSION	**NO. OF DWGS**	**TIME ISSUED**	**DATE ISSUED**
SDR	-		**Friday, 6 December 2024**

<====== TO BE COMPLETED BY IC

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O Observation / Comment

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C Closed
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DRR REV	**DRR STATUS**	**DATE**

No.	Stage	PACKAGE	Rev	Reviewer Name	Initial Comment Date	Discipline	Organisation	Document Reference	[redacted]	Project Deed ref	Compliance Status	Contractor Response	Initial Response Date	Response Status	Reviewer Comment Closeout	Date Comment Closed
28	SDR	Stormwater Drainage and Water Quality Design (SD-0001)	A	Hassan Narimani	16-Dec-2024	Senior Manager Engineering & Infrastructure Assets	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100215	NA / Parramatta council LGA			Noted	30-Jan-2025	**C**	IC (TM) 21/05/25 As agreed with TfNSW at Project Management Meeting (PMM) on 26/03/25 all Third Party comments from previous design stage should be closed if not a non compliance to the SOPA Development Agreement, and addressed by the Contractor. The Third Party is to raise a new comment at the next stage if they consider the issue still open.	21-May-2025
29	PDR	PLR2 EW- SD-0001 Stormwater Drainage and Water Quality Design	B	Kamrul Hasan	16-May-2025	Drainage	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110 and PLR2EW-JHGRP-LRPEWRC-SD-DRG-100111	On the north-west side of MC00, from Ch-8100 to Ch-8200, SOPA's existing overland flow path is obstructed by the rail track. Provide details on how SOPA's current overland flow path functions. Show the flow arrow and path . Refer to the snapshot below, highlighted in yellow, for details.		**0**			**C**	IC (TM) 21/05/25 The future light rail is not part of this enabling works contract or SOPA Development agreement and so this comment can be closed.	21-May-2025
30	PDR	PLR2 EW- SD-0001 Stormwater Drainage and Water Quality Design	B	Kamrul Hasan	16-May-2025	Drainage	SOPA	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110	Show details how the overland flow path along the western side of the bioretention basin 3 and SOPA's the existing overland flowpath works along the SAS project boundary. Refer to the above shapshot, highlighted yellow, for details.		**0**	Tim Snape (GHD): There is no defined drainage feature shown in the detailed survey undertaken for the project. Further investigations will be undertaken at the DDR stage to confirm overland flows within the footprint of the SOPA Construction Licensed Area. EF(JHG) 23-09-2025: Assessment of overland flow paths and flooding will be provided in design package FL-0001.	05-Jun-2025	**C**	IC (TM) 12/09/25 Although section 4.3.2.2.4 has been added to the DDR SD-0001 report confirming the min dim of the swale to be reinstated to ensure min flow paths are not affected, the analysis of the flow paths has not been provided, will this be in FL-0001 DDR? TM 2/10/25 Transfer comment to FL-0001 **AD (IC): 03/10/2025 - comment has been transferred to package FL-0001 as comment number 03.**	
31	PDR	PLR2 EW- SD-0001 Stormwater Drainage and Water Quality Design	B	Gabriela Fernandez	19-May-2025	Stormwater drainage	SOPA		Please show existing and proposed flow paths in SOPA land and indicate how the project reduces impacts to SOPA land		**0**	Tim Snape (GHD): Agreed any drainage features captured in the detailed site survey impact by the permanent works will be captured and any impacts added to the DDR SD-0001 submission. EF(JHG) 23-09-2025: Assessment of overland flow paths and flooding will be provided in design package FL-0001.	05-Jun-2025	**C**	IC (TM) 12/09/25 Although section 4.3.2.2.4 has been added to the DDR SD-0001 report confirming the min dim of the swale to be reinstated to ensure min flow paths are not affected, the analysis of the flow paths has not been provided, will this be in FL-0001 DDR? TM 2/10/25 Transfer comment to FL-0001 **AD (IC): 03/10/2025 - comment has been transferred to package FL-0001 as comment number 04.**	
32	PDR	PLR2 EW- SD-0001 Stormwater Drainage and Water Quality Design	B	Hassan Narimani	24-May-2025	civil/flooding	SOPA	Overall	**** Transferred from BR-0002 SDR SOPA comment 15**** **RFI on Swale Impacted by PLR2 Early Works** The swale located between the Sekisui development and the PLR2 corridor, which PLR 2 EW has either not adequately considered or clarified resulting in its obstruction by the PLR2 Early Works (EW). Please refer to the attached screenshot. Originally, Transport for NSW indicated this swale would be retained (earlier concept plans). This swale is essential for conveying runoff from SOPA-owned land to the west of Hill Road. Further at the western boundary of the Sekisui development, there is a well-defined swale which needs to be retained for overland flows. Hence, the PLR2 EW design should ensure that the existing functionality of the swale at the western and southern boundaries of the Sekisui development is maintained post PLR2 EW construction. Additionally, this will also have the potential to divert Hill Road flood , that d flood rainage flood risk. tional ailable. ctations			EF(JHG): The existing swale as identified in the drawings is not impacted by the Permanent Works for PLR2EW. Overland flow will be reviewed as part of the Rehabilitation Strategy for Reinstatement Area 2b. Further consultation will be undertaken during DDR for SOPA Reinstatement Areas as per the SOPA Development Agreement. EF(JHG) 23-09-2025: Th reinstatement swale will be developed and documented as part of the SOPA Reinstatement Works and will be separate from the SD-0001 design package as it is located within the TL-06 SOPA Reinstatement Area 1:	03-Jul-2025	**C**	IC (TM) 12/09/25 Although section 4.3.2.2.4 has been added to the DDR SD-0001 report confirming the min dim of the swale to be reinstated to ensure min flow paths are not affected this swale is not detailed in the drgs. IC (TM) 1/12/25 Impact of permanent piling platform on over land flow has been assessd in FL-0001, see associated comments as part of that package review. The Contractor will reinstate the swale as indicted in BR-0002 drawings, comment closed. Also see IC commment 166 regarding additional pipe to be included underneath the piling platform.	01-Dec-2025

Parramatta Light Rail - Stage 2 Enabling Works
Contract No. IPD 22-12894

DESIGN REVIEW RECORD (DRR)

Contract:	PLR 2 - ENABLING WORKS CONTRACT
DP Ref:	**SD-0001**
Design Package Title:	**Stormwater Drainage and Water Quality Design**
Design Report:	As per transmittal
Drawing List:	As per transmittal

ISSUED FOR REVIEW			
SUBMISSION	**NO. OF DWGS**	**TIME ISSUED**	**DATE ISSUED**
SDR	-		**Friday, 6 December 2024**

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COMPLIANCE STATUS LEGEND

O Observation / Comment

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RESPONSE STATUS LEGEND

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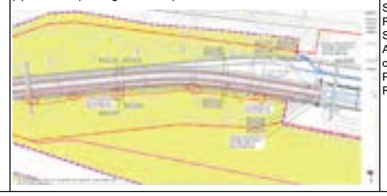
DRR REV	**DRR STATUS**	**DATE**

No.	Stage	PACKAGE	Rev	Reviewer Name	Initial Comment Date	Discipline	Organisation	Document Reference		Project Deed ref	Compliance Status	Contractor Response	Initial Response Date	Response Status	Reviewer Comment Closeout	Date Comment Closed
33	DDR	PLR2 EW- SD-0001 Stormwater Drainage and Water Quality Design	A	Gabriela Fernandez	18.08.25	Interface	SOPA	PLR2EW-JHGRP-LRPEWRC-SR-DRG-100209	**** 08/09/25 Transferred from CS-0001 DDR SOPA comment 2**** See below mark-up. Stormwater drainage has been shifted to land coming back to SOPA. This area is identified as Rehabilitation area 2b. SOPA requires small plants and shrubs to be planted in this area. There has been no mention of a stormwater pipe running through this land. The pipe will limit planting. SOPA requires clarification. 	PART 3 - Reinstatement Area Requirements. 1/ 3 Requirements - Reinstatement Area 2. In relation to all of Reinstatement Area 2, TfNSW: will reinstate Utilities and Services in accordance with the Rehabilitation Strategy and all relevant Approvals and the requirements of any relevant Public Authorities as relevant to Reinstatement Area 2;	**O**	L Liu [JHG]: Request for comment to be transferred to SD-0001. Lily Liu [JHG] 22/09/2025: This line 19 will be moved under the alignment.	05-Sep-2025	**C**	IC (TM) 25/08/25 the IC has amended this from a non compliance to an Observation, for the Contractor to respond, because it is not clear if the relocation of drainage line 19 (detailed in SD-0001 and only shown for information in this CS-0001 CSR package) is within SOPA rehabilitation area 2c or 2a (ie land that will not be handed back to SOPA) IC (TM) 1/12/25 Line 19 has been relocated at AFC to under the alignment therefore outside of SOPA land, therefore comment closed	01-Dec-2025

Document Transmittal

Transmittal No: PLR2EW-JHGRP-TX-000092

Date:	06 December 2024 03:57 PM
Reason for Issue:	Issued For Review
Subject:	PLR2EW - SD-0001 Stormwater Drainage and Water Quality Design - SDR Design Stage - Submit for Review
Contract No:	PLR2EW - Enabling Works Detailed Design and Construction

Message:

Dear [redacted],

Pursuant to Clause 5.5 of the Deed, please find **attached** the following design package which is submitted for review under section 7.3.2.2(b) of Annexure 3 of the Management Requirements.

Design Package Number: SD-0001

Design Package Name: Stormwater Drainage and Water Quality Design

Design Stage: SDR

Kind regards,

[redacted]

Contractor's Representative

Transmitted to:

Company	Name
Transport for NSW	[redacted]

Transmitted cc:

Company	Name
Transport for NSW	[redacted]
Transport for NSW	[redacted]
Transport for NSW	PLR2 Delivery Document Control
The APP Group	[redacted]
The APP Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]

John Holland Group	[redacted]

Click here to download all Transmittal files.

Click on Document Nos to download them individually.

Item	Document No	Rev	Sts	Title	Contract No	Design Package No
1	PLR2EW-JHGRP-LRPEWRC-SD-CER-100001	A.01	S4	PLR2EW - Stormwater Drainage - Schedule 5 Designer's Certificate of Design Compliance	PLR2EW	
2	PLR2EW-JHGRP-LRPEWRC-SD-CER-100002	A.01	S4	PLR2EW - Stormwater Drainage - Schedule 5 Contractor's Certificate of Design Compliance	PLR2EW	
3	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001	A.01	S4	PLR2EW - Stormwater Drainage - Cover Sheet	PLR2EW	
4	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100005	A.02	S4	PLR2EW - Stormwater Drainage - Drawing Index	PLR2EW	
5	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100011	A.02	S4	PLR2EW - Stormwater Drainage - Key Plan	PLR2EW	
6	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101	A.02	S4	PLR2EW - Stormwater Drainage - Drawing Sheet 1	PLR2EW	
7	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102	A.01	S4	PLR2EW - Stormwater Drainage - Drawing Sheet 2	PLR2EW	
8	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100103	A.01	S4	PLR2EW - Stormwater Drainage - Drawing Sheet 3	PLR2EW	
9	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104	A.01	S4	PLR2EW - Stormwater Drainage - Drawing Sheet 4	PLR2EW	
10	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100105	A.01	S4	PLR2EW - Stormwater Drainage - Drawing Sheet 5	PLR2EW	
11	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100106	A.01	S4	PLR2EW - Stormwater Drainage - Drawing Sheet 6	PLR2EW	
12	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100107	A.01	S4	PLR2EW - Stormwater Drainage - Drawing Sheet 7	PLR2EW	

13	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100108	A.01	S4	PLR2EW - Stormwater Drainage - Drawing Sheet 8	PLR2EW	
14	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109	A.01	S4	PLR2EW - Stormwater Drainage - Drawing Sheet 9	PLR2EW	
15	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110	A.01	S4	PLR2EW - Stormwater Drainage - Drawing Sheet 10	PLR2EW	
16	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100111	A.01	S4	PLR2EW - Stormwater Drainage - Drawing Sheet 11	PLR2EW	
17	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201	A.01	S4	PLR2EW - Stormwater Drainage - Drainage Long Section Sheet 1	PLR2EW	
18	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100202	A.01	S4	PLR2EW - Stormwater Drainage - Drainage Long Section Sheet 2	PLR2EW	
19	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100203	A.01	S4	PLR2EW - Stormwater Drainage - Drainage Long Section Sheet 3	PLR2EW	
20	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100204	A.01	S4	PLR2EW - Stormwater Drainage - Drainage Long Section Sheet 4	PLR2EW	
21	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100205	A.01	S4	PLR2EW - Stormwater Drainage - Drainage Long Section Sheet 5	PLR2EW	
22	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100206	A.01	S4	PLR2EW - Stormwater Drainage - Drainage Long Section Sheet 6	PLR2EW	
23	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100207	A.01	S4	PLR2EW - Stormwater Drainage - Drainage Long Section Sheet 7	PLR2EW	
24	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100208	A.01	S4	PLR2EW - Stormwater Drainage - Drainage Long Section Sheet 8	PLR2EW	
25	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100209	A.01	S4	PLR2EW - Stormwater Drainage - Drainage Long Section Sheet 9	PLR2EW	
26	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100210	A.01	S4	PLR2EW - Stormwater Drainage - Drainage Long Section Sheet 10	PLR2EW	
27	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100211	A.01	S4	PLR2EW - Stormwater Drainage - Drainage	PLR2EW	

				Long Section Sheet 11		
28	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100212	A.01	S4	PLR2EW - Stormwater Drainage - Drainage Long Section Sheet 12	PLR2EW	
29	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100213	A.01	S4	PLR2EW - Stormwater Drainage - Drainage Long Section Sheet 13	PLR2EW	
30	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100214	A.01	S4	PLR2EW - Stormwater Drainage - Drainage Long Section Sheet 14	PLR2EW	
31	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100215	A.01	S4	PLR2EW - Stormwater Drainage - Drainage Long Section Sheet 15	PLR2EW	
32	PLR2EW-JHGRP-LRPEWRC-SD-DRG-199999	A.01	S4	PLR2EW - Stormwater Drainage - Combined Drawings	PLR2EW	
33	PLR2EW-JHGRP-LRPEWRC-SD-M2D-199999	A.01	S4	PLR2EW - Stormwater Drainage - Combined Model Files	PLR2EW	
34	PLR2EW-JHGRP-LRPEWRC-SD-M3D-199999	A.01	S4	PLR2EW - Stormwater Drainage - Combined M3D Models	PLR2EW	
35	PLR2EW-JHGRP-LRPEWRC-SD-REG-100001	A.01	S4	PLR2EW - Stormwater Drainage - Comment Register - TfNSW	PLR2EW	
36	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	A.01	S4	PLR2EW - Stormwater Drainage - Report	PLR2EW	

Transmitted by: [redacted], John Holland Group

Attachment(s):

Document Transmittal

Transmittal No: PLR2EW-JHGRP-TX-000205

Date: 30 January 2025 05:34 PM

Reason for Issue:

Subject: PLR2EW | SD-0001 Stormwater Drainage and Water Quality Design - Rev A – JHGRP Comment Responses

Contract No: PLR2EW - Enabling Works Detailed Design and Construction

Message:

Dear [redacted],

Please find the attached Revision A of the Stormwater Drainage and Water Quality Design - JH Comment Sheet (PLR2EW-JHGRP-LRPEWRC-SD-COM-100001) as a response to comments raised in PLR2EW-APP-TX-000051 for design package SD-0001 Stormwater Drainage and Water Quality Design.

Kind regards,

[redacted]

Contractor's Representative

Transmitted to:

Company	Name
The APP Group	[redacted]

Transmitted cc:

Company	Name
The APP Group	[redacted]
The APP Group	[redacted]
The APP Group	[redacted]
Transport for NSW	[redacted]
Transport for NSW	[redacted]
Transport for NSW	[redacted]
Transport for NSW	C[redacted]
Transport for NSW	[redacted]
Transport for NSW	PLR2 Delivery Document Control
Transport for NSW	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]

John Holland Group	[redacted]

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Item	Document No	Rev	Sts	Title	Contract No	Design Package No
1	PLR2EW-JHGRP-LRPEWRC-SD-COM-100001	A.01	S3	PLR2EW - Stormwater Drainage and Water Quality Design - JH Comment Sheet	PLR2EW	

Transmitted by: [redacted], John Holland Group

Attachment(s):

Document Transmittal

Transmittal No: PLR2EW-JHGRP-TX-000399

Date: 06 May 2025 05:44 PM

Reason for Issue:

Subject: PLR2EW - SD-0001 Stormwater Drainage and Water Quality Design - PDR Design Stage - Submit for Review

Contract No: PLR2EW - Enabling Works Detailed Design and Construction

Message:

Dear [redacted],

Pursuant to Clause 5.5 of the Deed, please find **attached** the following design package which is submitted for review under section 7.3.2.3(b) of Annexure 3 of the Management Requirements.

Design Package Number: SD-0001

Design Package Name: Stormwater Drainage

Design Stage: PDR

Kind Regards,

[redacted]

Contractor's Representative

Transmitted to:

Company	Name
Transport for NSW	[redacted]

Transmitted cc:

Company	Name
Transport for NSW	[redacted]
Transport for NSW	[redacted]
Transport for NSW	PLR2 Delivery Document Control
The APP Group	[redacted]
The APP Group	[redacted]
The APP Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]

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Item	Document No	Rev	Sts	Title	Contract No	Design Package No
1	PLR2EW-JHGRP-LRPEWRC-DE-REG-100001	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Task Information Delivery Plan	PLR2EW	
2	PLR2EW-JHGRP-LRPEWRC-SD-CER-100001	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule 5 Designer's Certificate of Design Compliance	PLR2EW	
3	PLR2EW-JHGRP-LRPEWRC-SD-CER-100002	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule 5 Contractor's Certificate of Design Compliance	PLR2EW	
4	PLR2EW-JHGRP-LRPEWRC-SD-CER-100103	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Model Validation Certificate - PLR2EW-JHGRP-LRPEWRC-SD-M3D-100101	PLR2EW	
5	PLR2EW-JHGRP-LRPEWRC-SD-CER-100104	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Model Validation Certificate - PLR2EW-JHGRP-LRPEWRC-SD-M3D-100102	PLR2EW	
6	PLR2EW-JHGRP-LRPEWRC-SD-COM-100001	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage and Water Quality Design - JH Comment Sheet	PLR2EW	
7	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Cover Sheet	PLR2EW	
8	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100005	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Drawing Index	PLR2EW	
9	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100011	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Key Plan	PLR2EW	
10	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100015	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - General Notes	PLR2EW	
11	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 1	PLR2EW	

12	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 2	PLR2EW	
13	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100103	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 3	PLR2EW	
14	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 4	PLR2EW	
15	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100105	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 5	PLR2EW	
16	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100106	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 6	PLR2EW	
17	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100107	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 7	PLR2EW	
18	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100108	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 8	PLR2EW	
19	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 9	PLR2EW	
20	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 10	PLR2EW	
21	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100111	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 11	PLR2EW	
22	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100112	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 12	PLR2EW	
23	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100113	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 13	PLR2EW	
24	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100114	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 14	PLR2EW	
25	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 1	PLR2EW	
26	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100152	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 2	PLR2EW	

27	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100153	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 3	PLR2EW	
28	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100154	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 4	PLR2EW	
29	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100155	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 5	PLR2EW	
30	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 1	PLR2EW	
31	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100202	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 2	PLR2EW	
32	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100203	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 3	PLR2EW	
33	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100204	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 4	PLR2EW	
34	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100205	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 5	PLR2EW	
35	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100206	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 6	PLR2EW	
36	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100207	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 7	PLR2EW	
37	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100208	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 8	PLR2EW	
38	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100209	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 9	PLR2EW	

39	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100210	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 10	PLR2EW	
40	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100211	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 11	PLR2EW	
41	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100212	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 12	PLR2EW	
42	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100213	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 13	PLR2EW	
43	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100214	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 14	PLR2EW	
44	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100215	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 15	PLR2EW	
45	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100216	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 16	PLR2EW	
46	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100217	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 17	PLR2EW	
47	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100218	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 18	PLR2EW	
48	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100401	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail	PLR2EW	
49	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100451	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 1	PLR2EW	
50	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100452	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 2	PLR2EW	

51	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100453	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 3	PLR2EW	
52	PLR2EW-JHGRP-LRPEWRC-SD-DRG-199999	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined Drawings	PLR2EW	
53	PLR2EW-JHGRP-LRPEWRC-SD-M2D-199999	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined M2D Model Files	PLR2EW	
54	PLR2EW-JHGRP-LRPEWRC-SD-M3D-199999	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined M3D Models	PLR2EW	
55	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Report	PLR2EW	

Transmitted by: [redacted], John Holland Group

Attachment(s):

Document Transmittal

Transmittal No: PLR2EW-JHGRP-TX-000400

Date: 06 May 2025 05:44 PM

Reason for Issue:

Subject: PLR2EW - Public Works Design Documents - SD-0001 Stormwater Drainage and Water Quality Design - PDR Design Stage - Submit for Review

Contract No: PLR2EW - Enabling Works Detailed Design and Construction

Message:

Dear [redacted],

Pursuant to Clause 7 and Schedule 2 of the Deed of Agreement for the Parramatta Light Rail Stage 2 Enabling Works between TfNSW and PMC, please find **attached** the following design packages forming part of the Public Works Design Documents submitted for your review.

Design Package Number	Design Package	Design Stage
SD-0001	Stormwater Drainage and Water Quality Design	PDR

As per the Deed of Agreement we kindly seek comments with respect to the Public Works contained within the Archer Park PMC Land nominated above within 10 Business Days of this transmittal.

Please find attached also a Comments Submission Form to facilitate the review.

Kind Regards,

[redacted]

Contractor's Representative

Transmitted to:

Company	Name
Planning Ministerial Corporation T/A Office of Strategic Lands	[redacted]

Transmitted cc:

Company	Name
Transport for NSW	[redacted]
The APP Group	[redacted]
The APP Group	[redacted]
The APP Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]

Transport for NSW	[redacted]
Transport for NSW	[redacted]
Transport for NSW	PLR2 Delivery Document Control
John Holland Group	[redacted]
Planning Ministerial Corporation T/A Office of Strategic Lands	[redacted]
Planning Ministerial Corporation T/A Office of Strategic Lands	[redacted]

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Click on Document Nos to download them individually.

Item	Document No	Rev	Sts	Title	Contract No	Design Package No
1	PLR2EW-JHGRP-LRPEWRC-SD-CER-100103	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Model Validation Certificate - PLR2EW-JHGRP-LRPEWRC-SD-M3D-100101	PLR2EW	
2	PLR2EW-JHGRP-LRPEWRC-SD-CER-100104	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Model Validation Certificate - PLR2EW-JHGRP-LRPEWRC-SD-M3D-100102	PLR2EW	
3	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Cover Sheet	PLR2EW	
4	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100005	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Drawing Index	PLR2EW	
5	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100011	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Key Plan	PLR2EW	
6	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100015	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - General Notes	PLR2EW	
7	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 1	PLR2EW	
8	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 2	PLR2EW	
9	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100103	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 3	PLR2EW	
10	PLR2EW-JHGRP-LRPEWRC-SD-DRG-	B.01	S4	PLR2EW - SD0001 - Stormwater	PLR2EW	

	100104			Drainage - Plan Sheet 4		
11	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100105	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 5	PLR2EW	
12	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100106	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 6	PLR2EW	
13	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100107	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 7	PLR2EW	
14	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100108	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 8	PLR2EW	
15	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 9	PLR2EW	
16	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 10	PLR2EW	
17	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100111	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 11	PLR2EW	
18	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100112	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 12	PLR2EW	
19	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100113	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 13	PLR2EW	
20	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100114	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 14	PLR2EW	
21	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 1	PLR2EW	
22	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100152	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 2	PLR2EW	
23	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100153	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 3	PLR2EW	
24	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100154	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 4	PLR2EW	
25	PLR2EW-JHGRP-LRPEWRC-SD-DRG-	A.01	S4	PLR2EW - SD0001 - Stormwater	PLR2EW	

	100155			Drainage - Schedule Sheet 5		
26	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 1	PLR2EW	
27	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100202	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 2	PLR2EW	
28	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100203	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 3	PLR2EW	
29	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100204	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 4	PLR2EW	
30	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100205	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 5	PLR2EW	
31	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100206	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 6	PLR2EW	
32	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100207	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 7	PLR2EW	
33	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100208	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 8	PLR2EW	
34	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100209	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 9	PLR2EW	
35	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100210	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 10	PLR2EW	
36	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100211	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 11	PLR2EW	
37	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100212	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 12	PLR2EW	

38	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100213	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 13	PLR2EW	
39	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100214	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 14	PLR2EW	
40	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100215	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 15	PLR2EW	
41	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100216	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 16	PLR2EW	
42	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100217	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 17	PLR2EW	
43	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100218	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 18	PLR2EW	
44	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100401	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail	PLR2EW	
45	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100451	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 1	PLR2EW	
46	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100452	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 2	PLR2EW	
47	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100453	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 3	PLR2EW	
48	PLR2EW-JHGRP-LRPEWRC-SD-DRG-199999	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined Drawings	PLR2EW	
49	PLR2EW-JHGRP-LRPEWRC-SD-M2D-199999	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined M2D Model Files	PLR2EW	

50	PLR2EW-JHGRP-LRPEWRC-SD-M3D-199999	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined M3D Models	PLR2EW	
51	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Report	PLR2EW	

Transmitted by: [redacted], John Holland Group

Attachment(s): PMC Comment Sheet - SD-0001 PDR.xlsx (25 KB)

Document Transmittal

Transmittal No: PLR2EW-JHGRP-TX-000401

Date: 06 May 2025 05:45 PM

Reason for Issue:

Subject: PLR2EW - Public Works Design Documents - SD-0001 Stormwater Drainage and Water Quality Design - PDR Design Stage - Submit for Review

Contract No: PLR2EW - Enabling Works Detailed Design and Construction

Message:

Dear [redacted]

Pursuant to Clause 7 and Schedule 2 of the MoU for the Parramatta Light Rail Stage 2 Enabling Works between TfNSW and CoPC, please find **attached** the following design packages forming part of the Public Works Design Documents submitted for your review.

Design Package Number	Design Package	Design Stage
SD-0001	Stormwater Drainage and Water Quality Design	PDR

As per the MoU we kindly seek comments with respect to the Public Works contained within the Archer Park CoPC Land nominated above within 10 Business Days of this transmittal.

Please find attached also a Comments Submission Form to facilitate the review.

Kind Regards,

Paul Dalziel

Contractor's Representative

Transmitted to:

Company	Name
City of Parramatta Council	[redacted]

Transmitted cc:

Company	Name
City of Parramatta Council	[redacted]
The APP Group	[redacted]
The APP Group	[redacted]
The APP Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]

Transport for NSW	[redacted]
Transport for NSW	[redacted]
Transport for NSW	PLR2 Delivery Document Control
Transport for NSW	[redacted]
John Holland Group	[redacted]

Click here to download all Transmittal files.

Click on Document Nos to download them individually.

Item	Document No	Rev	Sts	Title	Contract No	Design Package No
1	PLR2EW-JHGRP-LRPEWRC-SD-CER-100103	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Model Validation Certificate - PLR2EW-JHGRP-LRPEWRC-SD-M3D-100101	PLR2EW	
2	PLR2EW-JHGRP-LRPEWRC-SD-CER-100104	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Model Validation Certificate - PLR2EW-JHGRP-LRPEWRC-SD-M3D-100102	PLR2EW	
3	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Cover Sheet	PLR2EW	
4	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100005	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Drawing Index	PLR2EW	
5	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100011	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Key Plan	PLR2EW	
6	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100015	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - General Notes	PLR2EW	
7	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 1	PLR2EW	
8	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 2	PLR2EW	
9	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100103	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 3	PLR2EW	
10	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 4	PLR2EW	
11	PLR2EW-JHGRP-	B.01	S4	PLR2EW - SD0001 -	PLR2EW	

	LRPEWRC-SD-DRG-100105			Stormwater Drainage - Plan Sheet 5		
12	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100106	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 6	PLR2EW	
13	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100107	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 7	PLR2EW	
14	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100108	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 8	PLR2EW	
15	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 9	PLR2EW	
16	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 10	PLR2EW	
17	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100111	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 11	PLR2EW	
18	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100112	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 12	PLR2EW	
19	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100113	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 13	PLR2EW	
20	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100114	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 14	PLR2EW	
21	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 1	PLR2EW	
22	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100152	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 2	PLR2EW	
23	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100153	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 3	PLR2EW	
24	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100154	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 4	PLR2EW	
25	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100155	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 5	PLR2EW	

26	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 1	PLR2EW	
27	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100202	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 2	PLR2EW	
28	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100203	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 3	PLR2EW	
29	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100204	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 4	PLR2EW	
30	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100205	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 5	PLR2EW	
31	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100206	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 6	PLR2EW	
32	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100207	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 7	PLR2EW	
33	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100208	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 8	PLR2EW	
34	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100209	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 9	PLR2EW	
35	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100210	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 10	PLR2EW	
36	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100211	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 11	PLR2EW	
37	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100212	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 12	PLR2EW	
38	PLR2EW-JHGRP-LRPEWRC-SD-DRG-	B.01	S4	PLR2EW - SD0001 - Stormwater	PLR2EW	

	100213			Drainage - Longitudinal Sections Sheet 13		
39	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100214	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 14	PLR2EW	
40	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100215	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 15	PLR2EW	
41	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100216	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 16	PLR2EW	
42	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100217	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 17	PLR2EW	
43	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100218	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 18	PLR2EW	
44	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100401	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail	PLR2EW	
45	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100451	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 1	PLR2EW	
46	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100452	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 2	PLR2EW	
47	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100453	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 3	PLR2EW	
48	PLR2EW-JHGRP-LRPEWRC-SD-DRG-199999	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined Drawings	PLR2EW	
49	PLR2EW-JHGRP-LRPEWRC-SD-M2D-199999	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined M2D Model Files	PLR2EW	
50	PLR2EW-JHGRP-LRPEWRC-SD-M3D-199999	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined M3D Models	PLR2EW	

51	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Report	PLR2EW	

Transmitted by: [redacted], John Holland Group

Attachment(s): CoPC Comment Sheet - SD-0001 PDR.xlsx (25 KB)

Document Transmittal

Transmittal No: PLR2EW-JHGRP-TX-000401

Date: 06 May 2025 05:45 PM

Reason for Issue:

Subject: PLR2EW - Public Works Design Documents - SD-0001 Stormwater Drainage and Water Quality Design - PDR Design Stage - Submit for Review

Contract No: PLR2EW - Enabling Works Detailed Design and Construction

Message:

Dear [redacted]

Pursuant to Clause 7 and Schedule 2 of the MoU for the Parramatta Light Rail Stage 2 Enabling Works between TfNSW and CoPC, please find **attached** the following design packages forming part of the Public Works Design Documents submitted for your review.

Design Package Number	Design Package	Design Stage
SD-0001	Stormwater Drainage and Water Quality Design	PDR

As per the MoU we kindly seek comments with respect to the Public Works contained within the Archer Park CoPC Land nominated above within 10 Business Days of this transmittal.

Please find attached also a Comments Submission Form to facilitate the review.

Kind Regards,

[redacted]

Contractor's Representative

Transmitted to:

Company	Name
City of Parramatta Council	[redacted]

Transmitted cc:

Company	Name
City of Parramatta Council	[redacted]
The APP Group	[redacted]
The APP Group	[redacted]
The APP Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]

Transport for NSW	[redacted]
Transport for NSW	[redacted]
Transport for NSW	PLR2 Delivery Document Control
Transport for NSW	[redacted]
John Holland Group	[redacted]

Click here to download all Transmittal files.

Click on Document Nos to download them individually.

Item	Document No	Rev	Sts	Title	Contract No	Design Package No
1	PLR2EW-JHGRP-LRPEWRC-SD-CER-100103	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Model Validation Certificate - PLR2EW-JHGRP-LRPEWRC-SD-M3D-100101	PLR2EW	
2	PLR2EW-JHGRP-LRPEWRC-SD-CER-100104	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Model Validation Certificate - PLR2EW-JHGRP-LRPEWRC-SD-M3D-100102	PLR2EW	
3	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Cover Sheet	PLR2EW	
4	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100005	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Drawing Index	PLR2EW	
5	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100011	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Key Plan	PLR2EW	
6	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100015	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - General Notes	PLR2EW	
7	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 1	PLR2EW	
8	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 2	PLR2EW	
9	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100103	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 3	PLR2EW	
10	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 4	PLR2EW	
11	PLR2EW-JHGRP-	B.01	S4	PLR2EW - SD0001 -	PLR2EW	

	LRPEWRC-SD-DRG-100105			Stormwater Drainage - Plan Sheet 5		
12	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100106	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 6	PLR2EW	
13	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100107	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 7	PLR2EW	
14	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100108	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 8	PLR2EW	
15	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 9	PLR2EW	
16	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 10	PLR2EW	
17	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100111	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 11	PLR2EW	
18	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100112	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 12	PLR2EW	
19	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100113	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 13	PLR2EW	
20	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100114	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 14	PLR2EW	
21	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 1	PLR2EW	
22	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100152	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 2	PLR2EW	
23	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100153	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 3	PLR2EW	
24	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100154	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 4	PLR2EW	
25	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100155	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 5	PLR2EW	

26	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 1	PLR2EW	
27	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100202	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 2	PLR2EW	
28	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100203	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 3	PLR2EW	
29	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100204	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 4	PLR2EW	
30	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100205	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 5	PLR2EW	
31	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100206	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 6	PLR2EW	
32	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100207	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 7	PLR2EW	
33	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100208	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 8	PLR2EW	
34	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100209	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 9	PLR2EW	
35	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100210	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 10	PLR2EW	
36	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100211	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 11	PLR2EW	
37	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100212	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 12	PLR2EW	
38	PLR2EW-JHGRP-LRPEWRC-SD-DRG-	B.01	S4	PLR2EW - SD0001 - Stormwater	PLR2EW	

	100213			Drainage - Longitudinal Sections Sheet 13		
39	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100214	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 14	PLR2EW	
40	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100215	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 15	PLR2EW	
41	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100216	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 16	PLR2EW	
42	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100217	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 17	PLR2EW	
43	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100218	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 18	PLR2EW	
44	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100401	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail	PLR2EW	
45	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100451	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 1	PLR2EW	
46	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100452	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 2	PLR2EW	
47	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100453	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 3	PLR2EW	
48	PLR2EW-JHGRP-LRPEWRC-SD-DRG-199999	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined Drawings	PLR2EW	
49	PLR2EW-JHGRP-LRPEWRC-SD-M2D-199999	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined M2D Model Files	PLR2EW	
50	PLR2EW-JHGRP-LRPEWRC-SD-M3D-199999	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined M3D Models	PLR2EW	

51	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Report	PLR2EW	

Transmitted by: [redacted] John Holland Group

Attachment(s): CoPC Comment Sheet - SD-0001 PDR.xlsx (25 KB)

Document Transmittal

Transmittal No: PLR2EW-JHGRP-TX-000402

Date: 06 May 2025 05:45 PM

Reason for Issue:

Subject: PLR2EW - Category 1 Design Documents - SD-0001 Stormwater Drainage and Water Quality Design - PDR Design Stage - Submit for Review

Contract No: PLR2EW - Enabling Works Detailed Design and Construction

Message:

Dear [redacted]

Pursuant to Section 7 and Schedule 7 of the Development Agreement for the Parramatta Light Rail Stage 2 Enabling Works between TfNSW and SOPA, please find **attached** the following design package forming part of the Category 1 Design Documents submitted for your review.

Design Package Number	Design Package	Design Stage
SD-0001	Stormwater Drainage and Water Quality Design	PDR

As per the Development Agreement we kindly seek comments with respect to the Category 1 Design Documents nominated above within 10 Business Days of this transmittal.

Please find attached also a Comments Submission Form to facilitate the review.

Kind Regards,

[redacted]

Contractor's Representative

Transmitted to:

Company	Name
Sydney Olympic Park Authority	[redacted]

Transmitted cc:

Company	Name
Sydney Olympic Park Authority	[redacted]
Sydney Olympic Park Authority	[redacted]
Sydney Olympic Park Authority	[redacted]
Sydney Olympic Park Authority	[redacted]
Transport for NSW	[redacted]
The APP Group	[redacted]
The APP Group	[redacted]

The APP Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
Transport for NSW	[redacted]
Transport for NSW	[redacted]
Transport for NSW	PLR2 Delivery Document Control
John Holland Group	[redacted]

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Click on Document Nos to download them individually.

Item	Document No	Rev	Sts	Title	Contract No	Design Package No
1	PLR2EW-JHGRP-LRPEWRC-SD-CER-100103	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Model Validation Certificate - PLR2EW-JHGRP-LRPEWRC-SD-M3D-100101	PLR2EW	
2	PLR2EW-JHGRP-LRPEWRC-SD-CER-100104	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Model Validation Certificate - PLR2EW-JHGRP-LRPEWRC-SD-M3D-100102	PLR2EW	
3	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Cover Sheet	PLR2EW	
4	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100005	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Drawing Index	PLR2EW	
5	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100011	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Key Plan	PLR2EW	
6	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100015	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - General Notes	PLR2EW	
7	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 1	PLR2EW	
8	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 2	PLR2EW	

9	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100103	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 3	PLR2EW	
10	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 4	PLR2EW	
11	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100105	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 5	PLR2EW	
12	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100106	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 6	PLR2EW	
13	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100107	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 7	PLR2EW	
14	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100108	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 8	PLR2EW	
15	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 9	PLR2EW	
16	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 10	PLR2EW	
17	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100111	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 11	PLR2EW	
18	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100112	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 12	PLR2EW	
19	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100113	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 13	PLR2EW	
20	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100114	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 14	PLR2EW	
21	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 1	PLR2EW	
22	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100152	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 2	PLR2EW	
23	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100153	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 3	PLR2EW	

24	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100154	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 4	PLR2EW	
25	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100155	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 5	PLR2EW	
26	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 1	PLR2EW	
27	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100202	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 2	PLR2EW	
28	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100203	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 3	PLR2EW	
29	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100204	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 4	PLR2EW	
30	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100205	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 5	PLR2EW	
31	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100206	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 6	PLR2EW	
32	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100207	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 7	PLR2EW	
33	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100208	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 8	PLR2EW	
34	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100209	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 9	PLR2EW	
35	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100210	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 10	PLR2EW	
36	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100211	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections	PLR2EW	

				Sheet 11		
37	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100212	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 12	PLR2EW	
38	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100213	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 13	PLR2EW	
39	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100214	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 14	PLR2EW	
40	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100215	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 15	PLR2EW	
41	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100216	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 16	PLR2EW	
42	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100217	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 17	PLR2EW	
43	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100218	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 18	PLR2EW	
44	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100401	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail	PLR2EW	
45	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100451	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 1	PLR2EW	
46	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100452	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 2	PLR2EW	
47	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100453	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 3	PLR2EW	
48	PLR2EW-JHGRP-LRPEWRC-SD-DRG-199999	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined Drawings	PLR2EW	

49	PLR2EW-JHGRP-LRPEWRC-SD-M2D-199999	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined M2D Model Files	PLR2EW	
50	PLR2EW-JHGRP-LRPEWRC-SD-M3D-199999	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined M3D Models	PLR2EW	
51	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Report	PLR2EW	

Transmitted by: [redacted], John Holland Group

Attachment(s): SOPA Comment Sheet - SD-0001 PDR.xlsx (25 KB)

Document Transmittal

Transmittal No: PLR2EW-JHGRP-TX-000503

Date: 19 June 2025 05:08 PM

Reason for Issue:

Subject: PLR2EW - SD-0001 Stormwater Drainage and Water Quality Design - JH Comment Responses

Contract No: PLR2EW - Enabling Works Detailed Design and Construction

Message:

Dear [redacted],

Please find attached Revision C of the SD-0001 Stormwater Drainage and Water Quality Design - JH Comment Sheet (PLR2EW-JHGRP-LRPEWRC-SD-COM-100001) as a response to comments raised in PLR2EW-APP-TX-000107.

Kind regards,
[redacted]
Contractor's Representative

Transmitted to:

Company	Name
The APP Group	[redacted]

Transmitted cc:

Company	Name
Transport for NSW	[redacted]
Transport for NSW	[redacted]
Transport for NSW	[redacted]
Transport for NSW	PLR2 Delivery Document Control
The APP Group	[redacted]
The APP Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]

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Item	Document No	Rev	Sts	Title	Contract No	Design Package No
1	PLR2EW-JHGRP-LRPEWRC-SD-COM-100001	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage and Water Quality Design - JH Comment Sheet	PLR2EW	

Transmitted by: [redacted] John Holland Group

Attachment(s):

Document Transmittal

Transmittal No: PLR2EW-JHGRP-TX-000628

Date: 20 August 2025 05:28 PM

Reason for Issue:

Subject: PLR2EW - Category 1 Design Documents - SD-0001 Stormwater Drainage and Water Quality Design - DDR Design Stage - Submit for Review

Contract No: PLR2EW - Enabling Works Detailed Design and Construction

Message:

Dear [redacted]

Pursuant to Section 7 and Schedule 7 of the Development Agreement for the Parramatta Light Rail Stage 2 Enabling Works between TfNSW and SOPA, please find **attached** the following design package forming part of the Category 1 Design Documents submitted for your review.

Design Package Number	Design Package	Design Stage
SD-0001	Stormwater Drainage and Water Quality Design	DDR

As per the Development Agreement we kindly seek comments with respect to the Category 1 Design Documents nominated above within 10 Business Days of this transmittal.

Please find attached also a Comments Submission Form to facilitate the review.

Kind Regards,

[redacted]

Contractor's Representative

Transmitted to:

Company	Name
Sydney Olympic Park Authority	[redacted]

Transmitted cc:

Company	Name
Sydney Olympic Park Authority	[redacted]
Sydney Olympic Park Authority	[redacted]
Sydney Olympic Park Authority	[redacted]
Sydney Olympic Park Authority	[redacted]
Transport for NSW	[redacted]

The APP Group	[redacted]
The APP Group	[redacted]
The APP Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
Transport for NSW	[redacted]
Transport for NSW	[redacted]
Transport for NSW	PLR2 Delivery Document Control
John Holland Group	[redacted]

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Item	Document No	Rev	Sts	Title	Contract No	Design Package No
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2	PLR2EW-JHGRP-LRPEWRC-SD-CER-100104	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Model Validation Certificate - PLR2EW-JHGRP-LRPEWRC-SD-M3D-100102	PLR2EW	WG01.005
3	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Cover Sheet	PLR2EW	WG01.005
4	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100005	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Drawing Index	PLR2EW	WG01.005
5	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100011	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Key Plan	PLR2EW	WG01.005
6	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100015	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - General Notes	PLR2EW	WG01.005
7	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 1	PLR2EW	WG01.005
8	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 2	PLR2EW	WG01.005
9	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100103	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 3	PLR2EW	WG01.005
10	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 4	PLR2EW	WG01.005

11	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100105	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 5	PLR2EW	WG01.005
12	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100106	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 6	PLR2EW	WG01.005
13	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100107	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 7	PLR2EW	WG01.005
14	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100108	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 8	PLR2EW	WG01.005
15	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 9	PLR2EW	WG01.005
16	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 10	PLR2EW	WG01.005
17	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100111	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 11	PLR2EW	WG01.005
18	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100112	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 12	PLR2EW	WG01.005
19	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100113	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 13	PLR2EW	WG01.005
20	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100114	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 14	PLR2EW	WG01.005
21	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 1	PLR2EW	WG01.005
22	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100152	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 2	PLR2EW	WG01.005
23	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100153	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 3	PLR2EW	WG01.005
24	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100154	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 4	PLR2EW	WG01.005
25	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100155	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 5	PLR2EW	WG01.005
26	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100156	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 6	PLR2EW	WG01.005
27	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100157	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 7	PLR2EW	WG01.005
28	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100158	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 8	PLR2EW	WG01.005
29	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections	PLR2EW	WG01.005

				Sheet 1		
30	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100202	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 2	PLR2EW	WG01.005
31	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100203	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 3	PLR2EW	WG01.005
32	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100204	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 4	PLR2EW	WG01.005
33	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100205	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 5	PLR2EW	WG01.005
34	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100206	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 6	PLR2EW	WG01.005
35	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100207	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 7	PLR2EW	WG01.005
36	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100208	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 8	PLR2EW	WG01.005
37	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100209	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 9	PLR2EW	WG01.005
38	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100210	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 10	PLR2EW	WG01.005
39	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100211	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 11	PLR2EW	WG01.005
40	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100212	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 12	PLR2EW	WG01.005
41	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100213	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 13	PLR2EW	WG01.005
42	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100214	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 14	PLR2EW	WG01.005
43	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100215	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 15	PLR2EW	WG01.005
44	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100216	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections	PLR2EW	WG01.005

				Sheet 16		
45	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100217	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 17	PLR2EW	WG01.005
46	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100218	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 18	PLR2EW	WG01.005
47	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100219	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 19	PLR2EW	WG01.005
48	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100220	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 20	PLR2EW	WG01.005
49	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100221	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 21	PLR2EW	WG01.005
50	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100222	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 22	PLR2EW	WG01.005
51	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100401	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 1	PLR2EW	WG01.005
52	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100402	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 2	PLR2EW	WG01.005
53	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100403	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 3	PLR2EW	WG01.005
54	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100404	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 4	PLR2EW	WG01.005
55	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100405	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 5	PLR2EW	WG01.005
56	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100406	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 6	PLR2EW	WG01.005
57	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100407	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 7	PLR2EW	WG01.005
58	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100408	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 8	PLR2EW	WG01.005
59	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100409	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 9	PLR2EW	WG01.005
60	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100410	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 10	PLR2EW	WG01.005
61	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100411	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage -	PLR2EW	WG01.005

				Typical Detail Sheet 11		
62	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100421	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 1	PLR2EW	WG01.005
63	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100422	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 2	PLR2EW	WG01.005
64	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100423	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 3	PLR2EW	WG01.005
65	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100424	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 4	PLR2EW	WG01.005
66	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100451	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 1	PLR2EW	WG01.005
67	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100452	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 2	PLR2EW	WG01.005
68	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100453	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 3	PLR2EW	WG01.005
69	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100454	A.01	S0	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Sections Sheet 1	PLR2EW	WG01.005
70	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100455	A.01	S0	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 2 Sections Sheet 2	PLR2EW	WG01.005
71	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100456	A.01	S0	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 2 Sections Sheet 3	PLR2EW	WG01.005
72	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100457	A.01	S0	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin Wall Details	PLR2EW	WG01.005
73	PLR2EW-JHGRP-LRPEWRC-SD-DRG-199999	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined Drawings	PLR2EW	WG01.005
74	PLR2EW-JHGRP-LRPEWRC-SD-M2D-199999	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined M2D Model Files	PLR2EW	WG01.005
75	PLR2EW-JHGRP-LRPEWRC-SD-M3D-100101	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - M3D - SD Drainage Design	PLR2EW	WG01.005

76	PLR2EW-JHGRP-LRPEWRC-SD-M3D-100102	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - M3D - SD Existing Drainage	PLR2EW	WG01.005
77	PLR2EW-JHGRP-LRPEWRC-SD-M3D-199999	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined MOD Models	PLR2EW	WG01.005
78	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Report	PLR2EW	WG01.005

Transmitted by: [redacted], John Holland Group

Attachment(s): SOPA Comment Sheet - SD-0001 DDR.xlsx (25 KB)

Document Transmittal

Transmittal N

Date: 20 August 2025 05:28 PM

Reason for Issue:

Subject: PLR2EW - Public Works Design Documents - SD-0001 Stormwater Drainage and Water Quality Design - DDR D

Contract No: PLR2EW - Enabling Works Detailed Design and Construction

Message:

Dear [redacted]

Pursuant to Clause 7 and Schedule 2 of the MoU for the Parramatta Light Rail Stage 2 Enabling Works between TfNSW and CoPC, following design packages forming part of the Public Works Design Documents submitted for your review.

Design Package Number	Design Package
SD-0001	Stormwater Drainage and Water Quality Design

As per the MoU we kindly seek comments with respect to the Public Works contained within the Archer Park CoPC Land nominated of this transmittal.

Please find attached also a Comments Submission Form to facilitate the review.

Kind Regards,

[redacted]

Contractor's Representative

Transmitted to:

Company	Name
City of Parramatta Council	[redacted]

Transmitted cc:

Company	Name
City of Parramatta Council	[redacted]
The APP Group	[redacted]
The APP Group	[redacted]
The APP Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
Transport for NSW	[redacted]

Transport for NSW	[redacted]
Transport for NSW	PLR2 Delivery Document Control
Transport for NSW	[redacted]
John Holland Group	[redacted]

Click here to download all Transmittal files.

Click on Document Nos to download them individually.

Item	Document No	Rev	Sts	Title	Contract No	D
1	PLR2EW-JHGRP-LRPEWRC-SD-CER-100103	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Model Validation Certificate - PLR2EW-JHGRP-LRPEWRC-SD-M3D-100101	PLR2EW	W
2	PLR2EW-JHGRP-LRPEWRC-SD-CER-100104	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Model Validation Certificate - PLR2EW-JHGRP-LRPEWRC-SD-M3D-100102	PLR2EW	W
3	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Cover Sheet	PLR2EW	W
4	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100005	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Drawing Index	PLR2EW	W
5	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100011	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Key Plan	PLR2EW	W
6	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100015	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - General Notes	PLR2EW	W
7	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 1	PLR2EW	W
8	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 2	PLR2EW	W
9	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100103	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 3	PLR2EW	W
10	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 4	PLR2EW	W
11	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100105	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 5	PLR2EW	W
12	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100106	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 6	PLR2EW	W
13	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100107	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 7	PLR2EW	W
14	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100108	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 8	PLR2EW	W
15	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan	PLR2EW	W

				Sheet 9		
16	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 10	PLR2EW	W
17	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100111	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 11	PLR2EW	W
18	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100112	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 12	PLR2EW	W
19	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100113	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 13	PLR2EW	W
20	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100114	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 14	PLR2EW	W
21	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 1	PLR2EW	W
22	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100152	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 2	PLR2EW	W
23	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100153	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 3	PLR2EW	W
24	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100154	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 4	PLR2EW	W
25	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100155	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 5	PLR2EW	W
26	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100156	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 6	PLR2EW	W
27	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100157	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 7	PLR2EW	W
28	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100158	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 8	PLR2EW	W
29	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 1	PLR2EW	W
30	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100202	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 2	PLR2EW	W
31	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100203	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 3	PLR2EW	W
32	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100204	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 4	PLR2EW	W

33	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100205	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 5	PLR2EW	W
34	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100206	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 6	PLR2EW	W
35	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100207	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 7	PLR2EW	W
36	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100208	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 8	PLR2EW	W
37	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100209	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 9	PLR2EW	W
38	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100210	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 10	PLR2EW	W
39	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100211	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 11	PLR2EW	W
40	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100212	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 12	PLR2EW	W
41	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100213	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 13	PLR2EW	W
42	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100214	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 14	PLR2EW	W
43	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100215	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 15	PLR2EW	W
44	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100216	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 16	PLR2EW	W
45	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100217	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 17	PLR2EW	W
46	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100218	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 18	PLR2EW	W
47	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100219	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 19	PLR2EW	W

48	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100220	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 20	PLR2EW	W
49	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100221	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 21	PLR2EW	W
50	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100222	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 22	PLR2EW	W
51	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100401	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 1	PLR2EW	W
52	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100402	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 2	PLR2EW	W
53	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100403	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 3	PLR2EW	W
54	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100404	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 4	PLR2EW	W
55	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100405	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 5	PLR2EW	W
56	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100406	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 6	PLR2EW	W
57	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100407	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 7	PLR2EW	W
58	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100408	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 8	PLR2EW	W
59	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100409	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 9	PLR2EW	W
60	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100410	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 10	PLR2EW	W
61	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100411	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 11	PLR2EW	W
62	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100421	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 1	PLR2EW	W
63	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100422	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 2	PLR2EW	W
64	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100423	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 3	PLR2EW	W
65	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100424	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 4	PLR2EW	W

66	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100451	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 1	PLR2EW	W
67	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100452	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 2	PLR2EW	W
68	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100453	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 3	PLR2EW	W
69	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100454	A.01	S0	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Sections Sheet 1	PLR2EW	W
70	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100455	A.01	S0	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 2 Sections Sheet 2	PLR2EW	W
71	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100456	A.01	S0	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 2 Sections Sheet 3	PLR2EW	W
72	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100457	A.01	S0	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin Wall Details	PLR2EW	W
73	PLR2EW-JHGRP-LRPEWRC-SD-DRG-199999	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined Drawings	PLR2EW	W
74	PLR2EW-JHGRP-LRPEWRC-SD-M2D-199999	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined M2D Model Files	PLR2EW	W
75	PLR2EW-JHGRP-LRPEWRC-SD-M3D-100101	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - M3D - SD Drainage Design	PLR2EW	W
76	PLR2EW-JHGRP-LRPEWRC-SD-M3D-100102	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - M3D - SD Existing Drainage	PLR2EW	W
77	PLR2EW-JHGRP-LRPEWRC-SD-M3D-199999	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined MOD Models	PLR2EW	W
78	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Report	PLR2EW	W

Transmitted by: [redacted] John Holland Group

Attachment(s): CoPC Comment Sheet - SD-0001 DDR.xlsx (25 KB)

Document Transmittal

Transmittal No: PLR2EW-JHGRP-TX-000630

Date: 20 August 2025 05:28 PM

Reason for Issue:

Subject: PLR2EW - Public Works Design Documents - SD-0001 Stormwater Drainage and Water Quality Design - DDR Design Stage - Submit for Review

Contract No: PLR2EW - Enabling Works Detailed Design and Construction

Message:

Dear [redacted]

Pursuant to Clause 7 and Schedule 2 of the Deed of Agreement for the Parramatta Light Rail Stage 2 Enabling Works between TfNSW and PMC, please find **attached** the following design packages forming part of the Public Works Design Documents submitted for your review.

Design Package Number	Design Package	Design Stage
SD-0001	Stormwater Drainage and Water Quality Design	DDR

As per the Deed of Agreement we kindly seek comments with respect to the Public Works contained within the Archer Park PMC Land nominated above within 10 Business Days of this transmittal.

Please find attached also a Comments Submission Form to facilitate the review.

Kind Regards,

[redacted]

Contractor's Representative

Transmitted to:

Company	Name
Planning Ministerial Corporation T/A Office of Strategic Lands	[redacted]

Transmitted cc:

Company	Name
Transport for NSW	[redacted]
The APP Group	[redacted]
The APP Group	[redacted]
The APP Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]

John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
Transport for NSW	[redacted]
Transport for NSW	[redacted]
Transport for NSW	PLR2 Delivery Document Control
Planning Ministerial Corporation T/A Office of Strategic Lands	[redacted]
Planning Ministerial Corporation T/A Office of Strategic Lands	[redacted]

Click here to download all Transmittal files.

Click on Document Nos to download them individually.

Item	Document No	Rev	Sts	Title	Contract No	Design Package No
1	PLR2EW-JHGRP-LRPEWRC-SD-CER-100103	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Model Validation Certificate - PLR2EW-JHGRP-LRPEWRC-SD-M3D-100101	PLR2EW	WG01.005
2	PLR2EW-JHGRP-LRPEWRC-SD-CER-100104	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Model Validation Certificate - PLR2EW-JHGRP-LRPEWRC-SD-M3D-100102	PLR2EW	WG01.005
3	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Cover Sheet	PLR2EW	WG01.005
4	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100005	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Drawing Index	PLR2EW	WG01.005
5	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100011	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Key Plan	PLR2EW	WG01.005
6	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100015	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - General Notes	PLR2EW	WG01.005
7	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 1	PLR2EW	WG01.005
8	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 2	PLR2EW	WG01.005
9	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100103	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan	PLR2EW	WG01.005

				Sheet 3		
10	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 4	PLR2EW	WG01.005
11	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100105	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 5	PLR2EW	WG01.005
12	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100106	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 6	PLR2EW	WG01.005
13	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100107	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 7	PLR2EW	WG01.005
14	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100108	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 8	PLR2EW	WG01.005
15	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 9	PLR2EW	WG01.005
16	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 10	PLR2EW	WG01.005
17	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100111	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 11	PLR2EW	WG01.005
18	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100112	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 12	PLR2EW	WG01.005
19	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100113	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 13	PLR2EW	WG01.005
20	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100114	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 14	PLR2EW	WG01.005
21	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 1	PLR2EW	WG01.005
22	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100152	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 2	PLR2EW	WG01.005
23	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100153	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 3	PLR2EW	WG01.005

24	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100154	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 4	PLR2EW	WG01.005
25	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100155	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 5	PLR2EW	WG01.005
26	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100156	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 6	PLR2EW	WG01.005
27	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100157	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 7	PLR2EW	WG01.005
28	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100158	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 8	PLR2EW	WG01.005
29	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 1	PLR2EW	WG01.005
30	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100202	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 2	PLR2EW	WG01.005
31	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100203	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 3	PLR2EW	WG01.005
32	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100204	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 4	PLR2EW	WG01.005
33	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100205	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 5	PLR2EW	WG01.005
34	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100206	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 6	PLR2EW	WG01.005
35	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100207	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 7	PLR2EW	WG01.005
36	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100208	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 8	PLR2EW	WG01.005

37	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100209	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 9	PLR2EW	WG01.005
38	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100210	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 10	PLR2EW	WG01.005
39	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100211	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 11	PLR2EW	WG01.005
40	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100212	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 12	PLR2EW	WG01.005
41	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100213	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 13	PLR2EW	WG01.005
42	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100214	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 14	PLR2EW	WG01.005
43	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100215	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 15	PLR2EW	WG01.005
44	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100216	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 16	PLR2EW	WG01.005
45	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100217	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 17	PLR2EW	WG01.005
46	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100218	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 18	PLR2EW	WG01.005
47	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100219	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 19	PLR2EW	WG01.005
48	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100220	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 20	PLR2EW	WG01.005
49	PLR2EW-JHGRP-LRPEWRC-SD-DRG-	A.01	S4	PLR2EW - SD0001 - Stormwater	PLR2EW	WG01.005

	100221			Drainage - Longitudinal Sections Sheet 21		
50	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100222	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 22	PLR2EW	WG01.005
51	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100401	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 1	PLR2EW	WG01.005
52	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100402	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 2	PLR2EW	WG01.005
53	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100403	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 3	PLR2EW	WG01.005
54	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100404	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 4	PLR2EW	WG01.005
55	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100405	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 5	PLR2EW	WG01.005
56	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100406	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 6	PLR2EW	WG01.005
57	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100407	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 7	PLR2EW	WG01.005
58	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100408	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 8	PLR2EW	WG01.005
59	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100409	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 9	PLR2EW	WG01.005
60	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100410	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 10	PLR2EW	WG01.005
61	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100411	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 11	PLR2EW	WG01.005
62	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100421	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 1	PLR2EW	WG01.005
63	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100422	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 2	PLR2EW	WG01.005

64	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100423	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 3	PLR2EW	WG01.005
65	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100424	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 4	PLR2EW	WG01.005
66	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100451	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 1	PLR2EW	WG01.005
67	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100452	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 2	PLR2EW	WG01.005
68	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100453	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 3	PLR2EW	WG01.005
69	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100454	A.01	S0	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Sections Sheet 1	PLR2EW	WG01.005
70	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100455	A.01	S0	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 2 Sections Sheet 2	PLR2EW	WG01.005
71	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100456	A.01	S0	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 2 Sections Sheet 3	PLR2EW	WG01.005
72	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100457	A.01	S0	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin Wall Details	PLR2EW	WG01.005
73	PLR2EW-JHGRP-LRPEWRC-SD-DRG-199999	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined Drawings	PLR2EW	WG01.005
74	PLR2EW-JHGRP-LRPEWRC-SD-M2D-199999	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined M2D Model Files	PLR2EW	WG01.005
75	PLR2EW-JHGRP-LRPEWRC-SD-M3D-100101	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - M3D - SD Drainage Design	PLR2EW	WG01.005

76	PLR2EW-JHGRP-LRPEWRC-SD-M3D-100102	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - M3D - SD Existing Drainage	PLR2EW	WG01.005
77	PLR2EW-JHGRP-LRPEWRC-SD-M3D-199999	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined MOD Models	PLR2EW	WG01.005
78	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Report	PLR2EW	WG01.005

Transmitted by: [redacted], John Holland Group

Attachment(s): PMC Comment Sheet - SD-0001 DDR.xlsx (25 KB)

Document Transmittal

Transmittal No: PLR2EW-JHGRP-TX-000631

Date: 20 August 2025 05:29 PM

Reason for Issue:

Subject: PLR2EW - SD-0001 Stormwater Drainage and Water Quality Design - DDR Design Stage - Submit for Review

Contract No: PLR2EW - Enabling Works Detailed Design and Construction

Message:

Dear [redacted],

Pursuant to Clause 5.5 of the Deed, please find **attached** the following design package which is submitted for review under section 7.3.2.4(b) of Annexure 3 of the Management Requirements.

Design Package Number: SD-0001

Design Package Name: Stormwater Drainage

Design Stage: DDR

Kind Regards,

[redacted]

Contractor's Representative

Transmitted to:

Company	Name
Transport for NSW	[redacted]

Transmitted cc:

Company	Name
Transport for NSW	[redacted]
Transport for NSW	[redacted]
Transport for NSW	PLR2 Delivery Document Control
The APP Group	[redacted]
The APP Group	[redacted]
The APP Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]

Click here to download all Transmittal files.

Click on Document Nos to download them individually.

Item	Document No	Rev	Sts	Title	Contract No	Design Package No
1	PLR2EW-JHGRP-LRPEWRC-SD-CER-100001	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule 5 Designer's Certificate of Design Compliance	PLR2EW	WG01.005
2	PLR2EW-JHGRP-LRPEWRC-SD-CER-100002	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule 5 Contractor's Certificate of Design Compliance	PLR2EW	WG01.005
3	PLR2EW-JHGRP-LRPEWRC-SD-CER-100103	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Model Validation Certificate - PLR2EW-JHGRP-LRPEWRC-SD-M3D-100101	PLR2EW	WG01.005
4	PLR2EW-JHGRP-LRPEWRC-SD-CER-100104	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Model Validation Certificate - PLR2EW-JHGRP-LRPEWRC-SD-M3D-100102	PLR2EW	WG01.005
5	PLR2EW-JHGRP-LRPEWRC-SD-COM-100001	D.01	S4	PLR2EW - SD0001 - Stormwater Drainage and Water Quality Design - JH Comment Sheet	PLR2EW	WG01.005
6	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Cover Sheet	PLR2EW	WG01.005
7	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100005	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Drawing Index	PLR2EW	WG01.005
8	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100011	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Key Plan	PLR2EW	WG01.005
9	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100015	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - General Notes	PLR2EW	WG01.005
10	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 1	PLR2EW	WG01.005
11	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 2	PLR2EW	WG01.005

12	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100103	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 3	PLR2EW	WG01.005
13	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 4	PLR2EW	WG01.005
14	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100105	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 5	PLR2EW	WG01.005
15	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100106	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 6	PLR2EW	WG01.005
16	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100107	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 7	PLR2EW	WG01.005
17	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100108	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 8	PLR2EW	WG01.005
18	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 9	PLR2EW	WG01.005
19	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 10	PLR2EW	WG01.005
20	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100111	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 11	PLR2EW	WG01.005
21	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100112	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 12	PLR2EW	WG01.005
22	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100113	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 13	PLR2EW	WG01.005
23	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100114	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 14	PLR2EW	WG01.005
24	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 1	PLR2EW	WG01.005
25	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100152	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 2	PLR2EW	WG01.005
26	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100153	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 3	PLR2EW	WG01.005

27	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100154	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 4	PLR2EW	WG01.005
28	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100155	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 5	PLR2EW	WG01.005
29	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100156	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 6	PLR2EW	WG01.005
30	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100157	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 7	PLR2EW	WG01.005
31	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100158	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 8	PLR2EW	WG01.005
32	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 1	PLR2EW	WG01.005
33	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100202	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 2	PLR2EW	WG01.005
34	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100203	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 3	PLR2EW	WG01.005
35	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100204	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 4	PLR2EW	WG01.005
36	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100205	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 5	PLR2EW	WG01.005
37	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100206	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 6	PLR2EW	WG01.005
38	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100207	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 7	PLR2EW	WG01.005
39	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100208	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 8	PLR2EW	WG01.005

40	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100209	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 9	PLR2EW	WG01.005
41	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100210	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 10	PLR2EW	WG01.005
42	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100211	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 11	PLR2EW	WG01.005
43	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100212	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 12	PLR2EW	WG01.005
44	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100213	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 13	PLR2EW	WG01.005
45	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100214	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 14	PLR2EW	WG01.005
46	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100215	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 15	PLR2EW	WG01.005
47	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100216	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 16	PLR2EW	WG01.005
48	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100217	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 17	PLR2EW	WG01.005
49	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100218	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 18	PLR2EW	WG01.005
50	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100219	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 19	PLR2EW	WG01.005
51	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100220	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 20	PLR2EW	WG01.005
52	PLR2EW-JHGRP-LRPEWRC-SD-DRG-	A.01	S4	PLR2EW - SD0001 - Stormwater	PLR2EW	WG01.005

	100221			Drainage - Longitudinal Sections Sheet 21		
53	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100222	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 22	PLR2EW	WG01.005
54	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100401	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 1	PLR2EW	WG01.005
55	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100402	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 2	PLR2EW	WG01.005
56	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100403	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 3	PLR2EW	WG01.005
57	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100404	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 4	PLR2EW	WG01.005
58	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100405	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 5	PLR2EW	WG01.005
59	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100406	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 6	PLR2EW	WG01.005
60	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100407	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 7	PLR2EW	WG01.005
61	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100408	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 8	PLR2EW	WG01.005
62	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100409	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 9	PLR2EW	WG01.005
63	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100410	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 10	PLR2EW	WG01.005
64	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100411	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 11	PLR2EW	WG01.005
65	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100421	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 1	PLR2EW	WG01.005
66	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100422	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 2	PLR2EW	WG01.005

67	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100423	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 3	PLR2EW	WG01.005
68	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100424	A.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 4	PLR2EW	WG01.005
69	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100451	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 1	PLR2EW	WG01.005
70	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100452	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 2	PLR2EW	WG01.005
71	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100453	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 3	PLR2EW	WG01.005
72	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100454	A.01	S0	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Sections Sheet 1	PLR2EW	WG01.005
73	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100455	A.01	S0	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 2 Sections Sheet 2	PLR2EW	WG01.005
74	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100456	A.01	S0	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 2 Sections Sheet 3	PLR2EW	WG01.005
75	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100457	A.01	S0	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin Wall Details	PLR2EW	WG01.005
76	PLR2EW-JHGRP-LRPEWRC-SD-DRG-199999	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined Drawings	PLR2EW	WG01.005
77	PLR2EW-JHGRP-LRPEWRC-SD-M2D-199999	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined M2D Model Files	PLR2EW	WG01.005
78	PLR2EW-JHGRP-LRPEWRC-SD-M3D-100101	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - M3D - SD Drainage Design	PLR2EW	WG01.005

79	PLR2EW-JHGRP-LRPEWRC-SD-M3D-100102	B.01	S4	PLR2EW - SD0001 - Stormwater Drainage - M3D - SD Existing Drainage	PLR2EW	WG01.005
80	PLR2EW-JHGRP-LRPEWRC-SD-M3D-199999	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Combined MOD Models	PLR2EW	WG01.005
81	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	C.01	S4	PLR2EW - SD0001 - Stormwater Drainage - Report	PLR2EW	WG01.005

Transmitted by: [redacted], John Holland Group

Attachment(s):

Document Transmittal

Transmittal No: PLR2EW-JHGRP-TX-000704

Date: 24 September 2025 10:17 AM

Reason for Issue: Issued For Review

Subject: PLR2EW - SD-0001 Stormwater Drainage and Water Quality Design - JH Comment Responses

Contract No: PLR2EW - Enabling Works Detailed Design and Construction

Message:

Dear [redacted],

Please find attached Revision E of the SD-0001 Stormwater Drainage and Water Quality Design - JH Comment Sheet (PLR2EW-JHGRP-LRPEWRC-SD-COM-100001) as a response to comments raised in PLR2EW-APP-TX-000359.

Kind regards,
[redacted]
Contractor's Representative

Transmitted to:

Company	Name
The APP Group	[redacted]

Transmitted cc:

Company	Name
The APP Group	[redacted]
The APP Group	[redacted]
The APP Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
Transport for NSW	[redacted]
Transport for NSW	[redacted]
Transport for NSW	[redacted]
Transport for NSW	PLR2 Delivery Document Control

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Item	Document No	Rev	Sts	Title	Contract No	Design Package No
1	PLR2EW-JHGRP-LRPEWRC-SD-COM-100001	E.01	S4	PLR2EW - SD0001 - Stormwater Drainage and Water Quality Design - JH Comment Sheet	PLR2EW	WG01.005

Transmitted by: [redacted], John Holland Group

Attachment(s):

Document Transmittal

Transmittal No: PLR2EW-JHGRP-TX-000750

Date: 15 October 2025 04:14 PM

Reason for Issue: Issued For Review

Subject: PLR2EW - SD-0001 Stormwater Drainage and Water Quality Design - Rev F - JH Comment Responses

Contract No: PLR2EW - Enabling Works Detailed Design and Construction

Message:

Dear [redacted],

Following the comment closeout meeting held on the 13/10/2025, please find attached Revision F of the SD-0001 Stormwater Drainage and Water Quality Design - JH Comment Sheet (PLR2EW-JHGRP-LRPEWRC-SD-COM-100001) as a response to comments raised in PLR2EW-APP-TX-000393.

Kind regards,
[redacted]
Contractor's Representative

Transmitted to:

Company	Name
The APP Group	[redacted]

Transmitted cc:

Company	Name
The APP Group	[redacted]
The APP Group	[redacted]
The APP Group	A[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
Transport for NSW	[redacted]
Transport for NSW	[redacted]
Transport for NSW	[redacted]
Transport for NSW	PLR2 Delivery Document Control
John Holland Group	[redacted]

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Item	Document No	Rev	Sts	Title	Contract No	Design Package No
1	PLR2EW-JHGRP-LRPEWRC-SD-COM-100001	F.01	S4	PLR2EW - SD0001 - Stormwater Drainage and Water Quality Design - JH Comment Sheet	PLR2EW	WG01.005

Transmitted by: [redacted] John Holland Group

Attachment(s):

Document Transmittal

Transmittal No: PLR2EW-JHGRP-TX-000828

Date: 21 November 2025 03:49 PM

Reason for Issue:

Subject: PLR2EW - SD-0001 Stormwater Drainage and Water Quality Design - AFC Design Stage - Submit for Review

Contract No: PLR2EW - Enabling Works Detailed Design and Construction

Message:

Dear [redacted]

Pursuant to Clause 5.5 of the Deed, please find **attached** the following design package which is submitted for review under section 7.3.2.5(a) of Annexure 3 of the Management Requirements and for the Independent Certifier certification.

Design Package Number: SD-0001

Design Package Name: Stormwater Drainage and Water Quality Design

Design Stage: AFC

Kind regards,
[redacted]
Contractor's Representative

Transmitted to:

Company	Name
Transport for NSW	[redacted]

Transmitted cc:

Company	Name
Transport for NSW	[redacted]
Transport for NSW	[redacted]
Transport for NSW	[redacted]
The APP Group	[redacted]
The APP Group	[redacted]
The APP Group	[redacted]
The APP Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]

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Item	Document No	Rev	Sts	Title	Contract No	Design Package No
1	PLR2EW-JHGRP-LRPEWRC-SD-CER-100001	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Schedule 5 Designer's Certificate of Design Compliance	PLR2EW	WG01.005
2	PLR2EW-JHGRP-LRPEWRC-SD-CER-100002	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Schedule 5 Contractor's Certificate of Design Compliance	PLR2EW	WG01.005
3	PLR2EW-JHGRP-LRPEWRC-SD-CER-100103	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Model Validation Certificate - PLR2EW-JHGRP-LRPEWRC-SD-M3D-100101	PLR2EW	WG01.005
4	PLR2EW-JHGRP-LRPEWRC-SD-CER-100104	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Model Validation Certificate - PLR2EW-JHGRP-LRPEWRC-SD-M3D-100102	PLR2EW	WG01.005
5	PLR2EW-JHGRP-LRPEWRC-SD-COM-100001	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage and Water Quality Design - JH Comment Sheet	PLR2EW	WG01.005
6	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Cover Sheet	PLR2EW	WG01.005
7	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100005	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Drawing Index	PLR2EW	WG01.005
8	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100011	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Key Plan	PLR2EW	WG01.005
9	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100015	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - General Notes	PLR2EW	WG01.005
10	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 1	PLR2EW	WG01.005
11	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 2	PLR2EW	WG01.005

12	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100103	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 3	PLR2EW	WG01.005
13	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 4	PLR2EW	WG01.005
14	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100105	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 5	PLR2EW	WG01.005
15	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100106	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 6	PLR2EW	WG01.005
16	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100107	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 7	PLR2EW	WG01.005
17	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100108	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 8	PLR2EW	WG01.005
18	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 9	PLR2EW	WG01.005
19	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 10	PLR2EW	WG01.005
20	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100111	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 11	PLR2EW	WG01.005
21	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100112	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 12	PLR2EW	WG01.005
22	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100113	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 13	PLR2EW	WG01.005
23	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100114	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 14	PLR2EW	WG01.005
24	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 1	PLR2EW	WG01.005
25	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100152	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 2	PLR2EW	WG01.005
26	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100153	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 3	PLR2EW	WG01.005

27	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100154	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 4	PLR2EW	WG01.005
28	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100155	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 5	PLR2EW	WG01.005
29	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100156	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 6	PLR2EW	WG01.005
30	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100157	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 7	PLR2EW	WG01.005
31	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100158	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 8	PLR2EW	WG01.005
32	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 1	PLR2EW	WG01.005
33	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100202	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 2	PLR2EW	WG01.005
34	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100203	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 3	PLR2EW	WG01.005
35	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100204	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 4	PLR2EW	WG01.005
36	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100205	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 5	PLR2EW	WG01.005
37	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100206	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 6	PLR2EW	WG01.005
38	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100207	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 7	PLR2EW	WG01.005
39	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100208	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 8	PLR2EW	WG01.005

40	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100209	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 9	PLR2EW	WG01.005
41	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100210	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 10	PLR2EW	WG01.005
42	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100211	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 11	PLR2EW	WG01.005
43	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100212	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 12	PLR2EW	WG01.005
44	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100213	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 13	PLR2EW	WG01.005
45	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100214	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 14	PLR2EW	WG01.005
46	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100215	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 15	PLR2EW	WG01.005
47	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100216	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 16	PLR2EW	WG01.005
48	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100217	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 17	PLR2EW	WG01.005
49	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100218	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 18	PLR2EW	WG01.005
50	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100219	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 19	PLR2EW	WG01.005
51	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100220	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 20	PLR2EW	WG01.005
52	PLR2EW-JHGRP-LRPEWRC-SD-DRG-	00.01	AA	PLR2EW - SD0001 - Stormwater	PLR2EW	WG01.005

	100221			Drainage - Longitudinal Sections Sheet 21		
53	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100222	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 22	PLR2EW	WG01.005
54	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100401	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 1	PLR2EW	WG01.005
55	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100402	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 2	PLR2EW	WG01.005
56	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100403	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 3	PLR2EW	WG01.005
57	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100404	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 4	PLR2EW	WG01.005
58	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100405	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 5	PLR2EW	WG01.005
59	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100406	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 6	PLR2EW	WG01.005
60	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100407	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 7	PLR2EW	WG01.005
61	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100408	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 8	PLR2EW	WG01.005
62	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100409	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 9	PLR2EW	WG01.005
63	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100410	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 10	PLR2EW	WG01.005
64	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100411	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 11	PLR2EW	WG01.005
65	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100421	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 1	PLR2EW	WG01.005
66	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100422	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 2	PLR2EW	WG01.005

67	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100423	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 3	PLR2EW	WG01.005
68	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100424	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 4	PLR2EW	WG01.005
69	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100451	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 1	PLR2EW	WG01.005
70	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100452	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 2	PLR2EW	WG01.005
71	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100453	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 3	PLR2EW	WG01.005
72	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100454	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Sections Sheet 1	PLR2EW	WG01.005
73	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100455	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 2 Sections Sheet 2	PLR2EW	WG01.005
74	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100456	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 2 Sections Sheet 3	PLR2EW	WG01.005
75	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100457	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin Wall Details	PLR2EW	WG01.005
76	PLR2EW-JHGRP-LRPEWRC-SD-DRG-199999	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Combined Drawings	PLR2EW	WG01.005
77	PLR2EW-JHGRP-LRPEWRC-SD-M2D-199999	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Combined M2D Model Files	PLR2EW	WG01.005
78	PLR2EW-JHGRP-LRPEWRC-SD-M3D-100101	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - M3D - SD Drainage Design	PLR2EW	WG01.005

79	PLR2EW-JHGRP-LRPEWRC-SD-M3D-100102	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - M3D - SD Existing Drainage	PLR2EW	WG01.005
80	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Report	PLR2EW	WG01.005

Transmitted by: [redacted], John Holland Group

Attachment(s):

Document Transmittal

Transmittal No: PLR2EW-JHGRP-TX-000868

Date:	09 December 2025 03:07 PM
Reason for Issue:	Issued For Review
Subject:	PLR2EW - SD-0001 Stormwater Drainage and Water Quality Design - AFC Design Stage - Submit for Review
Contract No:	PLR2EW - Enabling Works Detailed Design and Construction

Message:

Dear [redacted],

Pursuant to Clause 5.5 of the Deed, please find **attached** the following design package which is re-submitted for review under section 7.3.2.5(a) of Annexure 3 of the Management Requirements and for the Independent Certifier certification.

This submission includes updated design documentation updated to address comments received via PLR2EW-APP-TX-000447 and also the Revision 1 of the Stormwater Drainage Design - JH Comment Sheet (PLR2EW-JHGRP-LRPEWRC-SD-COM-100001) as a response to comments raised in PLR2EW-APP-TX-000447.

Design Package Number:SD-0001

Design Package Name: Stormwater Drainage and Water Quality Design

Design Stage:AFC

Kind regards,

[redacted]

Contractor's Representative

Transmitted to:

Company	Name
Transport for NSW	[redacted]

Transmitted cc:

Company	Name
Transport for NSW	[redacted]
Transport for NSW	[redacted]
Transport for NSW	PLR2 Delivery Document Control
The APP Group	[redacted]
The APP Group	[redacted]
The APP Group	[redacted]
The APP Group	A[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]

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Item	Document No	Rev	Sts	Title	Contract No	Design Package No
1	PLR2EW-JHGRP-LRPEWRC-SD-CER-100001	01.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Schedule 5 Designer's Certificate of Design Compliance	PLR2EW	WG01.005
2	PLR2EW-JHGRP-LRPEWRC-SD-CER-100002	01.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Schedule 5 Contractor's Certificate of Design Compliance	PLR2EW	WG01.005
3	PLR2EW-JHGRP-LRPEWRC-SD-CER-100103	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Model Validation Certificate - PLR2EW-JHGRP-LRPEWRC-SD-M3D-100101	PLR2EW	WG01.005
4	PLR2EW-JHGRP-LRPEWRC-SD-CER-100104	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Model Validation Certificate - PLR2EW-JHGRP-LRPEWRC-SD-M3D-100102	PLR2EW	WG01.005
5	PLR2EW-JHGRP-LRPEWRC-SD-COM-100001	01.01	AA	PLR2EW - SD0001 - Stormwater Drainage and Water Quality Design - JH Comment Sheet	PLR2EW	WG01.005
6	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Cover Sheet	PLR2EW	WG01.005
7	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100005	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Drawing Index	PLR2EW	WG01.005
8	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100011	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Key Plan	PLR2EW	WG01.005
9	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100015	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - General Notes	PLR2EW	WG01.005
10	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 1	PLR2EW	WG01.005
11	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102	01.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 2	PLR2EW	WG01.005
12	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100103	01.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan	PLR2EW	WG01.005

				Sheet 3		
13	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104	01.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 4	PLR2EW	WG01.005
14	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100105	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 5	PLR2EW	WG01.005
15	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100106	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 6	PLR2EW	WG01.005
16	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100107	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 7	PLR2EW	WG01.005
17	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100108	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 8	PLR2EW	WG01.005
18	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109	01.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 9	PLR2EW	WG01.005
19	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 10	PLR2EW	WG01.005
20	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100111	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 11	PLR2EW	WG01.005
21	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100112	01.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 12	PLR2EW	WG01.005
22	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100113	01.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 13	PLR2EW	WG01.005
23	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100114	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 14	PLR2EW	WG01.005
24	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 1	PLR2EW	WG01.005
25	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100152	01.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 2	PLR2EW	WG01.005
26	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100153	01.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 3	PLR2EW	WG01.005

27	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100154	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 4	PLR2EW	WG01.005
28	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100155	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 5	PLR2EW	WG01.005
29	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100156	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 6	PLR2EW	WG01.005
30	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100157	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 7	PLR2EW	WG01.005
31	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100158	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 8	PLR2EW	WG01.005
32	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 1	PLR2EW	WG01.005
33	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100202	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 2	PLR2EW	WG01.005
34	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100203	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 3	PLR2EW	WG01.005
35	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100204	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 4	PLR2EW	WG01.005
36	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100205	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 5	PLR2EW	WG01.005
37	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100206	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 6	PLR2EW	WG01.005
38	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100207	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 7	PLR2EW	WG01.005
39	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100208	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 8	PLR2EW	WG01.005

40	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100209	01.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 9	PLR2EW	WG01.005
41	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100210	01.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 10	PLR2EW	WG01.005
42	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100211	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 11	PLR2EW	WG01.005
43	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100212	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 12	PLR2EW	WG01.005
44	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100213	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 13	PLR2EW	WG01.005
45	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100214	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 14	PLR2EW	WG01.005
46	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100215	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 15	PLR2EW	WG01.005
47	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100216	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 16	PLR2EW	WG01.005
48	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100217	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 17	PLR2EW	WG01.005
49	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100218	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 18	PLR2EW	WG01.005
50	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100219	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 19	PLR2EW	WG01.005
51	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100220	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 20	PLR2EW	WG01.005
52	PLR2EW-JHGRP-LRPEWRC-SD-DRG-	00.01	AA	PLR2EW - SD0001 - Stormwater	PLR2EW	WG01.005

	100221			Drainage - Longitudinal Sections Sheet 21		
53	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100222	01.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 22	PLR2EW	WG01.005
54	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100401	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 1	PLR2EW	WG01.005
55	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100402	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 2	PLR2EW	WG01.005
56	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100403	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 3	PLR2EW	WG01.005
57	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100404	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 4	PLR2EW	WG01.005
58	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100405	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 5	PLR2EW	WG01.005
59	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100406	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 6	PLR2EW	WG01.005
60	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100407	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 7	PLR2EW	WG01.005
61	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100408	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 8	PLR2EW	WG01.005
62	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100409	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 9	PLR2EW	WG01.005
63	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100410	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 10	PLR2EW	WG01.005
64	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100411	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 11	PLR2EW	WG01.005
65	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100421	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 1	PLR2EW	WG01.005
66	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100422	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 2	PLR2EW	WG01.005

67	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100423	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 3	PLR2EW	WG01.005
68	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100424	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 4	PLR2EW	WG01.005
69	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100451	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 1	PLR2EW	WG01.005
70	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100452	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 2	PLR2EW	WG01.005
71	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100453	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 3	PLR2EW	WG01.005
72	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100454	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Sections Sheet 1	PLR2EW	WG01.005
73	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100455	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 2 Sections Sheet 2	PLR2EW	WG01.005
74	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100456	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 2 Sections Sheet 3	PLR2EW	WG01.005
75	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100457	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin Wall Details	PLR2EW	WG01.005
76	PLR2EW-JHGRP-LRPEWRC-SD-DRG-199999	01.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Combined Drawings	PLR2EW	WG01.005
77	PLR2EW-JHGRP-LRPEWRC-SD-M2D-199999	01.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Combined M2D Model Files	PLR2EW	WG01.005
78	PLR2EW-JHGRP-LRPEWRC-SD-M3D-100101	01.01	AA	PLR2EW - SD0001 - Stormwater Drainage - M3D - SD Drainage Design	PLR2EW	WG01.005

79	PLR2EW-JHGRP-LRPEWRC-SD-M3D-100102	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - M3D - SD Existing Drainage	PLR2EW	WG01.005
80	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	00.01	AA	PLR2EW - SD0001 - Stormwater Drainage - Report	PLR2EW	WG01.005

Transmitted by: [redacted] John Holland Group

Attachment(s):

Document Transmittal

Transmittal No: PLR2EW-JHGRP-TX-000884

Date: 17 December 2025 10:00 AM

Reason for Issue:

Subject: PLR2 Enabling Works - IC Certified Approved for Construction (AFC) Drawings - SD-0001 - Stormwater Drainage and Water Quality

Contract No: PLR2EW - Enabling Works Detailed Design and Construction

Message:

Dear [redacted]

Please find attached the Design Package, certified by the Independent Certifier at the AFC stage. The IC AFC Certificate was updated on 12/12/2025 (Ref: PLR2EW-APP-TX-000463, Rev 00.01), and the AFC drawings now reflect the updated "D4" document status.

Design Package Number: SD-0001

Design Package Name: Stormwater Drainage and Water Quality

Design Stage: AFC

Status: D4

Kind regards,

[redacted]

JH Document Controller

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John Holland Group	[redacted]
John Holland Group	[redacted]
John Holland Group	[redacted]

Click here to download all Transmittal files.

Click on Document Nos to download them individually.

Item	Document No	Rev	Sts	Title	Contract No	Design Package No
1	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Cover Sheet	PLR2EW	WG01.005
2	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100005	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Drawing Index	PLR2EW	WG01.005
3	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100011	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Key Plan	PLR2EW	WG01.005
4	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100015	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - General Notes	PLR2EW	WG01.005
5	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 1	PLR2EW	WG01.005
6	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102	01.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 2	PLR2EW	WG01.005
7	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100103	01.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 3	PLR2EW	WG01.005
8	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104	01.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 4	PLR2EW	WG01.005
9	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100105	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 5	PLR2EW	WG01.005
10	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100106	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 6	PLR2EW	WG01.005
11	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100107	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 7	PLR2EW	WG01.005
12	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100108	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 8	PLR2EW	WG01.005
13	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109	01.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 9	PLR2EW	WG01.005
14	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 10	PLR2EW	WG01.005
15	PLR2EW-JHGRP-LRPEWRC-SD-DRG-	00.01	D4	PLR2EW - SD0001 - Stormwater	PLR2EW	WG01.005

	100111			Drainage - Plan Sheet 11		
16	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100112	01.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 12	PLR2EW	WG01.005
17	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100113	01.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 13	PLR2EW	WG01.005
18	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100114	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Plan Sheet 14	PLR2EW	WG01.005
19	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 1	PLR2EW	WG01.005
20	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100152	01.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 2	PLR2EW	WG01.005
21	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100153	01.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 3	PLR2EW	WG01.005
22	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100154	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 4	PLR2EW	WG01.005
23	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100155	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 5	PLR2EW	WG01.005
24	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100156	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 6	PLR2EW	WG01.005
25	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100157	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 7	PLR2EW	WG01.005
26	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100158	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Schedule Sheet 8	PLR2EW	WG01.005
27	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 1	PLR2EW	WG01.005
28	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100202	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 2	PLR2EW	WG01.005
29	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100203	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal	PLR2EW	WG01.005

				Sections Sheet 3		
30	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100204	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 4	PLR2EW	WG01.005
31	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100205	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 5	PLR2EW	WG01.005
32	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100206	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 6	PLR2EW	WG01.005
33	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100207	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 7	PLR2EW	WG01.005
34	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100208	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 8	PLR2EW	WG01.005
35	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100209	01.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 9	PLR2EW	WG01.005
36	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100210	01.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 10	PLR2EW	WG01.005
37	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100211	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 11	PLR2EW	WG01.005
38	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100212	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 12	PLR2EW	WG01.005
39	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100213	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 13	PLR2EW	WG01.005
40	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100214	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 14	PLR2EW	WG01.005
41	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100215	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 15	PLR2EW	WG01.005

42	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100216	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 16	PLR2EW	WG01.005
43	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100217	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 17	PLR2EW	WG01.005
44	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100218	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 18	PLR2EW	WG01.005
45	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100219	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 19	PLR2EW	WG01.005
46	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100220	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 20	PLR2EW	WG01.005
47	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100221	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 21	PLR2EW	WG01.005
48	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100222	01.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Longitudinal Sections Sheet 22	PLR2EW	WG01.005
49	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100401	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 1	PLR2EW	WG01.005
50	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100402	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 2	PLR2EW	WG01.005
51	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100403	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 3	PLR2EW	WG01.005
52	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100404	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 4	PLR2EW	WG01.005
53	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100405	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 5	PLR2EW	WG01.005
54	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100406	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 6	PLR2EW	WG01.005
55	PLR2EW-JHGRP-LRPEWRC-SD-DRG-	00.01	D4	PLR2EW - SD0001 - Stormwater	PLR2EW	WG01.005

	100407			Drainage - Typical Detail Sheet 7		
56	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100408	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 8	PLR2EW	WG01.005
57	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100409	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 9	PLR2EW	WG01.005
58	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100410	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 10	PLR2EW	WG01.005
59	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100411	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Typical Detail Sheet 11	PLR2EW	WG01.005
60	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100421	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 1	PLR2EW	WG01.005
61	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100422	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 2	PLR2EW	WG01.005
62	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100423	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 3	PLR2EW	WG01.005
63	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100424	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Headwall Detail Sheet 4	PLR2EW	WG01.005
64	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100451	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 1	PLR2EW	WG01.005
65	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100452	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 2	PLR2EW	WG01.005
66	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100453	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Plan and Detail Sheet 3	PLR2EW	WG01.005
67	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100454	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 1 Sections Sheet 1	PLR2EW	WG01.005
68	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100455	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 2	PLR2EW	WG01.005

				Sections Sheet 2		
69	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100456	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin 2 Sections Sheet 3	PLR2EW	WG01.005
70	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100457	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Bioretention Basin Wall Details	PLR2EW	WG01.005
71	PLR2EW-JHGRP-LRPEWRC-SD-DRG-199999	01.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Combined Drawings	PLR2EW	WG01.005
72	PLR2EW-JHGRP-LRPEWRC-SD-M2D-199999	01.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Combined M2D Model Files	PLR2EW	WG01.005
73	PLR2EW-JHGRP-LRPEWRC-SD-M3D-100101	01.01	D4	PLR2EW - SD0001 - Stormwater Drainage - M3D - SD Drainage Design	PLR2EW	WG01.005
74	PLR2EW-JHGRP-LRPEWRC-SD-M3D-100102	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - M3D - SD Existing Drainage	PLR2EW	WG01.005
75	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001	00.01	D4	PLR2EW - SD0001 - Stormwater Drainage - Report	PLR2EW	WG01.005

Transmitted by: [redacted], John Holland Group

Attachment(s):

Appendix C Assumptions, Dependencies and Constraints (ADC) Register

Parramatta Light Rail Stage 2 Enabling Works
Assumptions, Dependencies, Constraints (ADC) Register

Assumptions *An assumption is a hypothesis made about any internal or external interface, including people and organisations with which the system/subsystem being assured will interact. Assumptions need to be progressively checked through the project lifecycle to ensure they remain valid when the PLR2 Works are handed over into service. Assumptions are likely to be made throughout the project, but many will be made near the beginning as an input to the design process.*

Dependencies *Dependencies are agreements between the PLR2 Enabling Works Project and another Project Stakeholder that they will put something in place before the PLR2 enters service or a design is complete. Dependencies are likely to be placed throughout the project, but many may not be placed until later in the project as they are likely to be outputs from design.*

Constraints *Constraints are factors which present limitations to the extent of physical configuration of the railway system and hence the SFAIRP demonstration and are to be acknowledged by the appropriate party*

ADC ID	Design Package	Designer Name	Designer Organisation	ADC Description	Validation	ADC Type	Safety Related?	Hazard Log Reference	Design Stage	ADC Status	Additional Comments / Notes
PLR2EW-ADC-045	SD-0001 - Stormwater Drainage and Water Quality Design	[redacted]	GHD	1.1m cover is assumed to set the pipe level at the Melrose Park development tie-in points	Detailed Survey to validate the level of existing drainage connections from upstream systems has been provided by JH.	Assumption	No		SDR	Closed	
PLR2EW-ADC-046	SD-0001 - Stormwater Drainage and Water Quality Design	[redacted]	GHD	2.31 ha of upstrea catchment will discharge into pipeline 07 and 0.874 ha will discharge into pipeline 01	Will be converted to the basis of design if no further information provided on Melrose Park development	Dependency	No		SDR	Closed	This catchment split and the basis of design has been presented in two submission of the SD-0001 package with no comment, the design has been updated from an assumption to a dependency and is documented in the Detailed design report for consideration of future upstream developments.
PLR2EW-ADC-047	SD-0001 - Stormwater Drainage and Water Quality Design	[redacted]	GHD	ATL catchment can directly discharge to Parramatta River	Closed as this is allowed under the SPR, water quality modelling demonstrates that targets can be met without routing this flow through the treatment train.	Assumption	No		SDR	Closed	
PLR2EW-ADC-062	SD-0001 - Stormwater Drainage and Water Quality Design	[redacted]	GHD	Existing CoPC 2x600mm diameter trunk drainage along Hill Road can accept the discharge from the bioretention basin at Ch 8080. The basin collects flow from run-off from the southern end of the PLRC from crest at Ch 7940.	Council has confirmed through the comment register that the existing system is undersized. The design has been developed on the basis that the post upgrade discharge to the system will not increase compared to the pre-upgrade condition.	Assumption	No		SDR	Closed	
PLR2EW-ADC-101	SD-0001 - Stormwater Drainage and Water Quality Design	[redacted]	GHD	That drainage infrastructure constructed as part of the Early Works scope that is located under the potential future PLR corridor is not considered a restriction on future performance as described in SPR Clause 7.4.9.	This has been confirmed in response to PLR2EW-JHGRP-RFI-000112	Dependency	No		DDR	Closed	Was discussed at comment closeout meeting and indications from TfNSW was that this was a valid Assumption, but Contractor to formalise through an RFI.

Appendix D Specialist Report Excerpts and Supporting Information

Appendix ID	Description
Appendix D1	PLR2EW-JHGRP-NWW-DR-MEM-000001 – Technical Memo: SPR Clause 7.4.9(d) Assessment of Need for Transverse Track Drainage
Appendix D2	PLR2EW-JHGRP-NWW-DR-MEM-000002 – Australian Rainfall and Runoff 2019 Version 4.2 Impact on Drainage Design

D-1 PLR2EW-JHGRP-NWW-DR-MEM-000001 – Technical Memo: SPR Clause 7.4.9(d) Assessment of Need for Transverse Track Drainage

Technical Note			
Project Name:	Parramatta Light Rail Stage 2 Enabling Works	Technical Note Number:	PLR2EW-JHGRP-NWW-DR-MEM-000001_ SPR Clause 7.4.9(d) Assessment of Transverse Track Drainage
Date:	04/11/2024	Revision:	B (Draft)
Originator:	[redacted] GHD	Reviewer	[redacted] GHD
Title:	SPR Clause 7.4.9(d) Assessment of Transverse Track Drainage		
Issued For:	Approval		

1. Introduction

Section 7.4.9 (d) of the Scope and Performance Requirements (SPR) specifies that the track '*drainage system must incorporate transverse drainage at no greater than 50m intervals within embedded track unless the Contractor can demonstrate to the Principal that operational surface water depth requirements can be achieved with an alternate approach. [940780]*'.

The Principal's reference design generally presented a flat PLRC track slab which relied on the use of monolithic transverse grated drains to capture flow and divert it to the pavement drainage pipe system. While this system still presents as the most logical in some section of the PLRC corridor, the bridge super structures are locations where the dual use of the PLRC has driven the adoption of fall across the formation to provide a suitable drainage of the PLRC carriageway for the use of buses.

This Technical Note outlines how the revised cross section geometry at discrete locations facilitates the removal of the transverse track drainage system for a more traditional drainage collection system, that will present the Principal with a reliable drainage system but with the benefit of reduced maintenance.

2. Purpose

The Purpose of this Technical Memo is to demonstrate that the proposed track drainage system across the two bridge structures can achieve the drainage requirements.

3. Deed Reference

SPR Section 7.4.9(d): *"The drainage system must incorporate transverse drainage at no greater than 50m intervals within embedded track unless the Contractor can demonstrate to the Principal that operational surface water depth requirements can be achieved with an alternate approach."*

This Technical Note does not seek to remove the requirements noted elsewhere on the need for transverse drainage at the locations identified in Section 7.4.9(e).

4. Proposal

4.1. Bridge BR01

For Bridge BR01 (Maritime Bridge), which has a crossfall of 2.7%, the proposal is to install a 0.3m wide longitudinal grated trench, 2m in length, at every 50m interval along the low side of the track slab. These trenches will be positioned where the scuppers are located and will be connected to the bridge drainage system via the scuppers. Additionally, 150mm diameter scuppers will be installed at 12m intervals, in accordance with SPR requirements. Refer to Figure 1 below.

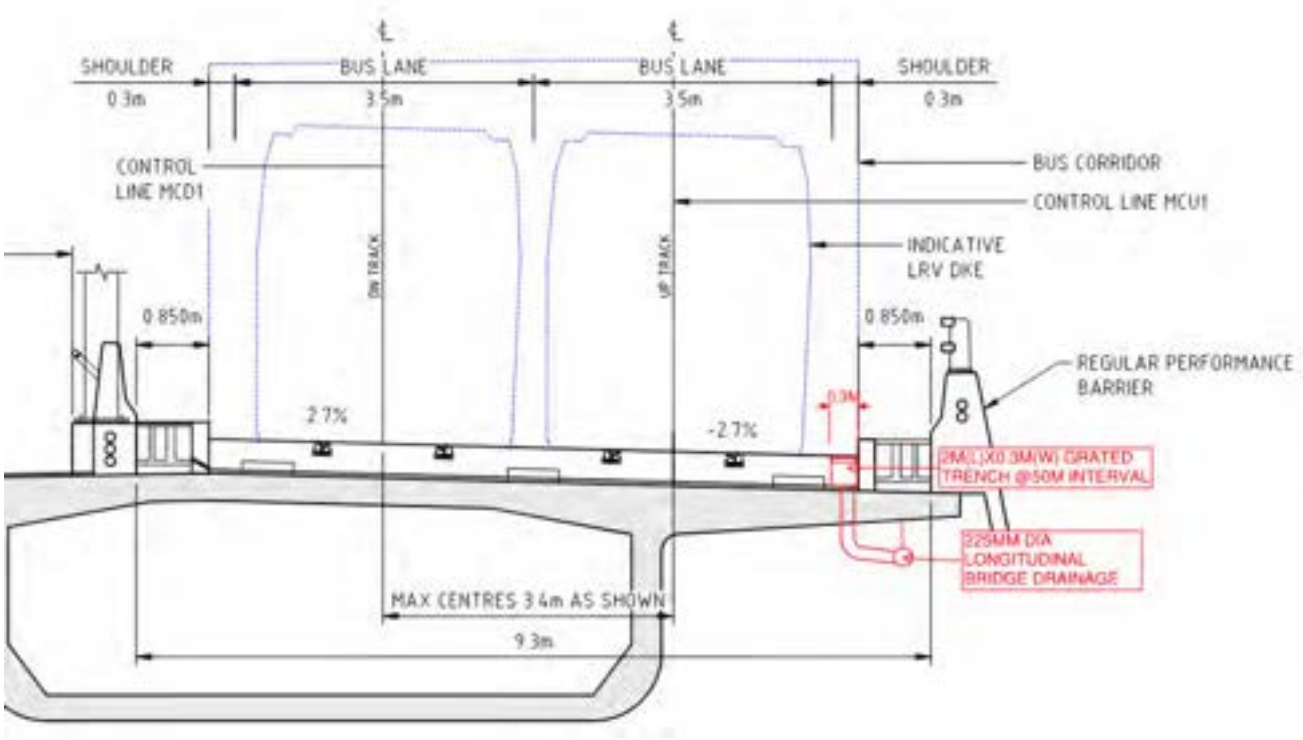


Figure 1: Bridge BR01 proposed longitudinal grate trench arrangement

4.2. Bridge BR02

Bridge BR02 has been removed from this Technical Note as the design still proposes the use of transverse drainage within the 4 foot of the track in this location.

5. Assessment

5.1. Operational Requirements

The technical assessment has focused on demonstrating that the revised track drainage system will meet the technical requirements as outlined in the SPR. The key sections that have been reviewed are:

1) SPR Clause 7.3.2(a): *The drainage system, comprising both road and track drainage and without reliance on future upgrades of the drainage system by the drainage Authority, must limit standing water to 50 mm depth above finished rail level in a 5% AEP event plus climate change up to 2130.*
2) SPR Clause 7.4.8(d): *The drainage system must be designed for a 5% AEP storm event (minor storm) inclusive of predicted climate change for year 2130, on the assumption that the drainage Authority's drainage system (upstream and downstream) be upgraded by the drainage Authority to meet the 5% AEP inclusive of predicted climate change for year 2130.*
3) SPR Clause 7.4.9(d): *The drainage system must incorporate transverse drainage at no greater than 50m intervals within embedded track unless the Contractor can demonstrate to the Principal that operational surface water depth requirements can be achieved with an alternate approach.*
4) SPR Clause 7.7.2.2(j)(iii): *where provided, scuppers must not be spaced more than 12 m apart. The scupper spacing must be reduced in the vicinity of deck joints to ensure any flow against the barrier is captured prior to reaching the deck joints.*

Other considerations that have been considered in the assessment include:

1) Drainage requirements of the Rail groove.
2) Self-cleaning of the Rail groove.
3) Maintenance considerations.

4) Drainage flow width requirements based on Austroads part 5A table 5.1 for one lane in each direction; flow width that will be applied to the design will be 1.3m (1.0m lane intrusion plus 0.3m shoulder).
5) Climate Change will be applied as per the SPR requirements and is currently nominated at 30% increase in IFD.

5.1.1. Bridge BR01 Assessment

5.1.1.1. Flow Width Assessment

To demonstrate that the flow width criteria can be complied with, an assessment has been undertaken in DRAINS. DRAINS was adopted as it allowed us to customise the assessment to:

- Utilise an appropriate hydrology Model, ILSAX hydrology.
- Develop the appropriate Inlet capture curves for a 0.3m wide, 2m longitudinal grated trench drain established using Watercom spreadsheets based on HEC-22 and incorporated into the model, with the grate aligned longitudinal to the direction of flow.
- Develop a specific cross section profile specific to the achieved track geometry, a 2.7% crossfall, refer to Figure 2.

The outcome of the assessment demonstrated that the maximum flow width across the Bridge BR01 can be contained to 1.3m within the design event (for 10% AEP storm event + climate change, CC), when utilising the combination of scuppers spaced at 12m centres and an additional longitudinal run of trench grate every 50m.

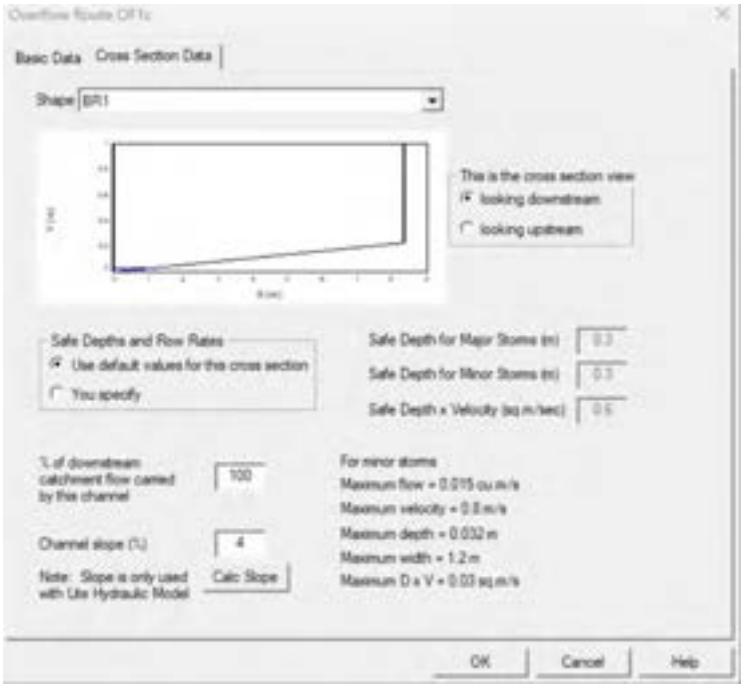


Figure 2: Screen shots from DRAINS model presenting flow width result

5.1.1.2. Flow Depth Over Rail Assessment

Utilising the same DRAINS model summarised above, compliance to the flow depth over the rail is confirmed as below 50mm in a 5% AEP + CC storm event. Refer to Figure 3 below, noting the maximum depth of 52mm is at the invert of gutter and not over the rail; the flow does not reach the rail alignment.

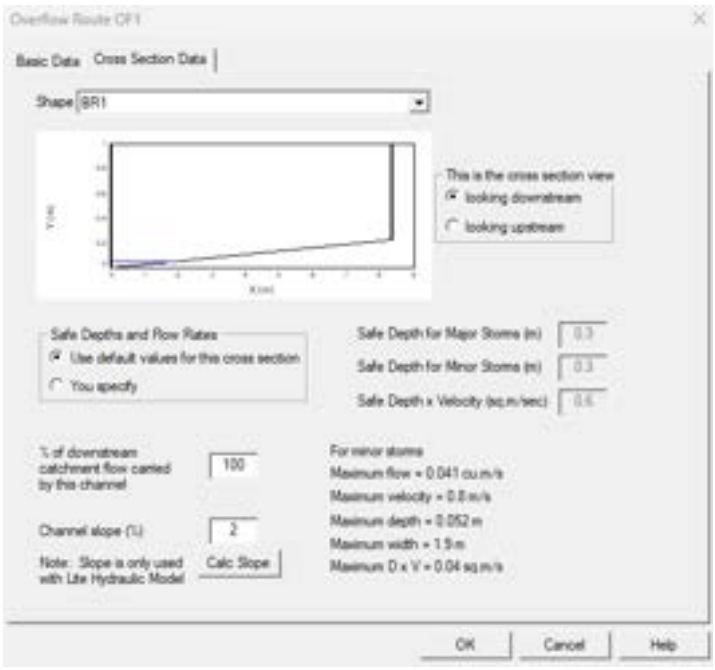


Figure 3: Bridge BR01 Ponding depth over the rail in 5% AEP event

5.1.2. Rail Groove Drainage Requirements Assessment

Both TfNSW and the SPR do not provide any overarching guidance of the drainage of the rail groove in the embedded Track system. GHD has undertaken a literature review of standards elsewhere to identify requirements and identified that the ***Transit Cooperative Research Program Report 155, Track Design Handbook for Light Rail Transit, Second Edition, Chapter 4 Track Structure Design*** provides the most guidance on the application of Rail groove drainage, as summarised below:

''Conventional flangeways will inevitably intercept and carry stormwater runoff. This runoff must eventually be intercepted and drained away from the track.

Drains immediately up-grade of embedded special trackwork installations are particularly important so as to intercept stormwater runoff and the debris it carries before it can enter the switches and interfere with switch operation.

Additional drainage points should be provided periodically along straight track grade sections so that runoff, debris, sand or other material can be carried away and the flangeway kept relatively clear. Typically, these track drains will be no more than 300m apart, depending on track gradients. Draining the flangeways is of greater importance in snowbelt climates where accumulated water might freeze in the flangeway and cause a derailment. These intermediate drains can be either the full width of the track slab or smaller units that drain only the flangeway, depending on local conditions."

Based on this GHD has identified that the maximum spacing for Rail groove drainage is 300m. Bridge BR01 groove drainage will be provided on the downstream side of the abutments.

5.1.3. Maintenance Assessment

The SPR Clause 7.4.8(g) requires that the transverse drainage system must not have a removable grate. The lack of a removable grate and frame structure will increase the risk to maintenance of these monolithic elements as maintenance will need to be by surface flushing only as access to the system is not feasible.

Trench Grates with low grades and small flows are susceptible to blockage as the catchments supporting them, particularly on the Bridge BR01, are low and so flows are insufficient to develop a self-cleaning velocity.

The adoption of the proposed alternate drainage system in lieu of the monolithic transverse drainage grates will provide a beneficial impact on the maintenance by removing this issue and providing bridge scuppers that connect directly to a piped drainage system that provide sufficient self-cleaning velocity.

6. Additional elements for consideration

The top of the rail is installed 6 mm above the adjacent surface, so even with a cross slope of 2.7% combined with longitudinal fall on the bridge there will be water trapped near the rail along with debris after rain events that will require maintenance activity to clean the surface. Further debris and water near the rail surface will cause issues to the rail insulation system (Pandrol or Edilon) and may affect the track insulation resistance criteria. The Contractor to note these issues when proposing an alternate drainage system approach.

Agreed that the 6mm projection will create a damming effect to flow across the deck; however the longitudinal fall will direct this flow towards the bridge abutments where it will be collected. This small section will fill quickly and would occur with the transverse drainage system as well (other than for the 2 locations, either side of the high point, immediately downstream from the transverse grate).

With the relatively good longitudinal fall, it is not considered that the water will sit against the track but will fall to the bridge abutments where it will be collected. Any impact that this has on the track insulation system will occur regardless of the drainage method of collection employed.

Review of the track system literature does not identify any drainage requirements of the rail groove system, which was the driver for the wider standard research undertaken by GHD (refer section 5.1.2 above).

Long-term performance, maintenance frequency and methods, safety in design, whole of life costing, etc.

The alternative system to provide a longitudinal grate at the low side of the deck as opposed to the transverse drainage system is not anticipated to change any of the above outcomes, other than provide a more accessible system for both inspection and cleaning through:

- *Providing removable grates that will make the system more accessible.*
- *Having inlets that can be visually inspected from the maintenance walkway rather than having workers cross the PLRC.*

Potential risks associated with the failure of the system.

The risks of failure proposed with the alternative system present an improvement over the transverse system. When a transverse system fails or blocks, all flows are directed to the low side kerb where there is no capacity for the flow to be captured. In the longitudinal system, flows along the kerb line will have the ability to enter the system at the next inlet with more efficiency due to the longer grate area provided in the direction of flow.

Further, given the flows are larger at the upstream end of the trench grate inlet, higher flows enter the system providing better opportunities for self-cleaning velocities to be obtained.

Consultation with and concurrence from the asset custodian will be required.

As stated in Section 5.1.3 the proposed system will provide an improved maintenance outcome by removing the need for monolithic drainage elements across the PLRC. The Asset Custodian for the drainage system is TfNSW (Greater Sydney Division). Based on the description provided within this Technical Note we kindly seek acceptance of this proposal from TfNSW.

7. Summary and Conclusion

The reference design was based on a track slab arrangement that presented 0% crossfall and was reliant on transverse drainage linear drains to adequately provide the track drainage function. The John Holland Design has been amended to respond to interoperable transport modes and incorporated elements such as crossfall to adequately provide for the bus usage.

The introduction of a crossfall on the track slab form has introduced opportunities to revisit the drainage scheme on Bridge BR01 and utilise a more traditional arrangement that is not reliant on the transverse drainage system.

The assessment contained within this technical memo has demonstrated that the proposed alternate scheme will satisfy all the requirements of the SPR and the derived requirements from Austroads Part 5A, whilst providing a more reliable drainage network.

The proposed alternative drainage approach is not considered to provide any adverse impacts over the transverse system, as the crossfall on the deck surface and very small projection of the rail above the deck will be inherent in any drainage system on Bridge BR01.

D-2 PLR2EW-JHGRP-NWW-DR-MEM-000002_Australian Rainfall and Runoff 2019 Version 4.2 Impact on Drainage Design

Technical Note			
Project Name:	Parramatta Light Rail Stage 2 Enabling Works	**Technical Note Number:**	PLR2EW-JHGRP-NWW-DR-MEM-000002_ Australian Rainfall and Runoff 2019 Version 4.2 Impact on Drainage Design
Date:	06/02/2025	**Revision:**	A
Originator:	[redacted] GHD	**Reviewer**	[redacted] GHD
Title:	Australian Rainfall and Runoff 2019 Version 4.2 Impact on Drainage Design		
Issued For:	Information		

1. Introduction

On 27th August 2024, a major update to the Australian Rainfall and Runoff (ARR) guidelines was released. This latest version 4.2 of the ARR2019 guidelines included revised guidance for practitioners, and fundamentally changes the approach to modelling the increases in rainfall intensity associated with global temperature increases (climate change). The guidance acknowledges that because our climate is changing, unadjusted historical observations are no longer a suitable basis for design flood estimation, they must be adjusted to reflect the impacts of rising global temperatures (ARR2019v4.2, Book 1 Chapter 6).

The detailed design of longitudinal drainage and stormwater quality treatment train for the Parramatta Light Rail project Enabling Works project has been developed using the specifications and reference documents which were current at the signing of the contract. This included the reference document Australian Rainfall and Runoff 2019 (ARR2019) Version 4.1.

The Project previously provided a technical note outlining the impacts of the changes on the flooding package (FL-0001), and in that review commentary on the impact to the longitudinal drainage was requested. This note specifically addresses the impacts of the update on the longitudinal drainage system, which is largely due to the increases in rainfall intensity due to climate change projections.

2. Purpose

This Technical Memorandum is provided as initial advice of the potential impacts to the current SDR design, and assess high-cost elements, such as transverse drainage and pit/scupper spacing detailed assessment during PDR will provide the actual impact and can be compared against the SDR design for more detailed quantitative analysis of the impacts.

The review of the PLR2 drainage design with respect to the adoption of ARR2019v4.2 has not included additional detailed modelling of the climate change scenarios presented, rather a preliminary assessment has been carried out based on percentage increases expected for rainfall depths. This is to allow a better understanding of the scale of changes that may be required for the design, and that a determination to adopt the revised methodology can be made.

3. Deed Reference

Following SPR clauses refer to considerations of climate change:

- 7.3.2(a): “The drainage system, comprising both road and track drainage and without reliance on future upgrades of the drainage system by the drainage Authority, must limit standing water to 50 mm depth above finished rail level in a 5% AEP event plus climate change up to 2130. ”
- 7.4.1 (c) (iii): “be resilient to the effects of climate change as a result of rainfall intensity increase, sea level rise and storm surge up to year 2130 as prescribed in this
- section and this SPR”.

- 7.4.8 (d): “be resilient to the effects of climate change as a result of rainfall intensity
- increase, sea level rise and storm surge up to year 2130 as prescribed in this section and this SPR”
- 7.4.8 (h): Where existing CoPC stormwater outfalls are to be replaced within Archer Park,
- these must be of sufficient alignment, size and depth to cater for the 1% AEP including climate change from the upstream catchment, assuming that no OSD
- will be provided in future developments.

4. Key changes to ARR2019 in Version 4.2

4.1.1. Summary of key changes

As per the Flooding Technical Memo (PLR2EW-JHGRP-NWW-FL-MEM-00001), the following is a summary of the revision to ARR 2019 with respect to climate change, which include:

- A recommendation to adjust Intensity-Frequency-Duration (IFD) curves from Bureau of Meteorology (http://www.bom.gov.au/water/designRainfalls/revised-ifd) to accommodate global temperature rises to current day and into the future with updated adjustment factors provided by the ARR 2019 Data Hub (data.arr-software.org) The factors now vary with storm duration.http://www.bom.gov.au/water/designRainfalls/revised-ifd) to accommodate global temperature rises to current day and into the future with updated adjustment factors provided by the ARR 2019 Data Hub () The factors now vary with storm duration.
- Advice that - global temperature rise impacts should now also be considered for events between 1EY and the PMF.

Recommendations on storm burst loss factors, with updated adjustment factors provided by the ARR 2019 Data Hub (data.arr-software.org) Adoption of the new guidelines would require update would potentially require an update of the pavement drainage system design.

The revision of ARR2019 also updates the older terminology used when discussing climate change impacts. Representative Concentration Pathways (RCPs) have been replaced in the methodology by Shared Socioeconomic Pathways (SSPs). RCPs showed how emissions might change and how much extra energy would be trapped by greenhouse gases, but they didn’t include social changes or policies. SSPs add these factors and make it easier for policymakers to determine the necessary actions to limit climate change impacts. The following are the adopted SSPs in the ARR2019 Version 4.2:

- SSP1: “Sustainability” – equivalent to RCP 2.6.
- SSP2: "Middle of the Road" – equivalent to RCP 4.5.
- SSP3: “Regional Rivalry” – equivalent to RCP 7.0.
- SSP5: “Fossil-fuelled Development” – equivalent to RCP 8.5.

4.1.2. Changes to rainfall intensity estimates (Rainfall Factors)

ARR2019 v4.2 recommends an approach whereby design rainfalls and burst losses are factored based on global temperature increase. These factors are applied to the BOM IFD data which has a baseline global temperature prevalent for the period 1961 to 1990 for the SSPs noted in Section 4.1.1 of this memo.

Figure 1 is an extract from ARR2019 v4.2 (Figure 1.6.2) and shows the global temperature projections for the various SSPs, along with the associated uncertainty. It is noted that the long-range predictions become increasingly uncertain, and it is for this reason that ARR2019 v4.2 (Section 6.4.1) recommends the rainfall factors should not be extrapolated beyond 2100:

“…projections beyond 2100 for flood designs with a long effective service and/or design life, the available evidence to support such projections is more speculative than that used to develop projections out to 2100. The

defensibility of designing for specific climate change projections beyond 2100 is therefore questionable, and a more flexible and adaptive approach may be advisable."

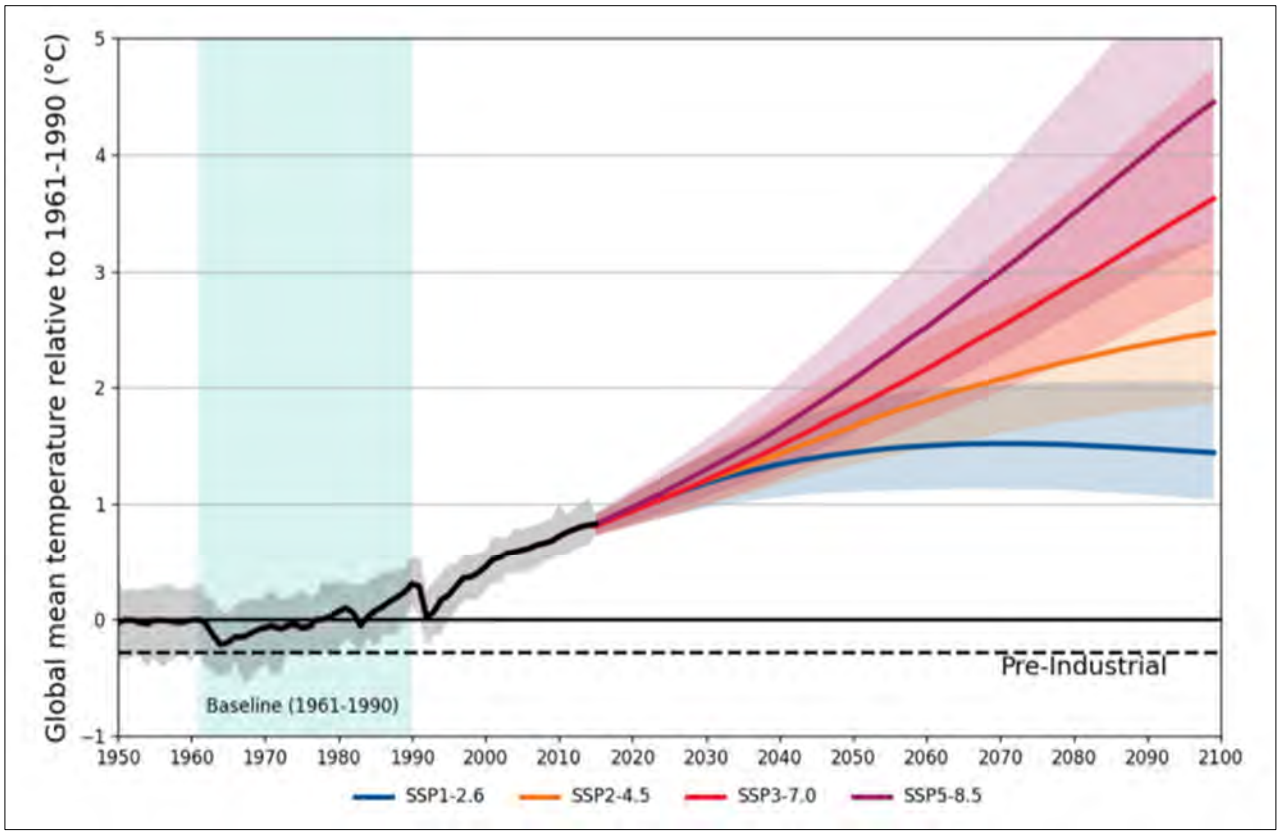


Figure 1 *Extract from ARR2019 v4.2 Figure 1.6.2 'Projected temperature increases associated with AR6 socioeconomic pathways relative to 1961-1990 and their associated uncertainty'*

ARR2019 v4.2 provides a methodology for factoring rainfall for given SSPs. Tables 1.6.1 provided in Book 1 Section 6 suggest values for rates of change and global mean temperature projections respectively, which are applied to a formula (Equation 1.6.1) to get a projected design rainfall (either depth or intensity).

The ARR Data Hub will generate tables of Rainfall Factors based on the ARR2019 v4.2 methodology for a given location. These are presented in Figure 2 to Figure 5, and are applicable to the PLR2 project site, based on Longitude 151.063 and Latitude -33.813. As can be seen in these figures, the shorter duration storms are most impacted. Rainfall factors under SSP1-2.6 do not significantly change with the longer term, peaking at 1.24 in Year 2070. For SSP5-8.5, rainfall factors continue to increase up to Year 2100.

Based on the figures the current design would:

- Meet a projected SSP1-2.6 projection.
- Require an additional intensity increase of circa 10% to meet a SSP2-4.5 projection.
- Require an additional intensity increase of circa 35% to meet a SSP3-7.0 projection.
- Require an additional intensity increase of circa 40%% to meet a SSP5-8.5 projection.

Climate Change Factors

Rainfall Factors

SSP1-2.6

Year	<1 hour	1.5 Hours	2 Hours	3 Hours	4.5 Hours	6 Hours	9 Hours	12 Hours	18 Hours	>24 Hours
2030	**1.18**	**1.17**	**1.16**	**1.14**	**1.13**	**1.12**	**1.12**	**1.11**	**1.1**	**1.1**
2040	1.21	1.19	1.17	1.16	1.15	1.14	1.13	1.12	1.11	1.11
2050	**1.22**	**1.2**	**1.18**	**1.17**	**1.15**	**1.15**	**1.14**	**1.13**	**1.12**	**1.11**
2060	1.23	1.21	1.2	1.18	1.17	1.16	1.15	1.14	1.13	1.12
2070	1.24	1.22	1.2	1.18	1.17	1.16	1.15	1.14	1.13	1.12
2080	1.23	1.21	1.2	1.18	1.17	1.16	1.15	1.14	1.13	1.12
2090	**1.23**	**1.21**	**1.2**	**1.18**	**1.17**	**1.16**	**1.15**	**1.14**	**1.13**	**1.12**
2100	1.22	1.2	1.19	1.17	1.16	1.15	1.14	1.13	1.12	1.12

Figure 2 Rainfall Factors for SSP1-2.6, ARR Data Hub (accessed 30th January 2025)

SSP2-4.5

Year	<1 hour	1.5 Hours	2 Hours	3 Hours	4.5 Hours	6 Hours	9 Hours	12 Hours	18 Hours	>24 Hours
2030	**1.18**	**1.17**	**1.16**	**1.14**	**1.13**	**1.12**	**1.12**	**1.11**	**1.1**	**1.1**
2040	1.22	1.2	1.19	1.17	1.16	1.15	1.14	1.13	1.12	1.12
2050	**1.27**	**1.24**	**1.23**	**1.21**	**1.19**	**1.18**	**1.17**	**1.16**	**1.15**	**1.14**
2060	1.3	1.27	1.25	1.23	1.21	1.2	1.19	1.18	1.16	1.16
2070	1.33	1.3	1.28	1.26	1.24	1.22	1.21	1.19	1.18	1.17
2080	1.37	1.33	1.31	1.28	1.26	1.24	1.22	1.21	1.2	1.19
2090	**1.4**	**1.36**	**1.34**	**1.31**	**1.28**	**1.26**	**1.24**	**1.23**	**1.21**	**1.2**
2100	1.41	1.37	1.35	1.32	1.29	1.27	1.25	1.24	1.22	1.21

Figure 3 Rainfall Factors for SSP2-4.5, ARR Data Hub (accessed 30th January 2025)

SSP3-7.0

Year	<1 hour	1.5 Hours	2 Hours	3 Hours	4.5 Hours	6 Hours	9 Hours	12 Hours	18 Hours	>24 Hours
2030	1.18	1.17	1.16	1.14	1.13	1.12	1.12	1.11	1.1	1.1
2040	1.23	1.21	1.2	1.18	1.17	1.16	1.15	1.14	1.13	1.12
2050	1.29	1.26	1.24	1.22	1.2	1.19	1.18	1.17	1.16	1.15
2060	1.35	1.32	1.3	1.27	1.25	1.23	1.22	1.2	1.19	1.18
2070	1.42	1.38	1.35	1.32	1.29	1.28	1.26	1.24	1.22	1.21
2080	1.5	1.45	1.42	1.38	1.35	1.33	1.3	1.28	1.26	1.25
2090	1.59	1.53	1.49	1.44	1.4	1.38	1.35	1.33	1.3	1.29
2100	1.66	1.59	1.55	1.5	1.45	1.42	1.39	1.37	1.34	1.32

Figure 4 Rainfall Factors for SSP3-7.0, ARR Data Hub (accessed 30th January 2025)

SSP5-8.5

Year	<1 hour	1.5 Hours	2 Hours	3 Hours	4.5 Hours	6 Hours	9 Hours	12 Hours	18 Hours	>24 Hours
2030	1.2	1.18	1.17	1.16	1.14	1.13	1.13	1.12	1.11	1.11
2040	1.26	1.24	1.22	1.2	1.18	1.17	1.16	1.15	1.14	1.14
2050	1.34	1.31	1.29	1.26	1.24	1.23	1.21	1.2	1.18	1.18
2060	1.42	1.38	1.35	1.32	1.29	1.28	1.26	1.24	1.22	1.21
2070	1.52	1.47	1.43	1.4	1.36	1.34	1.31	1.29	1.27	1.26
2080	1.63	1.57	1.52	1.48	1.43	1.4	1.37	1.35	1.33	1.31
2090	1.77	1.69	1.64	1.58	1.52	1.49	1.45	1.42	1.39	1.37
2100	1.86	1.77	1.71	1.64	1.58	1.54	1.5	1.47	1.43	1.41

Figure 5 Rainfall Factors for SSP5-8.5, ARR Data Hub (accessed 30th January 2025)

4.1.3. Changes to design storm losses (Loss factors)

As per advice from Department of Climate Change, Energy, the Environment and Water (arr.ga.gov.au/__data/assets/pdf_file/0007/172843/Climate-Change-Considerations-FAQs.pdf), the guidance on adjustment factors for IL/CL should not be applied to other loss models. As the

stormwater drainage design for PLR2 has been undertaken using a Horton's Loss Model, there is no requirement to adjust losses for the project.

4.1.4. Changes to tailwater conditions (Sea level rise)

With regards to sea level rise, ARR2019 Version 4.2 Book 1 Section 6.4.2, states:

"…changes to the interaction (or 'joint probability') between high sea levels (due to the combination of high astronomic tides and storm surges) and heavy rainfall events, remain poorly understood."

The ARR Guideline further recommends that jurisdictional guidance on changes in the sea level is sought before assessing impacts using the steps outlined in in ARR Book 6, Chapter 5, Section 5. These matters have been addressed in the project flooding technical memo (PLR2EW-JHGRP-NWW-FL-MEM-00001).

4.1.5. Rainfall Projection Scenario

The existing PLR2EW design has been developed utilising an SSP8.5 projection and this projection is consistent with Section 3.3.4 of TfNSW's Climate Risk Assessment Guideline which recommends using only the RCP8.5 Projections for climate change risk assessment, the equivalent of SSP5-8.5. This assessment has been undertaken utilising SSP5-8.5.

5. Impacts of implementing ARR2019 Version 4.2 to the PLR2 Longitudinal Drainage design

As outlined in the Stormwater Drainage and Water Quality Design Report for PLR2 Design Package SD-0001 (PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001), climate change impacts have already been considered using the methodology of the previous version of ARR2019. Section 4.2.3 of the report states:

"SPR 7.4.1(c)(iii) requires for the drainage system to be resilient to the effects of climate change as a result of rainfall intensity increase, sea level rise and storm surge up to year 2130. The projected 30% increase in rainfall by 2130 is calculated using linear extrapolation, following the methodology outlined in Australian Rainfall and Runoff 2019 (Version 4.1, Book 1, Chapter 6). For the "much hotter" climate scenario, the median temperature is determined using Table 1.6.3, and the rainfall increase is estimated using Equation 1.6.1 from the same reference."

As such, the rainfall depth/intensity that was used for the current design is already 1.3x the historic rainfall. This would be the equivalent of SSP5-8.5 in Year 2045 (by interpolation of values shown in Figure 5).

Given that the ARR2019 Data Hub does not provide data for scenarios beyond Year 2100, the SPR Clause 7.4.1 (c) (iii) for Year 2130 cannot be addressed using the ARR Data Hub information and would need to be extrapolated. This is not recommended by ARR2019 v4.2 as previously discussed in Section 4.1.2 of this memo. L3ing the forecast year to 2100 as per ARR2019 v4.2 will require approval for a departure from the SPR requirements noted in Section 6 of this memo.

The rainfall factor to be used for the assessment is summarised in Table 1.

Table 1 Comparison of Rainfall Factor under current PLR2 design and Version 4.2 for Storms <1hr in Year 2100

	Current PLR2 Design	ARR2019 Version 4.2 Year 2100	Difference
SSP5-8.5	1.30	1.86	+43%

The expected impact on the design adopting ARR v4.2 for global temperature increase are as follows:

- Long drainage networks will need to be redesigned to accommodate the increase in rainfall, including additional pits and scuppers to limit flooded width, pipe sizing will need to be increased in some instances due to both increased rainfall and sea level rise.
- Positive impact may be expected for pipes with low self-cleansing velocity due to increased rainfall and subsequent increase in flows.
- Transverse drainage sizing is likely to increase to accommodate additional rainfall and may also be impacted by sea level rise
- Scour protection to pipe outlets may require larger rock sizing.
- Onsite Detention (OSD) basin volume is likely to increase due to rainfall increase

5.1.1. Pit and scupper spacing

Shorter duration storm events are critical for the spacing of pits and scuppers to meet gutter flow width limits. Maintaining the maximum flow width would be achieved by reducing each pit or scupper catchment to ensure that the maximum flowrate is not exceeded from the current PLR2 design. This has been assessed using the inverse of the percentage increase to rainfall under the SSR5-8.5 scenario. If rainfall intensity or depth is increased by 43% for the Year 2100 forecast, the area of catchment must be decreased to 70% (i.e. 1/1.43) to maintain the same flowrate, based on a Rational Method approach (Q=CIA).

The maximum spacing of transverse track drains specified by SPR Clause 7.4.9 (d) is 50m. Currently the PLR2 design has TramDrain200 at varying spacings. A more detailed analysis would need to be carried out, however it is expected that MEA DRAIN and TramDrain spacing intervals would reduce by 30% for Year 2100. Bridge 2 MEA DRAIN intervals would reduce by 9.6m.

Table 2 Comparison of inlet spacing, current PLR2 design and Version 4.2 for Storms <1hr in Years 2100

Location	Current PLR2 Design	ARR2019 Version 4.2 (SSP5-8.5, Year 2100)
TramDrain intervals in northern section of Parramatta River	Varies	Varies, reduce spacing to 70% of current PLR2 Design
Bridge 1 scupper intervals	12m	8.4m
Bridge 1 trench drain intervals	50m	35m
Bridge 2 scupper intervals	8m	5.6m
Bridge 2 MEA DRAIN intervals	32m	22.4m

Table 3 Comparison of inlet quantities, current PLR2 design and Version 4.2 for Storms <1hr in year 2100

Location	Current PLR2 Design	ARR2019 Version 4.2 (SSP5-8.5, Year 2100)
TramDrain intervals in northern section of Parramatta River	Varies	Varies, reduce spacing to 70% of current PLR2 Design
Bridge 1 scupper intervals	22	29
Bridge 1 trench drain intervals	8	11
Bridge 2 scupper intervals	28	37
Bridge 2 MEA DRAIN intervals	7	10

5.1.1.1. Bridge 1 Scupper spacing

Whilst the assessment above looks at impact from the intensity increase the constructability consideration provides a for a scupper to be placed mid on every second segment at present (10.2m spacing), the noted impact on spacing in Table 2 would result in a scupper to be provided on every segment now (approx. 5.1m spacing).

5.1.2. Pipe sizing

Increased rainfall depths for critical design storms will result in higher peak flow rates through the pipe drainage network. Based on the longitudinal drainage drawings presented at SDR stage, many of the pipes are sized based on the minimum diameter of 375mm and 450mm for longitudinal and transverse pipes respectively and have capacity for additional flows. Under the ARR2019 Version 4.2 (SSP5SSR5-8.5) design scenario, most of these pipes are expected to remain unchanged.

Toward the lower reaches of networks, particularly for drainage Lines 10, 14 and 17, some pipes may require upsizing by several sizes to maintain performance of the network. Similarly for Line 13, which drains the scuppers for Bridge 1, the pipework has been sized primarily based on the smallest pipe size for bridge drainage, but the lower reach of the line would likely require upsizing by one or two sizes to accommodate additional flows due to the predicted global temperature increases.

Transverse pipes which drain external catchments, particularly Lines 1 and 7, were sized in the SDR stage for the 1% AEP + 30% increase in rainfall due to climate change effects. Both Line 1 and Line 7 would require upsizing by one or two pipe size if ARR2019 v4.2 is adopted (SSR5-8.5, Year 2100). There is limited scope to increase the longitudinal grade of these pipes as this would increase velocity, which may adversely impact sensitive downstream vegetation.

Lines 17 and the lower portion of 14, which drain the deck of Bridge 1 and the sag point at PLRC alignment adjacent to Sekisui development, were also designed for the 1% AEP + 30% increase to rainfall. The expected impact of adopting the ARR2019 v4.2 methodology with SSP5-8.5 scenario in Year 2100 is that the pipework would require upsizing by one or two pipe sizes.

Predominantly, tailwater conditions for pipes discharging to the Parramatta River have been determined from the GHD flood model for a 5% AEP and would need to be reviewed for impacts of adopting ARR 2019 V 4.2 in the flood model, refer to Flooding Technical Memo (PLR2EW-JHGRP-NWW-FL-MEM-00001), for further details. It is anticipated that there would be some increase in the tailwater levels, and this may have an impact on the performance of the drainage network, including transverse drainage pipes which drain external catchments.

Low-lying areas, such as Wharf Road and the Southern Foreshore, are likely to be inundated under the SSP-8.5 Sea Level Rise scenario for the year 2100 considering only the ocean boundary level as per IPCC 6th Assessment Report, 2023. For these locations, the highest astronomical tide (HAT) for present day will be used as the tailwater level.

5.1.3. Transverse Drainage

There are two transverse drainage lines at adjacent to the future Waratah Street station, bot of these crossings is design to convey 100 Year peak flows from a fully urbanised upstream catchment, as required by the SPR, these pipes will need to be increased in size as summarised below:

- Line 01 and 07: Increase from a 825 mm to a 1050mm

5.1.4. Detention storage volume

In SDR the detention storage volume has been designed based on the peak flow rate of the 1% AEP design storm event to ensure that the project does not exceed the pre-development peak flow rate. Additionally, a 220mm freeboard is included above the 1% AEP water level to accommodate potential water level rises resulting from a 30% increase in rainfall intensity. In considering the impact of ARR2019 v4.2 on this design element, it is expected that there will be an increase in storage volume on the basis that the difference between the pre and post peak flowrates will be larger due to the increase in rainfall depth.

Additional volume would be provided in the same surface area, due to project spatial constraints, and trigger the increase in the ponding depth in the basin. The impact of this will be an increases bund height and the provision of a fence around the basin as the new ponding depths would be in excess of 600mm.

5.1.5. Stormwater quality treatment

MUSIC model uses continuous simulation and to date there is not approved method for adjusting runoff timeseries for global temperature rise. Therefore, the design for stormwater quality will not be revised due to the revision of ARR2019.

6. SPR Compliance

Since the ARR2019 Data Hub does not include data for scenarios beyond the year 2100, and ARR2019 v4.2 advises against extrapolating data beyond this point, the following SPR clauses should be updated to restrict the forecast to the year 2100.Refer to section 5 for further details.

- 7.3.2(a): “The drainage system, comprising both road and track drainage and without reliance on future upgrades of the drainage system by the drainage Authority, must limit standing water to 50 mm depth above finished rail level in a 5% AEP event plus climate change up to 2130.”
- 7.4.1 (c) (iii): “be resilient to the effects of climate change as a result of rainfall intensity increase, sea level rise and storm surge up to year 2130 as prescribed in this section and this SPR”.
- 7.4.8 (d): “be resilient to the effects of climate change as a result of rainfall intensity increase, sea level rise and storm surge up to year 2130 as prescribed in this section and this SPR”

7. Summary and Recommendations

The revision to ARR2019 in August 2024 changes the approach to incorporating global temperature increase impacts on design rainfall. As a result, the design would be impacted by increased number of pits and scuppers, sizing of longitudinal trench drains on Bridge 02, increases to the diameter of some pipes, particularly in the lower sections of drainage pipelines, and increase to the volume storage required for the detention basin.

The stormwater quality design will not be reassessed based on ARR2019 revision as there is no approved method in MUSIC for adjusting runoff timeseries for global temperature rise.

The drainage design will be revised using the revised methodology Book 1 of ARR2019 v4.2 for the projected year 2100, for SSP5 – 8.5. This is consistent with both the recommendations of ARR2019 v4.2, TfNSW’s Climate Risk Assessment Guidelines and the scenario selected for the current PLR2 design (RCP8.5). A departure should be sought for the requirements SPR which refer to Year 2130, as noted in Section 6 of this memo.

References

Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M, Testoni I, (Editors) Australian Rainfall and Runoff: A Guide to Flood Estimation, © Commonwealth of Australia (Geoscience Australia), Version 4.2, 2019

Department of Climate Change, Energy, the Environment and Water, Frequently Asked Questions: Update to the Climate Change Considerations chapter in Australian Rainfall and Runoff: A guide to

Flood Estimation , https://arr.ga.gov.au/__data/assets/pdf_file/0007/172843/Climate-Change-Considerations-FAQs.pdf, © Commonwealth of Australia, 2024

TfNSW, Climate Risk Assessment Guidelines DMS-SD-081/4.0, Version 4.1, 27 August 2022

Regards

[redacted]

Senior Drainage Engineer

Appendix E Certifications and Third Party Approvals

Appendix ID	Description
Appendix E1	RFIs

E-1 RFIs

RFI Number	Subject
PLR2EW-JHGRP-RFI-000021	Adoption of ARR2019 Version 4.2
PLR2EW-JHGRP-RFI-000010	SPR Clause 7.4.9(d) Assessment of Transverse Track Drainage
PLR2EW-JHGRP-RFI-000112	Clarification on SPR Clause 7.4.9(b) no restriction on wider drainage system

Request for Information

RFI Reference No: **PLR2EW-JHGRP-RFI-000010**
Status: INITOADDINFO

For Action:	[redacted] Transport for NSW [Role: TfNSW Respondent] [redacted] Transport for NSW [Role: TfNSW Respondent] [redacted] Transport for NSW [Role: TfNSW Respondent] [redacted] Transport for NSW [Role: TfNSW Respondent] [redacted] Transport for NSW [Role: TfNSW Respondent] [redacted] Transport for NSW [Role: TfNSW Respondent]
For Info:	[redacted] The APP Group [redacted] The APP Group [Role: TfNSW For Info] PLR2 Delivery Document Control, Transport for NSW [Role: TfNSW For Info]
Project:	Parramatta Light Rail - Stage 2 - Enabling works
Subject:	**SPR Clause 7.4.9(d) Assessment of Transverse Track Drainage**

Dear TfNSW,

Please find attached the following Technical Note.

PLR2EW-JHGRP-NWW-DR-MEM-000001

With reference to the SPR Clause 7.4.9(d), could TfNSW kindly review and provide a response including feedback and acceptance that this Technical Note demonstrates to the Principal that operational surface water depth requirements can be achieved without the need to incorporate transverse drainage at no greater than 50m internals within the embedded track.

Kind Regards,
[redacted]

Discipline: HY **Area:** **Location:** NWW

Response Required By : 18 October 2024, 00:00:00 AM +11:00

Attachments: PLR2EW-JHGRP-NWW-DR-MEM-000001_ SPR Clause 7.4.9(d) Assessment of Transverse Track Drainage_Rev A.pdf

RFI by:	[redacted] John Holland Group	On: 14 October 2024
Created By:	[redacted] John Holland Group	On: 14 October 2024, 05:32:43 PM +11:00
Last Edited By:	[redacted] John Holland Group	On: 14 October 2024, 05:32:43 PM +11:00

01 - RFI Response

Hi [redacted],

Please see below consolidated commentary to be considered when updating the Technical paper on the Transverse Drainage:

1. Please clarify on the following:
o Confirm that the alternative drainage approach considers operational surface water depth requirements for both road and rail operations, demonstrating compliance traceability back to the SPR and derived requirements from Austroads.
o Confirm the climate change projections that were used for the assessment?

2. Whilst the alternative approach appears to satisfy the operational surface water depth requirements if designed appropriately (subject to confirmation on the above), the Contractor should consider the following:
o The top of the rail is installed 6 mm above the adjacent surface, so even with a cross slope of 2.7% combined with longitudinal fall on the bridge there will be water trapped near the rail along with debris after rain events that will require maintenance activity to clean the surface. Further debris and water near the rail surface will cause issues to the rail insulation system (Pandrol or Edilon) and may affect the track insulation resistance criteria. The Contractor to note these issues when proposing an alternate drainage system approach.
o Long-term performance, maintenance frequency and methods, safety in design, whole of life costing, etc.
o Potential risks associated with the failure of the system.
o Consultation with and concurrence from the asset custodian will be required.

3. TfNSW would question the need to consider the proposal for BR02 under Exhibit B SPR section 7.4.9(d) as the design proposal infers transverse drainage at intervals less than 50m.

I propose that we meet to run through the updated technical paper prior to resubmittal on Teambinder (via this RFI thread).

Kind Regards,
[redacted]

RFI Response by: [redacted] Transport for NSW On: 24 October 2024

#	Item	Date	Raised By	Company	Comments	Closed-Out
1	01	2024-11-04	[redacted]	John Holland Group	Hi [redacted] Please find attached updated Draft Rev B of the Technical Note in response to TfNSW's comments. We have included in the updated Technical Note responses to the specific additional consideration items that were raised by TfNSW. Refer to section 6 for details. Please advise if you require any further information prior to use formalise Rev B. Kind Regards [redacted]	No
2	02	2024-11-15	[redacted]	Transport for NSW	Hi [redacted] Your RFI No. PLR2EW-JHGRP-RFI-000010 and Technical Note PLR2EW-JHGRP-NWW-DR-MEM-000001Revision B refer. Notwithstanding any other provisions of the Deed or the requirements of all relevant Laws, Authority Approvals, Codes and Standards, the Principal has no objections to the Contractor pursuing an alternative drainage system approach as permitted under SPR Section 7.4.9 (d). Whilst the Principal has no objections at this early stage of design development, the Contractor is required, under the obligations of the Deed, to demonstrate to the Principal at each Design Stage that operational surface water depth requirements can be achieved with the alternate approach proposed. Below are some additional comments on the technical memo for John Holland's consideration through design development: Climate change calculations or what parameters have been used was not available for assessment. Note climate change up to Year 2130 is to be considered. The Track design Handbook says "Typically, these track drains will be no more than 300m apart, depending on track gradients". It is noted that the bridge crest vertical curve is relatively flat(circa 0.86% over 20m). Debris collection within the rail is possible at the crest. Contractor to consider if crest achieves self-cleansing velocities. Kind Regards, [redacted]	No

Request for Information

RFI Reference No: **PLR2EW-JHGRP-RFI-000021**
Status: INITOCLOSE

For Action: [redacted], Transport for NSW [Role: TfNSW Respondent]
[redacted], Transport for NSW [Role: TfNSW Respondent]
[redacted] Transport for NSW [Role: TfNSW Respondent]
[redacted] Transport for NSW [Role: TfNSW Respondent]
[redacted] Transport for NSW [Role: TfNSW Respondent]
[redacted] Transport for NSW [Role: TfNSW Respondent]

For Info: [redacted] John Holland Group
[redacted], John Holland Group
[redacted], John Holland Group
PLR2 Delivery Document Control, Transport for NSW
[redacted] The APP Group
[redacted], The APP Group [Role: TfNSW For Info]

Project: Parramatta Light Rail - Stage 2 - Enabling works

Subject: **Adoption of ARR2019 Version 4.2**

Dear TfNSW,

Please find attached the following Request for Information (RFI):

PLR2EW-JHGRP-PM-RFI-0022 - Adoption of ARR2019 Version 4.2

Can TfNSW please review and provide a response.

Kind Regards,
[redacted]

Discipline: **Area:** **Location:**

Response Required By : 18 November 2024, 00:00:00 AM +11:00

Attachments: PLR2EW-JHGRP-PM-RFI-0022 - Adoption of ARR2019 Version 4.2.pdf

RFI by:	[redacted] John Holland Group	On: 11 November 2024
Created By:	[redacted], John Holland Group	On: 11 November 2024, 05:12:37 PM +11:00
Last Edited By:	[redacted], John Holland Group	On: 11 November 2024, 05:12:37 PM +11:00

01 - RFI Response

Hi [redacted]

Your RFI No. PLR2EW-JHGRP-RFI-000021 and Technical Note PLR2EW-JHGRP-PM-RFI-0022 refer.

Notwithstanding any other provisions of the Deed or the requirements of all relevant Laws, Authority Approvals, Codes and Standards, the Principal recommends that the Contractor uses the latest climate change guidelines and projections (AR&R Version 4.2 and APCC 6th Assessment Report). As noted in the PLR2 EW Flooding technical session (7 January 2025), should the Contractor propose an alternative method for the practical consideration of climate change for specific elements of the design, the Principal will consider accordingly.

Kind Regards,
[redacted]

RFI Response by:	[redacted], Transport for NSW	On: 15 January 2025
Created By:	[redacted], Transport for NSW	On: 15 January 2025, 03:01:57 PM +11:00
Last Edited By:	[redacted], Transport for NSW	On: 15 January 2025, 03:01:57 PM +11:00

Request for Information

RFI Reference No: **PLR2EW-JHGRP-RFI-000112**
Status: INITOCLOSE

For Action: [redacted] Transport for NSW [Role: TfNSW Respondent]
[redacted] Transport for NSW [Role: TfNSW Respondent]
[redacted] Transport for NSW [Role: TfNSW Respondent]
[redacted] Transport for NSW [Role: TfNSW Respondent]
[redacted] Transport for NSW [Role: TfNSW Respondent]
[redacted] Transport for NSW [Role: TfNSW Respondent]

For Info: [redacted] The APP Group
[redacted] John Holland Group
[redacted] John Holland Group
[redacted] John Holland Group
PLR2 Delivery Document Control, Transport for NSW
[redacted] The APP Group
[redacted] The APP Group

Project: Parramatta Light Rail - Stage 2 - Enabling works

Subject: **Clarification on SPR Clause 7.4.9(b) no restriction on wider drainage system**

Dear TfNSW

SPR Clause 7.4.9(b) states: "The drainage system must not become a restriction on performance of the wider drainage Authority drainage system if a future upgrade (for example, CoPC) is undertaken and must:…" This clause is referred in Comments 10 and 11 in the design review register for SD-0001 Stormwater Drainage and Water Quality Design (PLR2EW-APP-LRPEWRC-SD-COM-100001) and the subsequent discussion held during the Engineering Assurance Meeting on 27th February 2025 in relation to the design of the drainage infrastructure at the southern extent of the project scope.

The Contractor interprets the term "drainage Authority" in this clause to refer to statutory bodies such as the City of Parramatta Council (CoPC), Sydney Olympic Park Authority (SOPA) and Sydney Water. It is not considered that a future extension of the Parramatta Light Rail (PLR) falls within this definition. The current design has been developed to ensure that, should a future PLR extension be undertaken, the drainage system can be readily connected to any future infrastructure and convey flows to a discharge point as determined by those future works. It is acknowledged that the detention system implemented in this stage of the design, is intended to meet CoPC requirements and may be removed or realigned in response to future upgrades.

We request the Principal's confirmation that a future PLR extension does not constitute a "drainage Authority" for the purposes of Clause 7.4.9(b) and the proposed detention system and outlet pipe connections to CoPC's drainage infrastructure are considered compliant with the clause, notwithstanding being located under a potential future PLR extension footprint.

Regards

Lily Liu

Discipline: **Area:** **Location:**

Response Required By : 23 June 2025, 00:00:00 AM +10:00

RFI by:	Lily Liu, John Holland Group	On: 16 June 2025
Created By:	Lily Liu, John Holland Group	On: 16 June 2025, 04:38:04 PM +10:00
Last Edited By:		On:

01 - RFI Response

TfNSW have reviewed PLR2EW-JHGRP-RFI-000112 and note the definition of "Authority" under PLR Stage 2: Enabling Works Contract Cl 1.1 (Definitions). As such, TfNSW agree with the Contractor's interpretation of Exhibit B Scope and Performance Requirements section 7.4.9(b), in that, the extension of PLR does not constitute a "drainage Authority".

RFI Response by:	[redacted] Transport for NSW	On: 18 June 2025
Created By:	[redacted] Transport for NSW	On: 18 June 2025, 03:53:24 PM +10:00
Last Edited By:	[redacted] Transport for NSW	On: 18 June 2025, 03:53:24 PM +10:00

Request for Information

RFI Reference No: **PLR2EW-JHGRP-RFI-000124**
Status: INITOCLOSE

For Action: [redacted], Transport for NSW [Role: TfNSW Respondent]
[redacted], Transport for NSW [Role: TfNSW Respondent]
[redacted], Transport for NSW [Role: TfNSW Respondent]
[redacted], Transport for NSW [Role: TfNSW Respondent]
[redacted], Transport for NSW [Role: TfNSW Respondent]
[redacted], Transport for NSW [Role: TfNSW Respondent]

For Info: [redacted], The APP Group
[redacted], John Holland Group
[redacted], John Holland Group
[redacted], John Holland Group
PLR2 Delivery Document Control, Transport for NSW
[redacted], The APP Group
[redacted], The APP Group

Project: Parramatta Light Rail - Stage 2 - Enabling works

Subject: **SPR Clause 7.7.2.2(k)(i) Principal's approval for free draining scuppers on the ATL**

Dear TfNSW,

SPR Clause 7.4.10(b) states that "The drainage system must collect runoff from bridge decks except for the ATL on the bridge between Melrose Park and Wentworth Point, where free-draining scuppers may be used subject to meeting the project's conditions of approval." Further, SPR Clause 7.7.2.2(k)(i) states that "free draining scuppers through decks must not be used unless approved by the Principal. Free draining scuppers must be designed to prevent use by fauna, including bats and birds;"

The Stormwater Drainage and Water Quality design package SD-0001 PDR submission incorporates free draining scuppers on the ATL over the Parramatta River and demonstrates how the design meets the project's conditions of approval for water quality discharge. Specifically, the water quality assessment model (MUSIC) model presented in SD-0001 incorporates free draining scuppers on the ATL to the Parramatta River.

On this basis and noting that the Principal's comments relating to water quality discharge have been either "Closed" or "Closed Subject to" at PDR, the Contractor seeks approval from the Principal in accordance with the SPR Clause 7.7.2.2(k)(i) for the use of free draining scupper as documented in the PDR submission of SD-0001.

Regards

[redacted]

Discipline: **Area:** **Location:**

Discipline: **Area**: **Location**:

Contract No : PLR2EW - Enabling Works Detailed Design and Construction

Response Required By : 16 July 2025

RFI by: [redacted], John Holland Group On: 09 July 2025
Created By: [redacted], John Holland Group On: 09 July 2025, 01:45:31 PM +10:00
Last Edited By: On:

01 - RFI Response

TfNSW have reviewed RFI PLR2EW-JHGRP-RFI-000124 and provide the following response.

Notwithstanding any other provisions of the Deed or the requirements of all relevant Laws, Authority Approvals, Codes and Standards, TfNSW have no technical objections to use of free draining scuppers being used on the ATL over the Parramatta River on the condition the Contractor can demonstrate, through the DDR design documentation, that the free draining scuppers will not introduce staining to the soffit or substructure.

The Contractor should seek formal approval from the Principal, citing this correspondence as evidence of no objections (with conditions) from TfNSW.

RFI Response by:	[redacted], Transport for NSW	On: 04 September 2025
Created By:	[redacted], Transport for NSW	On: 04 September 2025, 04:32:34 PM +10:00
Last Edited By:	[redacted], Transport for NSW	On: 04 September 2025, 04:32:34 PM +10:00

Request for Information

RFI Reference No: **PLR2EW-JHGRP-RFI-000159**
Status: RESPONDENT

For Action:	[redacted], Transport for NSW [Role: TfNSW Respondent] [redacted] Transport for NSW [Role: TfNSW Respondent] [redacted], Transport for NSW [Role: TfNSW Respondent] [redacted], Transport for NSW [Role: TfNSW Respondent] [redacted] Transport for NSW [Role: TfNSW Respondent] [redacted] Transport for NSW [Role: TfNSW Respondent]
For Info:	[redacted] John Holland Group [redacted], John Holland Group [redacted], The APP Group [Role: TfNSW For Info] PLR2 Delivery Document Control, Transport for NSW [Role: TfNSW For Info] [redacted] The APP Group [Role: TfNSW For Info]
Project:	Parramatta Light Rail - Stage 2 - Enabling works
Subject:	**Stormwater drainage asset ownership**

Dear TfNSW,

Please find attached a marked drainage plans to identify the CoPC and CoR Drainage Assets, developed in line with the asset identified within the TfNSW Asset Delineation Principles" issued on the 13th March 2025. Can TfNSW please confirm this is consistent with the intent of the document. Please note the document did not cover asset lands of Wharf Road so it has been assumed that drainage assets that do not service the PLRC drainage will be handed to council, as identified.

regards
[redacted]

Discipline: **Area:** **Location:**

Discipline: **Area**: **Location**:

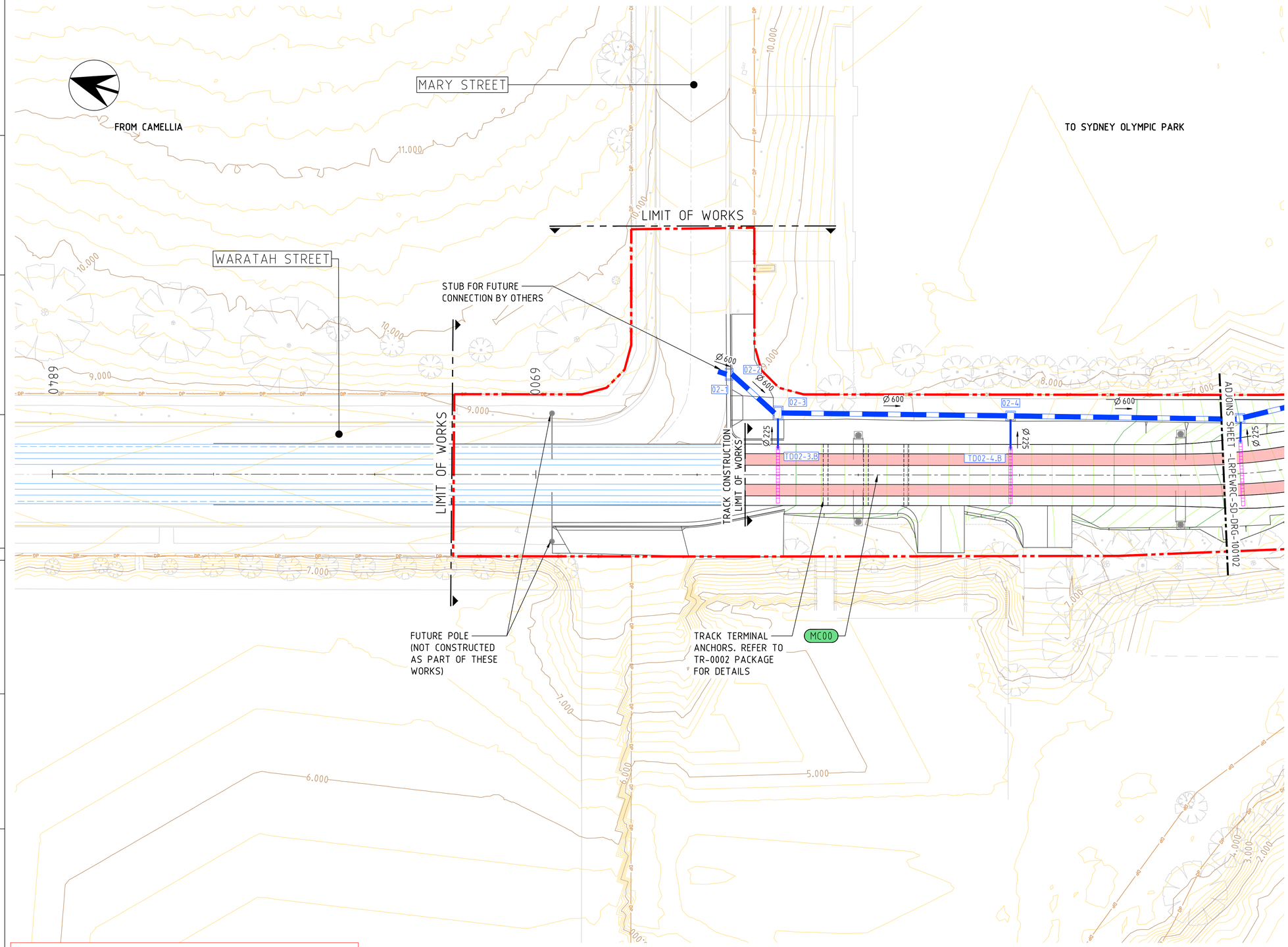
Contract No : PLR2EW - Enabling Works Detailed Design and Construction

Response Required By :

Attachments:	PLR2EW-JHGRP-LRPEWRC-SD-DRG-199999_Council Ownership_Rev A.pdf	
RFI by:	[redacted] John Holland Group	On: 24 September 2025
Created By:	[redacted] John Holland Group	On: 24 September 2025, 04:00:10 PM +10:00
Last Edited By:	[redacted] John Holland Group	On: 24 September 2025, 04:00:10 PM +10:00

01 - RFI Response

RFI Response by:	On:
Created By:	On:
Last Edited By:	On:



LEGEND

- 19000 – CHAINAGES
- MCD1 – DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

- PROPOSED TRACK ALIGNMENT
- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

DRAINAGE LEGEND

- Ø 375 – PROPOSED BRIDGE DRAINAGE
- Ø 375 – PROPOSED IN GROUND DRAINAGE
- H-1 – PROPOSED BRIDGE DRAINAGE PIT TAG
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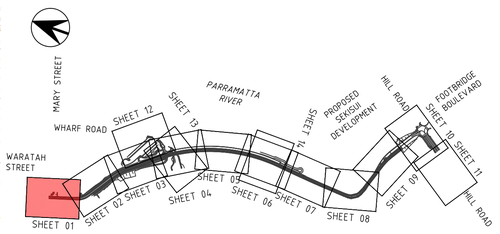
- SS — SS – DRAINAGE SUBSOIL
- PROPOSED SCOUR PROTECTION
- PROPOSED TYPE 3 SCUPPER

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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REV	DESCRIPTION	DESIGNER INITIAL/DATE	VERIFIER INITIAL/DATE	APPROVED INITIAL/DATE
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B	ISSUED FOR PDR	[redacted] 05.05.25	[redacted] 05.05.25	[redacted] 05.05.25
A	ISSUED FOR SDR	[redacted] 04.12.24	[redacted] 04.12.24	[redacted] 04.12.24

COORDINATE SYSTEM: GDA1994MGA56

HEIGHT DATUM: AHD

SCALE: 1:250

0 2.5 5 7.5 10 12.5m

SCALE 1:250 AT ORIGINAL SIZE

DESIGN LOT CODE:

CLIENT:

NSW GOVERNMENT Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY PROJECT OFFICE
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JOHN HOLLAND GHD

JOHN HOLLAND GROUP

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DESIGNED	[redacted] 19.08.25
DRG CHECK	[redacted] 19.08.25
DESIGN CHECK	[redacted] 19.08.25
PROJ/DES MNGR	[redacted] 19.08.25
APPROVED	[redacted] 19.08.25

ENABLING WORKS RAIL CORRIDOR

CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY

STORMWATER DRAINAGE

PLAN SHEET 1

DRAWING SET No: -	PART: -	SHEET: 1	OF 14	A1
STATUS: DETAILED DESIGN REVIEW [DDR]	BRIDGE No:			©

DRG No.	REV	VER	EDMS No.	AMD No.
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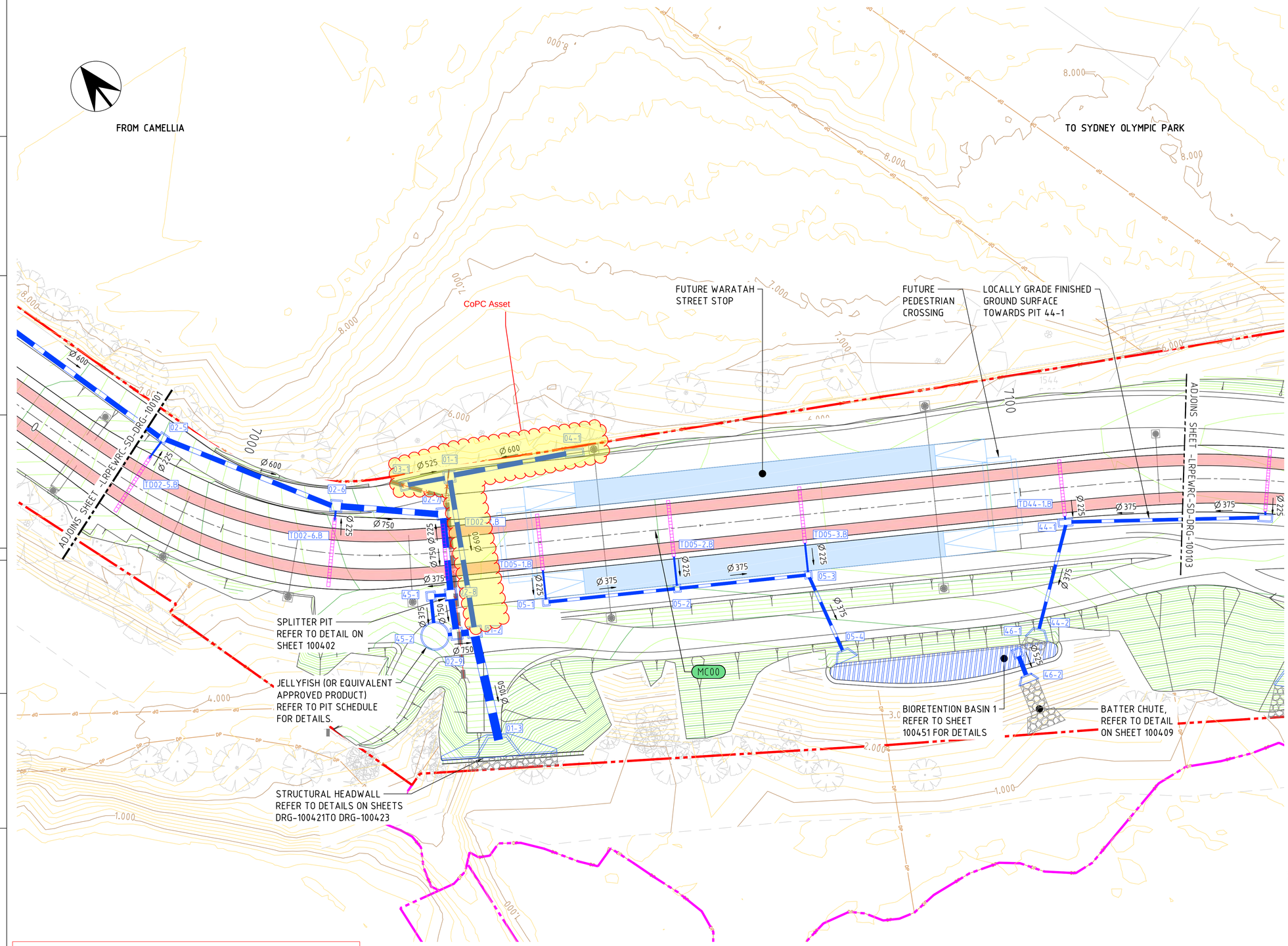

LEGEND

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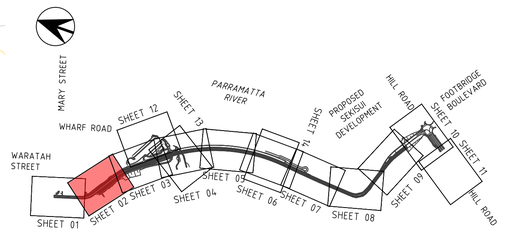
OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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A	ISSUED FOR SDR	[redacted] 04.12.24	[redacted] 04.12.24	[redacted] 04.12.24

COORDINATE SYSTEM: GDA1994MGA56

HEIGHT DATUM: AHD

SCALE: 1:250

0 2.5 5 7.5 10 12.5m

SCALE 1:250 AT ORIGINAL SIZE

DESIGN LOT CODE:

CLIENT:

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DESIGN CHECK	[redacted]	19.08.25
PROJ/DES MNGR	[redacted]	19.08.25
APPROVED	[redacted]	19.08.25

ENABLING WORKS RAIL CORRIDOR

CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY

STORMWATER DRAINAGE
PLAN SHEET 2

DRAWING SET No: -	PART: -	SHEET: 2 OF 14		A1
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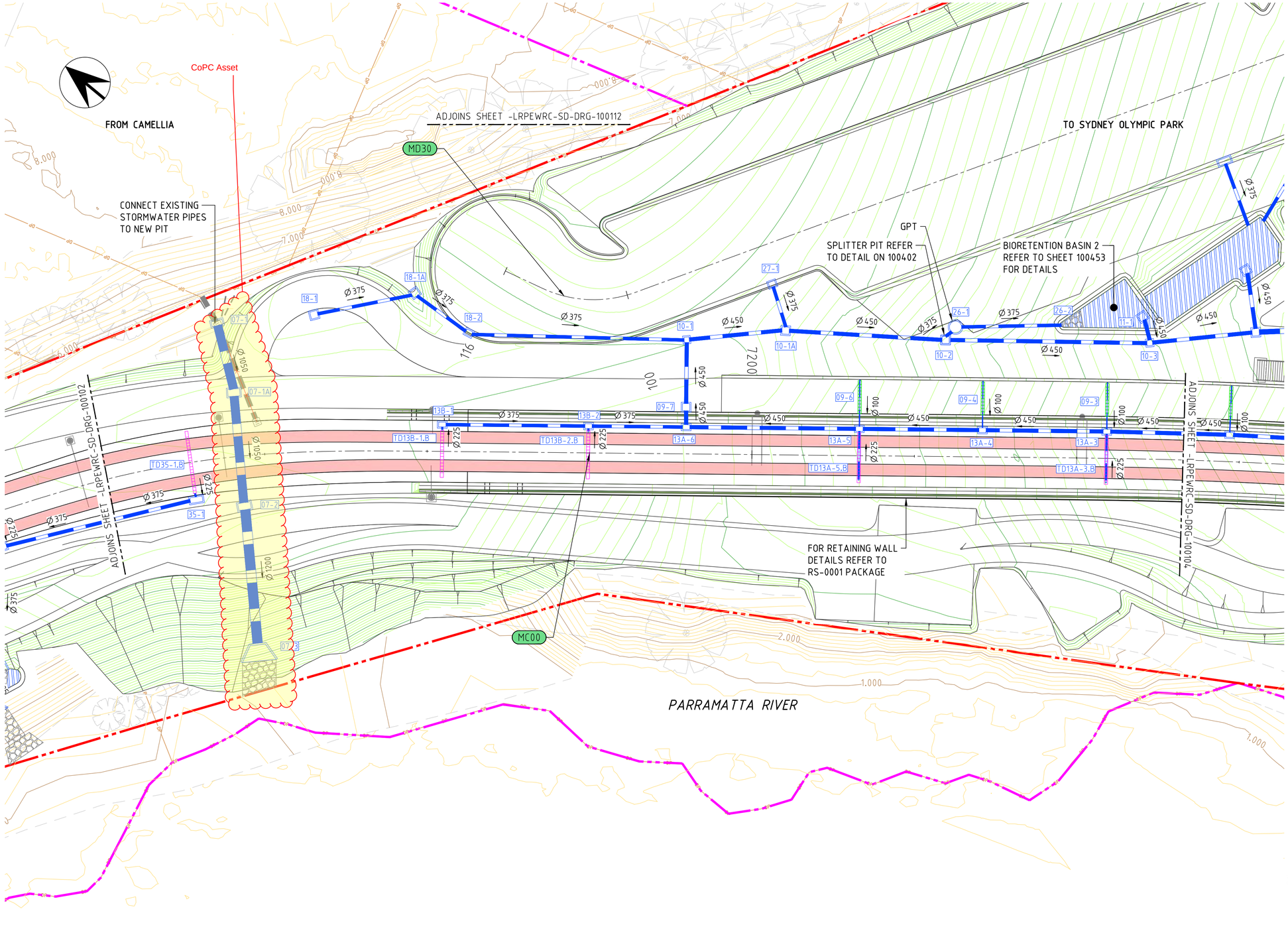

LEGEND

- 19000 – CHAINAGES
- MCD1 – DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
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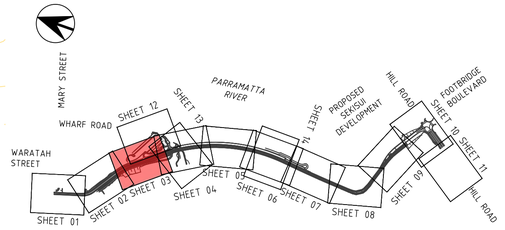
OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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COORDINATE SYSTEM: GDA1994MGA56

HEIGHT DATUM: AHD

SCALE: 1:250

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SCALE 1:250 AT ORIGINAL SIZE

DESIGN LOT CODE:

CLIENT:

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DESIGNED	[redacted]	19.08.25
DRG CHECK	[redacted]	19.08.25
DESIGN CHECK	[redacted]	19.08.25
PROJ/DES MNGR	[redacted]	19.08.25
APPROVED	[redacted]	19.08.25

ENABLING WORKS RAIL CORRIDOR

CAMELLIA TO LIDCOMBE LINE

PARRAMATTA LIGHT RAIL - STAGE 2

SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY

STORMWATER DRAINAGE

PLAN SHEET 3

DRAWING SET No: -	PART: -	SHEET: 3 OF 14	A1
STATUS: DETAILED DESIGN REVIEW [DDR]	BRIDGE No:		©

DRG No.	REV	VER	EDMS No.	AMD No.
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100103	C			

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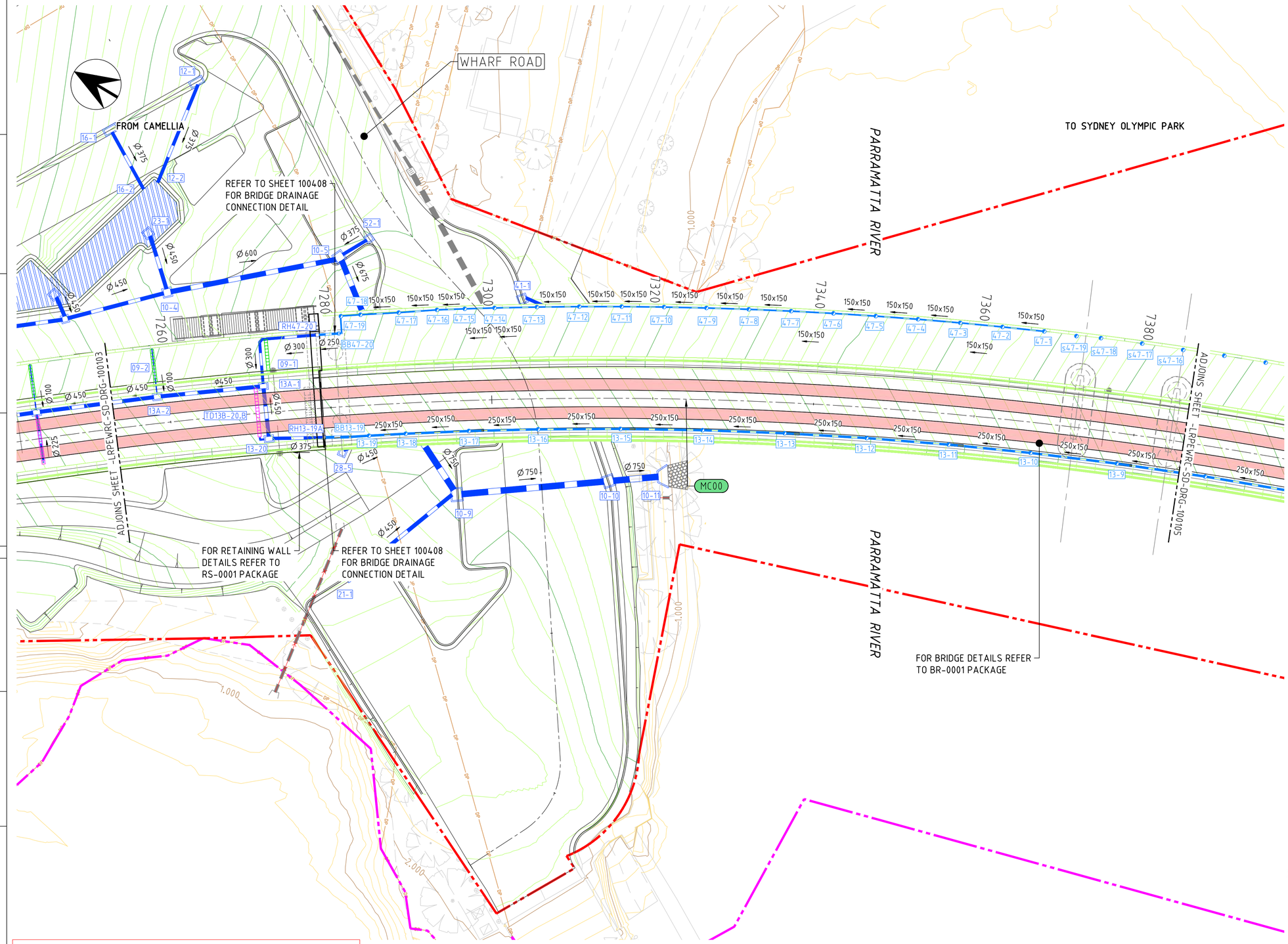
PLOT DATE & TIME: 19/08/2025 10:21:07 AM



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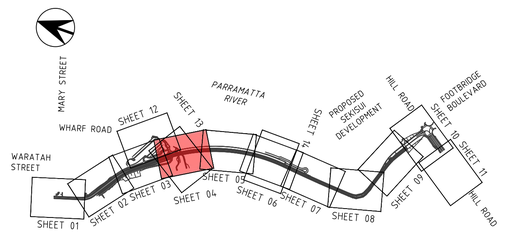
- H - 1 – PROPOSED IN GROUND DRAINAGE PIT TAG
- ACO TRAMDRAIN
- ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIT
- BIORETENTION ZONE
- DESIGN MAJOR CONTOUR 1M INTERVALS
- DESIGN MINOR CONTOUR
- EXISTING MAJOR CONTOUR 1M INTERVALS
- EXISTING MINOR CONTOUR
- DRAINAGE LINE TO BE REMOVED
- BRIDGE DRAINAGE SCUPPERS
- SUBSOIL DRAINAGE FLUSHING POINT
- SS – SS – DRAINAGE SUBSOIL
- PROPOSED SCOUR PROTECTION
- PROPOSED TYPE 3 SCUPPER

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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OFFICIAL

FOR STAGE APPROVAL

FILE NAME: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104.dwg

PLOT DATE & TIME: 19/08/2025 10:22:29 AM

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PLR2EW-JHGRP-LRPEWRC-GA-MD2-000001
PLR2EW-JHGRP-LRPEWRC-GA-MD2-100111
PLR2EW-JHGRP-LRPEWRC-GA-MD2-100003
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PLR2EW-JHGRP-LRPEWRC-GA-MD2-100011
PLR2EW-JHGRP-LRPEWRC-RW-MD2-100102
PLR2EW-JHGRP-LRPEWRC-TR-MD2-100102
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PLR2EW-JHGRP-LRPEWRC-SU-MD2-100001
PLR2EW-JHGRP-LRPEWRC-SD-MD2-100101_01
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PLR2EW-JHGRP-LRPEWRP-RW-MD2-100121
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PLR2EW-JHGRP-LRPEWRC-RW-MD2-100152
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PLR2EW-JHGRP-LRPEWRW-BR-MD2-210001

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REV	DESCRIPTION	DESIGNER INITIAL/DATE	VERIFIED INITIAL/DATE	APPROVED INITIAL/DATE
C	ISSUED FOR DDR	19.08.25	19.08.25	19.08.25
B	ISSUED FOR PDR	05.05.25	05.05.25	05.05.25
A	ISSUED FOR SDR	04.12.24	04.12.24	04.12.24

COORDINATE SYSTEM: GDA1994MGA56

HEIGHT DATUM: AHD

SCALE: 1:250

0 2.5 5 7.5 10 12.5m

SCALE 1:250 AT ORIGINAL SIZE

DESIGN LOT CODE:

CLIENT:

NSW GOVERNMENT Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY
PROJECT OFFICE
NETWORK COMPLEX CODE: LRP

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JOHN HOLLAND GHD

JOHN HOLLAND GROUP

CIVIL

DRAWN	19.08.25
DESIGNED	19.08.25
DRG CHECK	19.08.25
DESIGN CHECK	19.08.25
PROJ/DES MNGR	19.08.25
APPROVED	19.08.25

ENABLING WORKS RAIL CORRIDOR

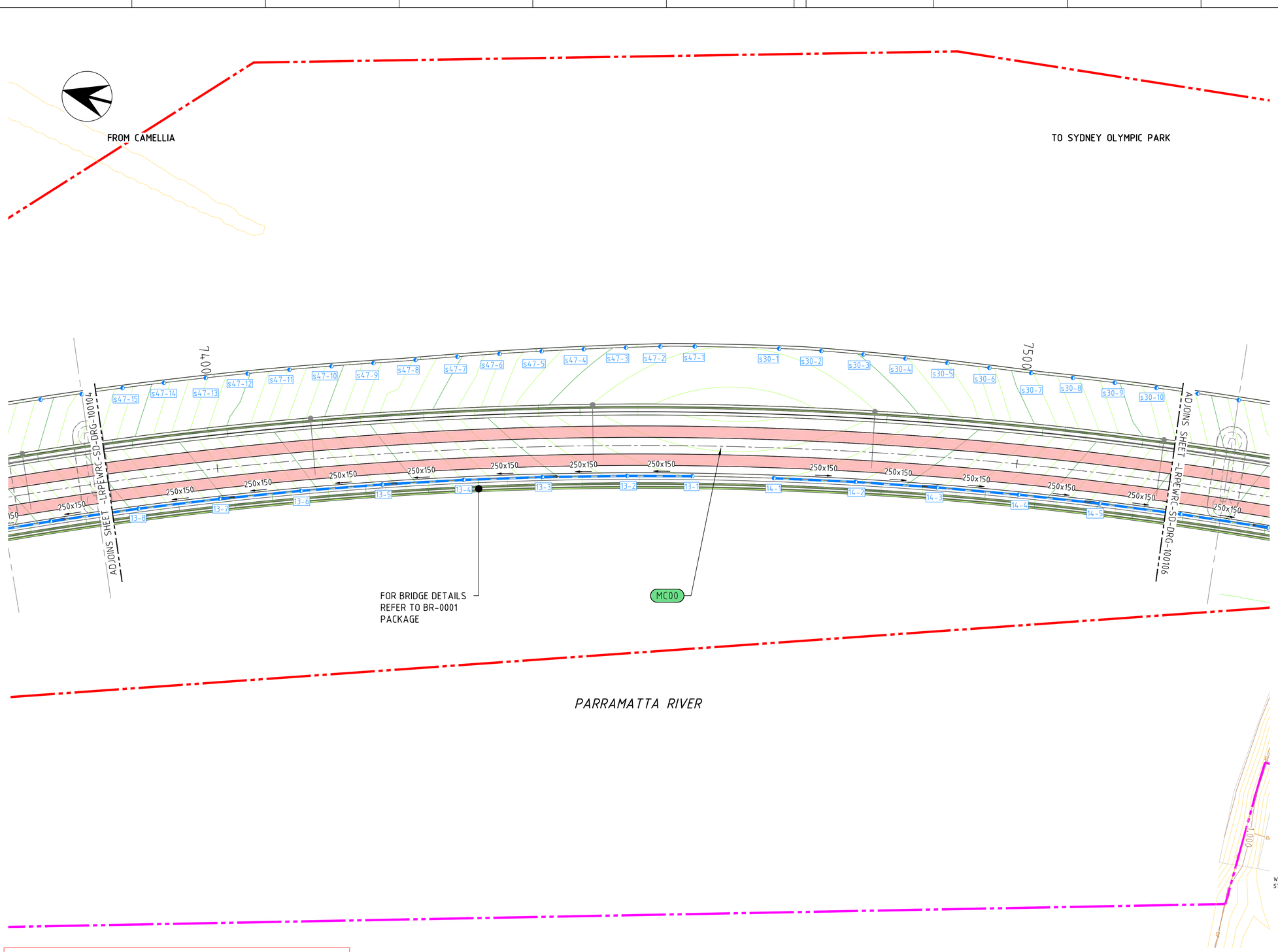
CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY

STORMWATER DRAINAGE

PLAN SHEET 4

DRAWING SET No: -	PART: -	SHEET: 4	OF 14	A1
STATUS: DETAILED DESIGN REVIEW [DDR]	BRIDGE No:			©

DRG No.	REV	VER	EDMS No.	AMD No.
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104	C			



LEGEND

- 19000 – CHAINAGES
- MCD1 – DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

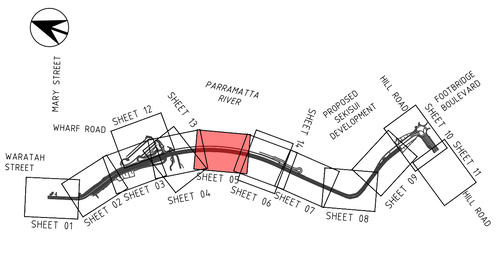
- PROPOSED TRACK ALIGNMENT
- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

DRAINAGE LEGEND

- Ø 375 / Ø 375 – PROPOSED BRIDGE DRAINAGE
- PROPOSED IN GROUND DRAINAGE
- H-1 – PROPOSED BRIDGE DRAINAGE PIT TAG
- H-1 – PROPOSED IN GROUND DRAINAGE PIT TAG
- ACO TRAMDRAIN
- ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIT
- BIORETENTION ZONE
- 8.0 – DESIGN MAJOR CONTOUR 1M INTERVALS
- DESIGN MINOR CONTOUR
- 8.0 – EXISTING MAJOR CONTOUR 1M INTERVALS
- EXISTING MINOR CONTOUR
- DRAINAGE LINE TO BE REMOVED
- BRIDGE DRAINAGE SCUPPERS
- SUBSOIL DRAINAGE FLUSHING POINT
- SS — SS – DRAINAGE SUBSOIL
- PROPOSED SCOUR PROTECTION
- PROPOSED TYPE 3 SCUPPER

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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FOR STAGE APPROVAL

REFERENCES:

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P:\2EW-JHGRP-LRPEWRC-SD-MOD-100103
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REV	DESCRIPTION	DESIGNER INITIAL/DATE	VERIFIED INITIAL/DATE	APPROVED INITIAL/DATE
C	ISSUED FOR DDR	[redacted] 19.08.25	[redacted] 19.08.25	[redacted] 19.08.25
B	ISSUED FOR PDR	[redacted] 05.05.25	[redacted] 05.05.25	[redacted] 05.05.25
A	ISSUED FOR SDR	[redacted] 04.12.24	[redacted] 04.12.24	[redacted] 04.12.24

COORDINATE SYSTEM: GDA1994MGA56

HEIGHT DATUM: AHD

SCALE: 1:250

0 2.5 5 7.5 10 12.5m

SCALE 1:250 AT ORIGINAL SIZE

DESIGN LOT CODE:

CLIENT:

NSW GOVERNMENT | Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY
PROJECT OFFICE
NETWORK COMPLEX CODE: LRP

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JOHN HOLLAND | GHD

JOHN HOLLAND GROUP

CIVIL

DRAWN	[redacted]	19.08.25
DESIGNED	[redacted]	19.08.25
DRG CHECK	[redacted]	19.08.25
DESIGN CHECK	[redacted]	19.08.25
PROJ/DES MNGR	[redacted]	19.08.25
APPROVED	[redacted]	19.08.25

ENABLING WORKS RAIL CORRIDOR

CAMELLIA TO LIDCOMBE LINE

PARRAMATTA LIGHT RAIL - STAGE 2

SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY

STORMWATER DRAINAGE

PLAN SHEET 5

DRAWING SET No: -	PART: -	SHEET: 5 OF 14	A1
STATUS: DETAILED DESIGN REVIEW [DDR]	BRIDGE No:		©

DRG No.	REV	VER	EDMS No.	AMD No.
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100105	C			

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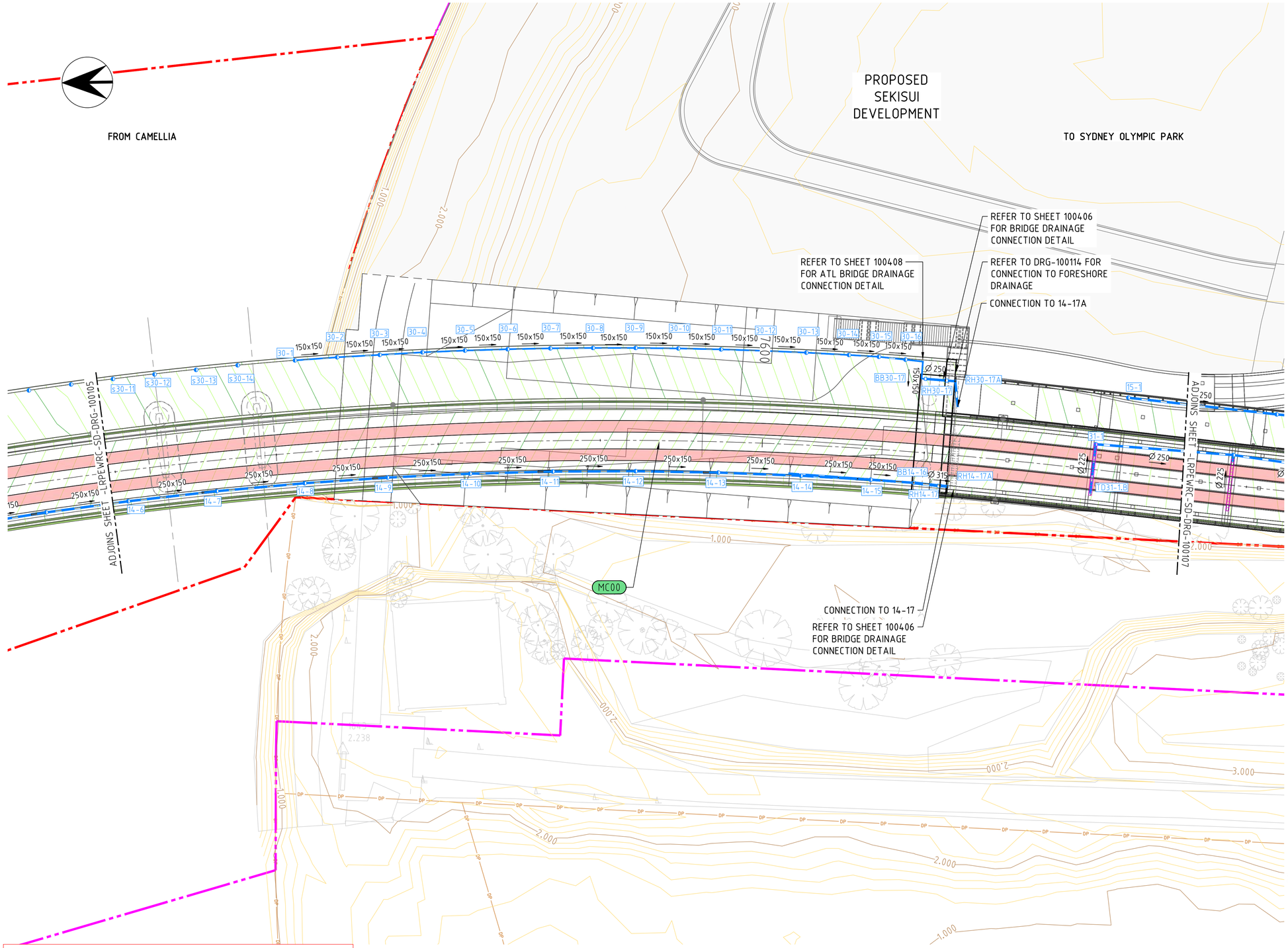


LEGEND

- 19000 - CHAINAGES
- MCD1 — DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

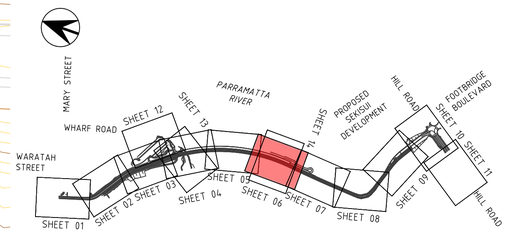
- PROPOSED TRACK ALIGNMENT
- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

DRAINAGE LEGEND

- Ø 375 / Ø 375 — PROPOSED BRIDGE DRAINAGE
- PROPOSED IN GROUND DRAINAGE
- # - 1 — PROPOSED BRIDGE DRAINAGE PIT TAG
- # - 1 — PROPOSED IN GROUND DRAINAGE PIT TAG
- ACO TRAMDRAIN
- ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIT
- BIORETENTION ZONE
- 8.0 — DESIGN MAJOR CONTOUR 1M INTERVALS
- DESIGN MINOR CONTOUR
- 8.0 — EXISTING MAJOR CONTOUR 1M INTERVALS
- EXISTING MINOR CONTOUR
- DRAINAGE LINE TO BE REMOVED
- BRIDGE DRAINAGE SCUPPERS
- SUBSOIL DRAINAGE FLUSHING POINT
- SS — SS — DRAINAGE SUBSOIL
- PROPOSED SCOUR PROTECTION
- PROPOSED TYPE 3 SCUPPER

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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FILE NAME: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100106.dwg

PLOT DATE & TIME: - 19/08/2025 10:26:12 AM

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PLR2EW-AHGRP-LRPEWRC-SD-MOD-000002
PLR2EW-JHGRP-LRPEWRC-SD-MOD-100010
PLR2EW-AHGRP-LRPEWRC-SD-MOD-100005
PLR2EW-JHGRP-LRPEWRC-SD-MOD-100102
PLR2EW-AHGRP-LRPEWRC-PV-MOD-100102
PLR2EW-AHGRP-LRPEWRC-SD-MOD-100001
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PLR2EW-JHGRP-LRPEWRC-PSSR-MOD-210001

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REV	DESCRIPTION	DESIGNER INITIAL/DATE	VERIFIED INITIAL/DATE	APPROVED INITIAL/DATE
C	ISSUED FOR DDR	[redacted]19.08.25	[redacted]19.08.25	[redacted]19.08.25
B	ISSUED FOR PDR	[redacted]05.05.25	[redacted]05.05.25	[redacted]05.05.25
A	ISSUED FOR SDR	[redacted]04.12.24	[redacted]04.12.24	[redacted]04.12.24

COORDINATE SYSTEM: GDA1994MGA56

HEIGHT DATUM: AHD

SCALE: 1:250

0 2.5 5 7.5 10 12.5m

SCALE 1:250 AT ORIGINAL SIZE

DESIGN LOT CODE:

CLIENT:

NSW GOVERNMENT | Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY PROJECT OFFICE
NETWORK COMPLEX CODE: LRP

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JOHN HOLLAND | GHD

JOHN HOLLAND GROUP
CIVIL

DRAWN	[redacted]	19.08.25
DESIGNED	[redacted]	19.08.25
DRG CHECK	[redacted]	19.08.25
DESIGN CHECK	[redacted]	19.08.25
PROJ/DES MNGR	[redacted]	19.08.25
APPROVED	[redacted]	19.08.25

ENABLING WORKS RAIL CORRIDOR

CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY

STORMWATER DRAINAGE
PLAN SHEET 6

DRAWING SET No: -	PART: -	SHEET: 6 OF 14	A1
STATUS: DETAILED DESIGN REVIEW [DDR]	BRIDGE No:		©

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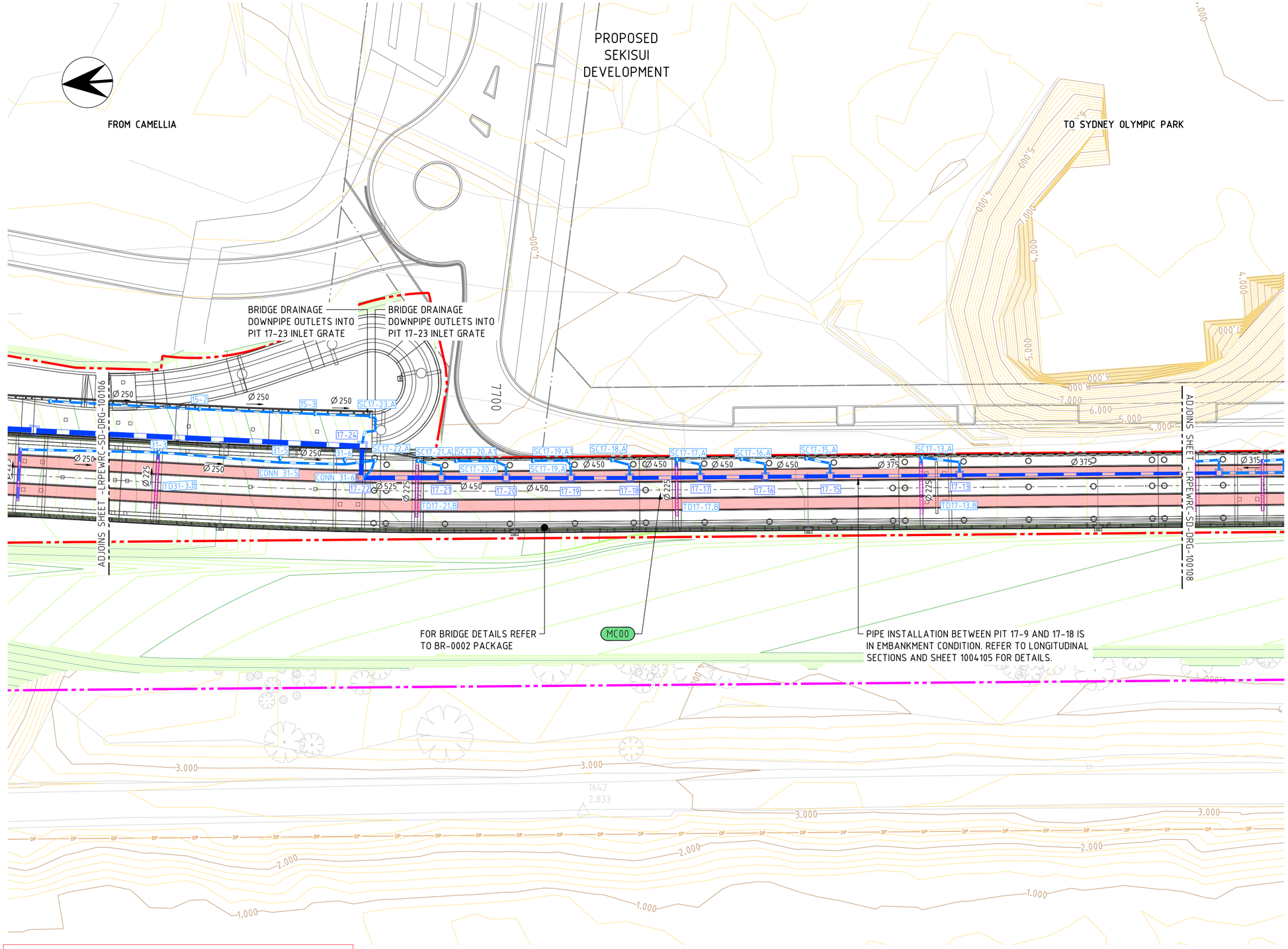


LEGEND

- 19000 – CHAINAGES
- MCD1 – DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

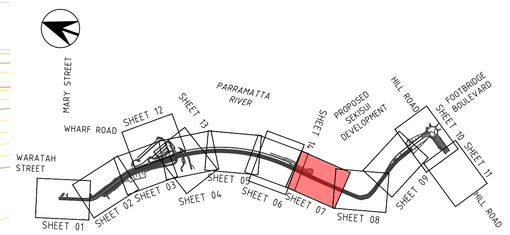
- PROPOSED TRACK ALIGNMENT
- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

DRAINAGE LEGEND

- PROPOSED BRIDGE DRAINAGE
- PROPOSED IN GROUND DRAINAGE
- PROPOSED BRIDGE DRAINAGE PIT TAG
- PROPOSED IN GROUND DRAINAGE PIT TAG
- ACO TRAMDRAIN
- ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIT
- BIORETENTION ZONE
- DESIGN MAJOR CONTOUR 1M INTERVALS
- DESIGN MINOR CONTOUR
- EXISTING MAJOR CONTOUR 1M INTERVALS
- EXISTING MINOR CONTOUR
- DRAINAGE LINE TO BE REMOVED
- BRIDGE DRAINAGE SCUPPERS
- SUBSOIL DRAINAGE FLUSHING POINT
- DRAINAGE SUBSOIL
- PROPOSED SCOUR PROTECTION
- PROPOSED TYPE 3 SCUPPER

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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FOR STAGE APPROVAL

REFERENCES:

PLR2EW-JHGRP-LRPEWRC-DN-MZD-000001
PLR2EW-JHGRP-LRPEWRC-DN-MZD-000002
PLR2EW-JHGRP-LRPEWRC-DN-MZD-100010
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PLR2EW-JHGRP-LRPEWRC-DN-MZD-100101
PLR2EW-JHGRP-LRPEWRC-TR-MZD-100102
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REV	DESCRIPTION	DESIGNER INITIAL/DATE	VERIFIED INITIAL/DATE	APPROVED INITIAL/DATE
C	ISSUED FOR DDR	19.08.25	19.08.25	19.08.25
B	ISSUED FOR PDR	05.05.25	05.05.25	05.05.25
A	ISSUED FOR SDR	04.12.24	04.12.24	04.12.24

COORDINATE SYSTEM: GDA1994MGA56 | HEIGHT DATUM: AHD | DESIGN LOT CODE:

SCALE: 1:250

0 2.5 5 7.5 10 12.5m

SCALE 1:250 AT ORIGINAL SIZE

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY
PROJECT OFFICE
NETWORK COMPLEX CODE: LRP

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JOHN HOLLAND GHD

JOHN HOLLAND GROUP

CIVIL

DRAWN	19.08.25
DESIGNED	19.08.25
DRG CHECK	19.08.25
DESIGN CHECK	19.08.25
PROJ/DES MNGR	19.08.25
APPROVED	19.08.25

ENABLING WORKS RAIL CORRIDOR

CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY

STORMWATER DRAINAGE
PLAN SHEET 7

DRAWING SET No: -	PART: -	SHEET: 7 OF 14	A1
STATUS: DETAILED DESIGN REVIEW [DDR]	BRIDGE No:		©

DRG No.	REV	VER	EDMS No.	AMD No.
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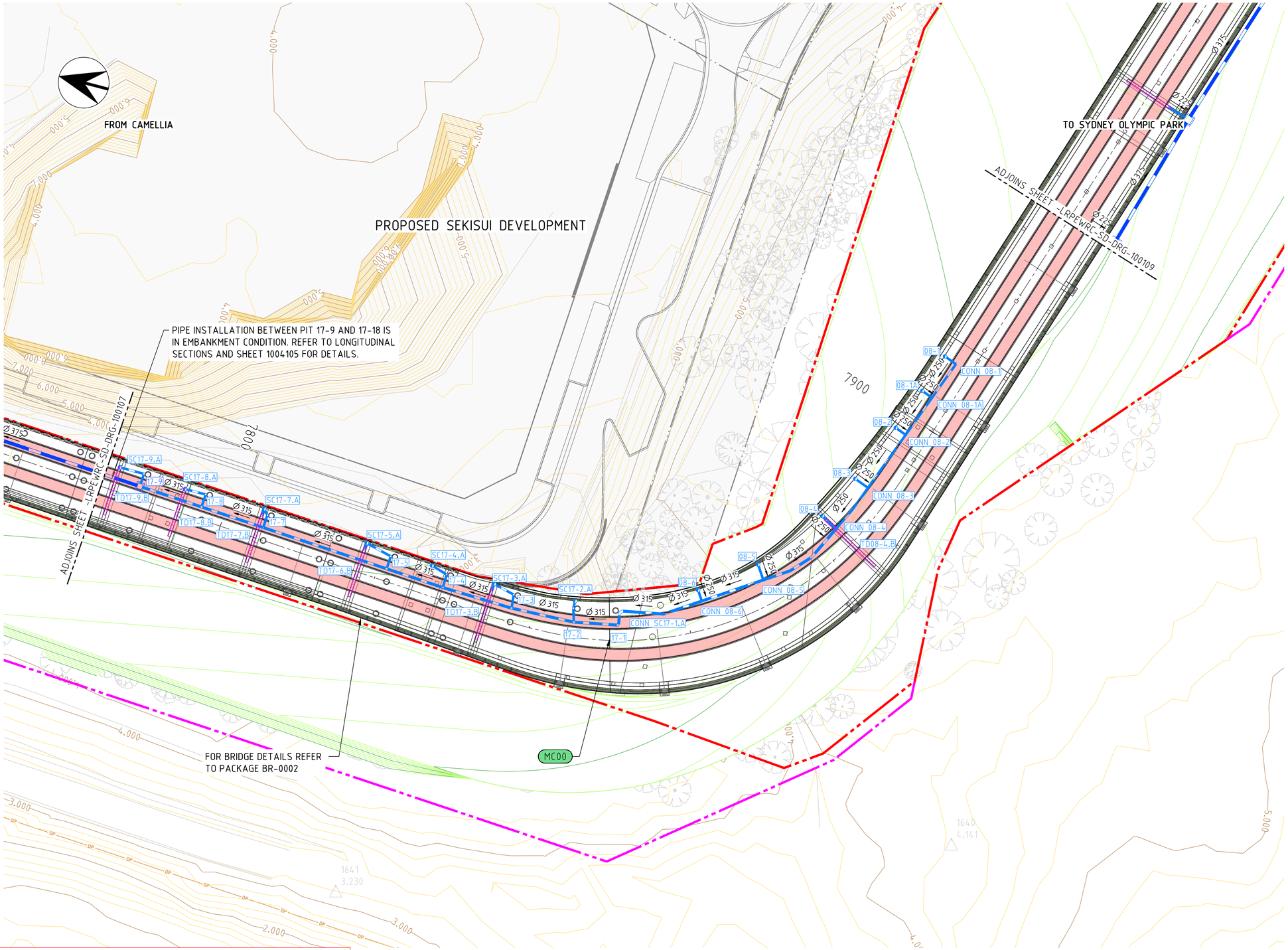

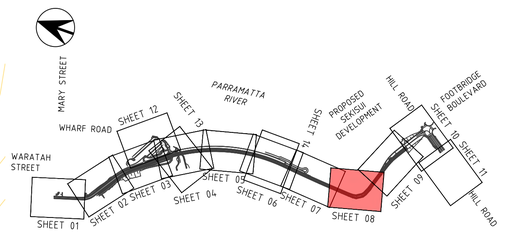

LEGEND

- 19000 – CHAINAGES
- MCD1 – DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

- PROPOSED TRACK ALIGNMENT
- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

DRAINAGE LEGEND

- PROPOSED BRIDGE DRAINAGE
- PROPOSED IN GROUND DRAINAGE
- PROPOSED BRIDGE DRAINAGE PIT TAG
- PROPOSED IN GROUND DRAINAGE PIT TAG
- ACO TRAMDRAIN
- ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIT
- BIORETENTION ZONE
- DESIGN MAJOR CONTOUR 1M INTERVALS
- DESIGN MINOR CONTOUR
- EXISTING MAJOR CONTOUR 1M INTERVALS
- EXISTING MINOR CONTOUR
- DRAINAGE LINE TO BE REMOVED
- BRIDGE DRAINAGE SCUPPERS
- SUBSOIL DRAINAGE FLUSHING POINT
- DRAINAGE SUBSOIL
- PROPOSED SCOUR PROTECTION
- PROPOSED TYPE 3 SCUPPER

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)

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FOR STAGE APPROVAL

REFERENCES:

PLR2EW-JHGRP-LRPEWRC-GN-MDS-000001
PLR2EW-JHGRP-LRPEWRC-GN-MDS-000003
PLR2EW-JHGRP-LRPEWRC-GN-MDS-100010
PLR2EW-JHGRP-LRPEWRC-GN-MDS-100005
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PLR2EW-JHGRP-LRPEWRC-SD-MDS-100105
PLR2EW-JHGRP-LRPEWRC-RW-MDS-100121
PLR2EW-JHGRP-LRPEWRC-RW-MDS-100111
PLR2EW-JHGRP-LRPEWRC-GN-MDS-100111
PLR2EW-JHGRP-LRPARP-RW-MDS-100101
PLR2EW-JHGRP-LRPEWRC-RW-MDS-100250
PLR2EW-JHGRP-LRPEWRC-RW-MDS-100101
PLR2EW-JHGRP-LRPEWRC-RW-MDS-100111
PLR2EW-JHGRP-LRPEWRC-RW-MDS-100121
PLR2EW-JHGRP-LRPEWRC-SD-MDS-100101
PLR2EW-JHGRP-LRPEWRC-SD-MDS-100103
PLR2EW-JHGRP-LRPEWRC-SD-MDS-100104
PLR2EW-JHGRP-LRPEWRC-MS-MDS-100101
PLR2EW-JHGRP-LRPEWRCEWB-BR-MDS-100101

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REV	DESCRIPTION	DESIGNER INITIAL/DATE	VERIFIER INITIAL/DATE	APPROVED INITIAL/DATE
C	ISSUED FOR DDR	[redacted]19.08.25	[redacted]19.08.25	[redacted]19.08.25
B	ISSUED FOR PDR	[redacted]05.05.25	[redacted]05.05.25	[redacted]05.05.25
A	ISSUED FOR SDR	[redacted]04.12.24	[redacted]04.12.24	[redacted]04.12.24

COORDINATE SYSTEM: GDA1994MGA56

HEIGHT DATUM: AHD

SCALE: 1:250

0 2.5 5 7.5 10 12.5m

SCALE 1:250 AT ORIGINAL SIZE

DESIGN LOT CODE:

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY
PROJECT OFFICE
NETWORK COMPLEX CODE: LRP

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JOHN HOLLAND GHD

JOHN HOLLAND GROUP

CIVIL

DRAWN	[redacted]	19.08.25
DESIGNED	[redacted]	19.08.25
DRG CHECK	[redacted]	19.08.25
DESIGN CHECK	[redacted]	19.08.25
PROJ/DES MNGR	[redacted]	19.08.25
APPROVED	[redacted]	19.08.25

ENABLING WORKS RAIL CORRIDOR

CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY

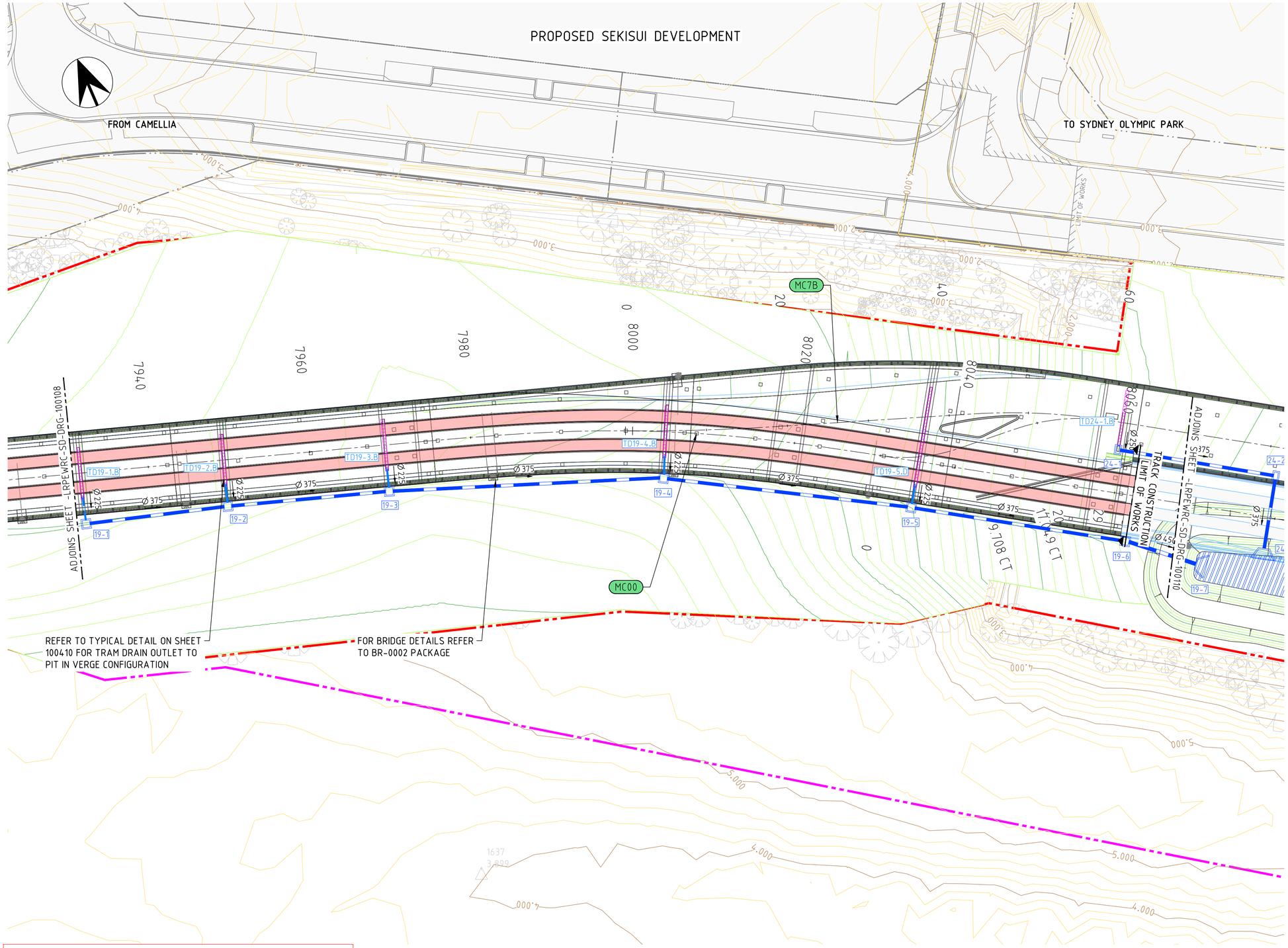
STORMWATER DRAINAGE

PLAN SHEET 8

DRAWING SET No: -	PART: -	SHEET: 8 OF 14		A1
STATUS: DETAILED DESIGN REVIEW [DDR]	BRIDGE No:			©
DRG No. PLR2EW-JHGRP-LRPEWRC-SD-DRG-100108	REV C	VER	EDMS No.	AMD No.

FILE NAME: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100108.dwg

PLOT DATE & TIME: 19/08/2025 10:30:20 AM



LEGEND

- 19000 – CHAINAGES
- MCD1 – DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

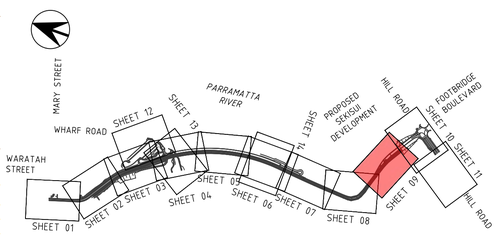
- PROPOSED TRACK ALIGNMENT
- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

DRAINAGE LEGEND

- Ø 375 – PROPOSED BRIDGE DRAINAGE
- Ø 375 – PROPOSED IN GROUND DRAINAGE
- # - 1 – PROPOSED BRIDGE DRAINAGE PIT TAG
- # - 1 – PROPOSED IN GROUND DRAINAGE PIT TAG
- ACO TRAMDRAIN
- ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIT
- BIORETENTION ZONE
- 8.0 – DESIGN MAJOR CONTOUR 1M INTERVALS
- DESIGN MINOR CONTOUR
- 8.0 – EXISTING MAJOR CONTOUR 1M INTERVALS
- EXISTING MINOR CONTOUR
- DRAINAGE LINE TO BE REMOVED
- BRIDGE DRAINAGE SCUPPERS
- SUBSOIL DRAINAGE FLUSHING POINT
- SS — SS – DRAINAGE SUBSOIL
- PROPOSED SCOUR PROTECTION
- PROPOSED TYPE 3 SCUPPER

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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OFFICIAL

FOR STAGE APPROVAL

REFERENCES:

PLR2EW-JHGRP-LRPEWRC-SH-MDD-000001
PLR2EW-JHGRP-LRPEWRC-SH-MDD-000010
PLR2EW-JHGRP-LRPEWRC-SH-MDD-100010
PLR2EW-JHGRP-LRPEWRC-SH-MDD-100005
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PLR2EW-JHGRP-LRPEWRC-TH-MDD-100102
PLR2EW-JHGRP-LRPEWRC-PY-MDD-100102
PLR2EW-JHGRP-LRPEWRC-SD-MDD-100005
PLR2EW-JHGRP-LRPEWRC-SD-MDD-100105
PLR2EW-JHGRP-LRPEWRC-SD-MDD-100101
PLR2EW-JHGRP-LRPEWRC-SD-MDD-100111
PLR2EW-JHGRP-LRPEWRC-RW-MDD-100151
PLR2EW-JHGRP-RPARP-RW-MDD-100101
PLR2EW-JHGRP-LRPEWRC-SH-MDD-100101
PLR2EW-JHGRP-LRPEWRC-DR-MDD-100250
PLR2EW-JHGRP-LRPEWRC-RW-MDD-100101
PLR2EW-JHGRP-LRPEWRC-RW-MDD-100121
PLR2EW-JHGRP-LRPEWRC-RW-MDD-100111
PLR2EW-JHGRP-LRPEWRC-SD-MDD-100101
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PLR2EW-JHGRP-LRPEWRC-RE-MDD-100105
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PLR2EW-JHGRP-LRPEWRCEWB-BR-MDD-100101

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REV	DESCRIPTION	DESIGNER INITIAL/DATE	VERIFIED INITIAL/DATE	APPROVED INITIAL/DATE
C	ISSUED FOR DDR	[redacted] 19.08.25	[redacted] 19.08.25	[redacted] 19.08.25
B	ISSUED FOR PDR	[redacted] 05.05.25	[redacted] 05.05.25	[redacted] 05.05.25
A	ISSUED FOR SDR	[redacted] 04.12.24	[redacted] 04.12.24	[redacted] 04.12.24

COORDINATE SYSTEM: GDA1994MGA56 | HEIGHT DATUM: AHD | DESIGN LOT CODE:

SCALE: 1:250

0 2.5 5 7.5 10 12.5m

SCALE 1:250 AT ORIGINAL SIZE

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY PROJECT OFFICE
NETWORK COMPLEX CODE: LRP

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JOHN HOLLAND GHD

JOHN HOLLAND GROUP

CIVIL

DRAWN	[redacted] 19.08.25
DESIGNED	[redacted] 19.08.25
DRG CHECK	[redacted] 19.08.25
DESIGN CHECK	[redacted] 19.08.25
PROJ/DES MNGR	[redacted] 19.08.25
APPROVED	[redacted] 19.08.25

ENABLING WORKS RAIL CORRIDOR
CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY
STORMWATER DRAINAGE
PLAN SHEET 9

DRAWING SET No: -	PART: -	SHEET: 9 OF 14	A1	
STATUS: DETAILED DESIGN REVIEW [DDR]	BRIDGE No:		©	
DRG No. PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109	REV C	VER	EDMS No.	AMD No.

FILE NAME: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109.dwg

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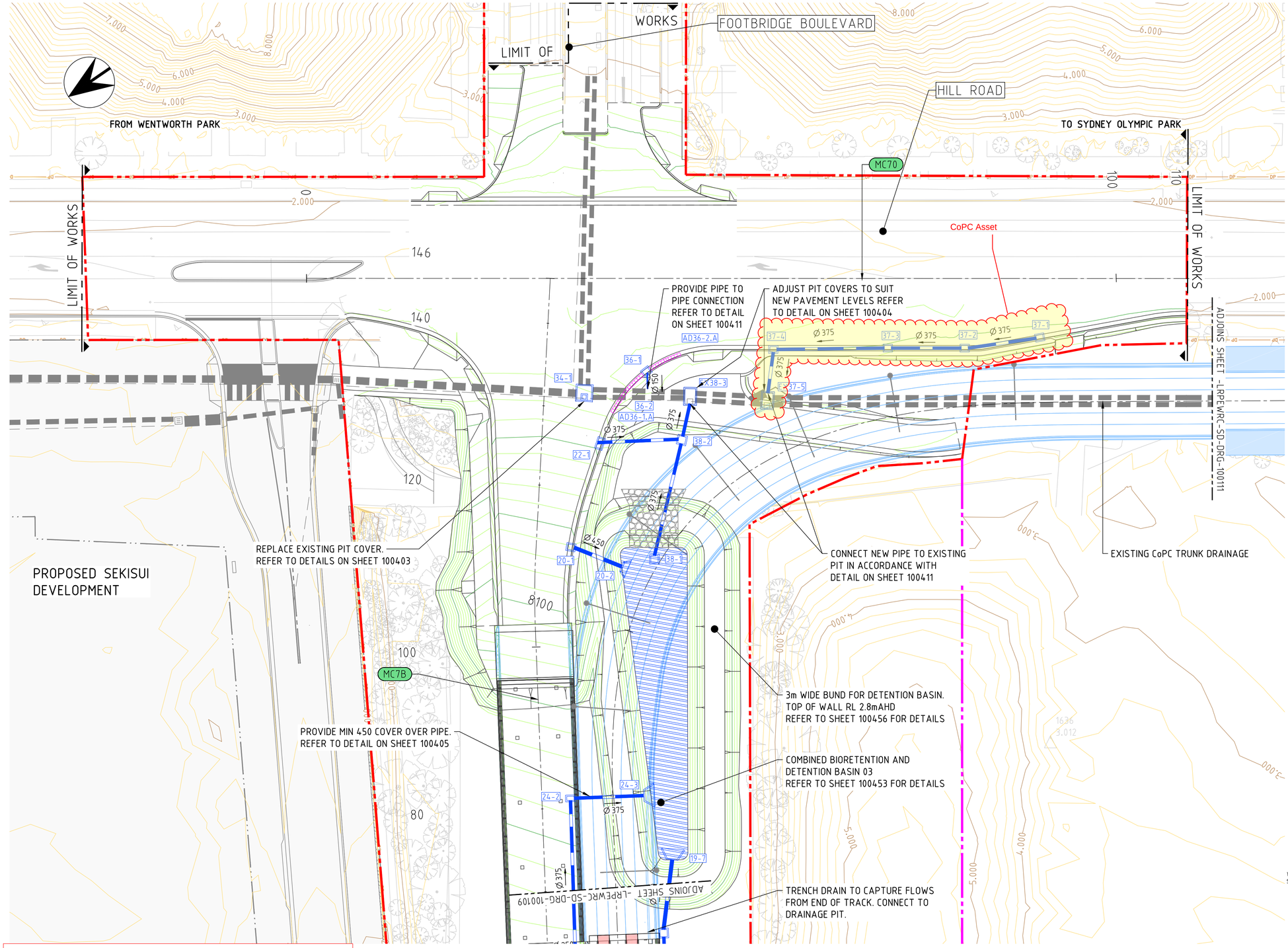


LEGEND

- 19000 – CHAINAGES
- MCD1 – DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

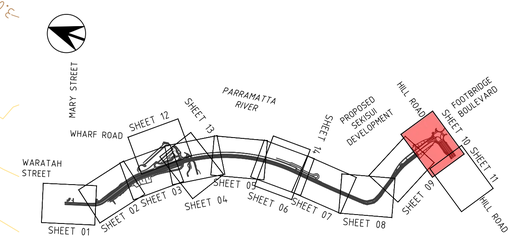
- PROPOSED TRACK ALIGNMENT
- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

DRAINAGE LEGEND

- PROPOSED BRIDGE DRAINAGE
- PROPOSED IN GROUND DRAINAGE
- PROPOSED BRIDGE DRAINAGE PIT TAG
- PROPOSED IN GROUND DRAINAGE PIT TAG
- ACO TRAMDRAIN
- ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIT
- BIORETENTION ZONE
- DESIGN MAJOR CONTOUR 1M INTERVALS
- DESIGN MINOR CONTOUR
- EXISTING MAJOR CONTOUR 1M INTERVALS
- EXISTING MINOR CONTOUR
- DRAINAGE LINE TO BE REMOVED
- BRIDGE DRAINAGE SCUPPERS
- SUBSOIL DRAINAGE FLUSHING POINT
- DRAINAGE SUBSOIL
- PROPOSED SCOUR PROTECTION
- PROPOSED TYPE 3 SCUPPER

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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REFERENCES:

PLR2EW-JHGRP-LRPEWRC-GN-MD25-000001
PLR2EW-JHGRP-LRPEWRC-GN-MD25-100009
PLR2EW-JHGRP-LRPEWRC-GN-MD25-100010
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PLR2EW-JHGRP-LRPEWRC-PV-MD25-100102
PLR2EW-JHGRP-LRPEWRC-SD-MD25-100102
PLR2EW-JHGRP-LRPEWRC-SD-MD25-100105
PLR2EW-JHGRP-LRPEWRC-SD-MD25-100101
PLR2EW-JHGRP-LRPEWRC-SD-MD25-100111
PLR2EW-JHGRP-LRPARP-RW-MD25-100101
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PLR2EW-JHGRP-LRPEWRC-SD-MD25-100102
PLR2EW-JHGRP-LRPEWRC-SD-MD25-100101
PLR2EW-JHGRP-LRPEWRC-RW-MD25-100115
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PLR2EW-JHGRP-LRPEWRC-RW-MD25-100101

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REV	DESCRIPTION	DESIGNER INITIAL/DATE	VERIFIED INITIAL/DATE	APPROVED INITIAL/DATE
C02.02	ISSUED FOR DDR	[redacted] 08.08.25	[redacted] 08.08.25	[redacted] 08.08.25
B	ISSUED FOR PDR	[redacted] 05.05.25	[redacted] 05.05.25	[redacted] 05.05.25
A	ISSUED FOR SDR	[redacted] 04.12.24	[redacted] 04.12.24	[redacted] 04.12.24

COORDINATE SYSTEM: GDA1994MGA56 | HEIGHT DATUM: AHD | DESIGN LOT CODE:

SCALE: 1:250

0 2.5 5 7.5 10 12.5m

SCALE 1:250 AT ORIGINAL SIZE

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY PROJECT OFFICE
NETWORK COMPLEX CODE: LRP

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JOHN HOLLAND GHD

JOHN HOLLAND GROUP
CIVIL

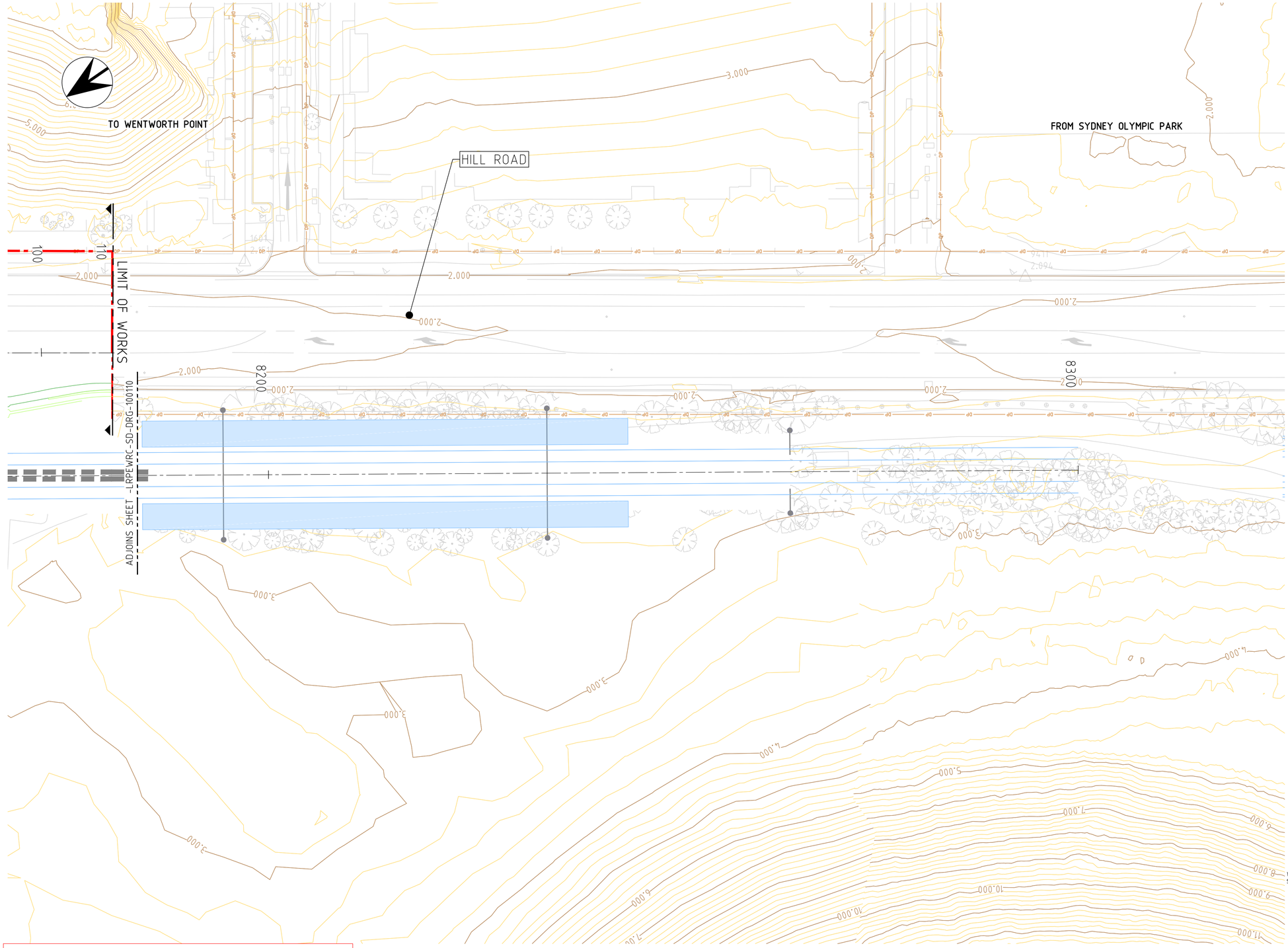
DRAWN	[redacted]	08.08.25
DESIGNED	[redacted]	08.08.25
DRG CHECK	[redacted]	08.08.25
DESIGN CHECK	[redacted]	08.08.25
PROJ/DES MNGR	[redacted]	08.08.25
APPROVED	[redacted]	08.08.25

ENABLING WORKS RAIL CORRIDOR
CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY
STORMWATER DRAINAGE
PLAN SHEET 10

DRAWING SET No: -	PART: -	SHEET: 10 OF 14		A1
STATUS: DETAILED DESIGN REVIEW [DDR]	BRIDGE No:			©
DRG No. PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110	REV C02.02	VER	EDMS No.	AMD No.

FILE NAME: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110.dwg

PLOT DATE & TIME: 19/08/2025 2:40:24 PM



LEGEND

- 19000 – CHAINAGES
- MCD1 – DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

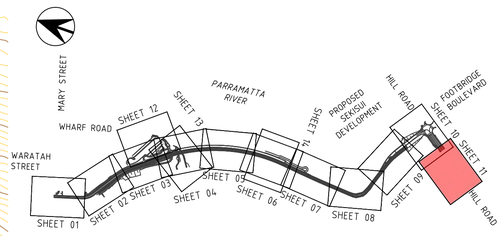
- PROPOSED TRACK ALIGNMENT
- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

DRAINAGE LEGEND

- Ø 375 – PROPOSED BRIDGE DRAINAGE
- Ø 375 – PROPOSED IN GROUND DRAINAGE
- H-1 – PROPOSED BRIDGE DRAINAGE PIT TAG
- H-1 – PROPOSED IN GROUND DRAINAGE PIT TAG
- ACO TRAMDRAIN
- ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIT
- BIORETENTION ZONE
- 8.0 – DESIGN MAJOR CONTOUR 1M INTERVALS
- DESIGN MINOR CONTOUR
- 8.0 – EXISTING MAJOR CONTOUR 1M INTERVALS
- EXISTING MINOR CONTOUR
- DRAINAGE LINE TO BE REMOVED
- BRIDGE DRAINAGE SCUPPERS
- SUBSOIL DRAINAGE FLUSHING POINT
- SS — SS — DRAINAGE SUBSOIL
- PROPOSED SCOUR PROTECTION
- PROPOSED TYPE 3 SCUPPER

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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FOR STAGE APPROVAL

REFERENCES:

PLR2EW-JHGRP-LRPEWRC-GN-MDS-000001
PLR2EW-JHGRP-LRPEWRC-GN-MDS-000003
PLR2EW-JHGRP-LRPEWRC-GN-MDS-100010
PLR2EW-JHGRP-LRPEWRC-GN-MDS-100005
PLR2EW-JHGRP-LRPEWRC-GN-MDS-100102
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PLR2EW-JHGRP-LRPEWRC-SD-MDS-100101
PLR2EW-JHGRP-LRPEWRC-SD-MDS-100105
PLR2EW-JHGRP-LRPEWRC-SD-MDS-100111
PLR2EW-JHGRP-LRPEWRC-SD-MDS-100151
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PLR2EW-JHGRP-LRPEWRC-SD-MDS-100102
PLR2EW-JHGRP-LRPEWRC-MS-MDS-100101

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REV	DESCRIPTION	DESIGNER INITIAL/DATE	VERIFIED INITIAL/DATE	APPROVED INITIAL/DATE
C	ISSUED FOR DDR	[redacted] 19.08.25	[redacted] 19.08.25	[redacted] 19.08.25
B	ISSUED FOR PDR	[redacted] 05.05.25	[redacted] 05.05.25	[redacted] 05.05.25
A	ISSUED FOR SDR	[redacted] 04.12.24	[redacted] 04.12.24	[redacted] 04.12.24

COORDINATE SYSTEM: GDA1994MGA56 | HEIGHT DATUM: AHD | DESIGN LOT CODE:

SCALE: 1:250

0 2.5 5 7.5 10 12.5m

SCALE 1:250 AT ORIGINAL SIZE

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY
PROJECT OFFICE
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JOHN HOLLAND GHD

JOHN HOLLAND GROUP
CIVIL

DRAWN	[redacted]	19.08.25
DESIGNED	[redacted]	19.08.25
DRG CHECK	[redacted]	19.08.25
DESIGN CHECK	[redacted]	19.08.25
PROJ/DES MNGR	[redacted]	19.08.25
APPROVED	[redacted]	19.08.25

ENABLING WORKS RAIL CORRIDOR
CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY
STORMWATER DRAINAGE
PLAN SHEET 11

DRAWING SET No: -	PART: -	SHEET: 11 OF 14		A1
STATUS: DETAILED DESIGN REVIEW [DDR]	BRIDGE No:			©
DRG No. PLR2EW-JHGRP-LRPEWRC-SD-DRG-100111	REV C	VER	EDMS No.	AMD No.

FILE NAME: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100111.dwg

PLOT DATE & TIME: 19/08/2025 10:35:06 AM

FROM CAMELLIA

TO SYDNEY OLYMPIC PARK

WHARF ROAD

MC30

MD30

CoPC Asset

CoPC Asset

ADJOINS SHEET -LRPEWRC-SD-DRG-100103

ADJOINS SHEET -LRPEWRC-SD-DRG-100113

BIORETENTION BASIN 2
REFER TO SHEET 100453
FOR DETAILS

LEGEND

19000 - CHAINAGES

DESIGN CONTROL STRING LABEL
PROJECT BOUNDARY (SAS)
TEMPORARY BOUNDARY
CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

PROPOSED TRACK ALIGNMENT
FUTURE RAIL ALIGNMENT
FUTURE RAILWAY STOP

DRAINAGE LEGEND

PROPOSED BRIDGE DRAINAGE
PROPOSED IN GROUND DRAINAGE
PROPOSED BRIDGE DRAINAGE PIT TAG
PROPOSED IN GROUND DRAINAGE PIT TAG
ACO TRAMDRAIN
ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
EXISTING STORMWATER PIPE
EXISTING STORMWATER PIT
BIORETENTION ZONE
DESIGN MAJOR CONTOUR 1M INTERVALS
DESIGN MINOR CONTOUR
EXISTING MAJOR CONTOUR 1M INTERVALS
EXISTING MINOR CONTOUR
DRAINAGE LINE TO BE REMOVED
BRIDGE DRAINAGE SCUPPERS
SUBSOIL DRAINAGE FLUSHING POINT
DRAINAGE SUBSOIL
PROPOSED SCOUR PROTECTION
PROPOSED TYPE 3 SCUPPER

OVERHEAD WIRING LEGEND

MULTI FUNCTION POLES (MFP)

MARY STREET · WHARF ROAD · WARATAH STREET · PARRAMATTA RIVER · PROPOSED SEASUD DEVELOPMENT · HILL ROAD · SS FOOTBRIDGE · OLYMPIC BOULEVARD · SHEET 01 · SHEET 02 · SHEET 03 · SHEET 04 · SHEET 05 · SHEET 06 · SHEET 07 · SHEET 08 · SHEET 09 · SHEET 10 · SHEET 11 · SHEET 12 · SHEET 13

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FILE NAME: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100112.dwg

PLOT DATE & TIME: 19/08/2025 10:38:37 AM

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PLR2EW-AHGRP-LRPEWRC-GN-MDS-100010
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PLR2EW-AHGRP-LRPEWRC-SD-MDS-100111
PLR2EW-AHGRP-LRPEWRC-RW-MDS-100151
PLR2EW-JHGRP-LRPABP-RW-MDS-100101
PLR2EW-JHGRP-LRPEWRC-RW-MDS-100102
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PLR2EW-AHGRP-LRPEWRC-GS-MDS-100101
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PLR2EW-AHGRP-LRPEWRC-RW-MDS-100115
PLR2EW-AHGRP-LRPEWRC-SD-MDS-100102
PLR2EW-AHGRP-LRPEWRC-SD-MDS-100103
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SCALE: 1:250

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

REV	DESCRIPTION	DESIGNER INITIAL/DATE	VERIFIED INITIAL/DATE	APPROVED INITIAL/DATE
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A	ISSUED FOR PDR	[redacted] 05.05.25	[redacted] 05.05.25	[redacted] 05.05.25

COORDINATE SYSTEM: GDA1994MGA56 | HEIGHT DATUM: AHD | DESIGN LOT CODE:

CLIENT:
NSW GOVERNMENT Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY
PROJECT OFFICE
NETWORK COMPLEX CODE: LRP

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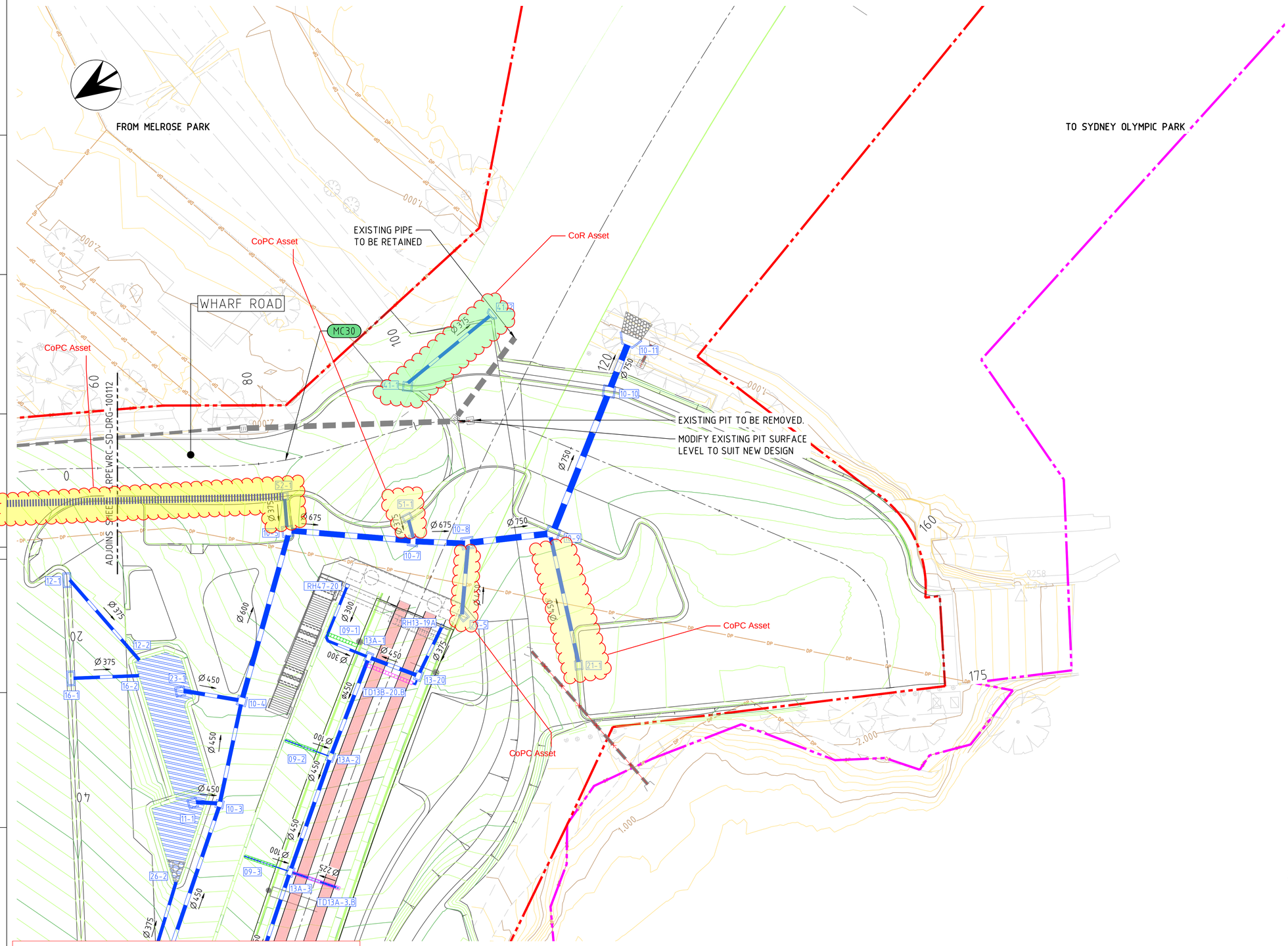
JOHN HOLLAND GHD
JOHN HOLLAND GROUP
CIVIL

DRAWN	[redacted]	19.08.25
DESIGNED	[redacted]	19.08.25
DRG CHECK	[redacted]	19.08.25
DESIGN CHECK	[redacted]	19.08.25
PROJ/DES MNGR	[redacted]	19.08.25
APPROVED	[redacted]	19.08.25

ENABLING WORKS RAIL CORRIDOR
CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY
STORMWATER DRAINAGE
PLAN SHEET 12

DRAWING SET No: -	PART: -	SHEET: 12 OF 14			A1
STATUS: DETAILED DESIGN REVIEW [DDR]	BRIDGE No:				©
DRG No. PLR2EW-JHGRP-LRPEWRC-SD-DRG-100112	REV B	VER	EDMS No.	AMD No.	



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LEGEND

- 19000 – CHAINAGES
- MCD1 – DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

- PROPOSED TRACK ALIGNMENT
- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

DRAINAGE LEGEND

- PROPOSED BRIDGE DRAINAGE
- PROPOSED IN GROUND DRAINAGE
- PROPOSED BRIDGE DRAINAGE PIT TAG
- PROPOSED IN GROUND DRAINAGE PIT TAG
- ACO TRAMDRAIN
- ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIT
- BIORETENTION ZONE
- DESIGN MAJOR CONTOUR 1M INTERVALS
- DESIGN MINOR CONTOUR
- EXISTING MAJOR CONTOUR 1M INTERVALS
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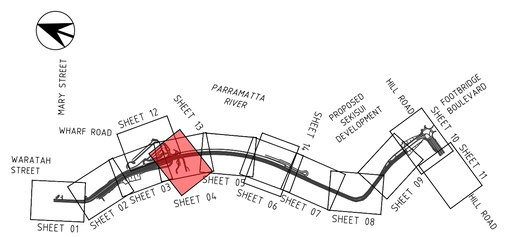
- DRAINAGE LINE TO BE REMOVED
- BRIDGE DRAINAGE SCUPPERS
- SUBSOIL DRAINAGE FLUSHING POINT
- DRAINAGE SUBSOIL
- PROPOSED SCOUR PROTECTION
- PROPOSED TYPE 3 SCUPPER

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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FOR STAGE APPROVAL

REFERENCES:

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PLR2EW-JHGRP-LRPEWRC-RW-MDD-100102
PLR2EW-JHGRP-LRPDP-RW-MDD-100101
PLR2EW-JHGRP-LRPEWRC-DR-MDD-100250
PLR2EW-JHGRP-LRPEWRC-SS-MDD-210011
PLR2EW-JHGRP-LRPEWSWB-BR-MDD-210001

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APPROVED	[redacted] 19.08.25

ENABLING WORKS RAIL CORRIDOR
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PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY
STORMWATER DRAINAGE
PLAN SHEET 13

DRAWING SET No: -	PART: -	SHEET: 13 OF 14	A1		
STATUS: DETAILED DESIGN REVIEW [DDR]	BRIDGE No:	©			
DRG No. PLR2EW-JHGRP-LRPEWRC-SD-DRG-100113	REV B	VER	EDMS No.	AMD No.	

FILE NAME: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100113.dwg

PLOT DATE & TIME: 19/08/2025 10:38:40 AM

Request for Information

RFI Reference No: **PLR2EW-JHGRP-RFI-000159**
Status: INITOCLOSE

For Action:	[redacted] Transport for NSW [Role: TfNSW Respondent] [redacted] Transport for NSW [Role: TfNSW Respondent] [redacted] Transport for NSW [Role: TfNSW Respondent] [redacted] Transport for NSW [Role: TfNSW Respondent] [redacted], Transport for NSW [Role: TfNSW Respondent] [redacted] Transport for NSW [Role: TfNSW Respondent]
For Info:	[redacted], John Holland Group [redacted], John Holland Group [redacted] The APP Group [Role: TfNSW For Info] PLR2 Delivery Document Control, Transport for NSW [Role: TfNSW For Info] [redacted] The APP Group [Role: TfNSW For Info]
Project:	Parramatta Light Rail - Stage 2 - Enabling works
Subject:	**Stormwater drainage asset ownership**

Dear TfNSW,

Please find attached a marked drainage plans to identify the CoPC and CoR Drainage Assets, developed in line with the asset identified within the TfNSW Asset Delineation Principles" issued on the 13th March 2025. Can TfNSW please confirm this is consistent with the intent of the document. Please note the document did not cover asset lands of Wharf Road so it has been assumed that drainage assets that do not service the PLRC drainage will be handed to council, as identified.

regards
[redacted]

Discipline: **Area:** **Location:**

Discipline: **Area**: **Location**:

Contract No : PLR2EW - Enabling Works Detailed Design and Construction

Response Required By :

Attachments: PLR2EW-JHGRP-LRPEWRC-SD-DRG-199999_Council Ownership_Rev A.pdf

RFI by:	[redacted] John Holland Group	On: 24 September 2025
Created By:	[redacted], John Holland Group	On: 24 September 2025, 04:00:10 PM +11:00
Last Edited By:	[redacted] John Holland Group	On: 24 September 2025, 04:00:10 PM +11:00

01 - RFI Response

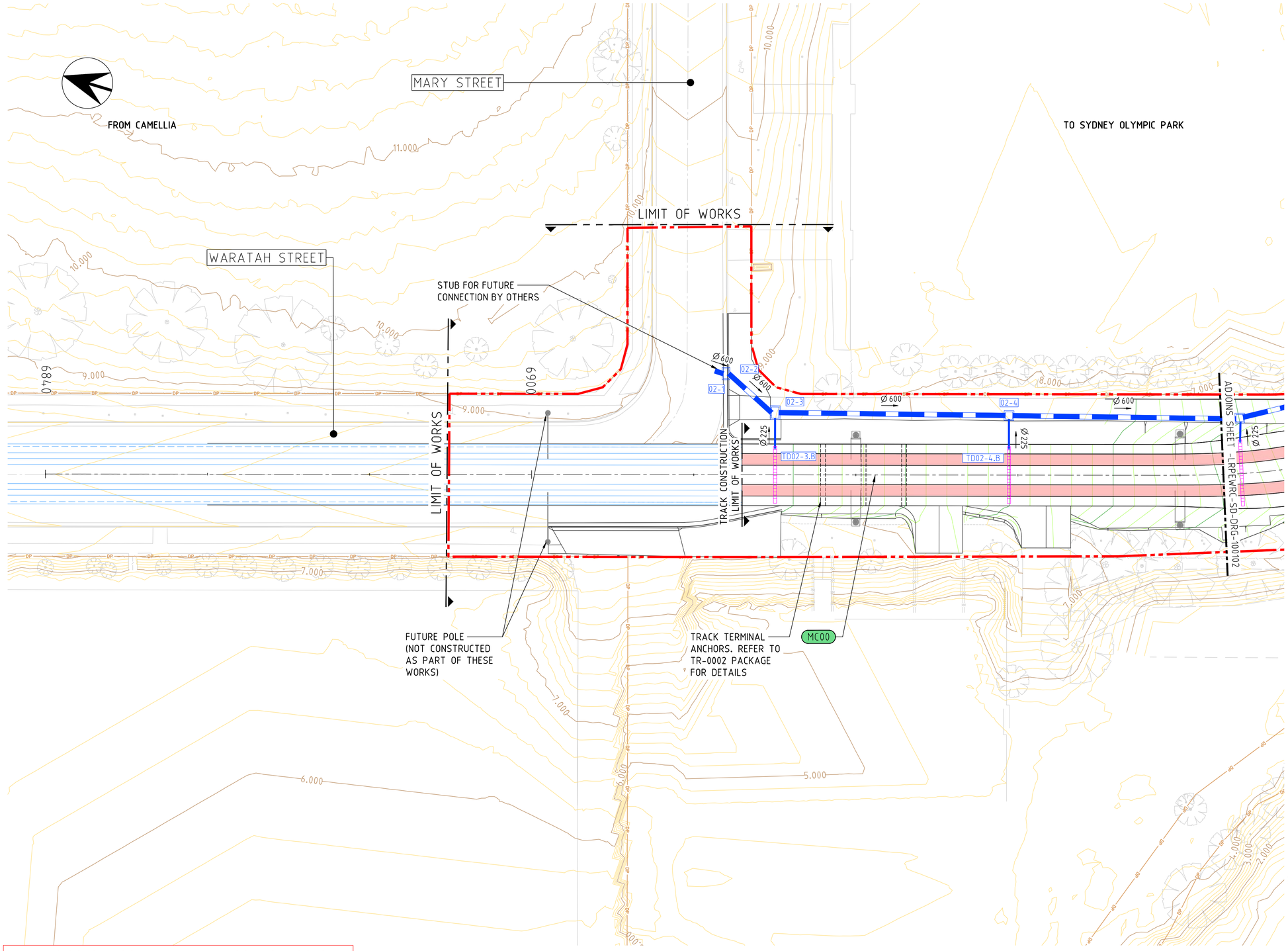
TfNSW have reviewed RFI:PLR2EW-JHGRP-RFI-000159 and have updated the drainage plans identifying the CoPC and CoR Drainage Assets.

Please find attached the updated markup for reference.

Kindly note that all assets located within Lot 1 are to be handed back to CoPC in the format specified by the Council, in accordance with the terms outlined in the MoU (clause 8(k)).

TfNSW considers this RFI is suitably addressed and requests the Contractor to close the RFI.

Attachments:	PLR2EW-JHGRP-RFI-000159-00-PLR2EW-JHGRP-LRPEWRC-SD-DRG-199999_Council Ownership_Markup_TfNSW.pdf	
RFI Response by:	[redacted] Transport for NSW	On: 29 October 2025
Created By:	[redacted] Transport for NSW	On: 29 October 2025, 01:19:55 PM +11:00
Last Edited By:	[redacted] Transport for NSW	On: 29 October 2025, 01:19:56 PM +11:00



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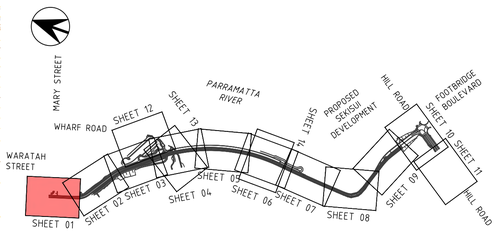

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REFERENCES:

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PLR2EW-JHGRP-LRPEWRC-SU-MD2-100103
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COORDINATE SYSTEM: GDA1994MGA56

HEIGHT DATUM: AHD

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0 2.5 5 7.5 10 12.5m

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ENABLING WORKS RAIL CORRIDOR

CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY

STORMWATER DRAINAGE

PLAN SHEET 1

DRAWING SET No: -	PART: -	SHEET: 1	OF 14	A1
STATUS: DETAILED DESIGN REVIEW [DDR]	BRIDGE No:			©

DRG No.	REV	VER	EDMS No.	AMD No.
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101	C			

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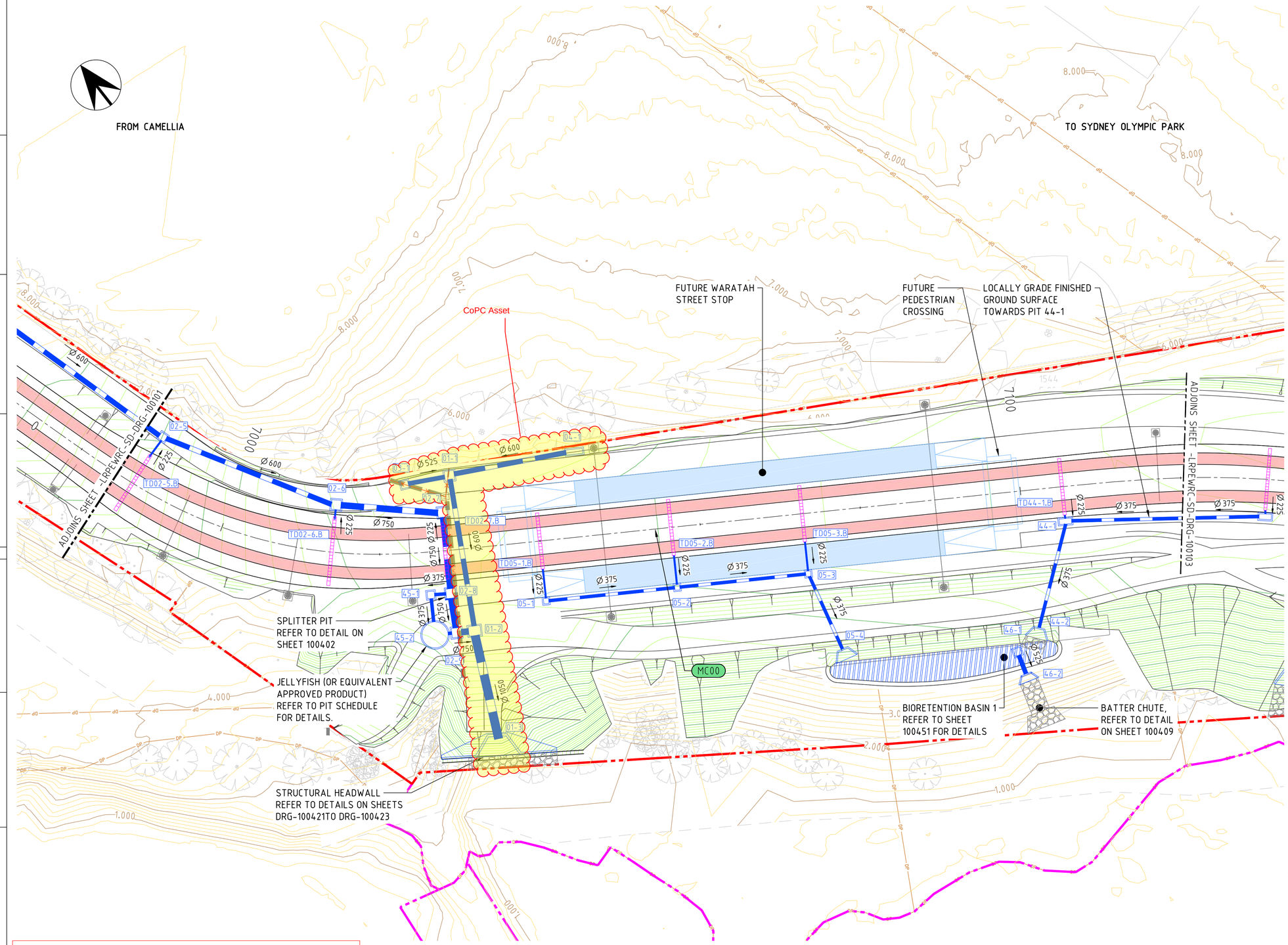

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PROPOSED RAIL ALIGNEMENT LEGEND

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- FUTURE RAILWAY STOP

DRAINAGE LEGEND

- Ø 375 / Ø 375 – PROPOSED BRIDGE DRAINAGE
- PROPOSED IN GROUND DRAINAGE
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- H-1 – PROPOSED IN GROUND DRAINAGE PIT TAG
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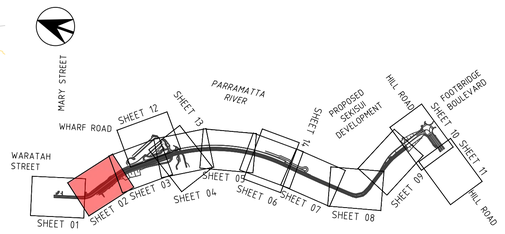

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PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY
STORMWATER DRAINAGE
PLAN SHEET 2

DRAWING SET No: -	PART: -	SHEET: 2 OF 14			A1
STATUS: DETAILED DESIGN REVIEW [DDR]	BRIDGE No:				©
DRG No. PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102	REV C	VER	EDMS No.	AMD No.	

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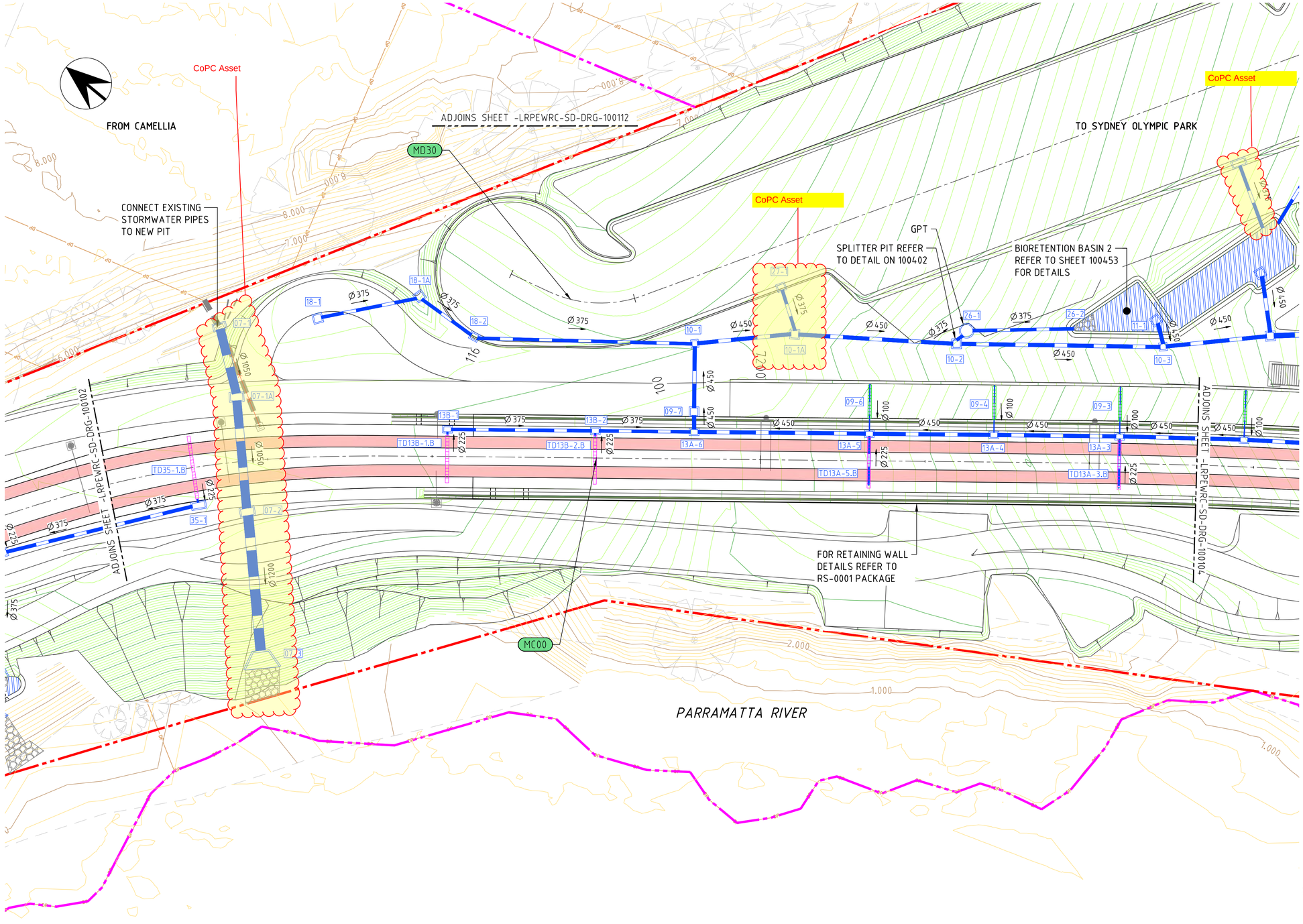


LEGEND

- 19000 – CHAINAGES
- MCD1 – DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

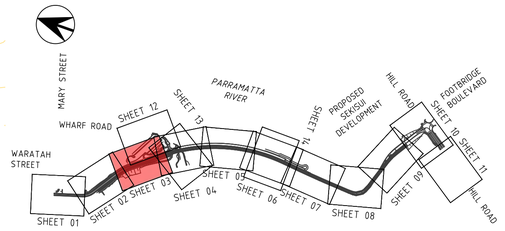
- PROPOSED TRACK ALIGNMENT
- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

DRAINAGE LEGEND

- PROPOSED BRIDGE DRAINAGE
- PROPOSED IN GROUND DRAINAGE
- PROPOSED BRIDGE DRAINAGE PIT TAG
- PROPOSED IN GROUND DRAINAGE PIT TAG
- ACO TRAMDRAIN
- ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIT
- BIORETENTION ZONE
- DESIGN MAJOR CONTOUR 1M INTERVALS
- DESIGN MINOR CONTOUR
- EXISTING MAJOR CONTOUR 1M INTERVALS
- EXISTING MINOR CONTOUR
- DRAINAGE LINE TO BE REMOVED
- BRIDGE DRAINAGE SCUPPERS
- SUBSOIL DRAINAGE FLUSHING POINT
- DRAINAGE SUBSOIL
- PROPOSED SCOUR PROTECTION
- PROPOSED TYPE 3 SCUPPER

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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FOR STAGE APPROVAL

REFERENCES:

PLR2EW-JHGRP-LRPEWRC-DM-MOD-000001
PLR2EW-JHGRP-LRPEWRC-DM-MOD-000111
PLR2EW-JHGRP-LRPEWRC-DM-MOD-100003
PLR2EW-JHGRP-LRPEWRC-DM-MOD-100010
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PLR2EW-JHGRP-LRPEWRC-RW-MOD-100102
PLR2EW-JHGRP-LRPEWRC-PY-MOD-100102
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PLR2EW-JHGRP-LRPEWRC-RW-MOD-100101
PLR2EW-JHGRP-LRPEWRC-DM-MOD-100101
PLR2EW-JHGRP-LRPEWRC-DM-MOD-100250
PLR2EW-JHGRP-LRPEWRC-MT-MOD-100121
PLR2EW-JHGRP-LRPEWRC-RW-MOD-100121
PLR2EW-JHGRP-LRPEWRC-TR-MOD-100101
PLR2EW-JHGRP-LRPEWRC-SD-MOD-100135
PLR2EW-JHGRP-LRPEWRC-DS-MOD-100101
PLR2EW-JHGRP-LRPEWRC-SD-MOD-100102
PLR2EW-JHGRP-LRPEWRC-SD-MOD-100103
PLR2EW-JHGRP-LRPEWRC-RW-MOD-100115
PLR2EW-JHGRP-LRPEWRC-MS-MOD-100101

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REV	DESCRIPTION	DESIGNER INITIAL/DATE	VERIFIED INITIAL/DATE	APPROVED INITIAL/DATE
C	ISSUED FOR DDR	[redacted]19.08.25	[redacted]19.08.25	[redacted]19.08.25
B	ISSUED FOR PDR	[redacted]05.05.25	[redacted]05.05.25	[redacted]05.05.25
A	ISSUED FOR SDR	[redacted]04.12.24	[redacted]04.12.24	[redacted]04.12.24

COORDINATE SYSTEM: GDA1994MGA56 | HEIGHT DATUM: AHD | DESIGN LOT CODE:

SCALE: 1:250

0 2.5 5 7.5 10 12.5m

SCALE 1:250 AT ORIGINAL SIZE

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY PROJECT OFFICE
NETWORK COMPLEX CODE: LRP

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JOHN HOLLAND GHD

JOHN HOLLAND GROUP
CIVIL

DRAWN	[redacted]	19.08.25
DESIGNED	[redacted]	19.08.25
DRG CHECK	[redacted]	19.08.25
DESIGN CHECK	[redacted]	19.08.25
PROJ/DES MNGR	[redacted]	19.08.25
APPROVED	[redacted]	19.08.25

ENABLING WORKS RAIL CORRIDOR
CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY
STORMWATER DRAINAGE
PLAN SHEET 3

DRAWING SET No: -	PART: -	SHEET: 3 OF 14		A1
STATUS: DETAILED DESIGN REVIEW [DDR]	BRIDGE No:			©
DRG No. PLR2EW-JHGRP-LRPEWRC-SD-DRG-100103	REV C	VER	EDMS No.	AMD No.

FILE NAME: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100103.dwg

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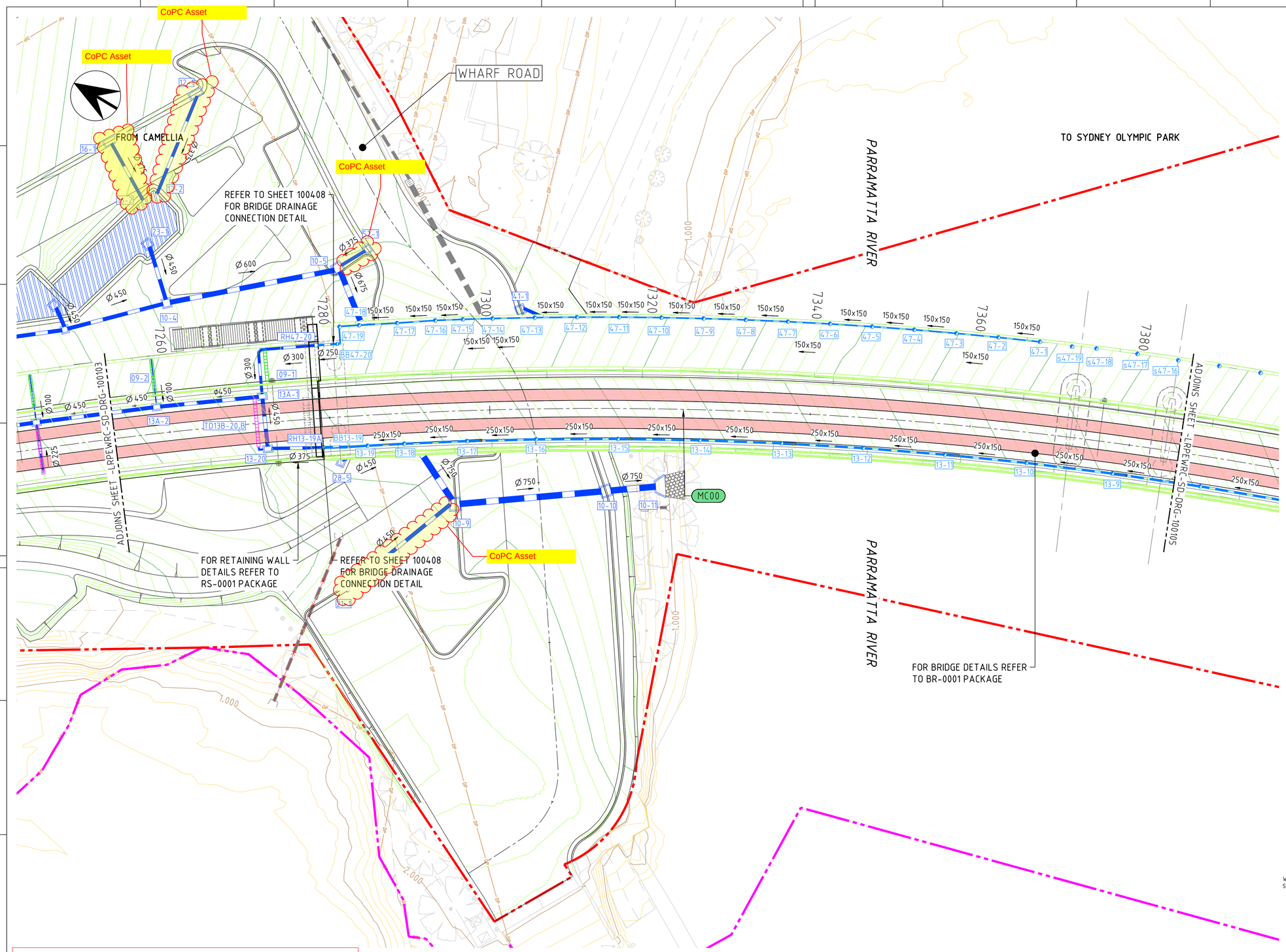


LEGEND

- 19000 – CHAINAGES
- MCD1 – DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

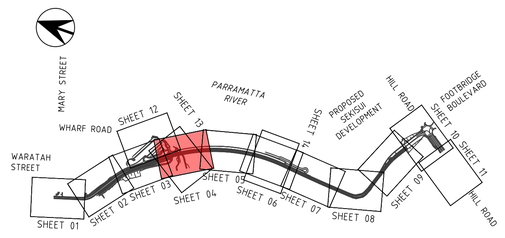
- PROPOSED TRACK ALIGNMENT
- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

DRAINAGE LEGEND

- Ø 375 / Ø 375 – PROPOSED BRIDGE DRAINAGE
- PROPOSED IN GROUND DRAINAGE
- H - 1 – PROPOSED BRIDGE DRAINAGE PIT TAG
- H - 1 – PROPOSED IN GROUND DRAINAGE PIT TAG
- ACO TRAMDRAIN
- ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIT
- BIORETENTION ZONE
- 8.0 – DESIGN MAJOR CONTOUR 1M INTERVALS
- DESIGN MINOR CONTOUR
- 8.0 – EXISTING MAJOR CONTOUR 1M INTERVALS
- EXISTING MINOR CONTOUR
- DRAINAGE LINE TO BE REMOVED
- BRIDGE DRAINAGE SCUPPERS
- SUBSOIL DRAINAGE FLUSHING POINT
- SS – SS – DRAINAGE SUBSOIL
- PROPOSED SCOUR PROTECTION
- PROPOSED TYPE 3 SCUPPER

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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FOR STAGE APPROVAL

REFERENCES:

PLR2EW-JHGRP-LRPEWRC-DR-MD0-000001
PLR2EW-JHGRP-LRPEWRC-DR-MD0-000111
PLR2EW-JHGRP-LRPEWRC-DR-MD0-100003
PLR2EW-JHGRP-LRPEWRC-DR-MD0-100010
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PLR2EW-JHGRP-LRPEWRC-MS-MD0-100113
PLR2EW-JHGRP-LRPEWRC-MS-MD0-100101
PLR2EW-JHGRP-LRPEWRC-RW-MD0-100152
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C	ISSUED FOR DDR	[redacted]19.08.25	[redacted]19.08.25	[redacted]19.08.25
B	ISSUED FOR PDR	[redacted]05.05.25	[redacted]05.05.25	[redacted]05.05.25
A	ISSUED FOR SDR	[redacted]04.12.24	[redacted]04.12.24	[redacted]04.12.24

COORDINATE SYSTEM: GDA1994MGA56 | HEIGHT DATUM: AHD | DESIGN LOT CODE:

SCALE: 1:250

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY
PROJECT OFFICE
NETWORK COMPLEX CODE: LRP

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JOHN HOLLAND GROUP
CIVIL

DRAWN	[redacted]19.08.25
DESIGNED	[redacted]19.08.25
DRG CHECK	[redacted]19.08.25
DESIGN CHECK	[redacted]19.08.25
PROJ/DES MNGR	[redacted]19.08.25
APPROVED	[redacted]19.08.25

ENABLING WORKS RAIL CORRIDOR
CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY
STORMWATER DRAINAGE
PLAN SHEET 4

DRAWING SET No: -	PART: -	SHEET: 4 OF 14			A1
STATUS: DETAILED DESIGN REVIEW [DDR]	BRIDGE No:				©
DRG No. PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104	REV C	VER	EDMS No.	AMD No.	

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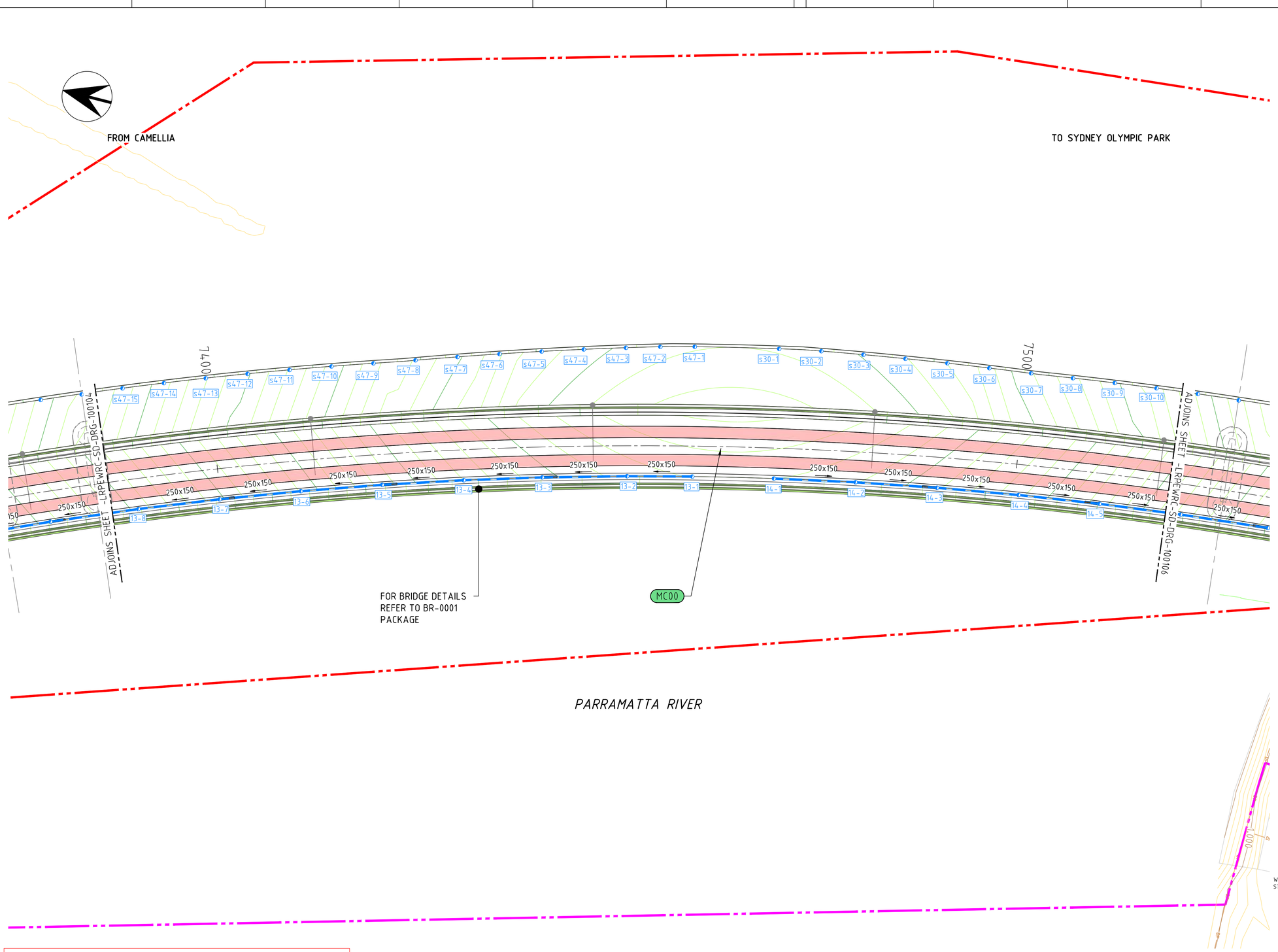


LEGEND

- 19000 – CHAINAGES
- MCD1 – DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

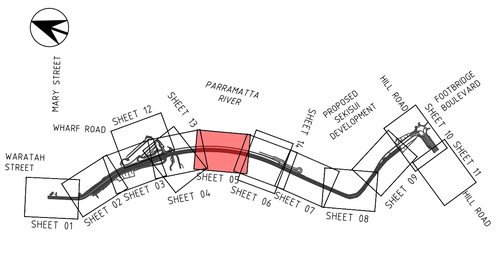
- PROPOSED TRACK ALIGNMENT
- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

DRAINAGE LEGEND

- Ø 375 / Ø 375 – PROPOSED BRIDGE DRAINAGE
- PROPOSED IN GROUND DRAINAGE
- #-1 – PROPOSED BRIDGE DRAINAGE PIT TAG
- #-1 – PROPOSED IN GROUND DRAINAGE PIT TAG
- ACO TRAMDRAIN
- ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIT
- BIORETENTION ZONE
- 8.0 – DESIGN MAJOR CONTOUR 1M INTERVALS
- DESIGN MINOR CONTOUR
- 8.0 – EXISTING MAJOR CONTOUR 1M INTERVALS
- EXISTING MINOR CONTOUR
- DRAINAGE LINE TO BE REMOVED
- BRIDGE DRAINAGE SCUPPERS
- SUBSOIL DRAINAGE FLUSHING POINT
- SS — SS – DRAINAGE SUBSOIL
- PROPOSED SCOUR PROTECTION
- PROPOSED TYPE 3 SCUPPER

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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FOR STAGE APPROVAL

REFERENCES:

PLR2EW-AKGRP-LRPEWRC-SD-MCD-000001
PLR2EW-AKGRP-LRPEWRC-SD-MCD-000010
PLR2EW-AKGRP-LRPEWRC-SH-MCD-100010
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PLR2EW-AKGRP-LRPEWRC-BR-MCD-210001

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REV	DESCRIPTION	DESIGNER INITIAL/DATE	VERIFIED INITIAL/DATE	APPROVED INITIAL/DATE
C	ISSUED FOR DDR	[redacted] 19.08.25	[redacted] 19.08.25	[redacted] 19.08.25
B	ISSUED FOR PDR	[redacted] 05.05.25	[redacted] 05.05.25	[redacted] 05.05.25
A	ISSUED FOR SDR	[redacted] 04.12.24	[redacted] 04.12.24	[redacted] 04.12.24

COORDINATE SYSTEM: GDA1994MGA56

HEIGHT DATUM: AHD

SCALE: 1:250

0 2.5 5 7.5 10 12.5m

SCALE 1:250 AT ORIGINAL SIZE

DESIGN LOT CODE:

CLIENT:

NSW GOVERNMENT | Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY
PROJECT OFFICE
NETWORK COMPLEX CODE: LRP

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JOHN HOLLAND GROUP

CIVIL

DRAWN	[redacted]	19.08.25
DESIGNED	[redacted]	19.08.25
DRG CHECK	[redacted]	19.08.25
DESIGN CHECK	[redacted]	19.08.25
PROJ/DES MNGR	[redacted]	19.08.25
APPROVED	[redacted]	19.08.25

ENABLING WORKS RAIL CORRIDOR

CAMELLIA TO LIDCOMBE LINE

PARRAMATTA LIGHT RAIL - STAGE 2

SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY

STORMWATER DRAINAGE

PLAN SHEET 5

DRAWING SET No: -	PART: -	SHEET: 5 OF 14	A1
STATUS: DETAILED DESIGN REVIEW [DDR]	BRIDGE No:		©

DRG No.	REV	VER	EDMS No.	AMD No.
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100105	C			

FILE NAME: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100105.dwg

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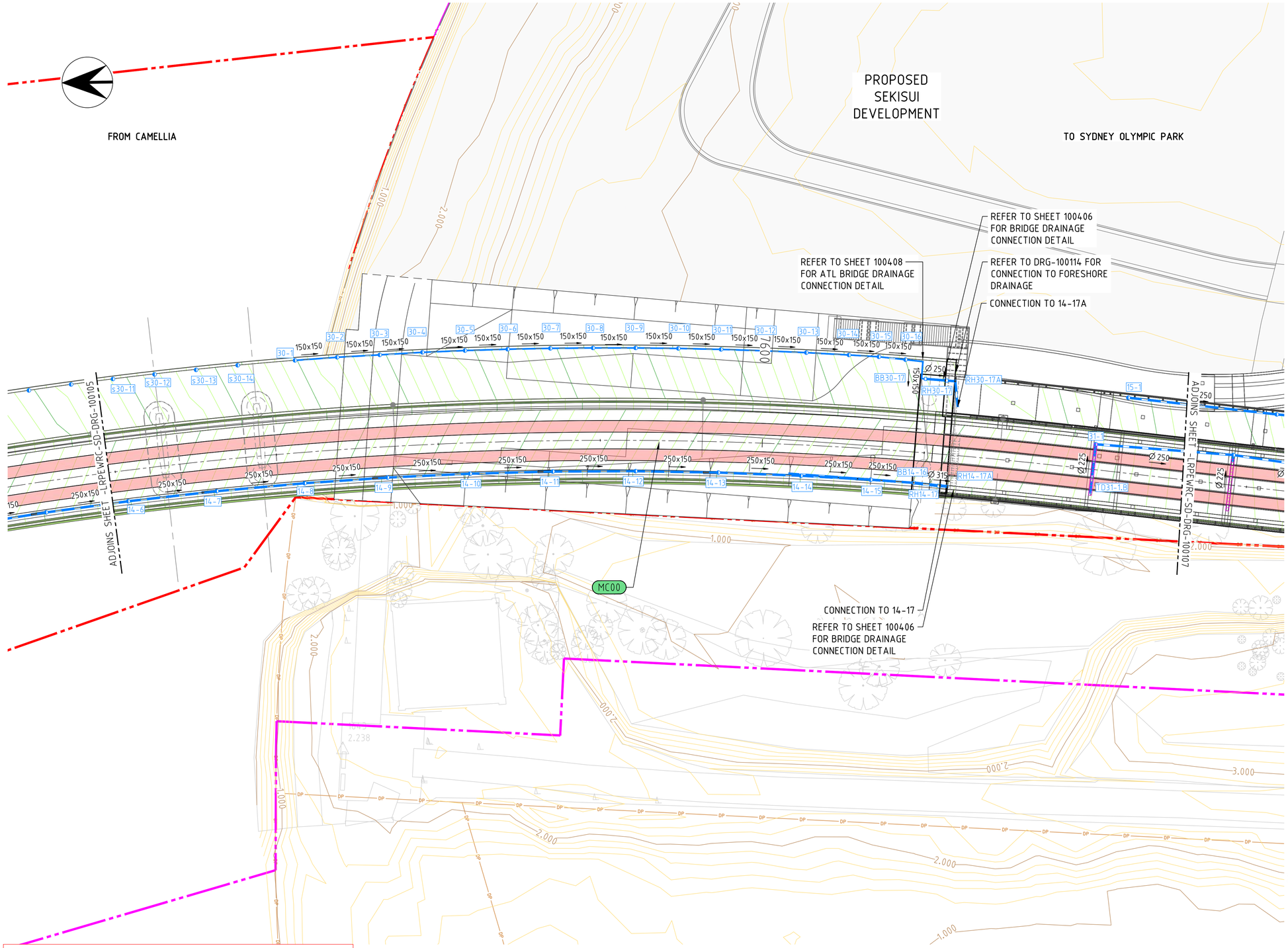


LEGEND

- 19000 – CHAINAGES
- MCD1 – DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

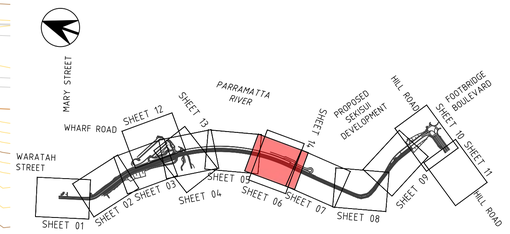
- PROPOSED TRACK ALIGNMENT
- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

DRAINAGE LEGEND

- Ø 375 / Ø 375 – PROPOSED BRIDGE DRAINAGE
- PROPOSED IN GROUND DRAINAGE
- # - 1 – PROPOSED BRIDGE DRAINAGE PIT TAG
- # - 1 – PROPOSED IN GROUND DRAINAGE PIT TAG
- ACO TRAMDRAIN
- ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIT
- BIORETENTION ZONE
- 8.0 – DESIGN MAJOR CONTOUR 1M INTERVALS
- DESIGN MINOR CONTOUR
- 8.0 – EXISTING MAJOR CONTOUR 1M INTERVALS
- EXISTING MINOR CONTOUR
- DRAINAGE LINE TO BE REMOVED
- BRIDGE DRAINAGE SCUPPERS
- SUBSOIL DRAINAGE FLUSHING POINT
- SS — SS – DRAINAGE SUBSOIL
- PROPOSED SCOUR PROTECTION
- PROPOSED TYPE 3 SCUPPER

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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FOR STAGE APPROVAL

FILE NAME: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100106.dwg

PLOT DATE & TIME: - 19/08/2025 10:26:12 AM

REFERENCES:

PLR2EW-AWGRP-LRPEWRC-SD-MOD-000001
PLR2EW-AWGRP-LRPEWRC-SD-MOD-000002
PLR2EW-JHGRP-LRPEWRC-SD-MOD-100010
PLR2EW-AWGRP-LRPEWRC-SD-MOD-100005
PLR2EW-AWGRP-LRPEWRC-SW-MOD-100101
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PLR2EW-JHGRP-LRPEWRC-PSSR-MOD-210001

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REV	DESCRIPTION	DESIGNER INITIAL/DATE	VERIFIED INITIAL/DATE	APPROVED INITIAL/DATE
C	ISSUED FOR DDR	[redacted] 19.08.25	[redacted] 19.08.25	[redacted] 19.08.25
B	ISSUED FOR PDR	[redacted] 05.05.25	[redacted] 05.05.25	[redacted] 05.05.25
A	ISSUED FOR SDR	[redacted] 04.12.24	[redacted] 04.12.24	[redacted] 04.12.24

COORDINATE SYSTEM: GDA1994MGA56

HEIGHT DATUM: AHD

SCALE: 1:250

0 2.5 5 7.5 10 12.5m

SCALE 1:250 AT ORIGINAL SIZE

DESIGN LOT CODE:

CLIENT: NSW GOVERNMENT | Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY PROJECT OFFICE
NETWORK COMPLEX CODE: LRP

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JOHN HOLLAND GROUP
CIVIL

DRAWN	[redacted]	19.08.25
DESIGNED	[redacted]	19.08.25
DRG CHECK	[redacted]	19.08.25
DESIGN CHECK	[redacted]	19.08.25
PROJ/DES MNGR	[redacted]	19.08.25
APPROVED	[redacted]	19.08.25

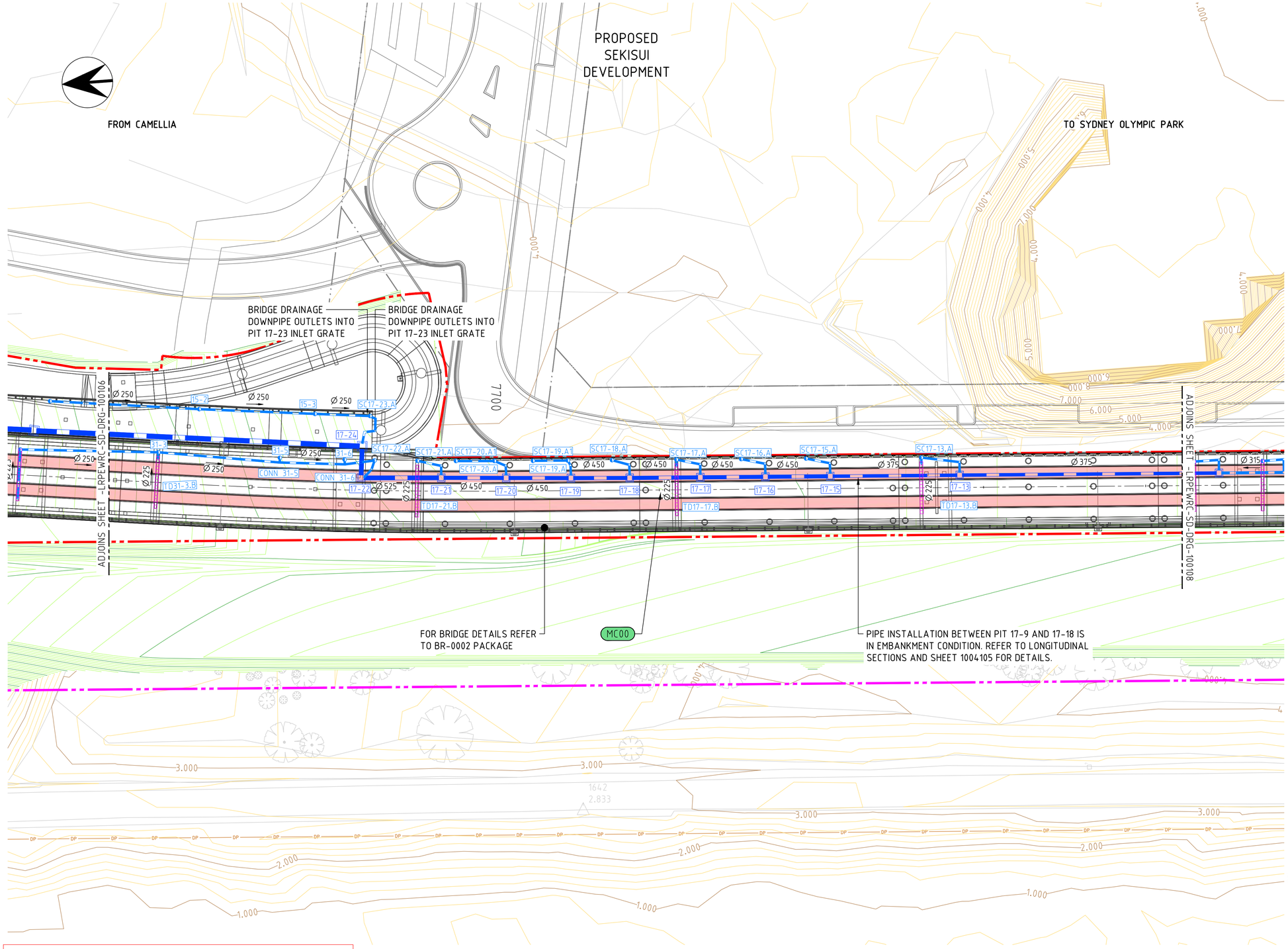
ENABLING WORKS RAIL CORRIDOR

CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY

STORMWATER DRAINAGE
PLAN SHEET 6

DRAWING SET No: -	PART: -	SHEET: 6 OF 14	A1
STATUS: DETAILED DESIGN REVIEW [DDR]	BRIDGE No:		©

DRG No.	REV	VER	EDMS No.	AMD No.
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100106	C			



LEGEND

- 19000 – CHAINAGES
- MCD1 – DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

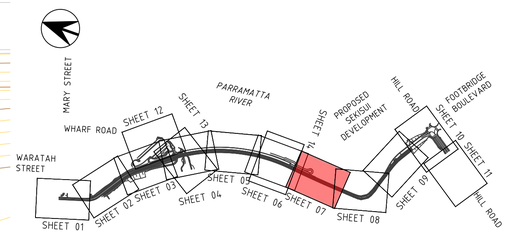
- PROPOSED TRACK ALIGNMENT
- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

DRAINAGE LEGEND

- PROPOSED BRIDGE DRAINAGE
- PROPOSED IN GROUND DRAINAGE
- PROPOSED BRIDGE DRAINAGE PIT TAG
- PROPOSED IN GROUND DRAINAGE PIT TAG
- ACO TRAMDRAIN
- ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIT
- BIORETENTION ZONE
- DESIGN MAJOR CONTOUR 1M INTERVALS
- DESIGN MINOR CONTOUR
- EXISTING MAJOR CONTOUR 1M INTERVALS
- EXISTING MINOR CONTOUR
- DRAINAGE LINE TO BE REMOVED
- BRIDGE DRAINAGE SCUPPERS
- SUBSOIL DRAINAGE FLUSHING POINT
- DRAINAGE SUBSOIL
- PROPOSED SCOUR PROTECTION
- PROPOSED TYPE 3 SCUPPER

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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FOR STAGE APPROVAL

REFERENCES:

PLR2EW-JHGRP-LRPEWRC-DN-MDS-000001
PLR2EW-JHGRP-LRPEWRC-DN-MDS-000002
PLR2EW-JHGRP-LRPEWRC-DN-MDS-100010
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PLR2EW-JHGRP-LRPEWRC-TR-MDS-100101
PLR2EW-JHGRP-LRPEWRC-TR-MDS-100102
PLR2EW-JHGRP-LRPEWRC-PV-MDS-100102
PLR2EW-JHGRP-LRPEWRC-SD-MDS-100101
PLR2EW-JHGRP-LRPEWRC-SD-MDS-100111
PLR2EW-JHGRP-LRPEWRC-DN-MDS-100111
PLR2EW-JHGRP-LRPEWRC-SD-MDS-100100
PLR2EW-JHGRP-LRPEWRC-RW-MDS-100101
PLR2EW-JHGRP-LRPEWRC-SD-MDS-100151
PLR2EW-JHGRP-LRPEWRC-RW-MDS-100151
PLR2EW-JHGRP-LRPEWRC-PV-MDS-100121
PLR2EW-JHGRP-LRPEWRC-SD-MDS-100121
PLR2EW-JHGRP-LRPEWRC-RW-MDS-100121
PLR2EW-JHGRP-LRPEWRC-TR-MDS-100101
PLR2EW-JHGRP-LRPEWRC-SD-MDS-100103
PLR2EW-JHGRP-LRPEWRC-SD-MDS-100105
PLR2EW-JHGRP-LRPEWRC-RW-MDS-100101
PLR2EW-JHGRP-LRPEWRC-SD-MDS-100110
PLR2EW-JHGRP-LRPEWRCEWB-BR-MDS-100101

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REV	DESCRIPTION	DESIGNER INITIAL/DATE	VERIFIED INITIAL/DATE	APPROVED INITIAL/DATE
C	ISSUED FOR DDR	19.08.25	19.08.25	19.08.25
B	ISSUED FOR PDR	05.05.25	05.05.25	05.05.25
A	ISSUED FOR SDR	04.12.24	04.12.24	04.12.24

COORDINATE SYSTEM: GDA1994MGA56 | HEIGHT DATUM: AHD | DESIGN LOT CODE:

SCALE: 1:250

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

CLIENT:
NSW GOVERNMENT Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY PROJECT OFFICE
NETWORK COMPLEX CODE: LRP

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JOHN HOLLAND GHD

JOHN HOLLAND GROUP
CIVIL

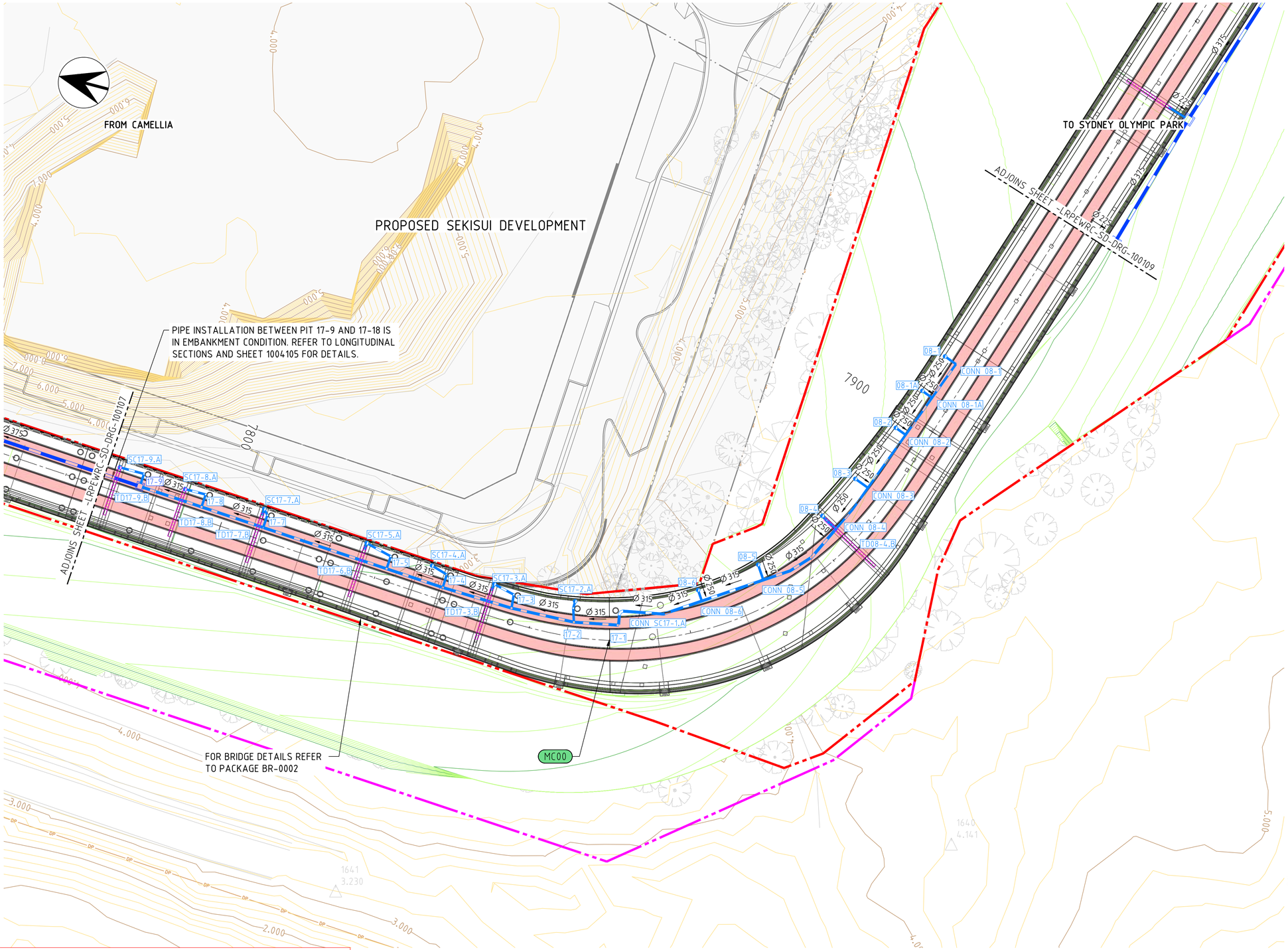
DRAWN	[redacted]	19.08.25
DESIGNED	[redacted]	19.08.25
DRG CHECK	[redacted]	19.08.25
DESIGN CHECK	[redacted]	19.08.25
PROJ/DES MNGR	[redacted]	19.08.25
APPROVED	[redacted]	19.08.25

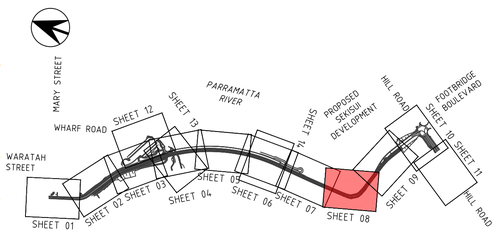
ENABLING WORKS RAIL CORRIDOR
CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY
STORMWATER DRAINAGE
PLAN SHEET 7

DRAWING SET No: -	PART: -	SHEET: 7 OF 14	A1
STATUS: DETAILED DESIGN REVIEW [DDR]	BRIDGE No:		©

DRG No.	REV	VER	EDMS No.	AMD No.
PLR2EW-JHGRP-LRPEWRC-SD-DRG-100107	C			

FILE NAME: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100107.dwg
PLOT DATE & TIME: 19/08/2025 10:28:00 AM





LEGEND

- 19000 – CHAINAGES
- MCD1 – DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

- PROPOSED TRACK ALIGNMENT
- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

DRAINAGE LEGEND

- Ø 375 / Ø 375 – PROPOSED BRIDGE DRAINAGE
- PROPOSED IN GROUND DRAINAGE
- H-1 – PROPOSED BRIDGE DRAINAGE PIT TAG
- H-1 – PROPOSED IN GROUND DRAINAGE PIT TAG
- ACO TRAMDRAIN
- ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIT
- BIORETENTION ZONE
- 8.0 – DESIGN MAJOR CONTOUR 1M INTERVALS
- DESIGN MINOR CONTOUR
- 8.0 – EXISTING MAJOR CONTOUR 1M INTERVALS
- EXISTING MINOR CONTOUR
- DRAINAGE LINE TO BE REMOVED
- BRIDGE DRAINAGE SCUPPERS
- SUBSOIL DRAINAGE FLUSHING POINT
- SS – SS – DRAINAGE SUBSOIL
- PROPOSED SCOUR PROTECTION
- PROPOSED TYPE 3 SCUPPER

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

OFFICIAL

FOR STAGE APPROVAL

REFERENCES:

PLR2EW-JHGRP-LRPEWRC-GN-MDS-000001
PLR2EW-JHGRP-LRPEWRC-GN-MDS-000003
PLR2EW-JHGRP-LRPEWRC-GN-MDS-100010
PLR2EW-JHGRP-LRPEWRC-GN-MDS-100005
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PLR2EW-JHGRP-LRPEWRC-SD-MDS-100101
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PLR2EW-JHGRP-LRPEWRC-RW-MDS-100121
PLR2EW-JHGRP-LRPEWRC-GN-MDS-100111
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PLR2EW-JHGRP-LRPEWRC-RW-MDS-100121
PLR2EW-JHGRP-LRPEWRC-SD-MDS-100101
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PLR2EW-JHGRP-LRPEWREWB-BR-MDS-100101

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REV	DESCRIPTION	DESIGNER INITIAL/DATE	VERIFIED INITIAL/DATE	APPROVED INITIAL/DATE
C	ISSUED FOR DDR	[redacted] 19.08.25	[redacted] 19.08.25	[redacted] 19.08.25
B	ISSUED FOR PDR	[redacted] 05.05.25	[redacted] 05.05.25	[redacted] 05.05.25
A	ISSUED FOR SDR	[redacted] 04.12.24	[redacted] 04.12.24	[redacted] 04.12.24

COORDINATE SYSTEM: GDA1994MGA56

HEIGHT DATUM: AHD

SCALE: 1:250

0 2.5 5 7.5 10 12.5m

SCALE 1:250 AT ORIGINAL SIZE

DESIGN LOT CODE:

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY
PROJECT OFFICE
NETWORK COMPLEX CODE: LRP

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JOHN HOLLAND GHD

JOHN HOLLAND GROUP

CIVIL

DRAWN	[redacted] 19.08.25
DESIGNED	[redacted] 19.08.25
DRG CHECK	[redacted] 19.08.25
DESIGN CHECK	[redacted] 19.08.25
PROJ/DES MNGR	[redacted] 19.08.25
APPROVED	[redacted] 19.08.25

ENABLING WORKS RAIL CORRIDOR

CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY

STORMWATER DRAINAGE

PLAN SHEET 8

DRAWING SET No: -	PART: -	SHEET: 8 OF 14	A1
STATUS: DETAILED DESIGN REVIEW [DDR]	BRIDGE No:		©

DRG No.	REV	VER	EDMS No.	AMD No.
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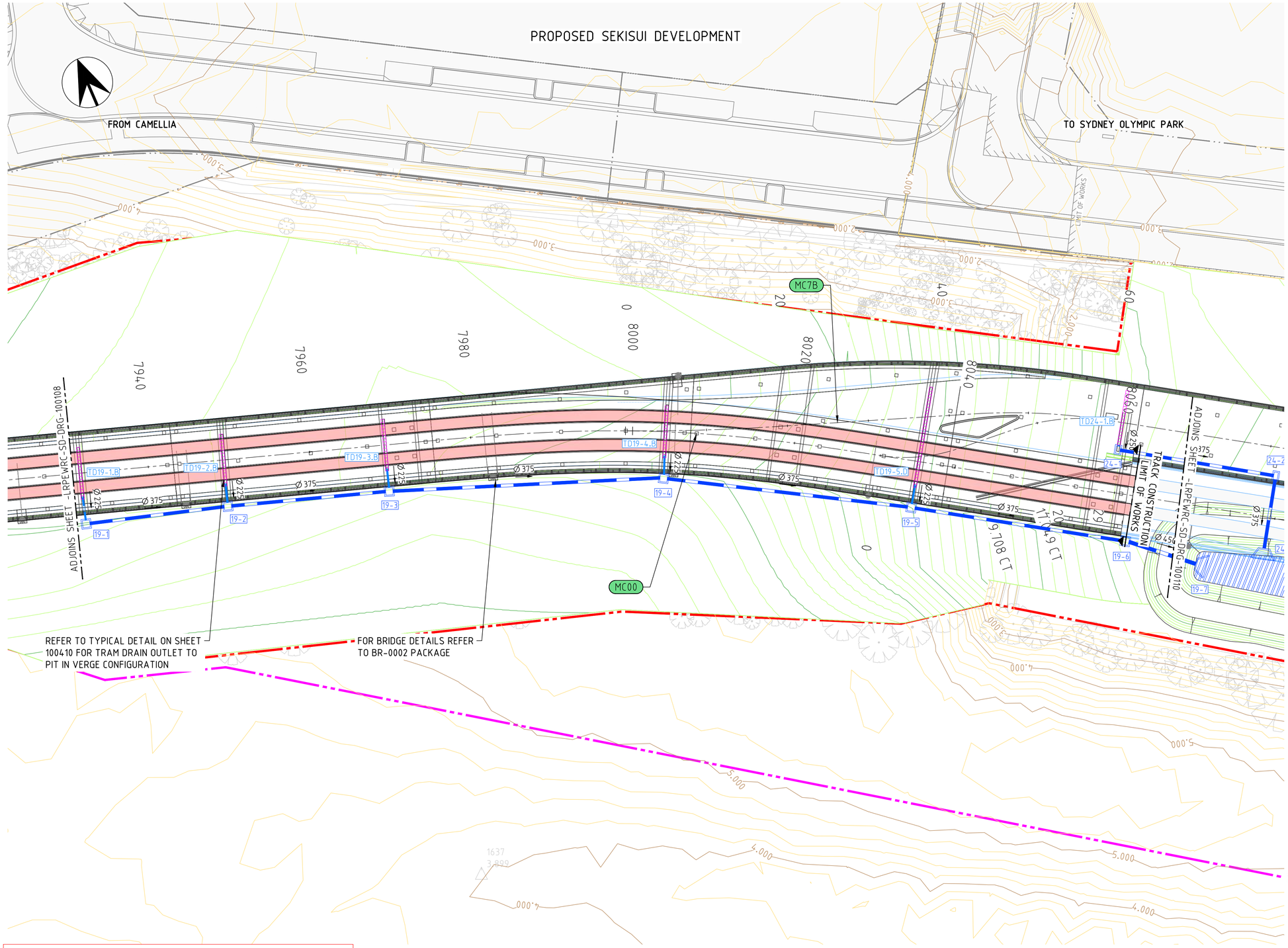
PLOT DATE & TIME: 19/08/2025 10:30:20 AM



LEGEND

- 19000 – CHAINAGES
- MCD1 – DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

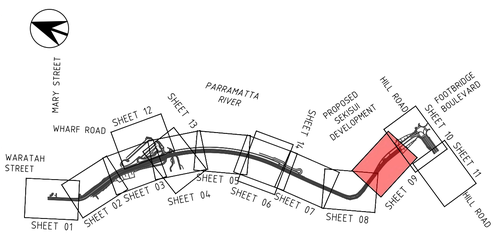
- PROPOSED TRACK ALIGNMENT
- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

DRAINAGE LEGEND

- PROPOSED BRIDGE DRAINAGE
- PROPOSED IN GROUND DRAINAGE
- PROPOSED BRIDGE DRAINAGE PIT TAG
- PROPOSED IN GROUND DRAINAGE PIT TAG
- ACO TRAMDRAIN
- ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIT
- BIORETENTION ZONE
- DESIGN MAJOR CONTOUR 1M INTERVALS
- DESIGN MINOR CONTOUR
- EXISTING MAJOR CONTOUR 1M INTERVALS
- EXISTING MINOR CONTOUR
- DRAINAGE LINE TO BE REMOVED
- BRIDGE DRAINAGE SCUPPERS
- SUBSOIL DRAINAGE FLUSHING POINT
- DRAINAGE SUBSOIL
- PROPOSED SCOUR PROTECTION
- PROPOSED TYPE 3 SCUPPER

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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FOR STAGE APPROVAL

REFERENCES:

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PLR2EW-JHGRP-LRPEWRC-SH-MDD-000010
PLR2EW-JHGRP-LRPEWRC-SH-MDD-100010
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PLR2EW-JHGRP-LRPEWRCEWB-BR-MDD-100101

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REV	DESCRIPTION	DESIGNER INITIAL/DATE	VERIFIED INITIAL/DATE	APPROVED INITIAL/DATE
C	ISSUED FOR DDR	[redacted]19.08.25	[redacted]19.08.25	[redacted]19.08.25
B	ISSUED FOR PDR	[redacted]05.05.25	[redacted]05.05.25	[redacted]05.05.25
A	ISSUED FOR SDR	[redacted]04.12.24	[redacted]04.12.24	[redacted]04.12.24

COORDINATE SYSTEM: GDA1994MGA56 | HEIGHT DATUM: AHD | DESIGN LOT CODE:

SCALE: 1:250

0 2.5 5 7.5 10 12.5m

SCALE 1:250 AT ORIGINAL SIZE

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY
PROJECT OFFICE
NETWORK COMPLEX CODE: LRP

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JOHN HOLLAND GHD

JOHN HOLLAND GROUP

CIVIL

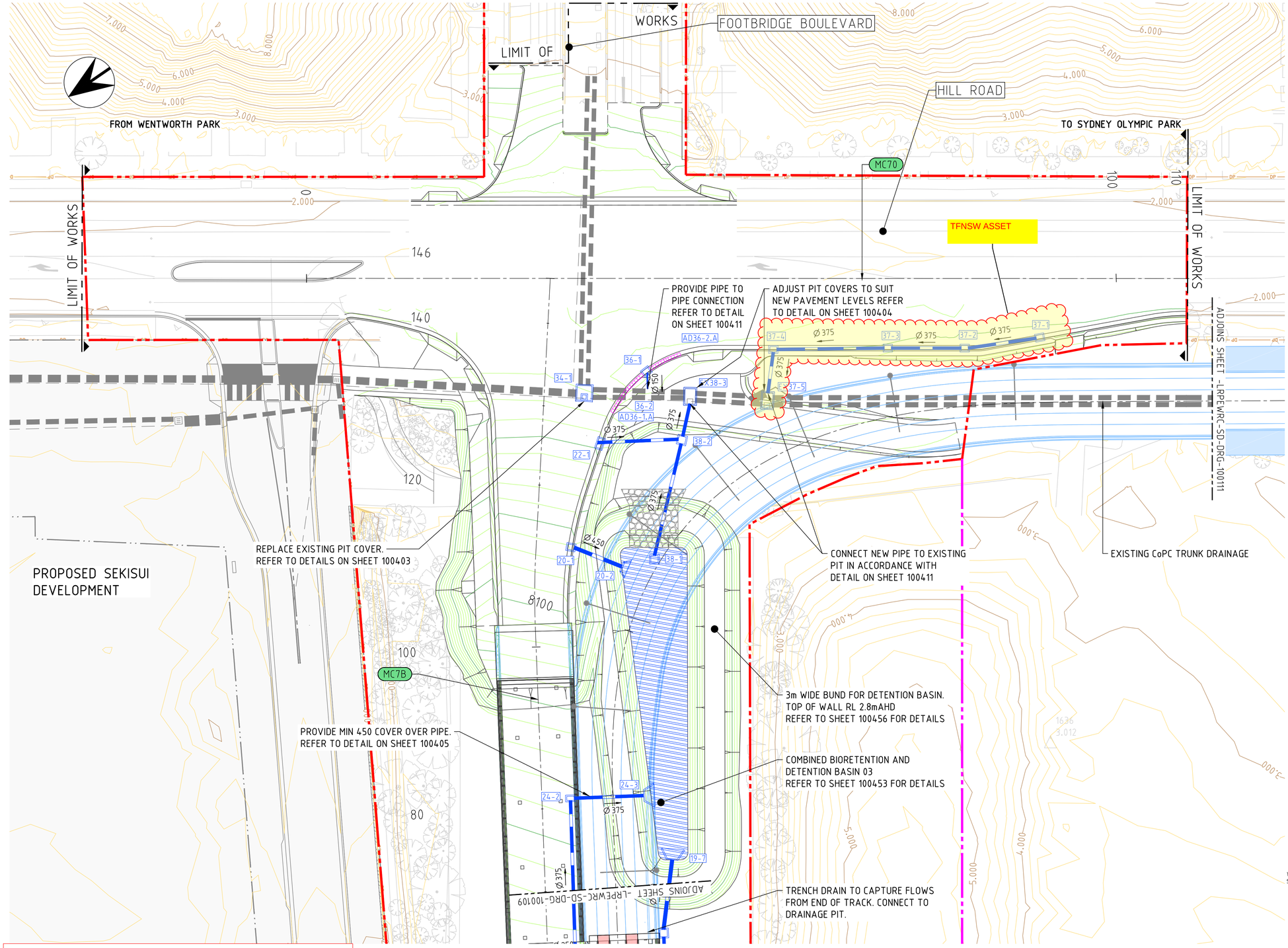
DRAWN	[redacted]19.08.25
DESIGNED	[redacted]19.08.25
DRG CHECK	[redacted]19.08.25
DESIGN CHECK	[redacted]19.08.25
PROJ/DES MNGR	[redacted]19.08.25
APPROVED	[redacted]19.08.25

ENABLING WORKS RAIL CORRIDOR
CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY
STORMWATER DRAINAGE
PLAN SHEET 9

DRAWING SET No: -	PART: -	SHEET: 9	OF 14	A1
STATUS: DETAILED DESIGN REVIEW [DDR]	BRIDGE No:			©
DRG No. PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109	REV C	VER	EDMS No.	AMD No.

FILE NAME: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100109.dwg

PLOT DATE & TIME: - 19/08/2025 10:31:47 AM



LEGEND

- 19000 – CHAINAGES
- MCD1 – DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

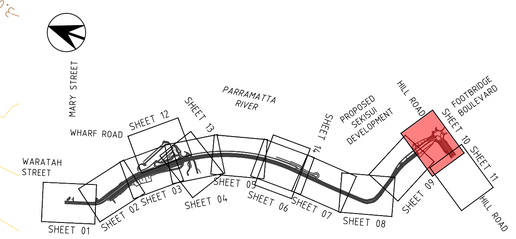
- PROPOSED TRACK ALIGNMENT
- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

DRAINAGE LEGEND

- PROPOSED BRIDGE DRAINAGE
- PROPOSED IN GROUND DRAINAGE
- PROPOSED BRIDGE DRAINAGE PIT TAG
- PROPOSED IN GROUND DRAINAGE PIT TAG
- ACO TRAMDRAIN
- ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIT
- BIORETENTION ZONE
- DESIGN MAJOR CONTOUR 1M INTERVALS
- DESIGN MINOR CONTOUR
- EXISTING MAJOR CONTOUR 1M INTERVALS
- EXISTING MINOR CONTOUR
- DRAINAGE LINE TO BE REMOVED
- BRIDGE DRAINAGE SCUPPERS
- SUBSOIL DRAINAGE FLUSHING POINT
- DRAINAGE SUBSOIL
- PROPOSED SCOUR PROTECTION
- PROPOSED TYPE 3 SCUPPER

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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FOR STAGE APPROVAL

REFERENCES:

PLR2EW-JHGRP-LRPEWRC-GN-MD25-000001
PLR2EW-JHGRP-LRPEWRC-GN-MD25-000003
PLR2EW-JHGRP-LRPEWRC-GN-MD25-100010
PLR2EW-JHGRP-LRPEWRC-GN-MD25-100005
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PLR2EW-JHGRP-LRPEWRC-PV-MD25-100102
PLR2EW-JHGRP-LRPEWRC-SC-MD25-100101
PLR2EW-JHGRP-LRPEWRC-SD-MD25-100101
PLR2EW-JHGRP-LRPEWRC-SD-MD25-100111
PLR2EW-JHGRP-LRPEWRC-RW-MD25-100101
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PLR2EW-JHGRP-LRPEWRC-AS-MD25-100101
PLR2EW-JHGRP-LRPEWRC-RW-MD25-100101

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED.

SCALE: 1:250

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

REV	DESCRIPTION	DESIGNER INITIAL/DATE	VERIFIED INITIAL/DATE	APPROVED INITIAL/DATE
C02.02	ISSUED FOR DDR	[redacted] 08.08.25	[redacted] 08.08.25	[redacted] 08.08.25
B	ISSUED FOR PDR	[redacted] 05.05.25	[redacted] 05.05.25	[redacted] 05.05.25
A	ISSUED FOR SDR	[redacted] 04.12.24	[redacted] 04.12.24	[redacted] 04.12.24

COORDINATE SYSTEM: GDA1994MGA56 | HEIGHT DATUM: AHD | DESIGN LOT CODE:

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY PROJECT OFFICE
NETWORK COMPLEX CODE: LRP

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JOHN HOLLAND GHD

JOHN HOLLAND GROUP
CIVIL

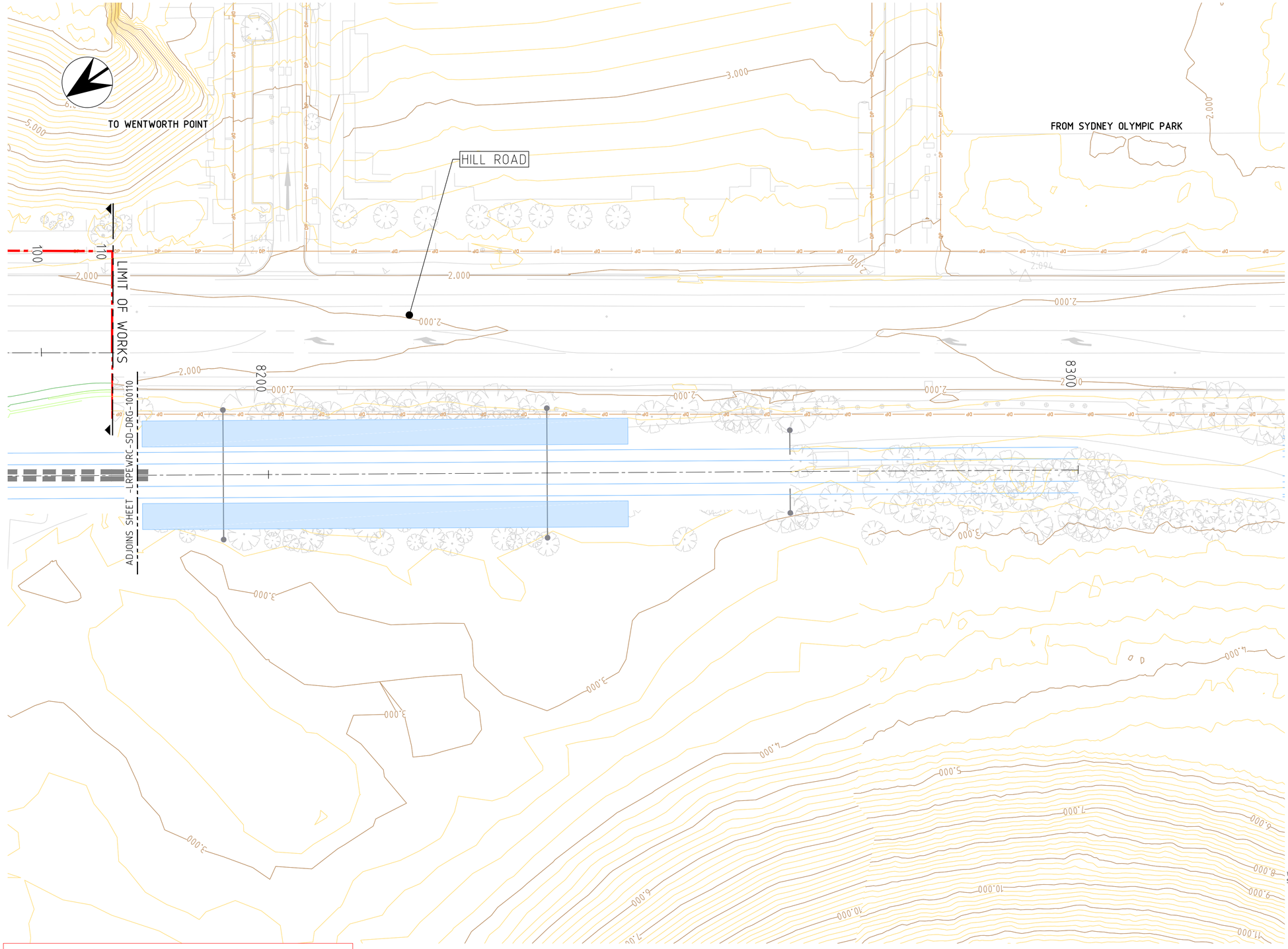
DRAWN	[redacted]	08.08.25
DESIGNED	[redacted]	08.08.25
DRG CHECK	[redacted]	08.08.25
DESIGN CHECK	[redacted]	08.08.25
PROJ/DES MNGR	[redacted]	08.08.25
APPROVED	[redacted]	08.08.25

ENABLING WORKS RAIL CORRIDOR
CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY
STORMWATER DRAINAGE
PLAN SHEET 10

DRAWING SET No: -	PART: -	SHEET: 10 OF 14		A1
STATUS: DETAILED DESIGN REVIEW [DDR]	BRIDGE No:			©
DRG No. PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110	REV C02.02	VER	EDMS No.	AMD No.

FILE NAME: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100110.dwg

PLOT DATE & TIME: 19/08/2025 2:40:24 PM



LEGEND

- 19000 – CHAINAGES
- MCD1 – DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

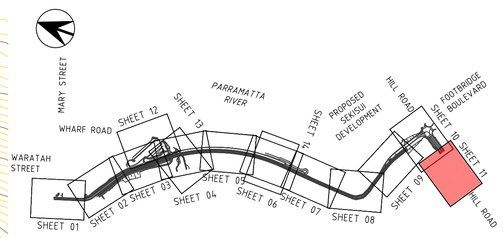
- PROPOSED TRACK ALIGNMENT
- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

DRAINAGE LEGEND

- Ø 375 – PROPOSED BRIDGE DRAINAGE
- Ø 375 – PROPOSED IN GROUND DRAINAGE
- H-1 – PROPOSED BRIDGE DRAINAGE PIT TAG
- H-1 – PROPOSED IN GROUND DRAINAGE PIT TAG
- ACO TRAMDRAIN
- ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIT
- BIORETENTION ZONE
- 8.0 – DESIGN MAJOR CONTOUR 1M INTERVALS
- DESIGN MINOR CONTOUR
- 8.0 – EXISTING MAJOR CONTOUR 1M INTERVALS
- EXISTING MINOR CONTOUR
- DRAINAGE LINE TO BE REMOVED
- BRIDGE DRAINAGE SCUPPERS
- SUBSOIL DRAINAGE FLUSHING POINT
- SS — SS — DRAINAGE SUBSOIL
- PROPOSED SCOUR PROTECTION
- PROPOSED TYPE 3 SCUPPER

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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FILE NAME: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100111.dwg

PLOT DATE & TIME: 19/08/2025 10:35:06 AM

REFERENCES:

PLR2EW-JHGRP-LRPEWRC-GN-MDS-000001
PLR2EW-JHGRP-LRPEWRC-GN-MDS-000003
PLR2EW-JHGRP-LRPEWRC-GN-MDS-100010
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PLR2EW-JHGRP-LRPEWRC-TR-MDS-100102
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PLR2EW-JHGRP-LRPEWRC-RW-MDS-100111
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PLR2EW-JHGRP-LRPEWRC-RW-MDS-100115
PLR2EW-JHGRP-LRPEWRC-SD-MDS-100102
PLR2EW-JHGRP-LRPEWRC-MS-MDS-100101

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C	ISSUED FOR DDR	[redacted] 19.08.25	[redacted] 19.08.25	[redacted] 19.08.25
B	ISSUED FOR PDR	[redacted] 05.05.25	[redacted] 05.05.25	[redacted] 05.05.25
A	ISSUED FOR SDR	[redacted] 04.12.24	[redacted] 04.12.24	[redacted] 04.12.24

COORDINATE SYSTEM: GDA1994MGA56

HEIGHT DATUM: AHD

SCALE: 1:250

0 2.5 5 7.5 10 12.5m

SCALE 1:250 AT ORIGINAL SIZE

DESIGN LOT CODE:

CLIENT:

NSW GOVERNMENT Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY
PROJECT OFFICE
NETWORK COMPLEX CODE: LRP

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JOHN HOLLAND GHD

JOHN HOLLAND GROUP

CIVIL

DRAWN	[redacted]	19.08.25
DESIGNED	[redacted]	19.08.25
DRG CHECK	[redacted]	19.08.25
DESIGN CHECK	[redacted]	19.08.25
PROJ/DES MNGR	[redacted]	19.08.25
APPROVED	[redacted]	19.08.25

ENABLING WORKS RAIL CORRIDOR

CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY

STORMWATER DRAINAGE

PLAN SHEET 11

DRAWING SET No: -	PART: -	SHEET: 11 OF 14		A1
STATUS: DETAILED DESIGN REVIEW [DDR]	BRIDGE No:			©
DRG No. PLR2EW-JHGRP-LRPEWRC-SD-DRG-100111	REV C	VER	EDMS No.	AMD No.

FROM CAMELLIA

TO SYDNEY OLYMPIC PARK

WHARF ROAD

MC30

MD30

CoPC Asset

ADJOINS SHEET -LRPEWRC-SD-DRG-100103

ADJOINS SHEET -LRPEWRC-SD-DRG-100113

BIORETENTION BASIN 2
REFER TO SHEET 100453
FOR DETAILS

CoPC Asset

LEGEND

- 19000 - CHAINAGES
- DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

- PROPOSED TRACK ALIGNMENT
- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

DRAINAGE LEGEND

- PROPOSED BRIDGE DRAINAGE
- PROPOSED IN GROUND DRAINAGE
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- PROPOSED IN GROUND DRAINAGE PIT TAG
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- DRAINAGE LINE TO BE REMOVED
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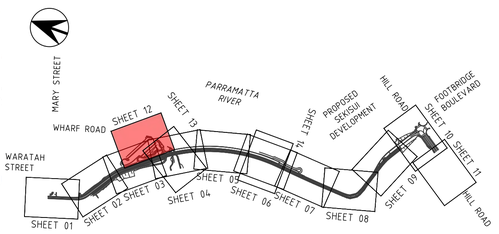
- DRAINAGE SUBSOIL
- PROPOSED SCOUR PROTECTION
- PROPOSED TYPE 3 SCUPPER

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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FOR STAGE APPROVAL

REFERENCES:

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PLR2EW-JHGRP-LRPEWRC-DA-MDS-100010
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PLR2EW-JHGRP-LRPEWRC-SD-MDS-100103
PLR2EW-JHGRP-LRPEWRC-RW-MDS-100152

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A	ISSUED FOR PDR	[redacted] 05.05.25	[redacted] 05.05.25	[redacted] 05.05.25

COORDINATE SYSTEM: GDA1994MGA56

HEIGHT DATUM: AHD

SCALE: 1:250

0 2.5 5 7.5 10 12.5m

SCALE 1:250 AT ORIGINAL SIZE

DESIGN LOT CODE:

CLIENT:

NSW GOVERNMENT Transport for NSW

PREPARED FOR:
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SYDNEY PROJECT DELIVERY
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JOHN HOLLAND GROUP

CIVIL

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DRG CHECK	[redacted]	19.08.25
DESIGN CHECK	[redacted]	19.08.25
PROJ/DES MNGR	[redacted]	19.08.25
APPROVED	[redacted]	19.08.25

ENABLING WORKS RAIL CORRIDOR

CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY

STORMWATER DRAINAGE
PLAN SHEET 12

DRAWING SET No: -	PART: -	SHEET: 12 OF 14		A1
STATUS: DETAILED DESIGN REVIEW [DDR]	BRIDGE No:			©
DRG No. PLR2EW-JHGRP-LRPEWRC-SD-DRG-100112	REV B	VER	EDMS No.	AMD No.

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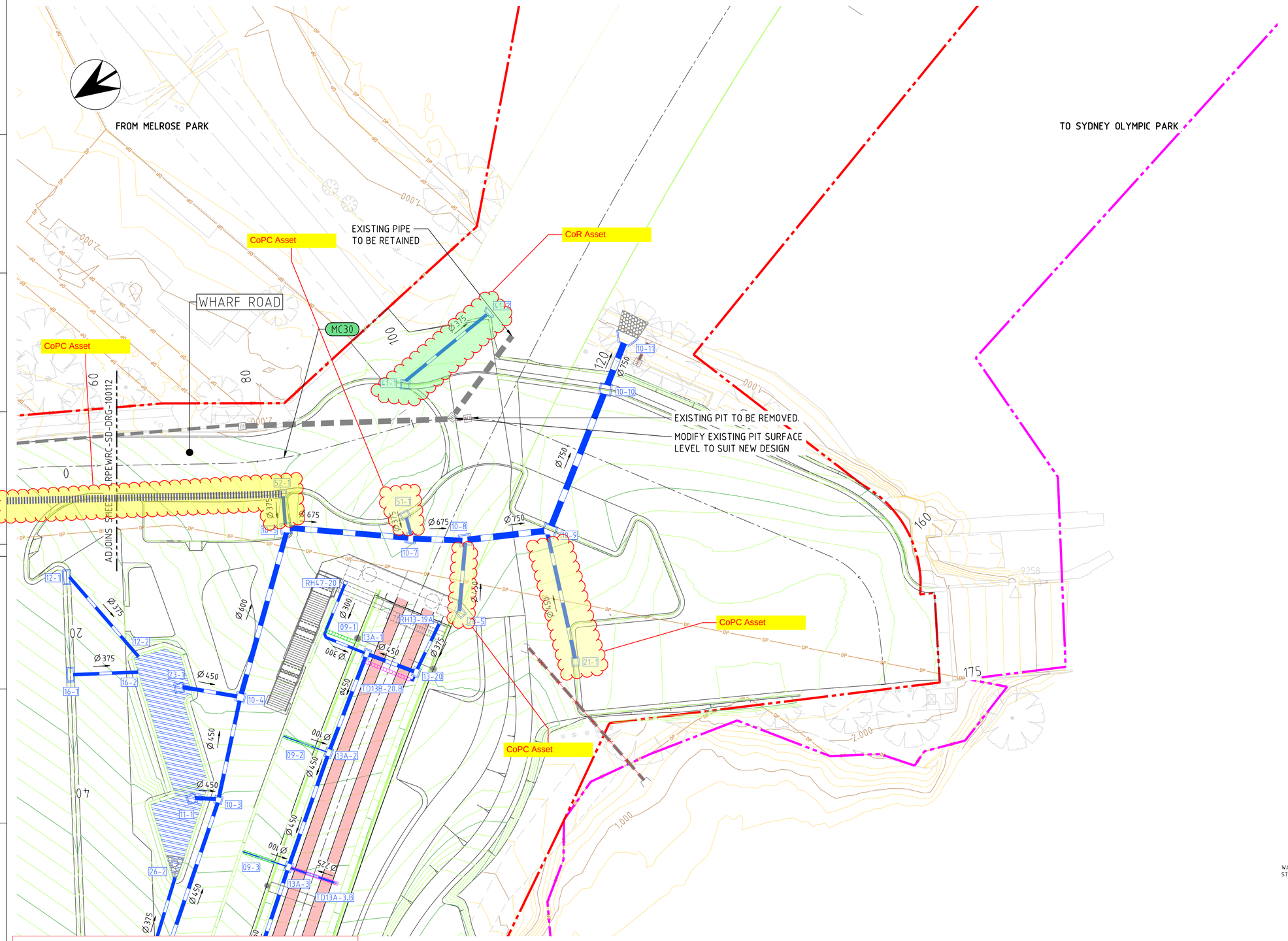

LEGEND

- 19000 – CHAINAGES
- MCD1 – DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
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- FUTURE RAILWAY STOP

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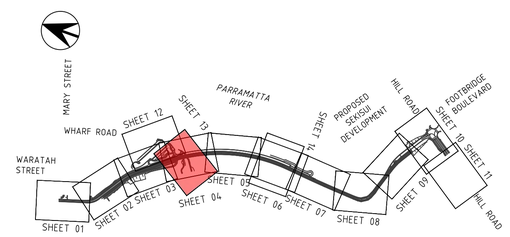

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REFERENCES:

PLR2EW-JHGRP-LRPEWRC-DR-MDD-000001
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PLR2EW-JHGRP-LRPEWSW-BR-MDD-210001

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B	ISSUED FOR DDR	[redacted] 19.08.25	[redacted] 19.08.25	[redacted] 19.08.25
A	ISSUED FOR PDR	[redacted] 05.05.25	[redacted] 05.05.25	[redacted] 05.05.25

COORDINATE SYSTEM: GDA1994MGA56 | HEIGHT DATUM: AHD | DESIGN LOT CODE:

SCALE: 1:250

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY
PROJECT OFFICE
NETWORK COMPLEX CODE: LRP

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JOHN HOLLAND GHD

JOHN HOLLAND GROUP
CIVIL

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DESIGNED	[redacted] 19.08.25
DRG CHECK	[redacted] 19.08.25
DESIGN CHECK	[redacted] 19.08.25
PROJ/DES MNGR	[redacted] 19.08.25
APPROVED	[redacted] 19.08.25

ENABLING WORKS RAIL CORRIDOR
CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY
STORMWATER DRAINAGE
PLAN SHEET 13

DRAWING SET No: -	PART: -	SHEET: 13 OF 14	A1	
STATUS: DETAILED DESIGN REVIEW [DDR]	BRIDGE No:			©
DRG No. PLR2EW-JHGRP-LRPEWRC-SD-DRG-100113	REV B	VER	EDMS No.	AMD No.

FILE NAME: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100113.dwg
PLOT DATE & TIME: 19/08/2025 10:38:40 AM

Appendix F Requirements Compliance

Appendix ID	Description
Appendix F1	Subsystem Requirements Specification - Requirements Verification Traceability Matrix (SSRS-RVTM)
Appendix F2	Environmental Compliance – Relevant CoAs, UMMs, SPR Appendix G
Appendix F3	SPR Appendix J Requirements
Appendix F4	Design Safety Verification Review

F-1 Subsystem Requirements Specification - Requirements Verification Traceability Matrix (SSRS-RVTM)

Requirement Identifier	Context	Description	Requirement ID	Client Id	Requirement Source	Requirement Status	Object type	Requirement type	Requirement level	Requirement Comments	Work Package Allocation	Requirement category	Requirement delivery phase	Criticality	Owner	Derives To child/Derives From Parent	Satisfies PSHL	V&V Identifier	Design Verification Method	Proposed Production Verification Method	Proposed Production Verification Test Type	Proposed Validation Method	Proposed Validation Test Type	Design Verification Evidence	Design Compliance Status	Production Verification Evidence	Production Compliance Status	Validation Evidence	Validation Compliance Status	Remarks / comments
3687258	6 STORMWATER DRAINAGE Table R204.1 – Stormwater Drainage Components 1:Component 2:Standard 3:Requirement	1: Component: Pipes to kerb outlet under footway. 2: Standard: AS 1163 3: Requirement: Minimum grade C250, minimum thickness 5 mm, galvanised inside and out to AS/NZS 4680 or AS/NZS 4792.	PLR-S2-EW-3687258		111223: MR Annexure 12 - Property Adjustments	Design Verified	Requirement	Technical	Subsystem requirement	No direct to kerb outlets currently in scope.	121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938418	Review	Certification	Not Applicable	Not Applicable	Not Applicable	No direct to kerb outlets currently in scope.	Not Applicable		Not Applicable		Not Applicable	
3687259	6 STORMWATER DRAINAGE Table R204.1 – Stormwater Drainage Components 1:Component 2:Standard 3:Requirement	1: Component: Covers and grates 2: Standard: AS 3996 3: Requirement: (i) Class B at areas other than driveways or parking areas in residential premises, and (ii) Class C at driveways and car parking areas in residential premises unless specified otherwise. Classes for commercial premises as specified.	PLR-S2-EW-3687259		111223: MR Annexure 12 - Property Adjustments	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938419	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151 to 100156	Compliant		Pending		Not Applicable	
2980913	1. Design Vehicles 1.2. Enabling Works (c) The Contractor must adopt the Light Rail Vehicle Characteristics and data provided in the following table. Table 2: Light Rail Vehicle characteristics and design criteria 1:Ref 2:LRV Characteristic 3:Design Criteria	1:6 2:Maximum depth of standing water through which LRV can operate with no speed restriction 3:50 mm	PLR-S2-EW-2980913		111116: SPR Appendix E - Design Vehicles	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938420	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Appendix J	Compliant		Pending		Not Applicable	
2981723	3 Scope 3.2 Enabling Works Summary (a) In summary, key features of PLR Stage 2 Enabling Works include, without limitation: [940092]	(xxv) Drainage works; [940149]	PLR-S2-EW-2981723	940149	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938426	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101 to 100114	Compliant		Pending		Not Applicable	
2988634	3 Scope 3.3 Works by Discipline 3.3.7 Earthworks and Geotechnical Investigations (a) The Enabling Works includes design, supply and construction of: (i) earthworks, including: [940376]	D. permanent water storage structures, as agreed with the Principal; and [940380]	PLR-S2-EW-2988634	940380	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement	There are no permanent water storage structures within the project.	121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938427	Review	Certification	Not Applicable	Not Applicable	Not Applicable	There are no permanent water storage structures within the project.	Not Applicable		Not Applicable		Not Applicable	
2981961	3 Scope 3.3 Works by Discipline 3.3.8 Drainage Works (b) the Enabling Works for drainage includes design, supply and construction of:	(ii) drainage of the rail flangeway; [940400]	PLR-S2-EW-2981961	940400	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938429	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.4	Compliant		Pending		Not Applicable	
2981962	3 Scope 3.3 Works by Discipline 3.3.8 Drainage Works (b) the Enabling Works for drainage includes design, supply and construction of:	(iii) drainage of roadworks and ATL; [940401]	PLR-S2-EW-2981962	940401	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938430	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101 to 100114 PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Appendix J	Compliant		Pending		Not Applicable	
2981966	3 Scope 3.3 Works by Discipline 3.3.8 Drainage Works (b) the Enabling Works for drainage includes design, supply and construction of:	(vii) water quality treatment and integration of WSUD elements per the Planning Approval and relevant Authority Approvals; [940405]	PLR-S2-EW-2981966	940405	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938433	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.3.3, 4.3.4.2 and 8	Compliant		Pending		Not Applicable	
2981968	3 Scope 3.3 Works by Discipline 3.3.8 Drainage Works (b) the Enabling Works for drainage includes design, supply and construction of:	(ix) drainage of bridges including deck drainage underside of the bridge structure; and	PLR-S2-EW-2981968	940407	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938435	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101 to 100114 PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.2 and 4.3.2.3.	Compliant		Pending		Not Applicable	
2981971	3 Scope 3.3 Works by Discipline 3.3.8 Drainage Works (c) The Contractor's Activities includes: [940409]	(i) identifying all existing drainage services which may conflict with the Project or Temporary Works; [940410]	PLR-S2-EW-2981971	940410	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938436	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101 to 100114	Compliant		Pending		Not Applicable	
2981972	3 Scope 3.3 Works by Discipline 3.3.8 Drainage Works (c) The Contractor's Activities includes: [940409]	(ii) identifying and consulting with all drainage asset owners that may be impacted by the Project; [940411]	PLR-S2-EW-2981972	940411	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938437	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 5.1 and 6.1.	Compliant		Pending		Not Applicable	
2981973	3 Scope 3.3 Works by Discipline 3.3.8 Drainage Works (c) The Contractor's Activities includes: [940409]	(iii) the protection, relocation or adjustment of all existing drainage services which may conflict with the Project or Temporary Works or in accordance with the relevant Third Party Agreement; and [940412]	PLR-S2-EW-2981973	940412	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938438	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101 to 100114	Compliant		Pending		Not Applicable	
2981974	3 Scope 3.3 Works by Discipline 3.3.8 Drainage Works (c) The Contractor's Activities includes: [940409]	(iv) augmenting the existing drainage as required to meet the flood immunity and flood impact performance requirements of section 7.3 and the Planning Approval. [940413]	PLR-S2-EW-2981974	940413	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938439	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.1	Compliant		Pending		Not Applicable	
2982100	4 General Requirements 4.5 Standard and available components and materials	(a) The Contractor must use components and materials that minimise whole of life costs. Where possible these components and materials must be readily available in the Australian market to enable efficient procurement of replacement parts. [940541]	PLR-S2-EW-2982100	940541	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Availability	01 Design, 02 Production	Essential	(GHD)			3938442	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100015. PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 7.2.	Compliant		Pending		Not Applicable	
2982265	7 Technical Requirements 7.3 Flooding 7.3.2 Flood Immunity	(a) The drainage system, comprising both road and track drainage and without reliance on future upgrades of the drainage system by the drainage Authority, must limit standing water to 50 mm depth above finished rail level in a 5% AEP event plus climate change up to 2100. [940706]	PLR-S2-EW-2982265	940706	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement	Requirement Change as per "Updated Variation Order 1 (VO-01) – Changes to Flood Model & Annual Rainfall Intensity - clause 6.2(a)(ii)" with Notice no.: PLR2EW-JHGRP-TFNSW-NOT-000065 & PLR2EW-TFNSW-JHGRP-NOT-000053.	121111: SD-0001 Stormwater Drainage and Water Quality Design	Safety	01 Design, 02 Production	Essential	(GHD)		C276	3938443	Review	Inspection	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Appendix J	Compliant		Pending		Not Applicable	
2982270	7 Technical Requirements 7.3 Flooding 7.3.3 Climate Change	(a) The Contractor must meet the obligations of the climate change and adaptation section of Appendix H Sustainability in relation to flooding. [940711]	PLR-S2-EW-2982270	940711	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Sustainability	01 Design, 02 Production	Essential	(GHD)			3938444	Review	Certification	Not Applicable	Not Applicable	Not Applicable	DS Tailwater on Drainage performance:PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.4.1.2 DS Tailwater on Water Quality Devices performance:PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.4.2.1. General Apllication of IFD:PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.2.3.	Compliant		Pending		Not Applicable	
2982273	7 Technical Requirements 7.4 Drainage 7.4.1 General	(a) The Contractor must design and construct all drainage in accordance with the relevant standards to support the delivery of the Contractor's Activities. [940714]	PLR-S2-EW-2982273	940714	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938445	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 7.2.	Compliant		Pending		Not Applicable	
2982274	7 Technical Requirements 7.4 Drainage 7.4.1 General	(b) The Contractor must provide a stormwater drainage system including both TfNSW drainage assets and assets returned to any relevant drainage Authority. [940715]	PLR-S2-EW-2982274	940715	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938446	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101 to 100114	Compliant		Pending		Not Applicable	
2982276	7 Technical Requirements 7.4 Drainage 7.4.1 General (c) The drainage system must: [940716]	(i) comply with the Australian Rainfall and Runoff national guideline 2019 with the hydrology upscaled to match FFA peak flows as per CoPC requirements; [940717]	PLR-S2-EW-2982276	940717	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938447	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.2.3.	Compliant		Pending		Not Applicable	
2982277	7 Technical Requirements 7.4 Drainage 7.4.1 General (c) The drainage system must: [940716]	(ii) comply with the guidelines and standards of relevant Authorities; [940718]	PLR-S2-EW-2982277	940718	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938448	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Table 3-1.	Compliant		Pending		Not Applicable	

Requirement Identifier	Context	Description	Requirement ID	Client Id	Requirement Source	Requirement Status	Object type	Requirement type	Requirement level	Requirement Comments	Work Package Allocation	Requirement category	Requirement delivery phase	Criticality	Owner	Derives To child/Derives From Parent	Satisfies PSHL	V&V Identifier	Design Verification Method	Proposed Production Verification Method	Proposed Production Verification Test Type	Proposed Validation Method	Proposed Validation Test Type	Design Verification Evidence	Design Compliance Status	Production Verification Evidence	Production Compliance Status	Validation Evidence	Validation Compliance Status	Remarks / comments
2982278	7 Technical Requirements 7.4 Drainage 7.4.1 General (c) The drainage system must: [940716]	(iii) be resilient to the effects of climate change as a result of rainfall intensity increase, sea level rise and storm surge up to year 2100 as prescribed in this section and this SPR; [940719]	PLR-S2-EW-2982278	940719	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement	Requirement Change as per "Updated Variation Order 1 (VO-01) – Changes to Flood Model & Annual Rainfall Intensity - clause 6.2(a)(ii)" with Notice no.: PLR2EW-JHGRP-TFNSW-NOT-000065 & PLR2EW-TFNSW-JHGRP-NOT-000053.	121111: SD-0001 Stormwater Drainage and Water Quality Design	Safety	01 Design, 02 Production	Essential	(GHD)		C276	3938449	Review	Inspection	Not Applicable	Not Applicable	Not Applicable	DS Tailwater on Drainage performance:PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.4.1.2 DS Tailwater on Water Quality Devices performance:PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.4.2.1. General Apllication of IFD:PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.2.3.	Compliant		Pending		Not Applicable	
2982280	7 Technical Requirements 7.4 Drainage 7.4.1 General (c) The drainage system must: [940716] (iv) accommodate minimum blockage for all events as follows: [940720]	A. for sag pits, including kerb inlet, grated and combination pits, a blockage of 50%; and [940721]	PLR-S2-EW-2982280	940721	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938450	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.3.1.3.	Compliant		Pending		Not Applicable	
2982281	7 Technical Requirements 7.4 Drainage 7.4.1 General (c) The drainage system must: [940716] (iv) accommodate minimum blockage for all events as follows: [940720]	B. for continuous grade (on-grade) pits, accommodate blockage in accordance with Part 5A of AGRD. [940722]	PLR-S2-EW-2982281	940722	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938451	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.3.1.3.	Compliant		Pending		Not Applicable	
2982283	7 Technical Requirements 7.4 Drainage 7.4.1 General (d) The Contractor must model: [940723]	(i) the drainage system using the storm duration that produces the largest peak discharge specific to that location for the given AEP; [940724]	PLR-S2-EW-2982283	940724	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938452	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Appendix J	Compliant		Pending		Not Applicable	
2982284	7 Technical Requirements 7.4 Drainage 7.4.1 General (d) The Contractor must model: [940723]	(ii) the entry capacity of each pit, pit losses of the drainage system and the upstream and downstream Authority drainage system; [940725]	PLR-S2-EW-2982284	940725	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938453	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.3.1.1.	Compliant		Pending		Not Applicable	
2982285	7 Technical Requirements 7.4 Drainage 7.4.1 General (d) The Contractor must model: [940723]	(iii) by-pass flow from each pit to the next pit in the drainage system; [940726]	PLR-S2-EW-2982285	940726	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938454	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.3.1.1.	Compliant		Pending		Not Applicable	
2982286	7 Technical Requirements 7.4 Drainage 7.4.1 General (d) The Contractor must model: [940723]	(iv) determine widths of flow and any depression pondage of the drainage system that might impact on trafficable widths or pavement; [940727]	PLR-S2-EW-2982286	940727	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938455	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.3.1.1.	Compliant		Pending		Not Applicable	
2982287	7 Technical Requirements 7.4 Drainage 7.4.1 General (d) The Contractor must model: [940723]	(v) drainage system overland flow times; and [940728]	PLR-S2-EW-2982287	940728	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938456	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.3.1.1.	Compliant		Pending		Not Applicable	
2982288	7 Technical Requirements 7.4 Drainage 7.4.1 General (d) The Contractor must model: [940723]	(vi) infiltration rates for the drainage system. [940729]	PLR-S2-EW-2982288	940729	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938457	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.3.1.2.	Compliant		Pending		Not Applicable	
2982289	7 Technical Requirements 7.4 Drainage 7.4.1 General	(e) The Contractor must incorporate routed reach hydrographs within the drainage model(s) for the drainage system. [940730]	PLR-S2-EW-2982289	940730	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938458	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.3.1.1.	Compliant		Pending		Not Applicable	
2982290	7 Technical Requirements 7.4 Drainage 7.4.1 General	(f) The drainage system must incorporate any existing inflows into the Site. [940731]	PLR-S2-EW-2982290	940731	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938459	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.1.2.	Compliant		Pending		Not Applicable	
2982291	7 Technical Requirements 7.4 Drainage 7.4.1 General	(g) The overland flow paths of the drainage system must convey major flows up to the 1% AEP design storm event in accordance with the NSW Floodplain Development Manual, unless otherwise agreed with the drainage Authority and in accordance with the Australian Rainfall and Runoff guidelines. [940732]	PLR-S2-EW-2982291	940732	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938460	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.1.2 and 4.3.2.2.2.	Compliant		Pending		Not Applicable	
2982292	7 Technical Requirements 7.4 Drainage 7.4.1 General	(h) The drainage system must prevent concentration of overland flows to adjacent development, or the road network. [940733]	PLR-S2-EW-2982292	940733	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938461	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.1.2 and 4.3.2.2.2.	Compliant		Pending		Not Applicable	
2982293	7 Technical Requirements 7.4 Drainage 7.4.1 General	(i) Where existing overland flow capacity is replaced by augmented underground drainage, the drainage system must incorporate entry pits designed such that no concentration of flows occurs on road pavements. [940734]	PLR-S2-EW-2982293	940734	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938462	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.1.2.	Compliant		Pending		Not Applicable	
2982295	7 Technical Requirements 7.4 Drainage 7.4.1 General	(k) The drainage system must comply with the TfNSW Sustainable Design Guidelines and Planning Approval. [940736]	PLR-S2-EW-2982295	940736	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938464	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 3.1.	Compliant		Pending		Not Applicable	
2982296	7 Technical Requirements 7.4 Drainage 7.4.1 General	(l) All elements of the drainage system requiring periodic maintenance must be located to allow safe access for maintenance. [940737]	PLR-S2-EW-2982296	940737	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938465	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 7.4	Compliant		Pending		Not Applicable	
2982297	7 Technical Requirements 7.4 Drainage 7.4.1 General	(m) Where the drainage system is connected to the drainage Authority's drainage system, the Contractor must obtain approval from the drainage Authority for connection. [940738]	PLR-S2-EW-2982297	940738	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938466	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 10.3.	Compliant		Pending		Not Applicable	
2982299	7 Technical Requirements 7.4 Drainage 7.4.2 Loading	(a) The Contractor must design and construct drainage system to accommodate all loadings in accordance with the relevant standards to support the delivery of the Contractor's Activities. [940740]	PLR-S2-EW-2982299	940740	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938467	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.3.4.	Compliant		Pending		Not Applicable	
2982302	7 Technical Requirements 7.4 Drainage 7.4.3 Drainage structures (a) The drainage system must: [940742]	(i) have a drainage pit at a minimum of every 60 metres on a straight section of each drainage line; and [940743]	PLR-S2-EW-2982302	940743	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938468	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101 to 100114	Compliant		Pending		Not Applicable	
2982303	7 Technical Requirements 7.4 Drainage 7.4.3 Drainage structures (a) The drainage system must: [940742]	(ii) have a drainage pit at all changes of direction of each drainage line. [940744]	PLR-S2-EW-2982303	940744	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938469	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101 to 100114	Compliant		Pending		Not Applicable	
2982305	7 Technical Requirements 7.4 Drainage 7.4.4 Drainage pipes and culverts	(a) All pipes/culverts of the drainage system including oversized detention pipes must be self-cleansing except where flow velocity is constrained due to catchment size. [940746]	PLR-S2-EW-2982305	940746	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938470	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.4.1.	Compliant		Pending		Not Applicable	
2982306	7 Technical Requirements 7.4 Drainage 7.4.4 Drainage pipes and culverts	(b) All pipes/culverts of the drainage system including oversized detention pipes to be part of drainage Authority drainage assets must be designed with a preferred grade of 1% and a minimum grade of 0.5%. [940747]	PLR-S2-EW-2982306	940747	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938471	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201 to 100218.	Compliant		Pending		Not Applicable	
2982310	7 Technical Requirements 7.4 Drainage 7.4.5 Access covers, grates and frames (a) All access covers and grates of the drainage system: [940750]	(i) in paved areas must be set level with the surrounding pavement; [940751]	PLR-S2-EW-2982310	940751	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938473	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151 to 100218.	Compliant		Pending		Not Applicable	
2982311	7 Technical Requirements 7.4 Drainage 7.4.5 Access covers, grates and frames (a) All access covers and grates of the drainage system: [940750]	(ii) which will be crossed by cyclists must be bicycle safe; [940752]	PLR-S2-EW-2982311	940752	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938474	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151 to 100156.	Compliant		Pending		Not Applicable	
2982312	7 Technical Requirements 7.4 Drainage 7.4.5 Access covers, grates and frames (a) All access covers and grates of the drainage system: [940750]	(iii) which will be crossed by pedestrians must be heel safe; [940753]	PLR-S2-EW-2982312	940753	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938475	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151 to 100156.	Compliant		Pending		Not Applicable	
2982313	7 Technical Requirements 7.4 Drainage 7.4.5 Access covers, grates and frames (a) All access covers and grates of the drainage system: [940750]	(iv) must be designed to remain in place in all surcharge conditions up to the 1% AEP; and [940754]	PLR-S2-EW-2982313	940754	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938476	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Appendix J.	Compliant		Pending		Not Applicable	
2982314	7 Technical Requirements 7.4 Drainage 7.4.5 Access covers, grates and frames (a) All access covers and grates of the drainage system: [940750]	(v) access covers, heel safe grates and frames in pedestrian areas must have slip resistance equivalent to that of the adjacent pavement. [940755]	PLR-S2-EW-2982314	940755	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938477	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151 to 100156.	Compliant		Pending		Not Applicable	

Requirement Identifier	Context	Description	Requirement ID	Client Id	Requirement Source	Requirement Status	Object type	Requirement type	Requirement level	Requirement Comments	Work Package Allocation	Requirement category	Requirement delivery phase	Criticality	Owner	Derives To child/Derives From Parent	Satisfies PSHL	V&V Identifier	Design Verification Method	Proposed Production Verification Method	Proposed Production Verification Test Type	Proposed Validation Method	Proposed Validation Test Type	Design Verification Evidence	Design Compliance Status	Production Verification Evidence	Production Compliance Status	Validation Evidence	Validation Compliance Status	Remarks / comments
2982316	7 Technical Requirements 7.4 Drainage 7.4.5 Access covers, grates and frames (b) All solid access covers of the drainage system with a diameter of greater than 300 mm must be: [940756]	(i) infilled to match the surrounding pavement; and [940757]	PLR-S2-EW-2982316	940757	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938478	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151 to 100156	Compliant		Pending		Not Applicable	
2982317	7 Technical Requirements 7.4 Drainage 7.4.5 Access covers, grates and frames (b) All solid access covers of the drainage system with a diameter of greater than 300 mm must be: [940756]	(ii) set square to the paving pattern and surrounding features. [940758]	PLR-S2-EW-2982317	940758	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938479	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151 to 100156	Compliant		Pending		Not Applicable	
2982319	7 Technical Requirements 7.4 Drainage 7.4.5 Access covers, grates and frames (c) All grated trench drains of the drainage system must: [940759]	(i) use straight linear runs; and [940760]	PLR-S2-EW-2982319	940760	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938480	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101 to 100114	Compliant		Pending		Not Applicable	
2982320	7 Technical Requirements 7.4 Drainage 7.4.5 Access covers, grates and frames (c) All grated trench drains of the drainage system must: [940759]	(ii) avoid the use of mitre cutting. [940761]	PLR-S2-EW-2982320	940761	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement	The design has not proposed any cutting of pipes to provide miter bends.	121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938481	Review	Certification	Not Applicable	Not Applicable	Not Applicable	The design has not proposed any cutting of pipes to provide miter bends.	Not Applicable		Not Applicable		Not Applicable	
2982322	7 Technical Requirements 7.4 Drainage 7.4.6 Geotextiles	(a) All geotextiles forming part of the drainage system must comply with the relevant standards to support the delivery of the Contractor's Activities. [940763]	PLR-S2-EW-2982322	940763	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938482	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Table 7-1.	Compliant		Pending		Not Applicable	
2982324	7 Technical Requirements 7.4 Drainage 7.4.7 Scour Protection	(a) The drainage system must include scour protection in all areas susceptible to scouring. [940765]	PLR-S2-EW-2982324	940765	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938483	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.4.2.	Compliant		Pending		Not Applicable	
2982332	7 Technical Requirements 7.4 Drainage 7.4.8 Road and Pavement Drainage (a) The drainage system must: [940772]	(i) meet flood impact performance requirements defined in section 7.3.2; and [940773]	PLR-S2-EW-2982332	940773	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938484	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201 to 100222	Compliant		Pending		Not Applicable	
2982333	7 Technical Requirements 7.4 Drainage 7.4.8 Road and Pavement Drainage (a) The drainage system must: [940772]	(ii) be provided as required to meet the PLR maximum operational surface water depth requirements defined in section 7.3.2. [940774]	PLR-S2-EW-2982333	940774	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938485	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Appendix J.	Compliant		Pending		Not Applicable	
2982334	7 Technical Requirements 7.4 Drainage 7.4.8 Road and Pavement Drainage	(b) New road drainage of the drainage system must meet the requirements of the drainage Authority in accordance with the requirements of the relevant Third Party Agreement. [940775]	PLR-S2-EW-2982334	940775	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938486	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 3.1.	Compliant		Pending		Not Applicable	
2982335	7 Technical Requirements 7.4 Drainage 7.4.8 Road and Pavement Drainage	(c) Where the Contractor's Activities impacts existing drainage infrastructure, the existing infrastructure must be treated in accordance with the requirements of the relevant Third Party Agreement. [940776]	PLR-S2-EW-2982335	940776	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938487	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.1.2.	Compliant		Pending		Not Applicable	
2982336	7 Technical Requirements 7.4 Drainage 7.4.8 Road and Pavement Drainage	(d) The drainage system must be designed for a 5% AEP storm event (minor storm) inclusive of predicted climate change for year 2100, on the assumption that the drainage Authority's drainage system (upstream and downstream) be upgraded by the drainage Authority to meet the 5% AEP inclusive of predicted climate change for year 2100. [940777]	PLR-S2-EW-2982336	940777	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement	Requirement Change as per "Updated Variation Order 1 (VO-01) – Changes to Flood Model & Annual Rainfall Intensity - clause 6.2(a)(ii)" with Notice no.: PLR2EW-JHGRP-TFNSW-NOT-000065 & PLR2EW-TFNSW-JHGRP-NOT-000053.	121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938488	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201 to 100218.	Compliant		Pending		Not Applicable	
2982337	7 Technical Requirements 7.4 Drainage 7.4.8 Road and Pavement Drainage	(e) Where the downstream conduit capacity is less than the 5% AEP including climate change, the tailwater level to be applied to the drainage system for road and pavement for the purpose of minor storm capacity must be 150 mm below the surface. [940778]	PLR-S2-EW-2982337	940778	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938489	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.2.4.	Compliant		Pending		Not Applicable	
2982338	7 Technical Requirements 7.4 Drainage 7.4.8 Road and Pavement Drainage	(f) The drainage system must comply with TfNSW Services Design and Construct Roadworks Specifications, unless approved by the Principal. [940779]	PLR-S2-EW-2982338	940779	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938490	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Table 7-1.	Compliant		Pending		Not Applicable	
2982339	7 Technical Requirements 7.4 Drainage 7.4.8 Road and Pavement Drainage	(g) Where trench grates are proposed to be transverse to the direction of travel of buses / emergency vehicles, removable grate covers are not permitted. [940780]	PLR-S2-EW-2982339	940780	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938491	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.4.	Compliant		Pending		Not Applicable	
2982340	7 Technical Requirements 7.4 Drainage 7.4.8 Road and Pavement Drainage	(h) Where existing CoPC stormwater outfalls are to be replaced within Archer Park, these must be of sufficient alignment, size and depth to cater for the 1% AEP including climate change from the upstream catchment, assuming that no OSD will be provided in future developments. [940781]	PLR-S2-EW-2982340	940781	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938492	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.1.2.	Compliant		Pending		Not Applicable	
2982341	7 Technical Requirements 7.4 Drainage 7.4.8 Road and Pavement Drainage	(i) Where the drainage system replaces an existing drainage system, all existing connections to the system must be reconnected to the drainage system. [940782]	PLR-S2-EW-2982341	940782	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938493	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.1.2.	Compliant		Pending		Not Applicable	
2982342	7 Technical Requirements 7.4 Drainage 7.4.8 Road and Pavement Drainage	(j) Where the Enabling Works requires removal of existing kerbs containing private property downpipe connections through the kerb, these connections must be reinstated to the satisfaction of the asset owner. [940783]	PLR-S2-EW-2982342	940783	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement	No properties in the extent of works fall towards the roads.	121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938494	Review	Certification	Not Applicable	Not Applicable	Not Applicable	No properties in the extent of works fall towards the roads.	Not Applicable		Not Applicable		Not Applicable	
2982347	7 Technical Requirements 7.4 Drainage 7.4.8 Road and Pavement Drainage (m) The drainage system in cuts must have: [940786]	(ii) surface drainage pits at no greater than 60 metre intervals, to agreement of the relevant asset owner and to demonstration that maintenance requirements are acceptable. [940788]	PLR-S2-EW-2982347	940788	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938498	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201 to 100218.	Compliant		Pending		Not Applicable	
2982349	7 Technical Requirements 7.4 Drainage 7.4.8 Road and Pavement Drainage	(o) Road drainage pipes, other than subsoil drains, must be not less than 375 mm in diameter or 450 mm for transverse drainage pipes on TfNSW roads. [940790]	PLR-S2-EW-2982349	940790	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938500	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101 to 100218.	Compliant		Pending		Not Applicable	
2982353	7 Technical Requirements 7.4 Drainage 7.4.9 Track Drainage (b) The drainage system must not become a restriction on performance of the wider drainage Authority drainage system if a future upgrade (for example, CoPC) is undertaken and must: [940793]	(i) incorporate free drainage of all surfaces, trackwork, rail grooves and ancillary equipment; [940794]	PLR-S2-EW-2982353	940794	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Safety	01 Design, 02 Production	Essential	(GHD)		C273	3938501	Review	Inspection	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101 to 100218.	Compliant		Pending		Not Applicable	
2982354	7 Technical Requirements 7.4 Drainage 7.4.9 Track Drainage (b) The drainage system must not become a restriction on performance of the wider drainage Authority drainage system if a future upgrade (for example, CoPC) is undertaken and must: [940793]	(ii) be provided as required to meet flood impact performance requirements defined in this SPR document; [940795]	PLR-S2-EW-2982354	940795	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938502	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.2.3.	Compliant		Pending		Not Applicable	
2982355	7 Technical Requirements 7.4 Drainage 7.4.9 Track Drainage (b) The drainage system must not become a restriction on performance of the wider drainage Authority drainage system if a future upgrade (for example, CoPC) is undertaken and must: [940793]	(iii) be provided in accordance with the requirements of the relevant road Authority where located within a road; [940796]	PLR-S2-EW-2982355	940796	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Safety	01 Design, 02 Production	Essential	(GHD)		C272	3938503	Review	Inspection	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.2.3.	Compliant		Pending		Not Applicable	
2982356	7 Technical Requirements 7.4 Drainage 7.4.9 Track Drainage (b) The drainage system must not become a restriction on performance of the wider drainage Authority drainage system if a future upgrade (for example, CoPC) is undertaken and must: [940793]	(iv) ensure provision of drainage catchpits at every track drainage run end, to allow trapping of LRV sand, ensure effective interface management, and improve cleaning efficiency; and [940797]	PLR-S2-EW-2982356	940797	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Interface	01 Design, 02 Production	Essential	(GHD)			3938504	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.3.3.2. PLR2EW-JHGRP-LRPEWRC-SD-DRG-100015.	Compliant		Pending		Not Applicable	
2982357	7 Technical Requirements 7.4 Drainage 7.4.9 Track Drainage (b) The drainage system must not become a restriction on performance of the wider drainage Authority drainage system if a future upgrade (for example, CoPC) is undertaken and must: [940793]	(v) be designed for the flood immunity requirements detailed within section 7.3.2. Flood Immunity. [940798]	PLR-S2-EW-2982357	940798	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938505	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201 to 100222	Compliant		Pending		Not Applicable	
2982358	7 Technical Requirements 7.4 Drainage 7.4.9 Track Drainage	(c) Where the downstream conduit capacity is less than the 5% AEP plus climate change, the tailwater level to be applied to the drainage system for track for the purpose of minor storm capacity must be 150 mm below the surface. [940799]	PLR-S2-EW-2982358	940799	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938506	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.2.4.	Compliant		Pending		Not Applicable	
2982359	7 Technical Requirements 7.4 Drainage 7.4.9 Track Drainage	(d) The drainage system must incorporate transverse drainage at no greater than 50m intervals within embedded track unless the Contractor can demonstrate to the Principal that operational surface water depth requirements can be achieved with an alternate approach. [940780]	PLR-S2-EW-2982359	940780	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938507	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Appendix D-1. Refer also to PLR2EW-JHGRP-RFI-000010.	Compliant		Pending		Not Applicable	

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2982361	7 Technical Requirements 7.4 Drainage 7.4.9 Track Drainage (e) The drainage system must incorporate transverse drainage: [940801]	(i) upstream of the Waratah Street stop; [940802]	PLR-S2-EW-2982361	940802	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938508	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102.	Compliant		Pending		Not Applicable	
2982362	7 Technical Requirements 7.4 Drainage 7.4.9 Track Drainage (e) The drainage system must incorporate transverse drainage: [940801]	(ii) upstream of all longitudinal sags; and [940803]	PLR-S2-EW-2982362	940803	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938509	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100102 & 100108.	Compliant		Pending		Not Applicable	
2982363	7 Technical Requirements 7.4 Drainage 7.4.9 Track Drainage (e) The drainage system must incorporate transverse drainage: [940801]	(iii) upstream of any above ground furniture located between track slabs which have the potential to restrict longitudinal flow paths. [940804]	PLR-S2-EW-2982363	940804	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement	The situation does not occur within the scope of this package.	121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938510	Review	Certification	Not Applicable	Not Applicable	Not Applicable	The situation does not occur within the scope of this package.	Not Applicable		Not Applicable		Not Applicable	
2982364	7 Technical Requirements 7.4 Drainage 7.4.9 Track Drainage	(f) The diameter of each track drainage pipe of the drainage system except subsoil drains and transverse drains within the trackslab must be no less than 225 mm. [940805]	PLR-S2-EW-2982364	940805	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938511	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101 to 100112.	Compliant		Pending		Not Applicable	
2982367	7 Technical Requirements 7.4 Drainage 7.4.10 Bridge Drainage	(a) The drainage system must comply with Austroads Guide to Bridge Technology. [940808]	PLR-S2-EW-2982367	940808	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938513	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 3.1.	Compliant		Pending		Not Applicable	
2982368	7 Technical Requirements 7.4 Drainage 7.4.10 Bridge Drainage	(b) The drainage system must collect runoff from bridge decks except for the ATL on the bridge between Melrose Park and Wentworth Point, where free-draining scuppers may be used subject to meeting the project's conditions of approval. [940809]	PLR-S2-EW-2982368	940809	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938514	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101 to 100112. PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.4.2.	Compliant		Pending		Not Applicable	
2982369	7 Technical Requirements 7.4 Drainage 7.4.10 Bridge Drainage	(c) Collected runoff from bridge decks must meet the water quality requirements of the Planning Approval. [940810]	PLR-S2-EW-2982369	940810	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938515	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.4.2.	Compliant		Pending		Not Applicable	
2982372	7 Technical Requirements 7.4 Drainage 7.4.11 Landscape Drainage (a) Subsoil drainage must be: [940812]	(i) provided to tree pits and landscaped areas at the advice of the Contractor's urban soil consultant to prevent standing water located adjacent to track; and [940813]	PLR-S2-EW-2982372	940813	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement	There are no tree pits adjoining the track.	121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938516	Review	Certification	Not Applicable	Not Applicable	Not Applicable	There are no tree pits adjoining the track	Not Applicable		Not Applicable		Not Applicable	
2982375	7 Technical Requirements 7.4 Drainage 7.4.12 Water Quality and Water Sensitive Urban Design (WSUD)	(a) The quality of all stormwater and groundwater discharge must comply with the Planning Approval. [940816]	PLR-S2-EW-2982375	940816	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938518	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.4.2.	Compliant		Pending		Not Applicable	
2982376	7 Technical Requirements 7.4 Drainage 7.4.12 Water Quality and Water Sensitive Urban Design (WSUD)	(b) The quality and quantity of all stormwater and groundwater discharge must comply with the TfNSW Sustainable Design Guidelines, unless approved otherwise by the Principal. [940817]	PLR-S2-EW-2982376	940817	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938519	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.3.3.2, and 4.3.4.2.	Compliant		Pending		Not Applicable	
2982377	7 Technical Requirements 7.4 Drainage 7.4.12 Water Quality and Water Sensitive Urban Design (WSUD)	(c) The drainage system must enable the maintainer and equipment to safely access and maintain the WSUD devices. [940818]	PLR-S2-EW-2982377	940818	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Maintainability	01 Design, 02 Production	Essential	(GHD)			3938520	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 7.4.	Compliant		Pending		Not Applicable	
2982378	7 Technical Requirements 7.4 Drainage 7.4.12 Water Quality and Water Sensitive Urban Design (WSUD)	(d) All WSUD elements that are to be returned to a drainage Authority must be approved by the drainage Authority. [940819]	PLR-S2-EW-2982378	940819	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938521	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 10.3.	Compliant		Pending		Not Applicable	
2982385	7 Technical Requirements 7.4 Drainage 7.4.13 Miscellaneous (a) The drainage system must: [940821]	(v) be resilient to groundwater chemistry. [940826]	PLR-S2-EW-2982385	940826	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938526	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.4.3.	Compliant		Pending		Not Applicable	
2982401	7 Technical Requirements 7.5 Utilities 7.5.3 Systems Interfaces 7.5.3.2 Drainage interface	(a) The Contractor must relocate all Utility Services so that they are at least 300 mm clear of the drainage pipes and pits, unless stated otherwise in the Basis of Design Manuals. [940841]	PLR-S2-EW-2982401	940841	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938527	Review	Certification	Not Applicable	Not Applicable	Not Applicable	LRPEWRC-UT-DRG-100101 to 100112.	Compliant		Pending		Not Applicable	
2982480	7 Technical Requirements 7.6 Urban Design and Architecture 7.6.2 Public Domain Technical Requirements 7.6.2.1 Footpaths (a) The Contractor must design the paving for the corridor as per the following: [940912]	(ii) Footpaths must have a positively drained surface with no pooling or ponding; [940914]	PLR-S2-EW-2982480	940914	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938529	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101 to 100112.	Compliant		Pending		Not Applicable	
2982481	7 Technical Requirements 7.6 Urban Design and Architecture 7.6.2 Public Domain Technical Requirements 7.6.2.1 Footpaths (a) The Contractor must design the paving for the corridor as per the following: [940912]	(iii) Runoff from footpaths must be preferentially directed to planting beds and swales before kerbs and gutters; [940915]	PLR-S2-EW-2982481	940915	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938530	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101 to 100112.	Compliant		Pending		Not Applicable	
2982602	7 Technical Requirements 7.6 Urban Design and Architecture 7.6.2 Public Domain Technical Requirements 7.6.2.7 Public Domain furniture 7.6.2.7.6. Grates and drains	(a) The Contractor must where possible not locate grates and drains in primary pedestrian routes. [941036]	PLR-S2-EW-2982602	941036	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938532	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101 to 100112.	Compliant		Pending		Not Applicable	
2982603	7 Technical Requirements 7.6 Urban Design and Architecture 7.6.2 Public Domain Technical Requirements 7.6.2.7 Public Domain furniture 7.6.2.7.6. Grates and drains	(b) Grates and drains must not create hazards for high heels, bicycle wheels or wheelchairs. [941037]	PLR-S2-EW-2982603	941037	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938533	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151 to 100156	Compliant		Pending		Not Applicable	
2982604	7 Technical Requirements 7.6 Urban Design and Architecture 7.6.2 Public Domain Technical Requirements 7.6.2.7 Public Domain furniture 7.6.2.7.6. Grates and drains	(c) Grates and drains must align with the adjacent paving pattern in areas of unit paving or the edge of pavement in areas of in-situ pavements. [941038]	PLR-S2-EW-2982604	941038	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938534	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.6.	Compliant		Pending		Not Applicable	
2982605	7 Technical Requirements 7.6 Urban Design and Architecture 7.6.2 Public Domain Technical Requirements 7.6.2.7 Public Domain furniture 7.6.2.7.6. Grates and drains	(d) The Contractor must prioritise locating grates and drains in garden beds before locating them in turfed and paved areas. [941039]	PLR-S2-EW-2982605	941039	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938535	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.4.1.3.	Compliant		Pending		Not Applicable	
2982607	7 Technical Requirements 7.6 Urban Design and Architecture 7.6.2 Public Domain Technical Requirements 7.6.2.7 Public Domain furniture 7.6.2.7.6. Grates and drains (e) Surface drain covers must: [941040]	(i) be 316. stainless steel or be of a material in colour to match the adjacent surroundings; [941041]	PLR-S2-EW-2982607	941041	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938536	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151 to 100156	Compliant		Pending		Not Applicable	
2982608	7 Technical Requirements 7.6 Urban Design and Architecture 7.6.2 Public Domain Technical Requirements 7.6.2.7 Public Domain furniture 7.6.2.7.6. Grates and drains (e) Surface drain covers must: [941040]	(ii) be set flush with the adjacent surroundings; and [941042]	PLR-S2-EW-2982608	941042	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938537	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151 to 100156	Compliant		Pending		Not Applicable	
2982609	7 Technical Requirements 7.6 Urban Design and Architecture 7.6.2 Public Domain Technical Requirements 7.6.2.7 Public Domain furniture 7.6.2.7.6. Grates and drains (e) Surface drain covers must: [941040]	(iii) have slip resistance equivalent to that of adjacent surroundings. [941043]	PLR-S2-EW-2982609	941043	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938538	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151 to 100156	Compliant		Pending		Not Applicable	
2982634	7 Technical Requirements 7.6 Urban Design and Architecture 7.6.2 Public Domain Technical Requirements 7.6.2.7 Public Domain furniture 7.6.2.7.10. Pit lids (a) The Contractor must: [941066]	(ii) ensure stormwater pits are located in garden areas and surrounded by planting where possible; and [941068]	PLR-S2-EW-2982634	941068	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938539	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101 to 100114	Compliant		Pending		Not Applicable	
2982635	7 Technical Requirements 7.6 Urban Design and Architecture 7.6.2 Public Domain Technical Requirements 7.6.2.7 Public Domain furniture 7.6.2.7.10. Pit lids (a) The Contractor must: [941066]	(iii) All trafficable pit lids must meet Class D load capacity according to AS3996. [941069]	PLR-S2-EW-2982635	941069	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938540	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.6.	Compliant		Pending		Not Applicable	
2982835	7 Technical Requirements 7.6 Urban Design and Architecture 7.6.2 Public Domain Technical Requirements 7.6.2.11 Softworks 7.6.2.11.8. Water Sensitive Urban Design (a) The Contractor must: [941268]	(i) divert all feasible low flow stormwater runoff to garden beds and other water sensitive urban design features; [941269]	PLR-S2-EW-2982835	941269	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938541	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.3.3, 4.3.4.2 and Appendix L.	Compliant		Pending		Not Applicable	
2982838	7 Technical Requirements 7.6 Urban Design and Architecture 7.6.2 Public Domain Technical Requirements 7.6.2.11 Softworks 7.6.2.11.8. Water Sensitive Urban Design (a) The Contractor must: [941268]	(iv) ensure surface water flows through a vegetated system before reaching the stormwater system, wherever possible; [941272]	PLR-S2-EW-2982838	941272	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938543	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101 to 100112.	Compliant		Pending		Not Applicable	
2982839	7 Technical Requirements 7.6 Urban Design and Architecture 7.6.2 Public Domain Technical Requirements 7.6.2.11 Softworks 7.6.2.11.8. Water Sensitive Urban Design (a) The Contractor must: [941268]	(v) provide clean gravel infiltration trenches located in the floor of swales to detain runoff; and [941273]	PLR-S2-EW-2982839	941273	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement	There are no swales utilised in the Water Quality Treatment Train.	121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938544	Review	Certification	Not Applicable	Not Applicable	Not Applicable	There are no swales utilised in the Water Quality Treatment Train	Not Applicable		Not Applicable		Not Applicable	

Requirement Identifier	Context	Description	Requirement ID	Client Id	Requirement Source	Requirement Status	Object type	Requirement type	Requirement level	Requirement Comments	Work Package Allocation	Requirement category	Requirement delivery phase	Criticality	Owner	Derives To child/Derives From Parent	Satisfies PSHL	V&V Identifier	Design Verification Method	Proposed Production Verification Method	Proposed Production Verification Test Type	Proposed Validation Method	Proposed Validation Test Type	Design Verification Evidence	Design Compliance Status	Production Verification Evidence	Production Compliance Status	Validation Evidence	Validation Compliance Status	Remarks / comments
2982841	7 Technical Requirements 7.6 Urban Design and Architecture 7.6.2 Public Domain Technical Requirements 7.6.2.11 Softworks 7.6.2.11.8. Water Sensitive Urban Design	(b) Where rain gardens are proposed they must be provided with 100 mm freeboard to a stormwater drainage pit to cater for larger rain events. [941275]	PLR-S2-EW-2982841	941275	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement	No rain gardens are proposed in the design.	121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938546	Review	Certification	Not Applicable	Not Applicable	Not Applicable	No rain gardens are proposed in the design, but noting all WQ have been designed to split and divert low flows to the devices to mitigate the impact of system overflow.	Not Applicable		Not Applicable		Not Applicable	
2982958	7 Technical Requirements 7.7 Bridges & Civil Structures 7.7.2 Application of AS 5100: 2017 Series - Bridge Design 7.7.2.2 AS 5100.1 – Bridge Design Part 1: Scope and General Principles (j) AS 5100.1,clause 18.1: Drainage of the carriageway: [941410]	(i) the gutter flow width on pedestrians, cycle paths and shared paths must be less than 0.5 m for a 20% AEP with a 5-minute intensity or 50 mm/h, whichever is greater; [941411]	PLR-S2-EW-2982958	941411	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938548	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Appendix J.	Compliant		Pending		Not Applicable	
2982960	7 Technical Requirements 7.7 Bridges & Civil Structures 7.7.2 Application of AS 5100: 2017 Series - Bridge Design 7.7.2.2 AS 5100.1 – Bridge Design Part 1: Scope and General Principles (j) AS 5100.1,clause 18.1: Drainage of the carriageway: [941410]	A. 50% blockage in urban areas; and [941413]	PLR-S2-EW-2982960	941413	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938549	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Appendix J, Section 4.3.2.3 Table 4-8, and Section 4.3.3.1.3.	Compliant		Pending		Not Applicable	
	(ii) an allowance for the blockage of the scuppers must be made in the estimation of gutter flow width as follows: [941412]																												
2982962	7 Technical Requirements 7.7 Bridges & Civil Structures 7.7.2 Application of AS 5100: 2017 Series - Bridge Design 7.7.2.2 AS 5100.1 – Bridge Design Part 1: Scope and General Principles (j) AS 5100.1,clause 18.1: Drainage of the carriageway: [941410]	(iii) where provided, scuppers must not be spaced more than 12 m apart. The scupper spacing must be reduced in the vicinity of deck joints to ensure any flow against the barrier is captured prior to reaching the deck joints; and [941415]	PLR-S2-EW-2982962	941415	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938551	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104 to 100106.	Compliant		Pending		Not Applicable	
2982963	7 Technical Requirements 7.7 Bridges & Civil Structures 7.7.2 Application of AS 5100: 2017 Series - Bridge Design 7.7.2.2 AS 5100.1 – Bridge Design Part 1: Scope and General Principles (j) AS 5100.1,clause 18.1: Drainage of the carriageway: [941410]	(iv) drainage pits must be provided past the ends of both bridge approach slabs to minimise the run off entering and exiting the bridge deck. [941416]	PLR-S2-EW-2982963	941416	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938552	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100104 and 100106.	Compliant		Pending		Not Applicable	
2982965	7 Technical Requirements 7.7 Bridges & Civil Structures 7.7.2 Application of AS 5100: 2017 Series - Bridge Design 7.7.2.2 AS 5100.1 – Bridge Design Part 1: Scope and General Principles (k) AS 5100.1, clause 18.2: Detailing for drainage: [941417]	(i) free draining scuppers through decks must not be used unless approved by the Principal. Free draining scuppers must be designed to prevent use by fauna, including bats and birds; [941418]	PLR-S2-EW-2982965	941418	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938553	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Table 11.2.	Compliant		Pending		Not Applicable	
2982966	7 Technical Requirements 7.7 Bridges & Civil Structures 7.7.2 Application of AS 5100: 2017 Series - Bridge Design 7.7.2.2 AS 5100.1 – Bridge Design Part 1: Scope and General Principles (k) AS 5100.1, clause 18.2: Detailing for drainage: [941417]	(ii) where grated inlet drains are provided, they must not be located over the closed voids or bridge girders; [941419]	PLR-S2-EW-2982966	941419	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938554	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101 to 100112.	Compliant		Pending		Not Applicable	
2982968	7 Technical Requirements 7.7 Bridges & Civil Structures 7.7.2 Application of AS 5100: 2017 Series - Bridge Design 7.7.2.2 AS 5100.1 – Bridge Design Part 1: Scope and General Principles (k) AS 5100.1, clause 18.2: Detailing for drainage: [941417]	(iv) all pipework for structure drainage must be resistant to corrosion and to all commonly occurring chemical spillage. Longitudinal drainage pipework must be a minimum of 225 mm diameter. Drainage pipework must not be located inside a closed cell girder; [941421]	PLR-S2-EW-2982968	941421	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938556	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201 to 100218.	Compliant		Pending		Not Applicable	
2982969	7 Technical Requirements 7.7 Bridges & Civil Structures 7.7.2 Application of AS 5100: 2017 Series - Bridge Design 7.7.2.2 AS 5100.1 – Bridge Design Part 1: Scope and General Principles (k) AS 5100.1, clause 18.2: Detailing for drainage: [941417]	(v) all drainage structures must be readily accessible for cleaning and maintenance purposes; [941422]	PLR-S2-EW-2982969	941422	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938557	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 7.4.	Compliant		Pending		Not Applicable	
2982970	7 Technical Requirements 7.7 Bridges & Civil Structures 7.7.2 Application of AS 5100: 2017 Series - Bridge Design 7.7.2.2 AS 5100.1 – Bridge Design Part 1: Scope and General Principles (k) AS 5100.1, clause 18.2: Detailing for drainage: [941417]	(vi) cleanout points for the piped drainage system must be provided at minimum 30 m nominal spacing or at pier locations; [941423]	PLR-S2-EW-2982970	941423	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938558	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 7.4.	Compliant		Pending		Not Applicable	
2982971	7 Technical Requirements 7.7 Bridges & Civil Structures 7.7.2 Application of AS 5100: 2017 Series - Bridge Design 7.7.2.2 AS 5100.1 – Bridge Design Part 1: Scope and General Principles (k) AS 5100.1, clause 18.2: Detailing for drainage: [941417]	(vii) scupper openings at deck surface level must be detailed with removable stainless steel gratings fixed to the deck comprising flat bars with maximum clear gap of 80 mm; [941424]	PLR-S2-EW-2982971	941424	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938559	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100401.	Compliant		Pending		Not Applicable	
2982972	7 Technical Requirements 7.7 Bridges & Civil Structures 7.7.2 Application of AS 5100: 2017 Series - Bridge Design 7.7.2.2 AS 5100.1 – Bridge Design Part 1: Scope and General Principles (k) AS 5100.1, clause 18.2: Detailing for drainage: [941417]	(viii) the pipe expansion joint must be fully detailed with support details; [941425]	PLR-S2-EW-2982972	941425	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938560	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100015.	Compliant		Pending		Not Applicable	
2982974	7 Technical Requirements 7.7 Bridges & Civil Structures 7.7.2 Application of AS 5100: 2017 Series - Bridge Design 7.7.2.2 AS 5100.1 – Bridge Design Part 1: Scope and General Principles (k) AS 5100.1, clause 18.2: Detailing for drainage: [941417]	(x) The free drainage off the shared path shall be designed to avoid water run off the concrete surfaces on the underside and faces of the bridge. [941427]	PLR-S2-EW-2982974	941427	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938561	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100105.	Compliant		Pending		Not Applicable	
2983341	7 Technical Requirements 7.7 Bridges & Civil Structures 7.7.5 Provisions for Specific Bridge and Structure Types 7.7.5.1 Culverts	(b) The design of culvert structures must assess and address foundation stability, settlements, including differential settlements, and foundation treatment requirements. [941804]	PLR-S2-EW-2983341	941804	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement	There are no box culverts in the design.	121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938563	Review	Certification	Not Applicable	Not Applicable	Not Applicable	There are no box culverts in the design.	Not Applicable		Not Applicable		Not Applicable	
2983342	7 Technical Requirements 7.7 Bridges & Civil Structures 7.7.5 Provisions for Specific Bridge and Structure Types 7.7.5.1 Culverts	(c) The differential settlement must be assessed and designed to suit the long term structural and drainage performance in accordance with AS/(NZS) 5100 and relevant part of the project brief. [941805]	PLR-S2-EW-2983342	941805	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement	There are no box culverts in the design.	121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938564	Review	Certification	Not Applicable	Not Applicable	Not Applicable	There are no box culverts in the design.	Not Applicable		Not Applicable		Not Applicable	
2983343	7 Technical Requirements 7.7 Bridges & Civil Structures 7.7.5 Provisions for Specific Bridge and Structure Types 7.7.5.1 Culverts	(d) The construction sequence, including the backfill sequence, must be specified in the Design Documentation to ensure that the structural and drainage capacities are not compromised over the culvert Design Life. [941806]	PLR-S2-EW-2983343	941806	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement	There are no box culverts in the design.	121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938565	Review	Certification	Not Applicable	Not Applicable	Not Applicable	There are no box culverts in the design.	Not Applicable		Not Applicable		Not Applicable	
2983344	7 Technical Requirements 7.7 Bridges & Civil Structures 7.7.5 Provisions for Specific Bridge and Structure Types 7.7.5.1 Culverts	(e) The residual settlement at any point along the culvert at the design invert level must be limited to 100 mm over 100 years' period after Enabling Works Practical Completion. The differential settlement must be limited to the design structural or hydraulic tolerances, whichever is more stringent. [941807]	PLR-S2-EW-2983344	941807	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement	There are no box culverts in the design.	121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938566	Review	Certification	Not Applicable	Not Applicable	Not Applicable	There are no box culverts in the design.	Not Applicable		Not Applicable		Not Applicable	
2983345	7 Technical Requirements 7.7 Bridges & Civil Structures 7.7.5 Provisions for Specific Bridge and Structure Types 7.7.5.1 Culverts	(f) The monitoring plan for the ground and the structure in the vicinity of the culvert must be provided in accordance with the requirements of this SPR. [941808]	PLR-S2-EW-2983345	941808	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement	There are no box culverts in the design.	121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938567	Review	Certification	Not Applicable	Not Applicable	Not Applicable	There are no box culverts in the design.	Not Applicable		Not Applicable		Not Applicable	
2983346	7 Technical Requirements 7.7 Bridges & Civil Structures 7.7.5 Provisions for Specific Bridge and Structure Types 7.7.5.1 Culverts	(g) All culverts constructed on compressible material must have a monitoring plan in accordance with the requirements of this SPR. [941809]	PLR-S2-EW-2983346	941809	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement	There are no box culverts in the design.	121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938568	Review	Certification	Not Applicable	Not Applicable	Not Applicable	There are no box culverts in the design.	Not Applicable		Not Applicable		Not Applicable	
2983347	7 Technical Requirements 7.7 Bridges & Civil Structures 7.7.5 Provisions for Specific Bridge and Structure Types 7.7.5.1 Culverts	(h) Minimum opening of a box culvert must be 1m wide by 1.5m high to facilitate maintenance and inspection where it does not impact waterway. Approval must be obtained from the Principal for culverts less than 1.5m high. [941810]	PLR-S2-EW-2983347	941810	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement	There are no box culverts in the design.	121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938569	Review	Certification	Not Applicable	Not Applicable	Not Applicable	There are no box culverts in the design.	Not Applicable		Not Applicable		Not Applicable	
2983348	7 Technical Requirements 7.7 Bridges & Civil Structures 7.7.5 Provisions for Specific Bridge and Structure Types 7.7.5.1 Culverts	(i) Precast base slabs must not be used in culvert construction. [941811]	PLR-S2-EW-2983348	941811	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement	There are no box culverts in the design.	121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938570	Review	Certification	Not Applicable	Not Applicable	Not Applicable	There are no box culverts in the design.	Not Applicable		Not Applicable		Not Applicable	
2983349	7 Technical Requirements 7.7 Bridges & Civil Structures 7.7.5 Provisions for Specific Bridge and Structure Types 7.7.5.1 Culverts	(j) Precast culvert crown units must comply with crack control requirements in clause 2.4.3 of AS 5100.5. [941812]	PLR-S2-EW-2983349	941812	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement	There are no box culverts in the design.	121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938571	Review	Certification	Not Applicable	Not Applicable	Not Applicable	There are no box culverts in the design.	Not Applicable		Not Applicable		Not Applicable	

Requirement Identifier	Context	Description	Requirement ID	Client Id	Requirement Source	Requirement Status	Object type	Requirement type	Requirement level	Requirement Comments	Work Package Allocation	Requirement category	Requirement delivery phase	Criticality	Owner	Derives To child/Derives From Parent	Satisfies PSHL	V&V Identifier	Design Verification Method	Proposed Production Verification Method	Proposed Production Verification Test Type	Proposed Validation Method	Proposed Validation Test Type	Design Verification Evidence	Design Compliance Status	Production Verification Evidence	Production Compliance Status	Validation Evidence	Validation Compliance Status	Remarks / comments
2983350	7 Technical Requirements 7.7 Bridges & Civil Structures 7.7.5 Provisions for Specific Bridge and Structure Types 7.7.5.1 Culverts	(k) All references to AS 3600 in AS 1597.1 and AS 1597.2 must be read as references to AS 5100. [941813]	PLR-S2-EW-2983350	941813	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement	There are no box culverts in the design.	121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938572	Review	Certification	Not Applicable	Not Applicable	Not Applicable	There are no box culverts in the design.	Not Applicable		Not Applicable		Not Applicable	
2983351	7 Technical Requirements 7.7 Bridges & Civil Structures 7.7.5 Provisions for Specific Bridge and Structure Types 7.7.5.1 Culverts	(l) Design Documentation including calculations and drawings, concrete reinforcement details and certification of conformity of the culverts including precast culvert units must be submitted for review and approval prior to commencement of manufacture and included in the Design Documentation. [941814]	PLR-S2-EW-2983351	941814	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement	There are no box culverts in the design.	121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938573	Review	Certification	Not Applicable	Not Applicable	Not Applicable	There are no box culverts in the design.	Not Applicable		Not Applicable		Not Applicable	
2983352	7 Technical Requirements 7.7 Bridges & Civil Structures 7.7.5 Provisions for Specific Bridge and Structure Types 7.7.5.1 Culverts	(m) The schedule of drawings of the precast culvert units must be added to the cover sheet of the design drawings. [941815]	PLR-S2-EW-2983352	941815	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement	There are no precast box culvert units in the design.	121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			3938574	Review	Certification	Not Applicable	Not Applicable	Not Applicable	There are no precast box culvert units in the design.	Not Applicable		Not Applicable		Not Applicable	
2983804	7 Technical Requirements 7.8 Roads & Maritime 7.8.3 Car and Boat Parking and Facilities	(q) The boat preparation and derigging bays must be provided with boat wash down facilities, including a sump to collect grey water. [942287]	PLR-S2-EW-2983804	942287	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)	The de-rigging bays must be provided with boat wash down facilities, including a sump to collect grey water.		4639042	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100113 Pit 23-1.	Compliant		Pending		Not Applicable	
2983932	7 Technical Requirements 7.11 Track 7.11.4 Track structure 7.11.4.1 General	(d) Each opening must have trafficable covers and drainage connections to the drainage network. [942376]	PLR-S2-EW-2983932	942376	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			4554300	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151 to 100155	Compliant		Pending		Not Applicable	
2984137	7 Technical Requirements 7.14 Asset Requirements 7.14.2 Asset Design Life (a) The Contractor must: [942541] Table 13: Asset Design Life [942546] 1:Ref 2:Asset 3:Design Life	1:BB. 15 2:CC. Drainage structures / tanks, pipe systems not covered by Third Party Agreements and accessible for refurbishment 3:50 years [830569]	PLR-S2-EW-2984137	942546	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			4609011	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-DY-RPT-100001, and pipe material class captured on the longsections PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201 to 100222.	Compliant		Pending		Not Applicable	
2984138	7 Technical Requirements 7.14 Asset Requirements 7.14.2 Asset Design Life (a) The Contractor must: [942541] Table 13: Asset Design Life [942546] 1:Ref 2:Asset 3:Design Life	1:DD. 16 2:EE. Drainage structures / tanks, pipe systems not covered by Third Party agreements and inaccessible for refurbishment 3:100 years	PLR-S2-EW-2984138	942546	111111: SPR Main Body	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design, 02 Production	Essential	(GHD)			4609012	Review	Certification	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-DY-RPT-100001, and pipe material class captured on the longsections PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201 to 100222.	Compliant		Pending		Not Applicable	
3692048	11. Sustainability Management (b) The Contractor's sustainability management activities for the Project must:	(vii) comply with the TfNSW Sustainable Design Guidelines version 4.0 to meet the minimum design ratings as nominates in SPR.	PLR-S2-EW-3692048		111211: MR Annexure 01 - Management Requirements	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Others	01 Design	Essential	(GHD)			4477188	Review	Not Applicable	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 8.2.	Compliant		Not Applicable		Not Applicable	
4561572		Under normal conditions, water basins shall be dry and free draining to eliminate the risk of drowning.	PLR-S2-EW-4561572		111711: Derived Safety Requirements	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Safety	01 Design, 02 Production	Essential	(GHD)		C277	4561575	Review	Inspection	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100451 to 100456	Compliant		Pending		Not Applicable	
4561573		Where water basins present a risk of a fall from height, the water basin shall either: include protection from falling or be located away from public gathering spaces.	PLR-S2-EW-4561573		111711: Derived Safety Requirements	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Safety	01 Design, 02 Production	Essential	(GHD)		C294	4561576	Review	Inspection	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100451 to 100456	Compliant		Pending		Not Applicable	
4561574		Water basins shall redirect flow when there is excessive water in the water basin.	PLR-S2-EW-4561574		111711: Derived Safety Requirements	Design Verified	Requirement	Technical	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Safety	01 Design, 02 Production	Essential	(GHD)		C295	4561577	Review	Inspection	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100451 to 100456 and PLR2EW-JHGRP-LRPEWRC-SD-DRG-100402	Compliant		Pending		Not Applicable	
4695118	4. DrainageTable 3 Drainage [946938]Clause, Deliverable, (SDR?), (PDR?), (DDR?), (AFC?), (WAE?)Clause: 4.1	Deliverable: (a) The Design Documentation submission for each design review stage will include:	(i) civil works drawings;	(SDR - Yes), (PDR - Yes), (DDR - Yes), (AFC - Yes), (WAE - Yes)	PLR-S2-EW-4695118	946938	111121: SPR Appendix J - Design Deliverables	Process Verified	Requirement	Process	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Plan	01 Design	Essential	(GHD)			4695760	Review	Not Applicable	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201 to 1000222	Compliant		Not Applicable		Not Applicable	
4695119	4. DrainageTable 3 Drainage [946938]Clause, Deliverable, (SDR?), (PDR?), (DDR?), (AFC?), (WAE?)Clause: 4.1	Deliverable: (a) The Design Documentation submission for each design review stage will include:	(ii) longitudinal drainage calculations, and output;	(SDR - Yes), (PDR - Yes), (DDR - Yes), (AFC - Yes), (WAE - Yes)	PLR-S2-EW-4695119	946938	111121: SPR Appendix J - Design Deliverables	Process Verified	Requirement	Process	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Plan	01 Design	Essential	(GHD)			4695761	Review	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Calculations: PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Appendix J. Output: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201 to 1000222	Compliant		Not Applicable		Not Applicable	
4695120	4. DrainageTable 3 Drainage [946938]Clause, Deliverable, (SDR?), (PDR?), (DDR?), (AFC?), (WAE?)Clause: 4.1	Deliverable: (a) The Design Documentation submission for each design review stage will include:	(iii) cross drainage calculations, and output;	(SDR - Yes), (PDR - Yes), (DDR - Yes), (AFC - Yes), (WAE - Yes)	PLR-S2-EW-4695120	946938	111121: SPR Appendix J - Design Deliverables	Process Verified	Requirement	Process	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Plan	01 Design	Essential	(GHD)			4695762	Review	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Calculations: PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Appendix J, and Section 4.3.2.1.2. Output: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100220.	Compliant		Not Applicable		Not Applicable	
4695121	4. DrainageTable 3 Drainage [946938]Clause, Deliverable, (SDR?), (PDR?), (DDR?), (AFC?), (WAE?)Clause: 4.1	Deliverable: (a) The Design Documentation submission for each design review stage will include:	(iv) hydraulic models; and	(SDR - Yes), (PDR - Yes), (DDR - Yes), (AFC - Yes), (WAE - Yes)	PLR-S2-EW-4695121	946938	111121: SPR Appendix J - Design Deliverables	Process Verified	Requirement	Process	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Plan	01 Design	Essential	(GHD)			4695763	Review	Not Applicable	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-MOD-100002.12daz	Compliant		Not Applicable		Not Applicable	
4695122	4. DrainageTable 3 Drainage [946938]Clause, Deliverable, (SDR?), (PDR?), (DDR?), (AFC?), (WAE?)Clause: 4.1	Deliverable: (a) The Design Documentation submission for each design review stage will include:	(v) water quality models (MUSIC unless otherwise agreed with the Principal).	(SDR - Yes), (PDR - Yes), (DDR - Yes), (AFC - Yes), (WAE - Yes)	PLR-S2-EW-4695122	946938	111121: SPR Appendix J - Design Deliverables	Process Verified	Requirement	Process	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Plan	01 Design	Essential	(GHD)			4695764	Review	Not Applicable	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-MOD-10001.mxproj	Compliant		Not Applicable		Not Applicable	
2980592	4. Drainage Table 3 Drainage [946938] Clause, Deliverable, (SDR?), (PDR?), (DDR?), (AFC?), (WAE?)	Clause: 4.1	Deliverable: (b) Each updated final hydraulic model will include the description of the model file, inputs, assumptions, and its purpose.	(SDR - Yes), (PDR - Yes), (DDR - Yes), (AFC - Yes), (WAE - Yes)	PLR-S2-EW-2980592	946938	111121: SPR Appendix J - Design Deliverables	Process Verified	Requirement	Process	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Plan	01 Design	Essential	(GHD)			4695765	Review	Not Applicable	Not Applicable	Not Applicable	Not Applicable	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.3.1.1: Drainage Design Software. Section 4.3.3.1.2: Design Loss Model. Section 4.3.3.1.3: Design Blockage. Section 4.2.2: IFD Data Section 4.2.3: Climate Change Section 4.2.4: Tailwater Conditions	Compliant		Not Applicable		Not Applicable	
4695204	7. Bridges & Civil Structures Table 6 Bridges and civil structures [946944]Clause, Deliverable, (SDR?), (PDR?), (DDR?), (AFC?), (WAE?)Clause: 7.2	Deliverable: (a) The Design report will also address the following:(SDR - No), (PDR - Yes), (DDR - Yes), (AFC - Yes), (WAE - Yes)	(vi) Demonstrate that water velocities and gradients of drainage systems associated with discrete bridge or civil elements are suitable to be considered self-cleansing.	PLR-S2-EW-4695204	946944	111121: SPR Appendix J - Design Deliverables	Process Verified	Requirement	Process	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Plan	01 Design	Essential	(GHD)			4695767	Review	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Calculations: PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Appendix M details the calculations and section 4.3.4.1.1 identify those reaches of pipework that have not achieved self-cleaning velocity.	Compliant		Not Applicable		Not Applicable	
4695294	11. TrackTable 10 Track [946952]Clause, Deliverable, (SDR?), (PDR?), (DDR?), (AFC?), (WAE?)Clause: 11.1	Deliverable: (a) The design documentation submission will include drawings, designs, and calculations for: (SDR - Yes), (PDR - Yes), (DDR - Yes), (AFC - Yes), (WAE - Yes)	(xi) subsurface drainage network; and	PLR-S2-EW-4695294	946952	111121: SPR Appendix J - Design Deliverables	Process Verified	Requirement	Process	Subsystem requirement		121111: SD-0001 Stormwater Drainage and Water Quality Design	Plan	01 Design	Essential	(GHD)			4695768	Review	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Calculations: PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Appendix J. Output: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201 to 1000222	Compliant		Not Applicable		Not Applicable	

F-2 Environmental Compliance – Relevant CoAs, UMMs, SPR Appendix G

CoA	Condition of Approval	Design Compliance Status (Y/N) *	Relevant Design Package(s)	Evidence of Design Compliance
E2	The clearing of native vegetation must be minimised to the greatest extent practicable with the objective of reducing impacts to threatened ecological communities and threatened species habitat.	Y	SD-0001	Drainage extents have not been increased at subsequent design iterations and will not require additional native vegetation clearing. Refer to PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001-100215.
E138	The CSSI must be designed, constructed and operated so as to maintain the NSW Water Quality Objectives where they are being achieved as at the date of this approval, and contribute towards achievement of the NSW Water Quality Objectives over time where they are not being achieved as at the date of this approval, unless an EPL in force in respect of the CSSI contains different requirements in relation to the NSW Water Quality Objectives, in which case those requirements must be complied with. Note: If construction stormwater will be discharged to waterways, a Water Pollution Impact Assessment will be required to inform licensing, consistent with section 45 of the POEO Act. Any such assessment must be prepared in consultation with the EPA and be consistent with the National Water Quality Guidelines, with a level of detail commensurate with the potential water pollution risk.	Y	SD-0001	Design Report PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.5 and 4.3.4.2 outline the requirements and outcomes of the treatment train. Noted that Water Quality Objectives in The Parramatta River are currently not being satisfied in the existing condition, as a result the project only provides an improvement on key pollutant loads compared to pre upgrade scenario to contribute to an improvement over time. Note that the Construction Water Quality is not considered in the operational water quality assessment.
E140	Drainage feature crossings (permanent and temporary watercourse crossings and stream diversions) and drainage swales and depressions must be carried out in accordance with relevant guidelines and designed by a suitably qualified and experienced person.	Y	SD-0001	There are three drainage feature crossings within the project, two existing pipe crossing which are to be upgraded as part of the works and the Parramatta River, all are compliant. Refer to PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001-100215. Note any temporary works and diversions created by those are not considered in the design report statement of conformance.
E142	The Proponent must undertake further hydrological and hydraulic modelling based on the detailed design of the CSSI to determine the ability of the receiving drainage systems to effectively convey pavement drainage from the CSSI. The modelling must be undertaken in consultation with the relevant asset owners and the outcomes documented in the Stormwater Drainage Report required under Condition E143.	Y	SD-0001	Design Report PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.2.3 details the OSD design to mitigate impacts on downstream system connection, all other systems discharge to the Parramatta River.
E143	The Stormwater Drainage Report must be prepared at least one month before the commencement of any new permanent drainage works, modifications or connections to existing drainage works, construction of hard surfaces that are associated with the operation of the project and would result in runoff to existing stormwater drainage systems. The Stormwater Drainage Report must be prepared in consultation with the relevant asset owners and must: a) assess the potential impacts of pavement drainage discharges from the CSSI drainage systems on the receiving environment and capacity of the asset owner's drainage infrastructure and receiving environment; b) identify mitigation measures to be implemented where pavement drainage from the CSSI drainage systems are predicted to adversely impact on the receiving environment or capacity of the asset owners drainage infrastructure; and c) set out a clear time frame for the implementation of mitigation measures. Nothing in this condition prevents the Proponent from preparing separate Stormwater Drainage Reports for pavement discharges to the drainage system provided that each report is prepared at least one (1) month before the subject works/discharges commencing. A copy of the Stormwater Drainage Report must be provided to the asset owner at least one (1) month prior to the subject works/discharges commencing.	Y	SD-0001	Design Report PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.2.3 details the OSD design to mitigate impacts on downstream system connection, all other systems discharge to the Parramatta River.
E144	All new or modified drainage systems associated with the CSSI must be designed to: a) meet the capacity constraints of any council's or Sydney Water's drainage system to receive and convey the proposed flows from the CSSI, or otherwise upgrade relevant authorities drainage system at the Proponent's expense, in consultation with the relevant council(s), SOPA or Sydney Water; b) minimise impacts on the receiving environment resulting from any additional flow volume (including, but not limited to scour, flooding, water quality impacts, and impacts on riparian vegetation, aquatic ecology and property); c) ensure mitigation measures are implemented where increased flows through cross drainage systems adversely impact on council or Sydney Water drainage infrastructure and the receiving environment; and d) ensure ease of maintenance and accessibility.	Y	SD-0001	**Existing Systems:** Design Report PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.1.2 details the modified transverse drainage system design. **New Systems:** a) Design Report PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.2.3 provides details of OSD system implemented in to the design at the only connection to an existing Drainage system. b) i) Scour PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.3.2 and Appendix O. b) ii) Flooding: Refer to PLR2EW-JHGRP-LRPEWRC-SD-RPT-100002 b)iii) Water Quality: PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.4.2. b)i v) Riparian Vegetation: PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.3.2 outlines the determination of outlet velocities to mitigtae impacts to downstream vegetation. b) v) Aquatic Ecology: PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.5.2 describes the mechanism of impact from stormwater discharge and how mitigation of of pollutants mitigates the impacts. b) vi) Propoerty: Refer to PLR2EW-JHGRP-LRPEWRC-SD-RPT-100002 c) There are no instances of cross drainag systems connecting to an existing council or Sydney Water System. d) All pits are standard TfNSW or CoPC in Ground as documented in PLR2EW-JHGRP-LRPEWRC-SD-DRG-100151 to 100158, further deatils on Maintenance considerations in the design are provided in PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 7.4.

UMM ID	Updated Mitigation Measure	Design Compliance Status (Y/N)	Relevant Design Package(s)	Evidence of Design Compliance
LP2	Consultation with key stakeholders (including City of Parramatta Council, Sydney Olympic Park Authority, the Department of Planning and Environment, Royal Agricultural Society of NSW, and relevant developers) will be ongoing to ensure that the design of the project is integrated as far as practicable with adjoining developments, proposed developments and urban renewal areas (including those subject to the Camellia-Rosehill Place Strategy (DPE, 2022), structure planning for Melrose Park North and Melrose Park South, the Parklands Plan of Management 2010 (Sydney Olympic Park Authority, 2010), the Sydney Olympic Park Master Plan 2030 (Sydney Olympic Park Authority, 2018) (including the Sydney Olympic Park Master Plan 2030 Interim Metro Review (Sydney Olympic Park Authority, 2022)), the Sydney Olympic Park Vision and Strategy 2050 (Sydney Olympic Park Authority, 2022), and the Carter Street Precinct Development Framework (DPIE, 2020)). This will include identifying measures and design responses to manage the interface between the project and adjoining land uses and properties as far as reasonably practicable.	Y	SD-0001	Refer to PLR2EW-JHGRP-LRPEWRC-RW-RPT-1000001 Section 6.1 for details of consultation with key stakeholders relevant to this design package, and Section 5.1 for consideration of external interfaces including integration as far as practicable with adjoining and proposed developments as well as with the wider PLR2 Main Works. Refer to PLR2EW-JHGRP-LRPEWRC-RW-RPT-1000001 Section 4.3.2.1 for details specific to the considerations of future upstream development of the PLRC for the Melrose Park Development, in the design of the transverse drainage system.
LV5	The design will continue to be refined to avoid or minimise impacts on trees. Any tree within the project site boundary, that will not be directly impacted by infrastructure or utility works, will be assessed for retention through careful consideration of design and construction methods. This will include consideration of the following options: • operational requirements in relation to tree locations • adjustments to the design to avoid impacting trees (such as opportunities for localised narrowing of footpaths, use of porous pavement) • reduction in the standard offset distances required for underground services • consideration of the health of each tree, including its vigour and likely ability to survive in-situ pruning or transplanting.	Y	SD-0001	Drainage extents have not been increased at subsequent design iterations and will not require additional tree clearing or an increase in offset distances. Refer to PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001-100215.
BD1	Vegetation clearing will be limited to the minimum necessary to construct the project. The design and location of infrastructure will be further refined during each design phase to minimise or avoid impacts on native vegetation, fauna movement and habitat as far as practicable	Y	SD-0001	Drainage extents have not been increased at subsequent design iterations and will not require additional vegetation clearing. Refer to PLR2EW-JHGRP-LRPEWRC-SD-DRG-100001-100215.
W2	Drainage and flood management infrastructure will be designed with regard to relevant drainage design requirements and guidelines, including the Development Engineering Design Guidelines (City of Parramatta Council, 2018) and Sydney Olympic Park Authority Policy–Stormwater Management and Water Sensitive Urban Design (Sydney Olympic Park Authority, 2016).	Y	SD-0001	Design Report PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 3.1 outlines the standards applied to the assets. the drainage drawings PLR2EW-JHGRP-LRPEWRC-SD-DRG-100101 to 100114 identify the asset ownership between CoPC and TfNSW. Design Report PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section and drawing PLR2EW-JHGRP-LRPEWRC-SD-DRG-100015 outlines the specifications applicable to the assets in construction.
W3	The location and specification of water quality treatment measures will be determined with reference to the NSW and project-specific water quality objectives and existing water quality.	Y	SD-0001	Design Report PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.2.5 and 4.3.3.3 outline the requirements and outcomes of the treatment train.
HR2	Ongoing design development will be subject to detailed safety reviews through the Safety in Design process, to identify measures to mitigate, manage and reduce the risk of incidents arising from collisions during operation.	Y	SD-0001	Design Report PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 8.3.2.

F-3 SPR Appendix J Requirements

Appendix F3 - SPR Appendix J requirements

Discipline	Clause	Deliverable	Coverage in this Package
DRAINAGE	4.1	(a) The Design Documentation submission for each design review stage will include:	
		(i) civil works drawings;	PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201 to 1000222
		(ii) longitudinal drainage calculations, and output;	Calculations:PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Appendix J. Output: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201 to 1000222
		(iii) cross drainage calculations, and output;	Calculations:PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Appendix J, and Section 4.3.2.1.2. Output: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100220.
		(iv) hydraulic models; and	PLR2EW-JHGRP-LRPEWRC-SD-MOD-100002.12daz
		(v) water quality models (MUSIC unless otherwise agreed with the Principal).	PLR2EW-JHGRP-LRPEWRC-SD-MOD-10001.mxproj
		(b) Each updated final hydraulic model will include the description of the model file, inputs, assumptions, and its purpose.	PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Section 4.3.3.1.1: Drainage Design Software. Section 4.3.3.1.2: Design Loss Model. Section 4.3.3.1.3: Design Blockage. Section 4.2.2: IFD Data Section 4.2.3: Climate Change Section 4.2.4: Tailwater Conditions
BRIDGES AND STRUCTURES	7.2	(a) The Design report will also address the following:	-
		(vii) Demonstrate that water velocities and gradients of drainage systems associated with discrete bridge or civil elements are suitable to be considered self-cleansing.	Calculations:PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Appendix M details the calculations and section 4.3.4.1.1 identifies those reaches of pipework that have not achieved self cleaning velocity.
TRACK	11.1	(a) The design documentation submission will include drawings, designs, and calculations for:	-
		(xi) subsurface drainage network; and	Calculations:PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001 Appendix J. Output: PLR2EW-JHGRP-LRPEWRC-SD-DRG-100201 to 1000222

F-4 Design Safety Verification Review

Parramatta Light Rail Stage 2 Enabling Works
Design Safety Verification Review

Detailed Design Review (DDR) Design Package Scope

Design Package(s) Name:	Stormwater Drainage and Water Quality Design
Design Package(s) No:	SD-0001
Design Package Lead(s) inc organisation:	[redacted](GHD) Note that [redacted] was unable to attend and [redacted] GHD Civil Team Lead provided appropriate representation
JH Systems Engineering & Safety Assurance Lead:	[redacted]
Date of Review:	25/07/2025
Review Attendees:	[redacted] (JH) [redacted] (JH) [redacted] (JH) [redacted] (GHD)
Also Invited:	[redacted] (TfNSW) [redacted] (JH) [redacted] (GHD) [redacted] (GHD)

Checklist Items

Checklist Item	Design Package(s) Scope
Design Changes:	
Have there been any changes to the design from the Preliminary Design Review (PDR) baseline? If so, has the impact on the systems assurance activities been addressed?	The following changes have been made to design since PDR: • WQ Basins – Relocated/Modified WQ Basins 1, 2 and 3. • Pit Removals – Removal of Pits 41-2 in Wharf Road and 25-1 along with its associated pipework. • Drainage Lines – Relocation of drainage lines 17 and 19 to be underground under the Bridge 2 structure and installed in-ground. During the review, it was determined that there were no negative safety impacts. Introduction of these design changes have improved safety in comparison to the previous design iteration.
Departures and Concessions:	
sHave all departures been addressed? For any outstanding, has the associated safety risk impact been addressed?	There are no outstanding departures associated with the package.

Checklist Items

Checklist Item	Design Package(s) Scope
Have all concessions been approved? For any outstanding, has the associated safety risk impact been addressed?	There are no outstanding concessions associated with the package.
Hazard Identification and Analysis Activities:	
Have hazard identification and analysis activities associated with the design package(s) scope been undertaken in accordance with the Systems Engineering, Assurance & Design Management Plan (SEADMP)?	All hazard identification and analysis activities (PHA, DHA) associated with the package have been completed.
Project Hazard Log (PHL) Management:	
Have all the hazards, causes, consequences associated with the design package(s) been captured in the PHL?	Hazards, causes, and consequences have been captured in the PHL.
Have the appropriate existing controls been identified and recorded in the PHL?	Existing controls have been identified and recorded in the PHL.
Have the appropriate proposed controls been identified and recorded in the PHL? Where a proposed control has been rejected, has justification been provided?	Proposed controls have been identified and recorded in the PHL. Controls C294 and C295 are to be reviewed following feedback and further detail provided by GHD. **ACTION** **28/07/2025**: Controls C294 and C295 will retain their current wording. It was determined that the additional details that the designers provided for the controls were more appropriate when provided as verification evidence for the derived requirements. **ACTION CLOSED** Rejection of control C278 to be reviewed as fencing has now been provided for the wet basin adjacent to Hill Road. **ACTION** **28/07/2025**: As fencing has now been utilised, the status of control C278 is no longer 'rejected' for this hazard. However, this will not be reinstated as a standalone control as it is covered by control C294. **ACTION CLOSED**
Have associated safety requirements (including derived requirements) been identified, recorded in the Requirements Management database and design verification complete?	Safety requirements have been identified and recorded in the RVTM, with design verification complete Following the review of control C294 and C295, their associated derived safety requirements will be reviewed. **ACTION** **28/07/2025**: Control C294 and C295 will retain their current derived requirement wording. **ACTION CLOSED**
Assumptions, Dependencies and Constraints (ADCs):	
Have appropriate ADCs been recorded in the PHL?	During the review, GHD have identified that ADC A068 was not applicable to SD-0001. JH SESA to review applicability of ADC. **ACTION**

Checklist Items

Checklist Item	Design Package(s) Scope
	29/07/2025: Upon review of the ADC in the context of the hazard, it was determined that A068 does not provide meaningful context or means to mitigate the risk. As such, A068 has now been cancelled. **ACTION CLOSED**
Have owners and validation methods for the ADC's been established and confirmed?	As noted above, A068 is currently under review. This item is pending on this confirmation. **ACTION** **29/07/2025:** N/A – As A068 has been cancelled there are no ADCs applicable to SD-0001. **ACTION CLOSED**
SFAIRP Argument and Residual Safety Risk:	
Has the SFAIRP argument been completed and agreed for all hazards in the PHL?	SFAIRP arguments have been reviewed and have been accepted.
Is the residual risk considered tolerable for all hazards (in accordance with the SEADMP)?	Residual risk ratings have been reviewed and have been accepted.
Design Review Comments:	
Have all the systems assurance-related review comments for the design package(s) been addressed?	All related comments have been closed.
Reliability, Availability and Maintainability (RAM):	
Have RAM activities required for the design package(s) been undertaken in accordance with the SEADMP?	N/A – Refer Design Report Section 8.3.4 (PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001)
Have outcomes of the RAM activities been appropriately addressed? Have identified safety impacts been captured in the PHL?	N/A – Refer Design Report Section 8.3.4 (PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001)
Human Factors (HF):	
Has designer reviewed the content provided by the HF SME and incorporated updates into the report?	N/A – Refer Design Report Section 8.3.3 (PLR2EW-JHGRP-LRPEWRC-SD-RPT-100001)
Has HF SME participation in all relevant safety (e.g., Hazard Analysis) and design-related activities been confirmed, in accordance with the SEADMP?	Yes, in PHA and DHA workshops.

Endorsed by:

Design Package Lead(s)	SESA Lead
Name: [redacted] (in the absence of Carol Schreiber – see above)	Name: [redacted]
Organisation: GHD	Organisation: John Holland
Date: 07/08/2025	Date: 07/08/2025
Signature:	Signature:

Appendix G Project Hazard Log

PROJECT SPECIFIC SAFETY RISK REGISTER

Project Code :		**Revision No :**	**See change journal**	**Comments : See change journal for comments**
Project Name		**Review Date :**	**07/08/2025**	

Risk Identification											Initial Risk Analysis (TfNSW Safety Risk Matrix)			Risk Evaluation and Treatment (TfNSW Safety Risk Matrix)								Residual Risk Analysis (TfNSW Safety Risk			Notes	
Hazard Ref.	**Source**	**Location**	**Keyword**	**Project Phase Hazard First May Occur**	**Operational Mode**	**Hazard**	**Potential causes**	**Potential consequence(s)**	**Safety Controls currently in place (which are considered when determining the risk rating)**	**SPR Reference (DOORS)**	**Initial Consequence**	**Initial Likelihood**	**Initial Risk rating**	**Additional risk controls (not O&M)**	**Safety Requirement**	**Rejected Controls**	**Rejected Controls Reason**	**SFAIRP Justification**	**Hazard Status / SFAIRP Achieved**	**Responsibility for Task**	**Assumptions, Dependencies, and Constraints**	**Residual Consequence**	**Residual Likelihood**	**Residual Risk rating**	**Notes**	**Historical Notes (Reference / Tender)**
PLR2-021	PLR2 EW - Detailed Hazard Analysis Workshop 1 [PLR2EW-JHGRP-NWW-SF-MIN-000004] PLR2 EW - Derailment Risk Assessment [PLR2EW-JHGRP-NWW-TR-MEM-000004] PLR2 EW - Preliminary Hazard Analysis Workshop 1 [PLR2EW-JHGRP-NWW-SF-MIN-000001] PLR-SHL-026	PLRC	Collision Derailment Human Factors	Operations	Normal	HAZ-016: LRV and emergency v ehicle collision	CAU-019: Emergency vehicle (police, ambulance, fire brigade) enters LRV corridor CAU-020: Slippery surfaces, including rail when wet or frosty [redacted]	Occupants of emergency v ehicle Fatality	C175: Infrastructure must not obstruct emergency service access requirements as defined in the Fire Safety Guideline: Access For fire brigade v ehicles and Firefighters C273: Track drainage sy stem provided to remov e water from the traffickable surface	C175: 2982990, 2983476, 2983551, 2983851 C273: 2982353	Severe - C2	Almost Unprecedented - L6	E					This is an operational hazard that is only possible during emergencies where response v ehicles need to cross Parramatta Riv er via the Maritime Bridge. However, collision between an LRV and emergency v ehicles is not a risk ev ent hazard as this is an existing risk for light rail sy stems within Sy dney. The likelihood of this risk occurring has been reduced through infrastructure design f eatures such that emergency v ehicles can trav erse the bridge without being obstructed or losing control due to slippery surfaces. However, the majority of this risk is mitigated by LRV the operator ensuring competencies and procedures are in place f or emergency situations ty pical f or an RSO. With the ev idence abov e, this hazard is considered to be managed SFAIRP.	Resolv ed for Design	RW-0001: Track and Roadworks Alignment Design SD-0001: Stormwater Drainage and Water Quality Design	A002: NSW road rules apply to PLRC during normal and emergency operations A003: Only licenced bus operators use the PLRC A043: RSO Accredited LRV Operator's operational processes and protocols applied	Severe - C2	Almost Unprecedented - L6	E	[2025/06/25] [redacted] DDR Review Removed ADC A044 and replaced ADCs A065 and A091 as they are now cancelled and consolidated into A043, A002, and A083 respectiv ely. [2025/06/10] [redacted] Added ADC A091 to describe that operators will need to consider the gradient and curv e when on the Wentworth Point Approach Structure. [2025/06/02] [redacted] Added ADC A065 for road rules while under emergency conditions. [2025/02/24] [redacted] Added clause CAU-020 to detail risk of slippery track/crm. Added control C273 to describe track drainage. [2025/02/13] [redacted] EHA 1 TfNSW noted that this hazard is to be mostly addressed by operational controls and procedures similar to what was done for PLR1. [2024/12/19] [redacted] Remov ed control C174 as it considered a duplicate of C175 which is already listed as a control.	
PLR2-104	PLR2 EW - Preliminary Hazard Analysis Workshop 3 [PLR2EW-JHGRP-NWW-SF-MIN-000003] PLR2 EW - Preliminary Hazard Analysis Workshop 1 [PLR2EW-JHGRP-NWW-SF-MIN-000001] PLR2 Enabling Works - Safety in Design Workshop Report (PLR2-ARU-SA-6000-REP-00002)	Wentworth Point Bridge	Collision	Operations	Normal	HAZ-068: Car accident (car striking car)	CAU-092: Car drives on LRV tracks and loses friction/traction	Fatality	C114: Track alignment ensured to have sufficient GXE clearance away from road v ehicles and road lanes C272: Ensuring that the track drainage sy stems are in accordance with the relev ant road authority when located within a road C273: Track drainage sy stem provided to remov e water from the traffickable surface C274: Concrete broom finish on the PLR2 ov er the Maritime Bridge and Wentworth Point Approach structure to deter non-authorised v ehicles by visually delineating the LRV track/crm from adjacent roads.	C114: 2983910, 2983911, 2983921, 2983922 C272: 2982355 C273: 2982353 C274: 2980716, 2983099	Severe - C2	Unlikely - L4	B					It has been identified that this risk falls outside of the PLR2 EW scope of works. At the Mary St / Waratah St intersection, the geometry of the intersection is unchanged. Upon completion of the PLR2 EW, there will be no difference in how drivers approach the turn until the PLR2 main works commence. Furthermore, JHG is responsible for the elements of the track leading up to the intersection - a future contractor is to complete the track alignment, track/crm, and road traffic signalisation as part of the broader PLR2 main works. At the Hill Road / Footbridge Boulev ard intersection, there is no road and track interface. LRV and vehicle collisions can only occur if a vehicle enters the 'Bus Only' slip lane and enters the shared zone. This scenario is already cov ered within other hazards. As such, considering that this risk is not constrained within the scope of works for PLR2 EW, it is considered retired.	Retired	SD-0001: Stormwater Drainage and Water Quality Design RW-0002: Roadworks Ancillary Civil Design RW-0003: Roadworks Sy stems Design (ITS, Street Lighting) BR-0002: Wentworth Point Approach Structure		Severe - C2	Very Unlikely - L5	C	[2025/02/24] [redacted] Retired - Risk has been retired as it was considered to be out of PLR2 EW scope of works.	
PLR2-106	PLR2 EW - Preliminary Hazard Analysis Workshop 1 [PLR2EW-JHGRP-NWW-SF-MIN-000001] PLR2 Enabling Works - Safety in Design Workshop Report (PLR2-ARU-SA-6000-REP-00002)	Wentworth Point Bridge	Drowning Human Factors	Operations	Normal	HAZ-080: Person drowns in detention basin	CAU-094: Ease of access (carpark and bridge) [redacted]	Fatality	C278: Water basins are provided in accordance with the AEP and climate change considerations	C278: 2982265, 2982278	Severe - C2	Unlikely - L4	B	C277: Detention basin designed as a dry basin, only filled in a rain ev ent. C294: Water basins are provided with protection to prev ent f alls f rom height or provided away f rom public gathering spaces C295: Water basins redirect f low when there is excessiv e water/risk of ov erflow	C277: Under normal conditions, water basins shall be dry and f ree draining to eliminate the risk of drowning. [4561572] C294: Where water basins present a risk of a f all f rom height, the water basin shall either: include protection from f alling or be located away f rom public gathering spaces. [4561573] C295: Water basins shall redirect f low when there is excessiv e water in the water basin [4561574]	C326: The basin batters are flatter than 4H:1V (current design 5:1 and 300mm deep)		All water basins hav e also been designed with consideration of f lood ev ents and are in accordance with AEP and climate change modelling. This is applicable to normal operations and during a 1:100 rain ev ent. These basins also redirect f low when there is excessiv e water or risk of ov erflow. With the ev idence abov e, this hazard is considered to be managed SFAIRP.	Resolv ed for Design	SD-0001: Stormwater Drainage and Water Quality Design		Severe - C2	Very Unlikely - L5	C	[2025/07/29] [redacted] SD-0001 DSVR Removed control C278 from the rejected categorisation. However, it will not be reinstated as a standalone control considering it is now cov ered by control C294. [2025/04/14] [redacted] Replaced control C332 with C294 as it is considered to be cov ered. Added control C295 which redirects excessiv e water. [2025/02/13] [redacted] Added control C332 which describes the design change of the basin. Rejected controls C278 and C332 due to being superseded by C332.	
PLR2-114	PLR2 EW - Preliminary Hazard Analysis Workshop 1 [PLR2EW-JHGRP-NWW-SF-MIN-000001] PLR2 Enabling Works - Civil Sy stems SID workshop 12/1/24	Archer Park and Hill Rd	Flood	Operations	Normal	HAZ-088: Ov erflow of water basin	CAU-104: Ov erflow of water basin in rain ev ents 1:100 ARI causing injury to person in the v icinity	Injury	C278: Water basins are provided in accordance with the AEP and climate change considerations	C278: 2982265, 2982278	Moderate - C4	Unlikely - L4	C	C294: Water basins are provided with protection to prev ent f alls f rom height or provided away f rom public gathering spaces C295: Water basins redirect f low when there is excessiv e water/risk of ov erflow	C294: Where water basins present a risk of a f all f rom height, the water basin shall either: include protection from f alling or be located away f rom public gathering spaces. [4561573] C295: Water basins shall redirect f low when there is excessiv e water in the water basin [4561574]			This hazard is characterised by the occurrence of a statistically rare 1:100 ARI rain ev ent. As a direct mitigation, all water basins have been designed with this ty pe of ev ent as a consideration and are in accordance with AEP and climate change modelling. The water basins also consider members of the public and are are designed with measures to reduce the risk of a f all f rom height or drowning. This is applicable to normal operations and during a 1:100 rain ev ent. Furthermore, this hazard is further mitigated if Archer Park is closed during these 1:100 rain ev ents. There are no further mitigations that can be reasonably taken by PLR2 EW. The risk rating for this hazard has been reduced to be broadly acceptable and is considered to be managed SFAIRP.	Resolv ed for Design	SD-0001: Stormwater Drainage and Water Quality Design		Moderate - C4	Very Unlikely - L5	D	[2025/07/29] [redacted] SD-0001 DSVR Removed ADC A060 as it has now been cancelled as it does not provide context or help manage the risk. [2025/04/14] [redacted] Remov ed control C309 as it is considered to already be cov ered under C295. [2024/11/05] [redacted] PHA 1 Added control C309 as a means of ensure low f low into detention basin	
PLR2-123	PLR2 EW - Preliminary Hazard Analysis Workshop 1 [PLR2EW-JHGRP-NWW-SF-MIN-000001] PLR2 Enabling Works - Tender Design SID workshop 31/7/24	Archer Park	Flood	Operations	Normal	HAZ-094: People trapped on the boat ramp during a flood / storm ev ent	CAU-112: Wharf Road lev els are lower than the boat ramp	Injury			Moderate - C4	Unlikely - L4	C	C123: Potential f lood warning signage prov ided around the RSM ramp	C123: Flood warning signage shall be around the boat ramp. []			It has been noted that this item is an existing risk in an area outside of the PLR2 EW scope of works. As there are no alterations to be made for the boat ramp, the Hazard Status is considered to be retired.	Retired	RW-0001: Track and Roadworks Alignment Design SD-0001: Stormwater Drainage and Water Quality Design		Moderate - C4	Unlikely - L4	C	[2025/02/18] [redacted] Retired - Confirmed with LL to be an existing hazard in an area outside of the PLR2 EW scope of works.	Boat ramp infrastructure is existing and it is not within scope to upgrade the existing boat ramp.
PLR2-128	PLR2 EW - Derailment Risk Assessment [PLR2EW-JHGRP-NWW-TR-MEM-000004] PLR2 EW - Preliminary Hazard Analysis Workshop 1 [PLR2EW-JHGRP-NWW-SF-MIN-000001]	Wentworth Point Bridge	Collision Derailment Human Factors	Operations	Normal	HAZ-099: LRV/Bus loss of control	CAU-118: Loss of v ehicular adhesion / equalspinning CAU-121: Low v isibility at night and during adv erse weather conditions [redacted]	Multiple injuries on the bus LRV derailment	C273: Track drainage sy stem provided to remov e water from the traffickable surface C352: Electrical sy stems and conduits in accordance with AS/NZ Standards C353: Electrical sy stems and conduits in accordance with the AMB standards	C273: 2982353 C160, 2980777, 2980778, 2980779, 2980780, 2982700, 3897915, 4411613	Major - C3	Very Unlikely - L5	E	C306: Bridge design accounts for appropriate superelev ation/cross f alls in accordance with AGRD – Part 3: Geometric Design	C306: The superelev ation/cross f alls for the bridge shall comply with Austroads Guide to Road Design - Part 3: Geometric Design. [4433401]		This is an operational hazard that details the loss of control. As this is an inherent risk of LRV/bus operations, this hazard cannot be eliminated but is an existing consideration for other shared LRV/bus routes within Sy dney. In order to reduce the likelihood for loss of control, the Maritime Bridge has been designed such that water does not remain on the trafficable areas through track drainage and bridge geometry. In other locations, equalpline assessments have been undertaken and informed the spacing of the trans-v erse drainage collection sy stem to limit equalpline potential. To assist the operators, appropriate lev els of lighting has been prov ided such that dri-ers hav e clear v isibility at all times and are able to maintain consistent control of the v ehicles. This hazard is further mitigated through the operation of LRVs and buses in accordance with procedures and processes ty pical of an accredited RSO/RIM. With the ev idence abov e, this hazard is considered to be managed SFAIRP.	Resolv ed for Design	RW-0001: Track and Roadworks Alignment Design SD-0001: Stormwater Drainage and Water Quality Design	A003: Only licenced bus operators use the PLRC A043: RSO Accredited LRV Operator's operational processes and protocols applied	Major - C3	Very Unlikely - L5	E	[2025/06/25] [redacted] DDR Review Replaced ADCs A004 and A091, and A044 as they are now cancelled and consolidated into A003 and A043 respectiv ely. Updated SFAIRP to include details on spacing of drainage sy stems to reduce equalpaling. [2025/06/02] [redacted] Added ADC A091 to describe that operators will need to consider the gradient and curv e when on the Wentworth Point Approach Structure. [2025/03/07] [redacted] DRA Remov ed control C352-121 to describe lack of v isibility. Added control C165 which describes lighting measures along the project. [2025/02/24] [redacted] Added control C273 to describe track drainage. [2024/11/21] [redacted] Added Initial Risk Rating during session with AW (JHG)	
PLR2-135	PLR2 EW - Future CSR Design for Waratah and Mary St Intersection [PLR2EW-JHGRP-LRPEWRC-SR-MEM-100001] PLR2 EW - Detailed Hazard Analysis Workshop 3 [PLR2EW-JHGRP-NWW-SF-MIN-000006] PLR2 EW - Preliminary Hazard Analysis Workshop 2 [PLR2EW-JHGRP-NWW-SF-MIN-000002]	PLRC	Maintenance Hazards	Operations	Normal	HAZ-102: Maintainer experiences electric shock / electrocution	CAU-131: Water pools in CSR pits	Major injury , potentially f atal to PLR maintainer	C317: Pits are positiv ely drained (i.e. self-draining) C352: Electrical sy stems and conduits in accordance with AS/NZ Standards C353: Electrical sy stems and conduits in accordance with the AMB standards	C317: 2982382, 2982383 C352: 2982033 C353: 2982031	Major - C3	Very Unlikely - L5	E	C354: Lockable CSR pit lids C355: Pits are sealed to prev ent water ingress	C354: CSR pit lids shall be lockable. [4559725] C355: CSR pits shall be sealed to prev ent water ingress. [4559726]		This is a maintenance phase hazard that cannot be eliminated due to the need for CSR. However, this is a ty pical risk that is common for light rail sy stems such that it is an existing consideration within the Sy dney light rail network. This hazard is best prev ented by ensuring water is unable to pool within the CSR pits. As a baseline measure, all CSR / electrical sy stems have been designed in accordance with AMB and AS standards in relation to prev ention of water and moisture. As additional mitigations, CSR pits have been designed to be lockable and sealed to prev ent water ingress. However, in the ev ent that water still manages to pool within the pit, the CSR pits hav e been designed to be positiv ely draining such that water is remov ed without any maintenance interactions. With the ev idence abov e, this hazard is considered to be managed SFAIRP.	Resolv ed for Design	SD-0001: Stormwater Drainage and Water Quality Design CS-0001: Combined Services Route (CSR) Design		Major - C3	Very Unlikely - L5	E	[2025/03/12] [redacted] EHA 3 Added controls C352, C353, C354, and C355. Added ADC A090 to replace rodent resistant wiring control. Remov ed control C318 as this is managed by a future contractor and co-ered under A090 [2025/03/06] [redacted] Added residual risk rating. [2024/11/21] [redacted] Added Initial Risk Rating during session with AW (JHG)	
PLR2-140	PLR2 EW - DDR Road Safety Audit PLR2 EW - PDR Road Safety Audit	Hill Rd and Footbridge Blv d intersection	Collision Human Factors	Operations	Normal	HAZ-068: Car accident (car striking car)	CAU-020: Slippery surfaces, including rail when wet or frosty [redacted] CAU-031: Road driv er inattention or risk taking CAU-032: Illegal road v ehicle manoeuv re (including right hand turns) CAU-033: Changed junction configuration CAU-060: Congestion, signal failure	Fatality	C202: Prov ision of signalised intersection at the Hill Road and Footbridge Boulev ard intersection C205: Traffic able lanes to be a minimum of standard width (3.5m) C246: Road Design dev eloped in accordance with relev ant Austroads standards. C272: Ensuring that the track drainage sy stems are in accordance with the relev ant road authority when located within a road	C202: 2983568, 2983569, 2983681, 2983568 C205: 2983628, 2983529 C246: 2982035 C272: 2982355	Moderate - C4	Likely - L3	E					This hazard details a business-as-usual risk of a car accident at the Hill Road and Footbridge Boulev ard intersection. Car accidents are fairly common and are generally considered across infrastructure projects. Measures have been made in design to reduce the likelihood of this risk from occurring such that the intersection has been designed in accordance with relev ant Austroads standards. As the junction configuration of this intersection has changed, the signalisation of the intersection should assist dri-ers if they are following local road rules. As the wentworth point approach structure is at a gradient and feeds into the intersection, appropriate drainage has been prov ided to reduce the likelihood of water flowing and creating slippery surf aces. Considering this a well documented risk which is heavily influenced by human behav iour, there are no further mitigations that can be reasonably taken by PLR2 EW. This hazard is considered to be managed SFAIRP.	Managed	RW-0001: Track and Roadworks Alignment Design RW-0002: Roadworks Ancillary Civil Design RW-0004: Roadworks Traffic Control Signals (TCS) Design SD-0001: Stormwater Drainage and Water Quality Design	A002: NSW road rules apply to PLRC during normal and emergency operations	Moderate - C4	Likely - L3	E	[2025/02/24] [redacted] New risk to detail the Hill Rd and Footbridge Blv d intersection. PLR2-067 has been combined into this item.	

Appendix H Departures

Not used

Appendix I Concessions

Not used

Appendix J Dynamic Drainage Results – Design Tailwater

12d Dynamic Drainage Results
Hydrology | Return Period | Event | Storms durations run
ILSAX 2 | 5 | | DRAI DES DRAI DES DRAI DES DRAI DESN 60 4569
Notes: All Results are maximums and flows in l/s
Negative Flow Values Indicate Reverse Flows

Node	Node Type	Catchmnet Areas (ha) Area 1	Area 2	Area 3	Area 4	Area 5	Catchment Flow Set 1	Set 2	Set 3	Set 4	Set 5	Approach Flow	Inlet Captured Flow	Efficiencies minor SAG	minor Ongrade	Major SAG	Major Ongrade	Uncapture Flow	Bypass Node	Bypass Flow	Bypass HGL	mid ch	Node HGL	Grate	LOST FLOW	Link HGL Upstream	Link HGL Downstream	Ku (at max	Ku	Flow	Capacity	Velocities Upstream	Link	Downstrea	Flood Widths Upstream	Downstrea	Flooded Depth Depth	DxV	Freeboard
01-1	IP XXX x XXX											0	0	50	80	50	80	0			5.324	0	4.001	5.324		3.767	3.403	2	0.239	561	0.8	1.98	2.22	2.78			0		1.323
01-2	IP XXX x XXX											0	0	50	80	50	80	0			5.237	0	2.679	5.237		2.558	2.455	1.3	0.12	1127	0.6	1.77	2	2.33			0		2.558
01-3	HW											0	0	50	80	50	80	0			1.882	0	2.455	2.932													0		-0.573
02-2	SA2 >450											5	5	50	80	50	80	0			8.837	0	7.314	8.837		7.309	6.817	0.4	0.005	413	0.3	4.13	4.33	4.55			0		1.523
02-3	IP XXX x XXX											0	0	50	80	50	80	0			8.814	0	6.77	8.814		6.768	5.658	0.6	0.003	442	0.4	3.67	3.78	3.92			0		2.044
02-4	IP XXX x XXX											0	0	50	80	50	80	0			7.57	0	5.581	7.57		5.581	4.547	0.2	0	484	0.4	3.87	3.88	3.94			0		1.989
02-5	IP XXX x XXX											0	0	50	80	50	80	0			6.493	0	4.547	6.493		4.522	3.998	0.3	0.024	521	0.4	4.16	2.38	2.48			0		1.946
02-6	IP XXX x XXX											0	0	50	80	50	80	0			5.584	0	3.998	5.584		3.922	3.836	1.4	0.078	571	0.7	1.3	1.39	1.54			0		1.586
02-7	GRATED INLET											0	0	50	80	50	80	0			5.364	0	3.836	5.364		3.663	3.569	1.8	0.171	583	0.7	1.41	1.62	1.98			0		1.528
02-8	IP XXX x XXX											0	0	50	80	50	80	0			5.364	0	3.569	5.364		3.569	3.38	0	0	460		0		0			0		1.795
02-9	IP XXX x XXX											0	0	50	80	50	80	0			5.207	0	3.149	5.207		2.918	2.864	2.5	0.231	581	0.4	1.86	2.19	3.29			0		2.058
03-1	IP XXX x XXX											0	0	50	80	50	80	0			5.351	0	4.066	5.351		4.066	4.001	0	0	0	0	0	0	0			0		1.285
04-1	M.G.T.G. (HAUNCHED)			0.7609		0.0441			547		25	571	562	50	80	50	80	6	LOST	6	5.403	0.249	4.816	5.154		4.272	4.013	3.6	0.559	562	0.9	1.99	2.12	2.41	0.522	0.516	0.249	0.03	0.338
05-1	IP XXX x XXX											0	0	50	80	50	80	0			5.343	0	4.473	5.343		4.473	4.447	0	0	19	0.2	0.82	0.58	0.46			0		0.87
05-2	IP XXX x XXX											0	0	50	80	50	80	0			5.4	0	4.447	5.4		4.445	4.388	0.4	0.003	41	0.3	0.95	0.87	0.8			0		0.953
05-3	IP XXX x XXX											0	0	50	80	50	80	0			5.51	0	4.388	5.51		4.402	4.343	0.7	0.004	70	0.5	1.36	1.29	1.23			0		1.122
07-1	M.G.D.G.					0.0735					-1E+08	42	46	50	80	50	80	0	18-1	0	5.348	0.057	3.96	5.291		3.96	3.889	9.1	0	1604	0.6	3.12	2.99	2.89	0	0	0.057	0	1.331
07-1A	IP XXX x XXX											0	0	50	80	50	80	0			5.921	0	3.889	5.921		3.872	3.734	0.2	0.018	1605	0.7	2.82	2.9	3			0		2.032
07-2	IP XXX x XXX											0	0	50	80	50	80	0			5.749	0	2.255	5.749		1.988	1.865	2.1	0.272	1604	0.6	1.61	1.9	2.42			0		3.494
07-3	HW											0	0	50	80	50	80	0			1.184	0	1.865	2.384													0		-0.681
CONN 08-1	SCUPPER CONN											0	0	50	80	50	80	0			6.945	0	5.81	6.945		5.81	5.792	2.1	0	1	0	0	0	0			0		1.135
CONN 08-1A	SCUPPER CONN											0	0	50	80	50	80	0			6.91	0	5.792	6.91		5.793	5.506	1.6	0	4	0	0	0.86	0.63			0		1.118
CONN 08-2	SCUPPER CONN											0	0	50	80	50	80	0			6.864	0	5.506	6.864		5.507	5.42	0.3	0	5	0.1	0.85	0.65	0.52			0		1.358
CONN 08-3	SCUPPER CONN											0	0	50	80	50	80	0			6.798	0	5.42	6.798		5.42	5.335	0.8	0	9	0.1	1	1.02	1.03			0		1.378
CONN 08-4	SCUPPER CONN											0	0	50	80	50	80	0			6.766	0	5.294	6.766		5.293	5.25	0.5	0.002	18	0.1	1.08	1.03	1			0		1.472
CONN 08-5	SCUPPER CONN											0	0	50	80	50	80	0			6.699	0	5.248	6.699		5.237	5.241	0.6	0.012	28	0.3	0.76	0.7	0.66			0		1.451
CONN 08-6	SCUPPER CONN											0	0	50	80	50	80	0			6.642	0	5.241	6.642		5.234	5.234	0.3	0.007	37	0.4	0.83	0.81	0.79			0		1.401
CONN SC17-1	SCUPPER CONN											0	0	50	80	50	80	0			6.59	0	5.228	6.59		5.226	5.224	0.2	0.003	38	0.4	0.69	0.68	0.71			0		1.362
09-2	ALL IN GRADE											0	0	50	80	50	80	0			8.457	0	7.301	8.457		7.295	7.23	0.2	0.003	6	1.4	0.7	0.76	0.86			0		1.156
09-3	ALL IN GRADE				0.0073					6		6	6	50	80	50	80	0			7.802	0	6.763	7.802		6.678	6.597	3.8	0.087	6	1.4	0.73	0.78	0.88			0		1.039
09-4	ALL IN GRADE											0	0	50	80	50	80	0			7.112	0	6.025	7.112		6.022	5.954	0.2	0.003	6	1.4	0.71	0.76	0.86			0		1.087
09-6	SCUPPER DP											0	0	50	80	50	80	0			6.496	0	5.548	6.496		5.548	5.51	0.2	0.006	7	1.6	0.83	0.88	0.95			0		0.948
09-7	IP XXX x XXX											0	0	50	80	50	80	0			6.157	0	5.064	6.157		5.058	4.961	0.2	0.027	269	0.8	2.22	2.23	2.31			0		1.093
10-1	M.G.S.G.				0.0071					6		6	6	50	80	50	80	0	10-2	18	6.098	0.036	4.961	6.062		4.623	4.405	1.8	0.338	342	1.7	2.15	2.15	2.15	0.861	0.933	0.036	0.04	1.101
10-1A	IP XXX x XXX											0	0	50	80	50	80	0			5.758	0	4.405	5.758		4.356	4.057	0.3	0.05	360	1.7	2.27	2.31	2.38			0		1.353
10-2	GRATED INLET 900X900	0.0222					19					18	17	50	80	50	80	1	10-3	24	4.827	0.042	4.005	4.785		4.005	3.821	0	0	187		0		0	0.933	0.558	0.042	0.06	0.78
10-3	SO1	0.0161				0.0222	13				13	24	21	50	80	50	80	3	LOST	3	3.549	0.022	2.606	3.527		2.562	2.023	1	0.15	403	0.6	3.41	3.5	3.88	0.815	0.815	0.022	0.01	0.921
10-4	IP XXX x XXX											0	0	50	80	50	80	0			2.919	0	2.023	2.919		1.976	1.818	0.3	0.084	523	0.5	3.21	1.85	1.85			0		0.896
10-5	GRATED INLET	0.0273					20					20	20	50	80	50	80	0			3	0	1.818	3		1.538	1.361	2.2	0.28	825	0.9	1.87	1.87	1.87			0		1.182
10-7	IP XXX x XXX											0	0	50	80	50	80	0			1.496	0	1.361	1.496		1.353	1.293	0.2	0.017	797	0.8	1.81	1.81	1.81			0		0.135
10-8	IP XXX x XXX											0	0	50	80	50	80	0			1.784	0	1.293	1.784		1.274	1.188	0.3	0.02	839	1	1.9	1.9	1.9			0		0.491
10-9	DS21>450	0.0067				0.0202	6				12	16	16	50	80	50	80	0	51-1	0	1.77	0.004	1.188	1.766		1.018	0.839	1.2	0.174	877	1.1	1.99	1.99	1.99	0.148	5.988	0.004	0	0.578
10-10	DS24 >450	0.074					-1E+08					61	53	50	80	50	80	0	LOST	0	1.663	0.083	0.839	1.58		0.765	0.675	0.5	0.076	915	0.9	2.1	2.14	2.21	0	0	0.083	0	0.741
10-11	HW											0	0	50	80	50	80	0			0	0	0.675	1.26													0		-0.675
11-1	GRATED INLET 900X900					0.0196					11	0	0	50	100	50	100	0	z BASIN 0	16	3.367	0.067	2.623	3.3		2.623	2.606	0	0	206	1	1.69	1.69	1.7	0	0	0.067	0	0.677
12-1	SO2	0.017			0.0159	0.03	10			14	17	37	37	50	80	50	80	0	12-2	0	3.112	0	2.268	3.112		2.266	2.203	9.7	0.057	37	0.3	0.9	0.94	1.01	0	0	0	0	0.844
13-1	SCUPPER F	0.0045					4					4	1	50	50	50	50	3	13-2	9	16.237	0.033	15.346	16.204		15.346	15.283	0	0	1	0	0	0.29	0	1.236	1.314	0.033	0.01	0.858
13-2	SCUPPER F	0.0073					6					9	2	50	50	50	50	7	13-3	15	16.173	0.036	15.283	16.137		15.283	15.103	0	0	3	0.1	0	0.41	0.29	1.314	1.325	0.036	0.02	0.854
13-3	Grated Trench 2m	0.0097					8					15	12	50	50	50	50	3	13-4	8	15.984	0.026	15.103	15.958		15.103	14.874	0	0	15	0.2	1.31	1.31	1.32	0.958	1.042	0.026	0.02	0.855
13-4	SCUPPER F	0.0088					7					8	3	50	50	50	50	6	13-5	12	15.729	0.028	14.872	15.701		14.872	14.521	0	0	17	0.2	1.57	1.42	1.29	1.042	1.061	0.028	0.02	0.829
13-5	Grated Trench 2m	0.0087					7					12	9	50	50	50	50	3	13-6	9	15.364	0.024	14.521	15.34		14.521	14.094	0	0	26	0.3	1.92	1.85	1.81	0.902	1.052	0.024	0.02	0.819
13-6	SCUPPER F	0.0096					8					9	3	50	50	50	50	6	13-7	13	14.937	0.028	14.094	14.909		14.094	13.673	0	0	29	0.3	1.99	1.79	1.63	1.052	1.061	0.028	0.03	0.815
13-7	Grated Trench 2m	0.0103					9					13	10	50	50	50	50	3	13-8	10	14.5	0.026	13.673	14.474		13.673	13.241	0	0	39	0.5	2.19	2.13	2.07	0.944	1.095	0.026	0.02	0.801
13-8	SCUPPER F	0.0105					9					10	4	50	50	50	50	7	13-9	15	14.068	0.03	13.241	14.038		13.241	12.782	0	0	42	0.5	2.24	2.05	1.9	1.095	1.098	0.03	0.03	0.797
13-9	Grated Trench 2m	0.0113					10					15	11	50	50	50	50	4	13-10	11	13.592	0.026	12.782	13.566		12.782	12.325	0	0	53	0.6	2.4	2.34	2.29	0.976	1.096	0.026	0.02	0.784
13-10	SCUPPER F	0.011					9					11	4	50	50	50	50	7	13-11	15	13.134	0.03	12.325	13.104		12.325	11.901	0	0	57	0.7	2.44	2.28	2.14	1.096	1.101	0.03	0.03	0.779
13-11	Grated Trench 2m	0.0105					9					15	11	50	50	50	50	4	13-12	10	12.693	0.026	11.901	12.667		11.901	11.469	0	0	68	0.8	2.56	2.52	2.47	0.958	1.084	0.026	0.02	0.766
13-12	SCUPPER F	0.0104					9					10	4	50	50	50	50	7	13-13	14	12.261	0.029	11.469	12.232		11.469	11.049	0	0	71	0.8	2.6	2.43	2.28	1.084	1.089	0.029	0.03	0.763
13-13	Grated Trench 2m	0.0103					9					14	11	50	50	50	50	3	13-14	10	11.822	0.026	11.049	11.796		11.051	10.612	0	0	82	1	2.63	2.66	2.69	0.955	1.08	0.026	0.02	0.747
13-14	SCUPPER F	0.0105					9					10	4	50	50	50	50	7	13-15	14	11.39	0.029	10.58	11.361		10.58	10.153	0	0	86	0.7	2.66	2.54	2.44	1.08	1.086	0.029	0.03	0.781
13-15	Grated Trench 2m	0.0103					9					14	11	50	50	50	50	3	13-16	10	10.951	0.026	10.153	10.925		10.153	9.719	0	0	97	0.8	2.75	2.73	2.71	0.955	1.088	0.026	0.02	0.772
13-16	SCUPPER F	0.0105					9					10	2	50	50	50	50	8	13-17	15	10.518	0.029	9.719	10.489		9.719	9.359	0	0	99	0.8	2.77	2.66	2.57	1.088	1.091	0.029	0.03	0.77
13-17	Grated Trench 2m	0.0088					7					15	11	50	50	50	50	3	13-18	8	10.146	0.024	9.359	10.122		9.359	9.026	0	0	111	0.9	2.86	2.83	2.81	0.887	0.892	0.024	0.02	0.763
13-18	SCUPPER F	0.0081					7					8	3	50	50	50	50	5	13-19	9	9.811	0.024	9.026	9.787		9.026	8.833	0	0	112	0.9	2.89	2.85	2.81	0.892	1.123	0.024	0.02	0.761
13-19	Grated Trench 3m	0.0046					4					9	8	50	50	50	50	1	TD13-20.A	12	9.622	0.03	8.833	9.592		8.833	8.725	0	0	120	0.9	2.99	2.99	2.99	1.123	1.123	0.03	0.02	0.759
BB13-19	SCUPPER DP											0	0	50	80	50	80	0			9.736	0	7.879	9.736		7.879	7.783	0	0	122	0.6	2.75	2.75	2.75			0		1.857
RH13-19A	ALL IN GRADE											0	0	50	80	50	80	0			9.359	0	7.606	9.359		7.606	7.458	0	0	122	0.5	2.29	2.29	2.29			0		1.753
13-20	IP XXX x XXX											0	0	50	80	50	80	0			9.075	0	7.449	9.075		7.399	7.308	1.9	0.049	134	0.4	1.33	1.55	1.86			0		1.626
13A-1	IP XXX x XXX											0	0	50	80	50	80	0			9.245	0	6.576	9.245		6.567	6.053	2.1	0.009	186	0.3	2.4	2.45	2.55			0		2.669
13A-2	IP XXX x XXX											0	0	50	80	50	80	0			8.688	0	6.053	8.688		6.053	5.78	0.2	0.002	191	0.5	2.33	2.3	2.3			0		2.635
13A-3	IP XXX x XXX											0	0	50	80	50	80	0			8.013	0	5.78	8.013		5.768	5.585	0.2	0.015	218	0.6	2.37	2.42	2.49			0		2.233
13A-4	IP XXX x XXX											0	0	50	80	50	80	0			7.329	0	5.585	7.329		5.56	5.51	0.2	0.044	225	0.6	2.35	2.36	2.41			0		1.744
13A-5	IP XXX x XXX											0	0	50	80	50	80	0			6.719	0	5.51	6.719		5.486	5.343	0.2	0.047	240	0.6	2.55	1.72	1.61			0		1.209
13A-6	IP XXX x XXX											0	0	50	80	50	80	0			6.205	0	5.343	6.205		5.132	5.064	2	0.231	269	0.7	1.69	1.78	2.42			0		0.862
13B-1	IP XXX x XXX											0	0	50	80	50	80	0			6.015	0	5.35	6.015		5.35	5.35	1.4	0.02	31	0.2	1.3	0.56	0.41			0		0.665
13B-2	IP XXX x XXX											0	0	50	80	50	80	0			6.102	0	5.35	6.102		5.348	5.343	0.4	0.02	58	0.3	1.31	0.83	0.89			0		0.752
14-1	SCUPPER F	0.0047					4					4	1	50	50	50	50	3	14-2	11	16.238	0.035	15.362	16.203		15.362	15.273	0	0	1	0	0	0.29	0	1.279	1.299	0.035	0.02	0.841
14-2	SCUPPER F	0.0091					8					11	3	50	50	50	50	8	14-3	15	16.141	0.035	15.273	16.106		15.273	15.102	0	0	4	0.1	0	0.45	0.32	1.299	1.31	0.035	0.02	0.833
14-3	Grated Trench 2m	0.0093					8					15	12	50	50	50	50	3	14-4	9	15.94	0.026	15.102	15.914		15.102	14.813	0	0	16	0.2	1.43	1.43	1.43	0.971	1.068	0.026	0.02	0.812
14-4	SCUPPER F	0.0088					7					9	3	50	50	50	50	6	14-5	13	15.654	0.029	14.812	15.625		14.812	14.44	0	0	18	0.2	1.64	1.48	1.35	1.068	1.068	0.029	0.02	0.813
14-5	Grated Trench 2m	0.0093					8					13	10	50	50	50	50	3	14-6	9	15.268	0.024	14.44	15.244		14.44	13.974	0	0	27	0.3	2.01	1.99	1.94	0.895	1.055	0.024	0.02	0.804
14-6	SCUPPER F	0.0092					8					9	3	50	50	50	50	6	14-7	14	14.799	0.029	13.974	14.77		13.974	13.452	0	0	30	0.3	2.12	1.89	1.71	1.055	1.061	0.029	0.03	0.796
14-7	Grated Trench 2m	0.0112					10					14	11	50	50	50	50	3	14-8	11	14.265	0.026	13.452	14.239		13.452	12.934	0	0	41	0.5	2.32	2.25	2.19	0.958	1.077	0.026	0.02	0.787
14-8	SCUPPER F	0.011					9					11	4	50	50	50	50	7	14-9	15	13.742	0.029	12.934	13.713		12.934	12.454	0	0	45	0.5	2.38	2.19	2.03	1.077	1.076	0.029	0.03	0.779
14-9	Grated Trench 2m	0.0105					9					15	11	50	50	50	50	4	14-10	11	13.244	0.026	12.454	13.218		12.454	11.965	0	0	56	0.6	2.54	2.49	2.44	0.943	1.066	0.026	0.02	0.764
14-10	SCUPPER F	0.0103					9					11	4	50	50	50	50	7	14-11	15	12.753	0.029	11.965	12.724		11.965	11.483	0	0	60	0.7	2.59	2.43	2.29	1.066	1.073	0.029	0.03	0.759
14-11	Grated Trench 2m	0.0104					9					15	11	50	50	50	50	3	14-12	10	12.256	0.026	11.483	12.231		11.483	10.997	0	0	71	0.8	2.71	2.63	2.55	0.944	1.063	0.026	0.02	0.748
14-12	SCUPPER F	0.0104					9					10	4	50	50	50	50	7	14-13	15	11.767	0.029	10.997	11.738		10.997	10.501	0	0	74	0.8	2.68	2.71	2.74	1.063	1.069	0.029	0.03	0.741
14-13	Grated Trench 2m	0.0103					9					15	11	50	50	50	50	3	14-14	10	11.27	0.025	10.481	11.245		10.481	9.99	0	0	85	0.6	2.77	2.73	2.69	0.941	1.028	0.025	0.02	0.764
14-14	SCUPPER F	0.0104					9					10	4	50	50	50	50	7	14-15	13	10.779	0.028	9.99	10.751		9.99	9.582	0	0	89	0.7	2.8	2.69	2.58	1.028	1.042	0.028	0.03	0.761
14-15	Grated Trench 2m	0.0087					7					13	10	50	50	50	50	3	14-16	5	10.354	0.019	9.582	10.335		9.582	9.438	0	0	100	0.7	2.88	2.77	2.67	0.691	0.71	0.019	0.01	0.753
14-16	SCUPPER F	0.0033					3					5	2	50	50	50	50	3	zBP TD14	3	10.205	0.016	9.438	10.189		9.438	9.35	0	0	100	0.8	2.71	2.71	2.71	0.58	0.565	0.016	0.01	0.751
BB14-16	SCUPPER DP											0	0	50	80	50	80	0			10.088	0	8.6	10.088		8.499	8.375	2.1	0.101	100	0.5	1.65	1.88	2.79			0		1.488
RH14-17	ALL IN GRADE											0	0	50	80	50	80	0			10.188	0	8.288	10.188		8.274	8.257	0.2	0.015	102	0.9	1.56	1.62	1.69			0		1.9
RH14-17A	SCUPPER DP											0	0	50	80	50	80	0			10.136	0	5.549	10.136		5.379	5.351	2.1	0.172	102	1	1.3	1.38	1.56			0		4.586
14-17	M.G.S.G.											0	0	50	80	50	80	0			5.422	0	3.784	5.422		3.742	3.593	2.1	0.041	102	0.5	1.32	1.53	1.84			0		1.638
14-17A	M.G.S.G. (HAUNCHED)											0	0	50	80	50	80	0			5.427	0	3.129	5.427		2.971	2.925	2.1	0.159	374	0.9	1.32	1.32	1.42			0		2.298
14-18	GRATED INLET 900X900											0	0	50	80	50	80	0			4.087	0	2.925	4.087		2.862	2.578	2	0.069	375	0.9	1.34	1.33	1.33			0		1.162
14-19	GRATED INLET											0	0	50	80	50	80	0			3.373	0	2.578	3.373		2.578	2.336	0	0	258		0		0			0		0.795
14-20	IP XXX x XXX											0	0	50	80	50	80	0			3.03	0	1.368	3.03		1.364	1.161	0.5	0.003	373	0.4	2	2.05	2.1			0		1.662
14-21	HW											0	0	50	80	50	80	0			0.844	0	1.161	1.594													0		-0.317
15-1	SCUPPER F	0.0101					9					27	6	50	50	50	50	21	zBP AD15	22	9.16	0.036	8.408	9.124		8.408	7.63	7	0	6	0	1.35	1.09	0.91	1.341	1.4	0.036	0.03	0.716
15-2	SCUPPER F	0.0087					7					28	6	50	50	50	50	23	zBP AD15	24	8.368	0.035	7.63	8.333		7.63	6.831	2.2	0	11	0.1	1.84	1.5	1.26	1.308	1.339	0.035	0.04	0.703
15-3	SCUPPER F	0.0066					6					29	6	50	50	50	50	23	zBP AD17	25	7.568	0.036	6.831	7.532		6.83	6.468	1.6	0	17	0.1	1.9	1.95	2.01	1.325	1.307	0.036	0.04	0.701
16-1	SO2	0.0484			0.0463	0.0598	28			39	34	92	91	50	80	50	80	0	12-1	37	3.659	0.042	3.032	3.617		2.778	2.656	9.1	0.26	92	0.5	0.91	1.05	1.68	1.563	1.564	0.042	0.05	0.585
17-1	SCUPPER DP											0	0	50	80	50	80	0			6.627	0	5.193	6.627		5.18	5.15	1.9	0.02	38	0.5	0.74	0.81	0.89			0		1.434
17-2	SCUPPER DP											0	0	50	80	50	80	0			6.6	0	5.15	6.6		5.143	5.141	0.2	0.007	39	0.5	0.87	0.82	0.77			0		1.45
17-3	SCUPPER DP											0	0	50	80	50	80	0			6.561	0	5.141	6.561		5.139	5.094	0.5	0.002	59	0.7	1.01	1.01	1.01			0		1.42
17-4	SCUPPER DP											0	0	50	80	50	80	0			6.525	0	5.094	6.525		5.095	5.062	0.2	0.001	62	0.7	1.03	1.04	1.07			0		1.431
17-5	SCUPPER DP											0	0	50	80	50	80	0			6.493	0	5.062	6.493		5.058	5.013	0.2	0.005	64	0.8	1.05	0.98	0.93			0		1.431
17-7	SCUPPER DP											0	0	50	80	50	80	0			6.452	0	5.013	6.452		5.009	4.963	1.7	0.003	77	0.9	1.11	1.14	1.16			0		1.439
17-8	SCUPPER DP											0	0	50	80	50	80	0			6.483	0	4.963	6.483		4.955	4.894	0.2	0.007	86	1	1.28	1.35	1.44			0		1.52
17-9	M.G.S.G.											0	0	50	80	50	80	0			4.984	0	3.856	4.984		3.846	3.656	2.1	0.078	110	0.8	1.16	1.16	1.21			0		1.128
17-13	M.G.S.G.											0	0	50	80	50	80	0			4.82	0	3.656	4.82		3.652	3.572	0.4	0.022	120	0.8	1.39	1.42	1.46			0		1.164
17-15	M.G.S.G.											0	0	50	50	50	50	0			4.708	0	3.572	4.708		3.566	3.553	0.2	0.015	121	0.5	1.27	1.22	1.19			0		1.136
17-16	M.G.S.G.											0	0	50	50	50	50	0			4.652	0	3.553	4.652		3.547	3.533	0.2	0.013	126	0.5	1.24	1.18	1.14			0		1.099

Node	Node Type	Catchmnet Areas (ha)					Catchment Flow					Approach	Inlet	Efficiencies minor		Major		Uncapture	Bypass	Bypass	Bypass		Node		LOST	Link HGL		Ku				Velocities			Flood Widths		Flooded Depth		Freeboard
		Area 1	Area 2	Area 3	Area 4	Area 5	Set 1	Set 2	Set 3	Set 4	Set 5	Flow	Captured Flow	SAG	Ongrade	SAG	Ongrade	Flow	Node	Flow	HGL	mid ch	HGL	Grate	FLOW	Upstream	Downstream	(at max	Ku	Flow	Capacity	Upstream	Link	Downstrea	Upstream	Downstrea	Depth	DxV	
17-17	M.G.S.G.											0	0	50	80	50	80	0			4.596	0	3.533	4.596		3.523	3.497	0.5	0.027	145	0.6	1.27	1.27	1.3			0		1.063
17-18	M.G.S.G.											0	0	50	50	50	50	0			4.534	0	3.497	4.534		3.489	3.47	0.2	0.014	147	0.6	1.28	1.25	1.23			0		1.037
17-19	M.G.S.G.											0	0	50	50	50	50	0			4.717	0	3.47	4.717		3.463	3.439	0.2	0.014	151	0.6	1.27	1.23	1.2			0		1.247
17-20	M.G.S.G.											0	0	50	50	50	50	0			4.848	0	3.439	4.848		3.433	3.405	0.2	0.014	157	0.7	1.3	1.26	1.23			0		1.409
17-21	M.G.S.G.											0	0	50	80	50	80	0			4.903	0	3.405	4.903		3.401	3.39	1.1	0.013	166	0.5	1.23	1.08	0.97			0		1.498
17-22	M.G.S.G.											0	0	50	80	50	80	0			4.855	0	3.39	4.855		3.339	3.307	2.1	0.079	186	0.5	1.09	1.22	1.39			0		1.465
17-24	M.G.S.G. (HAUNCHED)	0.0723					61					61	61	50	80	50	80	0			4.625	0	3.307	4.625		3.229	3.163	2.2	0.122	242	0.5	1.55	1.31	1.39			0		1.318
17-25	M.G.S.G. (HAUNCHED)											0	0	50	80	50	80	0			5.349	0	3.163	5.349		3.156	3.129	0.2	0.011	243	0.5	1.1	0.86	0.86			0		2.186
18-1	GRATED INLET 900X900	0.0225					19					0	0	50	80	50	80	0			5.622	0	5.05	5.622		5.05	5.049	0.2	0.007	-27	-0.2	0.96	0.49	0.33			0		0.572
18-1A	GRATED INLET 900X900					0.0559					32	19	26	50	80	50	80	0	18-1	0	5.433	0.046	5.049	5.387		5.038	5.037	9.7	0.04	39	0.3	0.85	0.77	0.8	0	0	0.046	0	0.338
18-2	GRATED INLET 900X600	0.0213					18					18	28	50	80	50	80	0	18-1A	0	5.655	0.054	5.037	5.601		5.027	5.016	7	0.051	54	0.3	0.97	0.93	0.91	0	0	0.054	0	0.564
18-2A	GRATED INLET 900X600	0.0275					23					23	23	50	80	50	80	0			5.725	0	5.016	5.725		4.996	4.961	5.9	0.062	69	0.5	1.1	0.89	0.95			0		0.709
19-1	IP XXX x XXX											0	0	50	80	50	80	0			6.902	0	5.211	6.902		5.211	5.118	0	0	18	0.1	0.88	0.76	0.69			0		1.691
19-2	IP XXX x XXX											0	0	50	80	50	80	0			6.792	0	5.118	6.792		5.118	5.016	0	0	33	0.3	0.96	0.96	0.97			0		1.674
19-3	IP XXX x XXX											0	0	50	80	50	80	0			6.652	0	5.003	6.652		5.003	4.574	0	0	55	0.3	1.52	1.52	1.52			0		1.649
19-4	IP XXX x XXX											0	0	50	80	50	80	0			6.284	0	4.555	6.284		4.555	3.831	0	0	76	0.3	2.09	2.07	2.06			0		1.729
19-5	IP XXX x XXX											0	0	50	80	50	80	0			5.543	0	3.831	5.543		3.831	3.032	0	0	112	0.4	2.54	2.54	2.54			0		1.712
19-6	GRATED INLET 900X900	0.0282					24					24	24	50	80	50	80	0			4.825	0	2.406	4.825		2.412	2.351	6.5	0.011	133	0.6	1.51	1.49	1.46			0		2.419
20-1	SA1	0.0233					20					19	17	50	80	50	80	2	zBP22-1	2	3.097	0.02	2.224	3.077		2.221	2.188	9.7	0.006	17	0.1	0.76	0.77	0.78	0.243	6.752	0.02	0.01	0.853
21-1	SAS	0.0298				0.0063	26				3	27	27	50	80	50	80	0			2.107	0.05	1.195	2.057		1.187	1.188	7	0.058	25	0.1	1.35	0.25	0.15			0.05		0.862
22-1	SA2 >450	0.0199					17					18	18	50	80	50	80	0	zBP36-2.L	0	2.438	0	1.924	2.438		1.92	1.913	3.1	0.004	19	0.1	0.17	0.17	0.17	0	0	0	0	0.514
23-1	GRATED INLET 900X900					0.0017					1	0	0	50	80	50	80	0	LOST	0	2.6	0	2.158	2.6		2.036	2.023	4	0.171	127	0.2	1.33	1.66	2.41	0	0	0	0	0.442
24-1	F2 >450											0	0	50	80	50	80	0			4.904	0	3.509	4.904		3.509	3.016	0	0	15	0.1	1.33	1.33	1.33			0		1.395
24-2	F2 >450	0.0124					11					10	9	50	80	50	80	0	zBP20-1	0	4.352	0.008	2.254	4.344		2.254	2.21	3.2	0.005	24	0.2	0.88	0.88	0.88	0.279	1.216	0.008	0	2.09
10-2	GRATED INLET 900X900	0.0222					19					18	17	50	80	50	80	1	10-3	24	4.827	0.042	4.005	4.785		4.005	3.821	0	0	187		0		0	0.933	0.558	0.042	0.06	0.78
26-1	GPT											0	0	50	80	50	80	0			4.845	0	3.981	4.845		3.656	3.313	4	0.324	187	0.6	1.69	2.01	2.89			0		0.864
27-1	SA2	0.0064			0.0154	0.0086	4			13	5	20	20	50	80	50	80	0	16-1	92	5.86	0.072	4.769	5.788		4.754	4.657	9.7	0.015	20	0.1	0.87	1.01	1.21	2.295	2.295	0.072	0.1	1.019
28-5	SO1											53	53	50	80	50	80	0	zBP 10-8	22	2.299	0.025	1.325	2.274		1.295	1.293	8.4	0.034	53	0.2	0.33	0.33	0.33	0.929	1.662	0.025	0.03	0.949
14-19	GRATED INLET											0	0	50	80	50	80	0			3.373	0	2.578	3.373		2.578	2.336	0	0	258		0		0			0		0.795
29-1	GPT											0	0	50	80	50	80	0			3.163	0	2.563	3.163		2.363	2.313	4	0.256	124	1	1.12	1.24	1.52			0		0.6
29-2	GPT											0	0	50	80	50	80	0			2.997	0	2.313	2.997		2.091	2.025	4	0.222	115	0.9	1.05	1.17	1.48			0		0.684
30-1	SCUPPER ATL				0.0047					4		4	3	50	50	50	50	1	30-2	4	13.533	0.018	13.046	13.515		13.046	12.81	0	0	3	0.1	0	0.88	0	0.676	0.69	0.018	0.01	0.469
30-2	SCUPPER ATL				0.0036					3		4	3	50	50	50	50	1	30-3	4	13.315	0.018	12.81	13.297		12.81	12.574	0	0	6	0.1	0	1.2	1.06	0.659	0.669	0.018	0.01	0.487
30-3	SCUPPER ATL				0.0037					3		4	3	50	50	50	50	1	30-4	4	13.056	0.017	12.574	13.039		12.574	12.334	0	0	9	0.2	1.58	1.43	1.31	0.634	0.717	0.017	0.01	0.465
30-4	SCUPPER ATL				0.0033					3		4	3	50	50	50	50	1	30-5	5	12.799	0.019	12.334	12.78		12.334	12.098	0	0	12	0.3	1.71	1.54	1.4	0.717	0.737	0.019	0.01	0.446
30-5	SCUPPER ATL				0.0046					4		5	4	50	50	50	50	1	30-6	3	12.575	0.017	12.098	12.558		12.098	11.862	0	0	16	0.3	1.82	1.73	1.65	0.613	0.616	0.017	0.01	0.46
30-6	SCUPPER ATL				0.0028					2		3	3	50	50	50	50	1	30-7	3	12.317	0.016	11.862	12.301		11.862	11.618	0	0	18	0.4	1.93	1.83	1.74	0.601	0.636	0.016	0.01	0.439
30-7	SCUPPER ATL				0.0031					3		3	3	50	50	50	50	1	30-8	4	12.058	0.017	11.618	12.041		11.618	11.378	0	0	21	0.5	1.98	1.89	1.81	0.636	0.642	0.017	0.01	0.423
30-8	SCUPPER ATL				0.0035					3		4	3	50	50	50	50	1	30-9	4	11.817	0.017	11.378	11.8		11.378	11.138	0	0	24	0.5	2.04	1.96	1.88	0.633	0.662	0.017	0.01	0.422
30-9	SCUPPER ATL				0.0033					3		4	3	50	50	50	50	1	30-10	4	11.58	0.018	11.138	11.562		11.138	10.898	0	0	26	0.6	2.1	2.01	1.93	0.662	0.673	0.018	0.01	0.424
30-10	SCUPPER ATL				0.004					3		4	3	50	50	50	50	1	30-11	4	11.32	0.017	10.898	11.303		10.898	10.658	0	0	29	0.6	2.15	2.07	2	0.638	0.644	0.017	0.01	0.405
30-11	SCUPPER ATL				0.0032					3		4	3	50	50	50	50	1	30-12	4	11.061	0.017	10.658	11.044		10.658	10.418	0	0	32	0.7	2.19	2.12	2.06	0.644	0.671	0.017	0.01	0.386
30-12	SCUPPER ATL				0.0033					3		4	3	50	50	50	50	1	30-13	4	10.842	0.018	10.418	10.824		10.418	10.18	0	0	35	0.8	2.23	2.16	2.09	0.671	0.684	0.018	0.01	0.406
30-13	SCUPPER ATL				0.0042					4		4	3	50	50	50	50	1	30-14	4	10.583	0.017	10.18	10.566		10.18	9.94	0	0	38	0.8	2.28	2.2	2.14	0.625	0.66	0.017	0.01	0.386
30-14	SCUPPER ATL				0.0031					3		4	3	50	50	50	50	1	30-15	4	10.325	0.018	9.94	10.307		9.94	9.777	0	0	41	0.9	2.3	2.21	2.14	0.66	1.288	0.018	0.01	0.367
30-15	SCUPPER ATL				0.0034					3		4	3	50	50	50	50	1	zBP AD15	19	10.202	0.035	9.777	10.167		9.777	9.632	0	0	44	1	2.28	2.28	2.28	1.288	1.418	0.035	0.03	0.39
30-16	SCUPPER ATL											0	0	50	80	50	80	0			10.009	0	9.629	10.009		9.629	9.523	0	0	44	0.9	2.39	2.33	2.29			0		0.38
SC30-16 dp.1	SCUPPER DP											0	0	50	80	50	80	0			9.906	0	9.523	9.906		9.523	9.426	0	0	44	1	2.31	2.29	2.29			0		0.383
SC30-16 dp.2	SCUPPER CONN											0	0	50	80	50	80	0			9.949	0	9.426	9.949		9.426	9.403	0	0	45	1	2.32	2.32	2.32			0		0.523
BB30-17	SCUPPER DP											0	0	50	80	50	80	0			9.926	0	8.502	9.926		8.502	8.412	0	0	45	0.4	2.27	2.27	2.27			0		1.424
RH30-17	ALL IN GRADE											0	0	50	80	50	80	0			9.788	0	8.214	9.788		8.214	8.201	0	0	45	0.7	1.4	1.4	1.4			0		1.574
RH30-17A	SCUPPER DP											0	0	50	80	50	80	0			9.788	0	5.464	9.788		5.38	5.329	2.1	0.084	44	0.7	0.94	1.08	1.41			0		4.324
CONN 31-5	SCUPPER CONN											0	0	50	80	50	80	0			7.816	0	6.786	7.816		6.787	6.419	0.2	0	24	0.2	2.13	1.92	1.76			0		1.029
CONN31-6	SCUPPER CONN											0	0	50	80	50	80	0			7.548	0	6.419	7.548		6.417	6.305	0.3	0.002	26	0.2	1.91	1.64	1.44			0		1.129
35-1	SO2	0.0288					24					29	29	50	80	50	80	0	zBP 44-1	0	5.79	0	4.708	5.79		4.708	4.587	0	0	29	0.2	0.92	0.89	0.88	1.118	1.64	0	0.01	1.082
36-1	ALL IN SAG											0	5	50	80	50	80	0	37-4	0	2.074	0.001	2.008	2.073		1.93	1.828	1.3	0.111	59	0.4	1.48	1.48	1.48	0.925	0.335	0.001	0	0.065
AD36-1.A	ALL IN GRADE	0.0464					39					39	39	50	80	50	80	0			2.237	0	2.141	2.237		2.138	2.012	9.3	0.016	38	0.2	1.09	0.96	0.91			0		0.096
AD36-1.B	ALL IN GRADE											0	0	50	80	50	80	0			2.103	0	2.012	2.103		2.008	2.008	0.2	0.007	38	0.3	0.94	0.89	0.86			0		0.091
AD36-2.A	ALL IN GRADE	0.0198					17					17	17	50	80	50	80	0			2.141	0	2.03	2.141		1.992	2.008	9.7	0.047	16	0.1	0.82	0.49	0.36			0		0.111
37-1	SA2	0.0109					9					16	16	50	80	50	80	0	zBP37-2.F	1	1.97	0.019	1.891	1.951		1.888	1.887	3.2	0.004	17	0.1	0.15	0.15	0.15	1.069	1.992	0.019	0.01	0.06
37-2	SAS	0.0246				0.0015	21				0	11	11	50	80	50	80	0	zBP37-3	0	1.959	0.027	1.887	1.932		1.883	1.881	1.2	0.004	28	0.1	0.25	0.25	0.25	0	0	0.027	0	0.045
37-3	SA2	0.0171				0.0105	15				6	21	21	50	80	50	80	0	zBP37-2.L	0	1.981	0.013	1.881	1.968		1.871	1.859	1.2	0.011	48	0.3	0.44	0.44	0.44	0.376	1.434	0.013	0.01	0.087
37-4	SA2	0.0078				0.0012	6				1	2	2	50	80	50	80	0	37-3	18	2.102	0.046	1.859	2.056		1.846	1.839	1.4	0.015	50	0.3	0.45	0.45	0.45	1.702	1.679	0.046	0.02	0.197
38-1	GRATED INLET 900X900					0.0669					38	0	0	50	80	50	80	0			2.3	0	2.149	2.3		2.131	1.913	1.2	0.019	163	0.8	1.48	1.48	1.48			0		0.151
38-2	IP XXX x XXX											0	0	50	80	50	80	0			2.264	0	1.913	2.264		1.896	1.837	0.2	0.022	171	0.7	1.55	1.55	1.55			0		0.351
41-1	SAS >450	0.0171					15					14	73	50	80	50	80	0	51-1	0	1.807	0.087	0.881	1.72		0.759	0.675	8.5	0.122	73	0.6	0.66	0.67	0.67	0	0	0.087	0	0.839
41-2	HW											0	0	50	80	50	80	0			0.32	0	0.675	0.694													0		-0.355
44-1	SO2	0.0211					18					10	10	50	80	50	80	0	TD05-3.A	39	5.783	0.053	4.587	5.73		4.565	4.272	1.7	0.023	59	0.2	1.45	1.64	1.88	1.95	1.74	0.053	0.02	1.143
02-8	IP XXX x XXX											0	0	50	80	50	80	0			5.364	0	3.569	5.364		3.569	3.38	0	0	460		0		0			0		1.795
45-1	IP XXX x XXX											0	0	50	80	50	80	0			5.362	0	3.558	5.362		3.475	3.413	2	0.155	138	0.8	1.25	1.38	1.71			0		1.804
45-2	GPT											0	0	50	80	50	80	0			5.186	0	3.413	5.186		3.202	3.149	4	0.235	120	0.5	1.08	1.32	2.05			0		1.773
46-1	GRATED INLET 900X900											0	0	50	80	50	80	0			4.35	0	3.354	4.35		3.312	3.213	2.1	0.045	130	0.2	1.83	2.11	2.56			0		0.996
46-2	HW											0	0	50	80	50	80	0			3.064	0	3.213	3.588													0		-0.149
47-1	SCUPPER ATL				0.0026					2		3	2	50	50	50	50	0	47-2	3	12.924	0.017	12.434	12.907		12.434	12.226	0	0	2	0.1	0	0.71	0	0.639	0.645	0.017	0.01	0.473
47-2	SCUPPER ATL				0.0036					3		3	3	50	50	50	50	1	47-3	4	12.73	0.017	12.226	12.713		12.226	12.019	0	0	5	0.1	0	1.04	0.91	0.639	0.662	0.017	0.01	0.487
47-3	SCUPPER ATL				0.0035					3		4	3	50	50	50	50	1	47-4	4	12.505	0.018	12.019	12.487		12.019	11.811	0	0	8	0.2	1.42	1.26	1.13	0.662	0.674	0.018	0.01	0.468
47-4	SCUPPER ATL				0.0038					3		4	3	50	50	50	50	1	47-5	4	12.28	0.018	11.811	12.262		11.811	11.601	0	0	11	0.3	1.57	1.43	1.32	0.666	0.68	0.018	0.01	0.451
47-5	SCUPPER ATL				0.0036					3		4	3	50	50	50	50	1	47-6	4	12.054	0.018	11.601	12.036		11.601	11.391	0	0	13	0.3	1.68	1.56	1.46	0.68	0.694	0.018	0.01	0.435
47-6	SCUPPER ATL				0.0035					3		4	3	50	50	50	50	1	47-7	4	11.858	0.018	11.391	11.84		11.391	11.181	0	0	16	0.4	1.77	1.67	1.57	0.66	0.67	0.018	0.01	0.449
47-7	SCUPPER ATL				0.0035					3		4	3	50	50	50	50	1	47-8	4	11.633	0.018	11.181	11.615		11.181	10.971	0	0	19	0.5	1.85	1.75	1.67	0.661	0.672	0.018	0.01	0.434
47-8	SCUPPER ATL				0.0036					3		4	3	50	50	50	50	1	47-9	4	11.407	0.018	10.971	11.389		10.971	10.76	0	0	22	0.5	1.92	1.83	1.74	0.655	0.68	0.018	0.01	0.418
47-9	SCUPPER ATL				0.0035					3		4	3	50	50	50	50	1	47-10	4	11.182	0.018	10.76	11.164		10.76	10.551	0	0	25	0.6	1.97	1.89	1.81	0.68	0.694	0.018	0.01	0.404
47-10	SCUPPER ATL				0.0036					3		4	3	50	50	50	50	1	47-11	4	10.986	0.018	10.551	10.968		10.551	10.34	0	0	28	0.7	2.02	1.95	1.87	0.659	0.67	0.018	0.01	0.417
47-11	SCUPPER ATL				0.0035					3		4	3	50	50	50	50	1	47-12	4	10.76	0.018	10.34	10.742		10.34	10.129	0	0	31	0.7	2.07	2	1.93	0.657	0.668	0.018	0.01	0.402
47-12	SCUPPER ATL				0.0035					3		4	3	50	50	50	50	1	47-13	4	10.535	0.018	10.129	10.517		10.129	9.918	0	0	34	0.8	2.11	2.04	1.97	0.66	0.673	0.018	0.01	0.388
47-13	SCUPPER ATL				0.0035					3		4	3	50	50	50	50	1	47-14	4	10.313	0.018	9.918	10.295		9.918	9.709	0	0	36	0.8	2.14	2.07	2.01	0.673	0.686	0.018	0.01	0.377
47-14	SCUPPER ATL				0.0034					3		4	3	50	50	50	50	1	47-15	3	10.112	0.016	9.709	10.096		9.709	9.563	0	0	39	0.9	2.17	2.12	2.07	0.602	0.6	0.016	0.01	0.387
47-15	SCUPPER ATL	0			0.0024		-1E+08			2		3	2	50	50	50	50	0	47-16	2	9.952	0.015	9.563	9.937		9.563	9.423	0	0	42	1	2.19	2.19	2.19	0.552	0.608	0.015	0.01	0.374
47-16	SCUPPER ATL				0.0024					2		2	2	50	50	50	50	0	47-17	3	9.805	0.016	9.374	9.789		9.374	9.179	0	0	44	0.5	2.24	2.2	2.16	0.608	0.606	0.016	0.01	0.415
47-17	SCUPPER ATL				0.0032					3		3	2	50	50	50	50	0	47-18	3	9.615	0.016	9.179	9.599		9.179	8.985	0	0	46	0.6	2.28	2.23	2.19	0.596	0.594	0.016	0.01	0.42
47-18	SCUPPER ATL	0			0.0031		0			3		3	3	50	50	50	50	1	47-19	3	9.384	0.015	8.985	9.369		8.985	8.884	0	0	48	0.6	2.31	2.27	2.23	0.559	0.836	0.015	0.01	0.384
47-19	Grated Trench 2m				0.0026					2		3	3	50	50	50	50	0	AD09-2.A	6	9.271	0.023	8.884	9.248		8.884	8.795	0	0	51	0.6	2.34	2.34	2.34	0.836	0.836	0.023	0.01	0.364
47-19dp	SCUPPER DP											0	0	50	80	50	80	0			9.281	0	8.795	9.281		8.795	8.777	0	0	51	0.6	2.35	2.35	2.35			0		0.486
BB47-20	SCUPPER DP											0	0	50	80	50	80	0			9.259	0	7.897	9.259		7.897	7.814	0	0	52	0.5	2.23	2.23	2.23			0		1.362
51-1	SAS	0.0719				0.0078	-2E+08				-2E+08	0	94	50	80	50	80	5	10-10	0	1.374	0.172	1.374	1.202		1.374	1.36	4.9	0.1	85	0.4	0.78	0.77	0.77	0	0	0.172	0	-0.172
52-1	SA3	0.0729					62					895	276	50	80	50	80	619	z10-4	624	4.159	0.108	3.14	4.051		3.006	2.299	4.3	0.145	274	0.5	2.16	2.66	3.54	6.228	6.225	0.108	0.23	0.911
52-2	IP XXX x XXX											0	0	50	80	50	80	0			3.09	0	2.299	3.09		2.258	2.17	0.3	0.072	273	0.5	2.98	3.06	3.17			0		0.791
52-3	SA1					0.0114					7	19	17	50	80	50	80	2	z10-5	27	2.801	0.079	2.17	2.722		2.144	2.037	0.4	0.084	289	0.6	2.59	2.73	2.94	1.458	1.454	0.079	0.04	0.552
52-4	IP XXX x XXX											0	0	50	80	50	80	0			2.525	0	2.037	2.525		1.998	1.818	0.2	0.061	289	0.6	2.89	1.82	1.82			0		0.488
AD09-1.A	LONG DRAIN				0.0075					6		6	6	50	80	50	80	0			9.567	0	9.002	9.567		9.002	8.919	0	0	6	0.4	1.12	1.12	1.12			0		0.565
AD09-2.A	LONG DRAIN				0.0071					6		6	6	50	80	50	80	0	AD09-3.A	0	8.54	0	8.466	8.54		8.466	8.383	0	0	6	0.3	1.08	1.08	1.08	0	0	0	0	0.074
AD09-3.A	LONG DRAIN											0	0	50	80	50	80	0	AD09-4.A	6	7.905	0.021	7.733	7.884		7.733	7.652	0	0	0	0	0	0	0	0.764	0.786	0.021	0.02	0.151
AD09-4.A	LONG DRAIN				0.0071					6		6	6	50	80	50	80	0	AD09-6.A	6	7.215	0.021	7.117	7.194		7.117	7.04	0	0	6	0.5	1.05	1.05	1.05	0.775	0.873	0.021	0.01	0.077
AD09-6.A	LONG DRAIN				0.0069					6		6	6	50	80	50	80	0	10-1	6	6.603	0.024	6.503	6.579		6.503	6.423	0	0	6	0.4	1.06	1.06	1.06	0.873	1.333	0.024	0.01	0.076
TD02-3.A	TRAM DRAIN	0.0414					35					36	36	50	80	50	80	29	zBP TD02	0	8.567	0.002	8.423	8.565		8.422	8.372	0	0	36	3.6	0.91	1.04	1.21	0.482	1.606	0.002	0	0.142
TD02-4.A	TRAM DRAIN	0.0393				0.0169	33				10	46	48	50	80	50	80	46	zBP TD02	0	7.501	0	7.384	7.501		7.384	7.329	0	0	46	5.1	1.02	1.15	1.31	0.301	1.582	0	0	0.117
TD02-5.A	TRAM DRAIN	0.038				0.017	32				10	39	41	50	80	50	80	40	zBP TD02	0	6.417	0.001	6.234	6.416		6.234	6.171	0	0	39	0.5	1.18	1.21	1.25	0.556	1.797	0.001	0	0.182
TD02-6.A	TRAM DRAIN	0.0376				0.0383	32				22	46	49	50	80	50	80	46	zBP TD02	0	5.56	0.001	5.394	5.559		5.394	5.322	0	0	47	0.5	1.26	1.29	1.32	0.269	1.325	0.001	0	0.165
TD02-7.A	TRAM DRAIN	0.0287					24					16	17	50	80	50	80	16	zBP TD02	0	5.4	0	5.148	5.4		5.148	5.107	0	0	16	0.3	0.88	0.9	0.93	0	0	0	0	0.252
TD05-1.A	TRAM DRAIN	0.0252					21					20	21	50	80	50	80	20	zBP TD02	0	5.424	0.001	5.181	5.423		5.181	5.178	0	0	20	2.2	0.99	0.99	1	1.178	1.449	0.001	0.01	0.242
TD05-2.A	TRAM DRAIN	0.028					24					22	23	50	80	50	80	20	zBP TD05	0	5.508	0.001	5.278	5.507		5.278	5.27	0	0	23	2.5	1.03	1.03	1.04	1.252	1.552	0.001	0.01	0.229
TD05-3.A	TRAM DRAIN	0.048					41					30	31	50	80	50	80	29	zBP TD05	0	5.586	0	5.431	5.586		5.431	5.397	0	0	39	3.9	1.24	1.24	1.25	1.322	1.621	0	0.01	0.155
TD08-4.A	TRAM DRAIN	0.0102					9					9	9	50	80	50	80	0			6.959	0	6.644	6.959		6.644	6.429	0	0	9	0.1	1.28	1.28	1.28			0		0.315
TD13-20.A	TRAM DRAIN	0.016					14					12	13	50	80	50	80	12	zBP TD13	0	9.202	0.001	8.854	9.201		8.854	8.688	0	0	12	0.1	1.46	1.46	1.46	0	0	0.001	0	0.347
TD13A-3.A	TRAM DRAIN	0.0308					26					25	26	50	80	50	80	25	zBP TD13	0	8.008	0.001	7.744	8.007		7.744	7.646	0	0	26	0.2	1.45	1.45	1.45	0	0	0.001	0	0.263
TD13A-5.A	TRAM DRAIN	0.0303					26					25	26	50	80	50	80	25	zBP TD13	0	6.718	0	6.51	6.718		6.51	6.469	0	0	26	0.4	0.94	1	1.08	0	0	0	0	0.208
TD13B-1.A	TRAM DRAIN	0.0183					16					11	11	50	80	50	80	11	zBP 35-1	0	6.013	0	5.758	6.013		5.758	5.732	0	0	11	1.1	0.59	0.69	0.81	0.606	1.791	0	0	0.255
TD13B-2.A	TRAM DRAIN	0.0339					29					33	35	50	80	50	80	33	zBP TD13	0	6.103	0.001	5.939	6.102		5.938	5.897	0	0	34	3.4	0.93	1.04	1.18	1.079	1.404	0.001	0.01	0.163
TD17-13.A	TRAM DRAIN	0.0163					-1E+08					18	19	50	80	50	80	18	zBP TD7-	0	6.883	0	6.664	6.883		6.664	6.63	0	0	18	1.9	0.71	0.82	0.96	0.782	1.722	0	0	0.219
TD17-17.A	TRAM DRAIN	0.0141					-1E+08					26	27	50	80	50	80	26	zBP TD17	0	7.103	0	6.893	7.103		6.893	6.852	0	0	26	0.4	0.97	1.02	1.1	0.95	1.263	0	0.01	0.21
TD17-21.A	TRAM DRAIN	0.0093					-1E+08					8	8	50	80	50	80	8	LOST	0	7.441	0	7.13	7.441		7.13	7.031	0	0	8	0.1	1.03	1.03	1.03	0	0	0	0	0.311

Node	Node Type	Catchmnet Areas (ha)					Catchment Flow					Approach	Inlet Captured	Efficiencies minor		Major		Uncapture	Bypass Node	Bypass Flow	Bypass HGL	mid ch	Node HGL	Grate	LOST FLOW
		Area 1	Area 2	Area 3	Area 4	Area 5	Set 1	Set 2	Set 3	Set 4	Set 5	Flow	Flow	SAG	Ongrade	SAG	Ongrade	Flow							
TD17-3.A	TRAM DRAIN											0	5	50	80	50	80	0	TD17-6.A	0	6.66	0.002	6.332	6.658	
TD17-6.A	TRAM DRAIN	0.0057					5					0	0	50	80	50	80	0	zBP TD17	0	6.522	0	6.155	6.522	
TD17-7.A	TRAM DRAIN	0.0206					17					13	14	50	80	50	80	13	SC17-7.A	0	6.46	0	6.21	6.46	
TD17-8.A	TRAM DRAIN	0.0084					7					11	11	50	80	50	80	10	zBP TD17	0	6.506	0.001	6.249	6.505	
TD17-9.A	TRAM DRAIN	0.0307					26					24	25	50	80	50	80	24	zBP TD17	0	6.58	0	6.384	6.58	
TD19-1.A	TRAM DRAIN	0.0164					14					18	19	50	80	50	80	18	zBP TD19	0	6.903	0.001	6.683	6.902	
TD19-2.A	TRAM DRAIN	0.018					15					15	15	50	80	50	80	15	zBP TD19	0	6.792	0	6.558	6.792	
TD19-3.A	TRAM DRAIN	0.0202					17					23	24	50	80	50	80	23	zBP TD19	0	6.675	0.001	6.452	6.674	
TD19-4.A	TRAM DRAIN	0.037					31					22	22	50	80	50	80	22	zBP TD19	0	6.455	0	6.171	6.455	
TD19-5.A	TRAM DRAIN	0.0131					11					11	11	50	80	50	80	0			5.549	0	5.393	5.549	
TD19-5.C	TRAM DRAIN	0.0343					29					27	27	50	80	50	80	24	zBP TD19	0	5.543	0.001	5.391	5.542	
TD24-1.A	TRAM DRAIN	0.018					15					15	15	50	80	50	80	14			4.913	0	4.628	4.913	
TD31-1.A	TRAM DRAIN	0.0182					15					16	17	50	80	50	80	16	zBP TD31	0	9.147	0	8.893	9.147	
TD31-3.A	TRAM DRAIN	0.0168					14					7	7	50	80	50	80	7	zBP TD17	0	8.413	0	8.124	8.413	
TD35-1.A	TRAM DRAIN											0	0	50	80	50	80	0			5.94	0	5.57	5.94	
TD44-1.A	TRAM DRAIN											0	0	50	80	50	80	0	TD44-1.B	0	5.754	0	5.424	5.754	
08-1	SCUPPER F (EXTENDED	0.0044					4					4	1	50	50	50	50	3	zBP 08-1A	3	6.962	0.018	6.128	6.944	
08-1A	SCUPPER F (EXTENDED	0.0049					4					7	3	50	50	50	50	4	SC08-2	4	6.925	0.025	6.078	6.9	
08-2	SCUPPER F (EXTENDED	0.007					6					10	1	50	50	50	50	8	zBP 08-3	8	6.875	0.032	5.774	6.843	
08-3	SCUPPER F (EXTENDED	0.0085					7					15	5	50	50	50	50	11	zBP 08-4	11	6.787	0.037	5.762	6.75	
08-4	SCUPPER F (EXTENDED											0	0	50	50	50	50	0			6.695	0	5.619	6.695	
08-5	SCUPPER ATL	0.0131					11					22	11	50	50	50	50	11	zBP 08-6	11	6.691	0.049	5.579	6.642	
08-6	SCUPPER ATL	0.0108					9					19	10	50	50	50	50	9	zBP SC17	10	6.642	0.043	5.427	6.599	
SC17-1.A	SCUPPER F (EXTENDED	0.0069					6					14	2	50	50	50	50	13	zBP SC17	13	6.597	0.044	5.317	6.553	
SC17-13.A	SCUPPER F											0	0	50	50	50	50	0			6.883	0	5.826	6.883	
SC17-13.B	SCUPPER DP											0	0	50	80	50	80	0			6.841	0	4.7	6.841	
SC17-15.A	SCUPPER F	0.0039					3					5	1	50	50	50	50	3	zBP SC17	3	6.995	0.004	6.207	6.991	
SC17-15.B	SCUPPER DP											0	0	50	80	50	80	0			6.971	0	4.501	6.971	
SC17-16.A	SCUPPER F	0.0039					3					3	1	50	50	50	50	2	zBP SC17	2	7.044	0.005	6.251	7.039	
SC17-16.B	SCUPPER DP											0	0	50	80	50	80	0			7.023	0	4.439	7.023	
SC17-17.A	SCUPPER F											0	0	50	50	50	50	0	zBP SC17	0	7.078	0	6.079	7.078	
SC17-17.B	SCUPPER DP											0	0	50	80	50	80	0			7.064	0	4.514	7.064	
SC17-18.A	SCUPPER F (EXTENDED	0.0023					2					13	2	50	50	50	50	12	zBP TD17	12	7.136	0.02	6.337	7.116	
SC17-18.B	SCUPPER DP											0	0	50	80	50	80	0			7.106	0	4.329	7.106	
SC17-19.A1	SCUPPER F (EXTENDED	0.0043					4					12	2	50	50	50	50	10	zBP SC17	10	7.176	0.014	6.375	7.162	
SC17-19.A	SCUPPER F (EXTENDED	0.0038					3					13	2	50	50	50	50	12	zBP SC17	12	7.157	0.014	6.347	7.143	
SC17-19.B	SCUPPER DP											0	0	50	80	50	80	0			7.141	0	4.523	7.141	
SC17-2.A	SCUPPER F (EXTENDED	0.0073					6					18	2	50	50	50	50	16	zBP SC17	15	6.579	0.057	5.737	6.522	
SC17-2.B	SCUPPER DP											0	0	50	80	50	80	0			6.548	0	5.151	6.548	
SC17-20.A1	SCUPPER F (EXTENDED	0.0017					1					14	4	50	50	50	50	9	zBP SC17	9	7.266	0.023	6.482	7.243	
SC17-20.A	SCUPPER F (EXTENDED	0.0035					3					12	4	50	50	50	50	8	zBP SC17	8	7.209	0.018	6.446	7.191	
SC17-20.B	SCUPPER DP											0	0	50	80	50	80	0			7.183	0	4.682	7.183	
SC17-21.A	SCUPPER F	0.0113					10					16	4	50	50	50	50	12	zBP SC17	12	7.342	0.024	6.304	7.318	
SC17-21.B	SCUPPER DP											0	0	50	80	50	80	0			7.278	0	4.754	7.278	
SC17-22.A	SCUPPER DP											0	0	50	80	50	80	0			7.437	0	6.305	7.437	
SC17-22.B	SCUPPER DP											0	0	50	80	50	80	0			7.468	0	4.77	7.468	
SC17-23.A	SCUPPER F	0.0031					3					27	6	50	50	50	50	21	LOST	21	7.196	0.045	6.179	7.151	
SC17-23.B	SCUPPER DP											0	0	50	80	50	80	0			7.176	0	4.063	7.176	
SC17-3.A	SCUPPER F	0.0123					10					10	2	50	50	50	50	8	zBP SC17	8	6.547	0.039	5.531	6.508	
SC17-3.B	SCUPPER DP											0	0	50	80	50	80	0			6.524	0	5.173	6.524	
SC17-4.A	SCUPPER F	0.0059					5					13	2	50	50	50	50	11	zBP SC17	11	6.54	0.04	5.729	6.5	
SC17-4.B	SCUPPER DP											0	0	50	80	50	80	0			6.508	0	5.094	6.508	
SC17-5.A	SCUPPER F	0.0038					3					13	2	50	50	50	50	10	SC17-7.A	10	6.529	0.047	5.413	6.482	
SC17-5.B	SCUPPER DP											0	0	50	80	50	80	0			6.491	0	5.062	6.491	
SC17-7.A	SCUPPER F											10	2	50	50	50	50	8	LOST	8	6.481	0.029	5.443	6.452	
SC17-7.B	SCUPPER DP											0	0	50	80	50	80	0			6.452	0	5.024	6.452	
TD17-8.B	TRAM DRAIN CONNECT(											0	0	50	80	50	80	0			6.505	0	5.468	6.505	
SC17-8.B	SCUPPER DP											0	0	50	80	50	80	0			6.483	0	4.967	6.483	
TD17-9.B	TRAM DRAIN CONNECT(											0	0	50	80	50	80	0			6.58	0	5.571	6.58	
SC17-9.B	SCUPPER DP											0	0	50	80	50	80	0			6.553	0	4.891	6.553	
31-5	SCUPPER F	0.0064					5					5	2	50	50	50	50	4	zBP31-6	4	7.823	0.019	6.817	7.804	
31-6	SCUPPER F	0.0057					5					8	2	50	50	50	50	6	zBP TD17	7	7.563	0.027	6.441	7.536	
TD02-3.B	TRAM DRAIN											0	0	50	80	50	80	0			8.565	0	8.292	8.565	
TD02-4.B	TRAM DRAIN CONNECT(											0	0	50	80	50	80	0			7.501	0	5.855	7.501	
TD02-5.B	TRAM DRAIN CONNECT(											0	0	50	80	50	80	0			6.345	0	5.071	6.345	
TD02-6.B	TRAM DRAIN CONNECT(											0	0	50	80	50	80	0			5.485	0	4.177	5.485	
TD02-7.B	TRAM DRAIN											0	0	50	80	50	80	0			5.364	0	5.05	5.364	
TD05-1.B	TRAM DRAIN											0	0	50	80	50	80	0			5.431	0	5.116	5.431	
TD05-2.B	TRAM DRAIN											0	0	50	80	50	80	0			5.507	0	5.205	5.507	
TD05-3.B	TRAM DRAIN											0	0	50	80	50	80	0			5.586	0	5.303	5.586	
TD08-4.B	TRAM DRAIN CONNECT(											0	0	50	80	50	80	0			6.718	0	5.617	6.718	
TD13-20.B	TRAM DRAIN CONNECT(											0	0	50	80	50	80	0			9.037	0	8.163	9.037	
TD13A-3.B	TRAM DRAIN CONNECT(											0	0	50	80	50	80	0			7.905	0	6.825	7.905	
TD13A-5.B	TRAM DRAIN CONNECT(											0	0	50	80	50	80	0			6.697	0	5.636	6.697	
TD13B-1.B	TRAM DRAIN CONNECT(											0	0	50	80	50	80	0			6.015	0	5.403	6.015	
TD13B-2.B	TRAM DRAIN CONNECT(											0	0	50	80	50	80	0			6.102	0	5.45	6.102	
TD17-13.B	TRAM DRAIN CONNECT(											0	0	50	80	50	80	0			6.883	0	5.888	6.883	
TD17-17.B	TRAM DRAIN CONNECT(											0	0	50	80	50	80	0			7.078	0	6.155	7.078	
TD17-21.B	TRAM DRAIN CONNECT(											0	0	50	80	50	80	0			7.333	0	6.34	7.333	
TD17-3.B	TRAM DRAIN											15	17	50	80	50	80	15			6.522	0	5.597	6.522	
TD17-6.B	TRAM DRAIN CONNECT(											0	0	50	80	50	80	0			6.482	0	5.412	6.482	
TD17-7.B	TRAM DRAIN CONNECT(											0	0	50	80	50	80	0			6.452	0	5.494	6.452	
TD31-1.B	TRAM DRAIN CONNECT(											0	0	50	80	50	80	0			9.11	0	8.103	9.11	
TD31-3.B	TRAM DRAIN CONNECT(											0	0	50	80	50	80	0			8.396	0	7.423	8.396	
TD35-1.B	TRAM DRAIN											0	0	50	80	50	80	0			5.795	0	5.454	5.795	
TD44-1.B	TRAM DRAIN											20	20	50	80	50	80	4	44-1	0	5.732	0.001	5.423	5.731	
z25-5	IP XXX x XXX											0	0	50	80	50	80	0			2.267	0	1.845	2.267	
34-1	IP XXX x XXX											0	0	50	80	50	80	0			2.218	0	1.82	2.218	
z26-1	GRATED INLET											0	0	50	80	50	80	0			2.35	0	1.825	2.35	
s30-1	SCUPPER ATL				0.0028					2		2	2	50	80	50	80	0	s30-2	3	16.113	0.023	15.183	16.09	
s30-2	SCUPPER ATL				0.0033					3		3	3	50	80	50	80	0	s30-3	3	16.073	0.02	15.134	16.053	
s30-3	SCUPPER ATL				0.0033					3		3	3	50	80	50	80	0	s30-4	3	16.012	0.019	15.079	15.993	
s30-4	SCUPPER ATL				0.0034					3		3	3	50	80	50	80	0	s30-5	3	15.927	0.019	15.017	15.908	
s30-5	SCUPPER ATL				0.0037					3		3	3	50	80	50	80	0	s30-6	3	15.817	0.017	14.92	15.8	
s30-6	SCUPPER ATL				0.0032					3		3	2	50	80	50	80	0	s30-7	3	15.65	0.016	14.759	15.634	
s30-7	SCUPPER ATL				0.0031					3		3	3	50	80	50	80	0	s30-8	3	15.425	0.016	14.589	15.409	
s30-8	SCUPPER ATL				0.003					3		3	2	50	80	50	80	0	s30-9	3	15.248	0.017	14.417	15.231	
s30-9	SCUPPER ATL				0.0032					3		3	3	50	80	50	80	1	s30-10	3	15.046	0.017	14.275	15.029	
s30-10	SCUPPER ATL				0.0029					3		3	3	50	80	50	80	0	s30-11	3	14.856	0.015	14.133	14.841	
s30-11	SCUPPER ATL				0.0033					3		3	2	50	80	50	80	0	s30-12	3	14.601	0.015	13.977	14.586	
s30-12	SCUPPER ATL				0.0029					2		3	2	50	80	50	80	0	s30-13	3	14.349	0.017	13.798	14.332	
s30-13	SCUPPER ATL				0.0037					3		3	3	50	80	50	80	0	s30-14	3	14.124	0.015	13.6	14.109	
s30-14	SCUPPER ATL				0.0032					3		3	2	50	80	50	80	0	30-1	4	13.882	0.018	13.366	13.864	
s30	BP NODE											0	0	50	80	50	80	0			12.896	0	13.046	15	
s47-1	SCUPPER ATL				0.0042					4		4	3	50	80	50	80	0	s47-2	3	16.113	0.022	15.14	16.091	
s47-2	SCUPPER ATL				0.0028					2		3	3	50	80	50	80	0	s47-3	2	16.085	0.02	15.089	16.065	
s47-3	SCUPPER ATL				0.003					3		2	2	50	80	50	80	0	s47-4	3	16.043	0.02	15.046	16.023	
s47-4	SCUPPER ATL				0.0036					3		3	3	50	80	50	80	0	s47-5	3	15.968	0.019	14.996	15.949	
s47-5	SCUPPER ATL				0.0037					3		3	3	50	80	50	80	0	s47-6	3	15.869	0.017	14.929	15.852	
s47-6	SCUPPER ATL	0			0.0032					3		3	2	50	80	50	80	0	s47-7	3	15.704	0.017	14.801	15.687	
s47-7	SCUPPER ATL				0.0034					3		3	3	50	80	50	80	0	s47-8	3	15.501	0.017	14.557	15.484	
s47-8	SCUPPER ATL				0.0035					3		3	3	50	80	50	80	0	s47-9	2	15.331	0.016	14.358	15.315	
s47-9	SCUPPER ATL				0.0029					3		2	2	50	80	50	80	0	s47-10	2	15.175	0.015	14.157	15.16	
s47-10	SCUPPER ATL				0.0025					2		2	2	50	80	50	80	0	s47-11	2	14.951	0.015	13.956	14.936	
s47-11	SCUPPER ATL				0.0026					2		2	2	50	80	50	80	0	s47-12	3	14.727	0.016	13.755	14.711	
s47-12	SCUPPER ATL				0.0034					3		3	2	50	80	50	80	0	s47-13	4	14.505	0.018	13.555	14.487	
s47-13	SCUPPER ATL				0.0036					3		4	3	50	80	50	80	1	s47-14	4	14.309	0.017	13.354	14.292	
s47-14	SCUPPER ATL				0.0035					3		4	3	50	80	50	80	1	s47-15	4	14.084	0.017	13.154	14.067	
s47-15	SCUPPER ATL				0.0033					3		4	3	50	80	50	80	1	s47-16	4	13.862	0.018	12.956	13.844	
s47-16	SCUPPER ATL				0.0039					3		4	3	50	80	50	80	1	s47-17	4	13.641	0.018	12.76	13.623	
s47-17	SCUPPER ATL				0.0034					3		4	3	50	80	50	80	1	s47-18	4	13.45	0.018	12.565	13.432	

Node	Link HGL Upstream	Downstream	Ku (at max	Ku	Flow	Capacity	Velocities Upstream	Link	Downstrea	Flood Widths Upstream	Downstrea	Flooded Depth Depth	DxV	Freeboard
TD17-3.A	6.332	6.192	0	0	5	0	0.99	0.99	0.99	0.148	0.148	0.002	0	0.326
TD17-6.A	6.155	6.1	0	0	0	0	0	0	0	0	0	0	0	0.367
TD17-7.A	6.21	6.18	0	0	13	0.4	0.67	0.76	0.87	0.514	1.092	0	0	0.25
TD17-8.A	6.249	6.223	0	0	11	1.1	0.58	0.68	0.81	0.96	1.649	0.001	0.01	0.256
TD17-9.A	6.384	6.347	0	0	24	2.3	0.81	0.92	1.06	0.576	1.043	0	0	0.196
TD19-1.A	6.683	6.651	0	0	18	1.9	0.73	0.83	0.97	0.998	1.374	0.001	0.01	0.219
TD19-2.A	6.558	6.528	0	0	15	2	0.67	0.77	0.9	0.971	1.498	0	0.01	0.234
TD19-3.A	6.452	6.415	0	0	23	0.3	0.94	0.99	1.04	1.348	1.764	0.001	0.01	0.222
TD19-4.A	6.171	5.993	0	0	22	0.1	1.75	1.75	1.75	0.529	1.478	0	0	0.284
TD19-5.A	5.393	5.393	0	0	11	0.1	0.52	0.5	0.53			0		0.156
TD19-5.C	5.391	5.338	0	0	38	0.5	1.09	1.16	1.23	0	0	0.001	0	0.151
TD24-1.A	4.628	4.602	0	0	16	0.3	0.93	0.93	0.93			0		0.285
TD31-1.A	8.892	8.856	0	0	16	0.2	0.85	0.89	0.93	0	0	0	0	0.254
TD31-3.A	8.124	8.096	0	0	7	0.1	0.59	0.64	0.71	0	0	0	0	0.289
TD35-1.A	5.57	5.454	0	0	0	0	0	0	0			0		0.37
TD44-1.A	5.424	5.423	0	0	-1	0	0	0	0	0	0	0	0	0.33
08-1	6.128	5.81	9.7	0	1	0	0	0	0	1.32	1.65	0.018	0	0.816
08-1A	6.078	5.792	9.7	0.001	3	0	0	1.41	0	0.911	0.934	0.025	0.01	0.822
08-2	5.773	5.506	2	0.001	1	0	0	0.45	0.24	1.236	1.46	0.032	0.01	1.069
08-3	5.762	5.42	9.7	0	5	0	0	0.87	0.52	1.219	1.241	0.037	0.02	0.988
08-4	5.619	5.617	0.2	0	0	0	0	0	0			0		1.076
08-5	5.573	5.248	9.7	0.007	11	0	2.57	2.13	1.97	1.622	1.646	0.049	0.01	1.063
08-6	5.417	5.241	9.7	0.011	10	0	2.77	1.77	0.99	1.579	1.642	0.043	0.01	1.172
SC17-1.A	5.317	5.228	0	0	1	0	0	0.14	0.07	1.495	1.71	0.044	0.02	1.236
SC17-13.A	5.826	5.778	0	0	18	0.3	1.12	1.12	1.12			0		1.057
SC17-13.B	4.681	4.66	2.1	0.019	18	0.3	0.83	0.95	1.12			0		2.141
SC17-15.A	6.208	6.179	0	0	1	0	0	0.52	0	7.599	7.599	0.004	0	0.784
SC17-15.B	4.501	4.486	2.1	0	2	0	0	0.52	0			0		2.47
SC17-16.A	6.251	6.221	0	0	1	0	0	0	0	3.993	7.599	0.005	0	0.788
SC17-16.B	4.439	4.423	2.1	0	1	0	0	0	0			0		2.584
SC17-17.A	6.079	6.05	0	0	27	0.4	1.24	1.24	1.24	2.97	3.601	0	0	0.999
SC17-17.B	4.479	4.458	2.1	0.035	27	0.4	0.85	1.01	1.25			0		2.55
SC17-18.A	6.338	6.316	0	0	2	0	0	0.52	0	3.939	4.066	0.02	0	0.779
SC17-18.B	4.329	4.313	2.1	0	2	0	0	0.52	0			0		2.777
SC17-19.A1	6.377	6.347	0	0	1	0	0	0.4	0.31	3.451	3.466	0.014	0	0.787
SC17-19.A	6.345	6.337	4.8	0.004	3	0.1	0.63	0.65	0.68	3.577	3.598	0.014	0	0.796
SC17-19.B	4.523	4.505	2.1	0.001	3	0.1	0.65	0.67	0.68			0		2.618
SC17-2.A	5.737	5.729	0	0	2	0	0	0.55	0	1.926	2.005	0.057	0.02	0.785
SC17-2.B	5.15	5.15	2.1	0.006	2	0	0.4	0.36	0.28			0		1.397
SC17-20.A1	6.477	6.446	7	0.005	4	0.1	0.62	0.53	0.46	1.894	1.869	0.023	0.01	0.761
SC17-20.A	6.446	6.43	0	0	8	0.1	0.9	0.9	0.9	3.428	3.634	0.018	0	0.745
SC17-20.B	4.677	4.657	2.1	0.005	8	0.1	0.78	0.84	0.92			0		2.501
SC17-21.A	6.304	6.275	0	0	12	0.2	0.99	0.99	0.99	1.973	2.074	0.024	0.01	1.014
SC17-21.B	4.745	4.726	2.1	0.01	12	0.2	0.79	0.88	0.99			0		2.524
SC17-22.A	6.305	6.287	0	0	26	0.3	1.44	1.44	1.44			0		1.132
SC17-22.B	4.737	4.713	2.1	0.033	26	0.4	0.9	1.03	1.27			0		2.698
SC17-23.A	6.179	6.159	0	0	23	0.4	1.14	1.14	1.14	1.655	1.645	0.045	0.03	0.972
SC17-23.B	4.042	4.002	2.1	0.021	23	0.3	0.9	1.04	1.23			0		3.113
SC17-3.A	5.531	5.504	0	0	22	0.3	1.18	1.18	1.18	1.429	1.324	0.039	0.01	0.977
SC17-3.B	5.158	5.141	2.1	0.016	21	0.3	0.79	0.82	0.86			0		1.351
SC17-4.A	5.729	5.708	0	0	2	0	0.62	0.62	0.62	1.486	1.359	0.04	0.01	0.771
SC17-4.B	5.093	5.094	2.1	0.009	3	0	0.48	0.57	0.48			0		1.414
SC17-5.A	5.413	5.38	0	0	2	0	0.61	0.61	0.61	1.722	1.329	0.047	0.01	1.069
SC17-5.B	5.062	5.062	2.1	0.009	3	0	0.44	0.39	0.32			0		1.429
SC17-7.A	5.443	5.437	0	0	15	0.3	0.95	0.95	0.95	1.092	1.092	0.029	0.01	1.009
SC17-7.B	5.018	5.013	2.1	0.01	15	0.2	0.73	0.8	0.89			0		1.428
TD17-8.B	5.468	5.441	0	0	11	0.2	0.97	0.97	0.97			0		1.037
SC17-8.B	4.96	4.963	2.1	0.012	10	0.1	0.72	0.76	0.84			0		1.516
TD17-9.B	5.571	5.54	0	0	24	0.4	1.22	1.22	1.22			0		1.009
SC17-9.B	4.861	4.84	2.1	0.031	24	0.4	0.85	1	1.22			0		1.662
31-5	6.817	6.786	9.7	0	1	0	0	0.3	0.15	0.695	0.928	0.019	0.01	0.987
31-6	6.441	6.419	9.7	0	2	0	0	0.34	0.17	0.992	1.259	0.027	0.01	1.095
TD02-3.B	8.292	8.292	0	0	36		0		0			0		0.273
TD02-4.B	5.855	5.855	0	0	46		0		0			0		1.646
TD02-5.B	5.071	5.071	0	0	39		0		0			0		1.274
TD02-6.B	4.177	4.177	0	0	47		0		0			0		1.308
TD02-7.B	5.05	5.05	0	0	16		0		0			0		0.314
TD05-1.B	5.116	5.116	0	0	20		0		0			0		0.315
TD05-2.B	5.205	5.205	0	0	22		0		0			0		0.302
TD05-3.B	5.303	5.303	0	0	33		0		0			0		0.283
TD08-4.B	5.617	5.617	0	0	8		0		0			0		1.101
TD13-20.B	8.163	8.163	0	0	12		0		0			0		0.874
TD13A-3.B	6.825	6.825	0	0	26		0		0			0		1.08
TD13A-5.B	5.636	5.636	0	0	26		0		0			0		1.061
TD13B-1.B	5.403	5.403	0	0	11		0		0			0		0.612
TD13B-2.B	5.45	5.45	0	0	33		0		0			0		0.652
TD17-13.B	5.888	5.888	0	0	18		0		0			0		0.995
TD17-17.B	6.155	6.155	0	0	26		0		0			0		0.923
TD17-21.B	6.34	6.34	0	0	8		0		0			0		0.993
TD17-3.B	5.597	5.597	0	0	20		0		0			0		0.925
TD17-6.B	5.413	5.413	0	0	0		0		0			0		1.07
TD17-7.B	5.494	5.494	0	0	13		0		0			0		0.958
TD31-1.B	8.103	8.103	0	0	16		0		0			0		1.007
TD31-3.B	7.423	7.423	0	0	7		0		0			0		0.973
TD35-1.B	5.454	5.454	0	0	0		0		0			0		0.341
TD44-1.B	5.423	5.423	0	0	20		0		0	1.734	1.95	0.001	0.02	0.308
z25-5	1.845	1.839	1.7	0	5	0	0.01	0.01	0.01			0		0.422
34-1	1.82	1.811	0	0	289	0.3	0.45	0.45	0.45			0		0.398
z26-1	1.825	1.82	1.9	0	4	0	0.01	0.01	0.01			0		0.525
s30-1	15.181	15.134	7	0.002	2	0.1	0.52	0.53	0.56	0.832	0.796	0.023	0.01	0.907
s30-2	15.133	15.079	2.9	0.002	5	0.3	0.66	0.68	0.73	0.741	0.778	0.02	0.01	0.919
s30-3	15.075	15.017	1.6	0.004	8	0.5	0.74	0.79	0.85	0.712	0.732	0.019	0.01	0.914
s30-4	15.011	14.934	1.4	0.006	11	0.6	0.87	0.95	1.03	0.698	0.716	0.019	0.01	0.891
s30-5	14.916	14.763	1.2	0.004	14	0.5	1.24	1.33	1.45	0.616	0.619	0.017	0.01	0.88
s30-6	14.756	14.591	0.9	0.004	16	0.6	1.35	1.45	1.56	0.599	0.598	0.016	0.01	0.875
s30-7	14.584	14.417	0.9	0.006	19	0.7	1.48	1.57	1.7	0.592	0.615	0.016	0.01	0.82
s30-8	14.392	14.275	0.7	0.024	21	0.7	1.51	1.6	1.74	0.615	0.622	0.017	0.01	0.814
s30-9	14.256	14.133	0.7	0.034	23	0.8	1.58	1.67	1.81	0.622	0.625	0.017	0.01	0.754
s30-10	14.116	13.977	0.5	0.037	23	0.8	1.69	1.74	1.89	0.57	0.568	0.015	0.01	0.708
s30-11	13.963	13.798	0.5	0.038	25	0.8	1.73	1.78	1.92	0.566	0.634	0.015	0.01	0.609
s30-12	13.794	13.6	0.6	0.035	26	0.8	1.68	1.66	1.77	0.634	0.639	0.017	0.01	0.534
s30-13	13.593	13.366	0.8	0.042	28	0.9	1.62	1.62	1.62	0.572	0.666	0.015	0.01	0.509
s30-14	13.143	13.046	1.5	0.225	30	13.9	1.72	1.72	1.72	0.666	0.678	0.018	0.01	0.498
s30												0		-0.15
s47-1	15.135	15.089	7	0.006	3	0.2	0.53	0.58	0.67	0.83	0.764	0.022	0.01	0.951
s47-2	15.089	15.046	1.9	0.002	6	0.4	0.67	0.71	0.76	0.74	0.755	0.02	0.01	0.976
s47-3	15.044	14.996	1.5	0.002	8	0.5	0.73	0.76	0.79	0.747	0.781	0.02	0.01	0.977
s47-4	14.989	14.929	1.4	0.007	11	0.7	0.79	0.84	0.91	0.718	0.738	0.019	0.01	0.953
s47-5	14.919	14.84	1.2	0.01	14	0.8	0.91	0.99	1.09	0.616	0.629	0.017	0.01	0.923
s47-6	14.799	14.594	0.9	0.003	16	0.5	1.5	1.59	1.7	0.629	0.635	0.017	0.01	0.886
s47-7	14.557	14.373	4.5	0	19	0.1	1.61	1.61	1.61	0.635	0.64	0.017	0.01	0.927
s47-8	14.358	14.173	0.9	0	22	0.1	1.64	1.65	1.66	0.601	0.601	0.016	0.01	0.957
s47-9	14.157	13.972	0.7	0	24	0.1	1.69	1.71	1.73	0.549	0.548	0.015	0.01	1.003
s47-10	13.956	13.771	0.6	0	26	0.1	1.74	1.76	1.78	0.542	0.601	0.015	0.01	0.98
s47-11	13.755	13.57	0.6	0	28	0.1	1.78	1.8	1.82	0.601	0.657	0.016	0.01	0.956
s47-12	13.555	13.369	0.7	0	31	0.1	1.83	1.84	1.87	0.657	0.667	0.018	0.01	0.932
s47-13	13.354	13.168	0.7	0	33	0.1	1.88	1.89	1.91	0.646	0.654	0.017	0.01	0.938
s47-14	13.154	12.969	0.6	0	36	0.1	1.94	1.94	1.95	0.638	0.671	0.017	0.01	0.913
s47-15	12.956	12.772	0.6	0.001	39	0.1	1.99	1.98	1.99	0.671	0.683	0.018	0.01	0.888
s47-16	12.76	12.575	0.6	0.001	43	0.1	2.03	2.03	2.06	0.676	0.69	0.018	0.01	0.863
s47-17	12.564	12.379	0.5	0.001	47	0.1	2.1	2.1	2.11	0.659	0.67	0.018	0.01	0.867

Node	Node Type	Catchmnet Areas (ha) Area 1	Area 2	Area 3	Area 4	Area 5	Catchment Flow Set 1	Set 2	Set 3	Set 4	Set 5	Approach Flow	Inlet Captured Flow	Efficiencies minor SAG	minor Ongrade	Major SAG	Major Ongrade	Uncapture Flow	Bypass Node	Bypass Flow	Bypass HGL	mid ch	Node HGL	Grate	LOST FLOW	Link HGL Upstream	Downstream	Ku (at max	Ku	Flow	Capacity	Velocities Upstream	Link	Downstrea	Flood Widths Upstream	Downstrea	Flooded Depth Depth	DxV	Freeboard
s47-18	SCUPPER ATL				0.0035					3		4	3	50	80	50	80	1	s47-19	3	13.227	0.016	12.378	13.211		12.376	12.27	0.5	0.004	51	0.2	2.15	2.1	2.13	0.595	0.591	0.016	0.01	0.833
s47-19	SCUPPER ATL				0.0023					2		3	2	50	80	50	80	0	47-1	3	13.095	0.015	12.27	13.08		12.254	12.12	1.4	0.016	57	0.2	2.19	2.19	2.22	0.563	0.639	0.015	0.01	0.81
s47	BP NODE											0	0	50	80	50	80	0			12.014	0	12.12	13.6													0		-0.106
z03A-1	ALL IN GRADE											0	0	50	80	50	80	0			5.212	0	4.481	5.212		4.481	4.266	0	0	0	0	0	0	0			0		0.731
z03B-1	ALL IN GRADE											0	0	50	80	50	80	0			5.51	0	4.997	5.51		4.997	4.977	0	0	0	0	0	0	0			0		0.513
z07-1	ALL IN GRADE	0.0419		2.2055			36		1538			1567	1567	50	80	50	100	0	07-1	3	8.199	0	8.102	8.199		4.266	3.967	2.5	3.836	1563	2	5.53	5.53	5.53	0	0	0	0	0.097
z10-1	BP NODE auto	0.2292	0.7348				195	515				678	0	50	0	50	0	678	z10-2	862	12.827	0.154	10.97	12.673		10.97	6.119	0	0	0	0	0	0	0	5.683	5.68	0.154	0.3	1.703
z10-2	BP NODE auto	0.2711					230					862	0	50	80	50	80	862	z10-3	845	7.931	0.132	6.03	7.799		6.03	2.717	0	0	0	0	0	0	0	4.886	4.904	0.132	0.35	1.769
z10-3	BP NODE auto											845	0	50	80	50	80	845	52-1	895	4.634	0.133	2.655	4.501		2.655	1.81	0	0	0	0	0	0	0	4.904	4.896	0.133	0.37	1.846
z10-4	BP NODE auto	0.0068					6					624	0	50	80	50	80	624	EX1-9	629	3.613	0.019	1.221	3.594		1.221	0.798	0	0	0	0	0	0	0	29.999	29.999	0.019	0.02	2.373
z10-5	BP NODE auto	0.0317					27					27	0	50	80	50	80	27	EX1-10	37	2.484	0.004	0.798	2.48		0.798	0.742	0	0	0	0	0	0	0	29.999	29.999	0.004	0	1.682
z10-6	BP NODE auto											0	0	50	80	50	80	0			0.742	0	0.742	2.043													0		0
zBP51-1	BP NODE											0	0	50	80	50	80	0			0.537	0	0	0.537		0.001	0	0	0	0	0	0	0	0			0		0.537
zBP10-12a	BP NODE											0	0	50	80	50	80	0	10-10	7	1.693	0.041	0	1.652		0.001	0	0	0	0	0	0	0	0	0.552	2.092	0.041	0.02	1.652
zBP10-12b	BP NODE											0	0	50	80	50	80	0	10-10	54	2.149	0.082	0	2.067		0.001	0	0	0	0	0	0	0	0	1.912	1.953	0.082	0.07	2.067
z10-12c	BP NODE auto											0	0	50	80	50	80	0			0	0	0	0.416													0		0
12-2	ALL IN GRADE											0	0	50	80	50	80	0	23-1	0	2.311	0.036	2.203	2.275		2.158	2.158	0	0	37		0		0	0	0	0.036	0	0.072
z12-1	BP NODE auto											0	0	50	80	50	80	0	z12-2	11	4.571	0.033	3.205	4.538		3.205	2.553	0	0	0	0	0	0	0	0.494	0.577	0.033	0.03	1.333
z12-2	BP NODE auto					0.0223					13	13	0	50	80	50	80	13	52-3	19	3.771	0.072	2.533	3.699		2.533	2.516	0	0	0	0	0	0	0	0.53	0.794	0.072	0.06	1.166
z12-3	BP NODE auto											0	0	50	80	50	80	0	z12-2	2	3.889	0.016	2.496	3.873		2.496	2.456	0	0	0	0	0	0	0	0.302	0.577	0.016	0.01	1.377
z12-4	BP NODE auto											0	0	50	80	50	80	0			2.456	0	2.456	4.303													0		0
zBP z07-1.R	BP NODE											0	0	50	80	50	80	0	07-1	8	5.689	0.024	0	5.665		0.001	0	0	0	0	0	0	0	0	0.888	2.112	0.024	0.01	5.665
zBP 18-1A	BP NODE											0	0	50	80	50	80	0	18-1A	19	5.643	0.038	0	5.605		0.001	0	0	0	0	0	0	0	0	1.407	1.699	0.038	0.02	5.605
zBP 18-1A.R	BP NODE											0	0	50	80	50	80	0			6.336	0	0	6.336		4.615	4.595	0	0	0	0	0	0	0			0		6.336
zBP18-2	SAS											0	0	50	80	50	80	0			4.595	0	4.595	6.281													0		0
26-2	ALL IN GRADE											0	0	50	80	50	80	0	11-1	0	3.673	0.198	3.1	3.475		3.1	3.1	0	0	203		0		0	1.579	2.453	0.198	0.02	0.375
11-1	GRATED INLET 900X900					0.0196					11	0	0	50	100	50	100	0	z BASIN 0	16	3.367	0.067	2.623	3.3		2.623	2.606	0	0	206	1	1.69	1.69	1.7	0	0	0.067	0	0.677
z BASIN 02-2	BASIN					0.0291					17	0	0	100	100	100	100	0	23-1	0	3.401	0.002	2.4	3.399		2.4	2.4	0	0	0		0		0	0	0	0.002	0	0.999
16-2	ALL IN GRADE											0	0	50	80	50	80	0	23-1	0	2.852	0.007	2.4	2.845		2.4	2.4	0	0	92		0		0	0	0	0.007	0	0.445
zBP18-2.L	BP NODE auto											0	0	50	80	50	80	0	LOST	0	6.332	0	2	6.332		2.001	2	0	0	0	0	0	0	0	0	0	0	0	4.332
zBP18-2.R	BP NODE auto											0	0	50	80	50	80	0	LOST	0	5.94	0	2	5.94		2.001	2	0	0	0	0	0	0	0	0	0	0	0	3.94
z18-2c	BP NODE auto											0	0	50	80	50	80	0			2	0	2	6.135													0		0
19-7	ALL IN GRADE											0	0	50	100	50	100	0	38-1	0	2.58	0.03	2.1	2.55		2.1	2.1	0	0	163		0		0	0	0	0.03	0	0.45
zBP02-2	SA 4.2m Lintel	0.1118					95					87	80	50	80	50	80	6	02-2	5	9.415	0.019	7.997	9.396		7.954	7.554	9.7	0.043	79	0.2	1.52	1.74	2.28	0.711	0.725	0.019	0.01	1.399
zBP24-2	BP NODE auto											0	0	50	0	50	0	0	24-2	10	4.99	0.043	0	4.947		0.001	0	0	0	0	0	0	0	0	0.769	0.725	0.043	0.04	4.947
zBP20-1	BP NODE											0	0	50	80	50	80	0	20-1	19	4.33	0.033	0	4.297		0.001	0	0	0	0	0	0	0	0	1.216	1.22	0.033	0.03	4.297
zBP22-1	BP NODE											2	0	50	80	50	80	2	22-1	18	3.042	0.05	0	2.992		0.001	0	0	0	0	0	0	0	0	6.752	6.752	0.05	0.04	2.992
zBP36-2.L	BP NODE											0	0	50	80	50	80	0	36-1	0	2.385	0	0	2.385		0.001	0	0	0	0	0	0	0	0	0	0	0	0	2.385
zBP36-2.R	BP NODE											0	0	50	80	50	80	0	36-1	0	2.141	0	0	2.141		0.001	0	0	0	0	0	0	0	0	0	0	0	0	2.141
zBP36-1	BP NODE auto											0	0	50	80	50	80	0	37-4	1	2.122	0.023	0	2.099		0.001	0	0	0	0	0	0	0	0	0.293	0.766	0.023	0.01	2.099
zBP37-2.L	BP NODE											0	0	50	80	50	80	0	37-2	10	2.008	0.062	0	1.946		0.001	0	0	0	0	0	0	0	0	1.434	0.936	0.062	0.02	1.946
zBP37-2.R	BP NODE											1	0	50	80	50	80	1	37-2	11	1.989	0.054	0	1.935		0.001	0	0	0	0	0	0	0	0	1.226	0.439	0.054	0.01	1.935
zBP37-1	BP NODE auto											0	0	50	80	50	80	0	37-1	9	2.031	0.068	0	1.963		0.001	0	0	0	0	0	0	0	0	1.917	1.172	0.068	0.02	1.963
zBP37-3	BP NODE auto											0	0	50	80	50	80	0			1.957	0.005	0	1.952		0.001	0	0	0	0	0	0	0	0			0.005		1.952
SC08-1	BP NODE											0	0	50	80	50	80	0			0	0	0	2.107													0		0
20-2	ALL IN GRADE											0	0	50	100	50	100	0	38-1	0	2.554	0.004	2.149	2.55		2.149	2.149	0	0	0		0		0	0	0	0.004	0	0.401
z200-2	SA 4.2m Lintel	0.1055	0.7889				90	495				567	332	50	80	50	80	235	LOST	234	9.105	0.11	8.452	8.995		8.01	7.866	8.3	0.441	333	0.6	1.18	1.39	1.97	4.074	4.055	0.11	0.12	0.543
zBP21-1.L	BP NODE auto											0	0	50	80	50	80	0	21-1	16	2.456	0.057	1.779	2.399		1.779	1.681	0	0	0	0	0	0	0	1.579	1.579	0.057	0.03	0.62
zBP21-1.R	BP NODE auto											0	0	50	80	50	80	0	21-1	11	2.35	0.055	1.661	2.296		1.661	1.617	0	0	0	0	0	0	0	0.496	0.496	0.055	0.04	0.635
zBP21-1	BP NODE auto											0	0	50	80	50	80	0			1.617	0	1.617	2.266													0		0
24-3	ALL IN GRADE											0	0	50	100	50	100	0	38-1	0	2.591	0.116	2.149	2.475		2.149	2.149	0	0	24		0		0	0	0	0.116	0	0.326
zBP27-1	ALL IN GRADE											0	0	50	80	50	80	0	27-1	20	6.022	0.063	4.842	5.959		4.842	4.793	0	0	0	0	0	0	0	1.265	1.573	0.063	0.04	1.117
z41-1	BP NODE											0	0	50	80	50	80	0	41-1	14	1.841	0.042	0.523	1.799		0.523	0.438	0	0	0	0	0	0	0	1.551	3.204	0.042	0.01	1.276
z41-2	BP NODE											0	0	50	80	50	80	0			0.438	0	0.438	10.175													0		0
44-2	ALL IN GRADE											0	0	100	100	100	100	0	46-1	0	4.525	0	4.15	4.525		4.15	4.15	0	0	59		0		0	0	0	0	0	0.375
05-4	ALL IN GRADE											0	0	50	100	50	100	0	46-1	0	4.525	0	4.15	4.525		4.15	4.15	0	0	70		0		0	0	0	0	0	0.375
zBP AD15-1	BP NODE	0.0133			0.0084		11			7		19	0	50	80	50	80	19	15-1	27	9.823	0.038	0	9.785		0.001	0	0	0	0	0	0	0	0	1.418	1.417	0.038	0.04	9.785
zBP AD15-2	BP NODE											22	0	50	80	50	80	22	15-2	28	9.124	0.038	0	9.086		0.001	0	0	0	0	0	0	0	0	1.4	1.4	0.038	0.04	9.086
zBP AD15-3	BP NODE											24	0	50	80	50	80	24	15-3	29	8.306	0.036	0	8.27		0.001	0	0	0	0	0	0	0	0	1.339	1.349	0.036	0.04	8.27
zBP AD17-23/	BP NODE											25	0	50	80	50	80	25	SC17-23./	27	7.497	0.035	0	7.462		0.001	0	0	0	0	0	0	0	0	1.307	1.655	0.035	0.04	7.462
zBP AD151	BP NODE											0	0	50	80	50	80	0			0	0	0	4.66													0		0
zBP 28-1	BP NODE											0	0	50	80	50	80	0	zBP 28-1a	11	5.526	0.03	0	5.496		0.001	0	0	0	0	0	0	0	0	0.743	0.868	0.03	0.03	5.496
zBP 28-1a	BP NODE	0.0119				0.0039	10				2	11	0	50	80	50	80	11	LOST	11	4.241	0.035	0	4.206		0.001	0	0	0	0	0	0	0	0	1.282	1.291	0.035	0.02	4.206
zBP 28-2	BP NODE											0	0	50	80	50	80	0	zBP 28-3	21	4.653	0.038	0	4.615		0.001	0	0	0	0	0	0	0	0	0.944	2.056	0.038	0.03	4.615
zBP 28-3	BP NODE	0.0141				0.0199	12				11	21	0	50	80	50	80	21	zBP 28-4	34	3.76	0.061	0	3.699		0.001	0	0	0	0	0	0	0	0	2.056	2.069	0.061	0.04	3.699
zBP 28-4	BP NODE	0.0076				0.0152	6				9	34	0	50	80	50	80	34	zBP 28-5	53	3.539	0.049	0	3.49		0.001	0	0	0	0	0	0	0	0	1.791	2.415	0.049	0.05	3.49
zBP 28-5	BP NODE	0.0123				0.0194	10				11	53	0	50	80	50	80	53	28-5	53	2.685	0.065	0	2.62		0.001	0	0	0	0	0	0	0	0	2.268	2.254	0.065	0.06	2.62
zBP 10-8	BP NODE	0.0141				0.0207	12				12	22	0	50	80	50	80	22	LOST	22	1.941	0.045	0	1.896		0.001	0	0	0	0	0	0	0	0	1.662	1.66	0.045	0.03	1.896
zBP ARP1	BP NODE											0	0	50	80	50	80	0			0	0	0	1													0		0
zBP TD02-3.A	BP NODE											0	0	50	80	50	80	0	TD02-3.A	35	8.947	0.048	0	8.899		0.001	0	0	0	0	0	0	0	0	1.769	1.767	0.048	0.04	8.899
zBP TD02-4.A	BP NODE											0	0	50	80	50	80	0	TD02-4.A	39	8.579	0.044	0	8.535		0.001	0	0	0	0	0	0	0	0	1.606	1.616	0.044	0.05	8.535
zBP TD02-5.A	BP NODE											0	0	50	80	50	80	0	TD02-5.A	38	7.51	0.043	0	7.467		0.001	0	0	0	0	0	0	0	0	1.582	1.59	0.043	0.05	7.467
zBP TD02-6.A	BP NODE											0	0	50	80	50	80	0	TD02-6.A	48	6.435	0.049	0	6.386		0.001	0	0	0	0	0	0	0	0	1.797	1.799	0.049	0.05	6.386
zBP TD02-7.A	BP NODE											0	0	50	80	50	80	0	TD02-7.A	12	5.567	0.036	0	5.531		0.001	0	0	0	0	0	0	0	0	1.325	1.338	0.036	0.02	5.531
zBP TD02	BP NODE											0	0	50	80	50	80	0	LOST	0	5.208	0	0	5.208		0.001	0	0	0	0	0	0	0	0	0	0	0	0	5.208
zBP TD02-7.A	BP NODE											0	0	50	80	50	80	0	TD02-7.A	12	5.459	0.039	0	5.42		0.001	0	0	0	0	0	0	0	0	1.449	0.967	0.039	0.01	5.42
zBP TD05-1.A	BP NODE											0	0	50	80	50	80	0	TD05-1.A	21	5.546	0.042	0	5.504		0.001	0	0	0	0	0	0	0	0	1.552	1.457	0.042	0.02	5.504
zBP TD05-2.A	BP NODE											0	0	50	80	50	80	0	TD05-2.A	24	5.627	0.044	0	5.583		0.001	0	0	0	0	0	0	0	0	1.621	1.502	0.044	0.02	5.583
zBP 44-1	BP NODE											0	0	50	80	50	80	0	44-1	16	5.827	0.044	0	5.783		0.001	0	0	0	0	0	0	0	0	1.64	1.95	0.044	0.01	5.783
zBP 35-1	BP NODE											0	0	50	80	50	80	0	35-1	24	6.031	0.048	0	5.983		0.001	0	0	0	0	0	0	0	0	1.791	1.79	0.048	0.03	5.983
zBP TD13B-1.	BP NODE											0	0	50	80	50	80	0	TD13B-1./	15	6.136	0.038	0	6.098		0.001	0	0	0	0	0	0	0	0	1.404	1.287	0.038	0.01	6.098
zBP TD13B-2.	BP NODE											0	0	50	80	50	80	0	TD13B-2./	27	6.709	0.044	0	6.665		0.001	0	0	0	0	0	0	0	0	1.636	1.641	0.044	0.03	6.665
zBP TD13A-5.	BP NODE											0	0	50	80	50	80	0	TD13A-5./	25	7.921	0.037	0	7.884		0.001	0	0	0	0	0	0	0	0	1.369	1.369	0.037	0.04	7.884
zBP TD13A-3.	BP NODE											0	0	50	80	50	80	0	TD13A-3./	25	8.998	0.037	0	8.961		0.001	0	0	0	0	0	0	0	0	1.382	1.381	0.037	0.04	8.961
zBP TD13A-1.	BP NODE											0	0	50	80	50	80	0			9.434	0	0	9.434		0.001	0	0	0	0	0	0	0	0			0		9.434
zBP N1	BP NODE											0	0	50	80	50	80	0			0	0	0	0.698													0		0
zBP TD14-17.	BP NODE											3	0	50	80	50	80	3	zBP TD31	3	10.17	0.015	0	10.155		0.001	0	0	0	0	0	0	0	0	0.565	1.14	0.015	0.01	10.155
zBP TD31-1.A	BP NODE					0						3	0	50	80	50	80	3	TD31-1.A	16	9.883	0.031	0	9.852		0.001	0	0	0	0	0	0	0	0	1.14	1.139	0.031	0.03	9.852
zBP TD31-3.A	BP NODE											0	0	50	80	50	80	0	TD31-3.A	14	9.076	0.022	0	9.054		0.001	0	0	0	0	0	0	0	0	0.823	0.822	0.022	0.02	9.054
zBP TD17-21.	BP NODE											0	0	50	80	50	80	0	TD17-21./	8	8.395	0.025	0	8.37		0.001	0	0	0	0	0	0	0	0	0.915	0.918	0.025	0.02	8.37
zBP 31-5	BP NODE											0	0	50	80	50	80	0	31-5	5	8.39	0.021	0	8.369		0.001	0	0	0	0	0	0	0	0	0.76	0.781	0.021	0.01	8.369
zBP31-6	BP NODE											4	0	50	80	50	80	4	31-6	8	7.801	0.025	0	7.776		0.001	0	0	0	0	0	0	0	0	0.928	0.992	0.025	0.02	7.776
zBP TD17-21.	BP NODE											7	0	50	80	50	80	7	SC17-21./	16	7.555	0.034	0	7.521		0.001	0	0	0	0	0	0	0	0	1.259	1.263	0.034	0.03	7.521
zBP SC17-20.	BP NODE											12	0	50	80	50	80	12	SC17-20./	14	7.327	0.025	0	7.302		0.001	0	0	0	0	0	0	0	0	2.074	2.071	0.025	0.01	7.302
zBP SC17-20.	BP NODE											9	0	50	80	50	80	9	SC17-20./	12	7.255	0.021	0	7.234		0.001	0	0	0	0	0	0	0	0	2.869	2.868	0.021	0.01	7.234
zBP TD17-17.	BP NODE											0	0	50	80	50	80	0	TD17-17./	12	7.292	0.038	0	7.254		0.001	0	0	0	0	0	0	0	0	1.397	1.396	0.038	0.02	7.254
zBP SC17-19.	BP NODE											8	0	50	80	50	80	8	SC17-19./	12	7.209	0.023	0	7.186		0.001	0	0	0	0	0	0	0	0	2.977	2.924	0.023	0.01	7.186
zBP SC17-19.	BP NODE											10	0	50	80	50	80	10	SC17-19./	13	7.175	0.015	0	7.16		0.001	0	0	0	0	0	0	0	0	3.466	3.425	0.015	0	7.16
zBP SC17-18.	BP NODE											12	0	50	50	50	50	12	SC17-18./	13	7.154	0.014	0	7.14		0.001	0	0	0	0	0	0	0	0	3.598	3.939	0.014	0	7.14
zBP TD17-17.	BP NODE											12	0	50	80	50	80	12	TD17-17./	11	7.137	0.023	0	7.114		0.001	0	0	0	0	0	0	0	0	4.066	3.413	0.023	0	7.114
zBP TD17-13.	BP NODE											0	0	50	80	50	80	0	TD17-13./	13	7.133	0.034	0	7.099		0.001	0	0	0	0	0	0	0	0	1.263	1.267	0.034	0.01	7.099
zBP SC17-16.	BP NODE											0	0	50	80	50	80	0	SC17-16./	3	7.08	0.006	0	7.074		0.001	0	0	0	0	0	0	0	0	3.601	3.445	0.006	0	7.074
zBP SC17-15.	BP NODE											2	0	50	80	50	80	2	SC17-15./	5	7.043	0.008	0	7.035		0.001	0	0	0	0	0	0	0	0	7.599	4.565	0.008	0	7.035
zBP SC17-14.	BP NODE											3	0	50	80	50	80	3	zBP TD17	6	6.993	0.005	0	6.988		0.001	0	0	0	0	0	0	0	0	7.599	7.6	0.005	0	6.988
zBP TD17-13.	BP NODE	0.0036					3					6	0	50	80	50	80	6	TD17-13./	6	6.927	0.006	0	6.921		0.001	0	0	0	0	0	0	0	0	7.6	7.599	0.006	0	6.921
zBP TD7-9.A	BP NODE											0	0	50	80	50	80	0	TD17-9.A	25	6.909	0.047	0	6.862		0.001	0	0	0	0	0	0	0	0	1.722	1.72	0.047	0.03	6.862
zBP TD17-8.A	BP NODE											0	0	50	80	50	80	0	TD17-8.A	7	6.599	0.028	0	6.571		0.001	0	0	0	0	0	0	0	0	1.043	1.061	0.028	0.01	6.571
zBP TD17-7.A	BP NODE											0	0	50	80	50	80	0	TD17-7.A	17	6.538	0.045	0	6.493		0.001	0	0	0	0	0	0	0	0	1.649	1.457	0.045	0.02	6.493
zBP TD17-7.A	BP NODE											0	0	50	80	50	80	0	SC17-7.A	0	6.518	0	0	6.518		0.001	0	0	0	0	0	0	0	0	0	0	0	0	6.518
zBP SC17-6.A	BP NODE											10	0	50	80	50	80	10	SC17-5.A	13	6.531	0.046	0	6.485		0.001	0	0	0	0	0	0	0	0	1.723	1.722	0.046	0.01	6.485
zBP SC17-5.A	BP NODE											11	0	50	80	50	80	11	zBP SC17	10	6.532	0.035	0	6.497		0.001	0	0	0	0	0	0	0	0	4.536	7.324	0.035	0	6.497
zBP SC17-4.A	BP NODE											8	0	50	80	50	80	8	SC17-4.A	13	6.544	0.036	0	6.508		0.001	0	0	0	0	0	0	0	0	3.403	3.575	0.036	0.01	6.508
zBP SC17-3.A	BP NODE											15	0	50	80	50	80	15	TD17-3.B	15	6.579	0.06	0	6.519		0.001	0	0	0	0	0	0	0	0	3.193	2.003	0.06	0.01	6.519
zBP SC17-2.A	BP NODE											13	0	50	80	50	80	13	SC17-2.A	18	6.591	0.051	0	6.54		0.001	0	0	0	0	0	0	0	0	1.71	1.926	0.051	0.02	6.54
zBP SC17-1A	BP NODE											10	0	50	80	50	80	10	SC17-1.A	14	6.638	0.044	0	6.594		0.001	0	0	0	0	0	0	0	0	1.514	1.505	0.044	0.02	6.594
zBP 08-6	BP NODE											11	0	50	80	50	80	11	08-6	19	6.686	0.049	0	6.637		0.001	0	0	0	0	0	0	0	0	1.646	1.607	0.049	0.02	6.637
zBP 08-5	BP NODE											11	0	50	80	50	80	11	08-5	22	6.743	0.053	0	6.69		0.001	0	0	0	0	0	0	0	0	1.747	1.701	0.053	0.03	6.69
zBP 08-4	BP NODE											11	0	50	80	50	80	11	zBP 08-5	11	6.779	0.037	0	6.742		0.001	0	0	0	0	0	0	0	0	1.241	1.732	0.037	0.01	6.742
zBP 08-3	BP NODE											8	0	50	80	50	80	8	08-3	15	6.869	0.038	0	6.831		0.001	0	0	0	0	0	0	0	0	1.46	1.458	0.038	0.02	6.831
SC08-2	BP NODE											4	0	50	80	50	80	4	08-2	10	6.908	0.025	0	6.883		0.001	0	0	0	0	0	0	0	0	1.798	2.243	0.025	0.01	6.883
zBP 08-1A	BP NODE											3	0	50	80	50	80	3	08-1A	7	6.961	0.023	0	6.938		0.001	0	0	0	0	0	0	0	0	1.65	1.758	0.023	0.01	6.938

Node	Node Type	Catchmnet Areas (ha)					Catchment Flow					Approach	Inlet Captured	Efficiencies minor		Major		Uncapture	Bypass Node	Bypass Flow	Bypass HGL	mid ch	Node HGL	Grate	LOST FLOW	Link HGL		Ku			Capacity	Velocities			Flood Widths		Flooded Depth		Freeboard
		Area 1	Area 2	Area 3	Area 4	Area 5	Set 1	Set 2	Set 3	Set 4	Set 5	Flow	Flow	SAG	Ongrade	SAG	Ongrade	Flow								Upstream	Downstream	(at max	Ku	Flow		Upstream	Link	Downstrea	Upstream	Downstrea	Depth	DxV	
zBP 08-1	BP NODE											0	0	50	80	50	80	0	08-1	4	6.977	0.013	0	6.964		0.001	0	0	0	0	0	0	0	0	2.815	3.161	0.013	0	6.964
zBP TD19-1.A	BP NODE											0	0	50	80	50	80	0	TD19-1.A	13	7.012	0.045	0	6.967		0.001	0	0	0	0	0	0	0	0	1.676	1.492	0.045	0.02	6.967
zBP TD19-2.A	BP NODE											0	0	50	80	50	80	0	TD19-2.A	15	6.934	0.037	0	6.897		0.001	0	0	0	0	0	0	0	0	1.374	1.334	0.037	0.01	6.897
zBP TD19-3.A	BP NODE											0	0	50	80	50	80	0	TD19-3.A	17	6.825	0.041	0	6.784		0.001	0	0	0	0	0	0	0	0	1.498	1.443	0.041	0.02	6.784
zBP TD19-4.A	BP NODE											0	0	50	80	50	80	0	TD19-4.A	30	6.717	0.048	0	6.669		0.001	0	0	0	0	0	0	0	0	1.764	1.752	0.048	0.02	6.669
zBP TD19-5.C	BP NODE											0	0	50	80	50	80	0	TD19-5.C	28	6.473	0.04	0	6.433		0.001	0	0	0	0	0	0	0	0	1.478	1.477	0.04	0.04	6.433
zBP TD19-5.A	BP NODE											0	0	50	80	50	80	0	zBP TD19	0	6.357	0	0	6.357		0.001	0	0	0	0	0	0	0	0	0	0	0	0	6.357
zBP TD19-6.A	BP NODE											0	0	50	80	50	80	0	LOST	0	5.504	0	0	5.504		0.001	0	0	0	0	0	0	0	0	0	0	0	0	5.504
zBP TD19-	BP NODE											0	0	50	80	50	80	0	TD24-1.A	15	5.534	0.032	0	5.502		0.001	0	0	0	0	0	0	0	0	1.197	1.198	0.032	0.02	5.502
zBP S1	BP NODE											0	0	50	80	50	80	0			0	0	0	5.482													0		0
zBP07-2	BP NODE auto											0	0	50	80	50	80	0	07-1	34	6.13	0.077	4.83	6.053		4.83	4.776	0	0	0	0	0	0	0	1.49	1.49	0.077	0.07	1.223
zBP07-2A	BP NODE auto											0	0	50	80	50	80	0			4.776	0	4.776	7.042													0		0
zBP02-1	BP NODE auto											0	0	50	80	50	80	0	zBP02-2	87	13.635	0.062	7.836	13.573		7.836	7.295	0	0	0	0	0	0	0	2.273	2.273	0.062	0.08	5.737
zBP02	BP NODE auto											0	0	50	80	50	80	0			7.295	0	7.295	8.764													0		0
zBP200-1	BP NODE auto											0	0	50	80	50	80	0	z200-2	567	10.574	0.119	9.067	10.455		9.067	7.629	0	0	0	0	0	0	0	4.404	4.397	0.119	0.26	1.388
z200	BP NODE auto											0	0	50	80	50	80	0			7.629	0	7.629	10.756													0		0
zBP25-1a	BP NODE auto											0	0	50	80	50	80	0			2.285	0	1.596	2.285		1.596	1.372	0	0	0	0	0	0	0				0		0.689
zBP25-1b	BP NODE auto	0.0164					14					14	0	50	80	50	80	14	LOST	14	2.142	0.021	1.352	2.121		1.352	1.312	0	0	0	0	0	0	0	3.518	3.514	0.021	0.01	0.769
z25-6	BP NODE auto											0	0	50	80	50	80	0			1.312	0	1.312	2.138													0		0

12d Dynamic Drainage Results

Hydrology Return Period Event Storms durations run

ILSAX 2 1 DRAI DES DRAI DES DRAI DES DRAI DESN 60 4569

Notes: All Results are maximums and flows in l/s

Negative Flow Values Indicate Reverse Flows

Node	Node Type	Catchmnet Areas (ha)					Catchment Flow					Approach	Inlet Captured	Efficiencies minor		Major		Uncapture	Bypass Node	Bypass Flow	Bypass HGL	mid ch	Node HGL	Grate	LOST FLOW	Link HGL Upstream	Downstream	Ku (at max	Ku	Flow	Capacity	Velocities Upstream	Link	Downstrea	Flood Widths Upstream	Downstrea	Flooded Depth Depth	DxV	Freeboard
		Area 1	Area 2	Area 3	Area 4	Area 5	Set 1	Set 2	Set 3	Set 4	Set 5	Flow	Flow	SAG	Ongrade	SAG	Ongrade	Flow																					
01-1	IP XXX x XXX											0	0					0			5.325	0	4.358	5.325		3.967	3.538	2	0.396	720	1	2.55	2.62	2.86			0		0.967
01-2	IP XXX x XXX											0	0					0			5.317	0	3.137	5.317		3.026	2.932	1.4	0.111	1405	0.7	1.62	1.62	1.62			0		2.18
01-3	HW											0	0					0			1.882	0	2.932	2.932													0		-1.05
02-2	SA2 >450											11	11					0			8.837	0	7.351	8.837		7.341	6.842	0.5	0.011	507	0.3	4.15	4.45	4.81			0		1.486
02-3	IP XXX x XXX											0	0					0			8.813	0	6.81	8.813		6.805	5.689	0.6	0.005	546	0.5	3.78	3.95	4.14			0		2.003
02-4	IP XXX x XXX											0	0					0			7.59	0	5.614	7.59		5.611	4.67	0.2	0.004	603	0.5	4.16	3.87	3.96			0		1.976
02-5	IP XXX x XXX											0	0					0			6.496	0	4.67	6.496		4.561	4.264	0.3	0.111	651	0.5	4.16	2.56	2.67			0		1.826
02-6	IP XXX x XXX											0	0					0			5.586	0	4.264	5.586		4.138	4.033	1.4	0.127	710	0.9	1.61	1.61	1.62			0		1.322
02-7	GRATED INLET											0	0					0			5.364	0	4.033	5.364		3.805	3.708	1.8	0.228	727	0.8	1.65	1.72	1.97			0		1.331
02-8	IP XXX x XXX											0	0					0			5.383	0	3.708	5.383		3.708	3.56	0	0	635		0		0			0		1.675
02-9	IP XXX x XXX											0	0					0			5.284	0	3.507	5.284		3.205	3.137	2.5	0.301	722	0.5	1.63	1.75	2.01			0		1.777
03-1	IP XXX x XXX											0	0					0			5.353	0	4.361	5.353		4.361	4.358	0.2	0.013	-12	0	1.21	0.24	0.13			0		0.992
04-1	M.G.T.G. (HAUNCHED)			0.7609		0.0441			727		36	762	718					43	LOST	43	5.448	0.294	5.448	5.154		4.684	4.358	4	0.683	718	1.2	2.54	2.54	2.54	0.825	0.824	0.294	0.09	-0.294
05-1	IP XXX x XXX											0	0					0			5.419	0	4.487	5.419		4.487	4.474	0	0	25	0.2	0.88	0.62	0.49			0		0.932
05-2	IP XXX x XXX											0	0					0			5.495	0	4.474	5.495		4.471	4.414	0.5	0.004	53	0.4	1.01	0.94	0.9			0		1.021
05-3	IP XXX x XXX											0	0					0			5.574	0	4.414	5.574		4.431	4.372	0.8	0.005	92	0.7	1.49	1.42	1.35			0		1.16
07-1	M.G.D.G.					0.0735					-1E+08	557	454					0	18-1	0	5.554	0.263	4.083	5.291		4.083	4.017	9.2	0	2025	0.7	3.16	3.03	2.96	0	0	0.263	0	1.208
07-1A	IP XXX x XXX											0	0					0			5.921	0	4.017	5.921		3.989	3.844	0.2	0.028	2025	0.8	2.89	3	3.14			0		1.904
07-2	IP XXX x XXX											0	0					0			5.721	0	3.272	5.721		3.013	2.901	2.1	0.259	2026	0.8	1.79	1.79	1.79			0		2.449
07-3	HW											0	0					0			1.184	0	2.901	2.384													0		-1.717
CONN 08-1	SCUPPER CONN											0	0					0			6.945	0	5.814	6.945		5.814	5.795	2.1	0	1	0	0	0	0			0		1.131
CONN 08-1A	SCUPPER CONN											0	0					0			6.91	0	5.795	6.91		5.795	5.51	1.8	0	4	0	0	0.91	0.67			0		1.115
CONN 08-2	SCUPPER CONN											0	0					0			6.864	0	5.51	6.864		5.51	5.427	0.4	0	6	0.1	0.89	0.67	0.53			0		1.354
CONN 08-3	SCUPPER CONN											0	0					0			6.798	0	5.427	6.798		5.427	5.342	0.8	0	11	0.2	1.05	1.07	1.09			0		1.371
CONN 08-4	SCUPPER CONN											0	0					0			6.766	0	5.313	6.766		5.301	5.32	0.6	0.012	22	0.2	1.25	0.72	0.51			0		1.453
CONN 08-5	SCUPPER CONN											0	0					0			6.699	0	5.32	6.699		5.309	5.308	1.1	0.017	35	0.4	0.77	0.75	0.73			0		1.379
CONN 08-6	SCUPPER CONN											0	0					0			6.642	0	5.308	6.642		5.303	5.296	0.3	0.01	48	0.6	0.96	0.94	0.93			0		1.334
CONN SC17-	SCUPPER CONN											0	0					0			6.59	0	5.296	6.59		5.292	5.286	0.3	0.006	49	0.6	0.93	0.94	0.96			0		1.294
09-2	ALL IN GRADE											0	0					0			8.457	0	7.337	8.457		7.331	7.239	0.2	0.006	7	1.8	0.9	0.94	1			0		1.12
09-3	ALL IN GRADE				0.0073					8		8	8					0			7.802	0	6.825	7.802		6.717	6.606	5.4	0.108	8	1.9	0.94	0.97	1.02			0		0.977
09-4	ALL IN GRADE											0	0					0			7.112	0	6.094	7.112		6.092	6.037	0.2	0.006	7	1.8	0.91	0.94	1			0		1.018
09-6	SCUPPER DP											0	0					0			6.496	0	5.961	6.496		5.959	5.907	0.2	0.009	8	2	0.99	1.02	1.06			0		0.535
09-7	IP XXX x XXX											0	0					0			6.157	0	5.363	6.157		5.36	5.228	0.2	0.035	306	0.9	2.24	2.27	2.32			0		0.794
10-1	M.G.S.G.				0.0071					8		8	8					0	10-2	24	6.083	0.04	5.228	6.043											0.903	0.978	0.04	0.04	0.815
10-1A	IP XXX x XXX											0	0					0			5.763	0	4.52	5.763		4.45	4.072	0.3	0.07	418	2	2.63	2.65	2.7			0		1.243
10-2	GRATED INLET 900X900	0.0222					24					24	21					2	10-3	34	4.831	0.046	4.047	4.785		4.047	3.845	0	0	243		0		0	0.978	0.776	0.046	0.06	0.738
10-3	SO1	0.0161				0.0222	17				18	34	34					0	LOST	0	3.529	0	3.049	3.529		2.922	2.163	1.2	0.197	489	0.8	3.46	3.08	3.08	0	0	0	0	0.48
10-4	IP XXX x XXX											0	0					0			2.934	0	2.163	2.934		2.102	1.889	0.3	0.063	608	0.6	2.15	2.15	2.15			0		0.771
10-5	GRATED INLET	0.0151					15					15	15					0			3	0	1.889	3		1.676	1.498	2	0.212	639	0.9	1.79	1.79	1.79			0		1.111
10-7	IP XXX x XXX											0	0					0			1.496	0	1.498	1.496	394	1.495	1.487	0.2	0.012	371	0.5	1.04	1.04	1.04			0		-0.002
10-8	IP XXX x XXX											0	0					0			1.784	0	1.487	1.784		1.483	1.47	0.3	0.01	393	0.5	0.89	0.89	0.89			0		0.297
10-9	DS21>450	0.0067				0.0202	7				16	22	21					1	51-1	1	1.777	0.011	1.47	1.766		1.451	1.402	1.2	0.036	403	0.5	0.91	0.91	0.91	0.417	8.349	0.011	0	0.296
10-10	DS24 >450	0.074					-1E+08					79	69					2	LOST	0	1.676	0.096	1.402	1.58		1.396	1.35	0.7	0.022	447	0.4	1.01	1.01	1.01	0	0	0.096	0	0.178
10-11	HW											0	0					0			0	0	1.35	1.26													0		-1.35
11-1	GRATED INLET 900X900					0.0196					16	1	1		100		100	0	z BASIN 0	22	3.373	0.073	3.068	3.3		3.068	3.049	0	0	218	1.1	1.7	1.7	1.71	0	0	0.073	0	0.232
12-1	SO2	0.017			0.0159	0.03	14			18	24	61	61					0	12-2	0	3.112	0	2.677	3.112		2.667	2.63	9.7	0.055	60	0.5	0.95	0.95	0.99	0	0	0	0	0.435
13-1	SCUPPER F	0.0045					5					5	1	50	50	50	50	3	13-2	11	16.24	0.036	15.348	16.204		15.348	15.287	0	0	1	0	0	0.34	0	1.338	1.426	0.036	0.02	0.856
13-2	SCUPPER F	0.0073					8					11	3	50	50	50	50	9	13-3	19	16.176	0.039	15.287	16.137		15.287	15.11	0	0	4	0.1	0	0.44	0.31	1.426	1.422	0.039	0.03	0.85
13-3	Grated Trench 2m	0.0097					11					19	15	50	50	50	50	5	13-4	11	15.987	0.029	15.11	15.958		15.11	14.882	0	0	19	0.3	1.41	1.41	1.41	1.078	1.166	0.029	0.02	0.848
13-4	SCUPPER F	0.0088					10					11	3	50	50	50	50	8	13-5	16	15.733	0.032	14.878	15.701		14.878	14.531	0	0	21	0.3	1.69	1.51	1.37	1.166	1.165	0.032	0.03	0.823
13-5	Grated Trench 2m	0.0087					10					16	12	50	50	50	50	4	13-6	13	15.368	0.028	14.531	15.34		14.531	14.105	0	0	33	0.4	2.07	1.99	1.95	1.022	1.171	0.028	0.02	0.809
13-6	SCUPPER F	0.0096					11					13	4	50	50	50	50	9	13-7	18	14.941	0.032	14.105	14.909		14.105	13.686	0	0	37	0.4	2.15	1.92	1.74	1.171	1.171	0.032	0.03	0.804
13-7	Grated Trench 2m	0.0103					11					18	13	50	50	50	50	5	13-8	14	14.503	0.029	13.686	14.474		13.686	13.286	0	0	50	0.6	2.35	2.28	2.21	1.07	1.223	0.029	0.02	0.788
13-8	SCUPPER F	0.0105					11					14	4	50	50	50	50	10	13-9	20	14.071	0.033	13.286	14.038		13.286	13.121	0	0	54	0.6	2.4	2.19	2.02	1.223	1.226	0.033	0.03	0.752
13-9	Grated Trench 2m	0.0113					12					20	14	50	50	50	50	6	13-10	16	13.596	0.03	13.121	13.566		13.121	12.858	0	0	66	0.8	2.54	2.45	2.4	1.113	1.236	0.03	0.03	0.445
13-10	SCUPPER F	0.011					12					16	5	50	50	50	50	11	13-11	21	13.137	0.033	12.858	13.104		12.858	12.573	0	0	69	0.8	2.54	2.37	2.22	1.236	1.241	0.033	0.03	0.246
13-11	Grated Trench 2m	0.0105					11					21	15	50	50	50	50	6	13-12	16	12.697	0.03	12.573	12.667		12.573	12.201	0	0	79	0.9	2.65	2.59	2.57	1.105	1.227	0.03	0.03	0.094
13-12	SCUPPER F	0.0104					11					16	5	50	50	50	50	11	13-13	21	12.265	0.033	12.201	12.232		12.201	11.805	0	0	83	1	2.64	2.46	2.33	1.227	1.232	0.033	0.03	0.031
13-13	Grated Trench 2m	0.0103					11					21	14	50	50	50	50	6	13-14	16	11.826	0.03	11.824	11.796		11.805	11.374	0	0	85	1	2.7	2.64	2.63	1.102	1.223	0.03	0.03	-0.028
13-14	SCUPPER F	0.0105					12					16	5	50	50	50	50	11	13-15	21	11.394	0.033	11.393	11.361		11.374	10.903	0	0	87	1	2.68	2.5	2.39	1.223	1.227	0.033	0.03	-0.032
13-15	Grated Trench 2m	0.0103					11					21	14	50	50	50	50	6	13-16	15	10.955	0.03	10.95	10.925		10.903	10.367	0	0	98	1.2	2.7	2.64	2.64	1.1	1.236	0.03	0.03	-0.025
13-16	SCUPPER F	0.0105					12					15	3	50	50	50	50	13	13-17	21	10.522	0.033	10.367	10.489		10.367	9.908	0	0	99	1.2	2.67	2.65	2.65	1.236	1.241	0.033	0.03	0.122
13-17	Grated Trench 2m	0.0088					10					21	15	50	50	50	50	6	13-18	13	10.15	0.028	9.908	10.122		9.908	9.356	0	0	108	1.3	2.87	2.87	2.87	1.04	1.061	0.028	0.02	0.214
13-18	SCUPPER F	0.0081					9					13	4	50	50	50	50	9	13-19	13	9.815	0.028	9.356	9.787		9.356	9.011	0	0	112	1.3	2.98	2.98	2.98	1.041	1.244	0.028	0.02	0.431
13-19	Grated Trench 3m	0.0046					5					13	12	50	50	50	50	2	TD13-20.	16	9.626	0.034	9.011	9.592											1.244	1.25	0.034	0.03	0.581
BB13-19	SCUPPER DP											0	0					0			9.736	0	8.336	9.736		8.336	8.262	0	0	123	0.7	2.47	2.47	2.47			0		1.4
RH13-19A	ALL IN GRADE											0	0					0			9.354	0	8.162	9.354		8.162	7.957	0	0	123	0.4	2.69	2.64	2.64			0		1.192
13-20	IP XXX x XXX											0	0					0			9.075	0	7.957	9.075		7.906	7.814	1.9	0.052	139	0.5	1.62	1.62	1.87			0		1.118
13A-1	IP XXX x XXX											0	0					0			9.245	0	6.612	9.245													0		2.633
13A-2	IP XXX x XXX											0	0					0			8.688	0	6.258	8.688													0		2.43
13A-3	IP XXX x XXX											0	0					0			8.013	0	6.165	8.014													0		1.848
13A-4	IP XXX x XXX											0	0					0			7.329	0	6.037	7.329													0		1.292
13A-5	IP XXX x XXX											0	0					0			6.719	0	5.907	6.719													0		0.812
13A-6	IP XXX x XXX											0	0					0			6.205	0	5.69	6.205		5.436	5.363	2.1	0.253	306	0.8	1.92	1.92	2.47			0		0.515
13B-1	IP XXX x XXX											0	0					0			6.015	0	5.7	6.015		5.7	5.699	1.6	0.032	33	0.2	1.33	0.58	0.43			0		0.315
13B-2	IP XXX x XXX											0	0					0			6.102	0	5.699	6.102		5.696	5.69	0.4	0.02	61	0.3	1.33	0.85	0.92			0		0.403
14-1	SCUPPER F	0.0047					5					5	2	50	50	50	50	4	14-2	13	16.24	0.037	15.365	16.203		15.365	15.275	0	0	1	0	0	0.34	0	1.383	1.426	0.037	0.02	0.838
14-2	SCUPPER F	0.0091					10					13	3	50	50	50	50	11	14-3	20	16.145	0.039	15.275	16.106		15.275	15.108	0	0	4	0.1	0	0.47	0.34	1.426	1.423	0.039	0.03	0.831
14-3	Grated Trench 2m	0.0093					10					20	15	50	50	50	50	5	14-4	12	15.943	0.029	15.108	15.914		15.108	14.82	0	0	20	0.3	1.53	1.53	1.53	1.088	1.185	0.029	0.02	0.806
14-4	SCUPPER F	0.0088					10					12	3	50	50	50	50	9	14-5	18	15.657	0.032	14.819	15.625		14.819	14.45	0	0	22	0.3	1.76	1.57	1.42	1.185	1.185	0.032	0.03	0.806
14-5	Grated Trench 2m	0.0093					10					18	13	50	50	50	50	5	14-6	13	15.271	0.027	14.45	15.244		14.45	13.984	0	0	35	0.4	2.17	2.11	2.08	1.008	1.167	0.027	0.02	0.794
14-6	SCUPPER F	0.0092					10					13	4	50	50	50	50	9	14-7	19	14.801	0.031	13.984	14.77		13.984	13.465	0	0	39	0.4	2.29	2.04	1.84	1.167	1.166	0.031	0.03	0.786
14-7	Grated Trench 2m	0.0112					12					19	14	50	50	50	50	6	14-8	15	14.268	0.029	13.465	14.239		13.465	12.948	0	0	52	0.6	2.49	2.42	2.35	1.075	1.2	0.029	0.03	0.774
14-8	SCUPPER F	0.011					12					15	5	50	50	50	50	11	14-9	21	13.745	0.032	12.948	13.713		12.948	12.509	0	0	57	0.6	2.55	2.33	2.16	1.2	1.202	0.032	0.03	0.765
14-9	Grated Trench 2m	0.0105					11					21	14	50	50	50	50	6	14-10	16	13.247	0.029	12.509	13.218		12.509	12.247	0	0	71	0.8	2.7	2.63	2.58	1.076	1.201	0.029	0.03	0.709
14-10	SCUPPER F	0.0103					11					16	5	50	50	50	50	11	14-11	21	12.756	0.032	12.247	12.724		12.247	11.943	0	0	74	0.8	2.73	2.53	2.38	1.201	1.203	0.032	0.03	0.477
14-11	Grated Trench 2m	0.0104					11					21	14	50	50	50	50	6	14-12	16	12.26	0.029	11.943	12.231		11.943	11.516	0	0	84	0.9	2.82	2.75	2.72	1.081	1.201	0.029	0.03	0.288
14-12	SCUPPER F	0.0104					11					16	5	50	50	50	50	11	14-13	21	11.77	0.032	11.516	11.738		11.516	11.043	0	0	88	1	2.81	2.63	2.5	1.201	1.203	0.032	0.03	0.222
14-13	Grated Trench 2m	0.0103					11					21	14	50	50	50	50	6	14-14	16	11.274	0.029	11.043	11.245		11.043	10.419	0	0	100	1.1	2.88	2.77	2.77	1.079	1.168	0.029	0.03	0.202
14-14	SCUPPER F	0.0104					11					16	5	50	50	50	50	11	14-15	19	10.783	0.032	10.419	10.751		10.419	9.847	0	0	105	1.2	2.84	2.79	2.79	1.168	1.167	0.032	0.03	0.332
14-15	Grated Trench 2m	0.0087					10					19	14	50	50	50	50	6	14-16	8	10.358	0.023	9.847	10.335		9.847	9.585	0	0	117	1.3	3.12	3.12	3.12	0.843	0.842	0.023	0.02	0.488
14-16	SCUPPER F	0.0033					4					8	3	50	50	50	50	5	zBP TD14	5	10.21	0.021	9.585	10.189		9.585	9.395	0	0	120	1.5	3.2	3.2	3.2	0.786	0.73	0.021	0.01	0.604
BB14-16	SCUPPER DP											0	0					0			10.088	0	8.916	10.088		8.785	8.658	2.1	0.132	120	0.6	1.86	2.12	2.85			0		1.172
RH14-17	ALL IN GRADE											0	0					0			10.187	0	8.525	10.187		8.507	8.474	0.2	0.02	120	0.7	2.29	2.29	2.4			0		1.662
RH14-17A	SCUPPER DP											0	0					0			10.136	0	5.616	10.136		5.391	5.371	2.1	0.225	120	1.2	1.54	1.6	1.72			0		4.52
14-17	M.G.S.G.											0	0					0			5.422	0	3.825	5.422													0		1.597
14-17A	M.G.S.G. (HAUNCHED)											0	0					0			5.427	0	3.501	5.427		3.256	3.196	2.1	0.244	485	1.1	1.72	1.72	1.72			0		1.926
14-18	GRATED INLET 900X900											0	0					0			4.087	0	3.196	4.087													0		0.891
14-19	GRATED INLET											0	0					0			3.373	0	2.64	3.373		2.64	2.336	0	0	363		0		0			0		0.733
14-20	IP XXX x XXX											0	0					0			3.03	0	1.671	3.03		1.671	1.5	0.5	0.037	485	0.5	1.58	1.34	1.18			0		1.359
14-21	HW											0	0					0			0.844	0	1.5	1.594													0		-0.656
15-1	SCUPPER F	0.0101					11					35	7	50	50	50	50	29	zBP AD15	29	9.166	0.042	8.411	9.124		8.411	7.634	7	0	7	0.1	1.4	1.13	0.94	1.538	1.535	0.042	0.04	0.713
15-2	SCUPPER F	0.0087					10					38	7	50	50	50	50	31	zBP AD15	35	8.376	0.043	7.634	8.333		7.634	6.838	2.3	0	13	0.1	1.93	1.55	1.3	1.599	1.512	0.043	0.05	0.699
15-3	SCUPPER F	0.0066					7					41	8	50	50	50	50	34	zBP AD17	38	7.578	0.046	6.838	7.532		6.837	6.474	1.7	0.001	21	0.1	1.97	2.05	2.14	1.704	1.516	0.046	0.05	0.694
16-1	SO2	0.0484			0.0463	0.0598	40			51	48	128	119					9	12-1	61	3.667	0.05	3.124	3.617		2.821	2.688	8	0.304	119	0.6	1.08	1.27	1.79	1.847	1.851	0.05	0.07	0.493
17-1	SCUPPER DP											0	0					0			6.627	0	5.286	6.627													0		1.341
17-2	SCUPPER DP											0	0					0			6.6	0	5.276	6.6		5.272	5.262	0.2	0.008	49	0.6	0.9	0.86	0.82			0		1.324
17-3	SCUPPER DP											0	0					0			6.561	0	5.262	6.561		5.256	5.204	0.6	0.006	73	0.9	1.04	1.04	1.05			0		1.299
17-4	SCUPPER DP											0	0					0			6.525	0	5.204	6.525		5.203	5.164	0.2	0.003	76	0.9	1.05	1.08	1.11			0		1.321
17-5	SCUPPER DP											0	0					0			6.493	0	5.164	6.493		5.164	5.084	0.2	0.006	79	0.9	1.06	1.02	1.01			0		1.329
17-7	SCUPPER DP											0	0					0			6.452	0	5.084	6.452		5.076	5.013	0.3	0.008	95	1.1	1.22	1.23	1.24			0		1.368
17-8	SCUPPER DP											0	0					0			6.483	0	5.013	6.483		4.998	4.919	0.2	0.015	106	1.3	1.38	1.46	1.6			0		1.47
17-9	M.G.S.G.											0	0					0			5.026	0	4.653	4.984		4.631	4.372	2.1	0.076	130	0.9	1.18	1.18	1.21			0		0.373
17-13	M.G.S.G.											0	0					0			4.57	0	4.372	4.82		4.366	4.229	0.4	0.033	153	1	1.45	1.43	1.51			0		0.198
17-15	M.G.S.G.											0	0	50	50	50	50	0			4.458	0	4.229	4.708		4.222	4.197	0.2	0.017	151	0.6	1.29	1.23	1.19			0		0.229
17-16	M.G.S.G.											0	0	50	50	50	50	0			4.402	0	4.197	4.652		4.19	4.165	0.2	0.014	152	0.6	1.24	1.15	1.1			0		0.205

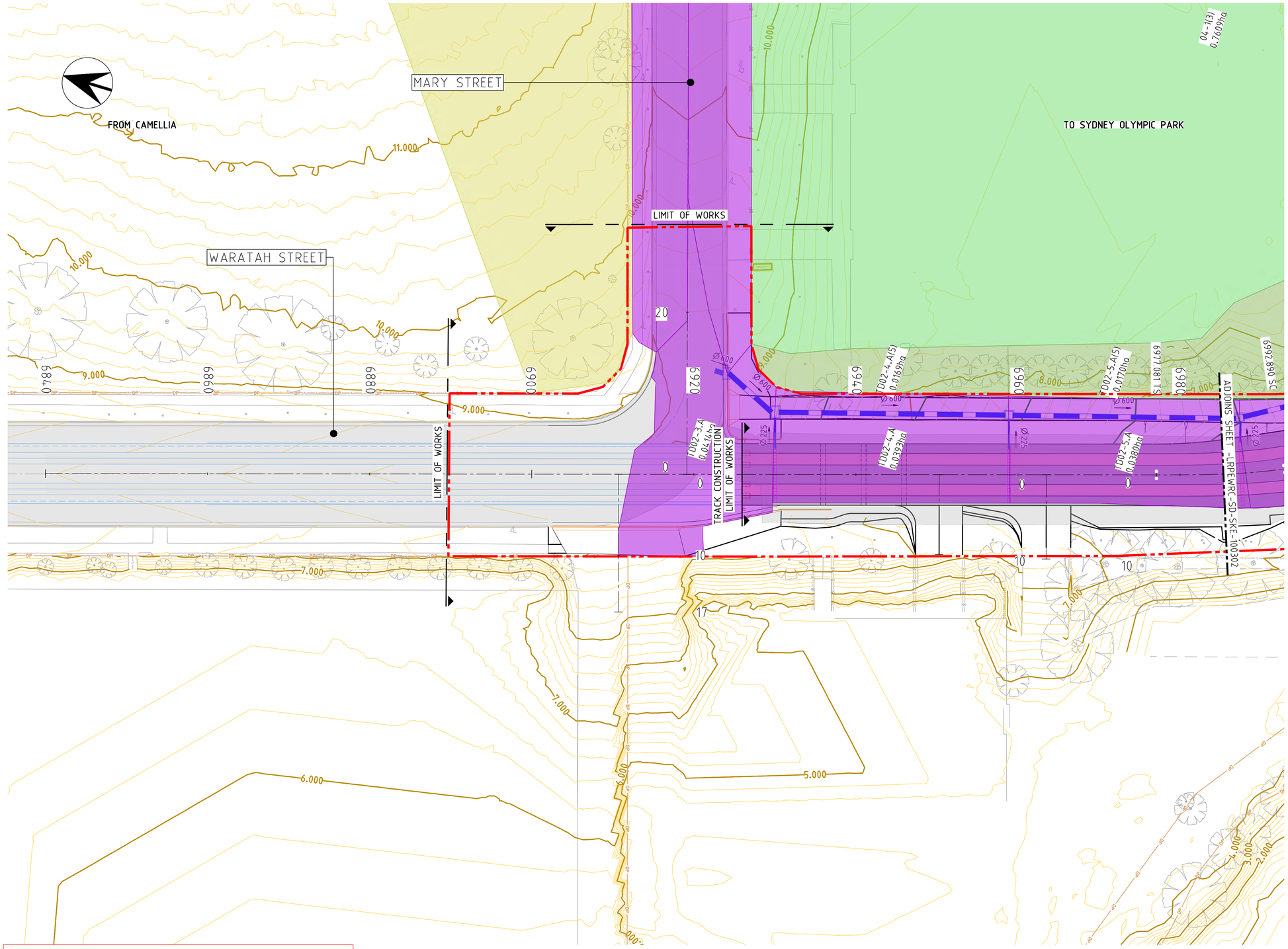
Node	Node Type	Catchmnet Areas (ha)					Catchment Flow					Approach	Inlet	Efficiencies				Uncapture	Bypass	Bypass	Bypass	mid ch	Node	Grate	LOST	Link HGL		Ku		Flow	Capacity	Velocities			Flood Widths		Flooded Depth		Freeboard
												Flow	Captured	minor		Major		Flow	Node	Flow	HGL		HGL		FLOW	Upstream	Downstream	(at max	Ku			Upstream	Link	Downstrea	Upstream	Downstrea	Depth	DxV	
		Area 1	Area 2	Area 3	Area 4	Area 5	Set 1	Set 2	Set 3	Set 4	Set 5		Flow	SAG	Ongrade	SAG	Ongrade																						
17-17	M.G.S.G.											0	0					0			4.346	0	4.165	4.596		4.161	4.097	0.6	0.041	184	0.8	1.28	1.27	1.32			0		0.181
17-18	M.G.S.G.											0	0	50	50	50	50	0			4.284	0	4.097	4.535		4.094	4.053	0.2	0.015	186	0.8	1.29	1.27	1.25			0		0.187
17-19	M.G.S.G.											0	0	50	50	50	50	0			4.717	0	4.053	4.717		4.051	4.003	0.2	0.014	191	0.8	1.25	1.21	1.2			0		0.664
17-20	M.G.S.G.											0	0	50	50	50	50	0			4.848	0	4.003	4.848		4.003	3.948	0.2	0.014	199	0.8	1.26	1.25	1.25			0		0.845
17-21	M.G.S.G.											0	0					0			4.903	0	3.948	4.904		3.94	3.916	1.2	0.018	211	0.6	1.22	1.05	0.98			0		0.955
17-22	M.G.S.G.											0	0					0			4.855	0	3.916	4.855		3.829	3.793	2.1	0.088	240	0.7	1.11	1.17	1.31			0		0.939
17-24	M.G.S.G. (HAUNCHED)	0.0723					79					79	79					0			4.625	0	3.793	4.625		3.764	3.563	2.2	0.13	317	0.6	1.55	1.33	1.44			0		0.832
17-25	M.G.S.G. (HAUNCHED)											0	0					0			4.4	0	3.563	5.349		3.556	3.501	0.2	0.011	317	0.7	1.12	1.12	1.12			0		0.837
18-1	GRATED INLET 900X900	0.0225					25					0	0					0			5.622	0	5.368	5.622		5.368	5.361	0.2	0.011	-47	-0.3	1.09	0.62	0.45			0		0.254
18-1A	GRATED INLET 900X900					0.0559					45	27	49					0	18-1	0	5.361	0.085	5.361	5.276		5.348	5.347	9.7	0.051	51	0.3	0.94	0.85	0.78	0	0	0.085	0	-0.085
18-2	SAS	0.0488					53					52	64					0	18-1A	0	5.721	0.08	5.347	5.641		5.308	5.228	9.7	0.087	91	0.6	1.27	0.88	1.02	0	0	0.08	0	0.294
18-2A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
19-1	IP XXX x XXX											0	0					0			5.979	0	5.1	5.979		5.098	5.055	0.9	0.002	24	0.2	0.87	0.68	0.66			0		0.879
19-2	IP XXX x XXX											0	0					0			6.792	0	5.055	6.792		5.049	5.007	0.5	0.006	42	0.3	0.97	0.79	0.66			0		1.737
19-3	IP XXX x XXX											0	0					0			6.651	0	5.007	6.651		5.006	4.824	0.5	0.001	70	0.6	1.14	1.18	1.22			0		1.644
19-4	IP XXX x XXX											0	0					0			6.26	0	4.776	6.26		4.776	3.852	0.3	0	96	0.3	2.44	2.37	2.3			0		1.484
19-5	IP XXX x XXX											0	0					0			4.992	0	3.852	4.992		3.852	2.446	0.3	0	142	0.3	3.39	2.94	2.91			0		1.14
19-6	GRATED INLET 900X900	0.0282					31					31	31					0			3.274	0	2.446	3.274		2.446	2.385	4.1	0.013	170	0.7	1.85	1.68	1.6			0		0.828
20-1	SA1	0.0233					26					25	24					1	zBP22-1	1	3.091	0.014	2.243	3.077		2.239	2.209	9.7	0.018	24	0.1	0.82	0.84	0.86	0.157	6.752	0.014	0	0.834
21-1	SAS	0.0298				0.0063	33				5	34	34					0			2.113	0.056	1.502	2.057		1.494	1.47	6.8	0.015	35	0.1	0.22	0.22	0.22			0.056		0.555
22-1	SA2 >450	0.0199					22					22	22					0	zBP36-2.L	0	2.438	0	1.929	2.438		1.925	1.92	3.1	0.006	22	0.1	0.2	0.2	0.2	0	0	0	0	0.509
23-1	GRATED INLET 900X900					0.0017					1	4	1					0	LOST	0	2.609	0.009	2.295	2.6		2.176	2.163	4	0.154	147	0.3	1.73	0.93	0.93	0	0	0.009	0	0.305
24-1	F2 >450											0	0					0			4.904	0	3.516	4.904		3.517	3.024	0	0	19	0.1	1.43	1.42	1.41			0		1.388
24-2	F2 >450	0.0124					14					13	12					1	zBP20-1	1	4.355	0.011	2.271	4.344		2.269	2.226	4.5	0.009	31	0.3	0.95	0.95	0.95	0.411	1.334	0.011	0	2.073
10-2	GRATED INLET 900X900	0.0222					24					24	21					2	10-3	34	4.831	0.046	4.047	4.785		4.047	3.845	0	0	243		0		0	0.978	0.776	0.046	0.06	0.738
26-1	GPT											0	0					0			4.846	0	4.022	4.846		3.675	3.316	4	0.352	191	0.6	1.73	2.05	2.91			0		0.824
27-1	SA2	0.0064			0.0154	0.0086	5			17	7	27	26					0	16-1	128	5.868	0.08	4.795	5.788		4.767	4.669	9.7	0.028	26	0.1	0.87	1.02	1.31	2.826	2.825	0.08	0.12	0.993
28-5	SO1											74	74					0	zBP 10-8	30	1.971	0.047	1.539	1.924		1.51	1.487	4.5	0.041	74	0.3	0.46	0.46	0.46	1.725	1.846	0.047	0.03	0.385
14-19	GRATED INLET											0	0					0			3.373	0	2.64	3.373		2.64	2.336	0	0	363		0		0			0		0.733
29-1	GPT											0	0					0			3.163	0	2.624	3.163		2.399	2.346	4	0.288	131	1.1	1.19	1.3	1.56			0		0.539
29-2	GPT											0	0					0			2.997	0	2.346	2.997		2.097	2.032	4	0.249	122	1	1.1	1.23	1.51			0		0.651
30-1	SCUPPER ATL				0.0047					5		6	5		50		50	2	30-2	5	13.535	0.02	13.051	13.515		13.051	12.818	0	0	5	0.1	0	0.98	0.8	0.75	0.782	0.02	0.01	0.464
30-2	SCUPPER ATL				0.0036					4		5	4		50		50	1	30-3	5	13.316	0.019	12.818	13.297		12.818	12.584	0	0	9	0.2	1.54	1.34	1.19	0.712	0.729	0.019	0.01	0.479
30-3	SCUPPER ATL				0.0037					4		5	4		50		50	1	30-4	5	13.057	0.018	12.584	13.039		12.584	12.346	0	0	13	0.3	1.74	1.58	1.45	0.678	0.778	0.018	0.01	0.455
30-4	SCUPPER ATL				0.0033					4		5	4		50		50	1	30-5	6	12.801	0.021	12.346	12.78		12.346	12.111	0	0	16	0.4	1.86	1.69	1.54	0.778	0.782	0.021	0.02	0.434
30-5	SCUPPER ATL				0.0046					5		6	5		50		50	2	30-6	5	12.576	0.018	12.111	12.558		12.111	11.877	0	0	21	0.5	1.96	1.86	1.78	0.679	0.692	0.018	0.01	0.447
30-6	SCUPPER ATL				0.0028					3		5	4		50		50	1	30-7	4	12.319	0.018	11.877	12.301		11.877	11.633	0	0	24	0.5	2.07	1.96	1.87	0.658	0.701	0.018	0.01	0.424
30-7	SCUPPER ATL				0.0031					3		4	3		50		50	1	30-8	5	12.06	0.019	11.633	12.041		11.633	11.396	0	0	27	0.6	2.11	2.01	1.92	0.701	0.718	0.019	0.01	0.408
30-8	SCUPPER ATL				0.0035					4		5	4		50		50	1	30-9	5	11.819	0.019	11.396	11.8		11.396	11.158	0	0	31	0.7	2.18	2.09	2.01	0.688	0.721	0.019	0.01	0.404
30-9	SCUPPER ATL				0.0033					4		5	4		50		50	1	30-10	5	11.581	0.019	11.158	11.562		11.158	10.936	0	0	35	0.8	2.23	2.13	2.04	0.721	0.741	0.019	0.01	0.404
30-10	SCUPPER ATL				0.004					4		5	4		50		50	1	30-11	5	11.322	0.019	10.936	11.303		10.936	10.781	0	0	39	0.8	2.29	2.18	2.1	0.686	0.7	0.019	0.01	0.367
30-11	SCUPPER ATL				0.0032					4		5	4		50		50	1	30-12	5	11.063	0.019	10.781	11.044		10.781	10.606	0	0	41	0.9	2.28	2.18	2.11	0.695	0.73	0.019	0.01	0.263
30-12	SCUPPER ATL				0.0033					4		5	4		50		50	1	30-13	6	10.844	0.02	10.606	10.824		10.606	10.409	0	0	41	0.9	2.27	2.16	2.08	0.73	0.769	0.02	0.01	0.218
30-13	SCUPPER ATL				0.0042					5		6	4		50		50	1	30-14	5	10.584	0.018	10.409	10.566		10.409	10.174	0	0	45	1	2.28	2.13	2.05	0.678	0.717	0.018	0.01	0.157
30-14	SCUPPER ATL				0.0031					3		5	4		50		50	1	30-15	5	10.326	0.019	10.174	10.307		10.174	9.987	0	0	47	1	2.2	2.1	2.1	0.717	1.353	0.019	0.01	0.133
30-15	SCUPPER ATL				0.0034					4		5	4		50		50	1	zBP AD15	24	10.201	0.037	9.987	10.164		9.987	9.798	0	0	50	1.1	2.23	2.23	2.23	1.353	1.587	0.037	0.03	0.177
30-16	SCUPPER ATL											0	0					0			9.998	0	9.798	9.998		9.798	9.67	0	0	50	1.1	2.24	2.24	2.24			0		0.2
SC30-16 dp.1	SCUPPER DP											0	0					0			9.89	0	9.67	9.89		9.67	9.546	0	0	50	2.4	2.24	2.24	2.24			0		0.22
SC30-16 dp.2	SCUPPER CONN											0	0					0			9.934	0	9.546	9.934		9.546	9.518	0	0	50	2.4	2.23	2.23	2.23			0		0.388
BB30-17	SCUPPER DP											0	0					0			9.91	0	8.856	9.91		8.856	8.811	0	0	50	0.6	1.8	1.8	1.8			0		1.054
RH30-17	ALL IN GRADE											0	0					0			9.78	0	8.588	9.78		8.588	8.577	0	0	50	0.8	1.45	1.45	1.45			0		1.192
RH30-17A	SCUPPER DP											0	0					0			9.724	0	5.502	9.724		5.398	5.343	2.1	0.104	50	0.8	1.02	1.15	1.45			0		4.222
CONN 31-5	SCUPPER CONN											0	0					0			7.816	0	6.797	7.816		6.797	6.432	0.2	0	31	0.2	2.28	2.05	1.86			0		1.019
CONN31-6	SCUPPER CONN											0	0					0			7.548	0	6.432	7.548		6.429	6.319	0.3	0.003	33	0.3	1.99	1.73	1.53			0		1.116
35-1	SO2	0.0288					32					37	37					0	zBP 44-1	0	5.79	0	4.725	5.79		4.725	4.609	0	0	37	0.3	0.98	0.94	0.91	1.253	1.778	0	0.01	1.065
36-1	ALL IN SAG											0	17					0	37-4	5	2.102	0.029	2.102	2.073		2.095	1.833	1.3	0.11	66	0.5	1.67	1.67	1.67	1.972	0.975	0.029	0.01	-0.029
AD36-1.A	ALL IN GRADE	0.0464					51					51	51					0			2.237	0	2.239	2.237	2	2.223	2.105	9.5	0.069	49	0.2	1.11	0.96	0.95			0		-0.002
AD36-1.B	ALL IN GRADE											0	0					0			2.103	0	2.105	2.103	11	2.102	2.102	0.2	0.01	48	0.4	1.07	0.97	1.04			0		-0.002
AD36-2.A	ALL IN GRADE	0.0198					22					22	22					0			2.141	0	2.129	2.141		2.101	2.102	9.7	0.063	23	0.1	0.96	0.55	0.44			0		0.012
37-1	SA2	0.0109					12					21	21					0	zBP37-2.F	1	1.975	0.024	1.931	1.951		1.922	1.921	3.3	0.006	22	0.1	0.2	0.2	0.2	1.177	2.109	0.024	0.01	0.02
37-2	SAS	0.0246				0.0015	27				2	13	13					0	zBP37-3	0	1.963	0.031	1.963	1.932		1.915	1.911	1.2	0.006	35	0.2	0.32	0.32	0.32	0	0	0.031	0	-0.031
37-3	SA2	0.0171				0.0105	19				8	26	26					0	zBP37-2.L	0	1.982	0.014	1.911	1.968		1.894	1.877	1.2	0.018	60	0.3	0.55	0.55	0.55	0.425	1.601	0.014	0.01	0.057
37-4	SA2	0.0078				0.0012	9				1	6	6					0	37-3	22	2.105	0.049	1.877	2.056		1.858	1.845	1.4	0.024	69	0.4	0.62	0.62	0.62	1.815	1.817	0.049	0.02	0.179
38-1	GRATED INLET 900X900					0.0669					54	0	0					0			2.3	0	2.209	2.3		2.168	1.92	1.2	0.041	177	0.8	1.6	1.6	1.6			0		0.091
38-2	IP XXX x XXX											0	0					0			2.264	0	1.92	2.264													0		0.344
41-1	SAS >450	0.0171					19					18	84					0	51-1	0	1.815	0.095	1.627	1.72		1.582	1.5	3.6	0.044	84	0.7	0.76	0.76	0.76	0	0	0.095	0	0.093
41-2	HW											0	0					0			0.32	0	1.5	0.695													0		-1.18
44-1	SO2	0.0211					23					13	13					0	TD05-3.A	51	5.787	0.057	4.609	5.73											2.123	1.945	0.057	0.03	1.121
02-8	IP XXX x XXX											0	0					0			5.383	0	3.708	5.383		3.708	3.56	0	0	635		0		0			0		1.675
45-1	IP XXX x XXX											0	0					0			5.373	0	3.704	5.373		3.686	3.635	2	0.129	123	0.7	1.12	1.27	1.67			0		1.669
45-2	GPT											0	0					0			5.147	0	3.635	5.147		3.554	3.507	4	0.175	105	0.5	1.37	1.14	1.93			0		1.512
46-1	GRATED INLET 900X900											0	0					0			4.35	0	3.485	4.35		3.458	3.369	2.1	0.075	167	0.2	1.16	1.21	1.28			0		0.865
46-2	HW											0	0					0			3.064	0	3.369	3.588													0		-0.305
47-1	SCUPPER ATL				0.0026					3		4	3		50		50	1	47-2	5	12.927	0.02	12.436	12.907		12.436	12.232	0	0	3	0.1	0	0.74	0.58	0.722	0.741	0.02	0.01	0.471
47-2	SCUPPER ATL				0.0036					4		5	4		50		50	1	47-3	5	12.732	0.019	12.232	12.713		12.232	12.027	0	0	6	0.1	1.34	1.13	0.98	0.709	0.727	0.019	0.01	0.481
47-3	SCUPPER ATL				0.0035					4		5	4		50		50	1	47-4	5	12.507	0.02	12.027	12.487		12.027	11.821	0	0	10	0.2	1.55	1.37	1.23	0.723	0.744	0.02	0.01	0.46
47-4	SCUPPER ATL				0.0038					4		5	4		50		50	1	47-5	5	12.281	0.019	11.821	12.262		11.821	11.614	0	0	14	0.3	1.7	1.55	1.43	0.718	0.737	0.019	0.01	0.441
47-5	SCUPPER ATL				0.0036					4		5	4		50		50	1	47-6	5	12.056	0.02	11.614	12.036		11.614	11.406	0	0	18	0.4	1.82	1.69	1.59	0.726	0.763	0.02	0.01	0.422
47-6	SCUPPER ATL				0.0035					4		5	4		50		50	1	47-7	5	11.859	0.019	11.406	11.84		11.406	11.197	0	0	22	0.5	1.91	1.79	1.69	0.707	0.725	0.019	0.01	0.434
47-7	SCUPPER ATL				0.0035					4		5	4		50		50	1	47-8	5	11.634	0.019	11.197	11.615		11.197	10.989	0	0	25	0.6	1.98	1.87	1.78	0.711	0.73	0.019	0.01	0.418
47-8	SCUPPER ATL				0.0036					4		5	4		50		50	1	47-9	5	11.408	0.019	10.989	11.389		10.989	10.788	0	0	29	0.7	2.05	1.95	1.86	0.705	0.732	0.019	0.01	0.4
47-9	SCUPPER ATL				0.0035					4		5	4		50		50	1	47-10	5	11.184	0.02	10.788	11.164		10.788	10.641	0	0	33	0.8	2.1	2	1.92	0.732	0.771	0.02	0.01	0.376
47-10	SCUPPER ATL				0.0036					4		5	4		50		50	1	47-11	5	10.987	0.019	10.641	10.968		10.641	10.525	0	0	37	0.9	2.13	2.03	1.95	0.707	0.724	0.019	0.01	0.327
47-11	SCUPPER ATL				0.0035					4		5	4		50		50	1	47-12	5	10.761	0.019	10.525	10.742		10.525	10.389	0	0	39	0.9	2.13	2.04	1.97	0.709	0.727	0.019	0.01	0.217
47-12	SCUPPER ATL				0.0035					4		5	4		50		50	1	47-13	5	10.536	0.019	10.389	10.517		10.389	10.229	0	0	39	0.9	2.14	2.05	1.98	0.714	0.733	0.019	0.01	0.128
47-13	SCUPPER ATL				0.0035					4		5	4		50		50	1	47-14	5	10.315	0.02	10.229	10.295		10.229	10.044	0	0	40	0.9	2.13	2.04	1.97	0.722	0.742	0.02	0.01	0.066
47-14	SCUPPER ATL				0.0034					4		5	4		50		50	1	47-15	4	10.113	0.017	10.044	10.096		10.044	9.895	0	0	42	1	2.1	2.03	1.98	0.64	0.646	0.017	0.01	0.052
47-15	SCUPPER ATL	0			0.0024		-1E+08			3		4	3		50		50	1	47-16	3	9.954	0.017	9.895	9.937		9.895	9.739	0	0	45	1.1	2.09	2.04	2.02	0.621	0.682	0.017	0.01	0.042
47-16	SCUPPER ATL				0.0024					3		3	3		50		50	1	47-17	4	9.807	0.018	9.739	9.789		9.739	9.499	0	0	47	1.1	2.1	2.08	2.08	0.682	0.694	0.018	0.01	0.05
47-17	SCUPPER ATL				0.0032					4		4	3		50		50	1	47-18	4	9.613	0.018	9.499	9.595		9.499	9.24	0	0	49	1.1	2.19	2.19	2.19	0.666	0.676	0.018	0.01	0.096
47-18	SCUPPER ATL	0			0.0031		0			3		4	3		50		50	1	47-19	4	9.374	0.017	9.24	9.357		9.24	9.09	0	0	52	1.2	2.3	2.3	2.3	0.629	0.906	0.017	0.01	0.117
47-19	Grated Trench 2m				0.0026					3		4	4		50		50	0	AD09-2.A	7	9.258	0.025	9.09	9.233											0.906	0.908	0.025	0.02	0.143
47-19dp	SCUPPER DP											0	0					0			9.276	0	8.945	9.276		8.945	8.922	0	0	54	2.6	2.42	2.42	2.42			0		0.331
BB47-20	SCUPPER DP											0	0					0			9.258	0	8.208	9.258		8.208	7.917	0	0	54	0.3	3.58	3.58	3.58			0		1.05
51-1	SAS	0.0633				0.0078	-2E+08				-2E+08	1	-55					114	10-10	0	1.501	0.299	1.501	1.202		1.501	1.468	1.8	0.091	-114	-0.6	1.03	1.03	1.03	0	0	0.299	0	-0.299
52-1	SA3																		z10-4					4.047															
52-2	IP XXX x XXX																							3.09															
52-3	SA1																		z10-5					2.722															
52-4	SO2	0.0122				0.0114	13				9	21	21					0	LOST	0	1.95	0.003	1.895	1.984		1.889	1.889	4.6	0.008	38	0.2	0.35	0.35	0.35	0.149	0.149	0.003	0	0.052
AD09-1.A	LONG DRAIN				0.0075					8		8	8					0			9.567	0	9.015	9.567		9.015	8.932	0	0	8	0.5	1.18	1.18	1.18			0		0.552
AD09-2.A	LONG DRAIN				0.0071					8		7	7					0	AD09-3.A	0	8.54	0	8.478	8.54		8.478	8.395	0	0	7	0.4	1.13	1.13	1.13	0	0	0	0	0.062
AD09-3.A	LONG DRAIN											0	0					0	AD09-4.A	8	7.906	0.022	7.733	7.884		7.733	7.652	0	0	0	0	0	0	0	0.831	0.843	0.022	0.02	0.151
AD09-4.A	LONG DRAIN				0.0071					8		8	8					0	AD09-6.A	7	7.217	0.023	7.131	7.194		7.131	7.054	0	0	7	0.6	1.1	1.1	1.1	0.843	0.944	0.023	0.02	0.063
AD09-6.A	LONG DRAIN				0.0069					8		7	7					0	10-1	8	6.605	0.026	6.516	6.579		6.516	6.436	0	0	7	0.6	1.12	1.12	1.12	0.944	1.466	0.026	0.01	0.063
TD02-3.A	TRAM DRAIN	0.0414					45					46	46					30	zBP TD02	0	8.566	0.001	8.457	8.565		8.457	8.4	0	0	46	4.6	1	1.14	1.32	0.545	1.749	0.001	0	0.108
TD02-4.A	TRAM DRAIN	0.0393				0.0169	43				14	60	62					60	zBP TD02	0	7.501	0	7.427	7.501		7.427	7.364	0	0	60	6.7	1.12	1.26	1.44	0.424	1.723	0	0	0.074
TD02-5.A	TRAM DRAIN	0.038				0.017	42				14	51	52					28	zBP TD02	0	6.417	0.001	6.272	6.416		6.272	6.202	0	0	52	0.6	1.25	1.3	1.36	0.66	1.973	0.001	0.01	0.144
TD02-6.A	TRAM DRAIN	0.0376				0.0383	41				31	62	64					62	zBP TD02	0	5.56	0.001	5.438	5.559		5.438	5.359	0	0	62	0.7	1.35	1.4	1.45	0.371	1.436	0.001	0	0.121
TD02-7.A	TRAM DRAIN	0.0287					32					21	22					21	zBP TD02	0	5.4	0	5.168	5.4		5.168	5.124	0	0	21	0.3	0.94	0.98	1.02	0	0	0	0	0.232
TD05-1.A	TRAM DRAIN	0.0252					28					26	26					20	zBP TD02	0	5.424	0.001	5.231	5.423		5.231	5.205	0	0	29	3.1	1.12	1.12	1.12	1.298	1.565	0.001	0.01	0.192
TD05-2.A	TRAM DRAIN	0.028					31					29	29					21	zBP TD05	0	5.508	0.001	5.297	5.507		5.297	5.293	0	0	30	3.3	1.14	1.14	1.14	1.382	1.674	0.001	0.01	0.21
TD05-3.A	TRAM DRAIN	0.048					53					39	40					39	zBP TD05	0	5.586	0	5.47	5.586		5.47	5.435	0	0	54	5.3	1.38	1.38	1.38	1.462	1.758	0	0.02	0.116
TD08-4.A	TRAM DRAIN	0.0102					11					11	11					0			6.959	0	6.652	6.959		6.652	6.437	0	0	11	0.1	1.38	1.38	1.38			0		0.307
TD13-20.A	TRAM DRAIN	0.016					18					16	17					16	zBP TD13	0	9.201	0	8.864	9.201		8.864	8.699	0	0	16	0.1	1.59	1.58	1.59	0	0	0	0	0.337
TD13A-3.A	TRAM DRAIN	0.0308					34					33	33					29	zBP TD13	0	8.007	0	7.764	8.008		7.764	7.666	0	0	33	0.3	1.53	1.54	1.54	0	0	0	0	0.243
TD13A-5.A	TRAM DRAIN	0.0303					33					33	34					33	zBP TD13	0	6.718	0	6.536	6.718		6.536	6.491	0	0	33	0.6	1.02	1.09	1.18	0	0	0	0	0.182
TD13B-1.A	TRAM DRAIN	0.0183					20					14	15					14	zBP 35-1	0	6.013	0	5.776	6.013		5.776	5.762	0	0	14	1.4	0.67	0.76	0.89	0.726	1.933	0	0	0.237
TD13B-2.A	TRAM DRAIN	0.0339					37					44	44					35	zBP TD13	0	6.102	0	5.973	6.102		5.973	5.925	0	0	44	4.4	1.01	1.13	1.29	1.196	1.52	0	0.01	0.129
TD17-13.A	TRAM DRAIN	0.0163					-1E+08					24	25					24	zBP TD7-	0	6.883	0	6.689	6.883		6.689	6.651	0	0	24	2.6	0.8	0.91	1.06	0.887	1.866	0	0.01	0.194
TD17-17.A	TRAM DRAIN	0.0141					-1E+08					37	38					37	zBP TD17	0	7.103	0	6.929	7.103		6.929	6.882	0	0	37	0.6	1.07	1.14	1.22	1.057	1.372	0	0.01	0.174
TD17-21.A	TRAM DRAIN	0.0093					-1E+08					10	10					10	LOST	0	7.441	0	7.138	7.441		7.138	7.039	0	0	10	0.1	1.11	1.11	1.11	0	0	0	0	0.303

Node	Node Type	Catchmnet Areas (ha)					Catchment Flow					Approach	Inlet Captured	Efficiencies minor		Major		Uncapture	Bypass Node	Bypass Flow	Bypass HGL	mid ch	Node HGL	Grate	LOST FLOW	Link HGL		Ku			Capacity	Velocities			Flood Widths		Flooded Depth		Freeboard
		Area 1	Area 2	Area 3	Area 4	Area 5	Set 1	Set 2	Set 3	Set 4	Set 5	Flow	Flow	SAG	Ongrade	SAG	Ongrade	Flow								Upstream	Downstream	(at max	Ku	Flow		Upstream	Link	Downstrea	Upstream	Downstrea	Depth	DxV	
TD17-3.A	TRAM DRAIN											0	6					0	TD17-6.A	0	6.661	0.003	6.337	6.658		6.337	6.197	0	0	6	0	1.07	1.07	1.07	0.149	0.149	0.003	0	0.321
TD17-6.A	TRAM DRAIN	0.0057					6					0	0					0	zBP TD17	0	6.522	0	6.156	6.522		6.156	6.1	0	0	0	0	0	0	0	0	0	0	0	0.366
TD17-7.A	TRAM DRAIN	0.0206					23					17	17					17	SC17-7.A	0	6.46	0	6.228	6.46		6.228	6.195	0	0	17	0.5	0.74	0.83	0.94	0.616	1.229	0	0	0.232
TD17-8.A	TRAM DRAIN	0.0084					9					14	14					13	zBP TD17	0	6.505	0	6.266	6.505		6.266	6.236	0	0	14	1.4	0.64	0.74	0.88	1.062	1.774	0	0.01	0.239
TD17-9.A	TRAM DRAIN	0.0307					34					31	31					31	zBP TD17	0	6.58	0	6.408	6.58		6.408	6.368	0	0	31	2.9	0.9	1.01	1.15	0.639	1.132	0	0	0.172
TD19-1.A	TRAM DRAIN	0.0164					18					24	24					21	zBP TD19	0	6.902	0	6.709	6.902		6.709	6.669	0	0	24	2.6	0.79	0.91	1.06	1.111	1.488	0	0.01	0.193
TD19-2.A	TRAM DRAIN	0.018					20					19	20					19	zBP TD19	0	6.792	0	6.578	6.792		6.578	6.543	0	0	19	2.6	0.73	0.84	0.99	1.084	1.614	0	0.01	0.214
TD19-3.A	TRAM DRAIN	0.0202					22					29	30					24	zBP TD19	0	6.674	0	6.48	6.674		6.479	6.436	0	0	30	0.5	0.99	1.06	1.14	1.504	1.916	0	0.02	0.194
TD19-4.A	TRAM DRAIN	0.037					41					28	29					28	zBP TD19	0	6.455	0	6.187	6.455		6.187	6.009	0	0	28	0.2	1.83	1.83	1.83	0.613	1.6	0	0	0.268
TD19-5.A	TRAM DRAIN	0.0131					14					14	14					0			5.549	0	5.432	5.549		5.432	5.431	0	0	14	0.2	0.54	0.51	0.54			0		0.117
TD19-5.C	TRAM DRAIN	0.0343					38					35	35					26	zBP TD19	0	5.543	0.001	5.427	5.542		5.427	5.366	0	0	48	0.7	1.15	1.24	1.34	0	0	0.001	0	0.115
TD24-1.A	TRAM DRAIN	0.018					20					19	19					19			4.913	0	4.646	4.913		4.646	4.62	0	0	21	0.4	1.02	1.02	1.02			0		0.267
TD31-1.A	TRAM DRAIN	0.0182					20					22	22					22	zBP TD31	0	9.147	0	8.916	9.147		8.916	8.876	0	0	22	0.3	0.94	0.98	1.03	0	0	0	0	0.231
TD31-3.A	TRAM DRAIN	0.0168					18					9	9					9	zBP TD17	0	8.413	0	8.135	8.413		8.135	8.106	0	0	9	0.2	0.64	0.7	0.76	0	0	0	0	0.278
TD35-1.A	TRAM DRAIN											0	0					0			5.94	0	5.57	5.94		5.57	5.454	0	0	0	0	0	0	0			0		0.37
TD44-1.A	TRAM DRAIN											0	0					0	TD44-1.B	0	5.754	0	5.437	5.754		5.437	5.434	0	0	-1	0	0	0	0	0	0	0	0	0.317
08-1	SCUPPER F (EXTENDED	0.0044					5					5	1	50	50	50	50	4	zBP 08-1A	4	6.964	0.02	6.13	6.944		6.13	5.814	9.7	0	1	0	0	0	0	1.451	1.799	0.02	0	0.814
08-1A	SCUPPER F (EXTENDED	0.0049					5					9	4	50	50	50	50	6	SC08-2	6	6.928	0.028	6.08	6.9		6.079	5.795	9.7	0.001	4	0	0	1.45	0	1.018	1.049	0.028	0.01	0.82
08-2	SCUPPER F (EXTENDED	0.007					8					13	2	50	50	50	50	12	zBP 08-3	12	6.88	0.037	5.775	6.843		5.773	5.51	2	0.002	2	0	0	0.48	0.26	1.442	1.636	0.037	0.02	1.068
08-3	SCUPPER F (EXTENDED	0.0085					9					21	6	50	50	50	50	15	zBP 08-4	16	6.792	0.042	5.764	6.75		5.765	5.427	9.7	0	6	0	0	1.13	0.52	1.393	1.402	0.042	0.02	0.986
08-4	SCUPPER F (EXTENDED											0	0	50	50	50	50	0			6.695	0	5.625	6.695		5.625	5.623	0.2	0	0	0	0	0	0			0		1.07
08-5	SCUPPER ATL	0.0131					14					28	14	50	50	50	50	15	zBP 08-6	15	6.696	0.054	5.59	6.642		5.576	5.32	9.7	0.013	14	0.1	3.02	2.12	1.9	1.797	1.849	0.054	0.02	1.052
08-6	SCUPPER ATL	0.0108					12					26	13	50	50	50	50	13	zBP SC17	14	6.648	0.049	5.442	6.599		5.421	5.308	9.7	0.021	13	0	2.96	1.81	1.32	1.81	1.874	0.049	0.02	1.157
SC17-1.A	SCUPPER F (EXTENDED	0.0069					8					21	2	50	50	50	50	19	zBP SC17	19	6.605	0.052	5.319	6.553		5.319	5.296	0	0	2	0	0	0.29	0.14	1.746	1.975	0.052	0.02	1.234
SC17-13.A	SCUPPER F											0	0	50	50	50	50	0			6.883	0	5.842	6.883		5.842	5.794	0	0	24	0.4	1.21	1.21	1.21			0		1.041
SC17-13.B	SCUPPER DP											0	0					0			6.841	0	4.477	6.841		4.449	4.428	2.1	0.03	24	0.4	0.85	1	1.22			0		2.364
SC17-15.A	SCUPPER F	0.0039					4					7	2	50	50	50	50	5	zBP SC17	5	6.996	0.005	6.208	6.991		6.209	6.179	0	0	2	0	0	0.53	0	7.599	7.6	0.005	0	0.783
SC17-15.B	SCUPPER DP											0	0					0			6.971	0	4.252	6.971		4.252	4.236	2.1	0	2	0	0	0.52	0			0		2.719
SC17-16.A	SCUPPER F	0.0039					4					4	1	50	50	50	50	3	zBP SC17	3	7.045	0.006	6.252	7.039		6.252	6.222	0	0	1	0	0	0.48	0	4.405	7.599	0.006	0	0.787
SC17-16.B	SCUPPER DP											0	0					0			7.023	0	4.195	7.023		4.195	4.197	2.1	0.004	1	0	0	0.5	0.29			0		2.828
SC17-17.A	SCUPPER F											1	1	50	50	50	50	0	zBP SC17	0	7.081	0.003	6.103	7.078		6.103	6.073	0	0	37	0.6	1.35	1.35	1.35	3.29	3.693	0.003	0	0.975
SC17-17.B	SCUPPER DP											0	0					0			7.064	0	4.324	7.064		4.255	4.232	2.1	0.071	37	0.6	0.87	1.03	1.35			0		2.74
SC17-18.A	SCUPPER F (EXTENDED	0.0023					2					19	2	50	50	50	50	17	zBP TD17	18	7.141	0.025	6.34	7.116		6.34	6.318	0	0	2	0	0	0.58	0	4.223	4.34	0.025	0	0.776
SC17-18.B	SCUPPER DP											0	0					0			7.106	0	4.109	7.106		4.109	4.097	2.1	0.009	2	0	0.68	0.68	0.48			0		2.997
SC17-19.A1	SCUPPER F (EXTENDED	0.0043					5					17	2	50	50	50	50	15	zBP SC17	15	7.18	0.018	6.377	7.162		6.377	6.351	0	0	2	0	0	0.4	0.31	3.613	3.618	0.018	0	0.785
SC17-19.A	SCUPPER F (EXTENDED	0.0038					4					19	2	50	50	50	50	17	zBP SC17	17	7.16	0.017	6.351	7.143		6.348	6.339	4.9	0.004	4	0.1	0.65	0.68	0.71	3.757	3.778	0.017	0.01	0.792
SC17-19.B	SCUPPER DP											0	0					0			7.141	0	4.526	7.141		4.525	4.507	2.1	0.001	4	0.1	0.67	0.68	0.71			0		2.615
SC17-2.A	SCUPPER F (EXTENDED	0.0073					8					25	2	50	50	50	50	23	zBP SC17	23	6.587	0.065	5.74	6.522		5.74	5.731	0	0	2	0	0.59	0.59	0.59	2.174	2.25	0.065	0.02	0.782
SC17-2.B	SCUPPER DP											0	0					0			6.548	0	5.277	6.548		5.277	5.276	2.1	0.006	3	0	0.48	0.46	0.39			0		1.271
SC17-20.A1	SCUPPER F (EXTENDED	0.0017					2					19	5	50	50	50	50	13	zBP SC17	14	7.27	0.027	6.491	7.243		6.485	6.453	7	0.006	5	0.1	0.63	0.55	0.49	2.173	2.137	0.027	0.01	0.752
SC17-20.A	SCUPPER F (EXTENDED	0.0035					4					17	5	50	50	50	50	12	zBP SC17	12	7.212	0.021	6.453	7.191		6.453	6.438	0	0	10	0.2	0.96	0.96	0.96	3.563	3.77	0.021	0	0.738
SC17-20.B	SCUPPER DP											0	0					0			7.183	0	4.691	7.183		4.684	4.664	2.1	0.007	10	0.1	0.8	0.88	0.98			0		2.492
SC17-21.A	SCUPPER F	0.0113					12					21	5	50	50	50	50	16	zBP SC17	17	7.346	0.028	6.313	7.318		6.313	6.283	0	0	15	0.2	1.05	1.05	1.05	2.239	2.333	0.028	0.01	1.005
SC17-21.B	SCUPPER DP											0	0					0			7.278	0	4.768	7.278		4.754	4.734	2.1	0.014	15	0.2	0.81	0.92	1.06			0		2.51
SC17-22.A	SCUPPER DP											0	0					0			7.437	0	6.319	7.437													0		1.118
SC17-22.B	SCUPPER DP											0	0					0			7.468	0	4.806	7.468		4.754	4.729	2.1	0.052	33	0.5	0.92	1.05	1.35			0		2.662
SC17-23.A	SCUPPER F	0.0031					3					41	8	50	50	50	50	34	LOST	32	7.203	0.052	6.193	7.151											1.933	1.916	0.052	0.03	0.958
SC17-23.B	SCUPPER DP											0	0					0			7.176	0	4.086	7.176		4.055	4.015	2.1	0.031	28	0.4	0.92	1.07	1.3			0		3.09
SC17-3.A	SCUPPER F	0.0123					13					13	2	50	50	50	50	11	zBP SC17	11	6.552	0.044	5.553	6.508		5.553	5.525	0	0	31	0.5	1.3	1.3	1.3	1.597	1.501	0.044	0.01	0.955
SC17-3.B	SCUPPER DP											0	0					0			6.524	0	5.294	6.524		5.273	5.262	2.1	0.025	30	0.5	0.82	0.85	0.89			0		1.23
SC17-4.A	SCUPPER F	0.0059					7					17	3	50	50	50	50	14	zBP SC17	15	6.545	0.045	5.732	6.5		5.732	5.711	0	0	3	0	0.65	0.65	0.65	1.655	1.54	0.045	0.02	0.768
SC17-4.B	SCUPPER DP											0	0					0			6.508	0	5.205	6.508		5.204	5.204	2.1	0.01	3	0.1	0.54	0.52	0.53			0		1.303
SC17-5.A	SCUPPER F	0.0038					4					17	3	50	50	50	50	14	SC17-7.A	14	6.533	0.051	5.416	6.482		5.416	5.383	0	0	3	0	0.65	0.64	0.65	1.899	1.521	0.051	0.02	1.066
SC17-5.B	SCUPPER DP											0	0					0			6.491	0	5.165	6.491		5.165	5.164	2.1	0.008	4	0.1	0.55	0.46	0.39			0		1.326
SC17-7.A	SCUPPER F											14	2	50	50	50	50	12	LOST	12	6.486	0.034	5.456	6.452		5.456	5.449	0	0	19	0.3	1.01	1.01	1.01	1.229	1.234	0.034	0.02	0.996
SC17-7.B	SCUPPER DP											0	0					0			6.452	0	5.099	6.452		5.097	5.084	2.1	0.01	18	0.3	0.75	0.82	0.93			0		1.353
TD17-8.B	TRAM DRAIN CONNECT											0	0					0			6.505	0	5.478	6.505													0		1.027
SC17-8.B	SCUPPER DP											0	0					0			6.483	0	5.019	6.483		5.013	5.013	2.1	0.013	13	0.2	0.74	0.78	0.86			0		1.464
TD17-9.B	TRAM DRAIN CONNECT											0	0					0			6.58	0	5.587	6.58													0		0.993
SC17-9.B	SCUPPER DP											0	0					0			6.553	0	4.968	6.553		4.92	4.898	2.1	0.049	31	0.5	0.86	1.02	1.3			0		1.585
31-5	SCUPPER F	0.0064					7					7	2	50	50	50	50	5	zBP31-6	6	7.827	0.023	6.817	7.804		6.817	6.797	9.7	0	2	0	0	0.31	0.15	0.863	1.034	0.023	0.01	0.987
31-6	SCUPPER F	0.0057					6					12	2	50	50	50	50	9	zBP TD17	10	7.568	0.032	6.441	7.536		6.441	6.432	9.7	0.002	2	0	0	0.36	0.19	1.195	1.383	0.032	0.02	1.095
TD02-3.B	TRAM DRAIN											0	0					0			8.565	0	8.309	8.565													0		0.256
TD02-4.B	TRAM DRAIN CONNECT											0	0					0			7.501	0	5.876	7.501													0		1.625
TD02-5.B	TRAM DRAIN CONNECT											0	0					0			6.345	0	5.09	6.345													0		1.255
TD02-6.B	TRAM DRAIN CONNECT											0	0					0			5.485	0	4.412	5.485													0		1.073
TD02-7.B	TRAM DRAIN											0	0					0			5.364	0	5.06	5.364													0		0.304
TD05-1.B	TRAM DRAIN											0	0					0			5.431	0	5.127	5.431													0		0.304
TD05-2.B	TRAM DRAIN											0	0					0			5.507	0	5.217	5.507													0		0.29
TD05-3.B	TRAM DRAIN											0	0					0			5.586	0	5.319	5.586													0		0.267
TD08-4.B	TRAM DRAIN CONNECT											0	0					0			6.718	0	5.623	6.718													0		1.095
TD13-20.B	TRAM DRAIN CONNECT											0	0					0			9.037	0	8.173	9.037													0		0.864
TD13A-3.B	TRAM DRAIN CONNECT											0	0					0			7.905	0	6.839	7.905													0		1.066
TD13A-5.B	TRAM DRAIN CONNECT											0	0					0			6.697	0	5.999	6.697													0		0.698
TD13B-1.B	TRAM DRAIN CONNECT											0	0					0			6.015	0	5.762	6.015													0		0.253
TD13B-2.B	TRAM DRAIN CONNECT											0	0					0			6.102	0	5.824	6.102													0		0.278
TD17-13.B	TRAM DRAIN CONNECT											0	0					0			6.883	0	5.916	6.883													0		0.967
TD17-17.B	TRAM DRAIN CONNECT											0	0					0			7.078	0	6.199	7.078													0		0.879
TD17-21.B	TRAM DRAIN CONNECT											0	0					0			7.333	0	6.355	7.333													0		0.978
TD17-3.B	TRAM DRAIN											23	24					23			6.522	0	5.638	6.522													0		0.884
TD17-6.B	TRAM DRAIN CONNECT											0	0					0			6.482	0	5.415	6.482													0		1.067
TD17-7.B	TRAM DRAIN CONNECT											0	0					0			6.452	0	5.516	6.452													0		0.936
TD31-1.B	TRAM DRAIN CONNECT											0	0					0			9.11	0	8.125	9.11													0		0.985
TD31-3.B	TRAM DRAIN CONNECT											0	0					0			8.396	0	7.44	8.396													0		0.956
TD35-1.B	TRAM DRAIN											0	0					0			5.795	0	5.454	5.795													0		0.341
TD44-1.B	TRAM DRAIN											25	26					5	44-1	0	5.732	0.001	5.434	5.731											1.915	2.123	0.001	0.02	0.297
z25-5	IP XXX x XXX											0	0					0			2.267	0	1.852	2.267		1.852	1.845	1.7	0	-7	0	0.01	0.01	0.01			0		0.415
34-1	IP XXX x XXX											0	0					0			2.218	0	1.824	2.218		1.824	1.812	0	0	312	0.3	0.49	0.49	0.49			0		0.394
z26-1	GRATED INLET											0	0					0			2.35	0	1.831	2.35		1.831	1.824	1.9	0	4	0	0.01	0.01	0.01			0		0.519
s30-1	SCUPPER ATL				0.0028					3		3	3					0	s30-2	4	16.114	0.024	15.193	16.09		15.187	15.149	7	0.006	3	0.2	0.52	0.53	0.56	0.901	0.883	0.024	0.01	0.897
s30-2	SCUPPER ATL				0.0033					4		4	3					0	s30-3	4	16.075	0.022	15.149	16.053		15.146	15.103	2.7	0.005	6	0.4	0.66	0.68	0.73	0.826	0.822	0.022	0.01	0.904
s30-3	SCUPPER ATL				0.0033					4		4	3					0	s30-4	4	16.014	0.021	15.103	15.993		15.097	15.045	1.6	0.006	10	0.6	0.75	0.8	0.86	0.793	0.789	0.021	0.01	0.89
s30-4	SCUPPER ATL				0.0034					4		4	4					0	s30-5	4	15.929	0.021	15.045	15.908		15.039	14.995	1.4	0.013	13	0.8	0.89	0.97	1.09	0.787	0.784	0.021	0.01	0.863
s30-5	SCUPPER ATL				0.0037					4		4	4					1	s30-6	4	15.819	0.019	14.995	15.8		14.968	14.912	1.2	0.04	17	0.7	1.37	1.34	1.48	0.702	0.719	0.019	0.01	0.805
s30-6	SCUPPER ATL				0.0032					4		4	3					1	s30-7	4	15.652	0.018	14.912	15.634		14.889	14.82	0.9	0.036	19	0.7	1.42	1.44	1.56	0.679	0.692	0.018	0.01	0.722
s30-7	SCUPPER ATL				0.0031					3		4	4					1	s30-8	4	15.427	0.018	14.82	15.409		14.799	14.705	0.8	0.037	21	0.8	1.56	1.55	1.7	0.678	0.702	0.018	0.01	0.589
s30-8	SCUPPER ATL				0.003					3		4	3					1	s30-9	4	15.25	0.019	14.705	15.231		14.691	14.567	0.7	0.033	22	0.8	1.55	1.6	1.74	0.702	0.718	0.019	0.01	0.526
s30-9	SCUPPER ATL				0.0032					4		4	3					1	s30-10	4	15.048	0.019	14.567	15.029		14.555	14.409	0.7	0.036	23	0.8	1.61	1.67	1.81	0.698	0.715	0.019	0.01	0.462
s30-10	SCUPPER ATL				0.0029					3		4	4					1	s30-11	4	14.859	0.018	14.409	14.841		14.401	14.22	0.6	0.035	25	0.8	1.67	1.74	1.9	0.652	0.659	0.018	0.01	0.432
s30-11	SCUPPER ATL				0.0033					4		4	3					1	s30-12	4	14.604	0.018	14.22	14.586		14.217	14.005	0.7	0.037	28	0.9	1.72	1.79	1.94	0.648	0.72	0.018	0.01	0.366
s30-12	SCUPPER ATL				0.0029					3		4	3					1	s30-13	5	14.351	0.019	14.005	14.332		13.998	13.758	0.7	0.036	30	0.9	1.69	1.69	1.77	0.72	0.739	0.019	0.01	0.327
s30-13	SCUPPER ATL				0.0037					4		5	4					1	s30-14	4	14.127	0.018	13.758	14.109		13.733	13.456	0.8	0.042	32	1.1	1.82	1.82	1.82	0.667	0.758	0.018	0.01	0.351
s30-14	SCUPPER ATL				0.0032					4		4	3					1	30-1	6	13.884	0.02	13.456	13.864		13.17	13.046	1.6	0.286	34	15.7	1.94	1.94	1.94	0.758	0.782	0.02	0.02	0.408
s30	BP NODE											0	0					0			12.896	0	13.046	15													0		-0.15
s47-1	SCUPPER ATL				0.0042					5		5	4					1	s47-2	4	16.116	0.025	15.152	16.092		15.15	15.119	7	0.009	4	0.2	0.54	0.58	0.67	0.942	0.893	0.025	0.01	0.939
s47-2	SCUPPER ATL				0.0028					3		4	3					0	s47-3	3	16.087	0.022	15.119	16.065		15.106	15.096	2	0.011	7	0.5	0.67	0.7	0.76	0.829	0.823	0.022	0.01	0.946
s47-3	SCUPPER ATL				0.003					3		3	3					0	s47-4	4	16.045	0.022	15.096	16.023		15.091	15.052	1.5	0.009	10	0.6	0.75	0.77	0.79	0.814	0.811	0.022	0.01	0.927
s47-4	SCUPPER ATL				0.0036					4		4	4					0	s47-5	4	15.971	0.022	15.052	15.949		15.04	14.976	1.4	0.011	13	0.9	0.81	0.86	0.92	0.81	0.806	0.022	0.01	0.897
s47-5	SCUPPER ATL				0.0037					4		4	4					1	s47-6	4	15.871	0.019	14.976	15.852		14.952	14.856	1.2	0.024	17	0.9	0.94	1.01	1.12	0.712	0.729	0.019	0.01	0.876
s47-6	SCUPPER ATL	0			0.0032					4		4	3					1	s47-7	5	15.706	0.019	14.816	15.687		14.811	14.604	1	0.005	19	0.7	1.54	1.64	1.78	0.718	0.737	0.019	0.01	0.871
s47-7	SCUPPER ATL				0.0034					4		5	4					1	s47-8	5	15.504	0.02	14.563	15.484		14.563	14.379	7	0	23	0.1	1.71	1.71	1.71	0.733	0.772	0.02	0.01	0.921
s47-8	SCUPPER ATL				0.0035					4		5	4					1	s47-9	4	15.334	0.019	14.366	15.315		14.365	14.179	1.1	0	27	0.1	1.72	1.75	1.79	0.696	0.712	0.019	0.01	0.949
s47-9	SCUPPER ATL				0.0029					3		4	3					1	s47-10	4	15.177	0.017	14.165	15.16		14.165	13.979	0.8	0	29	0.1	1.78	1.81	1.84	0.637	0.642	0.017	0.01	0.995
s47-10	SCUPPER ATL				0.0025					3		4	3					1	s47-11	4	14.953	0.017	13.965	14.936		13.964	13.778	0.6	0	32	0.1	1.83	1.86	1.89	0.631	0.686	0.017	0.01	0.971
s47-11	SCUPPER ATL				0.0026					3		4	3					1	s47-12	4	14.73	0.019	13.764	14.711		13.764	13.578	0.6	0	35	0.1	1.88	1.9	1.93	0.686	0.737	0.019	0.01	0.947
s47-12	SCUPPER ATL				0.0034					4		4	3					1	s47-13	5	14.507	0.02	13.565	14.487		13.565	13.378	0.6	0	38	0.1	1.92	1.95	1.98	0.737	0.777	0.02	0.01	0.922
s47-13	SCUPPER ATL				0.0036					4		5	4					1	s47-14	5	14.311	0.019	13.366	14.292		13.366	13.178	0.6	0.001	42	0.1	1.98	2.01	2.05	0.704	0.722	0.019	0.01	0.926
s47-14	SCUPPER ATL				0.0035					4		5	4					1	s47-15	5	14.086	0.019	13.167	14.067		13.166	12.98	0.6	0.001	46	0.1	2.04	2.06	2.1	0.695	0.732	0.019	0.01	0.9
s47-15	SCUPPER ATL				0.0033					4		5	4					1	s47-16	5	13.864	0.02	12.97	13.844		12.968	12.783	0.6	0.001	50	0.1	2.12	2.12	2.15	0.732	0.77	0.02	0.01	0.874
s47-16	SCUPPER ATL				0.0039					4		5	4					1	s47-17	5	13.643	0.02	12.776	13.623		12.775	12.588	0.6	0.002	55	0.2	2.19	2.19	2.21	0.728	0.765	0.02	0.01	0.847
s47-17	SCUPPER ATL				0.0034					4		5	4					1	s47-18	5	13.451	0.019	12.583	13.432		12.581	12.404	0.5	0.003	61	0.2	2.26	2.21	2.25	0.711	0.729	0.019	0.01	0.849

Node	Node Type	Catchmnet Areas (ha) Area 1	Area 2	Area 3	Area 4	Area 5	Catchment Flow Set 1	Set 2	Set 3	Set 4	Set 5	Approach Flow	Inlet Captured Flow	Efficiencies minor SAG	minor Ongrade	Major SAG	Major Ongrade	Uncapture Flow	Bypass Node	Bypass Flow	Bypass HGL	mid ch	Node HGL	Grate	LOST FLOW	Link HGL Upstream	Link HGL Downstream	Ku (at max	Ku	Flow	Capacity	Velocities Upstream	Link	Downstrea	Flood Widths Upstream	Downstrea	Flooded Depth Depth	DxV	Freeboard
s47-18	SCUPPER ATL				0.0035					4		5	4					1	s47-19	4	13.228	0.017	12.404	13.211		12.401	12.298	0.5	0.008	67	0.2	2.32	2.24	2.26	0.633	0.635	0.017	0.01	0.807
s47-19	SCUPPER ATL				0.0023					3		4	3					1	47-1	4	13.097	0.017	12.298	13.08		12.271	12.136	1.4	0.028	75	0.2	2.36	2.35	2.4	0.631	0.722	0.017	0.01	0.782
s47	BP NODE											0	0					0			12.014	0	12.136	13.6													0		-0.122
z03A-1	ALL IN GRADE											0	0					0			5.212	0	4.481	5.212		4.481	4.361	0	0	0	0	0	0	0			0		0.731
z03B-1	ALL IN GRADE											0	0					0			5.51	0	4.997	5.51		4.997	4.977	0	0	0	0	0	0	0			0		0.513
z07-1	ALL IN GRADE	0.0419		2.2055			46		2033			2072	1606				100	501	07-1	501	8.257	0.058	8.257	8.199		4.37	4.083	2.5	3.971	1590	2	5.62	5.62	5.62	2.148	8.349	0.058	0.19	-0.058
z10-1	BP NODE auto	0.2292	0.7348				252	669				876	0		0		0	876	z10-2	1113	12.84	0.167	10.97	12.673		10.97	6.119	0	0	0	0	0	0	0	6.172	6.172	0.167	0.36	1.703
z10-2	BP NODE auto	0.2711					298					1113	0					1113	z10-3	1171	7.946	0.147	6.03	7.799		6.03	2.717	0	0	0	0	0	0	0	5.447	5.476	0.147	0.43	1.769
z10-3	BP NODE auto	0.0797					87					1171	0					1171	52-1A	1168	4.64	0.148	2.655	4.492		2.655	1.81	0	0	0	0	0	0	0	5.476	5.796	0.148	0.42	1.837
z10-4	BP NODE auto											1168	0					1168	52-1C	1190	3.751	0.157	1.221	3.594		1.221	0.798	0	0	0	0	0	0	0	5.796	7.478	0.157	0.36	2.373
z10-5	BP NODE auto	0.0579					64					1233	0					1233	LOST	1236	2.683	0.203	0.798	2.48		0.798	0.742	0	0	0	0	0	0	0	7.478	7.471	0.203	0.33	1.682
z10-6	BP NODE auto											0	0					0			0.742	0	0.742	2.043													0		0
zBP51-1	BP NODE											0	0					0			0.537	0	0	0.537		0.001	0	0	0	0	0	0	0	0			0		0.537
zBP10-12a	BP NODE											0	0					0	10-10	9	1.698	0.046	0	1.652		0.001	0	0	0	0	0	0	0	0	0.743	2.601	0.046	0.02	1.652
zBP10-12b	BP NODE											0	0					0	10-10	70	2.156	0.089	0	2.067		0.001	0	0	0	0	0	0	0	0	2.149	2.437	0.089	0.08	2.067
z10-12c	BP NODE auto											0	0					0			0	0	0	0.416													0		0
12-2	ALL IN GRADE											0	0					60	23-1	4	2.631	0.356	2.631	2.275											1.484	0.927	0.356	0.01	-0.356
z12-1	BP NODE auto											0	0					0	z12-2	15	4.576	0.038	3.205	4.538		3.205	2.553	0	0	0	0	0	0	0	0.505	0.641	0.038	0.04	1.333
z12-2	BP NODE auto					0.0223					18	18	0					18	52-1C	45	3.793	0.095	2.533	3.698		2.533	2.516	0	0	0	0	0	0	0	0.741	3.015	0.095	0.07	1.165
z12-3	BP NODE auto											0	0					0	z12-2	3	3.888	0.018	2.496	3.87		2.496	2.456	0	0	0	0	0	0	0	0.336	0.641	0.018	0.01	1.374
z12-4	BP NODE auto											0	0					0			2.456	0	2.456	4.303													0		0
zBP z07-1.R	BP NODE											0	0					0	07-1	11	5.692	0.027	0	5.665		0.001	0	0	0	0	0	0	0	0	0.998	8.349	0.027	0.01	5.665
zBP 18-1A	BP NODE											0	0					0	18-1A	27	5.649	0.04	0	5.609		0.001	0	0	0	0	0	0	0	0	1.461	3.156	0.04	0.03	5.609
zBP 18-1A.R	BP NODE											0	0					0			6.336	0	0	6.336		4.615	4.595	0	0	0	0	0	0	0			0		6.336
zBP18-2	SAS											0	0					0			4.595	0	4.595	6.281													0		0
26-2	ALL IN GRADE											0	0					0	11-1	0	3.953	0.478	3.1	3.475											1.834	2.712	0.478	0.02	0.375
11-1	GRATED INLET 900X900					0.0196					16	1	1		100		100	0	z BASIN 0	22	3.373	0.073	3.068	3.3		3.068	3.049	0	0	218	1.1	1.7	1.7	1.71	0	0	0.073	0	0.232
z BASIN 02-2	BASIN					0.0291					23	0	0	100	100	100	100	0	23-1	1	3.402	0.002	2.4	3.4		2.4	2.4	0	0	0		0		0	0.149	0.336	0.002	0	1
16-2	ALL IN GRADE											0	0					0	23-1	0	2.862	0.017	2.4	2.845											0.149	0.336	0.017	0	0.445
zBP18-2.L	BP NODE auto											0	0					0	18-2	29	6.394	0.062	2	6.332		2.001	2	0	0	0	0	0	0	0	1.027	1.439	0.062	0.06	4.332
zBP18-2.R	BP NODE auto											0	0					0	18-2	23	6.003	0.063	2	5.94		2.001	2	0	0	0	0	0	0	0	1.049	1.439	0.063	0.04	3.94
z18-2c	BP NODE auto											0	0					0			2	0	2	6.04													0		0
19-7	ALL IN GRADE											0	0		100		100	0	38-1	0	2.622	0.072	2.112	2.55											0	0	0.072	0	0.438
zBP02-2	SA 4.2m Lintel	0.1118					123					112	100					13	02-2	11	9.422	0.026	8.042	9.396		7.97	7.568	9.7	0.072	100	0.2	1.54	1.76	2.43	0.966	0.975	0.026	0.02	1.354
zBP24-2	BP NODE auto											0	0		0		0	0	24-2	13	4.92	0.049	0	4.871		0.001	0	0	0	0	0	0	0	0	1.334	1.334	0.049	0.04	4.871
zBP20-1	BP NODE											1	0					1	20-1	25	4.333	0.036	0	4.297		0.001	0	0	0	0	0	0	0	0	1.334	1.35	0.036	0.04	4.297
zBP22-1	BP NODE											1	0					1	22-1	22	3.042	0.05	0	2.992		0.001	0	0	0	0	0	0	0	0	6.752	6.752	0.05	0.04	2.992
zBP36-2.L	BP NODE											0	0					0	36-1	0	2.385	0	0	2.385		0.001	0	0	0	0	0	0	0	0	0	0	0	0	2.385
zBP36-2.R	BP NODE											0	0					0	36-1	0	2.139	0	0	2.139		0.001	0	0	0	0	0	0	0	0	0	0	0	0	2.139
zBP36-1	BP NODE auto											0	0					0	37-4	2	2.124	0.025	0	2.099		0.001	0	0	0	0	0	0	0	0	0.322	0.894	0.025	0.01	2.099
zBP37-2.L	BP NODE											0	0					0	37-2	14	2.012	0.066	0	1.946		0.001	0	0	0	0	0	0	0	0	1.601	1.107	0.066	0.02	1.946
zBP37-2.R	BP NODE											1	0					1	37-2	14	1.992	0.057	0	1.935		0.001	0	0	0	0	0	0	0	0	1.384	0.477	0.057	0.01	1.935
zBP37-1	BP NODE auto											0	0					0	37-1	12	2.035	0.072	0	1.963		0.001	0	0	0	0	0	0	0	0	2.141	1.389	0.072	0.02	1.963
zBP37-3	BP NODE auto											0	0					0			1.958	0.006	0	1.952		0.001	0	0	0	0	0	0	0	0			0.006		1.952
SC08-1	BP NODE											0	0					0			0	0	0	2.107													0		0
20-2	ALL IN GRADE											0	0		100		100	0	38-1	0	2.561	0.011	2.209	2.55											0	0	0.011	0	0.341
z200-2	SA 4.2m Lintel	0.1055	0.7889				116	659				754	403					352	LOST	350	9.121	0.126	8.556	8.995		8.039	7.914	7.4	0.517	403	0.7	1.43	1.6	2.03	4.667	4.653	0.126	0.15	0.439
zBP21-1.L	BP NODE auto											0	0					0	21-1	21	2.46	0.061	1.779	2.399		1.779	1.681	0	0	0	0	0	0	0	1.776	1.776	0.061	0.04	0.62
zBP21-1.R	BP NODE auto											0	0					0	21-1	13	2.361	0.065	1.661	2.296		1.661	1.617	0	0	0	0	0	0	0	1.031	1.03	0.065	0.04	0.635
zBP21-1	BP NODE auto											0	0					0			1.617	0	1.617	2.266													0		0
24-3	ALL IN GRADE											0	0		100		100	0	38-1	0	2.743	0.268	2.209	2.475											0	0	0.268	0	0.266
zBP27-1	ALL IN GRADE											0	0					0	27-1	27	6.028	0.069	4.842	5.959		4.842	4.795	0	0	0	0	0	0	0	1.465	1.847	0.069	0.04	1.117
z41-1	BP NODE											0	0					0	41-1	18	1.845	0.046	0.523	1.799		0.523	0.438	0	0	0	0	0	0	0	1.689	3.498	0.046	0.01	1.276
z41-2	BP NODE											0	0					0			0.438	0	0.438	10.175													0		0
44-2	ALL IN GRADE											0	0	100	100	100	100	0	46-1	0	4.525	0	4.15	4.525											0	0	0	0	0.375
05-4	ALL IN GRADE											0	0		100		100	0	46-1	0	4.525	0	4.15	4.525											0	0	0	0	0.375
zBP AD15-1	BP NODE	0.0133			0.0084		15			9		24	0					24	15-1	35	9.745	0.043	0	9.702		0.001	0	0	0	0	0	0	0	0	1.587	1.596	0.043	0.04	9.702
zBP AD15-2	BP NODE											29	0					29	15-2	38	9.128	0.042	0	9.086		0.001	0	0	0	0	0	0	0	0	1.535	1.599	0.042	0.05	9.086
zBP AD15-3	BP NODE											35	0					35	15-3	41	8.311	0.041	0	8.27		0.001	0	0	0	0	0	0	0	0	1.512	1.704	0.041	0.05	8.27
zBP AD17-23/	BP NODE											38	0					38	SC17-23./	41	7.503	0.041	0	7.462		0.001	0	0	0	0	0	0	0	0	1.516	1.933	0.041	0.05	7.462
zBP AD151	BP NODE											0	0					0			0	0	0	4.66													0		0
zBP 28-1	BP NODE											0	0					0	zBP 28-1a	15	5.529	0.033	0	5.496		0.001	0	0	0	0	0	0	0	0	0.825	0.954	0.033	0.03	5.496
zBP 28-1a	BP NODE	0.0119				0.0039	13				3	15	0					15	LOST	15	4.244	0.038	0	4.206		0.001	0	0	0	0	0	0	0	0	1.41	1.41	0.038	0.02	4.206
zBP 28-2	BP NODE											0	0					0	zBP 28-3	29	4.039	0.054	0	3.985		0.001	0	0	0	0	0	0	0	0	1.7	1.841	0.054	0.04	3.985
zBP 28-3	BP NODE	0.0141				0.0199	15				16	29	0					29	zBP 28-4	48	3.763	0.057	0	3.706		0.001	0	0	0	0	0	0	0	0	1.841	2.012	0.057	0.06	3.706
zBP 28-4	BP NODE	0.0076				0.0152	8				12	48	0					48	zBP 28-5	74	3.163	0.06	0	3.103		0.001	0	0	0	0	0	0	0	0	2.226	2.394	0.06	0.06	3.103
zBP 28-5	BP NODE	0.0123				0.0194	14				16	74	0					74	28-5	74	2.672	0.065	0	2.607		0.001	0	0	0	0	0	0	0	0	2.239	2.241	0.065	0.08	2.607
zBP 10-8	BP NODE	0.0141				0.0207	16				17	30	0					30	LOST	30	1.946	0.05	0	1.896		0.001	0	0	0	0	0	0	0	0	1.846	1.849	0.05	0.03	1.896
zBP ARP1	BP NODE											0	0					0			0	0	0	1.001													0		0
zBP TD02-3.A	BP NODE											0	0					0	TD02-3.A	45	8.948	0.052	0	8.896		0.001	0	0	0	0	0	0	0	0	1.927	1.935	0.052	0.05	8.896
zBP TD02-4.A	BP NODE											0	0					0	TD02-4.A	51	8.582	0.047	0	8.535		0.001	0	0	0	0	0	0	0	0	1.749	1.749	0.047	0.06	8.535
zBP TD02-5.A	BP NODE											0	0					0	TD02-5.A	49	7.514	0.047	0	7.467		0.001	0	0	0	0	0	0	0	0	1.723	1.723	0.047	0.06	7.467
zBP TD02-6.A	BP NODE											0	0					0	TD02-6.A	65	6.44	0.054	0	6.386		0.001	0	0	0	0	0	0	0	0	1.973	1.982	0.054	0.06	6.386
zBP TD02-7.A	BP NODE											0	0					0	TD02-7.A	16	5.57	0.039	0	5.531		0.001	0	0	0	0	0	0	0	0	1.436	1.433	0.039	0.02	5.531
zBP TD02	BP NODE											0	0					0	LOST	0	5.289	0	0	5.289		0.001	0	0	0	0	0	0	0	0	0	0	0	0	5.289
zBP TD02-7.A	BP NODE											0	0					0	TD02-7.A	16	5.462	0.042	0	5.42		0.001	0	0	0	0	0	0	0	0	1.565	1.09	0.042	0.01	5.42
zBP TD05-1.A	BP NODE											0	0					0	TD05-1.A	27	5.549	0.045	0	5.504		0.001	0	0	0	0	0	0	0	0	1.674	1.609	0.045	0.02	5.504
zBP TD05-2.A	BP NODE											0	0					0	TD05-2.A	31	5.631	0.048	0	5.583		0.001	0	0	0	0	0	0	0	0	1.758	1.669	0.048	0.02	5.583
zBP 44-1	BP NODE											0	0					0	44-1	22	5.831	0.048	0	5.783		0.001	0	0	0	0	0	0	0	0	1.778	2.123	0.048	0.01	5.783
zBP 35-1	BP NODE											0	0					0	35-1	31	6.035	0.052	0	5.983		0.001	0	0	0	0	0	0	0	0	1.933	1.935	0.052	0.03	5.983
zBP TD13B-1.	BP NODE											0	0					0	TD13B-1.	20	6.139	0.041	0	6.098		0.001	0	0	0	0	0	0	0	0	1.52	1.429	0.041	0.02	6.098
zBP TD13B-2.	BP NODE											0	0					0	TD13B-2.	36	6.713	0.048	0	6.665		0.001	0	0	0	0	0	0	0	0	1.784	1.784	0.048	0.04	6.665
zBP TD13A-5.	BP NODE											0	0					0	TD13A-5.	33	7.924	0.04	0	7.884		0.001	0	0	0	0	0	0	0	0	1.491	1.491	0.04	0.04	7.884
zBP TD13A-3.	BP NODE											0	0					0	TD13A-3.	33	9.002	0.041	0	8.961		0.001	0	0	0	0	0	0	0	0	1.506	1.508	0.041	0.04	8.961
zBP TD13A-1.	BP NODE											0	0					0			9.434	0	0	9.434		0.001	0	0	0	0	0	0	0	0			0		9.434
zBP N1	BP NODE											0	0					0			0	0	0	0.698													0		0
zBP TD14-17.	BP NODE											5	0					5	zBP TD31	5	10.174	0.019	0	10.155		0.001	0	0	0	0	0	0	0	0	0.717	1.266	0.019	0.01	10.155
zBP TD31-1.A	BP NODE					0						5	0					5	TD31-1.A	22	9.886	0.034	0	9.852		0.001	0	0	0	0	0	0	0	0	1.266	1.275	0.034	0.03	9.852
zBP TD31-3.A	BP NODE											0	0					0	TD31-3.A	18	9.078	0.024	0	9.054		0.001	0	0	0	0	0	0	0	0	0.897	0.897	0.024	0.02	9.054
zBP TD17-21.	BP NODE											0	0					0	TD17-21./	10	8.397	0.027	0	8.37		0.001	0	0	0	0	0	0	0	0	0.995	1.008	0.027	0.02	8.37
zBP 31-5	BP NODE											0	0					0	31-5	7	8.391	0.022	0	8.369		0.001	0	0	0	0	0	0	0	0	0.824	0.863	0.022	0.02	8.369
zBP31-6	BP NODE											6	0					6	31-6	12	7.804	0.028	0	7.776		0.001	0	0	0	0	0	0	0	0	1.034	1.195	0.028	0.02	7.776
zBP TD17-21.	BP NODE											10	0					10	SC17-21./	21	7.558	0.037	0	7.521		0.001	0	0	0	0	0	0	0	0	1.383	1.382	0.037	0.03	7.521
zBP SC17-20.	BP NODE											17	0					17	SC17-20./	19	7.331	0.029	0	7.302		0.001	0	0	0	0	0	0	0	0	2.333	2.329	0.029	0.02	7.302
zBP SC17-20.	BP NODE											14	0					14	SC17-20./	17	7.258	0.024	0	7.234		0.001	0	0	0	0	0	0	0	0	3.007	3.006	0.024	0.01	7.234
zBP TD17-17.	BP NODE											0	0					0	TD17-17./	15	7.295	0.041	0	7.254		0.001	0	0	0	0	0	0	0	0	1.523	1.526	0.041	0.02	7.254
zBP SC17-19.	BP NODE											12	0					12	SC17-19./	17	7.212	0.026	0	7.186		0.001	0	0	0	0	0	0	0	0	3.123	3.082	0.026	0.01	7.186
zBP SC17-19.	BP NODE											15	0					15	SC17-19./	19	7.178	0.018	0	7.16		0.001	0	0	0	0	0	0	0	0	3.618	3.579	0.018	0.01	7.16
zBP SC17-18.	BP NODE											17	0		50		50	17	SC17-18./	19	7.158	0.018	0	7.14		0.001	0	0	0	0	0	0	0	0	3.778	4.223	0.018	0.01	7.14
zBP TD17-17.	BP NODE											18	0					18	TD17-17./	17	7.141	0.027	0	7.114		0.001	0	0	0	0	0	0	0	0	4.34	3.615	0.027	0	7.114
zBP TD17-13.	BP NODE											0	0					0	TD17-13./	17	7.136	0.037	0	7.099		0.001	0	0	0	0	0	0	0	0	1.372	1.371	0.037	0.02	7.099
zBP SC17-16.	BP NODE											0	0					0	SC17-16./	4	7.081	0.007	0	7.074		0.001	0	0	0	0	0	0	0	0	3.693	3.575	0.007	0	7.074
zBP SC17-15.	BP NODE											3	0					3	SC17-15./	7	7.044	0.009	0	7.035		0.001	0	0	0	0	0	0	0	0	7.599	7.425	0.009	0	7.035
zBP SC17-14.	BP NODE											5	0					5	zBP TD17	9	6.994	0.006	0	6.988		0.001	0	0	0	0	0	0	0	0	7.6	7.6	0.006	0	6.988
zBP TD17-13.	BP NODE	0.0036					4					9	0					9	TD17-13./	9	6.929	0.008	0	6.921		0.001	0	0	0	0	0	0	0	0	7.6	7.599	0.008	0	6.921
zBP TD7-9.A	BP NODE											0	0					0	TD17-9.A	33	6.912	0.05	0	6.862		0.001	0	0	0	0	0	0	0	0	1.866	1.87	0.05	0.03	6.862
zBP TD17-8.A	BP NODE											0	0					0	TD17-8.A	9	6.602	0.031	0	6.571		0.001	0	0	0	0	0	0	0	0	1.132	1.127	0.031	0.01	6.571
zBP TD17-7.A	BP NODE											0	0					0	TD17-7.A	22	6.541	0.048	0	6.493		0.001	0	0	0	0	0	0	0	0	1.774	1.606	0.048	0.02	6.493
zBP TD17-7.A	BP NODE											0	0					0	SC17-7.A	0	6.518	0	0	6.518		0.001	0	0	0	0	0	0	0	0	0	0	0	0	6.518
zBP SC17-6.A	BP NODE											14	0					14	SC17-5.A	17	6.536	0.051	0	6.485		0.001	0	0	0	0	0	0	0	0	1.902	1.899	0.051	0.02	6.485
zBP SC17-5.A	BP NODE											15	0					15	zBP SC17	14	6.537	0.04	0	6.497		0.001	0	0	0	0	0	0	0	0	6.858	7.324	0.04	0	6.497
zBP SC17-4.A	BP NODE											11	0					11	SC17-4.A	17	6.549	0.041	0	6.508		0.001	0	0	0	0	0	0	0	0	3.59	3.754	0.041	0.01	6.508
zBP SC17-3.A	BP NODE											23	0					23	TD17-3.B	23	6.586	0.067	0	6.519		0.001	0	0	0	0	0	0	0	0	3.455	2.362	0.067	0.02	6.519
zBP SC17-2.A	BP NODE											19	0					19	SC17-2.A	25	6.599	0.059	0	6.54		0.001	0	0	0	0	0	0	0	0	1.975	2.174	0.059	0.03	6.54
zBP SC17-1A	BP NODE											14	0					14	SC17-1.A	21	6.645	0.051	0	6.594		0.001	0	0	0	0	0	0	0	0	1.726	1.769	0.051	0.02	6.594
zBP 08-6	BP NODE											15	0					15	08-6	26	6.692	0.055	0	6.637		0.001	0	0	0	0	0	0	0	0	1.849	1.804	0.055	0.03	6.637
zBP 08-5	BP NODE											16	0					16	08-5	28	6.748	0.058	0	6.69		0.001	0	0	0	0	0	0	0	0	1.925	1.893	0.058	0.03	6.69
zBP 08-4	BP NODE											16	0					16	zBP 08-5	16	6.784	0.042	0	6.742		0.001	0	0	0	0	0	0	0	0	1.402	1.904	0.042	0.02	6.742
zBP 08-3	BP NODE											12	0					12	08-3	21	6.873	0.042	0	6.831		0.001	0	0	0	0	0	0	0	0	1.636	1.635	0.042	0.03	6.831
SC08-2	BP NODE											6	0					6	08-2	13	6.911	0.028	0	6.883		0.001	0	0	0	0	0	0	0	0	2.005	2.594	0.028	0.01	6.883
zBP 08-1A	BP NODE											4	0					4	08-1A	9	6.963	0.025	0	6.938		0.001	0	0	0	0	0	0	0	0	1.799	1.949	0.025	0.01	6.938

Node	Node Type	Catchmnet Areas (ha)					Catchment Flow					Approach	Inlet Captured	Efficiencies minor		Major		Uncapture	Bypass Node	Bypass Flow	Bypass HGL	mid ch	Node HGL	Grate	LOST FLOW	Link HGL		Ku			Capacity	Velocities			Flood Widths		Flooded Depth		Freeboard
		Area 1	Area 2	Area 3	Area 4	Area 5	Set 1	Set 2	Set 3	Set 4	Set 5	Flow	Flow	SAG	Upgrade	SAG	Upgrade	Flow								Upstream	Downstream	(at max	Ku	Flow		Upstream	Link	Downstrea	Upstream	Downstrea	Depth	DxV	
zBP 08-1	BP NODE											0	0					0	08-1	5	6.979	0.015	0	6.964		0.001	0	0	0	0	0	0	0	0	2.901	3.282	0.015	0	6.964
zBP TD19-1.A	BP NODE											0	0					0	TD19-1.A	17	7.016	0.049	0	6.967		0.001	0	0	0	0	0	0	0	0	1.814	1.657	0.049	0.02	6.967
zBP TD19-2.A	BP NODE											0	0					0	TD19-2.A	20	6.937	0.04	0	6.897		0.001	0	0	0	0	0	0	0	0	1.488	1.477	0.04	0.02	6.897
zBP TD19-3.A	BP NODE											0	0					0	TD19-3.A	22	6.828	0.044	0	6.784		0.001	0	0	0	0	0	0	0	0	1.614	1.592	0.044	0.02	6.784
zBP TD19-4.A	BP NODE											0	0					0	TD19-4.A	40	6.721	0.052	0	6.669		0.001	0	0	0	0	0	0	0	0	1.916	1.927	0.052	0.03	6.669
zBP TD19-5.C	BP NODE											0	0					0	TD19-5.C	37	6.476	0.043	0	6.433		0.001	0	0	0	0	0	0	0	0	1.6	1.61	0.043	0.04	6.433
zBP TD19-5.A	BP NODE											0	0					0	zBP TD19	0	6.357	0	0	6.357		0.001	0	0	0	0	0	0	0	0	0	0	0	0	6.357
zBP TD19-6.A	BP NODE											0	0					0	LOST	0	5.504	0	0	5.504		0.001	0	0	0	0	0	0	0	0	0	0	0	0	5.504
zBP TD19-	BP NODE											0	0					0	TD24-1.A	19	5.537	0.035	0	5.502		0.001	0	0	0	0	0	0	0	0	1.302	1.313	0.035	0.03	5.502
zBP S1	BP NODE											0	0					0			0	0	0	5.482												0		0
zBP07-2	BP NODE auto											0	0					0	07-1	48	6.137	0.084	4.83	6.053		4.83	4.776	0	0	0	0	0	0	0	1.561	3.49	0.084	0.07	1.223
zBP07-2A	BP NODE auto											0	0					0			4.776	0	4.776	7.042												0		0
zBP02-1	BP NODE auto											0	0					0	zBP02-2	112	13.64	0.067	7.836	13.573		7.836	7.295	0	0	0	0	0	0	0	2.474	2.488	0.067	0.09	5.737
zBP02	BP NODE auto											0	0					0			7.295	0	7.295	8.764												0		0
zBP200-1	BP NODE auto											0	0					0	z200-2	754	10.586	0.131	9.067	10.455		9.067	7.629	0	0	0	0	0	0	0	4.835	4.83	0.131	0.31	1.388
z200	BP NODE auto											0	0					0			7.629	0	7.629	10.756												0		0
zBP25-1a	BP NODE auto											0	0					0			2.285	0	1.596	2.285		1.596	1.372	0	0	0	0	0	0	0			0		0.689
zBP25-1b	BP NODE auto	0.0164					18					18	0					18	LOST	18	2.144	0.023	1.352	2.121		1.352	1.312	0	0	0	0	0	0	0	3.874	3.871	0.023	0.01	0.769
z25-6	BP NODE auto											0	0					0			1.312	0	1.312	2.138												0		0

Appendix K Catchment Plan



LEGEND

- 19000 - CHAINAGES
- MCD1 — DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

- PROPOSED TRACK ALIGNMENT
- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

DRAINAGE LEGEND

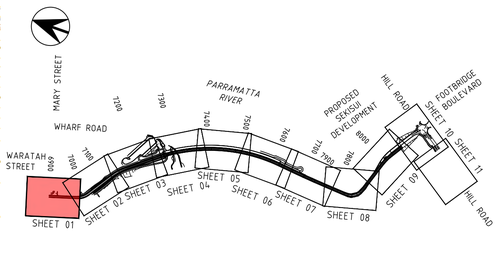
- PROPOSED MAIN DRAINAGE LINE
- PROPOSED DRAINAGE LINE
- ACO TRAMDRAIN 200 (OR EQUIVALENT)
- ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIT
- BIORETENTION ZONE
- DESIGN MAJOR CONTOUR 1M INTERVALS
- DESIGN MINOR CONTOUR
- EXISTING MAJOR CONTOUR 1M INTERVALS
- EXISTING MINOR CONTOUR
- DRAINAGE LINE TO BE REMOVED
- DRAINAGE SCUPPERS

CATCHMENT PLAN LEGEND

- DESIGN 2
- DESIGN 3
- DESIGN CATCHMENT
- DESIGN CATCHMENT PERV
- DESIGN CATCHMENT ATL

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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FOR INFORMATION

REFERENCES:

PLR2EW-JHGRP-LRPEWRC-DR-MDD-000001
PLR2EW-JHGRP-LRPEWRC-DR-MDD-000002
PLR2EW-JHGRP-LRPEWRC-DR-MDD-100010
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PLR2EW-JHGRP-LRPEWRC-SD-MDS-100113
PLR2EW-JHGRP-LRPEWRC-SD-MDS-100301
PLR2EW-JHGRP-LRPEWRC-SD-MDS-100306
PLR2EW-JHGRP-LRPEWRC-RW-MDS-100115

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REV	DESCRIPTION	DESIGNER INITIAL/DATE	VERIFIED INITIAL/DATE	APPROVED INITIAL/DATE
A01.01	ISSUED FOR PDR	[redacted] 07.04.25	[redacted] 07.04.25	[redacted] 07.04.25

COORDINATE SYSTEM: GDA1994MGA56

HEIGHT DATUM: AHD

SCALE: 1:250

0 1 2 3 4 5m

SCALE 1:100 AT ORIGINAL SIZE

DESIGN LOT CODE:

CLIENT:

NSW GOVERNMENT Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY
PROJECT OFFICE
NETWORK COMPLEX CODE: LRP

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JOHN HOLLAND GHD

JOHN HOLLAND GROUP

CIVIL

DRAWN	[redacted] 07.04.25
DESIGNED	[redacted] 07.04.25
DRG CHECK	[redacted] 07.04.25
DESIGN CHECK	[redacted] 07.04.25
PROJ/DES MNGR	[redacted] 07.04.25
APPROVED	[redacted] 07.04.25

CITY OF PARRAMATTA

CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY

STORMWATER DRAINAGE

CATCHMENT PLAN

DRAWING SET No: -	PART: -	SHEET: 1	OF 11	A1
STATUS: PRELIMINARY DESIGN REVIEW [PDR]	BRIDGE No:			©

DRG No.	REV	VER	EDMS No.	AMD No.
PLR2EW-JHGRP-LRPEWRC-SD-SKE-100301	A01.01			

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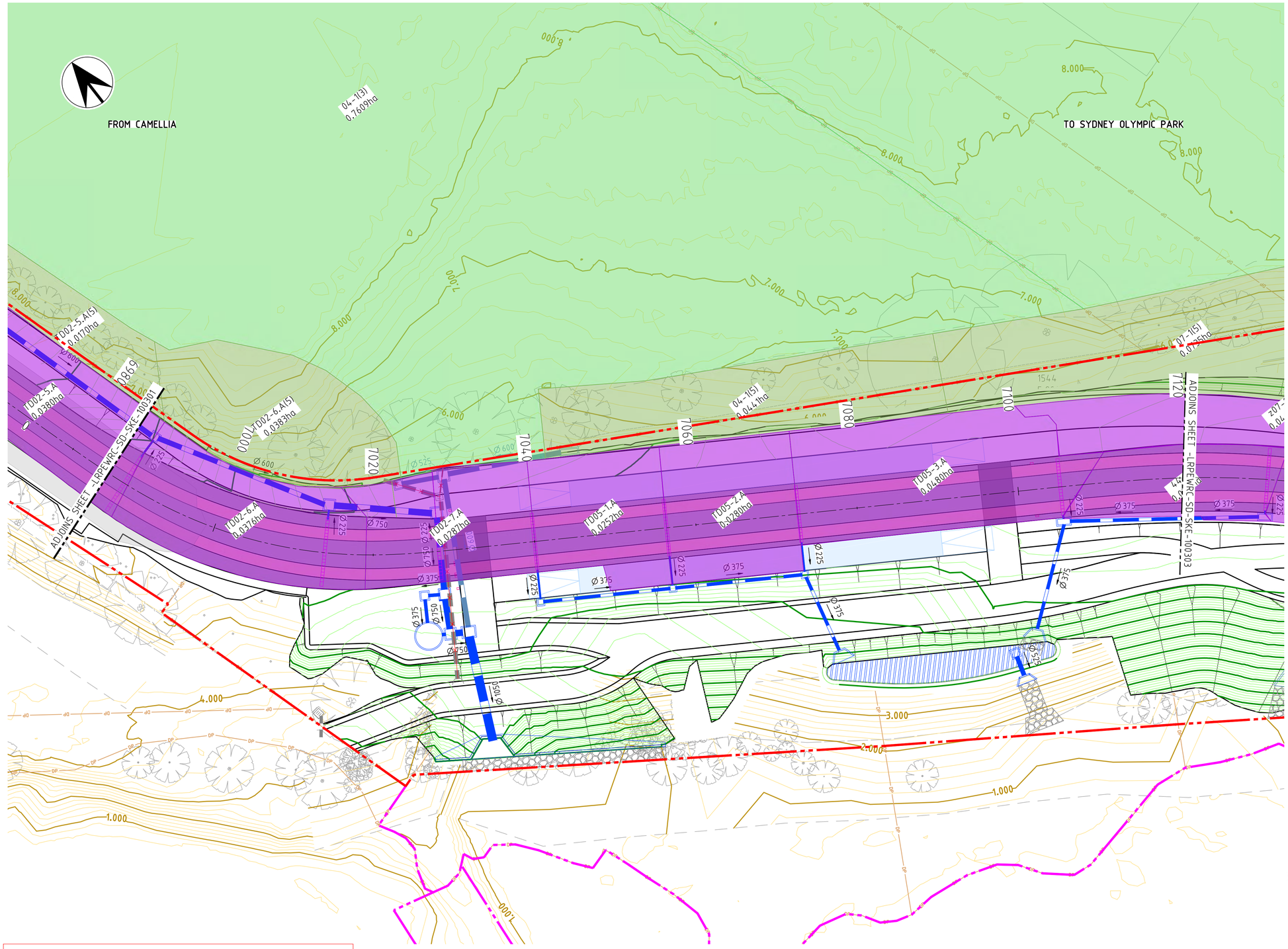

LEGEND

- 19000 – CHAINAGES
- MCD1 – DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

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- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

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- ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
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- EXISTING STORMWATER PIT
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- DESIGN MINOR CONTOUR
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- EXISTING MINOR CONTOUR
- DRAINAGE LINE TO BE REMOVED
- DRAINAGE SCUPPERS

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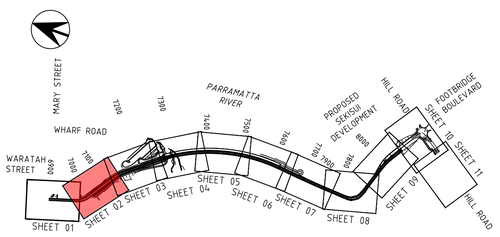
- DESIGN 2
- DESIGN 3
- DESIGN CATCHMENT
- DESIGN CATCHMENT PERV
- DESIGN CATCHMENT ATL

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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FOR INFORMATION

REFERENCES:

PLR2EW-JHGRP-LRPEWRC-GN-MDS-000001
PLR2EW-JHGRP-LRPEWRC-GN-MDS-000002
PLR2EW-JHGRP-LRPEWRC-GN-MDS-100010
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PLR2EW-JHGRP-LRPEWRC-SD-MDS-100301
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PLR2EW-JHGRP-LRPEWRC-RW-MDS-100115

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REV	DESCRIPTION	DESIGNER INITIAL/DATE	VERIFIED INITIAL/DATE	APPROVED INITIAL/DATE
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COORDINATE SYSTEM: GDA1994MGA56

HEIGHT DATUM: AHD

SCALE: 1:250

0 1 2 3 4 5m

SCALE 1:100 AT ORIGINAL SIZE

DESIGN LOT CODE:

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY PROJECT OFFICE
NETWORK COMPLEX CODE: LRP

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JOHN HOLLAND GHD

JOHN HOLLAND GROUP

CIVIL

DRAWN	[redacted]	07.04.25
DESIGNED	[redacted]	07.04.25
DRG CHECK	[redacted]	07.04.25
DESIGN CHECK	[redacted]	07.04.25
PROJ/DES MNGR	[redacted]	07.04.25
APPROVED	[redacted]	07.04.25

CITY OF PARRAMATTA

CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY

STORMWATER DRAINAGE

CATCHMENT PLAN

DRAWING SET No: -	PART: -	SHEET: 2 OF 11		A1
STATUS: PRELIMINARY DESIGN REVIEW [PDR]	BRIDGE No:			©
DRG No. PLR2EW-JHGRP-LRPEWRC-SD-SKE-100302	REV A01.01	VER	EDMS No.	AMD No.

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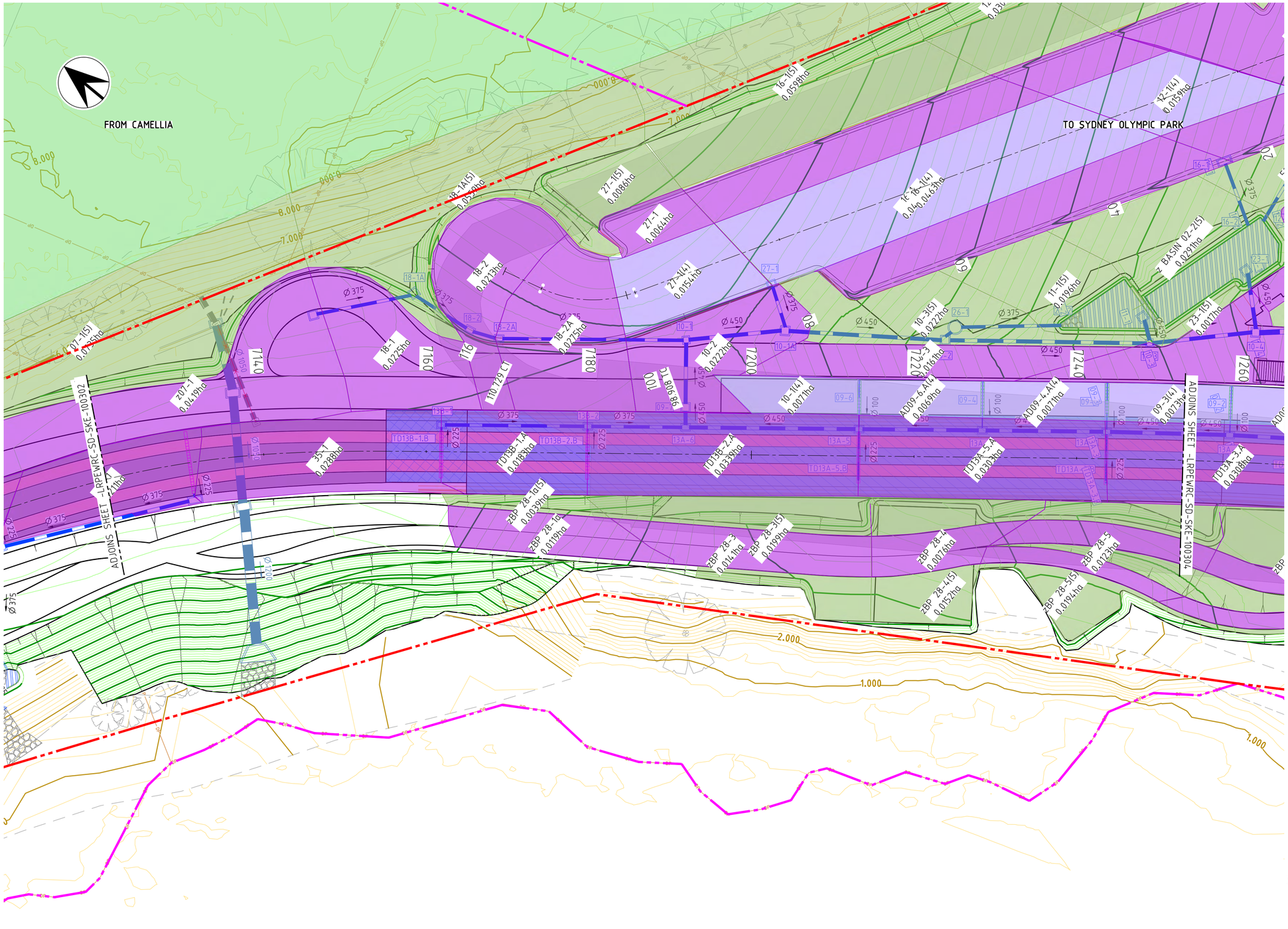


LEGEND

- 19000 – CHAINAGES
- MCD1 – DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

- PROPOSED TRACK ALIGNMENT
- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

DRAINAGE LEGEND

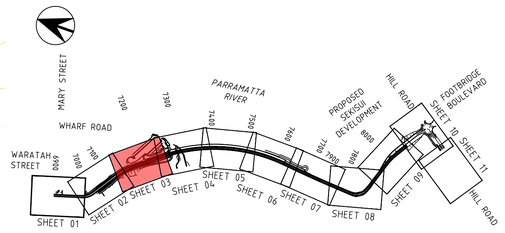
- PROPOSED MAIN DRAINAGE LINE
- PROPOSED DRAINAGE LINE
- ACO TRAMDRAIN 200 (OR EQUIVALENT)
- ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIT
- BIORETENTION ZONE
- DESIGN MAJOR CONTOUR 1M INTERVALS
- DESIGN MINOR CONTOUR
- EXISTING MAJOR CONTOUR 1M INTERVALS
- EXISTING MINOR CONTOUR
- DRAINAGE LINE TO BE REMOVED
- DRAINAGE SCUPPERS

CATCHMENT PLAN LEGEND

- DESIGN 2
- DESIGN 3
- DESIGN CATCHMENT
- DESIGN CATCHMENT PERV
- DESIGN CATCHMENT ATL

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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REFERENCES:

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PLR2EW-JHGRP-LRPEWRC-RW-MDS-100101
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PLR2EW-JHGRP-LRPEWRC-SD-MDS-100103
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PLR2EW-JHGRP-LRPEWRC-RW-MDS-100115

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COORDINATE SYSTEM: GDA1994MGA56

HEIGHT DATUM: AHD

SCALE: 1:250

0 1 2 3 4 5m
SCALE 1:100 AT ORIGINAL SIZE

DESIGN LOT CODE:

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY
PROJECT OFFICE
NETWORK COMPLEX CODE: LRP

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JOHN HOLLAND GHD

JOHN HOLLAND GROUP
CIVIL

DRAWN	[redacted]	07.04.25
DESIGNED	[redacted]	07.04.25
DRG CHECK	[redacted]	07.04.25
DESIGN CHECK	[redacted]	07.04.25
PROJ/DES MNGR	[redacted]	07.04.25
APPROVED	[redacted]	07.04.25

CITY OF PARRAMATTA
CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY
STORMWATER DRAINAGE
CATCHMENT PLAN

DRAWING SET No: -	PART: -	SHEET: 3 OF 11	A1
STATUS: PRELIMINARY DESIGN REVIEW [PDR]	BRIDGE No:		©

DRG No.	REV	VER	EDMS No.	AMD No.
PLR2EW-JHGRP-LRPEWRC-SD-SKE-100303	A01.01			

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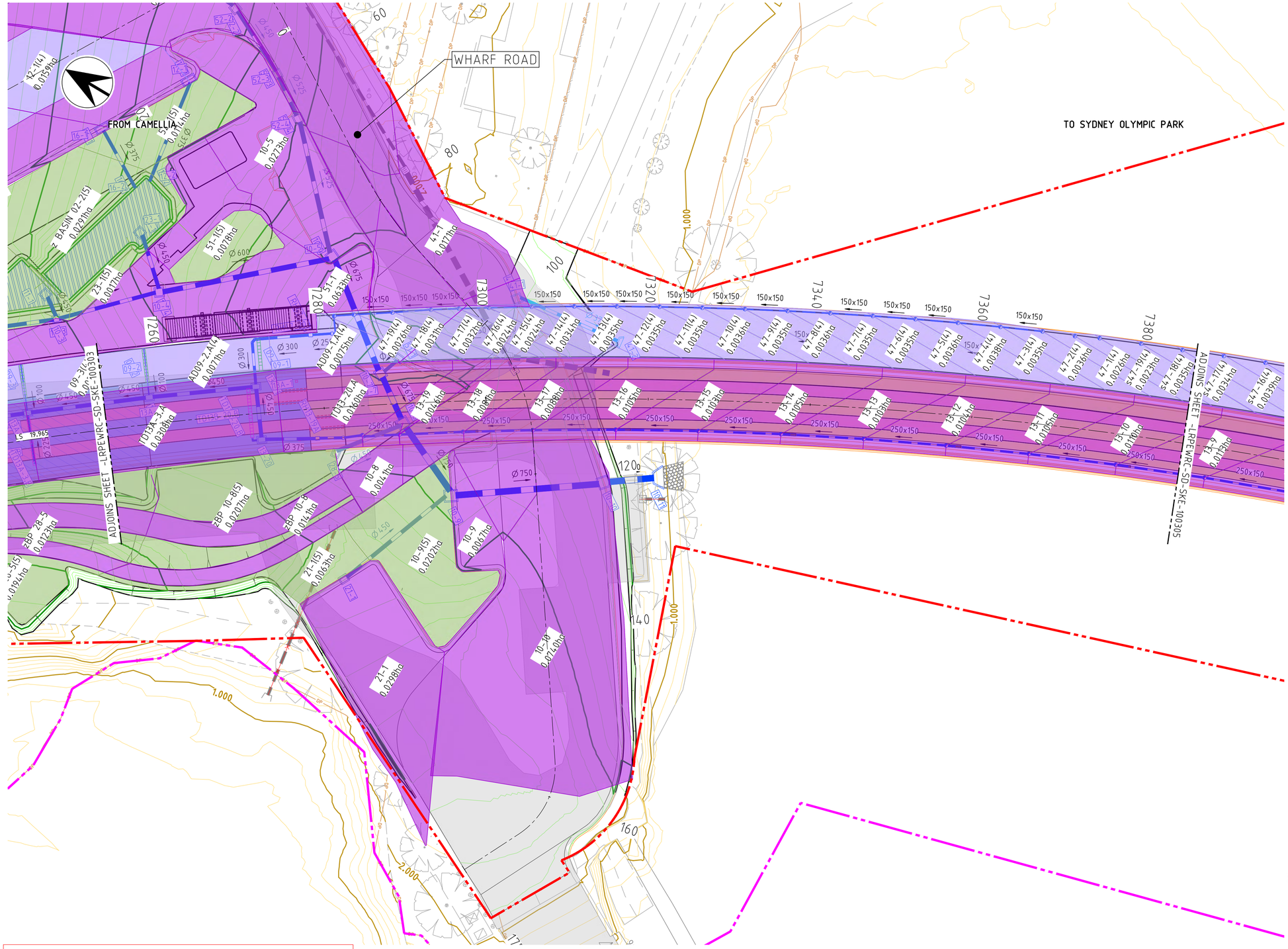

LEGEND

- 19000 – CHAINAGES
- MCD1 – DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

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- DESIGN 2
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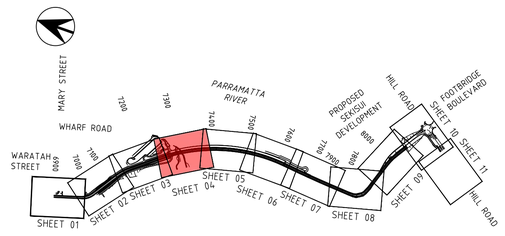
- DESIGN CATCHMENT
- DESIGN CATCHMENT PERV
- DESIGN CATCHMENT ATL

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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FOR INFORMATION

REFERENCES:

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PLR2EW-JHGRP-LRPEWRC-SD-MCD-000002
PLR2EW-JHGRP-LRPEWRC-SD-MCD-100010
PLR2EW-JHGRP-LRPEWRC-SD-MCD-100005
PLR2EW-JHGRP-LRPEWRC-SD-MCD-100102
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PLR2EW-JHGRP-LRPEWRC-SD-MCD-100101
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PLR2EW-JHGRP-LRPEWRC-SD-MCD-100113
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PLR2EW-JHGRP-LRPEWRC-RW-MCD-100115

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REV	DESCRIPTION	DESIGNER INITIAL/DATE	VERIFIED INITIAL/DATE	APPROVED INITIAL/DATE
A01.01	ISSUED FOR PDR	[redacted]07.04.25	[redacted]07.04.25	[redacted]07.04.25

COORDINATE SYSTEM: GDA1994MGA56 | HEIGHT DATUM: AHD | DESIGN LOT CODE:

SCALE: 1:250

0 1 2 3 4 5m
SCALE 1:100 AT ORIGINAL SIZE

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY
PROJECT OFFICE
NETWORK COMPLEX CODE: LRP

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JOHN HOLLAND GHD

JOHN HOLLAND GROUP
CIVIL

DRAWN	[redacted]07.04.25
DESIGNED	[redacted]07.04.25
DRG CHECK	[redacted]07.04.25
DESIGN CHECK	[redacted]07.04.25
PROJ/DES MNGR	[redacted]07.04.25
APPROVED	[redacted]07.04.25

CITY OF PARRAMATTA
CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY
STORMWATER DRAINAGE
CATCHMENT PLAN

DRAWING SET No: -	PART: -	SHEET: 4 OF 11		A1
STATUS: PRELIMINARY DESIGN REVIEW [PDR]	BRIDGE No:			©
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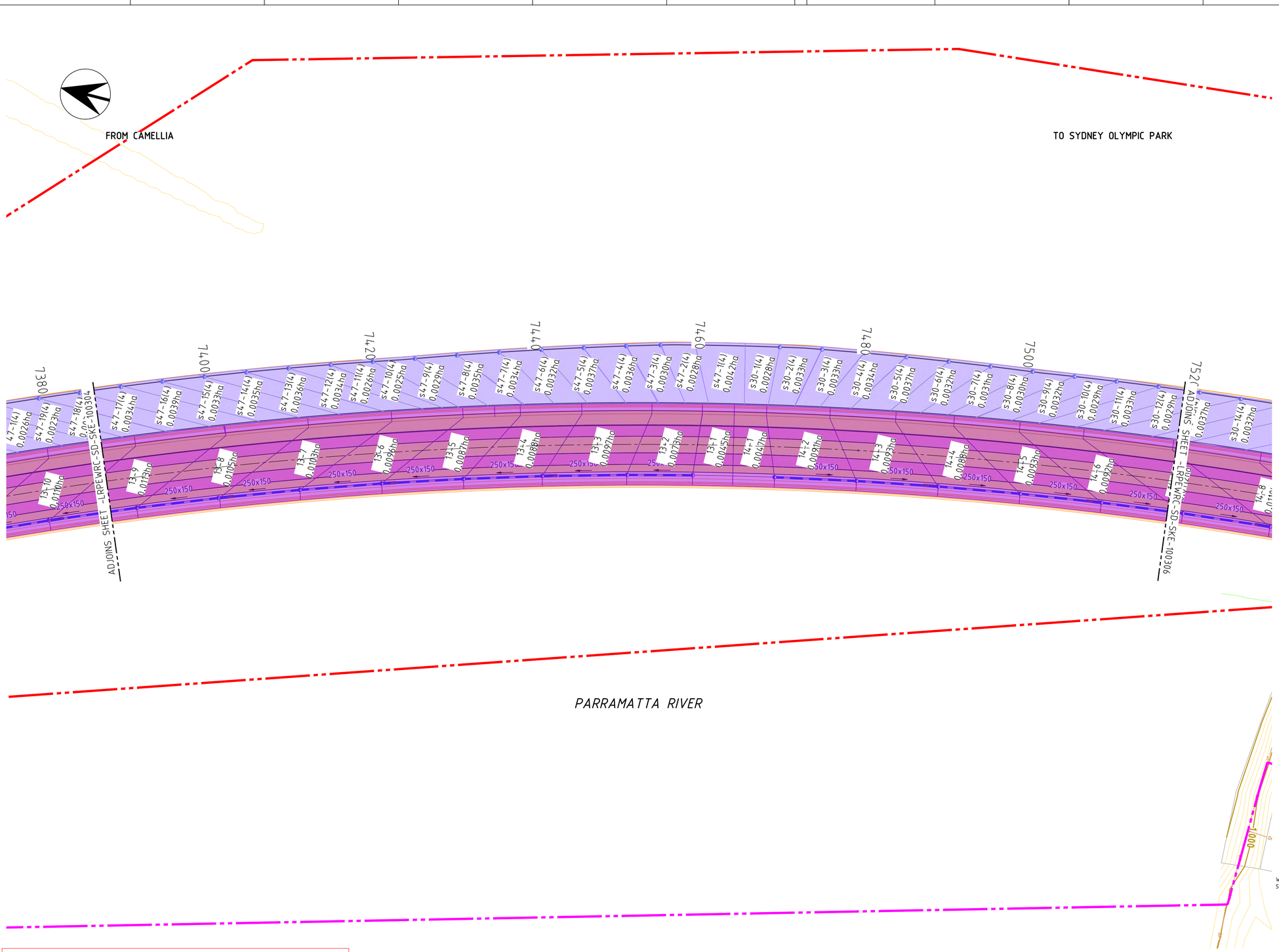
FILE NAME: PLR2EW-JHGRP-LRPEWRC-SD-SKE-100304.dwg
PLOT DATE & TIME: 30/10/2025 11:57:10 AM



LEGEND

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- DESIGN MINOR CONTOUR
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- EXISTING MINOR CONTOUR
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- DRAINAGE SCUPPERS

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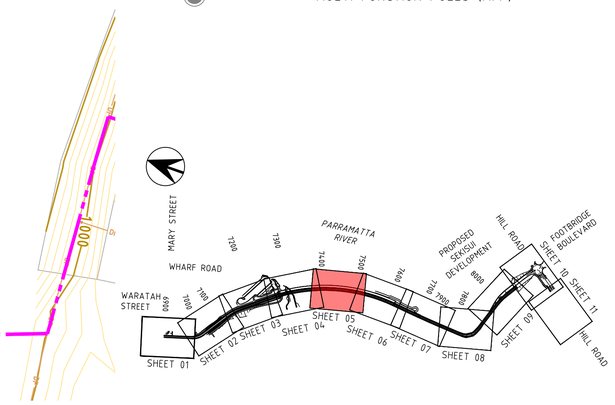
- DESIGN CATCHMENT ATL

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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FOR INFORMATION

REFERENCES:

PLR2EW-JHGRP-LRPEWRC-DN-MDS-000001
PLR2EW-JHGRP-LRPEWRC-MA-MDS-000001
PLR2EW-JHGRP-LRPEWRC-DN-MDS-100010
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PLR2EW-JHGRP-LRPEWRC-RW-MDS-100121
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PLR2EW-JHGRP-LRPEWRC-PV-MDS-100103
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PLR2EW-JHGRP-LRPEWRC-SS-MDS-100101
PLR2EW-JHGRP-LRPEWRC-DN-MDS-100113
PLR2EW-JHGRP-LRPEWRC-SD-MDS-100301
PLR2EW-JHGRP-LRPEWRC-SD-MDS-100306
PLR2EW-JHGRP-LRPEWRC-RW-MDS-100115

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REV	DESCRIPTION	DESIGNER INITIAL/DATE	VERIFIED INITIAL/DATE	APPROVED INITIAL/DATE
A01.01	ISSUED FOR PDR	07.04.25	07.04.25	07.04.25

COORDINATE SYSTEM: GDA1994MGA56

HEIGHT DATUM: AHD

SCALE: 1:250

0 1 2 3 4 5m

SCALE 1:100 AT ORIGINAL SIZE

DESIGN LOT CODE:

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY PROJECT OFFICE
NETWORK COMPLEX CODE: LRP

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JOHN HOLLAND GHD

JOHN HOLLAND GROUP

CIVIL

DRAWN	07.04.25
DESIGNED	07.04.25
DRG CHECK	07.04.25
DESIGN CHECK	07.04.25
PROJ/DES MNGR	07.04.25
APPROVED	07.04.25

CITY OF PARRAMATTA

CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY

STORMWATER DRAINAGE

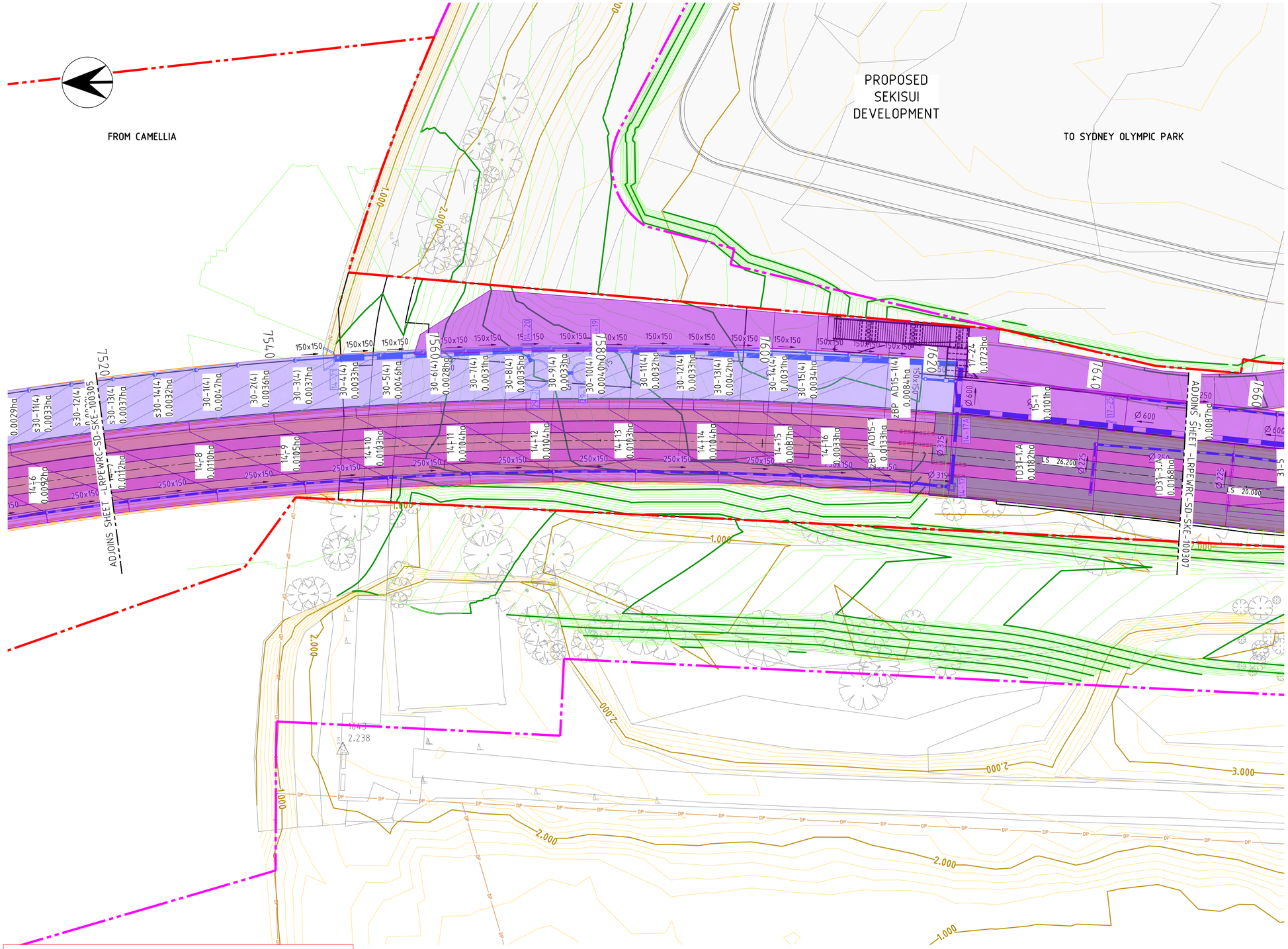
CATCHMENT PLAN

DRAWING SET No: -	PART: -	SHEET: 5 OF 11	A1
STATUS: PRELIMINARY DESIGN REVIEW [PDR]	BRIDGE No:		©

DRG No.	REV	VER	EDMS No.	AMD No.
PLR2EW-JHGRP-LRPEWRC-SD-SKE-100305	A01.01			

FILE NAME: PLR2EW-JHGRP-LRPEWRC-SD-SKE-100305.dwg

PLOT DATE & TIME: 30/10/2025 11:58:07 AM



LEGEND

- 19000 – CHAINAGES
- MCD1 – DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

- PROPOSED TRACK ALIGNMENT
- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

DRAINAGE LEGEND

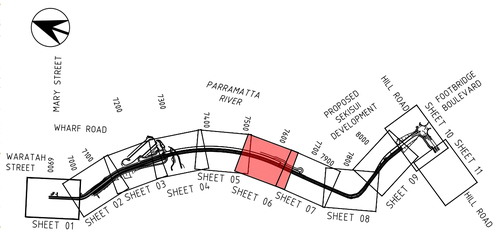
- PROPOSED MAIN DRAINAGE LINE
- PROPOSED DRAINAGE LINE
- ACO TRAMDRAIN 200 (OR EQUIVALENT)
- ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIT
- BIORETENTION ZONE
- DESIGN MAJOR CONTOUR 1M INTERVALS
- DESIGN MINOR CONTOUR
- EXISTING MAJOR CONTOUR 1M INTERVALS
- EXISTING MINOR CONTOUR
- DRAINAGE LINE TO BE REMOVED
- DRAINAGE SCUPPERS

CATCHMENT PLAN LEGEND

- DESIGN 2
- DESIGN 3
- DESIGN CATCHMENT
- DESIGN CATCHMENT PERV
- DESIGN CATCHMENT ATL

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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FOR INFORMATION

REFERENCES:

PLR2EW-JHGRP-LRPEWRC-DN-MOD-000021
PLR2EW-JHGRP-LRPEWRC-MA-MOD-000010
PLR2EW-JHGRP-LRPEWRC-DN-MOD-100010
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PLR2EW-JHGRP-LRPEWRC-MA-MOD-100102
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PLR2EW-JHGRP-LRPEWRC-MA-MOD-100113
PLR2EW-JHGRP-LRPEWRC-SD-MOD-100301
PLR2EW-JHGRP-LRPEWRC-SD-MOD-100306
PLR2EW-JHGRP-LRPEWRC-RW-MOD-100115

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REV	DESCRIPTION	DESIGNER INITIAL/DATE	VERIFIED INITIAL/DATE	APPROVED INITIAL/DATE
A01.01	ISSUED FOR PDR	[redacted]07.04.25	[redacted]07.04.25	[redacted]07.04.25

COORDINATE SYSTEM: GDA1994MGA56

HEIGHT DATUM: AHD

SCALE: 1:250

0 1 2 3 4 5m

SCALE 1:100 AT ORIGINAL SIZE

DESIGN LOT CODE:

CLIENT:

NSW GOVERNMENT | Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY
PROJECT OFFICE
NETWORK COMPLEX CODE: LRP

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JOHN HOLLAND | GHD

JOHN HOLLAND GROUP

CIVIL

DRAWN	[redacted]07.04.25
DESIGNED	[redacted]07.04.25
DRG CHECK	[redacted]07.04.25
DESIGN CHECK	[redacted]07.04.25
PROJ/DES MNGR	[redacted]07.04.25
APPROVED	[redacted]07.04.25

CITY OF PARRAMATTA

CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY

STORMWATER DRAINAGE

CATCHMENT PLAN

DRAWING SET No: -	PART: -	SHEET: 6 OF 11	A1
STATUS: PRELIMINARY DESIGN REVIEW [PDR]	BRIDGE No:		©

DRG No.	VER	EDMS No.	AMD No.
PLR2EW-JHGRP-LRPEWRC-SD-SKE-100306	A01.01		

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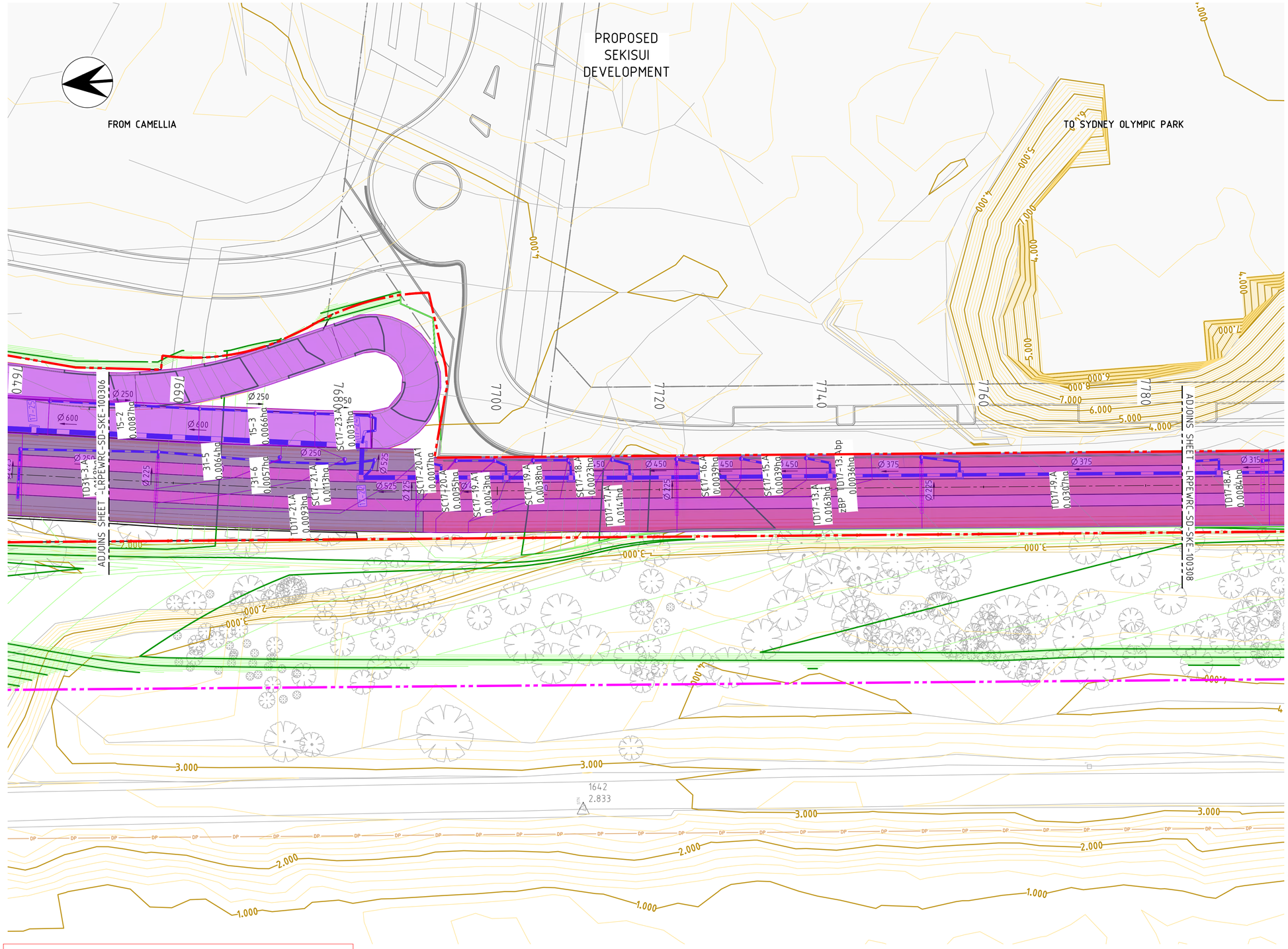


LEGEND

- 19000 – CHAINAGES
- MCD1 – DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

- PROPOSED TRACK ALIGNMENT
- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

DRAINAGE LEGEND

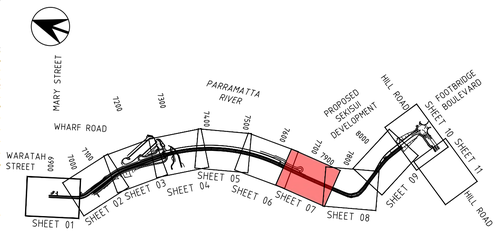
- PROPOSED MAIN DRAINAGE LINE
- PROPOSED DRAINAGE LINE
- ACO TRAMDRAIN 200 (OR EQUIVALENT)
- ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIT
- BIORETENTION ZONE
- DESIGN MAJOR CONTOUR 1M INTERVALS
- DESIGN MINOR CONTOUR
- EXISTING MAJOR CONTOUR 1M INTERVALS
- EXISTING MINOR CONTOUR
- DRAINAGE LINE TO BE REMOVED
- DRAINAGE SCUPPERS

CATCHMENT PLAN LEGEND

- DESIGN 2
- DESIGN 3
- DESIGN CATCHMENT
- DESIGN CATCHMENT PERV
- DESIGN CATCHMENT ATL

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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REFERENCES:

PLR2EW-JHGRP-LRPEWRC-GN-MDS-000001
PLR2EW-JHGRP-LRPEWRC-GN-MDS-000002
PLR2EW-JHGRP-LRPEWRC-GN-MDS-000010
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PLR2EW-JHGRP-LRPEWRC-SD-MDS-100306
PLR2EW-JHGRP-LRPEWRC-SD-SKE-100307
PLR2EW-JHGRP-LRPEWRC-RW-MDS-100115

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A01.01	ISSUED FOR PDR	[redacted]07.04.25	[redacted]07.04.25	[redacted]07.04.25

COORDINATE SYSTEM: GDA1994MGA56

HEIGHT DATUM: AHD

SCALE: 1:250

0 1 2 3 4 5m
SCALE 1:100 AT ORIGINAL SIZE

DESIGN LOT CODE:

CLIENT:
NSW GOVERNMENT Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY PROJECT OFFICE
NETWORK COMPLEX CODE: LRP

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JOHN HOLLAND GHD
JOHN HOLLAND GROUP
CIVIL

DRAWN	[redacted]	07.04.25
DESIGNED	[redacted]	07.04.25
DRG CHECK	[redacted]	07.04.25
DESIGN CHECK	[redacted]	07.04.25
PROJ/DES MNGR	[redacted]	07.04.25
APPROVED	[redacted]	07.04.25

CITY OF PARRAMATTA
CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY
STORMWATER DRAINAGE
CATCHMENT PLAN

DRAWING SET No: -	PART: -	SHEET: 7 OF 11		A1
STATUS: PRELIMINARY DESIGN REVIEW [PDR]	BRIDGE No:			©
DRG No. PLR2EW-JHGRP-LRPEWRC-SD-SKE-100307	REV A01.01	VER	EDMS No.	AMD No.

FILE NAME: PLR2EW-JHGRP-LRPEWRC-SD-SKE-100307.dwg

PLOT DATE & TIME: 30/10/2025 11:59:55 AM

PROPOSED SEKISUI DEVELOPMENT

FROM CAMELLIA

TO SYDNEY OLYMPIC PARK

ADJOINS SHEET -LRPEWRC-SD-SKE-100307

ADJOINS SHEET -LRPEWRC-SD-SKE-100309

LEGEND

- 19000 – CHAINAGES
- MCD1 – DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

- PROPOSED TRACK ALIGNMENT
- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

DRAINAGE LEGEND

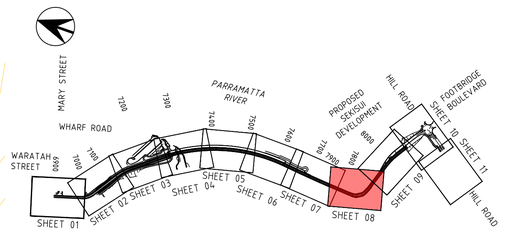
- PROPOSED MAIN DRAINAGE LINE
- PROPOSED DRAINAGE LINE
- ACO TRAMDRAIN 200 (OR EQUIVALENT)
- ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIT
- BIORETENTION ZONE
- DESIGN MAJOR CONTOUR 1M INTERVALS
- DESIGN MINOR CONTOUR
- EXISTING MAJOR CONTOUR 1M INTERVALS
- EXISTING MINOR CONTOUR
- DRAINAGE LINE TO BE REMOVED
- DRAINAGE SCUPPERS

CATCHMENT PLAN LEGEND

- DESIGN 2
- DESIGN 3
- DESIGN CATCHMENT
- DESIGN CATCHMENT PERV
- DESIGN CATCHMENT ATL

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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FOR INFORMATION

REFERENCES:

PLR2EW-JHGRP-LRPEWRC-GN-MDS-000001
PLR2EW-JHGRP-LRPEWRC-GN-MDS-000003
PLR2EW-JHGRP-LRPEWRC-GN-MDS-100010
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PLR2EW-JHGRP-LRPEWRC-SD-MDS-100301
PLR2EW-JHGRP-LRPEWRC-RW-MDS-100115
PLR2EW-JHGRP-LRPEWRC-RW-MDS-100315

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REV	DESCRIPTION	DESIGNER INITIAL/DATE	VERIFIED INITIAL/DATE	APPROVED INITIAL/DATE
A01.01	ISSUED FOR PDR	[redacted] 07.04.25	[redacted] 07.04.25	[redacted] 07.04.25

COORDINATE SYSTEM: GDA1994MGA56

HEIGHT DATUM: AHD

SCALE: 1:250

0 1 2 3 4 5m

SCALE 1:100 AT ORIGINAL SIZE

DESIGN LOT CODE:

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY
PROJECT OFFICE
NETWORK COMPLEX CODE: LRP

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JOHN HOLLAND GHD

JOHN HOLLAND GROUP
CIVIL

DRAWN	[redacted]	07.04.25
DESIGNED	[redacted]	07.04.25
DRG CHECK	[redacted]	07.04.25
DESIGN CHECK	[redacted]	07.04.25
PROJ/DES MNGR	[redacted]	07.04.25
APPROVED	[redacted]	07.04.25

CITY OF PARRAMATTA
CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY
STORMWATER DRAINAGE
CATCHMENT PLAN

DRAWING SET No: -	PART: -	SHEET: 8 OF 11	A1
STATUS: PRELIMINARY DESIGN REVIEW [PDR]	BRIDGE No:		©

DRG No.	REV	VER	EDMS No.	AMD No.
PLR2EW-JHGRP-LRPEWRC-SD-SKE-100308	A01.01			

FILE NAME: PLR2EW-JHGRP-LRPEWRC-SD-SKE-100308.dwg

PLOT DATE & TIME: 30/10/2025 12:00:52 PM

PROPOSED SEKISUI DEVELOPMENT

FROM CAMELLIA

TO SYDNEY OLYMPIC PARK

LIMIT OF WORKS

TRACK CONSTRUCTION LIMIT OF WORKS

ADJOINS SHEET - LRPEWRC-SD-SKE-100308

ADJOINS SHEET - LRPEWRC-SD-SKE-100310

TD19-1.A 0.0164ha

TD19-2.A 0.0180ha

TD19-3.A 0.0202ha

TD19-4.A 0.0370ha

TD19-5.A 0.0131ha

TD19-5.C 0.0313ha

TD24-1.A 0.0180ha

TD19-6 0.0282ha

TD24-1.B 0.0127ha

R 250.000 L 18.319

24.492 109°39'33.0"

L 17.089 CR 76.000

36.060 122°22'31.1"

18.319 CT

2.811 TC

55.901 CT

17.049 CT

9.708 CT

Ø375

1637
3.899

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FOR INFORMATION

LEGEND

- 19000 - CHAINAGES
- MCD1 - DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

- PROPOSED TRACK ALIGNMENT
- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

DRAINAGE LEGEND

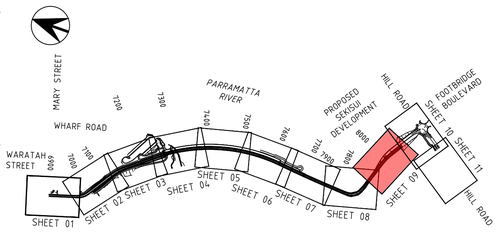
- PROPOSED MAIN DRAINAGE LINE
- PROPOSED DRAINAGE LINE
- ACO TRAMDRAIN 200 (OR EQUIVALENT)
- ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIT
- BIORETENTION ZONE
- DESIGN MAJOR CONTOUR 1M INTERVALS
- DESIGN MINOR CONTOUR
- EXISTING MAJOR CONTOUR 1M INTERVALS
- EXISTING MINOR CONTOUR
- DRAINAGE LINE TO BE REMOVED
- DRAINAGE SCUPPERS

CATCHMENT PLAN LEGEND

- DESIGN 2
- DESIGN 3
- DESIGN CATCHMENT
- DESIGN CATCHMENT PERV
- DESIGN CATCHMENT ATL

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



REFERENCES:

PLR2EW-JHGRP-LRPEWRC-DM-MOD-000001
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PLR2EW-JHGRP-LRPEWRC-MA-MOD-100001
PLR2EW-JHGRP-LRPEWRC-TR-MOD-100102
PLR2EW-JHGRP-LRPEWRC-PV-MOD-100102
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PLR2EW-JHGRP-LRPEWRC-RW-MOD-100115
PLR2EW-JHGRP-DPFWP-RW-MOD-100101
PLR2EW-JHGRP-DPFEP-RW-MOD-100101
PLR2EW-JHGRP-DPFEP-RW-MOD-100121
PLR2EW-JHGRP-DPFEP-SD-MOD-100101
PLR2EW-JHGRP-LRPEWRC-TR-MOD-100101
PLR2EW-JHGRP-LRPEWRC-PV-MOD-100101
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PLR2EW-JHGRP-LRPEWRC-SD-MOD-100115
PLR2EW-JHGRP-LRPEWRC-DM-MOD-100113
PLR2EW-JHGRP-LRPEWRC-SD-MOD-100301
PLR2EW-JHGRP-LRPEWRC-DM-MOD-100036
PLR2EW-JHGRP-LRPEWRC-RW-MOD-100115

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A01.01	ISSUED FOR PDR	07.04.25	07.04.25	07.04.25

COORDINATE SYSTEM: GDA1994MGA56

HEIGHT DATUM: AHD

SCALE: 1:250

0 1 2 3 4 5m

SCALE 1:100 AT ORIGINAL SIZE

DESIGN LOT CODE:

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR:
INFRASTRUCTURE AND PLACE
SYDNEY PROJECT DELIVERY
CENTRAL AND SOUTHERN SYDNEY PROJECT OFFICE
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JOHN HOLLAND GHD

JOHN HOLLAND GROUP

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DESIGNED	[redacted]	07.04.25
DRG CHECK	[redacted]	07.04.25
DESIGN CHECK	[redacted]	07.04.25
PROJ/DES MNGR	[redacted]	07.04.25
APPROVED	[redacted]	07.04.25

CITY OF PARRAMATTA

CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY

STORMWATER DRAINAGE
CATCHMENT PLAN

DRAWING SET No: -	PART: -	SHEET: 9 OF 11	A1	
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FILE NAME: PLR2EW-JHGRP-LRPEWRC-SD-SKE-100309.dwg

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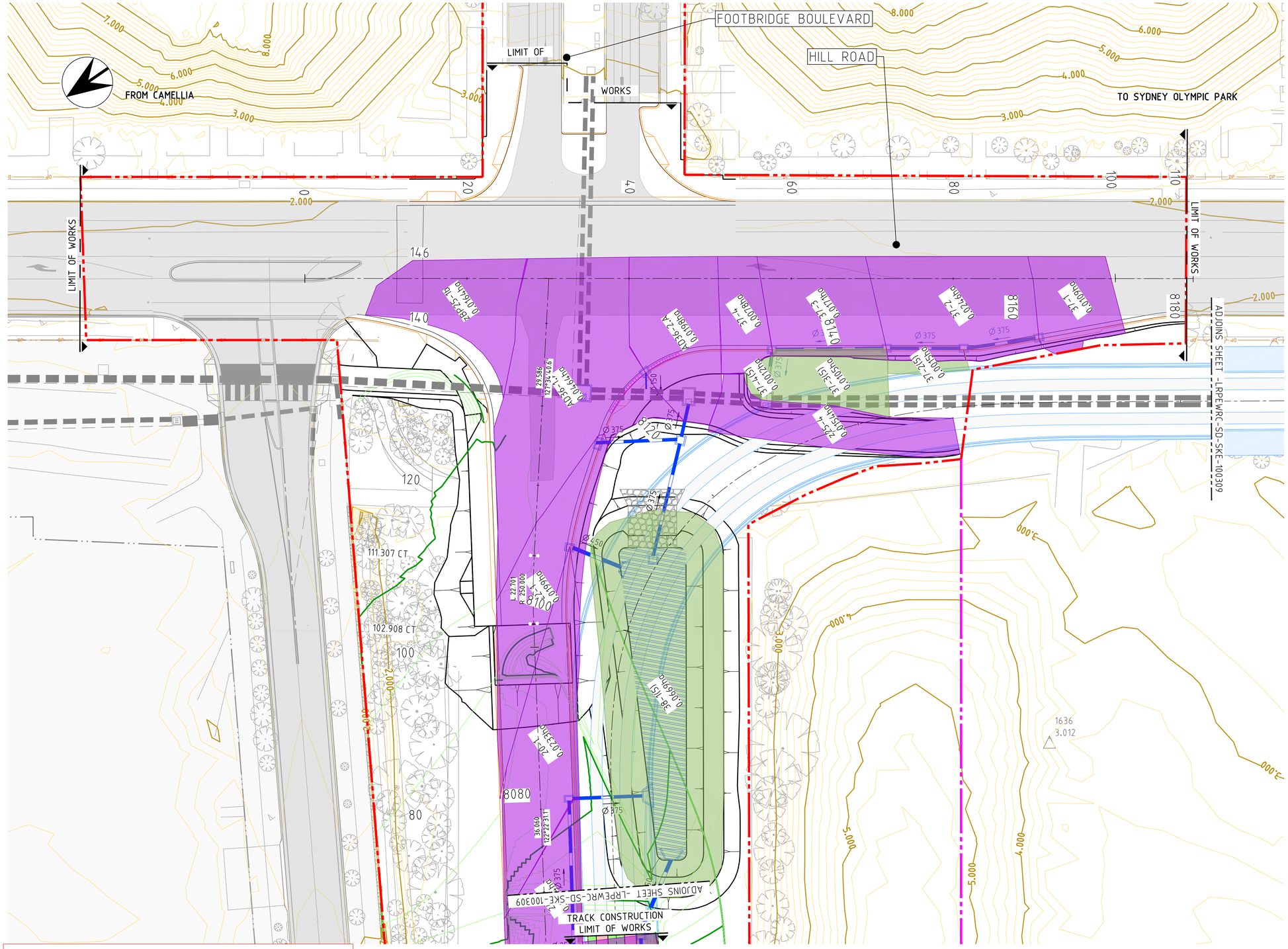

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LEGEND

- 19000 - CHAINAGES
- MCD1 — DESIGN CONTROL STRING LABEL
- PROJECT BOUNDARY (SAS)
- TEMPORARY BOUNDARY
- CADASTRAL BOUNDARY

PROPOSED RAIL ALIGNEMENT LEGEND

- PROPOSED TRACK ALIGNMENT
- FUTURE RAIL ALIGNMENT
- FUTURE RAILWAY STOP

DRAINAGE LEGEND

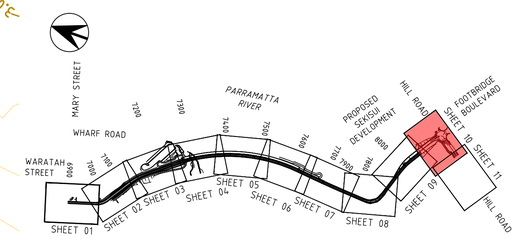
- PROPOSED MAIN DRAINAGE LINE
- PROPOSED DRAINAGE LINE
- ACO TRAMDRAIN 200 (OR EQUIVALENT)
- ACO SLAB DRAIN H100 CLASS D HEELSAFE (OR SIMILAR APPROVED)
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIT
- BIORETENTION ZONE
- DESIGN MAJOR CONTOUR 1M INTERVALS
- DESIGN MINOR CONTOUR
- EXISTING MAJOR CONTOUR 1M INTERVALS
- EXISTING MINOR CONTOUR
- DRAINAGE LINE TO BE REMOVED
- DRAINAGE SCUPPERS

CATCHMENT PLAN LEGEND

- DESIGN 2
- DESIGN 3
- DESIGN CATCHMENT
- DESIGN CATCHMENT PERV
- DESIGN CATCHMENT ATL

OVERHEAD WIRING LEGEND

- MULTI FUNCTION POLES (MFP)



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FOR INFORMATION

REFERENCES:

PLR2EW-JHGRP-LRPEWRC-GN-MDS-000001
PLR2EW-JHGRP-LRPEWRC-GN-MDS-000003
PLR2EW-JHGRP-LRPEWRC-GN-MDS-100010
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PLR2EW-JHGRP-LRPEWRC-GA-MDS-100113
PLR2EW-JHGRP-LRPEWRC-SD-MDS-100301
PLR2EW-JHGRP-LRPEWRC-SD-MDS-100305
PLR2EW-JHGRP-LRPEWRC-RW-MDS-100115

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COORDINATE SYSTEM: GDA1994MGA56

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SCALE: 1:250

0 1 2 3 4 5m

SCALE 1:100 AT ORIGINAL SIZE

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DESIGN CHECK	[redacted]	07.04.25
PROJ/DES MNGR	[redacted]	07.04.25
APPROVED	[redacted]	07.04.25

CITY OF PARRAMATTA

CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY

STORMWATER DRAINAGE

CATCHMENT PLAN

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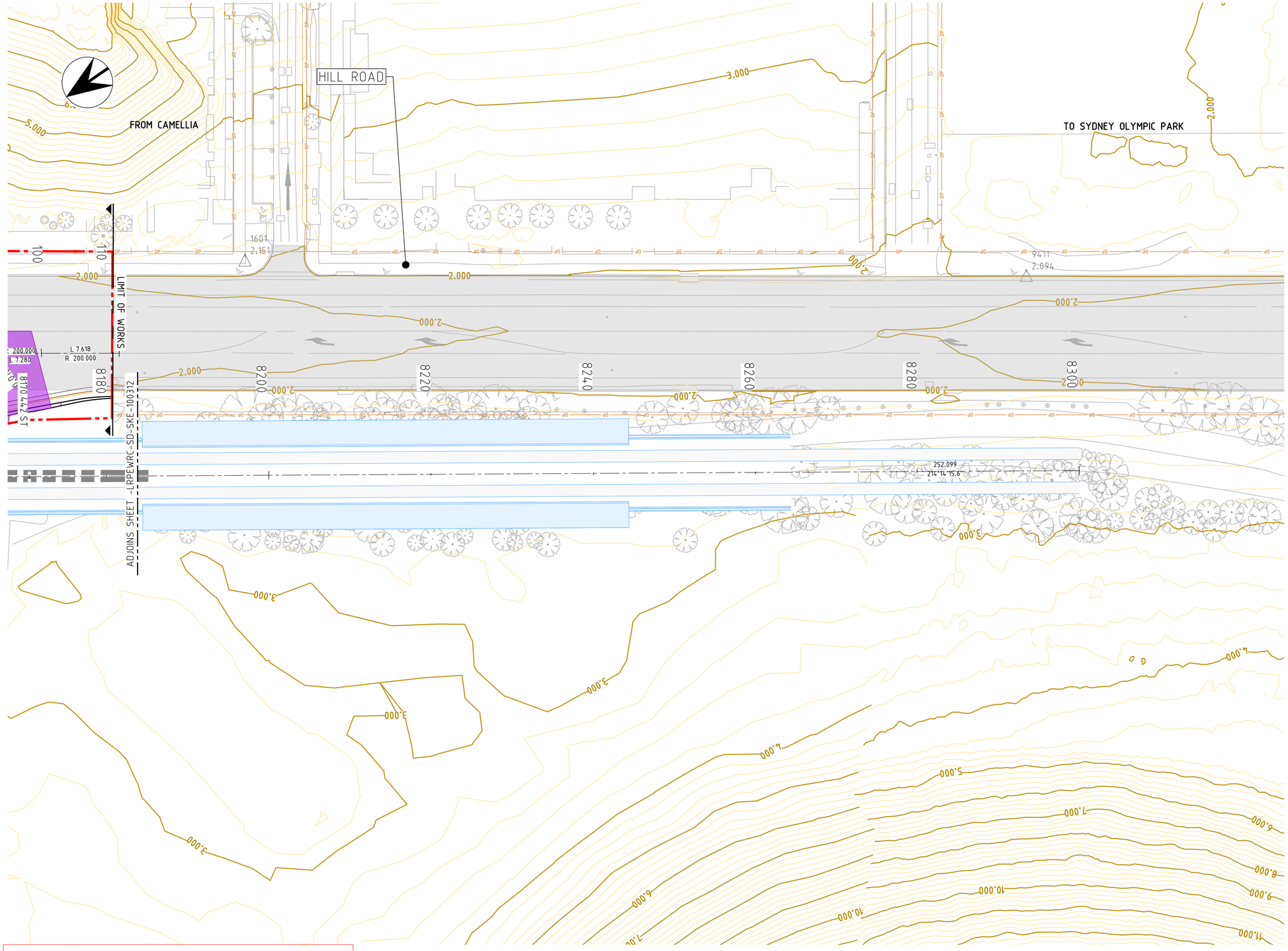

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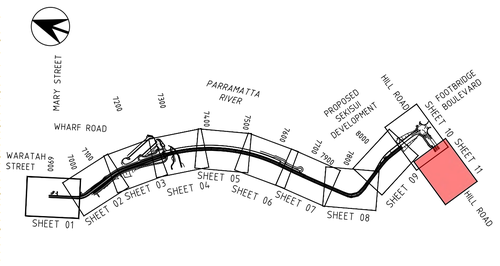

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REFERENCES:

PLR2EW-JHGRP-LRPEWRC-DR-MDD-000001
PLR2EW-JHGRP-LRPEWRC-DR-MDD-100010
PLR2EW-JHGRP-LRPEWRC-DR-MDD-100013
PLR2EW-JHGRP-LRPEWRC-DR-MDD-100005
PLR2EW-JHGRP-LRPEWRC-DR-MDD-100102
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PLR2EW-JHGRP-LRPEWRC-TR-MDD-100101
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PLR2EW-JHGRP-LRPEWRC-SS-MDD-100101
PLR2EW-JHGRP-LRPEWRC-MS-MDD-100101
PLR2EW-JHGRP-LRPEWRC-AS-MDD-100101
PLR2EW-JHGRP-LRPEWRC-GA-MDD-100113
PLR2EW-JHGRP-LRPEWRC-SS-MDD-100201
PLR2EW-JHGRP-LRPEWRC-RW-MDD-100115

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COORDINATE SYSTEM: GDA1994MGA56

HEIGHT DATUM: AHD

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SCALE 1:100 AT ORIGINAL SIZE

DESIGN LOT CODE:

CLIENT:

NSW GOVERNMENT Transport for NSW

PREPARED FOR:
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JOHN HOLLAND GHD

JOHN HOLLAND GROUP

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DRG CHECK	07.04.25
DESIGN CHECK	
PROJ/DES MNGR	07.04.25
APPROVED	07.04.25

CITY OF PARRAMATTA

CAMELLIA TO LIDCOMBE LINE
PARRAMATTA LIGHT RAIL - STAGE 2
SD-0001 - STORMWATER DRAINAGE AND WATER QUALITY

STORMWATER DRAINAGE
CATCHMENT PLAN

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FILE NAME: PLR2EW-JHGRP-LRPEWRC-SD-SKE-100311.dwg

PLOT DATE & TIME: 30/10/2025 11:53:26 AM

Appendix L MUSIC Model Setup, Inputs and Results

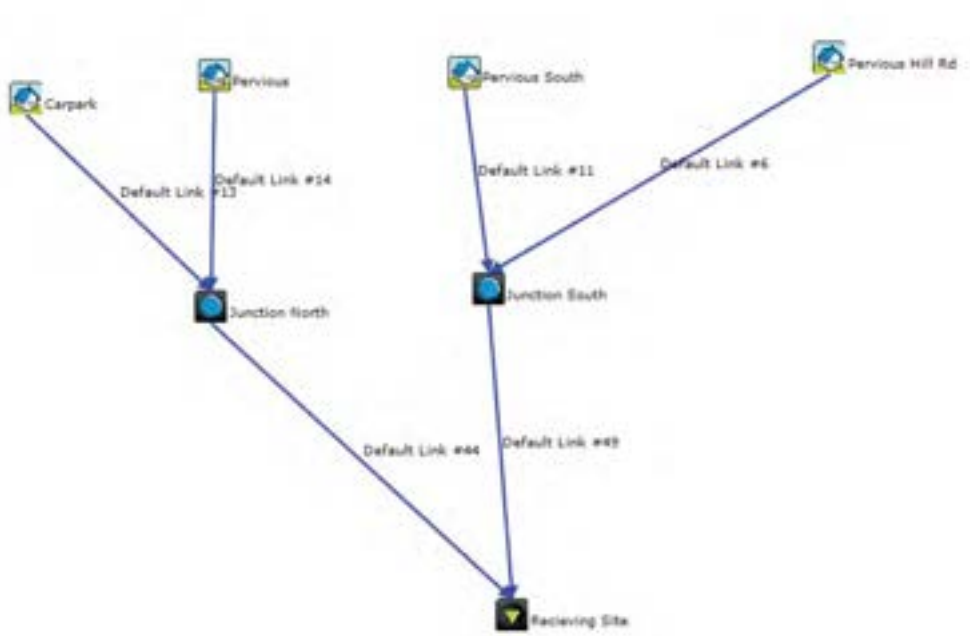


Figure 11-1: Pre-Upgrade MUSIC Model Setup

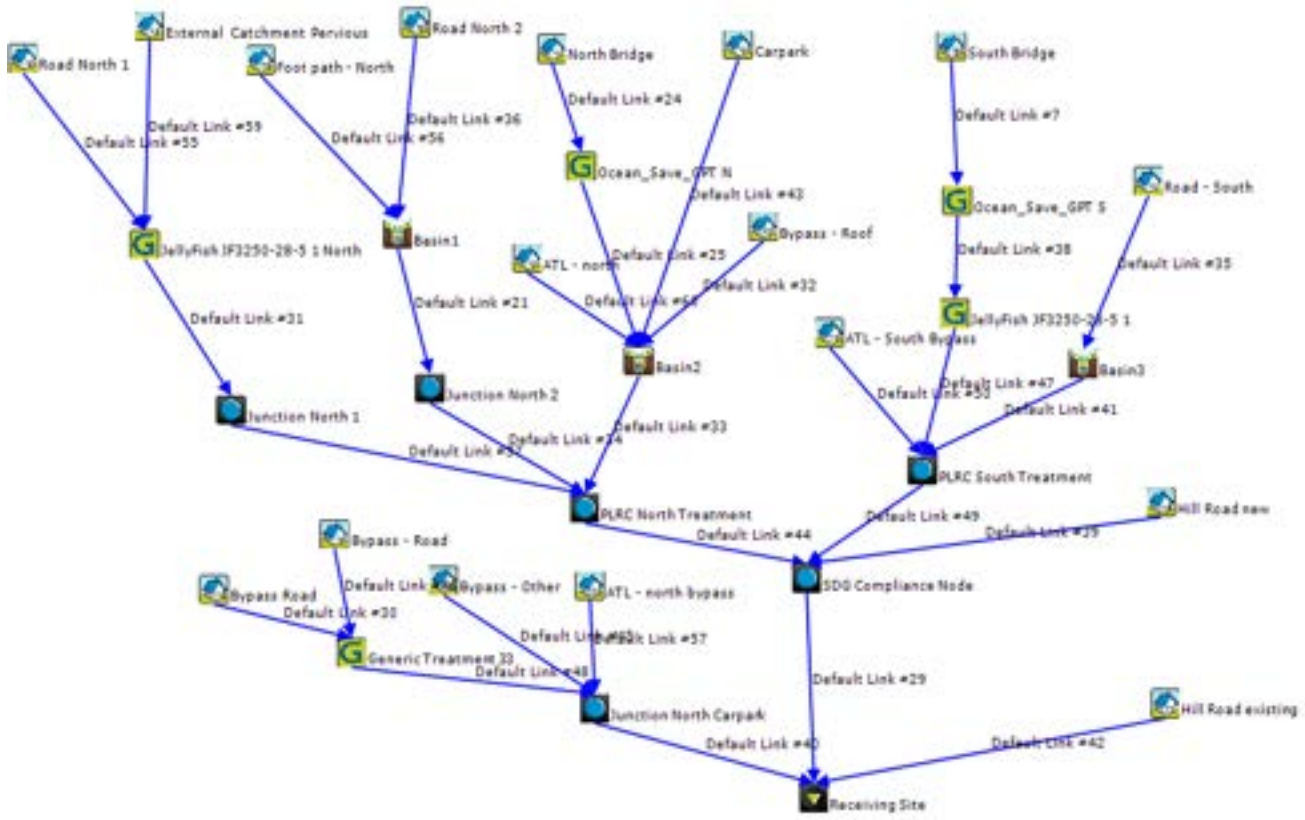


Figure 11-2: Post-Upgrade MUSIC Model Setup

Inputs

Source

Name	Land Use-Land Use/Zoning	Areas-Total Area (ha)	Areas-Impervious Area (%)	Areas-Pervious Area (%)	Impervious Area Properties-Rainfall Threshold (mm/d)	Pervious Area Properties-Soil Storage Capacity (mm)	Pervious Area Properties-Initial Storage (%)	Pervious Area Properties-Field Capacity (mm)	Pervious Area Properties-Infiltration Coefficient - a (None)	Pervious Area Properties-Infiltration Coefficient - b (None)	Groundwater Properties-Initial Depth (mm)
North Bridge	Urban - Sealed Road	0.5079	100	0	1.5	170	30	70	210	4.7	10
Carpark	Urban - Sealed Road	0.5657	75	25	1.5	170	30	70	210	4.7	10
South Bridge	Urban - Sealed Road	0.607	100	0	1.5	170	30	70	210	4.7	10
Road - South	Urban - Sealed Road	0.232	100	0	1.5	170	30	70	210	4.7	10
Hill Road new	Urban - Sealed Road	0.086	90	10	1.5	170	30	70	210	4.7	10
Road North 2	Urban - Sealed Road	0.1937	90	10	1.5	170	30	70	210	4.7	10
Road North 1	Urban - Sealed Road	0.15	90	10	1.5	170	30	70	210	4.7	10
Bypass - Road	Urban - Sealed Road	0.0132	100	0	1.5	170	30	70	210	4.7	10
Foot path - North	Urban - Mixed	0.0871	53	47	1.5	170	30	70	210	4.7	10
Bypass - Roof	Urban - Roof	0.008	100	0	1.5	170	30	70	210	4.7	10
Bypass - Other	Urban - Mixed	0.0532	20	80	1.5	170	30	70	210	4.7	10
Bypass Road	Urban - Sealed Road	0.039	100	0	1.5	170	30	70	210	4.7	10
ATL - north bypass	Urban - Mixed	0.0687	100	0	1	170	30	70	210	4.7	10
ATL - South Bypass	Urban - Mixed	0.065	100	0	1	170	30	70	210	4.7	10
External Catchment Pervious	Urban - Mixed	0.072	0	100	1.5	170	30	70	210	4.7	10
ATL - north	Urban - Mixed	0.0743	100	0	1	170	30	70	210	4.7	10
Hill Road existing	Urban - Sealed Road	0.026	90	10	1.5	170	30	70	210	4.7	10

Groundwater Properties-Daily Recharge Rate (%)	Groundwater Properties-Daily Baseflow Rate (%)	Groundwater Properties-Daily Deep Seepage Rate (%)	Total Suspended Solids Properties-Base Flow Mean (log mg/L)	Total Suspended Solids Properties-Base Flow Std Dev (log mg/L)	Total Suspended Solids Properties-Base Flow Estimation Method	Total Suspended Solids Properties-Base Flow Serial Correlation (r squared)	Total Suspended Solids Properties-Storm Flow Mean (log mg/L) (None)	Total Suspended Solids Properties-Storm Flow Std Dev (log mg/L)	Total Suspended Solids Properties-Storm Flow Estimation Method	Total Suspended Solids Properties-Storm Flow Serial Correlation (r squared)	Total Phosphorus Properties-Base Flow Mean (log mg/L)
50	5	0	1.2	0.17	Stochastically generated	0	2.43	0.32	Stochastically generated	0	-0.85
50	5	0	1.2	0.17	Stochastically generated	0	2.43	0.32	Stochastically generated	0	-0.85
50	5	0	1.2	0.17	Stochastically generated	0	2.43	0.32	Stochastically generated	0	-0.85
50	5	0	1.2	0.17	Stochastically generated	0	2.43	0.32	Stochastically generated	0	-0.85
50	5	0	1.2	0.17	Stochastically generated	0	2.43	0.32	Stochastically generated	0	-0.85
50	5	0	1.2	0.17	Stochastically generated	0	2.43	0.32	Stochastically generated	0	-0.85
50	5	0	1.2	0.17	Stochastically generated	0	2.43	0.32	Stochastically generated	0	-0.85
50	5	0	1.2	0.17	Stochastically generated	0	2.43	0.32	Stochastically generated	0	-0.85
50	5	0	1.2	0.17	Stochastically generated	0	2.43	0.32	Stochastically generated	0	-0.85
50	5	0	1.2	0.17	Stochastically generated	0	2.15	0.32	Stochastically generated	0	-0.85
50	5	0	1.1	0.17	Stochastically generated	0	1.3	0.32	Stochastically generated	0	-0.82
50	5	0	1.2	0.17	Stochastically generated	0	2.15	0.32	Stochastically generated	0	-0.85
50	5	0	1.2	0.17	Stochastically generated	0	2.43	0.32	Stochastically generated	0	-0.85
50	5	0	1.2	0.17	Stochastically generated	0	2.15	0.32	Stochastically generated	0	-0.85
50	5	0	1.2	0.17	Stochastically generated	0	2.15	0.32	Stochastically generated	0	-0.85
50	5	0	1.2	0.17	Stochastically generated	0	2.15	0.32	Stochastically generated	0	-0.85
50	5	0	1.2	0.17	Stochastically generated	0	2.15	0.32	Stochastically generated	0	-0.85
50	5	0	1.2	0.17	Stochastically generated	0	2.43	0.32	Stochastically generated	0	-0.85

Total Phosphorus Properties-Base Flow Std Dev (log mg/L)	Total Phosphorus Properties-Base Flow Estimation Method	Total Phosphorus Properties-Base Flow Serial Correlation (r squared)	Total Phosphorus Properties-Storm Flow Mean (log mg/L)	Total Phosphorus Properties-Storm Flow Std Dev (log mg/L)	Total Phosphorus Properties-Storm Flow Estimation Method	Total Phosphorus Properties-Storm Flow Serial Correlation (r squared)	Total Nitrogen Properties-Base Flow Mean (log mg/L)	Total Nitrogen Properties-Base Flow Std Dev (log mg/L)	Total Nitrogen Properties-Base Flow Estimation Method	Total Nitrogen Properties-Base Flow Serial Correlation (r squared)	Total Nitrogen Properties-Storm Flow Mean (log mg/L)
0.19	Stochastically generated	0	-0.3	0.25	Stochastically generated	0	0.11	0.12	Stochastically generated	0	0.34
0.19	Stochastically generated	0	-0.3	0.25	Stochastically generated	0	0.11	0.12	Stochastically generated	0	0.34
0.19	Stochastically generated	0	-0.3	0.25	Stochastically generated	0	0.11	0.12	Stochastically generated	0	0.34
0.19	Stochastically generated	0	-0.3	0.25	Stochastically generated	0	0.11	0.12	Stochastically generated	0	0.34
0.19	Stochastically generated	0	-0.3	0.25	Stochastically generated	0	0.11	0.12	Stochastically generated	0	0.34
0.19	Stochastically generated	0	-0.3	0.25	Stochastically generated	0	0.11	0.12	Stochastically generated	0	0.34
0.19	Stochastically generated	0	-0.3	0.25	Stochastically generated	0	0.11	0.12	Stochastically generated	0	0.34
0.19	Stochastically generated	0	-0.3	0.25	Stochastically generated	0	0.11	0.12	Stochastically generated	0	0.34
0.19	Stochastically generated	0	-0.3	0.25	Stochastically generated	0	0.11	0.12	Stochastically generated	0	0.34
0.19	Stochastically generated	0	-0.6	0.25	Stochastically generated	0	0.11	0.12	Stochastically generated	0	0.3
0.19	Stochastically generated	0	-0.89	0.25	Stochastically generated	0	0.32	0.12	Stochastically generated	0	0.3
0.19	Stochastically generated	0	-0.6	0.25	Stochastically generated	0	0.11	0.12	Stochastically generated	0	0.3
0.19	Stochastically generated	0	-0.3	0.25	Stochastically generated	0	0.11	0.12	Stochastically generated	0	0.34
0.19	Stochastically generated	0	-0.6	0.25	Stochastically generated	0	0.11	0.12	Stochastically generated	0	0.3
0.19	Stochastically generated	0	-0.6	0.25	Stochastically generated	0	0.11	0.12	Stochastically generated	0	0.3
0.19	Stochastically generated	0	-0.6	0.25	Stochastically generated	0	0.11	0.12	Stochastically generated	0	0.3
0.19	Stochastically generated	0	-0.6	0.25	Stochastically generated	0	0.11	0.12	Stochastically generated	0	0.3
0.19	Stochastically generated	0	-0.3	0.25	Stochastically generated	0	0.11	0.12	Stochastically generated	0	0.34

Total Nitrogen Properties-Storm Flow Std Dev (log mg/L)	Total Nitrogen Properties-Storm Flow Estimation Method	Total Nitrogen Properties-Storm Flow Serial Correlation (r squared)	Location-Northing	Location-Easting	Location-Elevation (m)
0.19	Stochastically generated	0	0	0	0
0.19	Stochastically generated	0	0	0	0
0.19	Stochastically generated	0	0	0	0
0.19	Stochastically generated	0	0	0	0
0.19	Stochastically generated	0	0	0	0
0.19	Stochastically generated	0	0	0	0
0.19	Stochastically generated	0	0	0	0
0.19	Stochastically generated	0	0	0	0
0.19	Stochastically generated	0	0	0	0
0.19	Stochastically generated	0	0	0	0
0.19	Stochastically generated	0	0	0	0
0.19	Stochastically generated	0	0	0	0
0.19	Stochastically generated	0	0	0	0
0.19	Stochastically generated	0	0	0	0
0.19	Stochastically generated	0	0	0	0
0.19	Stochastically generated	0	0	0	0
0.19	Stochastically generated	0	0	0	0

Bioretention

Name	Inlet Properties-Low Flow BypassThreshold (mÂ³/s)	Inlet Properties-High Flow BypassThreshold (mÂ³/s)	Storage Properties-Extended Detention Depth (m)	Storage Properties-Surface Area (mÂ²)	Filter and Media Properties-Filter Area (mÂ²)	Filter and Media Properties-Saturated Hydraulic Conductivity (mm/h)	Filter and Media Properties-Filter Depth (m)	Filter and Media Properties-TN Content of Filter Media (mg/kg) (None)	Filter and Media Properties-Orthophosphate Content of Filter Media (mg/kg) (None)	Infiltration and Lining Properties-Is Base Lined?	Infiltration and Lining Properties-Unlined Filter Media Perimeter (m)
Basin2	0	100	0.3	122	122	100	0.5	800	40	TRUE	14
Basin3	0	100	0.3	270	230	100	0.5	800	40	TRUE	14
Basin1	0	100	0.3	97	83	100	0.5	800	40	TRUE	14

Infiltration and Lining Properties-Exfiltration Rate (mm/h)	Vegetation Properties-Vegetation Type	Outlet Properties-Overflow Weir Width (m)	Outlet Properties-Underdrain Present?	Outlet Properties-Submerged Zone with Carbon Present?	Outlet Properties-Submerged Zone Depth (m)	Advanced Properties-PET Scaling Factor (proportion)	Advanced Properties-Weir Coefficient (None)	Advanced Properties-Number of CSTR Cells	Advanced Properties-Porosity of Filter Media (proportion)	Advanced Properties-Porosity of Submerged Zone (proportion)	Advanced Properties-Horizontal Flow Coefficient (None)
0	Vegetated with Effective N	1	TRUE	FALSE	0.45	2.1	1.7	3	0.35	0.35	3
0	Vegetated with Effective N	2	TRUE	FALSE	0.45	2.1	1.7	3	0.35	0.35	3
0	Vegetated with Effective N	1	TRUE	FALSE	0.45	2.1	1.7	3	0.35	0.35	3

Advanced Properties-Filter Media Soil Type	Advanced Properties - Total Suspended Solids-k	Advanced Properties - Total Suspended Solids-C*	Advanced Properties - Total Phosphorus-k	Advanced Properties - Total Phosphorus-C*	Advanced Properties - Total Nitrogen-k	Advanced Properties - Total Nitrogen-C*	Location-Northing	Location-Easting	Location-Elevation (m)
Loamy Sand	8000	20	6000	0.13	500	1.4	0	0	0
Loamy Sand	8000	20	6000	0.13	500	1.4	0	0	0
Loamy Sand	8000	20	6000	0.13	500	1.4	0	0	0

Generic Treatment

Name	Inlet Properties-Low Flow Bypass (mÂ³/s)	Inlet Properties-High Flow Bypass (mÂ³/s)	Location-Northing	Location-Easting	Location-Elevation (m)
JellyFish JF3250-28-5 1	0	0.158	-28.26188515	-6.402	0
Ocean_Save_GPT S	0	0.17	0	0	0
Ocean_Save_GPT N	0	0.3	0	0	0
JellyFish JF3250-28-5 1 North	0	0.072	-28.26188515	-6.402	0
Generic Treatment 33	0	0.09	0	0	0

Treatment Train Effectiveness Results

Basin1

Sources		Residual Load	% Reduction
Flow (ML/yr)	1.868	1.701	8.949
Total Suspended Solids (kg/yr)	560.269	26.805	95.216
Total Phosphorus (kg/yr)	0.938	0.148	84.183
Total Nitrogen (kg/yr)	4.341	1.533	64.694
Gross Pollutants (kg/yr)	46.914	0	100

Basin2

Flow (ML/yr)	8.217	7.960	3.126
Total Suspended Solids (kg/yr)	2716.990	356.028	86.896
Total Phosphorus (kg/yr)	4.615	1.274	72.399
Total Nitrogen (kg/yr)	19.384	10.248	47.135
Gross Pollutants (kg/yr)	208.165	0	100

Basin3

Flow (ML/yr)	1.776	1.378	22.446
Total Suspended Solids (kg/yr)	614.215	5.635	99.083
Total Phosphorus (kg/yr)	1.049	0.095	90.910
Total Nitrogen (kg/yr)	4.267	1.047	75.458
Gross Pollutants (kg/yr)	44.817	0	100

Generic Treatment 33

Flow (ML/yr)	0.40	0.40	0
Total Suspended Solids (kg/yr)	143.542	122.010	15
Total Phosphorus (kg/yr)	0.236	0.201	15
Total Nitrogen (kg/yr)	0.957	0.918	4
Gross Pollutants (kg/yr)	10.084	0.303	97

JellyFish JF3250-28-5 1

Flow (ML/yr)	4.647	4.647	0
Total Suspended Solids (kg/yr)	1616.795	58.011	96.412
Total Phosphorus (kg/yr)	2.741	0.996	63.663
Total Nitrogen (kg/yr)	11.140	5.597	49.756
Gross Pollutants (kg/yr)	117.258	0.255	99.782

JellyFish JF 3250-28-5 1 North

Flow (ML/yr)	1.294	1.294	0
Total Suspended Solids (kg/yr)	397.854	28.802	92.761
Total Phosphorus (kg/yr)	0.676	0.297	56.062
Total Nitrogen (kg/yr)	2.931	1.469	49.885
Gross Pollutants (kg/yr)	27.366	0.285	98.959

Ocean_Save_GPT N

Flow (ML/yr)	3.889	3.889	0
Total Suspended Solids (kg/yr)	1393.235	618.936	55.576
Total Phosphorus (kg/yr)	2.296	1.883	17.972
Total Nitrogen (kg/yr)	9.267	9.267	0
Gross Pollutants (kg/yr)	98.115	9.818	89.993

Ocean_Save_GPT S

Flow (ML/yr)	4.647	4.647	0
Total Suspended Solids (kg/yr)	1616.795	728.770	54.925
Total Phosphorus (kg/yr)	2.741	2.262	17.459
Total Nitrogen (kg/yr)	11.140	11.140	0
Gross Pollutants (kg/yr)	117.258	11.973	89.789

Junction North 1			
Flow (ML/yr)	1.294	1.294	0
Total Suspended Solids (kg/yr)	397.854	28.802	92.761
Total Phosphorus (kg/yr)	0.676	0.297	56.062
Total Nitrogen (kg/yr)	2.931	1.469	49.885
Gross Pollutants (kg/yr)	27.366	0.285	98.959
Junction North 2			
Flow (ML/yr)	1.868	1.701	8.949
Total Suspended Solids (kg/yr)	560.269	26.805	95.216
Total Phosphorus (kg/yr)	0.938	0.148	84.183
Total Nitrogen (kg/yr)	4.341	1.533	64.694
Gross Pollutants (kg/yr)	46.914	0	100
Junction North Carpark			
Flow (ML/yr)	1.160	1.160	0
Total Suspended Solids (kg/yr)	273.949	252.418	7.860
Total Phosphorus (kg/yr)	0.453	0.417	7.831
Total Nitrogen (kg/yr)	2.574	2.535	1.487
Gross Pollutants (kg/yr)	27.584	17.802	35.461
PLRC North Treatment			
Flow (ML/yr)	11.379	10.955	3.727
Total Suspended Solids (kg/yr)	3675.113	411.634	88.799
Total Phosphorus (kg/yr)	6.230	1.719	72.40
Total Nitrogen (kg/yr)	26.656	13.249	50.297
Gross Pollutants (kg/yr)	282.445	0.285	99.899
PLRC South Treatment			
Flow (ML/yr)	6.945	6.546	5.740
Total Suspended Solids (kg/yr)	2329.321	161.957	93.047
Total Phosphorus (kg/yr)	3.946	1.247	68.401
Total Nitrogen (kg/yr)	16.562	7.799	52.911
Gross Pollutants (kg/yr)	175.516	13.696	92.197
SDG Compliance Node			
Flow (ML/yr)	18.943	18.120	4.343
Total Suspended Solids (kg/yr)	6217.292	786.448	87.351
Total Phosphorus (kg/yr)	10.532	3.323	68.448
Total Nitrogen (kg/yr)	44.715	22.544	49.582
Gross Pollutants (kg/yr)	473.651	29.671	93.736
Receiving Site			
Flow (ML/yr)	20.289	19.467	4.055
Total Suspended Solids (kg/yr)	6556.116	1103.741	83.165
Total Phosphorus (kg/yr)	11.094	3.849	65.304
Total Nitrogen (kg/yr)	47.737	25.528	46.523
Gross Pollutants (kg/yr)	505.978	52.217	89.680

Appendix M Pipe Strength Class Assessment

CPAA
PipeClass
Pipe Load Summary Sheet

DESIGN OF 450 DIA. RRJ DRAINAGE PIPE

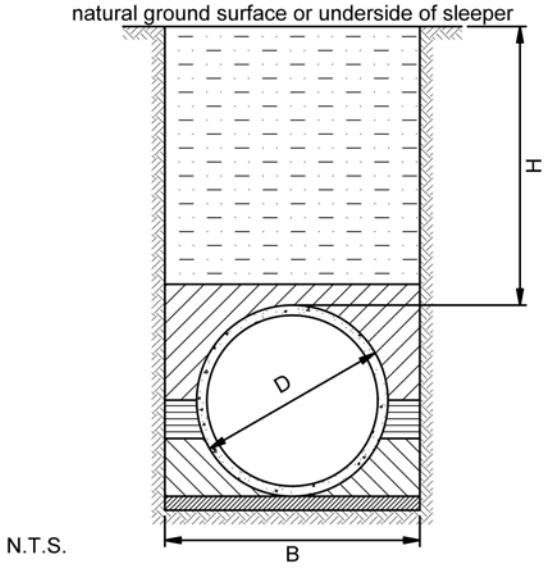
Client And Project Details

Date: 01-Apr-2025

Job number:	12631444	Design:	13-20
Client:		Designer:	KB, CS
Project:	PLR2EW	Company:	GHD
Description:		File:	12631444-PLR2EW PDR.ppr

Design Parameters

Installation Condition:	trench
Pipe Nominal Diameter (mm):	450
Pipe External Diameter, D (mm):	534
Pipeline Orientation:	perpendicular
Soil Type:	wet clay
Soil Density (kN/m³):	20
Soil Parameter K_μ:	0.1100
Trench Width, B (m):	0.850
Height Of Fill, H (m):	1.150
Support Type:	HS3
Bedding Factor:	4.0



In Service Load Cases/Combinations Considered (controlling load case/combination highlighted)

Load Description*	Fill Height (m)	Wg/4.0	Wq/1.5	Tc	Pipe Class
earth	1.150	3.9		3.9	2
W80(AS/NZS3725)	1.150	3.9	6.8	10.7	2
A160(AS/NZS3725)	1.150	3.9	7.9	11.8	2
M1600(AS/NZS3725)	1.150	3.9	7.8	11.7	2
S1600(AS/NZS3725)	1.150	3.9	5.7	9.7	2
HLP400	1.150	3.9	7.5	11.4	2
300LA	1.150	3.9	24.7	28.6	3

All loads in kN/m. *Includes earth load at fill height shown.

Controlling Loads: earth + 300LA railway load
Minimum Test Load: Tc = 3.9 + 24.7 = 28.6 kN/m

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DESIGN OF 450 DIA. RRJ DRAINAGE PIPE

Construction Load Cases/Combinations Considered

Load Description^	Allowable Fill Ranges (m)
CAT785B (Const)	cannot be used
CAT657E (Const)	0.772 - 1.150
T54 (Const)	0.400 - 1.150
T54 (Const)	0.400 - 1.150
HLP400 (Const)	0.400 - 1.150
CPAAVTR2T (Const)	0.200 - 1.150
CPAAVPL (Const)	0.150 - 1.150
CPAARAM (Const)	0.150 - 1.150

All loads in kN/m. ^Includes earth load at fill ranges shown.

Adopt 450 dia. Class 3 RRJ pipe (450/3 RRJ) in accordance with AS/NZS 4058:2007.

Design Notes:

1. Construction loads are considered as acting directly (no distribution) on the pipe (for cover < 0.4 m) in accordance with AS/NZS 3725:2007.
2. A nominal pipe wall thickness of 38 mm has been assumed.

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INSTALLATION OF 450 DIA. CLASS 3 RRJ DRAINAGE PIPE

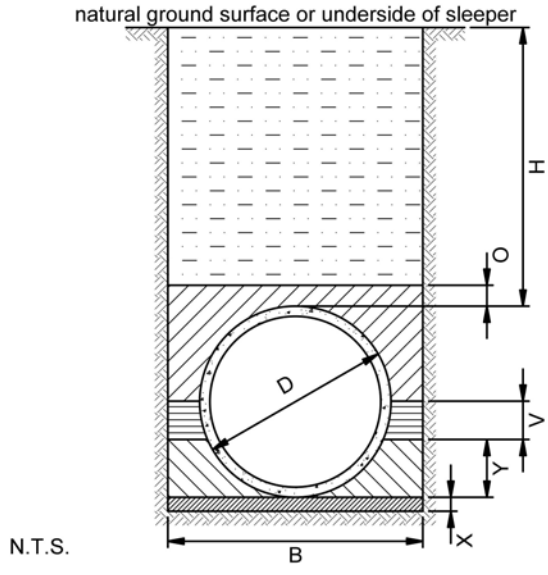
Client And Project Details

Date: 01-Apr-2025

Job number:	12631444	Design:	13-20
Client:		Designer:	KB, CS
Project:	PLR2EW	Company:	GHD
Description:		File:	12631444-PLR2EW PDR.ppr

Design Parameters

Installation Condition:	trench
Pipe Nominal Diameter (mm):	450
Pipe External Diameter, D (mm):	534
Pipeline Orientation:	perpendicular
Trench Width, B (m):	0.850
Height Of Fill, H (m):	1.150
Support Type:	HS3
Excavation Volume (solid) (m³/m):	1.6



Installation Quantities

Support Zone	Depth (mm)	Quantities(m³/m)		Minimum Zone Compaction (%)	
		Solid	Loose	Density Index (for cohesionless soils)	Relative Density (standard compaction)
Bed zone	X = 100	0.085	0.102	70	-
Haunch zone	Y = 165	0.082	0.098	70	-
Side zone	V = 105	0.035	0.042	70	95
Overlay zone	O = 150	0.242	0.363	as per project specification	as per project specification
Backfill	1000	0.850	1.275	as per project specification	as per project specification

Material Grading Requirements

Sieve Size (mm)	75.0	19.0	9.5	2.36	0.60	0.30	0.15	0.075
Bed & Haunch Zones (% mass passing)	-	100	-	100-50	90-20	60-10	25-0	10-0
Side Zone (% mass passing)	100	-	100-50	100-30	50-15	-	-	20-0

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INSTALLATION OF 450 DIA. CLASS 3 RRJ DRAINAGE PIPE

Construction Equipment Requirements

Name	Description	Allowable Fill Ranges^ (m)
CAT785B	Truck, Mining CAT785B - Total weight (loaded) 249.4 t	cannot be used
CAT657E	Scraper CAT657E - Total weight (loaded) 116.0 t	0.772 - 1.150
T54	Standard Vehicle, RTA NSW - T54 Truck Load	0.400 - 1.150
T54	Standard Vehicle, RTA NSW - T54 Truck Load	0.400 - 1.150
HLP400	Standard Vehicle, AS/NZS 3725:2007 - Heavy Load Platform...	0.400 - 1.150
CPAAVTR2T	CPAA Construction Vehicle - Vibratory Trench Roller (2 t)	0.200 - 1.150
CPAAVPL	CPAA Construction Vehicle - Vibratory plate (up to 135 kg w...	0.150 - 1.150
CPAARAM	CPAA Construction Vehicle - Vibratory rammer (up to 75 kg ...	0.150 - 1.150

^Equipment is not to be used outside of these fill ranges over top of pipe.

Design Notes:

1. All bed, haunch and side zone material passing the 0.075 mm sieve to have low plasticity (AS 1726).
2. Ordinary fill material to have no stones > 150 mm dia., and no more than 20% to be 75-150 mm.
3. For additional information refer to the project specification.
4. A nominal pipe wall thickness of 38 mm has been assumed.

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CPAA
PipeClass
Pipe Load Summary Sheet

DESIGN OF 600 DIA. RRJ DRAINAGE PIPE

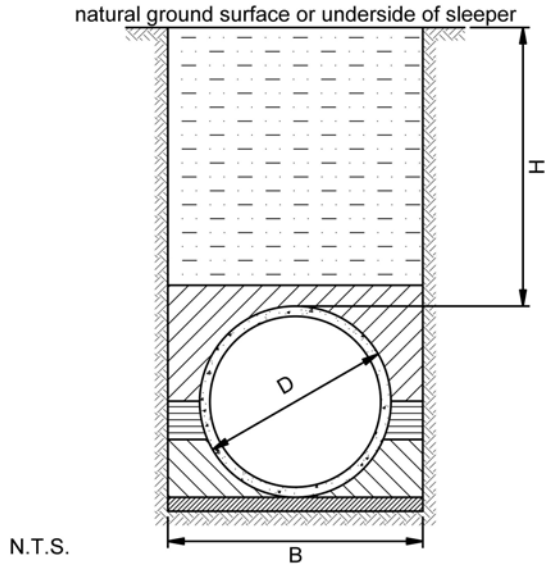
Client And Project Details

Date: 01-Apr-2025

Job number:	12631444	Design:	01-1
Client:		Designer:	KB, CS
Project:	PLR2EW	Company:	GHD
Description:		File:	12631444-PLR2EW PDR.ppr

Design Parameters

Installation Condition:	trench
Pipe Nominal Diameter (mm):	600
Pipe External Diameter, D (mm):	699
Pipeline Orientation:	perpendicular
Soil Type:	wet clay
Soil Density (kN/m³):	20
Soil Parameter K_μ:	0.1100
Trench Width, B (m):	1.055
Height Of Fill, H (m):	1.350
Support Type:	HS3
Bedding Factor:	4.0



In Service Load Cases/Combinations Considered (controlling load case/combination highlighted)

Load Description*	Fill Height (m)	Wg/4.0	Wq/1.5	Tc	Pipe Class
earth	1.350	5.9		5.9	2
W80(AS/NZS3725)	1.350	5.9	6.4	12.3	2
A160(AS/NZS3725)	1.350	5.9	7.9	13.8	2
M1600(AS/NZS3725)	1.350	5.9	8.6	14.5	2
S1600(AS/NZS3725)	1.350	5.9	6.5	12.3	2
HLP400	1.350	5.9	9.7	15.6	2
300LA	1.350	5.9	27.3	33.2	3

All loads in kN/m. *Includes earth load at fill height shown.

Controlling Loads: earth + 300LA railway load
Minimum Test Load: Tc = 5.9 + 27.3 = 33.2 kN/m

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DESIGN OF 600 DIA. RRJ DRAINAGE PIPE

Construction Load Cases/Combinations Considered

Load Description^	Allowable Fill Ranges (m)
CAT785B (Const)	cannot be used
CAT657E (Const)	0.725 - 1.350
T54 (Const)	0.400 - 1.350
T54 (Const)	0.400 - 1.350
HLP400 (Const)	0.400 - 1.350
CPAAVTR2T (Const)	0.200 - 1.350
CPAAVPL (Const)	0.150 - 1.350
CPAARAM (Const)	0.150 - 1.350

All loads in kN/m. ^Includes earth load at fill ranges shown.

Adopt 600 dia. Class 3 RRJ pipe (600/3 RRJ) in accordance with AS/NZS 4058:2007.

Design Notes:

1. Construction loads are considered as acting directly (no distribution) on the pipe (for cover < 0.4 m) in accordance with AS/NZS 3725:2007.
2. A nominal pipe wall thickness of 44 mm has been assumed.

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INSTALLATION OF 600 DIA. CLASS 3 RRJ DRAINAGE PIPE

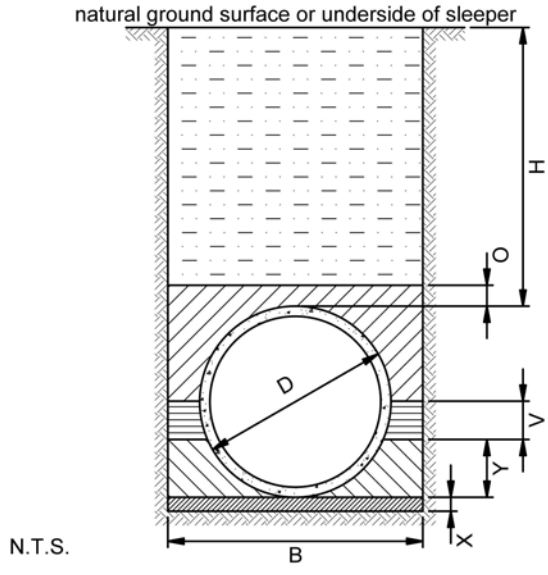
Client And Project Details

Date: 01-Apr-2025

Job number:	12631444	Design:	01-1
Client:		Designer:	KB, CS
Project:	PLR2EW	Company:	GHD
Description:		File:	12631444-PLR2EW PDR.ppr

Design Parameters

Installation Condition:	trench
Pipe Nominal Diameter (mm):	600
Pipe External Diameter, D (mm):	699
Pipeline Orientation:	perpendicular
Trench Width, B (m):	1.055
Height Of Fill, H (m):	1.350
Support Type:	HS3
Excavation Volume (solid) (m³/m):	2.3



Installation Quantities

Support Zone	Depth (mm)	Quantities(m³/m)		Minimum Zone Compaction (%)	
		Solid	Loose	Density Index (for cohesionless soils)	Relative Density (standard compaction)
Bed zone	X = 100	0.106	0.127	70	-
Haunch zone	Y = 210	0.125	0.150	70	-
Side zone	V = 140	0.053	0.063	70	95
Overlay zone	O = 150	0.335	0.503	as per project specification	as per project specification
Backfill	1200	1.266	1.899	as per project specification	as per project specification

Material Grading Requirements

Sieve Size (mm)	75.0	19.0	9.5	2.36	0.60	0.30	0.15	0.075
Bed & Haunch Zones (% mass passing)	-	100	-	100-50	90-20	60-10	25-0	10-0
Side Zone (% mass passing)	100	-	100-50	100-30	50-15	-	-	20-0

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INSTALLATION OF 600 DIA. CLASS 3 RRJ DRAINAGE PIPE

Construction Equipment Requirements

Name	Description	Allowable Fill Ranges^ (m)
CAT785B	Truck, Mining CAT785B - Total weight (loaded) 249.4 t	cannot be used
CAT657E	Scraper CAT657E - Total weight (loaded) 116.0 t	0.725 - 1.350
T54	Standard Vehicle, RTA NSW - T54 Truck Load	0.400 - 1.350
T54	Standard Vehicle, RTA NSW - T54 Truck Load	0.400 - 1.350
HLP400	Standard Vehicle, AS/NZS 3725:2007 - Heavy Load Platform...	0.400 - 1.350
CPAAVTR2T	CPAA Construction Vehicle - Vibratory Trench Roller (2 t)	0.200 - 1.350
CPAAVPL	CPAA Construction Vehicle - Vibratory plate (up to 135 kg w...	0.150 - 1.350
CPAARAM	CPAA Construction Vehicle - Vibratory rammer (up to 75 kg ...	0.150 - 1.350

^Equipment is not to be used outside of these fill ranges over top of pipe.

Design Notes:

1. All bed, haunch and side zone material passing the 0.075 mm sieve to have low plasticity (AS 1726).
2. Ordinary fill material to have no stones > 150 mm dia., and no more than 20% to be 75-150 mm.
3. For additional information refer to the project specification.
4. A nominal pipe wall thickness of 44 mm has been assumed.

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CPAA
PipeClass
Pipe Load Summary Sheet

DESIGN OF 750 DIA. RRJ DRAINAGE PIPE

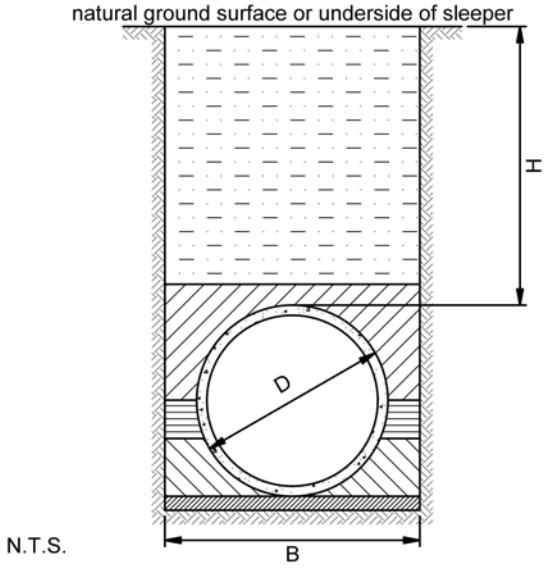
Client And Project Details

Date: 01-Apr-2025

Job number:	12631444	Design:	10-11
Client:		Designer:	KB, CS
Project:	PLR2EW	Company:	GHD
Description:		File:	12631444-PLR2EW PDR.ppr

Design Parameters

Installation Condition:	trench
Pipe Nominal Diameter (mm):	750
Pipe External Diameter, D (mm):	870
Pipeline Orientation:	perpendicular
Soil Type:	wet clay
Soil Density (kN/m³):	20
Soil Parameter K_μ:	0.1100
Trench Width, B (m):	1.262
Height Of Fill, H (m):	0.650
Support Type:	HS3
Bedding Factor:	4.0



In Service Load Cases/Combinations Considered (controlling load case/combination highlighted)

Load Description*	Fill Height (m)	Wg/4.0	Wq/1.5	Tc	Pipe Class
earth	0.650	3.1		3.1	2
W80(AS/NZS3725)	0.650	3.1	22.1	25.2	2
A160(AS/NZS3725)	0.650	3.1	22.1	25.2	2
M1600(AS/NZS3725)	0.650	3.1	16.6	19.7	2
S1600(AS/NZS3725)	0.650	3.1	11.3	14.3	2
HLP400	0.650	3.1	21.3	24.3	2

All loads in kN/m. *Includes earth load at fill height shown.

Controlling Loads: earth + W80(AS/NZS3725) standard vehicle
Minimum Test Load: Tc = 3.1 + 22.1 = 25.2 kN/m

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DESIGN OF 750 DIA. RRJ DRAINAGE PIPE

Construction Load Cases/Combinations Considered

Load Description^	Allowable Fill Ranges (m)
CAT785B (Const)	cannot be used
CAT657E (Const)	cannot be used
T54 (Const)	0.400 - 0.650
T54 (Const)	0.400 - 0.650
HLP400 (Const)	0.472 - 0.650
CPAAVTR2T (Const)	0.200 - 0.650
CPAAVPL (Const)	0.150 - 0.650
CPAARAM (Const)	0.150 - 0.650

All loads in kN/m. ^Includes earth load at fill ranges shown.

Adopt 750 dia. Class 2 RRJ pipe (750/2 RRJ) in accordance with AS/NZS 4058:2007.

Design Notes:

1. Construction loads are considered as acting directly (no distribution) on the pipe (for cover < 0.4 m) in accordance with AS/NZS 3725:2007.
2. A nominal pipe wall thickness of 52 mm has been assumed.

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INSTALLATION OF 750 DIA. CLASS 2 RRJ DRAINAGE PIPE

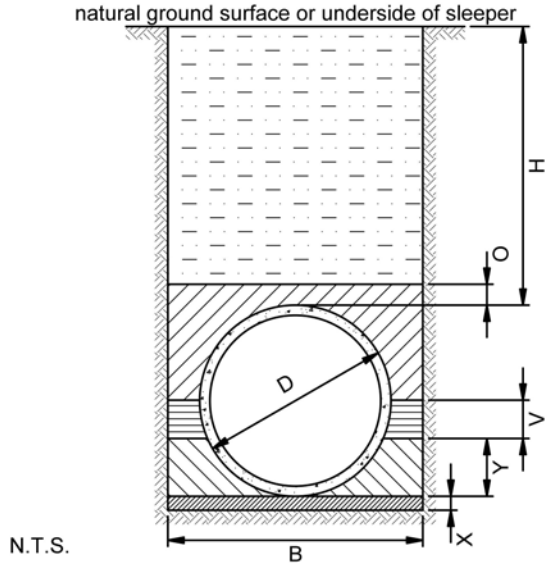
Client And Project Details

Date: 01-Apr-2025

Job number:	12631444	Design:	10-11
Client:		Designer:	KB, CS
Project:	PLR2EW	Company:	GHD
Description:		File:	12631444-PLR2EW PDR.ppr

Design Parameters

Installation Condition:	trench
Pipe Nominal Diameter (mm):	750
Pipe External Diameter, D (mm):	870
Pipeline Orientation:	perpendicular
Trench Width, B (m):	1.262
Height Of Fill, H (m):	0.650
Support Type:	HS3
Excavation Volume (solid) (m³/m):	2.1



Installation Quantities

Support Zone	Depth (mm)	Quantities(m³/m)		Minimum Zone Compaction (%)	
		Solid	Loose	Density Index (for cohesionless soils)	Relative Density (standard compaction)
Bed zone	X = 100	0.127	0.152	70	-
Haunch zone	Y = 265	0.182	0.218	70	-
Side zone	V = 170	0.071	0.085	70	95
Overlay zone	O = 150	0.442	0.662	as per project specification	as per project specification
Backfill	500	0.631	0.947	as per project specification	as per project specification

Material Grading Requirements

Sieve Size (mm)	75.0	19.0	9.5	2.36	0.60	0.30	0.15	0.075
Bed & Haunch Zones (% mass passing)	-	100	-	100-50	90-20	60-10	25-0	10-0
Side Zone (% mass passing)	100	-	100-50	100-30	50-15	-	-	20-0

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INSTALLATION OF 750 DIA. CLASS 2 RRJ DRAINAGE PIPE

Construction Equipment Requirements

Name	Description	Allowable Fill Ranges^ (m)
CAT785B	Truck, Mining CAT785B - Total weight (loaded) 249.4 t	cannot be used
CAT657E	Scraper CAT657E - Total weight (loaded) 116.0 t	cannot be used
T54	Standard Vehicle, RTA NSW - T54 Truck Load	0.400 - 0.650
T54	Standard Vehicle, RTA NSW - T54 Truck Load	0.400 - 0.650
HLP400	Standard Vehicle, AS/NZS 3725:2007 - Heavy Load Platform...	0.472 - 0.650
CPAAVTR2T	CPAA Construction Vehicle - Vibratory Trench Roller (2 t)	0.200 - 0.650
CPAAVPL	CPAA Construction Vehicle - Vibratory plate (up to 135 kg w...	0.150 - 0.650
CPAARAM	CPAA Construction Vehicle - Vibratory rammer (up to 75 kg ...	0.150 - 0.650

^Equipment is not to be used outside of these fill ranges over top of pipe.

Design Notes:

1. All bed, haunch and side zone material passing the 0.075 mm sieve to have low plasticity (AS 1726).
2. Ordinary fill material to have no stones > 150 mm dia., and no more than 20% to be 75-150 mm.
3. For additional information refer to the project specification.
4. A nominal pipe wall thickness of 52 mm has been assumed.

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CPAA
PipeClass
Pipe Load Summary Sheet

DESIGN OF 750 DIA. RRJ DRAINAGE PIPE

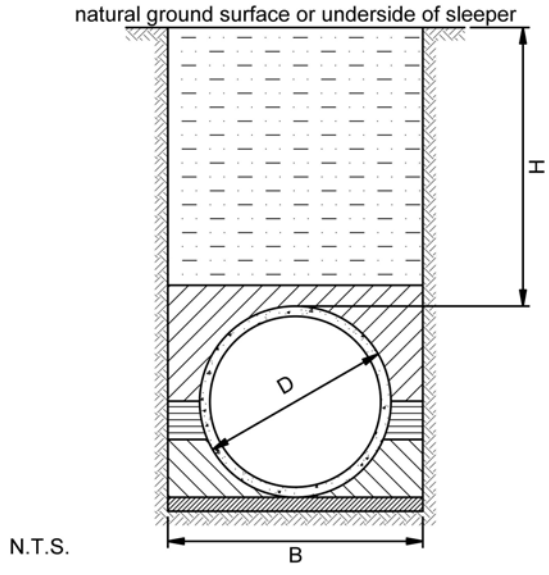
Client And Project Details

Date: 01-Apr-2025

Job number:	12631444	Design:	02-8
Client:		Designer:	KB, CS
Project:	PLR2EW	Company:	GHD
Description:		File:	12631444-PLR2EW PDR.ppr

Design Parameters

Installation Condition:	trench
Pipe Nominal Diameter (mm):	750
Pipe External Diameter, D (mm):	870
Pipeline Orientation:	perpendicular
Soil Type:	wet clay
Soil Density (kN/m³):	20
Soil Parameter K_μ:	0.1100
Trench Width, B (m):	1.262
Height Of Fill, H (m):	1.350
Support Type:	HS3
Bedding Factor:	4.0



In Service Load Cases/Combinations Considered (controlling load case/combination highlighted)

Load Description*	Fill Height (m)	Wg/4.0	Wq/1.5	Tc	Pipe Class
earth	1.350	7.0		7.0	2
W80(AS/NZS3725)	1.350	7.0	7.5	14.5	2
A160(AS/NZS3725)	1.350	7.0	9.5	16.5	2
M1600(AS/NZS3725)	1.350	7.0	10.3	17.3	2
S1600(AS/NZS3725)	1.350	7.0	7.8	14.8	2
HLP400	1.350	7.0	11.8	18.8	2
300LA	1.350	7.0	33.0	40.0	3

All loads in kN/m. *Includes earth load at fill height shown.

Controlling Loads: earth + 300LA railway load
Minimum Test Load: Tc = 7.0 + 33.0 = 40.0 kN/m

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DESIGN OF 750 DIA. RRJ DRAINAGE PIPE

Construction Load Cases/Combinations Considered

Load Description^	Allowable Fill Ranges (m)
CAT785B (Const)	cannot be used
CAT657E (Const)	0.685 - 1.350
T54 (Const)	0.150 - 1.350
T54 (Const)	0.150 - 1.350
HLP400 (Const)	0.150 - 1.350
CPAAVTR2T (Const)	0.150 - 1.350
CPAAVPL (Const)	0.150 - 1.350
CPAARAM (Const)	0.150 - 1.350

All loads in kN/m. ^Includes earth load at fill ranges shown.

Adopt 750 dia. Class 3 RRJ pipe (750/3 RRJ) in accordance with AS/NZS 4058:2007.

Design Notes:

1. Construction loads are considered as acting directly (no distribution) on the pipe (for cover < 0.4 m) in accordance with AS/NZS 3725:2007.
2. A nominal pipe wall thickness of 52 mm has been assumed.

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INSTALLATION OF 750 DIA. CLASS 3 RRJ DRAINAGE PIPE

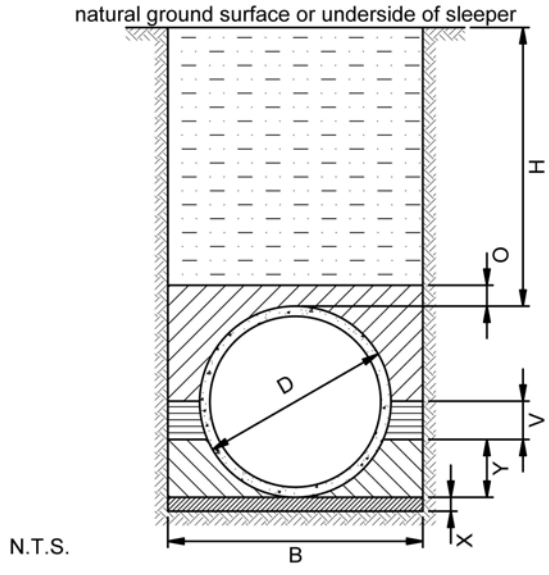
Client And Project Details

Date: 01-Apr-2025

Job number:	12631444	Design:	02-8
Client:		Designer:	KB, CS
Project:	PLR2EW	Company:	GHD
Description:		File:	12631444-PLR2EW PDR.ppr

Design Parameters

Installation Condition:	trench
Pipe Nominal Diameter (mm):	750
Pipe External Diameter, D (mm):	870
Pipeline Orientation:	perpendicular
Trench Width, B (m):	1.262
Height Of Fill, H (m):	1.350
Support Type:	HS3
Excavation Volume (solid) (m³/m):	3.0



Installation Quantities

Support Zone	Depth (mm)	Quantities(m³/m)		Minimum Zone Compaction (%)	
		Solid	Loose	Density Index (for cohesionless soils)	Relative Density (standard compaction)
Bed zone	X = 100	0.127	0.152	70	-
Haunch zone	Y = 265	0.182	0.218	70	-
Side zone	V = 170	0.071	0.085	70	95
Overlay zone	O = 150	0.442	0.662	as per project specification	as per project specification
Backfill	1200	1.515	2.272	as per project specification	as per project specification

Material Grading Requirements

Sieve Size (mm)	75.0	19.0	9.5	2.36	0.60	0.30	0.15	0.075
Bed & Haunch Zones (% mass passing)	-	100	-	100-50	90-20	60-10	25-0	10-0
Side Zone (% mass passing)	100	-	100-50	100-30	50-15	-	-	20-0

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INSTALLATION OF 750 DIA. CLASS 3 RRJ DRAINAGE PIPE

Construction Equipment Requirements

Name	Description	Allowable Fill Ranges^ (m)
CAT785B	Truck, Mining CAT785B - Total weight (loaded) 249.4 t	cannot be used
CAT657E	Scraper CAT657E - Total weight (loaded) 116.0 t	0.685 - 1.350
T54	Standard Vehicle, RTA NSW - T54 Truck Load	0.150 - 1.350
T54	Standard Vehicle, RTA NSW - T54 Truck Load	0.150 - 1.350
HLP400	Standard Vehicle, AS/NZS 3725:2007 - Heavy Load Platform...	0.150 - 1.350
CPAAVTR2T	CPAA Construction Vehicle - Vibratory Trench Roller (2 t)	0.150 - 1.350
CPAAVPL	CPAA Construction Vehicle - Vibratory plate (up to 135 kg w...	0.150 - 1.350
CPAARAM	CPAA Construction Vehicle - Vibratory rammer (up to 75 kg ...	0.150 - 1.350

^Equipment is not to be used outside of these fill ranges over top of pipe.

Design Notes:

1. All bed, haunch and side zone material passing the 0.075 mm sieve to have low plasticity (AS 1726).
2. Ordinary fill material to have no stones > 150 mm dia., and no more than 20% to be 75-150 mm.
3. For additional information refer to the project specification.
4. A nominal pipe wall thickness of 52 mm has been assumed.

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CPAA
PipeClass
Pipe Load Summary Sheet

DESIGN OF 1050 DIA. RRJ DRAINAGE PIPE

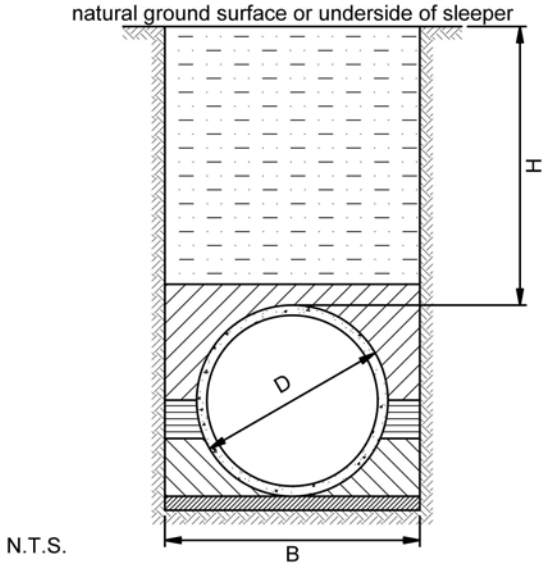
Client And Project Details

Date: 01-Apr-2025

Job number:	12631444	Design:	07-1
Client:		Designer:	KB, CS
Project:	PLR2EW	Company:	GHD
Description:		File:	12631444-PLR2EW PDR.ppr

Design Parameters

Installation Condition:	trench
Pipe Nominal Diameter (mm):	1050
Pipe External Diameter, D (mm):	1220
Pipeline Orientation:	perpendicular
Soil Type:	wet clay
Soil Density (kN/m³):	20
Soil Parameter K_μ:	0.1100
Trench Width, B (m):	1.664
Height Of Fill, H (m):	1.500
Support Type:	HS3
Bedding Factor:	4.0



In Service Load Cases/Combinations Considered (controlling load case/combination highlighted)

Load Description*	Fill Height (m)	Wg/4.0	Wq/1.5	Tc	Pipe Class
earth	1.500	10.5		10.5	2
W80(AS/NZS3725)	1.500	10.5	8.1	18.6	2
A160(AS/NZS3725)	1.500	10.5	10.7	21.2	2
M1600(AS/NZS3725)	1.500	10.5	12.2	22.7	2
S1600(AS/NZS3725)	1.500	10.5	9.1	19.6	2
HLP400	1.500	10.5	15.2	25.7	2
300LA	1.500	10.5	40.5	51.0	3

All loads in kN/m. *Includes earth load at fill height shown.

Controlling Loads: earth + 300LA railway load
Minimum Test Load: Tc = 10.5 + 40.5 = 51.0 kN/m

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DESIGN OF 1050 DIA. RRJ DRAINAGE PIPE

Construction Load Cases/Combinations Considered

Load Description^	Allowable Fill Ranges (m)
CAT785B (Const)	1.328 - 1.500
CAT657E (Const)	0.645 - 1.500
T54 (Const)	0.150 - 1.500
T54 (Const)	0.150 - 1.500
HLP400 (Const)	0.150 - 1.500
CPAAVTR2T (Const)	0.150 - 1.500
CPAAVPL (Const)	0.150 - 1.500
CPAARAM (Const)	0.150 - 1.500

All loads in kN/m. ^Includes earth load at fill ranges shown.

Adopt 1050 dia. Class 3 RRJ pipe (1050/3 RRJ) in accordance with AS/NZS 4058:2007.

Design Notes:

1. Construction loads are considered as acting directly (no distribution) on the pipe (for cover < 0.4 m) in accordance with AS/NZS 3725:2007.
2. A nominal pipe wall thickness of 64 mm has been assumed.

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INSTALLATION OF 1050 DIA. CLASS 3 RRJ DRAINAGE PIPE

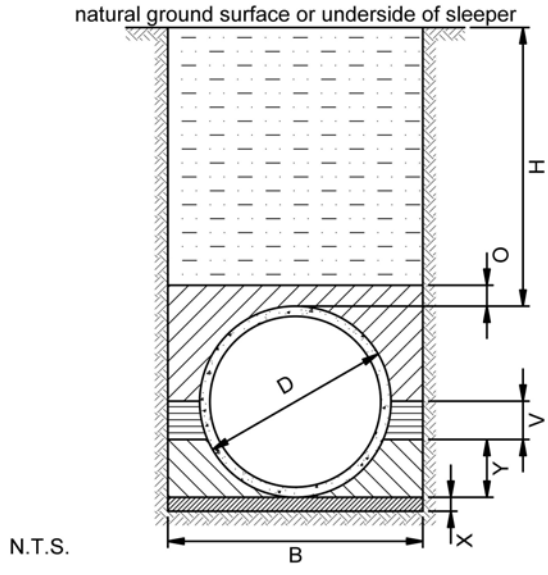
Client And Project Details

Date: 01-Apr-2025

Job number:	12631444	Design:	07-1
Client:		Designer:	KB, CS
Project:	PLR2EW	Company:	GHD
Description:		File:	12631444-PLR2EW PDR.ppr

Design Parameters

Installation Condition:	trench
Pipe Nominal Diameter (mm):	1050
Pipe External Diameter, D (mm):	1220
Pipeline Orientation:	perpendicular
Trench Width, B (m):	1.664
Height Of Fill, H (m):	1.500
Support Type:	HS3
Excavation Volume (solid) (m³/m):	4.7



Installation Quantities

Support Zone	Depth (mm)	Quantities(m³/m)		Minimum Zone Compaction (%)	
		Solid	Loose	Density Index (for cohesionless soils)	Relative Density (standard compaction)
Bed zone	X = 100	0.167	0.200	70	-
Haunch zone	Y = 370	0.317	0.380	70	-
Side zone	V = 240	0.115	0.138	70	95
Overlay zone	O = 150	0.681	1.021	as per project specification	as per project specification
Backfill	1350	2.247	3.370	as per project specification	as per project specification

Material Grading Requirements

Sieve Size (mm)	75.0	19.0	9.5	2.36	0.60	0.30	0.15	0.075
Bed & Haunch Zones (% mass passing)	-	100	-	100-50	90-20	60-10	25-0	10-0
Side Zone (% mass passing)	100	-	100-50	100-30	50-15	-	-	20-0

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INSTALLATION OF 1050 DIA. CLASS 3 RRJ DRAINAGE PIPE

Construction Equipment Requirements

Name	Description	Allowable Fill Ranges^ (m)
CAT785B	Truck, Mining CAT785B - Total weight (loaded) 249.4 t	1.328 - 1.500
CAT657E	Scraper CAT657E - Total weight (loaded) 116.0 t	0.645 - 1.500
T54	Standard Vehicle, RTA NSW - T54 Truck Load	0.150 - 1.500
T54	Standard Vehicle, RTA NSW - T54 Truck Load	0.150 - 1.500
HLP400	Standard Vehicle, AS/NZS 3725:2007 - Heavy Load Platform...	0.150 - 1.500
CPAAVTR2T	CPAA Construction Vehicle - Vibratory Trench Roller (2 t)	0.150 - 1.500
CPAAVPL	CPAA Construction Vehicle - Vibratory plate (up to 135 kg w...	0.150 - 1.500
CPAARAM	CPAA Construction Vehicle - Vibratory rammer (up to 75 kg ...	0.150 - 1.500

^Equipment is not to be used outside of these fill ranges over top of pipe.

Design Notes:

1. All bed, haunch and side zone material passing the 0.075 mm sieve to have low plasticity (AS 1726).
2. Ordinary fill material to have no stones > 150 mm dia., and no more than 20% to be 75-150 mm.
3. For additional information refer to the project specification.
4. A nominal pipe wall thickness of 64 mm has been assumed.

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Appendix N Dynamic Drainage Results – 5%AEP+CC

12d Dynamic Drainage Results
Hydrology Return Period Event Storms durations run
ILSAX 2 5 DRAI DES DRAI DES DRAI DES DRAI DESN 60 4569
Notes: All Results are maximums and flows in l/s
Negative Flow Values Indicate Reverse Flows

Node	Node Type	Catchmnet Areas (ha)					Catchment Flow					Approach	Inlet	Efficiencies				Uncapture
													Captured	minor		Major		
		Area 1	Area 2	Area 3	Area 4	Area 5	Set 1	Set 2	Set 3	Set 4	Set 5	Flow	Flow	SAG	Ongrade	SAG	Ongrade	Flow
01-1	IP XXX x XXX											0	0	50	80	50	80	0
01-2	IP XXX x XXX											0	0	50	80	50	80	0
01-3	HW											0	0	50	80	50	80	0
02-2	SA2 >450											5	5	50	80	50	80	0
02-3	IP XXX x XXX											0	0	50	80	50	80	0
02-4	IP XXX x XXX											0	0	50	80	50	80	0
02-5	IP XXX x XXX											0	0	50	80	50	80	0
02-6	IP XXX x XXX											0	0	50	80	50	80	0
02-7	GRATED INLET											0	0	50	80	50	80	0
02-8	IP XXX x XXX											0	0	50	80	50	80	0
02-9	IP XXX x XXX											0	0	50	80	50	80	0
03-1	IP XXX x XXX											0	0	50	80	50	80	0
04-1	M.G.T.G. (HAUNCHED)			0.7609		0.0441			547		25	571	562	50	80	50	80	7
05-1	IP XXX x XXX											0	0	50	80	50	80	0
05-2	IP XXX x XXX											0	0	50	80	50	80	0
05-3	IP XXX x XXX											0	0	50	80	50	80	0
07-1	M.G.D.G.					0.0735					-1E+08	43	46	50	80	50	80	0
07-1A	IP XXX x XXX											0	0	50	80	50	80	0
07-2	IP XXX x XXX											0	0	50	80	50	80	0
07-3	HW											0	0	50	80	50	80	0
CONN 08-1	SCUPPER CONN											0	0	50	80	50	80	0
CONN 08-1A	SCUPPER CONN											0	0	50	80	50	80	0
CONN 08-2	SCUPPER CONN											0	0	50	80	50	80	0
CONN 08-3	SCUPPER CONN											0	0	50	80	50	80	0
CONN 08-4	SCUPPER CONN											0	0	50	80	50	80	0
CONN 08-5	SCUPPER CONN											0	0	50	80	50	80	0
CONN 08-6	SCUPPER CONN											0	0	50	80	50	80	0
CONN SC17-	SCUPPER CONN											0	0	50	80	50	80	0
09-2	ALL IN GRADE											0	0	50	80	50	80	0
09-3	ALL IN GRADE				0.0073					6		6	6	50	80	50	80	0
09-4	ALL IN GRADE											0	0	50	80	50	80	0
09-6	SCUPPER DP											0	0	50	80	50	80	0
09-7	IP XXX x XXX											0	0	50	80	50	80	0
10-1	M.G.S.G.				0.0071					6		6	6	50	80	50	80	0
10-1A	IP XXX x XXX											0	0	50	80	50	80	0
10-2	GRATED INLET 900X900	0.0222					19					18	17	50	80	50	80	1
10-3	SO1	0.0161				0.0222	13				13	24	21	50	80	50	80	3
10-4	IP XXX x XXX											0	0	50	80	50	80	0
10-5	GRATED INLET	0.0273					20					20	20	50	80	50	80	0
10-7	IP XXX x XXX											0	0	50	80	50	80	0
10-8	IP XXX x XXX											0	0	50	80	50	80	0
10-9	DS21>450	0.0067				0.0202	6				12	195	109	50	80	50	80	86
10-10	DS24 >450	0.074					-1E+08					327	-2475	50	80	50	80	2732
10-11	HW											0	0	50	80	50	80	0
11-1	GRATED INLET 900X900					0.0196					11	0	0	50	100	50	100	0
12-1	SO2	0.017			0.0159	0.03	10			14	17	37	37	50	80	50	80	0
13-1	SCUPPER F	0.0045					4					4	1	50	50	50	50	3
13-2	SCUPPER F	0.0073					6					9	2	50	50	50	50	7
13-3	Grated Trench 2m	0.0097					8					15	12	50	50	50	50	3
13-4	SCUPPER F	0.0088					7					8	3	50	50	50	50	6
13-5	Grated Trench 2m	0.0087					7					12	9	50	50	50	50	3
13-6	SCUPPER F	0.0096					8					9	3	50	50	50	50	6
13-7	Grated Trench 2m	0.0103					9					13	10	50	50	50	50	3
13-8	SCUPPER F	0.0105					9					10	4	50	50	50	50	7
13-9	Grated Trench 2m	0.0113					10					15	11	50	50	50	50	4
13-10	SCUPPER F	0.011					9					11	4	50	50	50	50	7
13-11	Grated Trench 2m	0.0105					9					15	11	50	50	50	50	4
13-12	SCUPPER F	0.0104					9					10	4	50	50	50	50	7
13-13	Grated Trench 2m	0.0103					9					14	11	50	50	50	50	3
13-14	SCUPPER F	0.0105					9					10	4	50	50	50	50	7
13-15	Grated Trench 2m	0.0103					9					14	11	50	50	50	50	3
13-16	SCUPPER F	0.0105					9					10	2	50	50	50	50	8
13-17	Grated Trench 2m	0.0088					7					15	11	50	50	50	50	3
13-18	SCUPPER F	0.0081					7					8	3	50	50	50	50	5
13-19	Grated Trench 3m	0.0046					4					9	8	50	50	50	50	1
BB13-19	SCUPPER DP											0	0	50	80	50	80	0
RH13-19A	ALL IN GRADE											0	0	50	80	50	80	0
13-20	IP XXX x XXX											0	0	50	80	50	80	0
13A-1	IP XXX x XXX											0	0	50	80	50	80	0
13A-2	IP XXX x XXX											0	0	50	80	50	80	0
13A-3	IP XXX x XXX											0	0	50	80	50	80	0
13A-4	IP XXX x XXX											0	0	50	80	50	80	0
13A-5	IP XXX x XXX											0	0	50	80	50	80	0
13A-6	IP XXX x XXX											0	0	50	80	50	80	0
13B-1	IP XXX x XXX											0	0	50	80	50	80	0
13B-2	IP XXX x XXX											0	0	50	80	50	80	0
14-1	SCUPPER F	0.0047					4					4	1	50	50	50	50	3
14-2	SCUPPER F	0.0091					8					11	3	50	50	50	50	8
14-3	Grated Trench 2m	0.0093					8					16	12	50	50	50	50	3
14-4	SCUPPER F	0.0088					7					9	3	50	50	50	50	6
14-5	Grated Trench 2m	0.0093					8					13	10	50	50	50	50	3
14-6	SCUPPER F	0.0092					8					9	3	50	50	50	50	6
14-7	Grated Trench 2m	0.0112					10					14	11	50	50	50	50	3
14-8	SCUPPER F	0.011					9					11	4	50	50	50	50	7
14-9	Grated Trench 2m	0.0105					9					15	11	50	50	50	50	4
14-10	SCUPPER F	0.0103					9					11	4	50	50	50	50	7
14-11	Grated Trench 2m	0.0104					9					15	11	50	50	50	50	3
14-12	SCUPPER F	0.0104					9					10	4	50	50	50	50	7
14-13	Grated Trench 2m	0.0103					9					15	11	50	50	50	50	3
14-14	SCUPPER F	0.0104					9					10	4	50	50	50	50	7
14-15	Grated Trench 2m	0.0087					7					13	10	50	50	50	50	3
14-16	SCUPPER F	0.0033					3					5	2	50	50	50	50	3
BB14-16	SCUPPER DP											0	0	50	80	50	80	0
RH14-17	ALL IN GRADE											0	0	50	80	50	80	0
RH14-17A	SCUPPER DP											0	0	50	80	50	80	0
14-17	M.G.S.G.											0	0	50	80	50	80	0
14-17A	M.G.S.G. (HAUNCHED)											0	0	50	80	50	80	0
14-18	GRATED INLET 900X900											0	0	50	80	50	80	0
14-19	GRATED INLET											0	0	50	80	50	80	0
14-20	IP XXX x XXX											0	0	50	80	50	80	0
14-21	HW											0	0	50	80	50	80	0
15-1	SCUPPER F	0.0101					9					27	6	50	50	50	50	21
15-2	SCUPPER F	0.0087					7					30	6	50	50	50	50	24
15-3	SCUPPER F	0.0066					6					32	6	50	50	50	50	25
16-1	SO2	0.0484			0.0463	0.0598	28			39	34	91	91	50	80	50	80	0
17-1	SCUPPER DP											0	0	50	80	50	80	0
17-2	SCUPPER DP											0	0	50	80	50	80	0
17-3	SCUPPER DP											0	0	50	80	50	80	0
17-4	SCUPPER DP											0	0	50	80	50	80	0
17-5	SCUPPER DP											0	0	50	80	50	80	0
17-7	SCUPPER DP											0	0	50	80	50	80	0
17-8	SCUPPER DP											0	0	50	80	50	80	0
17-9	M.G.S.G.											0	0	50	80	50	80	0
17-13	M.G.S.G.											0	0	50	80	50	80	0
17-15	M.G.S.G.											0	0	50	50	50	50	0
17-16	M.G.S.G.											0	0	50	50	50	50	0

Node	Bypass Node	Bypass Flow	Bypass HGL	mid ch	Node HGL	Grate	LOST FLOW	Link HGL		Ku			Capacity	Velocities			Flood Widths		Flooded Depth		Freeboard
								Upstream	Downstream	(at max	Ku	Flow		Upstream	Link	Downstrea	Upstream	Downstrea	Depth	DxV	
01-1			5.324	0	4.001	5.324		3.767	3.403	2	0.231	561	0.8	2.01	2.22	2.78			0		1.323
01-2			5.237	0	2.764	5.237		2.646	2.55	1.4	0.117	1128	0.6	1.57	1.73	1.94			0		2.473
01-3			1.882	0	2.55	2.932													0		-0.668
02-2			8.837	0	7.314	8.837		7.309	6.818	0.4	0.005	412	0.3	4.14	4.33	4.55			0		1.523
02-3			8.814	0	6.77	8.814		6.768	5.657	0.7	0.003	442	0.4	3.67	3.79	3.92			0		2.044
02-4			7.57	0	5.581	7.57		5.58	4.548	0.2	0.001	484	0.4	3.89	3.89	3.94			0		1.989
02-5			6.493	0	4.548	6.493		4.522	4	0.3	0.024	528	0.4	4.17	2.34	2.51			0		1.945
02-6			5.584	0	4	5.584		3.923	3.837	1.4	0.078	572	0.7	1.31	1.38	1.53			0		1.584
02-7			5.364	0	3.837	5.364		3.665	3.57	1.8	0.171	584	0.7	1.42	1.62	1.98			0		1.527
02-8			5.364	0	3.57	5.364		3.57	3.381	0	0	461		0		0			0		1.794
02-9			5.207	0	3.15	5.207		2.918	2.865	2.5	0.232	582	0.4	1.91	2.19	3.29			0		2.057
03-1			5.351	0	4.066	5.351		4.066	4.001	0	0	0	0	0	0	0			0		1.285
04-1	LOST	6	5.403	0.249	4.816	5.154		4.273	4.015	5.1	0.559	562	0.9	1.99	2.12	2.41	0.522	0.516	0.249	0.03	0.338
05-1			5.343	0	4.474	5.343		4.474	4.448	0	0	20	0.2	0.82	0.59	0.46			0		0.869
05-2			5.4	0	4.448	5.4		4.446	4.391	0.5	0.003	42	0.3	0.96	0.87	0.81			0		0.952
05-3			5.51	0	4.391	5.51		4.405	4.346	0.8	0.005	72	0.5	1.38	1.3	1.24			0		1.119
07-1	18-1	0	5.348	0.057	3.962	5.291		3.962	3.89	9.1	0	1605	0.6	3.12	3	2.9	0	0	0.057	0	1.329
07-1A			5.921	0	3.89	5.921		3.873	3.735	0.2	0.018	1607	0.7	2.82	2.9	3			0		2.031
07-2			5.749	0	2.796	5.749		2.646	2.55	2.1	0.149	1608	0.6	1.42	1.42	1.42			0		2.954
07-3			1.184	0	2.55	2.384													0		-1.366
CONN 08-1			6.945	0	5.81	6.945		5.81	5.792	2.1	0	1	0	0	0	0			0		1.135
CONN 08-1A			6.91	0	5.792	6.91		5.793	5.506	1.6	0	4	0	0	0.86	0.63			0		1.118
CONN 08-2			6.864	0	5.506	6.864		5.507	5.42	0.4	0	5	0.1	0.85	0.65	0.51			0		1.358
CONN 08-3			6.798	0	5.42	6.798		5.42	5.335	0.8	0	9	0.1	1	1.02	1.03			0		1.378
CONN 08-4			6.766	0	5.294	6.766		5.293	5.251	0.5	0.002	18	0.1	1.09	1.04	0.99			0		1.472
CONN 08-5			6.699	0	5.248	6.699		5.237	5.241	0.6	0.012	29	0.3	0.76	0.69	0.65			0		1.451
CONN 08-6			6.642	0	5.241	6.642		5.234	5.234	0.3	0.007	38	0.5	0.81	0.79	0.78			0		1.401
CONN SC17-			6.59	0	5.227	6.59		5.226	5.224	0.2	0.004	38	0.5	0.68	0.68	0.7			0		1.363
09-2			8.457	0	7.301	8.457		7.296	7.23	0.2	0.003	6	1.4	0.71	0.76	0.86			0		1.156
09-3			7.802	0	6.763	7.802		6.678	6.597	6.7	0.087	6	1.5	0.73	0.78	0.88			0		1.039
09-4			7.112	0	6.025	7.112		6.022	5.955	0.2	0.003	6	1.4	0.71	0.76	0.86			0		1.087
09-6			6.496	0	5.476	6.496		5.475	5.439	0.2	0.004	6	1.4	0.71	0.79	0.89			0		1.02
09-7			6.157	0	5.012	6.157		5.004	4.912	0.2	0.029	261	0.8	2.24	2.25	2.3			0		1.145
10-1	10-2	18	6.098	0.036	4.912	6.062		4.586	4.379	1.9	0.325	334	1.6	2.1	2.1	2.1	0.861	0.933	0.036	0.04	1.15
10-1A			5.758	0	4.379	5.758		4.334	4.053	0.3	0.045	350	1.7	2.2	2.25	2.33			0		1.379
10-2	10-3	24	4.827	0.042	3.998	4.785		3.998	3.815	0	0	178		0		0	0.933	0.559	0.042	0.06	0.787
10-3	LOST	3	3.549	0.022	2.696	3.527		2.636	2.151	1.1	0.198	395	0.6	3.46	2.48	2.48	0.816	0.816	0.022	0.01	0.831
10-4			2.919	0	2.151	2.919		2.105	1.949	0.3	0.048	518	0.5	1.83	1.83	1.83			0		0.768
10-5			3	0	1.949	3		1.676	1.498	2.1	0.273	822	0.9	1.86	1.86	1.86			0		1.051
10-7			1.496	0	1.498	1.496	2151	1.498	1.584	0.2	0.065	-1114	-1.1	2.52	2.52	2.52			0		-0.002
10-8			1.784	0	1.644	1.784		1.644	1.751	0.2	0.059	-1067	-1.3	2.41	2.41	2.41			0		0.14
10-9	51-1	155	1.979	0.213	1.979	1.766		1.806	1.916	0.2	0.054	-1021	-1.3	2.31	2.31	2.31	7.882	8.349	0.213	0.03	-0.213
10-10	LOST	2733	1.963	0.383	1.963	1.58		1.963	2.55	0	0	-3415	-3.2	7.73	7.73	7.73	6.23	6.177	0.383	0.23	-0.383
10-11			0	0	2.55	1.26													0		-2.55
11-1	z BASIN 0	16	3.367	0.067	2.713	3.3		2.713	2.696	0	0	204	1	1.67	1.67	1.67	0	0	0.067	0	0.587
12-1	12-2	0	3.112	0	2.424	3.112		2.358	2.378	9.7	0.044	38	0.3	0.89	0.9	0.95	0	0	0	0	0.688
13-1	13-2	9	16.238	0.034	15.346	16.204		15.346	15.283	0	0	1	0	0	0.29	0	1.242	1.321	0.034	0.01	0.858
13-2	13-3	15	16.173	0.036	15.283	16.137		15.283	15.103	0	0	3	0.1	0	0.41	0.29	1.321	1.331	0.036	0.02	0.854
13-3	13-4	8	15.984	0.026	15.103	15.958		15.103	14.875	0	0	15	0.2	1.31	1.32	1.32	0.958	1.045	0.026	0.02	0.855
13-4	13-5	12	15.729	0.028	14.872	15.701		14.872	14.521	0	0	17	0.2	1.58	1.42	1.3	1.045	1.061	0.028	0.02	0.829
13-5	13-6	9	15.364	0.024	14.521	15.34		14.521	14.094	0	0	26	0.3	1.92	1.85	1.81	0.902	1.052	0.024	0.02	0.819
13-6	13-7	13	14.937	0.028	14.094	14.909		14.094	13.673	0	0	29	0.3	1.99	1.79	1.63	1.052	1.061	0.028	0.03	0.815
13-7	13-8	10	14.5	0.026	13.673	14.474		13.673	13.241	0	0	39	0.5	2.19	2.13	2.07	0.944	1.096	0.026	0.02	0.801
13-8	13-9	15	14.068	0.03	13.241	14.038		13.241	12.782	0	0	42	0.5	2.24	2.05	1.9	1.096	1.099	0.03	0.03	0.797
13-9	13-10	11	13.592	0.026	12.782	13.566		12.782	12.325	0	0	53	0.6	2.4	2.34	2.29	0.976	1.095	0.026	0.02	0.784
13-10	13-11	15	13.134	0.03	12.325	13.104		12.325	11.915	0	0	57	0.7	2.44	2.28	2.14	1.095	1.096	0.03	0.03	0.779
13-11	13-12	10	12.693	0.026	11.915	12.667		11.915	11.664	0	0	68	0.8	2.56	2.5	2.46	0.959	1.083	0.026	0.02	0.752
13-12	13-13	14	12.261	0.029	11.664	12.232		11.664	11.388	0	0	71	0.8	2.57	2.41	2.29	1.083	1.09	0.029	0.03	0.568
13-13	13-14	10	11.822	0.026	11.388	11.796		11.388	11.031	0	0	78	0.9	2.64	2.57	2.54	0.955	1.081	0.026	0.02	0.408
13-14	13-15	14	11.39	0.029	11.031	11.361		11.031	10.644	0	0	79	0.9	2.63	2.49	2.39	1.081	1.087	0.029	0.03	0.33
13-15	13-16	10	10.951	0.026	10.644	10.925		10.644	10.161	0	0	88	1.1	2.68	2.62	2.62	0.955	1.092	0.026	0.02	0.281
13-16	13-17	15	10.518	0.029	10.161	10.489		10.161	9.735	0	0	90	1.1	2.65	2.52	2.43	1.092	1.092	0.029	0.03	0.328
13-17	13-18	8	10.146	0.024	9.735	10.122		9.735	9.26	0	0	100	1.2	2.69	2.66	2.66	0.887	0.892	0.024	0.02	0.387
13-18	13-19	9	9.811	0.024	9.26	9.787		9.26	8.967	0	0	103	1.2	2.74	2.74	2.74	0.892	1.124	0.024	0.02	0.527
13-19	TD13-20./	12	9.622	0.03	8.967	9.592		8.967	8.794	0	0	110	1.5	2.93	2.93	2.93	1.124	1.124	0.03	0.02	0.625
BB13-19			9.736	0	7.868	9.736		7.868	7.772	0	0	110	0.5	2.69	2.69	2.69			0		1.868
RH13-19A			9.359	0	7.595	9.359		7.595	7.447	0	0	110	0.4	2.24	2.24	2.24			0		1.764
13-20			9.075	0	7.429	9.075		7.389	7.297	1.9	0.04	121	0.4	1.49	1.56	1.81			0		1.646
13A-1			9.245	0	6.561	9.245		6.555	6.041	2.1	0.008	172	0.3	2.58	2.47	2.6			0		2.684
13A-2			8.688	0	6.041	8.688		6.041	5.759	0.2	0.001	177	0.5	2.34	2.34	2.34			0		2.647
13A-3			8.013	0	5.759	8.013		5.759	5.504	0.2	0.004	203	0.5	2.39	2.4	2.46			0		2.254
13A-4			7.329	0	5.504	7.329		5.491	5.439	0.2	0.043	213	0.6	2.38	2.38	2.44			0		1.825
13A-5			6.719	0	5.439	6.719		5.417	5.28	0.2	0.047	232	0.6	2.55	1.73	1.62			0		1.28
13A-6			6.205	0	5.28	6.205		5.078	5.012	2.1	0.252	261	0.6	1.64	1.79	2.47			0		0.925
13B-1			6.015	0	5.286	6.015		5.286	5.285	1.3	0.018	25	0.1	1.23	0.56	0.43			0		0.729
13B-2			6.102	0	5.285	6.102		5.283	5.28	0.4	0.028	67	0.3	1.3	0.81	0.89			0		0.817
14-1	14-2	11	16.238	0.035	15.362	16.203		15.362	15.273	0	0	1	0	0	0.29	0	1.285	1.304	0.035	0.02	0.841
14-2	14-3	16	16.141	0.035	15.273	16.106		15.273	15.102	0	0	4	0.1	0	0.45	0.32	1.304	1.314	0.035	0.02	0.833
14-3	14-4	9	15.94	0.026	15.102	15.914		15.102	14.813	0	0	16	0.2	1.43	1.43	1.43	0.971	1.066	0.026	0.02	0.812
14-4	14-5	13	15.654	0.029	14.812	15.625		14.812	14.44	0	0	18	0.2	1.64	1.48	1.36	1.066	1.069	0.029	0.02	0.813
14-5	14-6	9	15.268	0.024	14.44	15.244		14.44	13.974	0	0	27	0.3	2.01	1.99	1.94	0.899	1.056	0.024	0.02	0.804
14-6	14-7	14	14.799	0.029	13.974	14.77		13.974	13.452	0	0	30	0.3	2.12	1.89	1.71	1.056	1.061	0.029	0.03	0.796
14-7	14-8	11	14.265	0.026	13.452	14.239		13.452	12.934	0	0	41	0.5	2.32	2.25	2.19	0.958	1.077	0.026	0.02	0.787
14-8	14-9	15	13.742	0.029	12.934	13.713		12.934	12.454	0	0	45	0.5	2.38	2.19	2.03	1.077	1.077	0.029	0.03	0.779
14-9	14-10	11	13.244	0.026	12.454	13.218		12.454	11.965	0	0	56	0.6	2.54	2.49	2.44	0.943	1.067	0.026	0.02	0.764
14-10	14-11	15	12.753	0.029	11.965	12.724		11.965	11.484	0	0	60	0.7	2.59	2.43	2.29	1.067	1.074	0.029	0.03	0.759
14-11	14-12	10	12.256	0.026	11.484	12.231		11.484	10.995	0	0	71	0.8	2.71	2.66	2.62	0.944	1.064	0.026	0.02	0.747
14-12	14-13	15	11.767	0.029	10.995	11.738		10.995	10.605	0	0	74	0.8	2.74	2.6	2.48	1.064	1.07	0.029	0.03	0.743
14-13	14-14	10	11.27	0.025	10.605	11.245		10.605	10.114	0	0	85	0.9	2.84	2.76	2.72	0.941	1.027	0.025	0.02	0.64
14-14	14-15	13	10.779	0.028	10.114	10.751		10.114	9.707	0	0	88	1	2.85	2.62	2.52	1.027	1.043	0.028	0.03	0.637
14-15	14-16	5	10.354	0.019	9.707	10.335		9.707	9.524	0	0	97	1.1	2.85	2.66	2.66	0.692	0.709	0.019	0.01	0.628
14-16	zBP TD14	3	10.205	0.016	9.524	10.189		9.524	9.395	0	0	99	1.2	2.71	2.71	2.72	0.593	0.571	0.016	0.01	0.665
BB14-16			10.088	0	8.591	10.088		8.498	8.374	2.1	0.095	99	0.4	1.74	2	2.78			0		1.497
RH14-17			10.188	0	8.286	10.188		8.27	8.253	0.2	0.02	100	0.8	1.64	1.65	1.69			0		1.904
RH14-17A			10.136	0	5.548	10.136		5.378	5.349	2.1	0.17	100	1	1.28	1.36	1.55			0		4.588
14-17			5.422	0	3.781	5.422		3.741	3.592	2.1	0.04	100	0.5	1.4	1.56	1.84			0		1.641
14-17A			5.427	0	3.293	5.427		3.129	3.082	2.1	0.165	388	0.9	1.37	1.37	1.37			0		2.134
14-18			4.087	0	3.082	4.087		3.008	2.714	2	0.076	388	0.9	1.37	1.37	1.37			0		1.005
14-19			3.373	0	2.714	3.373		2.714	2.627	0	0	331		0		0			0		0.659
14-20			3.03	0	2.592	3.03		2.589	2.55	0.1	0.005	390	0.4	0.88	0.88	0.88			0		0.438
14-21			0.844	0	2.55	1.594													0		-1.706
15-1	zBP AD15	23	9.163	0.039	8.408	9.124		8.408	7.63	7	0	6	0	1.35	1.09	0.92	1.455	1.429	0.039	0.03	0.716
15-2	zBP AD15	27	8.373	0.04	7.63	8.333		7.63	6.831	2.2	0	12	0.1	1.85	1.5	1.26	1.478	1.384	0.04	0.04	0.703
15-3	zBP AD17	27	7.572	0.04	6.831	7.532		6.831	6.469	1.6	0	18	0.1	1.91	1.97	2.02	1.463	1.345	0.04	0.04	0.701
16-1	12-1	37	3.659	0.042	3.032	3.617		2.778	2.657	9.2	0.26	92	0.5	0.93	1.05	1.68	1.563	1.57	0.042	0.05	0.585
17-1			6.627	0	5.194	6.627		5.183	5.152	1.9	0.02	38	0.5	0.73	0.8	0.88			0		1.433
17-2			6.6	0	5.152	6.6		5.145	5.141	0.2	0.007	39	0.5	0.87	0.82	0.77			0		1.448
17-3			6.561	0	5.141	6.561		5.143	5.097	0.5	0.002	60	0.7	1.02	1.01	1.01			0		1.42
17-4			6.525	0	5.097	6.525		5.096	5.066	0.2	0.002	62	0.7	1.03	1.03	1.06			0		1.428
17-5			6.493	0	5.066	6.493		5.061	5.015	0.2	0.005	64	0.8	1.05	0.99	0.93			0		1.427
17-7			6.452	0	5.015	6.452		5.012	4.964	1.6	0.003	78	0.9	1.12	1.14	1.16			0		1.437
17-8			6.483	0	4.964	6.483		4.956	4.895	0.2	0.007	86	1	1.28	1.35	1.44			0		1.519
17-9			4.984	0	4.061	4.984		4.051	3.858	2.1	0.09	108	0.7	1.2	1.15	1.19			0		0.923
17-13			4.82	0	3.858	4.82		3.854	3.771	0.3	0.027	121	0.8	1.39	1.41	1.46			0		0.962
17-15			4.708	0	3.771	4.708		3.765	3.75	0.2	0.016	121	0.5	1.27	1.22	1.19			0		0.937
17-16			4.652	0	3.75	4.652		3.744	3.728	0.2	0.015	124	0.5	1.22	1.16	1.11			0		0.902

Node	Node Type	Catchmnet Areas (ha)					Catchment Flow					Approach	Inlet	Efficiencies				Uncapture	Bypass	Bypass	Bypass		Node		LOST	Link HGL		Ku				Velocities			Flood Widths		Flooded Depth		Freeboard
													Captured	minor		Major			Node	Flow	HGL	mid ch	HGL	Grate	FLOW	Upstream	Downstream	(at max	Ku	Flow	Capacity	Upstream	Link	Downstrea	Upstream	Downstrea	Depth	DxV	
		Area 1	Area 2	Area 3	Area 4	Area 5	Set 1	Set 2	Set 3	Set 4	Set 5	Flow	Flow	SAG	Ongrade	SAG	Ongrade	Flow																					
17-17	M.G.S.G.											0	0	50	80	50	80	0			4.596	0	3.728	4.596		3.719	3.688	0.5	0.035	145	0.6	1.27	1.28	1.3			0		0.868
17-18	M.G.S.G.											0	0	50	50	50	50	0			4.534	0	3.688	4.534		3.681	3.66	0.2	0.017	148	0.6	1.28	1.26	1.24			0		0.846
17-19	M.G.S.G.											0	0	50	50	50	50	0			4.717	0	3.66	4.717		3.653	3.629	0.2	0.016	154	0.7	1.25	1.2	1.17			0		1.057
17-20	M.G.S.G.											0	0	50	50	50	50	0			4.848	0	3.629	4.848		3.622	3.593	0.2	0.016	164	0.7	1.24	1.21	1.19			0		1.219
17-21	M.G.S.G.											0	0	50	80	50	80	0			4.903	0	3.593	4.903		3.588	3.571	2.1	0.013	174	0.5	1.24	1.05	0.92			0		1.31
17-22	M.G.S.G.											0	0	50	80	50	80	0			4.855	0	3.571	4.855		3.517	3.485	2.1	0.062	196	0.6	1.1	1.16	1.26			0		1.284
17-24	M.G.S.G. (HAUNCHED)	0.0723					61					61	61	50	80	50	80	0			4.625	0	3.485	4.625		3.411	3.335	2.2	0.113	248	0.5	1.57	0.98	0.88			0		1.14
17-25	M.G.S.G. (HAUNCHED)											0	0	50	80	50	80	0			5.349	0	3.335	5.349		3.327	3.293	0.2	0.008	249	0.6	0.88	0.88	0.88			0		2.014
18-1	GRATED INLET 900X900	0.0225					19					0	0	50	80	50	80	0			5.622	0	4.993	5.622		4.993	4.991	0.2	0.011	-28	-0.2	1.03	0.52	0.38			0		0.629
18-1A	GRATED INLET 900X900					0.0559					32	19	26	50	80	50	80	0	18-1	0	5.433	0.046	4.991	5.387		4.979	4.977	9.7	0.044	-47	-0.3	0.9	0.82	0.8	0	0	0.046	0	0.396
18-2	GRATED INLET 900X600	0.0213					18					18	28	50	80	50	80	0	18-1A	0	5.655	0.054	4.977	5.601		4.968	4.959	7	0.065	53	0.3	1.02	0.98	0.93	0	0	0.054	0	0.624
18-2A	GRATED INLET 900X600	0.0275					23					23	23	50	80	50	80	0			5.725	0	4.959	5.725		4.942	4.912	6	0.063	69	0.5	1.12	0.88	0.95			0		0.766
19-1	IP XXX x XXX											0	0	50	80	50	80	0			6.902	0	5.211	6.902		5.211	5.119	0	0	18	0.1	0.88	0.76	0.68			0		1.691
19-2	IP XXX x XXX											0	0	50	80	50	80	0			6.792	0	5.119	6.792		5.119	5.016	0	0	33	0.3	0.96	0.97	0.97			0		1.673
19-3	IP XXX x XXX											0	0	50	80	50	80	0			6.652	0	5.003	6.652		5.003	4.575	0	0	56	0.3	1.53	1.53	1.53			0		1.649
19-4	IP XXX x XXX											0	0	50	80	50	80	0			6.284	0	4.555	6.284		4.555	3.832	0	0	77	0.3	2.09	2.08	2.07			0		1.729
19-5	IP XXX x XXX											0	0	50	80	50	80	0			5.543	0	3.832	5.543		3.832	3.032	0	0	113	0.4	2.55	2.55	2.55			0		1.711
19-6	GRATED INLET 900X900	0.0282					24					24	24	50	80	50	80	0			4.825	0	2.533	4.825		2.481	2.412	2.3	0.071	133	0.6	1.23	1.23	1.37			0		2.292
20-1	SA1	0.0233					20					19	17	50	80	50	80	2	zBP22-1	2	3.097	0.02	2.373	3.077		2.374	2.372	9.7	0.025	17	0.1	0.76	0.77	0.78	0.244	6.752	0.02	0.01	0.704
21-1	SAS	0.0298				0.0063	26				3	27	27	50	80	50	80	0			2.107	0.05	1.848	2.057		1.847	1.806	3.2	0.007	33	0.1	0.21	0.21	0.21			0.05		0.209
22-1	SA2 >450	0.0199					17					18	18	50	80	50	80	0	zBP36-2.L	0	2.441	0.003	2.271	2.438		2.269	2.266	2.4	0.004	23	0.1	0.21	0.21	0.21	0.037	0.053	0.003	0	0.167
23-1	GRATED INLET 900X900					0.0017					1	0	0	50	80	50	80	0	LOST	0	2.6	0	2.275	2.6		2.156	2.151	4	0.126	124	0.2	0.79	0.78	0.78	0	0	0	0	0.325
24-1	F2 >450											0	0	50	80	50	80	0			4.904	0	3.509	4.904		3.509	3.016	0	0	15	0.1	1.33	1.33	1.33			0		1.395
24-2	F2 >450	0.0124					11					10	9	50	80	50	80	0	zBP20-1	0	4.352	0.008	2.373	4.344		2.374	2.372	2.3	0.021	24	0.2	0.88	0.88	0.89	0.279	1.217	0.008	0	1.971
10-2	GRATED INLET 900X900	0.0222					19					18	17	50	80	50	80	1	10-3	24	4.827	0.042	3.998	4.785		3.998	3.815	0	0	178		0		0	0.933	0.559	0.042	0.06	0.787
26-1	GPT											0	0	50	80	50	80	0			4.845	0	3.975	4.845		3.679	3.312	4	0.32	186	0.6	1.69	2.01	2.89			0		0.87
27-1	SA2	0.0064			0.0154	0.0086	4			13	5	20	20	50	80	50	80	0	16-1	91	5.86	0.072	4.769	5.788		4.754	4.657	9.7	0.015	20	0.1	0.88	1.01	1.21	2.294	2.295	0.072	0.1	1.019
28-5	SO1											53	53	50	80	50	80	0	zBP 10-8	22	2.299	0.025	1.664	2.274		1.642	1.644	3.8	0.022	54	0.2	0.34	0.34	0.34	0.929	1.663	0.025	0.03	0.61
14-19	GRATED INLET											0	0	50	80	50	80	0			3.373	0	2.714	3.373		2.714	2.627	0	0	331		0		0			0		0.659
29-1	GPT											0	0	50	80	50	80	0			3.163	0	2.712	3.163		2.68	2.648	4	0.032	59	0.5	0.53	0.53	0.53			0		0.451
29-2	GPT											0	0	50	80	50	80	0			2.997	0	2.648	2.997		2.606	2.592	4	0.043	59	0.5	0.53	0.53	0.53			0		0.349
30-1	SCUPPER ATL				0.0047					4		4	3	50	50	50	50	1	30-2	4	13.533	0.018	13.046	13.515		13.046	12.81	0	0	3	0.1	0	0.88	0	0.68	0.693	0.018	0.01	0.469
30-2	SCUPPER ATL				0.0036					3		4	3	50	50	50	50	1	30-3	4	13.315	0.018	12.81	13.297		12.81	12.574	0	0	6	0.1	0	1.2	1.06	0.664	0.672	0.018	0.01	0.487
30-3	SCUPPER ATL				0.0037					3		4	3	50	50	50	50	1	30-4	4	13.056	0.017	12.574	13.039		12.574	12.334	0	0	9	0.2	1.58	1.43	1.32	0.634	0.724	0.017	0.01	0.465
30-4	SCUPPER ATL				0.0033					3		4	3	50	50	50	50	1	30-5	5	12.8	0.02	12.334	12.78		12.334	12.098	0	0	12	0.3	1.71	1.54	1.4	0.724	0.741	0.02	0.01	0.446
30-5	SCUPPER ATL				0.0046					4		5	4	50	50	50	50	1	30-6	3	12.575	0.017	12.098	12.558		12.098	11.863	0	0	16	0.3	1.82	1.74	1.66	0.615	0.617	0.017	0.01	0.46
30-6	SCUPPER ATL				0.0028					2		3	3	50	50	50	50	1	30-7	3	12.317	0.016	11.863	12.301		11.863	11.618	0	0	18	0.4	1.93	1.83	1.74	0.602	0.642	0.016	0.01	0.438
30-7	SCUPPER ATL				0.0031					3		3	3	50	50	50	50	1	30-8	4	12.058	0.017	11.618	12.041		11.618	11.378	0	0	21	0.5	1.98	1.89	1.81	0.642	0.646	0.017	0.01	0.423
30-8	SCUPPER ATL				0.0035					3		4	3	50	50	50	50	1	30-9	4	11.817	0.017	11.378	11.8		11.378	11.138	0	0	24	0.5	2.04	1.96	1.88	0.637	0.668	0.017	0.01	0.422
30-9	SCUPPER ATL				0.0033					3		4	3	50	50	50	50	1	30-10	4	11.58	0.018	11.138	11.562		11.138	10.899	0	0	26	0.6	2.1	2.01	1.93	0.668	0.678	0.018	0.01	0.424
30-10	SCUPPER ATL				0.004					3		4	3	50	50	50	50	1	30-11	4	11.32	0.017	10.899	11.303		10.899	10.659	0	0	30	0.7	2.16	2.07	2	0.642	0.648	0.017	0.01	0.404
30-11	SCUPPER ATL				0.0032					3		4	3	50	50	50	50	1	30-12	4	11.062	0.018	10.659	11.044		10.659	10.42	0	0	33	0.7	2.2	2.12	2.06	0.648	0.677	0.018	0.01	0.385
30-12	SCUPPER ATL				0.0033					3		4	3	50	50	50	50	1	30-13	4	10.842	0.018	10.42	10.824		10.42	10.181	0	0	35	0.8	2.24	2.16	2.09	0.677	0.689	0.018	0.01	0.404
30-13	SCUPPER ATL				0.0042					4		4	3	50	50	50	50	1	30-14	4	10.583	0.017	10.181	10.566		10.181	9.941	0	0	39	0.8	2.29	2.21	2.14	0.629	0.661	0.017	0.01	0.385
30-14	SCUPPER ATL				0.0031					3		4	3	50	50	50	50	1	30-15	4	10.325	0.018	9.941	10.307		9.941	9.778	0	0	41	0.9	2.31	2.22	2.15	0.661	1.288	0.018	0.01	0.366
30-15	SCUPPER ATL				0.0034					3		4	3	50	50	50	50	1	zBP AD15	19	10.202	0.035	9.778	10.167		9.778	9.632	0	0	44	1	2.29	2.29	2.29	1.288	1.415	0.035	0.03	0.389
30-16	SCUPPER ATL											0	0	50	80	50	80	0			10.009	0	9.631	10.009		9.631	9.526	0	0	44	1	2.39	2.34	2.29			0		0.378
SC30-16 dp.1	SCUPPER DP											0	0	50	80	50	80	0			9.906	0	9.526	9.906		9.526	9.447	0	0	45	1	2.32	2.29	2.31			0		0.38
SC30-16 dp.2	SCUPPER CONN											0	0	50	80	50	80	0			9.949	0	9.437	9.949		9.437	9.425	0	0	45	1	2.32	2.32	2.32			0		0.512
BB30-17	SCUPPER DP											0	0	50	80	50	80	0			9.926	0	8.513	9.926		8.513	8.415	0	0	47	0.4	2.3	2.3	2.3			0		1.413
RH30-17	ALL IN GRADE											0	0	50	80	50	80	0			9.788	0	8.231	9.788		8.231	8.208	0	0	48	0.8	1.42	1.42	1.42			0		1.557
RH30-17A	SCUPPER DP											0	0	50	80	50	80	0			9.788	0	5.469	9.788		5.382	5.33	2.1	0.087	45	0.7	0.98	1.11	1.42			0		4.319
CONN 31-5	SCUPPER CONN											0	0	50	80	50	80	0			7.816	0	6.786	7.816		6.787	6.42	0.2	0	24	0.2	2.13	1.92	1.77			0		1.029
CONN31-6	SCUPPER CONN											0	0	50	80	50	80	0			7.548	0	6.42	7.548		6.418	6.305	0.3	0.002	26	0.2	1.91	1.64	1.44			0		1.128
35-1	SO2	0.0288					24					29	29	50	80	50	80	0	zBP 44-1	0	5.79	0	4.708	5.79		4.708	4.588	0	0	29	0.2	0.92	0.9	0.88	1.118	1.65	0	0.01	1.082
36-1	ALL IN SAG											0	135	50	80	50	80	0	37-4	0	2.152	0.079	2.152	2.073		2.152	2.198	0.2	0.032	-70	-0.5	1.77	1.77	1.77	3.802	5.204	0.079	0.06	-0.079
AD36-1.A	ALL IN GRADE	0.0464					39					39	39	50	80	50	80	0			2.237	0	2.205	2.237		2.173	2.105	9.7	0.084	39	0.2	0.5	0.46	0.44			0		0.032
AD36-1.B	ALL IN GRADE											0	0	50	80	50	80	0			2.103	0	2.105	2.103	188	2.105	2.152	0	0	-151	-1.3	1.68	1.68	1.68			0		-0.002
AD36-2.A	ALL IN GRADE	0.0198					17					17	17	50	80	50	80	0			2.141	0	2.144	2.141	57	2.144	2.152	9.7	0.005	-44	-0.3	0.49	0.49	0.49			0		-0.003
37-1	SA2	0.0109					9					76	-33	50	80	50	80	84	zBP37-2.F	70	2.203	0.252	2.203	1.951		2.203	2.2	2.6	0	-18	-0.1	0.16	0.16	0.16	8.348	8.348	0.252	0.02	-0.252
37-2	SAS	0.0246				0.0015	21				0	197	62	50	80	50	80	185	zBP37-3	123	2.2	0.268	2.2	1.932		2.198	2.199	2.5	0.007	26	0.1	0.24	0.24	0.24	7.373	8.348	0.268	0.03	-0.268
37-3	SA2	0.0171				0.0105	15				6	143	-105	50	80	50	80	177	zBP37-2.L	181	2.199	0.231	2.199	1.968		2.196	2.197	2.3	0.005	-66	-0.4	0.6	0.6	0.6	9.358	11.261	0.231	0.07	-0.231
37-4	SA2	0.0078				0.0012	6				1	25	-104	50	80	50	80	106	37-3	103	2.202	0.146	2.202	2.056		2.197	2.215	0.2	0.022	-163	-0.9	1.47	1.47	1.47	5.41	8.348	0.146	0.04	-0.146
38-1	GRATED INLET 900X900					0.0669					38	225	33	50	80	50	80	183			2.353	0.053	2.349	2.3		2.33	2.266	1.2	0.057	-122	-0.6	1.1	1.1	1.1			0.053		-0.049
38-2	IP XXX x XXX											0	0	50	80	50	80	0			2.264	0	2.266	2.264	1	2.252	2.224	0.2	0.014	123	0.5	1.12	1.12	1.12			0		-0.002
41-1	SAS >450	0.0171					15					120	-243	50	80	50	80	250	51-1	136	1.979	0.259	1.979	1.72		1.979	2.55	0	0	-364	-3	3.29	3.29	3.29	8.348	8.349	0.259	0.09	-0.259
41-2	HW											0	0	50	80	50	80	0			0.32	0	2.55	0.694													0		-2.23
44-1	SO2	0.0211					18					10	10	50	80	50	80	0	TD05-3.A	40	5.783	0.053	4.588	5.73		4.565	4.273	1.7	0.023	59	0.2	1.45	1.64	1.88	1.969	1.756	0.053	0.02	1.142
02-8	IP XXX x XXX											0	0	50	80	50	80	0			5.364	0	3.57	5.364		3.57	3.381	0	0	461		0		0			0		1.794
45-1	IP XXX x XXX											0	0	50	80	50	80	0			5.362	0	3.559	5.362		3.475	3.414	2	0.155	138	0.8	1.25	1.38	1.71			0		1.803
45-2	GPT											0	0	50	80	50	80	0			5.186	0	3.414	5.186		3.203	3.15	4	0.235	120	0.5	1.08	1.32	2.05			0		1.772
46-1	GRATED INLET 900X900											0	0	50	80	50	80	0			4.35	0	3.361	4.35		3.312	3.214	2.1	0.049	132	0.2	1.88	2.13	2.57			0		0.989
46-2	HW											0	0	50	80	50	80	0			3.064	0	3.214	3.588													0		-0.151
47-1	SCUPPER ATL				0.0026					2		3	2	50	50	50	50	0	47-2	3	12.924	0.017	12.434	12.907		12.434	12.226	0	0	2	0.1	0	0.71	0	0.644	0.648	0.017	0.01	0.473
47-2	SCUPPER ATL				0.0036					3		3	3	50	50	50	50	1	47-3	4	12.73	0.017	12.226	12.713		12.226	12.019	0	0	5	0.1	0	1.04	0.91	0.642	0.666	0.017	0.01	0.487
47-3	SCUPPER ATL				0.0035					3		4	3	50	50	50	50	1	47-4	4	12.505	0.018	12.019	12.487		12.019	11.811	0	0	8	0.2	1.42	1.26	1.14	0.666	0.677	0.018	0.01	0.468
47-4	SCUPPER ATL				0.0038					3		4	3	50	50	50	50	1	47-5	4	12.28	0.018	11.811	12.262		11.811	11.602	0	0	11	0.3	1.57	1.43	1.32	0.67	0.685	0.018	0.01	0.451
47-5	SCUPPER ATL				0.0036					3		4	3	50	50	50	50	1	47-6	4	12.055	0.019	11.602	12.036		11.602	11.392	0	0	14	0.3	1.68	1.56	1.46	0.685	0.698	0.019	0.01	0.434
47-6	SCUPPER ATL				0.0035					3		4	3	50	50	50	50	1	47-7	4	11.858	0.018	11.392	11.84		11.392	11.181	0	0	16	0.4	1.77	1.67	1.58	0.664	0.674	0.018	0.01	0.448
47-7	SCUPPER ATL				0.0035					3		4	3	50	50	50	50	1	47-8	4	11.633	0.018	11.181	11.615		11.181	10.971	0	0	19	0.5	1.85	1.75	1.67	0.666	0.677	0.018	0.01	0.434
47-8	SCUPPER ATL				0.0036					3		4	3	50	50	50	50	1	47-9	4	11.407	0.018	10.971	11.389		10.971	10.761	0	0	22	0.5	1.92	1.83	1.75	0.659	0.687	0.018	0.01	0.418
47-9	SCUPPER ATL				0.0035					3		4	3	50	50	50	50	1	47-10	4	11.183	0.019	10.761	11.164		10.761	10.551	0	0	25	0.6	1.97	1.89	1.82	0.687	0.699	0.019	0.01	0.403
47-10	SCUPPER ATL				0.0036					3		4	3	50	50	50	50	1	47-11	4	10.986	0.018	10.551	10.968		10.551	10.34	0	0	28	0.7	2.03	1.95	1.88	0.664	0.674	0.018	0.01	0.417
47-11	SCUPPER ATL				0.0035					3		4	3	50	50	50	50	1	47-12	4	10.76	0.018	10.34	10.742		10.34	10.13	0	0	31	0.7	2.07	2	1.93	0.66	0.67	0.018	0.01	0.402
47-12	SCUPPER ATL				0.0035					3		4	3	50	50	50	50	1	47-13	4	10.535	0.018	10.13	10.517		10.13	9.919	0	0	34	0.8	2.11	2.04	1.97	0.663	0.678	0.018	0.01	0.387
47-13	SCUPPER ATL				0.0035					3		4	3	50	50	50	50	1	47-14	4	10.313	0.018	9.919	10.295		9.919	9.711	0	0	37	0.9	2.15	2.07	2	0.678	0.689	0.018	0.01	0.376
47-14	SCUPPER ATL				0.0034					3		4	3	50	50	50	50	1	47-15	3	10.113	0.017	9.711	10.096		9.711	9.595	0	0	39	0.9	2.14	2.07	2.02	0.61	0.605	0.017	0.01	0.385
47-15	SCUPPER ATL	0			0.0024		-1E+08			2		3	3	50	50	50	50	1	47-16	2	9.952	0.015	9.595	9.937		9.595	9.473	0	0	41	1	2.14	2.1	2.09	0.56	0.614	0.015	0.01	0.342
47-16	SCUPPER ATL				0.0024					2		2	2	50	50	50	50	0	47-17	3	9.806	0.017	9.473	9.789		9.473	9.289	0	0	42	1	2.19	2.12	2.08	0.614	0.611	0.017	0.01	0.316
47-17	SCUPPER ATL				0.0032					3		3	2	50	50	50	50	0	47-18	3	9.615	0.016	9.289	9.599		9.289	9.087	0	0	43	1	2.2	2.12	2.08	0.6	0.596	0.016	0.01	0.31
47-18	SCUPPER ATL	0			0.0031		0			3		3	3	50	50	50	50	1	47-19	3	9.384	0.015	9.087	9.369		9.087	8.971	0	0	46	1.1	2.2	2.15	2.1	0.559	0.837	0.015	0.01	0.282
47-19	Grated Trench 2m				0.0026					2		3	3	50	50	50	50	0	AD09-2.A	6	9.271	0.023	8.971	9.248		8.971	8.864	0	0	48	1.1	2.21	2.2	2.22	0.837	0.837	0.023	0.01	0.277
47-19dp	SCUPPER DP											0	0	50	80	50	80	0			9.281	0	8.864	9.281		8.864	8.84	0	0	48	1.1	2.23	2.23	2.23			0		0.417
BB47-20	SCUPPER DP											0	0	50	80	50	80	0			9.259	0	7.894	9.259		7.894	7.81	0	0	48	0.4	2.19	2.19	2.19			0		1.365
51-1	SAS	0.0719				0.0078	-2E+08				-2E+08	752	426	50	80	50	80	537	10-10	469	1.973	0.771	1.973	1.202		1.583	1.498	2.2	0.39	224	1.1	2.02	2.02	2.02	7.87	8.349	0.771	0.07	-0.771
52-1	SA3	0.0729					62					897	276	50	80	50	80	621	z10-4	628	4.16	0.109	3.231	4.051		3.1	2.438	4.6	0.178	276	0.5	2.18	2.58	3.35	6.228	6.225	0.109	0.23	0.82
52-2	IP XXX x XXX											0	0	50	80	50	80	0			3.09	0	2.438	3.09		2.397	2.306	0.3	0.062	276	0.5	2.96	1.74	1.74			0		0.652
52-3	SA1					0.0114					7	19	17	50	80	50	80	2	z10-5	27	2.802	0.08	2.306	2.722		2.281	2.173	0.4	0.049	292	0.6	1.84	1.84	1.84	1.47	1.468	0.08	0.04	0.416
52-4	IP XXX x XXX											0	0	50	80	50	80	0			2.525	0	2.173	2.525		2.132	1.949	0.2	0.04	293	0.6	1.84	1.84	1.84			0		0.352
AD09-1.A	LONG DRAIN				0.0075					6		6	6	50	80	50	80	0			9.567	0	9.003	9.567		9.003	8.919	0	0	6	0.4	1.12	1.12	1.12			0		0.564
AD09-2.A	LONG DRAIN				0.0071					6		6	6	50	80	50	80	0	AD09-3.A	0	8.54	0	8.467	8.54		8.467	8.384	0	0	6	0.3	1.08	1.08	1.08	0	0	0	0	0.073
AD09-3.A	LONG DRAIN											0	0	50	80	50	80	0	AD09-4.A	6	7.905	0.021	7.733	7.884		7.733	7.652	0	0	0	0	0	0	0	0.765	0.786	0.021	0.02	0.151
AD09-4.A	LONG DRAIN				0.0071					6		6	6	50	80	50	80	0	AD09-6.A	6	7.215	0.021	7.118	7.194		7.118	7.04	0	0	6	0.5	1.05	1.05	1.05	0.775	0.873	0.021	0.01	0.076
AD09-6.A	LONG DRAIN				0.0069					6		6	6	50	80	50	80	0	10-1	6	6.603	0.024	6.503	6.579		6.503	6.423	0	0	6	0.4	1.06	1.06	1.06	0.873	1.333	0.024	0.01	0.076
TD02-3.A	TRAM DRAIN	0.0414					35					36	36	50	80	50	80	27	zBP TD02	0	8.567	0.002	8.424	8.565		8.423	8.373	0	0	36	3.6	0.92	1.04	1.21	0.482	1.607	0.002	0	0.141
TD02-4.A	TRAM DRAIN	0.0393				0.0169	33				10	46	48	50	80	50	80	46	zBP TD02	0	7.501	0	7.385	7.501		7.384	7.33	0	0	46	5.1	1.01	1.16	1.31	0.299	1.583	0	0	0.116
TD02-5.A	TRAM DRAIN	0.038				0.017	32				10	39	41	50	80	50	80	39	zBP TD02	0	6.417	0.001	6.234	6.416		6.234	6.171	0	0	39	0.5	1.18	1.21	1.25	0.555	1.799	0.001	0	0.182
TD02-6.A	TRAM DRAIN	0.0376				0.0383	32				22	47	49	50	80	50	80	46	zBP TD02	0	5.56	0.001	5.395	5.559		5.395	5.322	0	0	47	0.5	1.27	1.29	1.32	0.266	1.331	0.001	0	0.164
TD02-7.A	TRAM DRAIN	0.0287					24					17	17	50	80	50	80	16	zBP TD02	0	5.4	0	5.15	5.4		5.15	5.108	0	0	17	0.3	0.89	0.91	0.94	0	0	0	0	0.25
TD05-1.A	TRAM DRAIN	0.0252					21					20	21	50	80	50	80	20	zBP TD02	0	5.424	0.001	5.182	5.423		5.182	5.179	0	0	20	2.2	1	1	1	1.178	1.47	0.001	0.01	0.241
TD05-2.A	TRAM DRAIN	0.028					24					23	24	50	80	50	80	22	zBP TD05	0	5.508	0.001	5.3	5.507		5.3	5.281	0	0	26	2.9	1.09	1.09	1.09	1.242	1.57	0.001	0.01	0.207
TD05-3.A	TRAM DRAIN	0.048					41					30	31	50	80	50	80	30	zBP TD05	0	5.587	0.001	5.436	5.586		5.436	5.403	0	0	41	4.1	1.26	1.26	1.27	1.315	1.641	0.001	0.01	0.15
TD08-4.A	TRAM DRAIN	0.0102					9					9	9	50	80	50	80	0			6.959	0	6.644	6.959		6.644	6.429	0	0	9	0.1	1.28	1.28	1.28			0		0.315
TD13-20.A	TRAM DRAIN	0.016					14					12	13	50	80	50	80	12	zBP TD13	0	9.202	0.001	8.854	9.201		8.854	8.688	0	0	12	0.1	1.47	1.46	1.46	0	0	0.001	0	0.347
TD13A-3.A	TRAM DRAIN	0.0308					26					26	27	50	80	50	80	25	zBP TD13	0	8.008	0.001	7.745	8.007		7.745	7.647	0	0	26	0.2	1.46	1.45	1.45	0	0	0.001	0	0.262
TD13A-5.A	TRAM DRAIN	0.0303					26					25	27	50	80	50	80	25	zBP TD13	0	6.718	0	6.511	6.718		6.511	6.47	0	0	26	0.4	0.95	1.01	1.08	0	0	0	0	0.207
TD13B-1.A	TRAM DRAIN	0.0183					16					11	11	50	80	50	80	11	zBP 35-1	0	6.013	0	5.76	6.013		5.76	5.734	0	0	11	1.1	0.6	0.69	0.82	0.606	1.799	0	0	0.253
TD13B-2.A	TRAM DRAIN	0.0339					29					33	35	50	80	50	80	33	zBP TD13	0	6.103	0.001	5.938	6.102		5.938	5.897	0	0	34	3.4	0.93	1.04	1.18	1.076	1.42	0.001	0.01	0.164
TD17-13.A	TRAM DRAIN	0.0163					-1E+08					18	19	50	80	50	80	18	zBP TD7-	0	6.883	0	6.665	6.883		6.665	6.631	0	0	18	1.9	0.72	0.82	0.97	0.78	1.729	0	0	0.218
TD17-17.A	TRAM DRAIN	0.0141					-1E+08					26	28	50	80	50	80	26	zBP TD17	0	7.103	0	6.895	7.103		6.895	6.853	0	0	27	0.4	0.98	1.04	1.1	0.949	1.272	0	0.01	0.208
TD17-21.A	TRAM DRAIN	0.0093					-1E+08					8	8	50	80	50	80	8	LOST	0	7.441	0	7.13	7.441		7.13	7.031	0	0	8	0.1	1.04	1.04	1.04	0	0	0	0	0.311

Node	Node Type	Catchmnet Areas (ha)					Catchment Flow					Approach	Inlet Captured	Efficiencies minor		Major		Uncapture	Bypass Node	Bypass Flow	Bypass HGL	mid ch	Node HGL	Grate	LOST FLOW	Link HGL		Ku			Capacity	Velocities			Flood Widths		Flooded Depth		Freeboard
		Area 1	Area 2	Area 3	Area 4	Area 5	Set 1	Set 2	Set 3	Set 4	Set 5	Flow	Flow	SAG	Ongrade	SAG	Ongrade	Flow								Upstream	Downstream	(at max	Ku	Flow		Upstream	Link	Downstrea	Upstream	Downstrea	Depth	DxV	
TD17-3.A	TRAM DRAIN											0	5	50	80	50	80	0	TD17-6.A	0	6.66	0.002	6.332	6.658		6.332	6.192	0	0	5	0	1	1	1	0.148	0.148	0.002	0	0.326
TD17-6.A	TRAM DRAIN	0.0057					5					0	0	50	80	50	80	0	zBP TD17	0	6.522	0	6.155	6.522		6.155	6.1	0	0	0	0	0	0	0	0	0	0	0	0.367
TD17-7.A	TRAM DRAIN	0.0206					17					13	14	50	80	50	80	13	SC17-7.A	0	6.461	0.001	6.211	6.46		6.211	6.18	0	0	13	0.4	0.67	0.76	0.87	0.517	1.095	0.001	0	0.249
TD17-8.A	TRAM DRAIN	0.0084					7					11	11	50	80	50	80	10	zBP TD17	0	6.506	0.001	6.25	6.505		6.25	6.223	0	0	11	1.1	0.59	0.68	0.81	0.956	1.664	0.001	0.01	0.255
TD17-9.A	TRAM DRAIN	0.0307					26					24	25	50	80	50	80	24	zBP TD17	0	6.58	0	6.384	6.58		6.384	6.348	0	0	24	2.3	0.82	0.92	1.06	0.57	1.051	0	0	0.196
TD19-1.A	TRAM DRAIN	0.0164					14					18	19	50	80	50	80	18	zBP TD19	0	6.903	0.001	6.683	6.902		6.683	6.651	0	0	18	1.9	0.73	0.83	0.97	0.988	1.388	0.001	0.01	0.219
TD19-2.A	TRAM DRAIN	0.018					15					15	16	50	80	50	80	15	zBP TD19	0	6.792	0	6.558	6.792		6.558	6.528	0	0	15	2	0.67	0.77	0.91	0.96	1.512	0	0.01	0.234
TD19-3.A	TRAM DRAIN	0.0202					17					23	24	50	80	50	80	23	zBP TD19	0	6.675	0.001	6.453	6.674		6.453	6.415	0	0	23	0.3	0.94	0.99	1.04	1.347	1.78	0.001	0.01	0.221
TD19-4.A	TRAM DRAIN	0.037					31					22	23	50	80	50	80	22	zBP TD19	0	6.455	0	6.172	6.455		6.172	5.994	0	0	22	0.1	1.77	1.76	1.76	0.519	1.484	0	0	0.283
TD19-5.A	TRAM DRAIN	0.0131					11					11	11	50	80	50	80	0			5.549	0	5.393	5.549		5.393	5.393	0	0	11	0.1	0.52	0.5	0.53			0		0.156
TD19-5.C	TRAM DRAIN	0.0343					29					27	28	50	80	50	80	27	zBP TD19	0	5.543	0.001	5.392	5.542		5.392	5.339	0	0	38	0.5	1.11	1.17	1.23	0	0	0.001	0	0.15
TD24-1.A	TRAM DRAIN	0.018					15					15	15	50	80	50	80	15			4.913	0	4.627	4.913		4.627	4.602	0	0	16	0.3	0.93	0.93	0.93			0		0.286
TD31-1.A	TRAM DRAIN	0.0182					15					16	17	50	80	50	80	16	zBP TD31	0	9.147	0	8.893	9.147		8.893	8.856	0	0	16	0.2	0.86	0.89	0.93	0	0	0	0	0.254
TD31-3.A	TRAM DRAIN	0.0168					14					7	7	50	80	50	80	7	zBP TD17	0	8.413	0	8.125	8.413		8.125	8.097	0	0	7	0.1	0.59	0.65	0.71	0	0	0	0	0.288
TD35-1.A	TRAM DRAIN											0	0	50	80	50	80	0			5.94	0	5.57	5.94		5.57	5.454	0	0	0	0	0	0	0			0		0.37
TD44-1.A	TRAM DRAIN											0	0	50	80	50	80	0	TD44-1.B	0	5.754	0	5.424	5.754		5.424	5.424	0	0	-1	0	0	0	0	0	0	0	0	0.33
08-1	SCUPPER F (EXTENDED	0.0044					4					4	1	50	50	50	50	3	zBP 08-1A	3	6.963	0.019	6.128	6.944		6.128	5.81	9.7	0	1	0	0	0	0	1.34	1.655	0.019	0	0.816
08-1A	SCUPPER F (EXTENDED	0.0049					4					7	3	50	50	50	50	4	SC08-2	4	6.925	0.025	6.078	6.9		6.078	5.792	9.7	0.001	3	0	0	1.42	0	0.916	0.932	0.025	0.01	0.822
08-2	SCUPPER F (EXTENDED	0.007					6					10	1	50	50	50	50	8	zBP 08-3	8	6.876	0.033	5.773	6.843		5.773	5.506	2	0.001	1	0	0	0.44	0.24	1.265	1.461	0.033	0.01	1.07
08-3	SCUPPER F (EXTENDED	0.0085					7					16	5	50	50	50	50	11	zBP 08-4	12	6.79	0.04	5.762	6.75		5.762	5.42	9.7	0	5	0	0	0.87	0.51	1.326	1.283	0.04	0.02	0.988
08-4	SCUPPER F (EXTENDED											0	0	50	50	50	50	0			6.695	0	5.618	6.695		5.618	5.617	0.2	0	0	0	0	0	0			0		1.077
08-5	SCUPPER ATL	0.0131					11					23	12	50	50	50	50	11	zBP 08-6	11	6.697	0.055	5.581	6.642		5.573	5.248	9.7	0.008	12	0	2.59	2.12	1.94	1.825	1.66	0.055	0.01	1.061
08-6	SCUPPER ATL	0.0108					9					19	10	50	50	50	50	9	zBP SC17	10	6.643	0.044	5.43	6.599		5.417	5.241	9.7	0.013	10	0	2.77	1.85	1.18	1.626	1.667	0.044	0.01	1.169
SC17-1.A	SCUPPER F (EXTENDED	0.0069					6					15	2	50	50	50	50	13	zBP SC17	13	6.598	0.045	5.317	6.553		5.317	5.227	0	0	2	0	0	0.17	0.07	1.529	1.757	0.045	0.02	1.236
SC17-13.A	SCUPPER F											0	0	50	50	50	50	0			6.883	0	5.826	6.883		5.826	5.779	0	0	18	0.3	1.12	1.12	1.12			0		1.057
SC17-13.B	SCUPPER DP											0	0	50	80	50	80	0			6.841	0	4.701	6.841		4.681	4.66	2.1	0.019	18	0.3	0.84	0.96	1.13			0		2.14
SC17-15.A	SCUPPER F	0.0039					3					5	2	50	50	50	50	4	zBP SC17	3	6.995	0.004	6.208	6.991		6.209	6.179	0	0	2	0	0	0.53	0	7.599	7.599	0.004	0	0.783
SC17-15.B	SCUPPER DP											0	0	50	80	50	80	0			6.971	0	4.502	6.971		4.502	4.486	2.1	0	2	0	0	0.52	0			0		2.469
SC17-16.A	SCUPPER F	0.0039					3					3	1	50	50	50	50	2	zBP SC17	2	7.044	0.005	6.251	7.039		6.251	6.221	0	0	1	0	0	0	0	3.998	7.599	0.005	0	0.788
SC17-16.B	SCUPPER DP											0	0	50	80	50	80	0			7.023	0	4.439	7.023		4.439	4.423	2.1	0	1	0	0	0	0			0		2.584
SC17-17.A	SCUPPER F											0	0	50	50	50	50	0	zBP SC17	0	7.078	0	6.081	7.078		6.081	6.051	0	0	27	0.4	1.25	1.25	1.25	2.969	3.604	0	0	0.997
SC17-17.B	SCUPPER DP											0	0	50	80	50	80	0			7.064	0	4.517	7.064		4.48	4.459	2.1	0.037	27	0.4	0.86	1.02	1.26			0		2.547
SC17-18.A	SCUPPER F (EXTENDED	0.0023					2					14	2	50	50	50	50	13	zBP TD17	14	7.137	0.021	6.338	7.116		6.338	6.317	0	0	2	0	0	0.53	0	3.972	4.121	0.021	0	0.778
SC17-18.B	SCUPPER DP											0	0	50	80	50	80	0			7.106	0	4.33	7.106		4.33	4.313	2.1	0	2	0	0	0.53	0			0		2.776
SC17-19.A1	SCUPPER F (EXTENDED	0.0043					4					12	2	50	50	50	50	11	zBP SC17	11	7.177	0.015	6.375	7.162		6.377	6.347	0	0	1	0	0	0.4	0.31	3.489	3.494	0.015	0	0.787
SC17-19.A	SCUPPER F (EXTENDED	0.0038					3					14	2	50	50	50	50	13	zBP SC17	13	7.158	0.015	6.347	7.143		6.345	6.336	5.2	0.004	3	0.1	0.63	0.65	0.68	3.618	3.63	0.015	0	0.796
SC17-19.B	SCUPPER DP											0	0	50	80	50	80	0			7.141	0	4.523	7.141		4.522	4.505	2.1	0.001	3	0.1	0.65	0.66	0.68			0		2.618
SC17-2.A	SCUPPER F (EXTENDED	0.0073					6					18	2	50	50	50	50	17	zBP SC17	16	6.58	0.058	5.737	6.522		5.737	5.729	0	0	2	0	0	0.56	0	1.94	2.023	0.058	0.02	0.785
SC17-2.B	SCUPPER DP											0	0	50	80	50	80	0			6.548	0	5.153	6.548		5.153	5.152	2.1	0.006	2	0	0.4	0.36	0.28			0		1.395
SC17-20.A1	SCUPPER F (EXTENDED	0.0017					1					14	4	50	50	50	50	10	zBP SC17	10	7.267	0.024	6.483	7.243		6.478	6.446	7	0.005	4	0.1	0.63	0.53	0.46	1.993	1.884	0.024	0.01	0.76
SC17-20.A	SCUPPER F (EXTENDED	0.0035					3					13	4	50	50	50	50	9	zBP SC17	9	7.211	0.02	6.446	7.191		6.446	6.431	0	0	8	0.1	0.9	0.9	0.9	3.48	3.657	0.02	0	0.745
SC17-20.B	SCUPPER DP											0	0	50	80	50	80	0			7.183	0	4.682	7.183		4.677	4.657	2.1	0.006	8	0.1	0.81	0.85	0.93			0		2.501
SC17-21.A	SCUPPER F	0.0113					10					16	4	50	50	50	50	12	zBP SC17	12	7.343	0.025	6.304	7.318		6.304	6.275	0	0	12	0.2	0.99	0.99	0.99	2.015	2.092	0.025	0.01	1.014
SC17-21.B	SCUPPER DP											0	0	50	80	50	80	0			7.278	0	4.755	7.278		4.745	4.726	2.1	0.01	12	0.2	0.8	0.88	1			0		2.523
SC17-22.A	SCUPPER DP											0	0	50	80	50	80	0			7.437	0	6.305	7.437		6.305	6.287	0	0	26	0.3	1.44	1.44	1.44			0		1.132
SC17-22.B	SCUPPER DP											0	0	50	80	50	80	0			7.468	0	4.771	7.468		4.737	4.713	2.1	0.033	26	0.4	0.97	1.04	1.28			0		2.697
SC17-23.A	SCUPPER F	0.0031					3					29	6	50	50	50	50	23	LOST	23	7.198	0.047	6.18	7.151		6.18	6.16	0	0	24	0.4	1.14	1.14	1.14	1.719	1.699	0.047	0.03	0.971
SC17-23.B	SCUPPER DP											0	0	50	80	50	80	0			7.176	0	4.065	7.176		4.043	4.003	2.1	0.022	24	0.4	0.91	1.04	1.23			0		3.111
SC17-3.A	SCUPPER F	0.0123					10					10	2	50	50	50	50	8	zBP SC17	8	6.548	0.04	5.533	6.508		5.533	5.505	0	0	22	0.3	1.19	1.19	1.19	1.473	1.346	0.04	0.01	0.975
SC17-3.B	SCUPPER DP											0	0	50	80	50	80	0			6.524	0	5.176	6.524		5.159	5.141	2.1	0.019	22	0.3	0.8	0.83	0.86			0		1.348
SC17-4.A	SCUPPER F	0.0059					5					13	2	50	50	50	50	11	zBP SC17	11	6.541	0.041	5.73	6.5		5.73	5.708	0	0	2	0	0.62	0.62	0.62	1.516	1.375	0.041	0.02	0.77
SC17-4.B	SCUPPER DP											0	0	50	80	50	80	0			6.508	0	5.098	6.508		5.097	5.097	2.1	0.009	3	0.1	0.54	0.58	0.53			0		1.41
SC17-5.A	SCUPPER F	0.0038					3					13	2	50	50	50	50	10	SC17-7.A	10	6.529	0.047	5.413	6.482		5.413	5.38	0	0	2	0	0.61	0.61	0.61	1.726	1.332	0.047	0.01	1.069
SC17-5.B	SCUPPER DP											0	0	50	80	50	80	0			6.491	0	5.066	6.491		5.066	5.066	2.1	0.011	3	0.1	0.6	0.4	0.33			0		1.425
SC17-7.A	SCUPPER F											10	2	50	50	50	50	8	LOST	8	6.482	0.03	5.443	6.452		5.443	5.437	0	0	15	0.3	0.95	0.95	0.95	1.095	1.091	0.03	0.01	1.009
SC17-7.B	SCUPPER DP											0	0	50	80	50	80	0			6.452	0	5.025	6.452		5.019	5.015	2.1	0.01	15	0.2	0.74	0.79	0.9			0		1.427
TD17-8.B	TRAM DRAIN CONNECT											0	0	50	80	50	80	0			6.505	0	5.468	6.505		5.468	5.442	0	0	11	0.2	0.97	0.97	0.97			0		1.037
SC17-8.B	SCUPPER DP											0	0	50	80	50	80	0			6.483	0	4.967	6.483		4.962	4.964	2.1	0.014	10	0.2	0.75	0.77	0.84			0		1.516
TD17-9.B	TRAM DRAIN CONNECT											0	0	50	80	50	80	0			6.58	0	5.572	6.58		5.572	5.541	0	0	24	0.4	1.22	1.22	1.22			0		1.008
SC17-9.B	SCUPPER DP											0	0	50	80	50	80	0			6.553	0	4.893	6.553		4.861	4.841	2.1	0.031	24	0.4	0.87	1	1.22			0		1.66
31-5	SCUPPER F	0.0064					5					5	2	50	50	50	50	4	zBP31-6	4	7.823	0.019	6.817	7.804		6.817	6.786	9.7	0	1	0	0	0.31	0.15	0.714	0.93	0.019	0.01	0.987
31-6	SCUPPER F	0.0057					5					8	2	50	50	50	50	6	zBP TD17	7	7.564	0.028	6.441	7.536		6.441	6.42	9.7	0	2	0	0	0.34	0.17	1.028	1.265	0.028	0.01	1.095
TD02-3.B	TRAM DRAIN											0	0	50	80	50	80	0			8.565	0	8.292	8.565		8.292	8.292	0	0	36		0		0			0		0.273
TD02-4.B	TRAM DRAIN CONNECT											0	0	50	80	50	80	0			7.501	0	5.855	7.501		5.855	5.855	0	0	46		0		0			0		1.646
TD02-5.B	TRAM DRAIN CONNECT											0	0	50	80	50	80	0			6.345	0	5.071	6.345		5.071	5.071	0	0	39		0		0			0		1.274
TD02-6.B	TRAM DRAIN CONNECT											0	0	50	80	50	80	0			5.485	0	4.177	5.485		4.177	4.177	0	0	47		0		0			0		1.308
TD02-7.B	TRAM DRAIN											0	0	50	80	50	80	0			5.364	0	5.051	5.364		5.051	5.051	0	0	17		0		0			0		0.313
TD05-1.B	TRAM DRAIN											0	0	50	80	50	80	0			5.431	0	5.116	5.431		5.116	5.116	0	0	20		0		0			0		0.315
TD05-2.B	TRAM DRAIN											0	0	50	80	50	80	0			5.507	0	5.205	5.507		5.205	5.205	0	0	23		0		0			0		0.302
TD05-3.B	TRAM DRAIN											0	0	50	80	50	80	0			5.586	0	5.306	5.586		5.306	5.306	0	0	34		0		0			0		0.28
TD08-4.B	TRAM DRAIN CONNECT											0	0	50	80	50	80	0			6.718	0	5.617	6.718		5.617	5.617	0	0	9		0		0			0		1.101
TD13-20.B	TRAM DRAIN CONNECT											0	0	50	80	50	80	0			9.037	0	8.163	9.037		8.163	8.163	0	0	12		0		0			0		0.874
TD13A-3.B	TRAM DRAIN CONNECT											0	0	50	80	50	80	0			7.905	0	6.825	7.905		6.825	6.825	0	0	26		0		0			0		1.08
TD13A-5.B	TRAM DRAIN CONNECT											0	0	50	80	50	80	0			6.697	0	5.626	6.697		5.626	5.626	0	0	26		0		0			0		1.071
TD13B-1.B	TRAM DRAIN CONNECT											0	0	50	80	50	80	0			6.015	0	5.336	6.015		5.336	5.336	0	0	11		0		0			0		0.679
TD13B-2.B	TRAM DRAIN CONNECT											0	0	50	80	50	80	0			6.102	0	5.382	6.102		5.382	5.382	0	0	34		0		0			0		0.72
TD17-13.B	TRAM DRAIN CONNECT											0	0	50	80	50	80	0			6.883	0	5.889	6.883		5.889	5.889	0	0	18		0		0			0		0.994
TD17-17.B	TRAM DRAIN CONNECT											0	0	50	80	50	80	0			7.078	0	6.158	7.078		6.158	6.158	0	0	26		0		0			0		0.92
TD17-21.B	TRAM DRAIN CONNECT											0	0	50	80	50	80	0			7.333	0	6.34	7.333		6.34	6.34	0	0	8		0		0			0		0.993
TD17-3.B	TRAM DRAIN											16	17	50	80	50	80	16			6.522	0	5.601	6.522		5.601	5.601	0	0	20		0		0			0		0.921
TD17-6.B	TRAM DRAIN CONNECT											0	0	50	80	50	80	0			6.482	0	5.412	6.482		5.413	5.413	0	0	0		0		0			0		1.07
TD17-7.B	TRAM DRAIN CONNECT											0	0	50	80	50	80	0			6.452	0	5.495	6.452		5.495	5.495	0	0	13		0		0			0		0.957
TD31-1.B	TRAM DRAIN CONNECT											0	0	50	80	50	80	0			9.11	0	8.103	9.11		8.103	8.103	0	0	16		0		0			0		1.007
TD31-3.B	TRAM DRAIN CONNECT											0	0	50	80	50	80	0			8.396	0	7.424	8.396		7.424	7.424	0	0	7		0		0			0		0.972
TD35-1.B	TRAM DRAIN											0	0	50	80	50	80	0			5.795	0	5.454	5.795		5.454	5.454	0	0	0		0		0			0		0.341
TD44-1.B	TRAM DRAIN											20	20	50	80	50	80	5	44-1	0	5.731	0	5.424	5.731		5.424	5.424	0	0	20		0		0	1.74	1.969	0	0.02	0.307
z25-5	IP XXX x XXX											0	0	50	80	50	80	0			2.267	0	2.226	2.267		2.226	2.224	0.2	0	8	0	0.01	0.01	0.01			0		0.041
34-1	IP XXX x XXX											0	0	50	80	50	80	0			2.218	0	2.22	2.218	666	2.22	2.259	0.2	0.012	-688	-0.6	1.08	1.08	1.08			0		-0.002
z26-1	GRATED INLET											0	0	50	80	50	80	0			2.35	0	2.269	2.35		2.269	2.22	0.2	0	22	0	0.05	0.05	0.05			0		0.081
s30-1	SCUPPER ATL				0.0028					2		2	2	50	80	50	80	0	s30-2	3	16.113	0.023	15.183	16.09		15.181	15.135	7	0.002	2	0.1	0.52	0.53	0.56	0.837	0.798	0.023	0.01	0.907
s30-2	SCUPPER ATL				0.0033					3		3	3	50	80	50	80	0	s30-3	3	16.073	0.02	15.135	16.053		15.133	15.08	2.9	0.002	5	0.3	0.66	0.68	0.73	0.746	0.778	0.02	0.01	0.918
s30-3	SCUPPER ATL				0.0033					3		3	3	50	80	50	80	0	s30-4	3	16.012	0.019	15.08	15.993		15.076	15.017	1.6	0.005	8	0.5	0.74	0.79	0.85	0.717	0.735	0.019	0.01	0.913
s30-4	SCUPPER ATL				0.0034					3		3	3	50	80	50	80	0	s30-5	3	15.927	0.019	15.017	15.908		15.011	14.934	1.4	0.006	11	0.6	0.88	0.95	1.04	0.702	0.72	0.019	0.01	0.891
s30-5	SCUPPER ATL				0.0037					3		3	3	50	80	50	80	0	s30-6	3	15.817	0.017	14.92	15.8		14.916	14.763	1.2	0.004	14	0.5	1.24	1.34	1.46	0.619	0.621	0.017	0.01	0.88
s30-6	SCUPPER ATL				0.0032					3		3	2	50	80	50	80	0	s30-7	3	15.65	0.016	14.76	15.634		14.756	14.591	0.9	0.004	16	0.6	1.36	1.45	1.56	0.602	0.6	0.016	0.01	0.874
s30-7	SCUPPER ATL				0.0031					3		3	3	50	80	50	80	0	s30-8	3	15.425	0.016	14.589	15.409		14.585	14.417	1	0.007	19	0.7	1.49	1.58	1.7	0.594	0.618	0.016	0.01	0.82
s30-8	SCUPPER ATL				0.003					3		3	2	50	80	50	80	0	s30-9	3	15.248	0.017	14.417	15.231		14.392	14.276	0.8	0.024	21	0.7	1.51	1.59	1.73	0.618	0.627	0.017	0.01	0.814
s30-9	SCUPPER ATL				0.0032					3		3	3	50	80	50	80	1	s30-10	3	15.046	0.017	14.276	15.029		14.257	14.134	0.7	0.034	23	0.8	1.59	1.67	1.81	0.627	0.629	0.017	0.01	0.753
s30-10	SCUPPER ATL				0.0029					3		3	3	50	80	50	80	0	s30-11	3	14.857	0.016	14.134	14.841		14.117	13.977	0.6	0.037	23	0.8	1.69	1.74	1.89	0.573	0.57	0.016	0.01	0.707
s30-11	SCUPPER ATL				0.0033					3		3	2	50	80	50	80	0	s30-12	3	14.601	0.015	13.977	14.586		13.964	13.799	0.6	0.038	25	0.8	1.73	1.78	1.92	0.567	0.638	0.015	0.01	0.609
s30-12	SCUPPER ATL				0.0029					2		3	2	50	80	50	80	0	s30-13	4	14.349	0.017	13.799	14.332		13.794	13.6	0.6	0.036	26	0.8	1.68	1.65	1.78	0.638	0.642	0.017	0.01	0.533
s30-13	SCUPPER ATL				0.0037					3		4	3	50	80	50	80	0	s30-14	3	14.124	0.015	13.6	14.109		13.593	13.366	0.7	0.042	29	0.9	1.62	1.62	1.62	0.572	0.668	0.015	0.01	0.509
s30-14	SCUPPER ATL				0.0032					3		3	2	50	80	50	80	0	30-1	4	13.882	0.018	13.366	13.864		13.143	13.046	1.7	0.224	30	13.9	1.72	1.72	1.72	0.668	0.68	0.018	0.01	0.498
s30	BP NODE											0	0	50	80	50	80	0			12.896	0	13.046	15													0		-0.15
s47-1	SCUPPER ATL				0.0042					4		4	3	50	80	50	80	0	s47-2	3	16.114	0.023	15.14	16.091		15.135	15.09	7	0.006	3	0.2	0.53	0.58	0.67	0.843	0.767	0.023	0.01	0.951
s47-2	SCUPPER ATL				0.0028					2		3	3	50	80	50	80	0	s47-3	2	16.085	0.02	15.09	16.065		15.089	15.046	1.9	0.002	6	0.4	0.68	0.71	0.75	0.745	0.756	0.02	0.01	0.975
s47-3	SCUPPER ATL				0.003					3		2	2	50	80	50	80	0	s47-4	3	16.043	0.02	15.046	16.023		15.045	14.997	1.5	0.002	8	0.5	0.74	0.76	0.8	0.751	0.781	0.02	0.01	0.977
s47-4	SCUPPER ATL				0.0036					3		3	3	50	80	50	80	0	s47-5	3	15.969	0.02	14.997	15.949		14.99	14.93	1.4	0.007	11	0.7	0.79	0.84	0.91	0.722	0.741	0.02	0.01	0.952
s47-5	SCUPPER ATL				0.0037					3		3	3	50	80	50	80	0	s47-6	3	15.869	0.017	14.93	15.852		14.92	14.84	1.2	0.01	14	0.8	0.92	0.99	1.09	0.618	0.633	0.017	0.01	0.922
s47-6	SCUPPER ATL	0			0.0032					3		3	2	50	80	50	80	0	s47-7	3	15.704	0.017	14.801	15.687		14.799	14.594	0.9	0.003	16	0.5	1.5	1.59	1.71	0.633	0.638	0.017	0.01	0.886
s47-7	SCUPPER ATL				0.0034					3		3	3	50	80	50	80	0	s47-8	3	15.501	0.017	14.557	15.484		14.557	14.373	7	0	19	0.1	1.62	1.61	1.61	0.638	0.642	0.017	0.01	0.927
s47-8	SCUPPER ATL				0.0035					3		3	3	50	80	50	80	0	s47-9	2	15.331	0.016	14.358	15.315		14.358	14.173	0.9	0	22	0.1	1.64	1.65	1.66	0.604	0.603	0.016	0.01	0.957
s47-9	SCUPPER ATL				0.0029					3		2	2	50	80	50	80	0	s47-10	2	15.175	0.015	14.157	15.16		14.157	13.972	0.8	0	24	0.1	1.7	1.71	1.73	0.552	0.551	0.015	0.01	1.003
s47-10	SCUPPER ATL				0.0025					2		2	2	50	80	50	80	0	s47-11	2	14.951	0.015	13.957	14.936		13.956	13.771	0.6	0	26	0.1	1.75	1.76	1.78	0.542	0.601	0.015	0.01	0.979
s47-11	SCUPPER ATL				0.0026					2		2	2	50	80	50	80	0	s47-12	3	14.727	0.016	13.756	14.711		13.756	13.57	0.6	0	28	0.1	1.8	1.81	1.82	0.601	0.662	0.016	0.01	0.955
s47-12	SCUPPER ATL				0.0034					3		3	2	50	80	50	80	0	s47-13	4	14.505	0.018	13.555	14.487		13.555	13.369	0.7	0	31	0.1	1.85	1.85	1.87	0.662	0.67	0.018	0.01	0.932
s47-13	SCUPPER ATL				0.0036					3		4	3	50	80	50	80	1	s47-14	4	14.31	0.018	13.356	14.292		13.356	13.169	0.6	0.001	34	0.1	1.91	1.91	1.92	0.651	0.658	0.018	0.01	0.936
s47-14	SCUPPER ATL				0.0035					3		4	3	50	80	50	80	1	s47-15	4	14.084	0.017	13.158	14.067		13.157	12.971	0.6	0.001	38	0.1	1.96	1.96	1.97	0.64	0.677	0.017	0.01	0.909
s47-15	SCUPPER ATL				0.0033					3		4	3	50	80	50	80	1	s47-16	4	13.862	0.018	12.963	13.844		12.961	12.774	0.6	0.001	42	0.1	2.03	2.03	2.04	0.677	0.687	0.018	0.01	0.881
s47-16	SCUPPER ATL				0.0039					3		4	3	50	80	50	80	1	s47-17	4	13.641	0.018	12.769	13.623		12.768	12.579	0.6	0.002	46	0.1	2.1	2.1	2.1	0.681	0.694	0.018	0.01	0.854
s47-17	SCUPPER ATL				0.0034					3		4	3	50	80	50	80	1	s47-18	4	13.45	0.018	12.577	13.432		12.575	12.396	0.5	0.002	52	0.2	2.17	2.09	2.15	0.663	0.673	0.018	0.01	0.855

Node	Node Type	Catchmnet Areas (ha)					Catchment Flow						Inlet	Efficiencies					Bypass	Bypass	Bypass		Node		LOST	Link HGL		Ku				Velocities			Flood Widths		Flooded Depth		Freeboard
												Approach	Captured	minor		Major		Uncapture	Node	Flow	HGL	mid ch	HGL	Grate	FLOW	Upstream	Downstream	(at max	Ku	Flow	Capacity	Upstream	Link	Downstrea	Upstream	Downstrea	Depth	DxV	
		Area 1	Area 2	Area 3	Area 4	Area 5	Set 1	Set 2	Set 3	Set 4	Set 5	Flow	Flow	SAG	Ongrade	SAG	Ongrade	Flow																				
s47-18	SCUPPER ATL				0.0035					3		4	3	50	80	50	80	1	s47-19	3	13.227	0.016	12.396	13.211		12.392	12.287	0.5	0.008	57	0.2	2.22	2.1	2.13	0.603	0.595	0.016	0.01	0.815
s47-19	SCUPPER ATL				0.0023					2		3	2	50	80	50	80	0	47-1	3	13.095	0.015	12.287	13.08		12.263	12.126	1.4	0.028	64	0.2	2.28	2.27	2.3	0.565	0.644	0.015	0.01	0.793
s47	BP NODE											0	0	50	80	50	80	0			12.014	0	12.126	13.6													0		-0.112
z03A-1	ALL IN GRADE											0	0	50	80	50	80	0			5.212	0	4.481	5.212		4.481	4.266	0	0	0	0	0	0	0			0		0.731
z03B-1	ALL IN GRADE											0	0	50	80	50	80	0			5.51	0	4.997	5.51		4.997	4.977	0	0	0	0	0	0	0			0		0.513
z07-1	ALL IN GRADE	0.0419		2.2055			36		1538			1567	1567	50	80	50	100	0	07-1	3	8.199	0	8.102	8.199		4.266	3.967	2.5	3.836	1563	2	5.53	5.53	5.53	0	0	0	0	0.097
z10-1	BP NODE auto	0.2292	0.7348				195	515				678	0	50	0	50	0	678	z10-2	862	12.827	0.154	10.97	12.673		10.97	6.119	0	0	0	0	0	0	0	5.684	5.679	0.154	0.3	1.703
z10-2	BP NODE auto	0.2711					230					862	0	50	80	50	80	862	z10-3	846	7.931	0.132	6.03	7.799		6.03	2.717	0	0	0	0	0	0	0	4.886	4.912	0.132	0.35	1.769
z10-3	BP NODE auto											846	0	50	80	50	80	846	52-1	897	4.634	0.133	2.655	4.501		2.655	1.81	0	0	0	0	0	0	0	4.912	4.9	0.133	0.37	1.846
z10-4	BP NODE auto	0.0068					6					628	0	50	80	50	80	628	EX1-9	632	3.613	0.019	1.221	3.594		1.221	0.798	0	0	0	0	0	0	0	29.999	29.999	0.019	0.02	2.373
z10-5	BP NODE auto	0.0317					27					27	0	50	80	50	80	27	EX1-10	37	2.484	0.004	0.798	2.48		0.798	0.742	0	0	0	0	0	0	0	29.999	29.999	0.004	0	1.682
z10-6	BP NODE auto											0	0	50	80	50	80	0			0.742	0	0.742	2.043													0		0
zBP51-1	BP NODE											0	0	50	80	50	80	0			0.537	0	0.007	0.537		0.007	0.033	0	0	0	-6.1	0	0	0			0		0.53
zBP10-12a	BP NODE											2015	0	50	80	50	80	2015	10-10	0	1.905	0.253	0.033	1.652	2019	0.033	0.007	0	0	0	4.9	0	0	0	9.241	9.241	0.253	0.48	1.619
zBP10-12b	BP NODE											0	0	50	80	50	80	0	10-10	54	2.148	0.081	0.007	2.067		0.007	0.002	0	0	0	1	0	0	0	1.9	9.17	0.081	0.02	2.06
z10-12c	BP NODE auto											0	0	50	80	50	80	0			0	0	0.002	0.416													0		-0.002
12-2	ALL IN GRADE											0	0	50	80	50	80	36	23-1	0	2.386	0.111	2.332	2.275		2.275	2.275	0	0	38		0		0	0	0	0.111	0	-0.057
z12-1	BP NODE auto											0	0	50	80	50	80	0	z12-2	11	4.571	0.033	3.205	4.538		3.205	2.553	0	0	0	0	0	0	0	0.494	0.577	0.033	0.03	1.333
z12-2	BP NODE auto					0.0223					13	13	0	50	80	50	80	13	52-3	19	3.771	0.072	2.533	3.699		2.533	2.516	0	0	0	0	0	0	0	0.53	0.794	0.072	0.06	1.166
z12-3	BP NODE auto											0	0	50	80	50	80	0	z12-2	2	3.889	0.016	2.496	3.873		2.496	2.456	0	0	0	0	0	0	0	0.302	0.577	0.016	0.01	1.377
z12-4	BP NODE auto											0	0	50	80	50	80	0			2.456	0	2.456	4.303													0		0
zBP z07-1.R	BP NODE											0	0	50	80	50	80	0	07-1	8	5.689	0.024	0	5.665		0.001	0	0	0	0	0	0	0	0	0.888	2.112	0.024	0.01	5.665
zBP 18-1A	BP NODE											0	0	50	80	50	80	0	18-1A	19	5.643	0.038	0	5.605		0.001	0	0	0	0	0	0	0	0	1.407	1.699	0.038	0.02	5.605
zBP 18-1A.R	BP NODE											0	0	50	80	50	80	0			6.336	0	0	6.336		4.615	4.595	0	0	0	0	0	0	0			0		6.336
zBP18-2	SAS											0	0	50	80	50	80	0			4.595	0	4.595	6.281													0		0
26-2	ALL IN GRADE											0	0	50	80	50	80	0	11-1	0	3.796	0.321	3.1	3.475		3.1	3.1	0	0	201		0		0	1.584	2.46	0.321	0.02	0.375
11-1	GRATED INLET 900X900					0.0196					11	0	0	50	100	50	100	0	z BASIN 0	16	3.367	0.067	2.713	3.3		2.713	2.696	0	0	204	1	1.67	1.67	1.67	0	0	0.067	0	0.587
z BASIN 02-2	BASIN					0.0291					17	0	0	100	100	100	100	0	23-1	0	3.401	0.002	2.4	3.399		2.4	2.4	0	0	0		0		0	0	0	0.002	0	0.999
16-2	ALL IN GRADE											0	0	50	80	50	80	0	23-1	0	2.856	0.011	2.4	2.845		2.4	2.4	0	0	92		0		0	0	0	0.011	0	0.445
zBP18-2.L	BP NODE auto											0	0	50	80	50	80	0	LOST	0	6.332	0	2	6.332		2.001	2	0	0	0	0	0	0	0	0	0	0	0	4.332
zBP18-2.R	BP NODE auto											0	0	50	80	50	80	0	LOST	0	5.94	0	2	5.94		2.001	2	0	0	0	0	0	0	0	0	0	0	0	3.94
z18-2c	BP NODE auto											0	0	50	80	50	80	0			2	0	2	6.135													0		0
19-7	ALL IN GRADE											0	0	50	100	50	100	0	38-1	0	2.598	0.048	2.412	2.55		2.412	2.412	0	0	-124		0		0	5.961	5.729	0.048	0.04	0.138
zBP02-2	SA 4.2m Lintel	0.1118					95					87	80	50	80	50	80	6	02-2	5	9.415	0.019	7.997	9.396		7.955	7.554	9.7	0.043	80	0.2	1.52	1.75	2.28	0.712	0.725	0.019	0.01	1.399
zBP24-2	BP NODE auto											0	0	50	0	50	0	0	24-2	10	4.99	0.043	0	4.947		0.001	0	0	0	0	0	0	0	0	0.779	0.725	0.043	0.04	4.947
zBP20-1	BP NODE											0	0	50	80	50	80	0	20-1	19	4.33	0.033	0	4.297		0.001	0	0	0	0	0	0	0	0	1.217	1.22	0.033	0.03	4.297
zBP22-1	BP NODE											2	0	50	80	50	80	2	22-1	18	3.042	0.05	0	2.992		0.001	0	0	0	0	0	0	0	0	6.752	6.752	0.05	0.04	2.992
zBP36-2.L	BP NODE											0	0	50	80	50	80	0	36-1	0	2.389	0.004	0	2.385		0.001	0	0	0	0	0	0	0	0	0.053	3.496	0.004	0	2.385
zBP36-2.R	BP NODE											0	0	50	80	50	80	0	36-1	0	2.152	0.011	0	2.141		0.001	0	0	0	0	0	0	0	0	0.15	3.521	0.011	0	2.141
zBP36-1	BP NODE auto											4	0	50	80	50	80	4	37-4	6	2.205	0.106	0	2.099		0.001	0	0	0	0	0	0	0	0	3.275	5.413	0.106	0	2.099
zBP37-2.L	BP NODE											181	0	50	80	50	80	181	37-2	169	2.197	0.251	0	1.946	139	0.001	0	0	0	0	0	0	0	0	11.261	11.261	0.251	0.05	1.946
zBP37-2.R	BP NODE											108	0	50	80	50	80	108	37-2	102	2.204	0.269	0	1.935		0.001	0	0	0	0	0	0	0	0	11.64	11.636	0.269	0.03	1.935
zBP37-1	BP NODE auto											52	0	50	80	50	80	52	37-1	48	2.203	0.24	0	1.963		0.001	0	0	0	0	0	0	0	0	11.316	11.59	0.24	0.01	1.963
zBP37-3	BP NODE auto											93	0	50	80	50	80	93			2.202	0.249	0	1.952		0.001	0	0	0	0	0	0	0	0			0.249		1.952
SC08-1	BP NODE											0	0	50	80	50	80	0			0	0	0	2.107													0		0
20-2	ALL IN GRADE											0	0	50	100	50	100	0	38-1	0	2.557	0.007	2.372	2.55		2.372	2.372	0	0	0		0		0	5.726	5.729	0.007	0.02	0.177
z200-2	SA 4.2m Lintel	0.1055	0.7889				90	495				567	332	50	80	50	80	235	LOST	234	9.106	0.11	8.451	8.995		8.01	7.866	8.4	0.443	332	0.6	1.18	1.39	1.97	4.084	4.052	0.11	0.12	0.544
zBP21-1.L	BP NODE auto											0	0	50	80	50	80	0	21-1	16	2.456	0.057	1.779	2.399		1.779	1.681	0	0	0	0	0	0	0	1.58	1.579	0.057	0.03	0.62
zBP21-1.R	BP NODE auto											0	0	50	80	50	80	0	21-1	11	2.351	0.055	1.661	2.296		1.661	1.617	0	0	0	0	0	0	0	0.498	0.497	0.055	0.04	0.635
zBP21-1	BP NODE auto											0	0	50	80	50	80	0			1.617	0	1.617	2.266													0		0
24-3	ALL IN GRADE											0	0	50	100	50	100	0	38-1	0	2.659	0.184	2.372	2.475		2.372	2.372	0	0	69		0		0	5.724	5.727	0.184	0.01	0.102
zBP27-1	ALL IN GRADE											0	0	50	80	50	80	0	27-1	20	6.022	0.063	4.842	5.959		4.842	4.793	0	0	0	0	0	0	0	1.265	1.573	0.063	0.04	1.117
z41-1	BP NODE											136	0	50	80	50	80	136	41-1	120	1.997	0.198	0.524	1.799		0.524	0.438	0	0	0	0	0	0	0	7.306	8.348	0.198	0.03	1.275
z41-2	BP NODE											0	0	50	80	50	80	0			0.438	0	0.438	10.175													0		0
44-2	ALL IN GRADE											0	0	100	100	100	100	0	46-1	0	4.525	0	4.15	4.525		4.15	4.15	0	0	59		0		0	0	0	0	0	0.375
05-4	ALL IN GRADE											0	0	50	100	50	100	0	46-1	0	4.525	0	4.15	4.525		4.15	4.15	0	0	72		0		0	0	0	0	0	0.375
zBP AD15-1	BP NODE	0.0133			0.0084		11			7		19	0	50	80	50	80	19	15-1	27	9.823	0.038	0	9.785		0.001	0	0	0	0	0	0	0	0	1.415	1.455	0.038	0.04	9.785
zBP AD15-2	BP NODE											23	0	50	80	50	80	23	15-2	30	9.125	0.039	0	9.086		0.001	0	0	0	0	0	0	0	0	1.429	1.478	0.039	0.04	9.086
zBP AD15-3	BP NODE											27	0	50	80	50	80	27	15-3	32	8.307	0.037	0	8.27		0.001	0	0	0	0	0	0	0	0	1.384	1.463	0.037	0.04	8.27
zBP AD17-23A	BP NODE											27	0	50	80	50	80	27	SC17-23.A	29	7.498	0.036	0	7.462		0.001	0	0	0	0	0	0	0	0	1.345	1.719	0.036	0.04	7.462
zBP AD151	BP NODE											0	0	50	80	50	80	0			0	0	0	4.66													0		0
zBP 28-1	BP NODE											0	0	50	80	50	80	0	zBP 28-1a	11	5.526	0.03	0	5.496		0.001	0	0	0	0	0	0	0	0	0.743	0.868	0.03	0.03	5.496
zBP 28-1a	BP NODE	0.0119				0.0039	10				2	11	0	50	80	50	80	11	LOST	11	4.241	0.035	0	4.206		0.001	0	0	0	0	0	0	0	0	1.282	1.292	0.035	0.02	4.206
zBP 28-2	BP NODE											0	0	50	80	50	80	0	zBP 28-3	21	4.653	0.038	0	4.615		0.001	0	0	0	0	0	0	0	0	0.944	2.041	0.038	0.03	4.615
zBP 28-3	BP NODE	0.0141				0.0199	12				11	21	0	50	80	50	80	21	zBP 28-4	34	3.76	0.061	0	3.699		0.001	0	0	0	0	0	0	0	0	2.041	2.069	0.061	0.04	3.699
zBP 28-4	BP NODE	0.0076				0.0152	6				9	34	0	50	80	50	80	34	zBP 28-5	53	3.539	0.049	0	3.49		0.001	0	0	0	0	0	0	0	0	1.797	2.402	0.049	0.05	3.49
zBP 28-5	BP NODE	0.0123				0.0194	10				11	53	0	50	80	50	80	53	28-5	53	2.685	0.065	0	2.62		0.001	0	0	0	0	0	0	0	0	2.27	2.254	0.065	0.06	2.62
zBP 10-8	BP NODE	0.0141				0.0207	12				12	22	0	50	80	50	80	22	LOST	22	1.941	0.045	0	1.896		0.001	0	0	0	0	0	0	0	0	1.663	1.659	0.045	0.03	1.896
zBP ARP1	BP NODE											0	0	50	80	50	80	0			0	0	0	1													0		0
zBP TD02-3.A	BP NODE											0	0	50	80	50	80	0	TD02-3.A	35	8.947	0.048	0	8.899		0.001	0	0	0	0	0	0	0	0	1.775	1.77	0.048	0.04	8.899
zBP TD02-4.A	BP NODE											0	0	50	80	50	80	0	TD02-4.A	40	8.579	0.044	0	8.535		0.001	0	0	0	0	0	0	0	0	1.607	1.617	0.044	0.05	8.535
zBP TD02-5.A	BP NODE											0	0	50	80	50	80	0	TD02-5.A	38	7.51	0.043	0	7.467		0.001	0	0	0	0	0	0	0	0	1.583	1.591	0.043	0.05	7.467
zBP TD02-6.A	BP NODE											0	0	50	80	50	80	0	TD02-6.A	49	6.435	0.049	0	6.386		0.001	0	0	0	0	0	0	0	0	1.799	1.801	0.049	0.05	6.386
zBP TD02-7.A	BP NODE											0	0	50	80	50	80	0	TD02-7.A	12	5.567	0.036	0	5.531		0.001	0	0	0	0	0	0	0	0	1.331	1.342	0.036	0.02	5.531
zBP TD02	BP NODE											0	0	50	80	50	80	0	LOST	0	5.208	0	0	5.208		0.001	0	0	0	0	0	0	0	0	0	0	0	0	5.208
zBP TD02-7.A	BP NODE											0	0	50	80	50	80	0	TD02-7.A	12	5.46	0.04	0	5.42		0.001	0	0	0	0	0	0	0	0	1.47	0.982	0.04	0.01	5.42
zBP TD05-1.A	BP NODE											0	0	50	80	50	80	0	TD05-1.A	21	5.547	0.043	0	5.504		0.001	0	0	0	0	0	0	0	0	1.57	1.471	0.043	0.02	5.504
zBP TD05-2.A	BP NODE											0	0	50	80	50	80	0	TD05-2.A	24	5.627	0.044	0	5.583		0.001	0	0	0	0	0	0	0	0	1.641	1.518	0.044	0.02	5.583
zBP 44-1	BP NODE											0	0	50	80	50	80	0	44-1	17	5.828	0.045	0	5.783		0.001	0	0	0	0	0	0	0	0	1.65	1.969	0.045	0.01	5.783
zBP 35-1	BP NODE											0	0	50	80	50	80	0	35-1	24	6.032	0.049	0	5.983		0.001	0	0	0	0	0	0	0	0	1.799	1.796	0.049	0.03	5.983
zBP TD13B-1.	BP NODE											0	0	50	80	50	80	0	TD13B-1.	15	6.136	0.038	0	6.098		0.001	0	0	0	0	0	0	0	0	1.42	1.303	0.038	0.01	6.098
zBP TD13B-2.	BP NODE											0	0	50	80	50	80	0	TD13B-2.	28	6.709	0.044	0	6.665		0.001	0	0	0	0	0	0	0	0	1.638	1.641	0.044	0.03	6.665
zBP TD13A-5.	BP NODE											0	0	50	80	50	80	0	TD13A-5.	25	7.921	0.037	0	7.884		0.001	0	0	0	0	0	0	0	0	1.372	1.37	0.037	0.04	7.884
zBP TD13A-3.	BP NODE											0	0	50	80	50	80	0	TD13A-3.	26	8.998	0.037	0	8.961		0.001	0	0	0	0	0	0	0	0	1.383	1.383	0.037	0.04	8.961
zBP TD13A-1.	BP NODE											0	0	50	80	50	80	0			9.434	0	0	9.434		0.001	0	0	0	0	0	0	0	0			0		9.434
zBP N1	BP NODE											0	0	50	80	50	80	0			0	0	0	0.698													0		0
zBP TD14-17.	BP NODE											3	0	50	80	50	80	3	zBP TD31	3	10.17	0.015	0	10.155		0.001	0	0	0	0	0	0	0	0	0.568	1.14	0.015	0.01	10.155
zBP TD31-1.A	BP NODE					0						3	0	50	80	50	80	3	TD31-1.A	16	9.883	0.031	0	9.852		0.001	0	0	0	0	0	0	0	0	1.14	1.14	0.031	0.03	9.852
zBP TD31-3.A	BP NODE											0	0	50	80	50	80	0	TD31-3.A	14	9.076	0.022	0	9.054		0.001	0	0	0	0	0	0	0	0	0.824	0.823	0.022	0.02	9.054
zBP TD17-21.	BP NODE											0	0	50	80	50	80	0	TD17-21.	8	8.395	0.025	0	8.37		0.001	0	0	0	0	0	0	0	0	0.915	0.919	0.025	0.02	8.37
zBP 31-5	BP NODE											0	0	50	80	50	80	0	31-5	5	8.39	0.021	0	8.369		0.001	0	0	0	0	0	0	0	0	0.761	0.781	0.021	0.01	8.369
zBP31-6	BP NODE											4	0	50	80	50	80	4	31-6	8	7.801	0.025	0	7.776		0.001	0	0	0	0	0	0	0	0	0.93	1.028	0.025	0.02	7.776
zBP TD17-21.	BP NODE											7	0	50	80	50	80	7	SC17-21.	16	7.555	0.034	0	7.521		0.001	0	0	0	0	0	0	0	0	1.265	1.266	0.034	0.03	7.521
zBP SC17-20.	BP NODE											12	0	50	80	50	80	12	SC17-20.	14	7.328	0.026	0	7.302		0.001	0	0	0	0	0	0	0	0	2.092	2.085	0.026	0.01	7.302
zBP SC17-20.	BP NODE											10	0	50	80	50	80	10	SC17-20.	13	7.255	0.021	0	7.234		0.001	0	0	0	0	0	0	0	0	2.882	2.879	0.021	0.01	7.234
zBP TD17-17.	BP NODE											0	0	50	80	50	80	0	TD17-17.	12	7.292	0.038	0	7.254		0.001	0	0	0	0	0	0	0	0	1.4	1.399	0.038	0.02	7.254
zBP SC17-19.	BP NODE											9	0	50	80	50	80	9	SC17-19.	12	7.21	0.024	0	7.186		0.001	0	0	0	0	0	0	0	0	3.003	2.95	0.024	0.01	7.186
zBP SC17-19.	BP NODE											11	0	50	80	50	80	11	SC17-19.	14	7.175	0.015	0	7.16		0.001	0	0	0	0	0	0	0	0	3.494	3.461	0.015	0	7.16
zBP SC17-18.	BP NODE											13	0	50	50	50	50	13	SC17-18.	14	7.155	0.015	0	7.14		0.001	0	0	0	0	0	0	0	0	3.63	3.972	0.015	0	7.14
zBP TD17-17.	BP NODE											14	0	50	80	50	80	14	TD17-17.	12	7.137	0.023	0	7.114		0.001	0	0	0	0	0	0	0	0	4.121	3.448	0.023	0	7.114
zBP TD17-13.	BP NODE											0	0	50	80	50	80	0	TD17-13.	13	7.133	0.034	0	7.099		0.001	0	0	0	0	0	0	0	0	1.272	1.276	0.034	0.01	7.099
zBP SC17-16.	BP NODE											0	0	50	80	50	80	0	SC17-16.	3	7.08	0.006	0	7.074		0.001	0	0	0	0	0	0	0	0	3.604	3.447	0.006	0	7.074
zBP SC17-15.	BP NODE											2	0	50	80	50	80	2	SC17-15.	5	7.043	0.008	0	7.035		0.001	0	0	0	0	0	0	0	0	7.599	4.569	0.008	0	7.035
zBP SC17-14.	BP NODE											3	0	50	80	50	80	3	zBP TD17	6	6.993	0.005	0	6.988		0.001	0	0	0	0	0	0	0	0	7.599	7.6	0.005	0	6.988
zBP TD17-13.	BP NODE	0.0036					3					6	0	50	80	50	80	6	TD17-13.	6	6.927	0.006	0	6.921		0.001	0	0	0	0	0	0	0	0	7.6	7.599	0.006	0	6.921
zBP TD7-9.A	BP NODE											0	0	50	80	50	80	0	TD17-9.A	26	6.909	0.047	0	6.862		0.001	0	0	0	0	0	0	0	0	1.729	1.727	0.047	0.03	6.862
zBP TD17-8.A	BP NODE											0	0	50	80	50	80	0	TD17-8.A	7	6.599	0.028	0	6.571		0.001	0	0	0	0	0	0	0	0	1.051	1.061	0.028	0.01	6.571
zBP TD17-7.A	BP NODE											0	0	50	80	50	80	0	TD17-7.A	17	6.538	0.045	0	6.493		0.001	0	0	0	0	0	0	0	0	1.664	1.465	0.045	0.02	6.493
zBP TD17-7.A	BP NODE											0	0	50	80	50	80	0	SC17-7.A	0	6.518	0	0	6.518		0.001	0	0	0	0	0	0	0	0	0	0	0	0	6.518
zBP SC17-6.A	BP NODE											10	0	50	80	50	80	10	SC17-5.A	13	6.532	0.047	0	6.485		0.001	0	0	0	0	0	0	0	0	1.73	1.726	0.047	0.01	6.485
zBP SC17-5.A	BP NODE											11	0	50	80	50	80	11	zBP SC17	10	6.532	0.035	0	6.497		0.001	0	0	0	0	0	0	0	0	4.544	7.324	0.035	0	6.497
zBP SC17-4.A	BP NODE											8	0	50	80	50	80	8	SC17-4.A	13	6.544	0.036	0	6.508		0.001	0	0	0	0	0	0	0	0	3.426	3.607	0.036	0.01	6.508
zBP SC17-3.A	BP NODE											16	0	50	80	50	80	16	TD17-3.B	16	6.58	0.06	0	6.519		0.001	0	0	0	0	0	0	0	0	3.224	2.028	0.06	0.01	6.519
zBP SC17-2.A	BP NODE											13	0	50	80	50	80	13	SC17-2.A	18	6.592	0.052	0	6.54		0.001	0	0	0	0	0	0	0	0	1.757	1.94	0.052	0.02	6.54
zBP SC17-1A	BP NODE											10	0	50	80	50	80	10	SC17-1.A	15	6.639	0.045	0	6.594		0.001	0	0	0	0	0	0	0	0	1.536	1.541	0.045	0.02	6.594
zBP 08-6	BP NODE											11	0	50	80	50	80	11	08-6	19	6.687	0.05	0	6.637		0.001	0	0	0	0	0	0	0	0	1.66	1.619	0.05	0.02	6.637
zBP 08-5	BP NODE											12	0	50	80	50	80	12	08-5	23	6.744	0.054	0	6.69		0.001	0	0	0	0	0	0	0	0	1.781	1.819	0.054	0.03	6.69
zBP 08-4	BP NODE											12	0	50	80	50	80	12	zBP 08-5	12	6.781	0.039	0	6.742		0.001	0	0	0	0	0	0	0	0	1.283	1.765	0.039	0.02	6.742
zBP 08-3	BP NODE											8	0	50	80	50	80	8	08-3	16	6.869	0.038	0	6.831		0.001	0	0	0	0	0	0	0	0	1.461	1.553	0.038	0.02	6.831
SC08-2	BP NODE											4	0	50	80	50	80	4	08-2	10	6.908	0.025	0	6.883		0.001	0	0	0	0	0	0	0	0	1.794	2.292	0.025	0.01	6.883
zBP 08-1A	BP NODE											3	0	50	80	50	80	3	08-1A	7	6.961	0.023	0	6.938		0.001	0	0	0	0	0	0	0	0	1.655	1.765	0.023	0.01	6.938

Node	Node Type	Catchmnet Areas (ha)					Catchment Flow					Approach	Inlet Captured	Efficiencies minor		Major		Uncapture	Bypass Node	Bypass Flow	Bypass HGL	mid ch	Node HGL	Grate	LOST FLOW	Link HGL		Ku			Capacity	Velocities			Flood Widths		Flooded Depth		Freeboard
		Area 1	Area 2	Area 3	Area 4	Area 5	Set 1	Set 2	Set 3	Set 4	Set 5	Flow	Flow	SAG	Ongrade	SAG	Ongrade	Flow								Upstream	Downstream	(at max	Ku	Flow		Upstream	Link	Downstrea	Upstream	Downstrea	Depth	DxV	
zBP 08-1	BP NODE											0	0	50	80	50	80	0	08-1	4	6.977	0.013	0	6.964		0.001	0	0	0	0	0	0	0	0	2.816	3.179	0.013	0	6.964
zBP TD19-1.A	BP NODE											0	0	50	80	50	80	0	TD19-1.A	14	7.013	0.046	0	6.967		0.001	0	0	0	0	0	0	0	0	1.682	1.496	0.046	0.02	6.967
zBP TD19-2.A	BP NODE											0	0	50	80	50	80	0	TD19-2.A	15	6.935	0.038	0	6.897		0.001	0	0	0	0	0	0	0	0	1.388	1.347	0.038	0.02	6.897
zBP TD19-3.A	BP NODE											0	0	50	80	50	80	0	TD19-3.A	17	6.825	0.041	0	6.784		0.001	0	0	0	0	0	0	0	0	1.512	1.455	0.041	0.02	6.784
zBP TD19-4.A	BP NODE											0	0	50	80	50	80	0	TD19-4.A	31	6.717	0.048	0	6.669		0.001	0	0	0	0	0	0	0	0	1.78	1.766	0.048	0.02	6.669
zBP TD19-5.C	BP NODE											0	0	50	80	50	80	0	TD19-5.C	29	6.473	0.04	0	6.433		0.001	0	0	0	0	0	0	0	0	1.484	1.484	0.04	0.04	6.433
zBP TD19-5.A	BP NODE											0	0	50	80	50	80	0	zBP TD19	0	6.357	0	0	6.357		0.001	0	0	0	0	0	0	0	0	0	0	0	0	6.357
zBP TD19-6.A	BP NODE											0	0	50	80	50	80	0	LOST	0	5.504	0	0	5.504		0.001	0	0	0	0	0	0	0	0	0	0	0	0	5.504
zBP TD19-	BP NODE											0	0	50	80	50	80	0	TD24-1.A	15	5.534	0.032	0	5.502		0.001	0	0	0	0	0	0	0	0	1.197	1.198	0.032	0.02	5.502
zBP S1	BP NODE											0	0	50	80	50	80	0			0	0	0	5.482													0		0
zBP07-2	BP NODE auto											0	0	50	80	50	80	0	07-1	34	6.13	0.077	4.83	6.053		4.83	4.776	0	0	0	0	0	0	0	1.491	1.491	0.077	0.07	1.223
zBP07-2A	BP NODE auto											0	0	50	80	50	80	0			4.776	0	4.776	7.042													0		0
zBP02-1	BP NODE auto											0	0	50	80	50	80	0	zBP02-2	87	13.635	0.062	7.836	13.573		7.836	7.295	0	0	0	0	0	0	0	2.274	2.273	0.062	0.08	5.737
zBP02	BP NODE auto											0	0	50	80	50	80	0			7.295	0	7.295	8.764													0		0
zBP200-1	BP NODE auto											0	0	50	80	50	80	0	z200-2	567	10.574	0.119	9.067	10.455		9.067	7.629	0	0	0	0	0	0	0	4.402	4.396	0.119	0.26	1.388
z200	BP NODE auto											0	0	50	80	50	80	0			7.629	0	7.629	10.756													0		0
zBP25-1a	BP NODE auto											0	0	50	80	50	80	0			2.285	0	1.596	2.285		1.596	1.372	0	0	0	0	0	0	0				0		0.689
zBP25-1b	BP NODE auto	0.0164					14					14	0	50	80	50	80	14	LOST	14	2.142	0.021	1.352	2.121		1.352	1.312	0	0	0	0	0	0	0	3.526	3.518	0.021	0.01	0.769
z25-6	BP NODE auto											0	0	50	80	50	80	0			1.312	0	1.312	2.138													0		0

Appendix O Outlet Scour Protection Assessment Calculations

OUTLET ID	Outlet Location	V (m/s)	ROCK REQ?	Pipe Size 'D' (mm)	TWL>0.5D?	D50 (mm)	L (m)	La (m)	Apron width 'S' (m)	Width of rock apron (m)
01-3	River (Archer Pk)	1.62	Y	1050	N	200	3.2	0.3	5.4	5.5
05-4	Basin 1	1.43	N	375	-	-	-	-	-	-
07-3	River (Archer Pk)	1.79	Y	1200	Y	200	4.8	2.4	5.2	6.2
10-11	River (Wharf Rd)	2.00	Y	750	Y	200	4.5	3.3	2.7	4.0
12-2	Basin 2	0.96	N	375	Y	-	-	-	-	-
14-21	River (Sthn Foreshore)	1.38	N	750	N	-	-	-	-	-
16-2	Basin 2	1.27	N	375	Y	-	-	-	-	-
19-7	Basin 3	1.68	Y	450	Y	100	2.7	2.1	1.6	2.5
20-2	Basin 3	0.84	N	450	Y	-	-	-	-	-
24-2	Basin 3	0.95	N	375	Y	-	-	-	-	-
26-2	Basin 2	2.05	Y	375	Y	100	1.5	1.1	1.3	1.8
41-2	River (Wharf Rd)	1.24	N	375	Y	-	-	-	-	-
44-2	Basin 1	1.75	Y	375	Y	100	1.5	1.1	1.9	2.3
46-2	Basin 1 to Batter Chute		Y	525	N	200	-	-	-	-

Batter Chute for 46-2
Catchments and Creeks Fact Sheet

Table 4 – Flow depth [1], y (m) and mean rock size, d_{50} (m) for SF = 1.5

Safety factor, SF = 1.5			Specific gravity, s_s = 2.4				Size distribution, d_{50}/d_{90} = 0.5	
Unit flow rate ($m^2/s/m$)	Bed slope = 1:2		Bed slope = 1:3		Bed slope = 1:4		Bed slope = 1:6	
	y (m)	d_{50}	y (m)	d_{50}	y (m)	d_{50}	y (m)	d_{50}
0.1	0.10	**0.20**	0.10	**0.20**	0.10	**0.20**	0.10	**0.10**
0.2	0.15	**0.30**	0.15	**0.30**	0.16	**0.20**	0.16	**0.20**
0.3	0.20	**0.40**	0.20	**0.30**	0.21	**0.30**	0.21	**0.30**
0.4	0.24	**0.50**	0.25	**0.40**	0.25	**0.40**	0.26	**0.30**
0.5	0.28	**0.50**	0.28	**0.50**	0.29	**0.40**	0.30	**0.30**
0.6	0.31	**0.60**	0.32	**0.50**	0.33	**0.40**	0.34	**0.40**
0.8	0.38	**0.70**	0.39	**0.60**	0.40	**0.50**	0.41	**0.40**
1.0	0.44	**0.80**	0.45	**0.70**	0.46	**0.60**	0.47	**0.50**
1.2	0.50	**0.90**	0.51	**0.80**	0.52	**0.70**	0.53	**0.60**
1.4	0.55	**1.00**	0.57	**0.90**	0.58	**0.80**	0.59	**0.60**
1.6	0.60	**1.10**	0.62	**0.90**	0.63	**0.80**	0.64	**0.70**
1.8	0.65	**1.20**	0.67	**1.00**	0.68	**0.90**	0.70	**0.70**
2.0	0.70	**1.30**	0.72	**1.10**	0.73	**0.90**	0.75	**0.80**
3.0	0.92	**1.70**	0.94	**1.40**	0.96	**1.20**	0.98	**1.00**
4.0	1.11	**2.00**	1.14	**1.70**	1.16	**1.50**	1.19	**1.20**
5.0	1.29	**2.30**	1.32	**1.90**	1.34	**1.70**	1.38	**1.40**

[1] Flow depth is expected to be highly variable due to whitewater (turbulent) flow conditions.

Table 1 – Mean rock size, d_{50} (mm) for batter chute outlet protection [1]

Depth of approach flow (mm) [2]	Flow velocity at base of *Chute* (m/s)						
	2.0	**3.0**	**4.0**	**5.0**	**6.0**	**7.0**	**8.0**
50	100	100	100	200	200	200	300
100	100	100	200	200	300	300	400
200	100	200	300	300	400	[3]	[3]
300	200	200	300	400	[3]	[3]	[3]

[1] For exit flow velocities not exceeding 1.5 m/s, and where growing conditions allow, loose 100 mm rock may be replaced with 75 mm rock stabilised with a good cover of grass.

[2] This is the flow depth at the base of the chute as it approaches the outlet structure. The flow depth is based on the maximum depth, not the average flow depth.

[3] Consider using 400 mm grouted rock pad, or a rock-filled mattress outlet.

Table 2 – Recommended length, L (m) of rock pad for batter chute outlet protection

Depth of approach flow (mm)	Flow velocity at base of *Chute* (m/s)						
	2.0	**3.0**	**4.0**	**5.0**	**6.0**	**7.0**	**8.0**
50	1.0	1.5	2.1	2.6	3.1	3.6	4.2
100	1.3	2.0	2.7	3.4	4.1	4.8	5.5
200	2.1	2.7	3.4	4.3	5.2	6.1	7.0
300	2.7	3.6	4.3	4.8	5.8	6.8	7.9

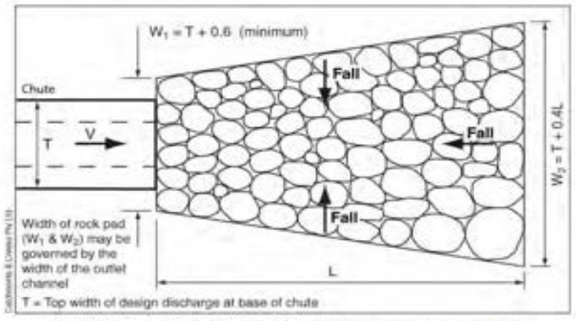
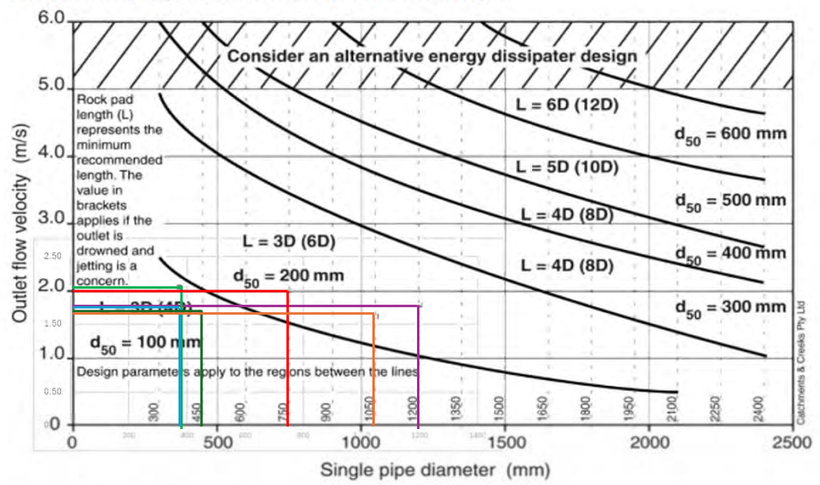


Figure 1 – Typical layout of a recessed rock pad for a chute (plan view)

Table 3 – Recommended recess depth, Z (m) for batter *Chute* outlet protection

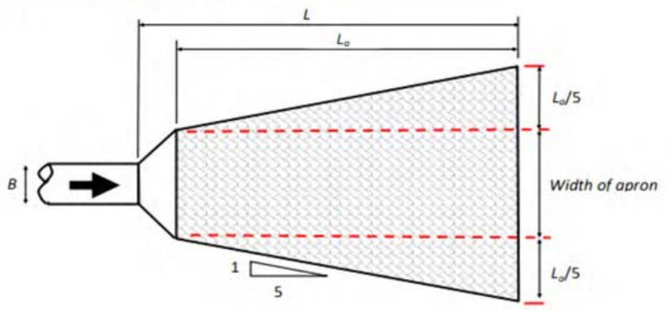
Depth of approach flow (mm)	Flow velocity at base of *Chute* (m/s)						
	2.0	**3.0**	**4.0**	**5.0**	**6.0**	**7.0**	**8.0**
50	0.13	0.20	0.28	0.36	0.43	0.50	0.60
100	0.14	0.23	0.32	0.42	0.50	0.60	0.70
200	0.12	0.21	0.31	0.42	0.50	0.60	0.70
300	0.07	0.16	0.25	0.35	0.44	0.55	0.65

Figure 3.15: Single pipe outlet minimum rock size and length of apron



Source: Catchments and Creeks (2011).

Figure 3.16: Rock apron detail for single pipe outlet



Appendix P Maintenance Diary

SD-0001 - Stromwater Drainage

A Instructions to Respondents

Complete the yellow input cells
Insert additional rows and/or columns as required.
For Frequency Interval, if an activity occurs more than once per year then the Frequency Interval will be a fraction of a year (e.g. an activity occurring every 3 months will have a Frequency Interval of 0.25 years).

B Maintenance and Asset Management Standards Applied

B.1	TS 01506 (T MU AM 01003 ST) Development of Technical Maintenance Plans
B.2	TS 01507 (T MU AM 01004 ST) Maintenance Service Schedule Classification and Compliance
B.3	TS 01508 Asset Handover Requirements
B.4	TS 01510 (T MU AM 01008 ST) Technical Maintenance Plans and Coding System
B.5	TS 01517 (T MU AM 01002 MA) Maintenance Requirements Analysis Manual

C Inspection and Preventative Maintenance Activities

	Asset Name	Activity Description	Frequency Interval (years)	Labour Hours °	Equipment Needs	Access Requirements	Notes
C.1	Bio Retention Basin 1	Visual Inspection for Debris and Damage	After major Storm		Nil	Nil above the Maintenance Access Strategy	
C.2	Bio Retention Basin 2	Visual Inspection for Debris and Damage	After major Storm		Nil	Nil above the Maintenance Access Strategy	
C.3	Bio Retention Basin 3	Visual Inspection for Debris and Damage	After major Storm		Nil	Nil above the Maintenance Access Strategy	
C.4	Bio Retention Basin 1	Inspection of Bio Filter Media, Flush of BioFilter Subsoil Drainage System	5				
C.5	Bio Retention Basin 2	Inspection of Bio Filter Media, Flush of BioFilter Subsoil Drainage System	5				
C.6	Bio Retention Basin 3	Inspection of Bio Filter Media, Flush of BioFilter Subsoil Drainage System	5				
C.7	GPT	Clean out GPT	1		Sucker Truck	Nil above the Maintenance Access Strategy	
C.8	Jelly Fish	Removal and Rinse of Cartridges Removal of Large Floating Debris Removal of accumulated sediment	0.5		Sucker truck and general utility.	Nil above the Maintenance Access Strategy	
C.9	Litter Baskets	Empty Litter Baskets	1			Access under ROL.	
C.10	Trench Drains (Tram Drain)	Visual Inspection	0.5		Nil	Closure of light rail/busway for activity.	
C.11	Trench Drains (ACO Drain)	Visual Inspection	0.5		Nil	Nil above the Maintenance Access Strategy	
C.12	Drainage Pipes	CCTV Inspection				Nil for pedstrian areas Closure of light rail/busway for activity for Pits on the PLRC	Undertake in the event of surcharge or observed blockage within a drainage pit.
C.13	Drainage Pits	Visual Inspection	1		Pit Lid Lifter	Nil for pedstrian areas Closure of light rail/busway for activity for Pits on the PLRC	

D Corrective maintenance activities

	Asset Name	Activity Description	Frequency Interval (years)	Labour Hours °	Equipment Needs	Access Requirements	Notes
D.1	Jelly Fish	Replace Jelly Fish Cartridges	2 to 5				Cartridge is accessed at each bi annual clean to confirm cartridge replacement.
D.2	Trench Drains (Tram Drain)	Flush Drains	Annual		High Pressure hose	Closure of light rail/busway for activity.	
D.3	Trench Drains (ACO Drain)	Flush Drains	Annual		High Pressure hose	Access from the ATL.	

E Whole of Life Refurbishment and Replacement Activities

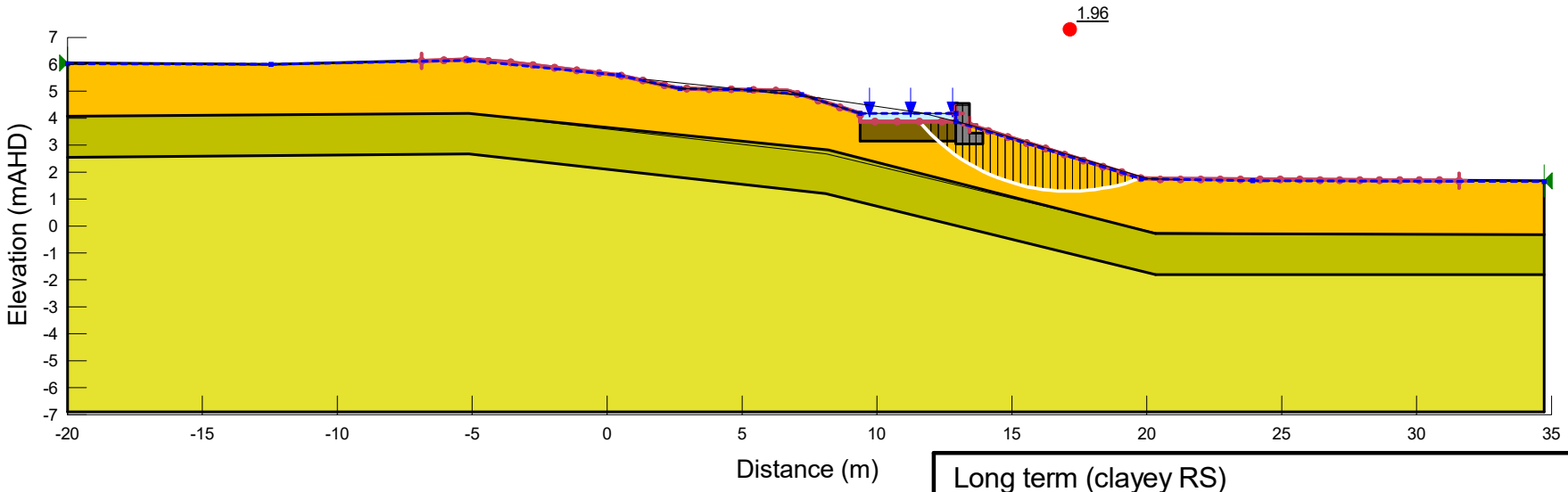
	Asset Name	Activity Description	Frequency Interval (Years)	Labour Hours °	Equipment Needs	Access Requirements	Notes
E.1	Bio Retention Basin 1	Replace Biofilter Media and vegetation	20		Excavator		
E.2	Bio Retention Basin 2	Replace Biofilter Media and vegetation	20		Excavator		
E.3	Bio Retention Basin 3	Replace Biofilter Media and vegetation	20		Excavator		
E.4	Jelly Fish	Replace Jelly Fish Cartridges	5				Undertake as per the Manaufacturers guidelines
E.5	Accessible Drainage Elements	Replace Pipes and Pits	50				

END OF SHEET

Appendix Q Geotechnical Calculations for Basins

Global Stability
Horz Seismic Coef.: 0

Color	Name	Slope Stability Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Surface
	Filter Media/Drainage Layer	Mohr-Coulomb	21	0	34	1
	General Fill	Mohr-Coulomb	20	5	30	1
	Residual Soil (Unit 5)	Mohr-Coulomb	20	6	28	1
	Sandstone block	High Strength	24			1
	Sandstone III (Unit 7C)	Mohr-Coulomb	24	200	35	1
	Sandstone IV (Unit 7B)	Mohr-Coulomb	24	75	35	1



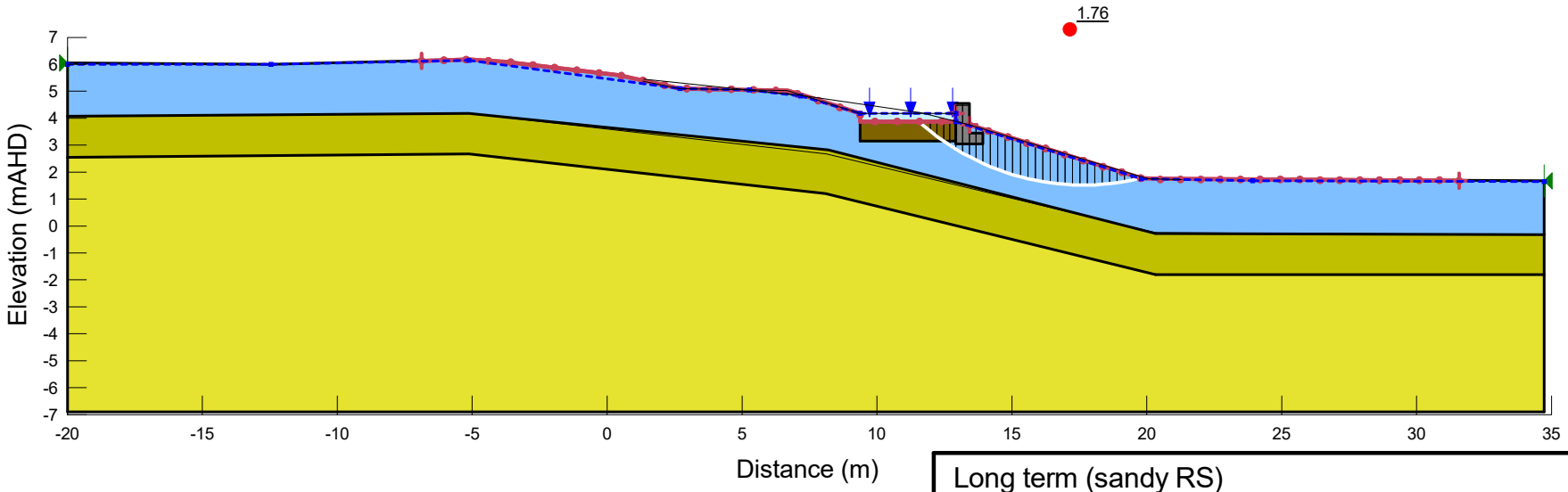
Long term (clayey RS)

Bioretention Basin 1.gsz

16/07/2025 1:250

Global Stability
Horz Seismic Coef.: 0

Color	Name	Slope Stability Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Surface
	Filter Media/Drainage Layer	Mohr-Coulomb	21	0	34	1
	General Fill	Mohr-Coulomb	20	5	30	1
	Residual Soil (Unit 5) (MD)	Mohr-Coulomb	20	3	34	1
	Sandstone block	High Strength	24			1
	Sandstone III (Unit 7C)	Mohr-Coulomb	24	200	35	1
	Sandstone IV (Unit 7B)	Mohr-Coulomb	24	75	35	1



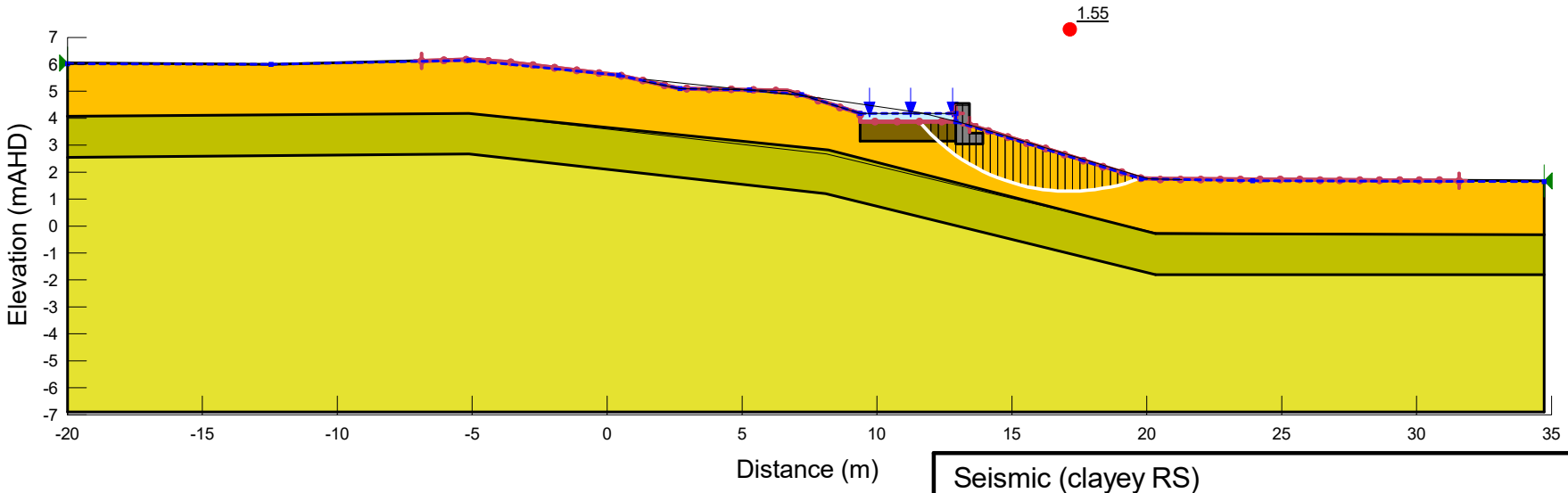
Long term (sandy RS)

Bioretention Basin 1.gsz

16/07/2025 1:250

Global Stability
Horz Seismic Coef.: 0.08

Color	Name	Slope Stability Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Surface
	Filter Media/Drainage Layer	Mohr-Coulomb	21	0	34	1
	General Fill	Mohr-Coulomb	20	5	30	1
	Residual Soil (Unit 5)	Mohr-Coulomb	20	6	28	1
	Sandstone block	High Strength	24			1
	Sandstone III (Unit 7C)	Mohr-Coulomb	24	200	35	1
	Sandstone IV (Unit 7B)	Mohr-Coulomb	24	75	35	1



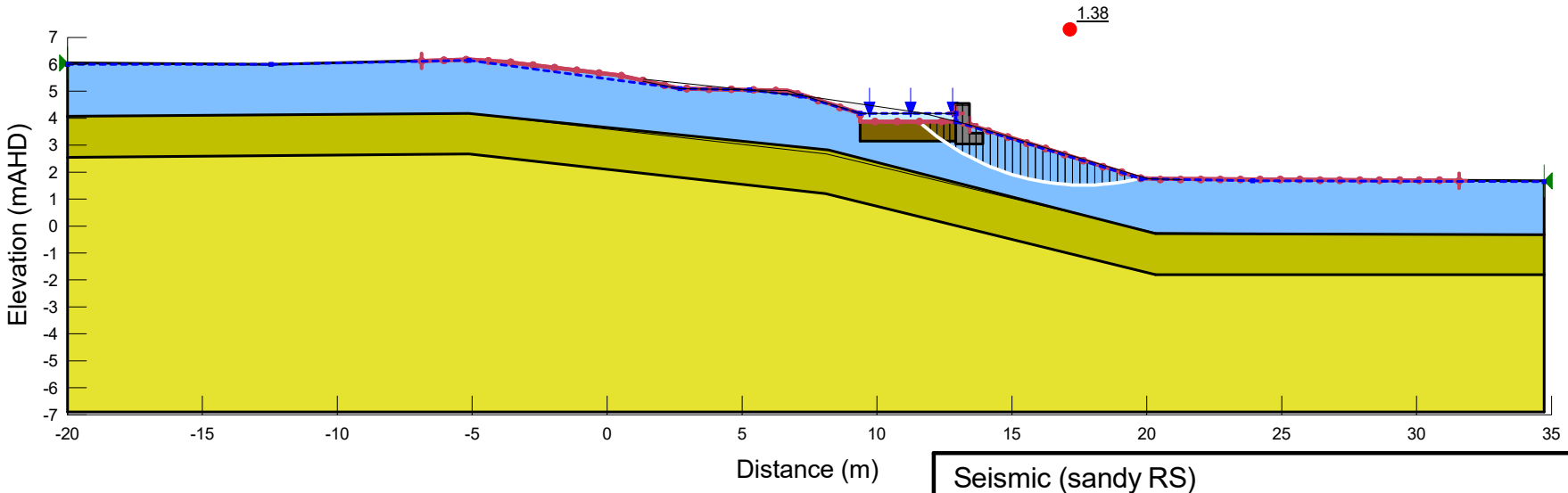
Seismic (clayey RS)

Bioretention Basin 1.gsz

16/07/2025 1:250

Global Stability
Horz Seismic Coef.: 0.08

Color	Name	Slope Stability Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Surface
	Filter Media/Drainage Layer	Mohr-Coulomb	21	0	34	1
	General Fill	Mohr-Coulomb	20	5	30	1
	Residual Soil (Unit 5) (MD)	Mohr-Coulomb	20	3	34	1
	Sandstone block	High Strength	24			1
	Sandstone III (Unit 7C)	Mohr-Coulomb	24	200	35	1
	Sandstone IV (Unit 7B)	Mohr-Coulomb	24	75	35	1



Seismic (sandy RS)

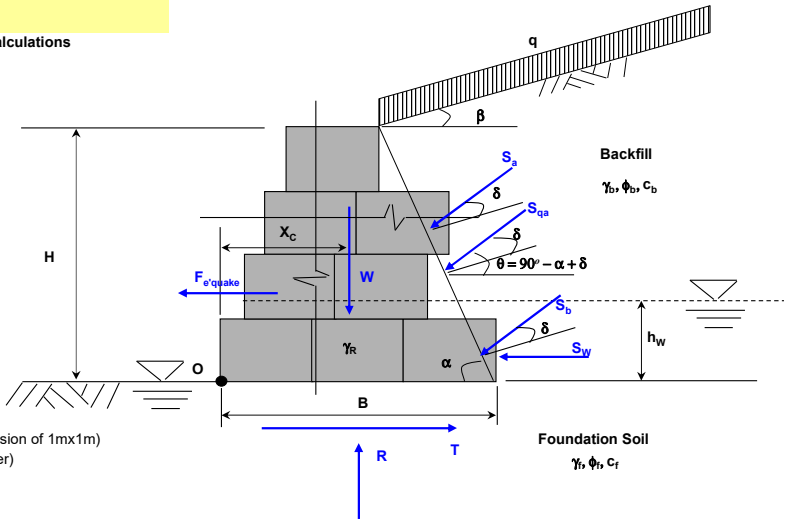
Bioretention Basin 1.gsz

16/07/2025 1:250

Client: TfNSW
Project: Parramatta Light Rail Stage 2 Enabling Works
Job No.: 12631444
Location: Bioretention Basin 1

Sandstone Block Wall External Stability Factor of Safety Calculations

Permanent Case



Backfill soil properties

γ_b =	20	(kN/m^3)
ϕ_b =	34	(degrees)
c_b =	0	(kPa)

Foundation soil properties

γ_f =	20	(kN/m^3)
ϕ_f =	28	(degrees)
c_f =	6	(kPa)

Retaining wall dimensions

H =	1.1	(m)
B =	1	(m)
h_W =	1.3	(m)
N =	1	(No. of blocks, Each block dimension of 1mx1m)
N_{sumb} =	1	(No. of blocks submerged in water)
γ_R =	25	(kN/m^3)
α =	90	(degrees)
β =	0	(degrees)
δ =	22.78	(degrees)
x_c =	0.375	(m)
q_{ult} =	375	(kPa) Ultimate foundation end bearing pressure

Passive side soil properties

γ_b =	20	(kN/m^3)
ϕ_b =	28	(degrees)
c_b =	6	(kPa)
Embedment=	0.3	m
GWL=	0	m

Surchage load and Earthquake load

q =	0	(kPa)
a_H =	0.08	Horizontal earthquake acceleration coefficient
K_a =	0.254	
θ =	22.78	(degrees)
π/180 =	0.01745	
Kp=	2.770	

$$S_{a1} = \frac{\gamma_b H^2 K_a}{2} - 2c_b H\sqrt{K_a}$$

$$S_{a2} = \frac{\gamma_b H^2 K_a}{2}$$

Factor of safety against sliding

S_{a1} (kN/m)	S_{a2} (kN/m)	S_{b1} (kN/m)	S_{w1} (kN/m)	S_{qa} (kN/m)	W (kN/m)	$F_{e'quake}$ (kN/m)	T_1 (kN/m)	T_2 (kN/m)	R_1 (kN/m)	R_2 (kN/m)	Passive Resistance (kN/m)	FoS_1	FoS_2
0.10	0.10	0.87	8.29	0.00	25.00	1.00	10.18	10.18	25.38	25.38	1.25	2.18	2.18
												OK	OK

Factor of safety against overturning

Centroid, x_c (m)	M_r (kNm/m)	M_{d1} (kNm/m)	M_{d2} (kNm/m)	FoS_1	FoS_2
0.38	9.50	4.05	4.05	2.35	2.35
				OK	OK

Factor of safety for wall bearing pressure

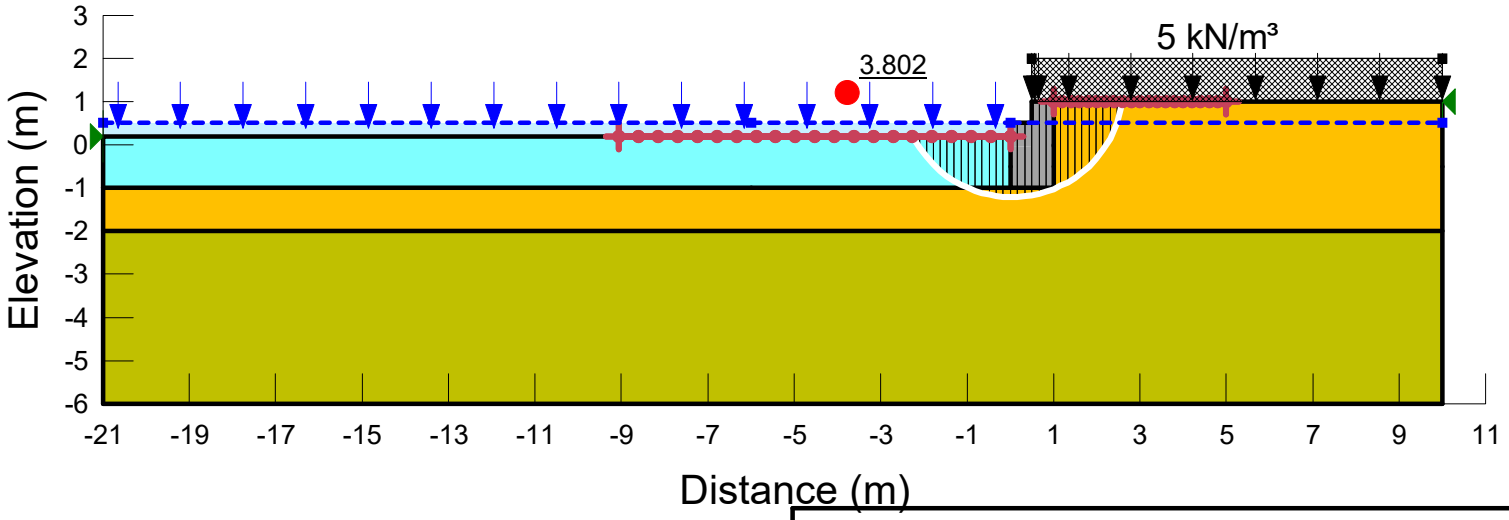
Moment arm X_{d1} (m)	Moment arm X_{d2} (m)	Eccentricity e_1 (m)	Eccentricity e_2 (m)	P_{av1} (kPa)	P_{min1} (kPa)	P_{max1} (kPa)	P_{av2} (kPa)	P_{min2} (kPa)	P_{max2} (kPa)
0.21	0.21	0.29	0.29	59.03	-18.03	68.78	59.03	-18.03	68.78

FoS_1			FoS_2		
6.35	-20.80	5.45	6.35	-20.80	5.45
		OK			OK

Global Stability

Horz Seismic Coef.:

Color	Name	Slope Stability Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Surface
	Block	High Strength	26			1
	Class IV Sandstone (Unit 7B)	Mohr-Coulomb	24	75	35	1
	Filter Media/ Drainage Layer	Mohr-Coulomb	20	0	34	1
	Residual Soil (Unit 5)	Mohr-Coulomb	20	6	28	1



Permanent - High GW

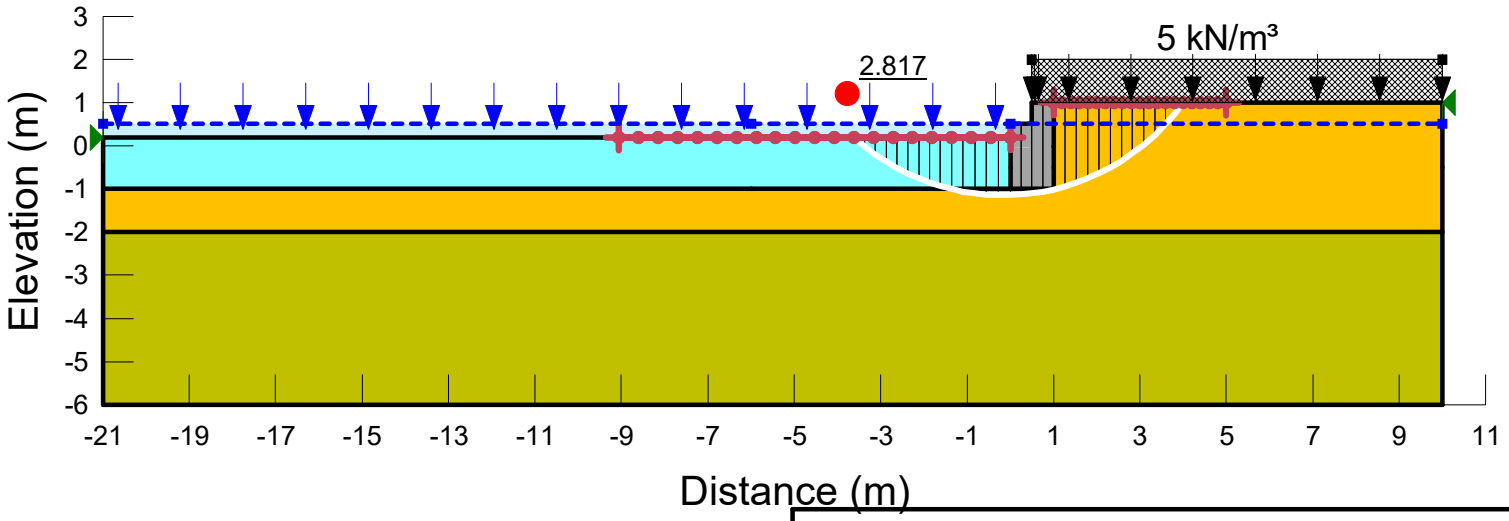
Bioretention Basin 2.gsz

16/07/2025 1:175

Global Stability

Horz Seismic Coef.: 0.08

Color	Name	Slope Stability Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Surface
	Block	High Strength	26			1
	Class IV Sandstone (Unit 7B)	Mohr-Coulomb	24	75	35	1
	Filter Media/ Drainage Layer	Mohr-Coulomb	20	0	34	1
	Residual Soil (Unit 5)	Mohr-Coulomb	20	6	28	1



Seismic - High GW

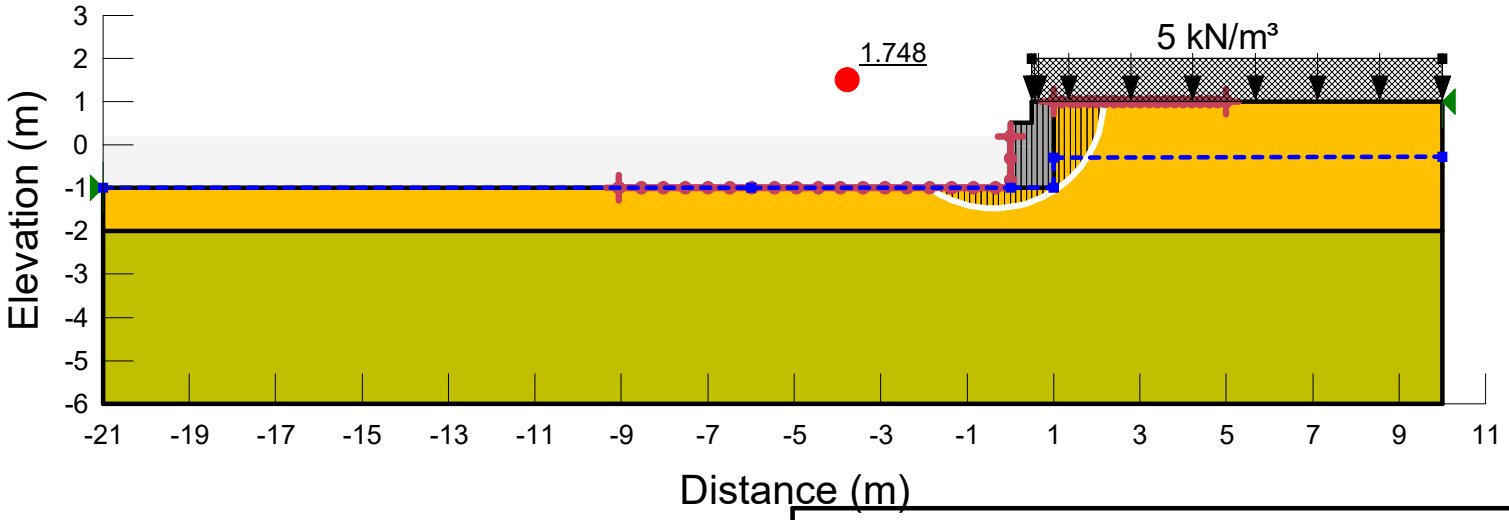
Bioretention Basin 2.gsz

16/07/2025 1:175

Global Stability

Horz Seismic Coef.:

Color	Name	Slope Stability Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Surface
	Block	High Strength	26			1
	Class IV Sandstone (Unit 7B)	Mohr-Coulomb	24	75	35	1
	Residual Soil (Unit 5)	Mohr-Coulomb	20	6	28	1



Temporary - GW at base

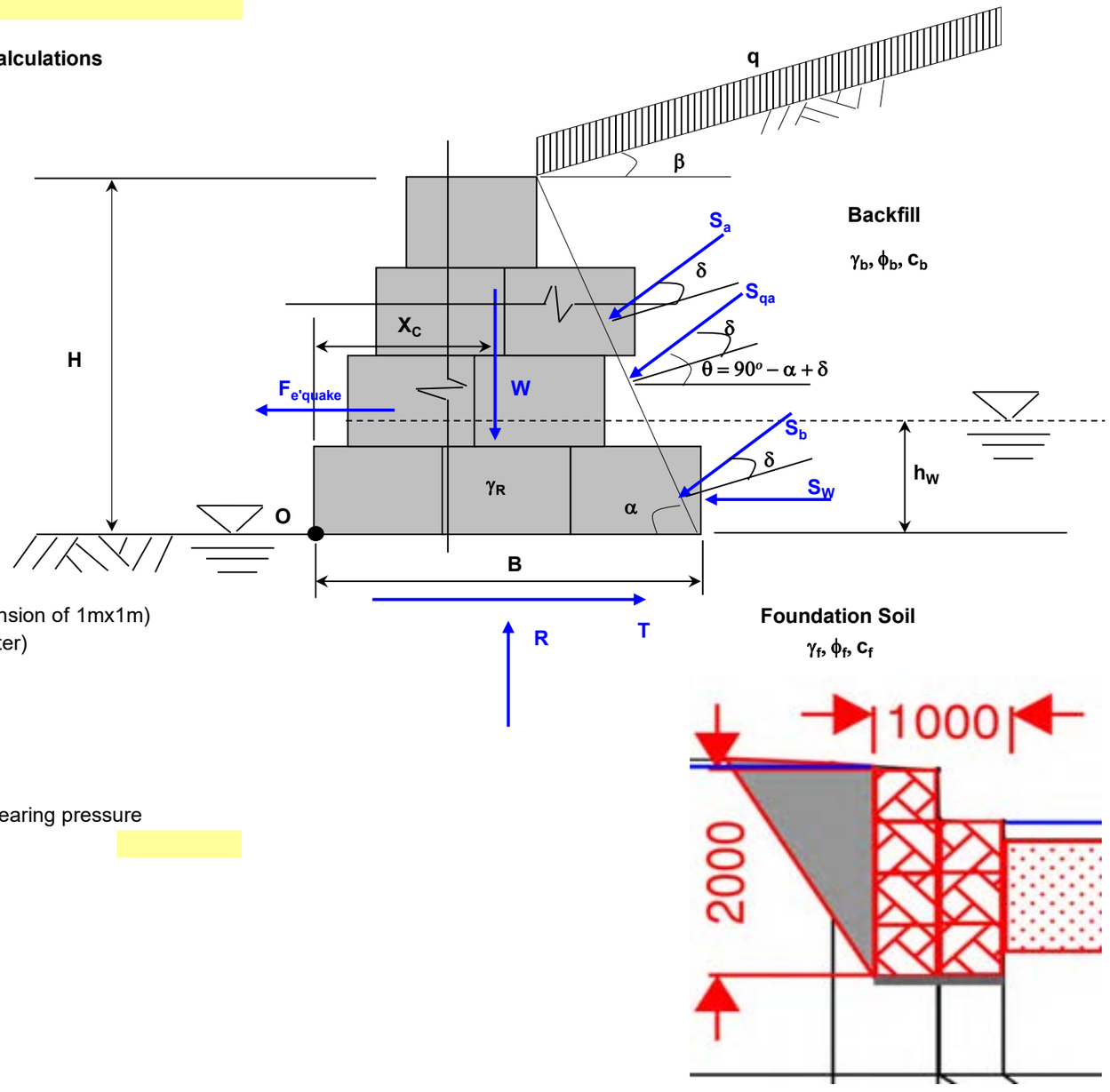
Bioretention Basin 2.gsz

16/07/2025 1:175

Client: TfNSW
Project: Parramatta Light Rail Stage 2 Enabling Works
Job No.: 12631444
Bioretention Basin 2 - Outer Wall

Sandstone Block Wall External Stability Factor of Safety Calculations

Permanent



Backfill soil properties

γ_b =	20	(kN/m^3)
ϕ_b =	34	(degrees)
c_b =	0	(kPa)

Foundation soil properties

γ_f =	20	(kN/m^3)
ϕ_f =	28	(degrees)
c_f =	6	(kPa)

Retaining wall dimensions

H =	2	(m)
B =	1	(m)
h_W =	2	(m)
N =	1.75	(No. of blocks, Each block dimension of 1mx1m)
N_{sumb} =	0.67	(No. of blocks submerged in water)
γ_R =	25	(kN/m^3)
α =	90	(degrees)
β =	0	(degrees)
δ =	22.78	(degrees)
x_c =	0.46	(m)
q_{ult} =	500	(kPa) Ultimate foundation end bearing pressure

Passive side soil properties

γ_b =	20	(kN/m^3)
ϕ_b =	28	(degrees)
c_b =	6	(kPa)
Embedment=	1.2	m
GWL=	1.5	m

Surchage load and Earthquake load

q =	5	(kPa)
a_H =	0.08	Horizontal earthquake acceleration coefficient
K_a =	0.254	
θ =	22.78	(degrees)
π/180 =	0.017453278	
Kp=	2.770	

$$S_{a1} = \frac{\gamma_b H^2 K_a}{2} - 2c_b H\sqrt{K_a}$$

$$S_{a2} = \frac{\gamma_b H^2 K_a}{2}$$

Factor of safety against sliding

S_{a1} (kN/m)	S_{a2} (kN/m)	S_{b1} (kN/m)	S_{w1} (kN/m)	S_{qa} (kN/m)	W (kN/m)	$F_{e'quake}$ (kN/m)	T_1 (kN/m)	T_2 (kN/m)	R_1 (kN/m)	R_2 (kN/m)	Passive Resistance (kN/m)	FoS_1	FoS_2
0.00	0.00	5.18	19.62	2.54	43.75	1.75	28.49	28.49	46.74	46.74	19.94	3.61	3.61
												OK	OK

Factor of safety against overturning

Centroid, x_c (m)	M_r (kNm/m)	M_{d1} (kNm/m)	M_{d2} (kNm/m)	FoS_1	FoS_2
0.46	33.91	16.79	16.79	2.02	2.02
				OK	OK

Factor of safety for wall bearing pressure

Moment arm X_{d1} (m)	Moment arm X_{d2} (m)	Eccentricity e_1 (m)	Eccentricity e_2 (m)	P_{av1} (kPa)	P_{min1} (kPa)	P_{max1} (kPa)	P_{av2} (kPa)	P_{min2} (kPa)	P_{max2} (kPa)
0.37	0.37	0.13	0.13	63.77	9.30	84.19	63.77	9.30	84.19

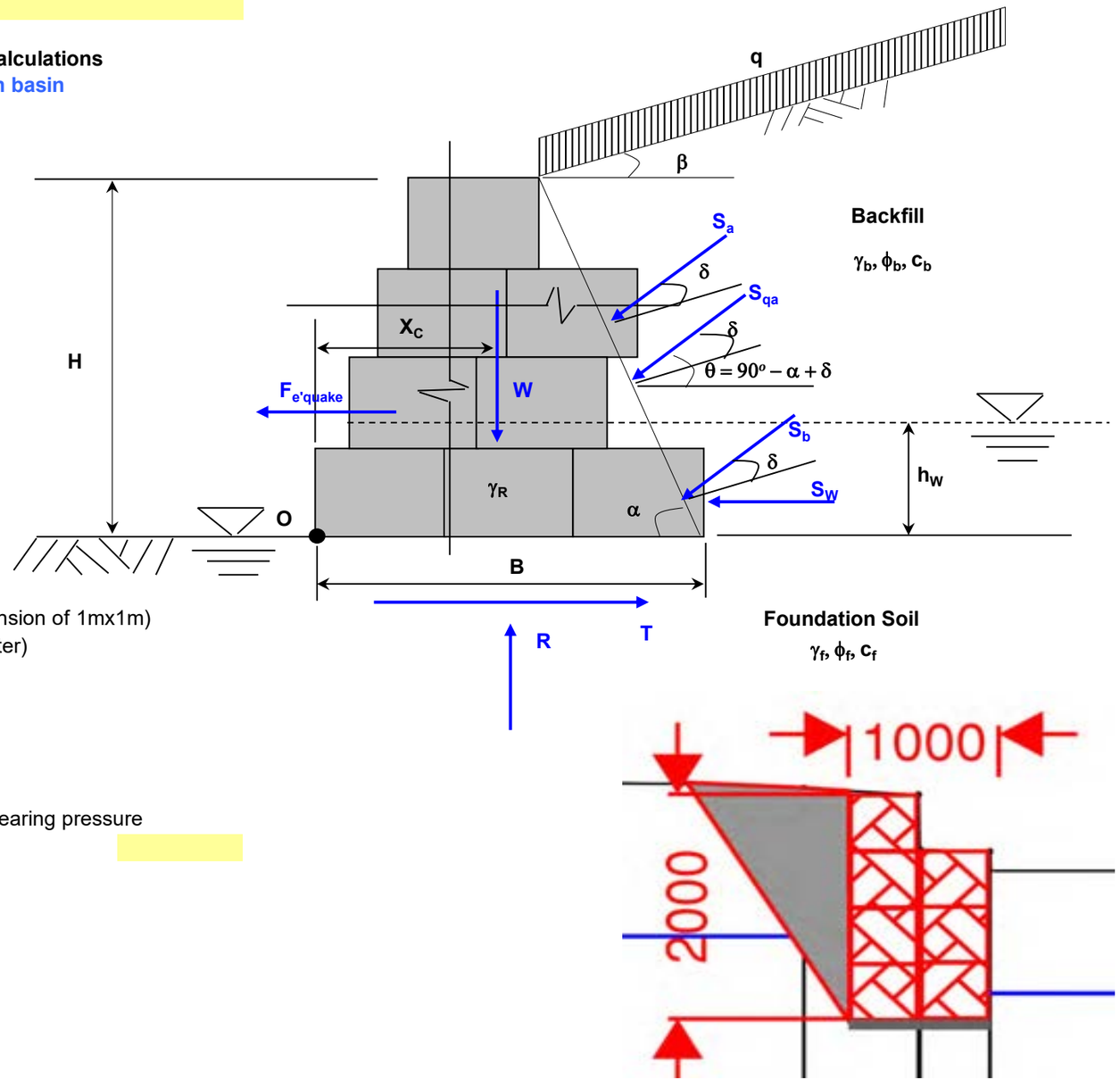
FoS_1			FoS_2		
7.84	53.79	5.94	7.84	53.79	5.94
		OK			OK

GHD Geotechnics
16/07/2025

Client: TfNSW
Project: Parramatta Light Rail Stage 2 Enabling Works
Job No.: 12631444
Bioretention Basin 2 - Outer Wall

Sandstone Block Wall External Stability Factor of Safety Calculations

Temporary - No filter media/drainage layer and water within basin



Backfill soil properties

γ_b =	20	(kN/m^3)
ϕ_b =	34	(degrees)
c_b =	0	(kPa)

Foundation soil properties

γ_f =	20	(kN/m^3)
ϕ_f =	28	(degrees)
c_f =	6	(kPa)

Retaining wall dimensions

H =	2	(m)
B =	1	(m)
h_W =	0.67	(m)
N =	1.75	(No. of blocks, Each block dimension of 1mx1m)
N_{sumb} =	0.67	(No. of blocks submerged in water)
γ_R =	25	(kN/m^3)
α =	90	(degrees)
β =	0	(degrees)
δ =	22.78	(degrees)
x_c =	0.46	(m)
q_{ult} =	500	(kPa) Ultimate foundation end bearing pressure

Passive side soil properties

γ_b =	20	(kN/m^3)
ϕ_b =	28	(degrees)
c_b =	6	(kPa)
Embedment=	0	m
GWL=	0	m

Surchage load and Earthquake load

q =	5	(kPa)
a_H =	0.08	Horizontal earthquake acceleration coefficient
K_a =	0.254	
θ =	22.78	(degrees)
π/180 =	0.017453278	
Kp=	2.770	

$$S_{a1} = \frac{\gamma_b H^2 K_a}{2} - 2c_b H\sqrt{K_a}$$

$$S_{a2} = \frac{\gamma_b H^2 K_a}{2}$$

Factor of safety against sliding

S_{a1} (kN/m)	S_{a2} (kN/m)	S_{b1} (kN/m)	S_{w1} (kN/m)	S_{qa} (kN/m)	W (kN/m)	$F_{e'quake}$ (kN/m)	T_1 (kN/m)	T_2 (kN/m)	R_1 (kN/m)	R_2 (kN/m)	Passive Resistance (kN/m)	FoS_1	FoS_2
4.50	4.50	5.11	2.20	2.54	43.75	1.75	15.16	15.16	48.46	48.46	0.00	2.10	2.10
												OK	OK

Factor of safety against overturning

Centroid, x_c (m)	M_r (kNm/m)	M_{d1} (kNm/m)	M_{d2} (kNm/m)	FoS_1	FoS_2
0.46	20.31	4.97	4.97	4.09	4.09
				OK	OK

Factor of safety for wall bearing pressure

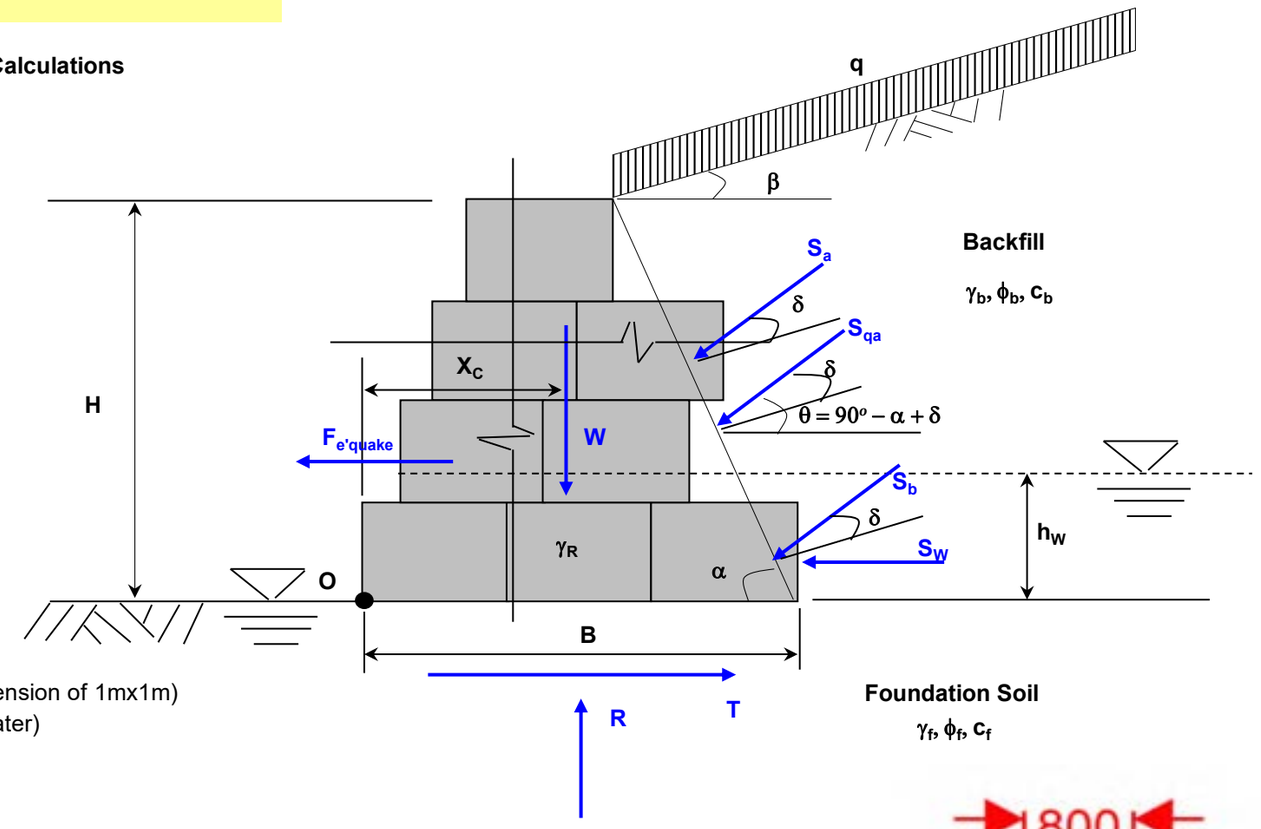
Moment arm X_{d1} (m)	Moment arm X_{d2} (m)	Eccentricity e_1 (m)	Eccentricity e_2 (m)	P_{av1} (kPa)	P_{min1} (kPa)	P_{max1} (kPa)	P_{av2} (kPa)	P_{min2} (kPa)	P_{max2} (kPa)
0.32	0.32	0.18	0.18	76.50	-4.83	101.75	76.50	-4.83	101.75

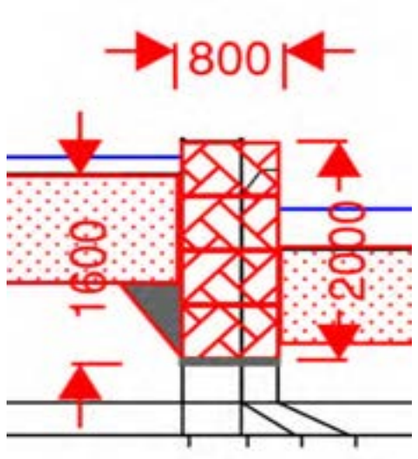
FoS_1			FoS_2		
6.54	-103.42	4.91	6.54	-103.42	4.91
		OK			OK

Client: TfNSW
Project: Parramatta Light Rail Stage 2 Enabling Works
Job No.: 12631444
Bioretention Basin 2 - Middle Wall (Weir)

Sandstone Block Wall External Stability Factor of Safety Calculations

Permanent Case





Backfill soil properties

γ_b =	20	(kN/m^3)
ϕ_b =	34	(degrees)
c_b =	0	(kPa)

Foundation soil properties

γ_f =	20	(kN/m^3)
ϕ_f =	28	(degrees)
c_f =	6	(kPa)

Retaining wall dimensions

H =	1.6	(m)
B =	0.8	(m)
h_W =	1.9	(m)
N =	1.6	(No. of blocks, Each block dimension of 1mx1m)
N_{sumb} =	1.2	(No. of blocks submerged in water)
γ_R =	25	(kN/m^3)
α =	90	(degrees)
β =	0	(degrees)
δ =	22.78	(degrees)
x_c =	0.4	(m)
q_{ult} =	500	(kPa) Ultimate foundation end bearing pressure

Passive side soil properties

γ_b =	20	(kN/m^3)
ϕ_b =	34	(degrees)
c_b =	0	(kPa)
Embedment=	1	m
GWL=	1.5	m

Surchage load and Earthquake load

q =	0	(kPa)
a_H =	0.08	Horizontal earthquake acceleration coefficient
K_a =	0.254	
θ =	22.78	(degrees)
π/180 =	0.0175	
Kp=	3.537	

$$S_{a1} = \frac{\gamma_b H^2 K_a}{2} - 2c_b H\sqrt{K_a}$$

$$S_{a2} = \frac{\gamma_b H^2 K_a}{2}$$

Factor of safety against sliding

S_{a1} (kN/m)	S_{a2} (kN/m)	S_{b1} (kN/m)	S_{w1} (kN/m)	S_{qa} (kN/m)	W (kN/m)	$F_{e'quake}$ (kN/m)	T_1 (kN/m)	T_2 (kN/m)	R_1 (kN/m)	R_2 (kN/m)	Passive Resistance (kN/m)	FoS_1	FoS_2
0.23	0.23	1.78	17.71	0.00	40.00	1.60	21.16	21.16	40.78	40.78	17.69	7.63	7.63
												OK	OK

Factor of safety against overturning

Centroid, x_c (m)	M_r (kNm/m)	M_{d1} (kNm/m)	M_{d2} (kNm/m)	FoS_1	FoS_2
0.40	27.52	12.86	12.86	2.14	2.14
				OK	OK

Factor of safety for wall bearing pressure

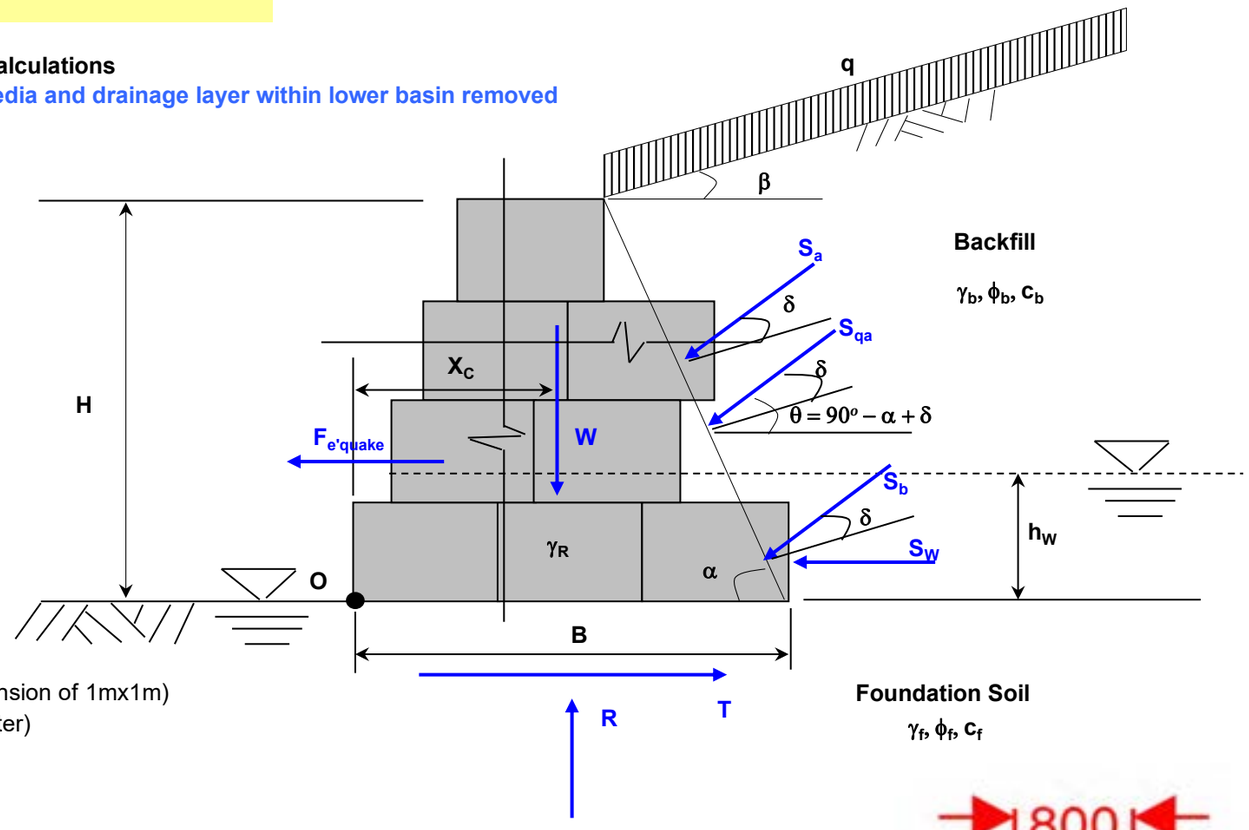
Moment arm X_{d1} (m)	Moment arm X_{d2} (m)	Eccentricity e_1 (m)	Eccentricity e_2 (m)	P_{av1} (kPa)	P_{min1} (kPa)	P_{max1} (kPa)	P_{av2} (kPa)	P_{min2} (kPa)	P_{max2} (kPa)
0.36	0.36	0.04	0.04	56.73	35.46	66.48	56.73	35.46	66.48

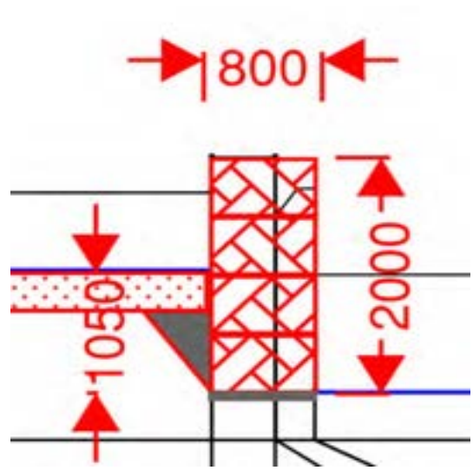
FoS_1			FoS_2		
8.81	14.10	7.52	8.81	14.10	7.52
		OK			OK

Client: TfNSW
Project: Parramatta Light Rail Stage 2 Enabling Works
Job No.: 12631444
Location: Bioretention Basin 2 - Middle Wall (Weir)

Sandstone Block Wall External Stability Factor of Safety Calculations

Temporary - No filter media in upper basin and the filter media and drainage layer within lower basin removed





Backfill soil properties

γ_b =	20	(kN/m^3)
ϕ_b =	34	(degrees)
c_b =	0	(kPa)

Foundation soil properties

γ_f =	20	(kN/m^3)
ϕ_f =	28	(degrees)
c_f =	6	(kPa)

Retaining wall dimensions

H =	1.05	(m)
B =	0.8	(m)
h_W =	1.05	(m)
N =	1.6	(No. of blocks, Each block dimension of 1mx1m)
N_{sumb} =	0	(No. of blocks submerged in water)
γ_R =	25	(kN/m^3)
α =	90	(degrees)
β =	0	(degrees)
δ =	22.78	(degrees)
x_c =	0.4	(m)
q_{ult} =	500	(kPa) Ultimate foundation end bearing pressure

Passive side soil properties

γ_b =	20	(kN/m^3)
ϕ_b =	28	(degrees)
c_b =	6	(kPa)
Embedment=	0	m
GWL=	0	m

Surchage load and Earthquake load

q =	0	(kPa)
a_H =	0.08	Horizontal earthquake acceleration coefficient
K_a =	0.254	
θ =	22.78	(degrees)
π/180 =	0.01745	
Kp=	2.770	

$$S_{a1} = \frac{\gamma_b H^2 K_a}{2} - 2c_b H\sqrt{K_a}$$

$$S_{a2} = \frac{\gamma_b H^2 K_a}{2}$$

Factor of safety against sliding

S_{a1} (kN/m)	S_{a2} (kN/m)	S_{b1} (kN/m)	S_{w1} (kN/m)	S_{qa} (kN/m)	W (kN/m)	$F_{e'quake}$ (kN/m)	T_1 (kN/m)	T_2 (kN/m)	R_1 (kN/m)	R_2 (kN/m)	Passive Resistance (kN/m)	FoS_1	FoS_2
0.00	0.00	1.43	5.41	0.00	40.00	1.60	8.32	8.32	40.55	40.55	0.00	3.17	3.17
												OK	OK

Factor of safety against overturning

Centroid, x_c (m)	M_r (kNm/m)	M_{d1} (kNm/m)	M_{d2} (kNm/m)	FoS_1	FoS_2
0.40	16.00	2.47	2.47	6.47	6.47
				OK	OK

Factor of safety for wall bearing pressure

Moment arm X_{d1} (m)	Moment arm X_{d2} (m)	Eccentricity e_1 (m)	Eccentricity e_2 (m)	P_{av1} (kPa)	P_{min1} (kPa)	P_{max1} (kPa)	P_{av2} (kPa)	P_{min2} (kPa)	P_{max2} (kPa)
0.33	0.33	0.07	0.07	60.78	25.45	75.93	60.78	25.45	75.93

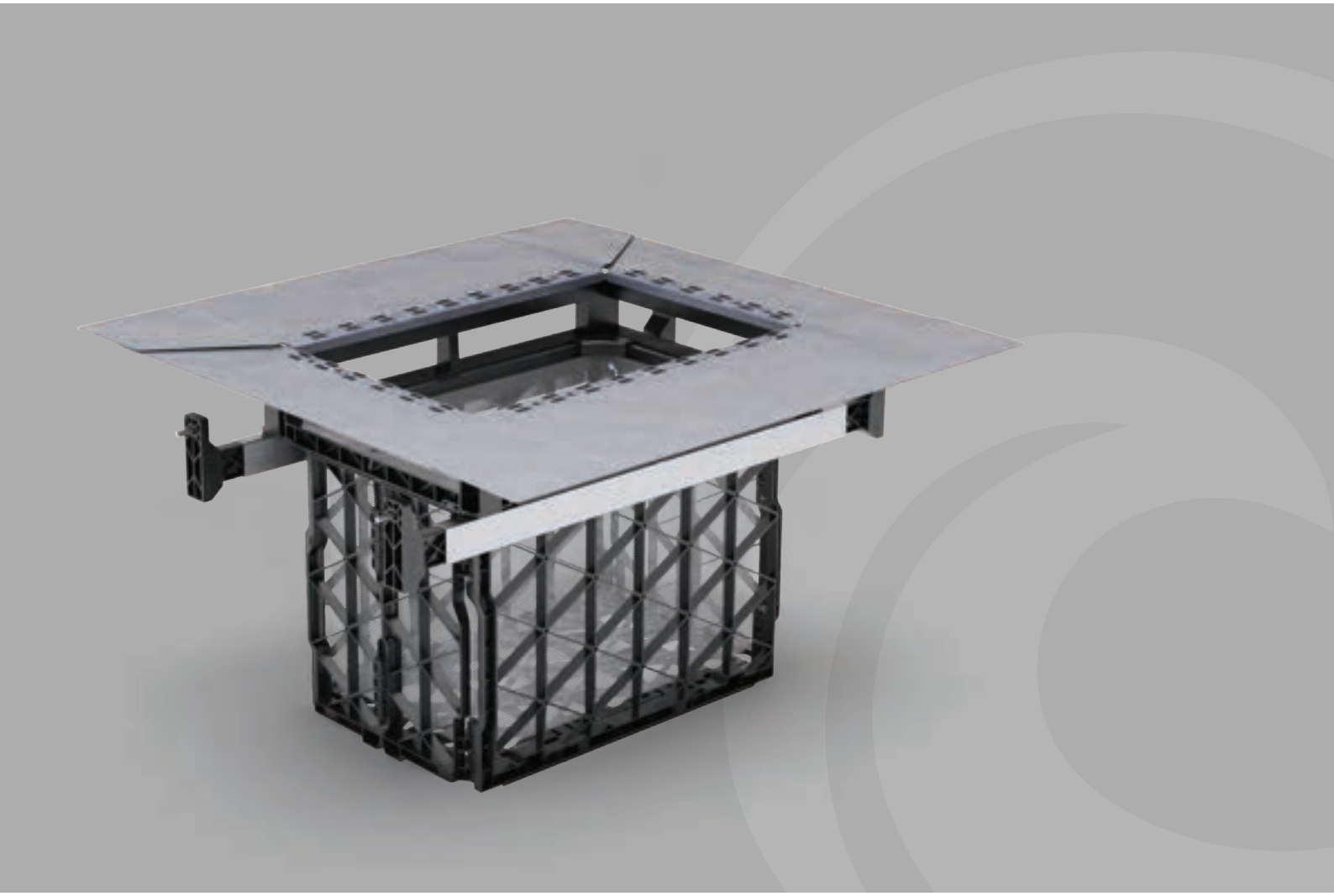
FoS_1			FoS_2		
8.23	19.65	6.58	8.23	19.65	6.58
		OK			OK

Appendix R Water Quality Device Data Sheets

OCEAN PROTECT

OceanGuard®

Installation Guide



Stopping Pollution Entering Waterways

07/24

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Introduction	3
Equipment	4
Components	4
Configurations	7
Installation Procedure	8

Introduction

The purpose of this manual is to advise the safest and most efficient method for installing the OceanGuard®.

This document does not include any details relating to OH&S procedures or requirements related to gully pit installation. It is recommended that all personnel performing installation activities evaluate their own requirements for the compliance with relevant industry regulations and guidelines.

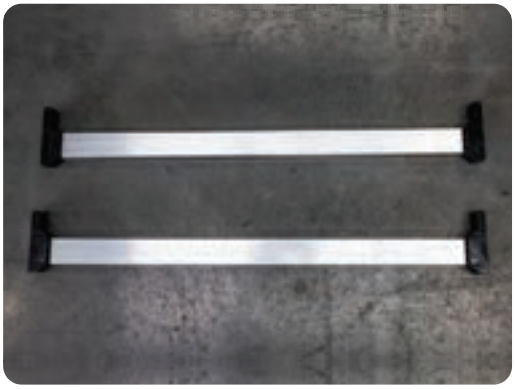
Equipment

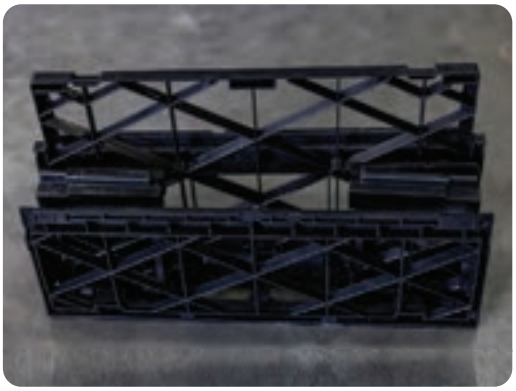
Typical tools required for installation include:

- **Tape measure**
- **Marking tools (marker, spray paint etc.)**
- **8mm masonry drill & drill bit**
- **10mm socket and ratchet**
- **Hammer**
- **Stanley knife**
- **Straight edge**
- **Hacksaw**

Components

Part ID	Qty	Description	
	1	**Cardboard Box**	
A	2	**Overflow Frame (long)**	
B	2	**Overflow Frame (short)**	

Part ID	Qty	Description	
C	2	Divertor Panel (long)	
D	2	Divertor Panel (short)	
	2	Support Strut	
	4	Wall Bracket / Mount	

Part ID	Qty	Description	
	1	**Filtration Cage**	
	1	**Filtration Bag & Support Ring**	
	4	**Dynabolts**	
	2	**Self-tapping screws**	

Configurations

The OceanGuard® can fit a range of pits typically found in Australia including, kerb entry, rear entry with grated drain entry as well as field gully pits. There are multiple sizes to suit pits ranging in plan dimensions of *450 x 450mm to 900mm x 900mm*. Additional custom sizes are available to suit large circular and non-standard pits.

The standard OceanGuard® installation collects surface flow only *(see Figure 1)*. In some instances, it may be necessary to collect pipe flow, however in this scenario design checks by a suitably qualified engineer need to be undertaken. Please note that the OceanGuard® technology is not a replacement for an in-line gross pollutant trap. Please consult Ocean Protect or the suitably qualified engineer for clarification.

Example Configuration Details:

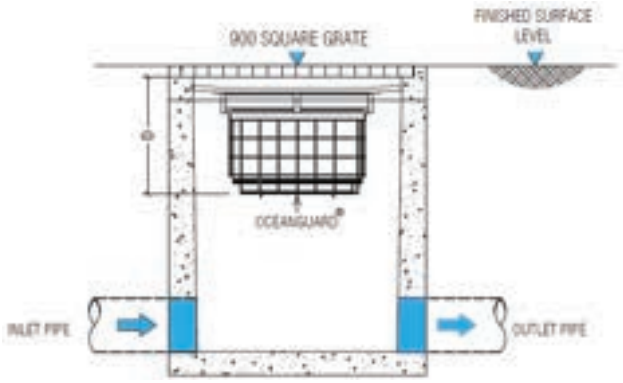


Figure 1: Standard configuration – surface flow

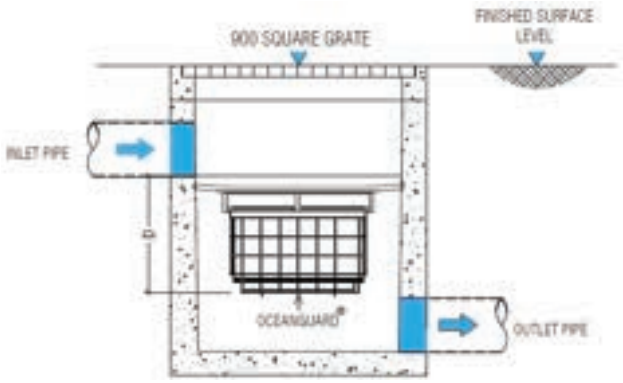


Figure 2: Example configuration – pipe flow

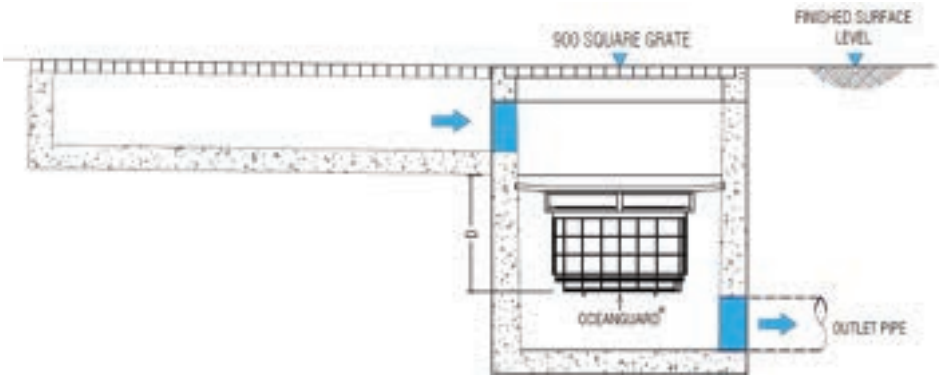


Figure 3: Example configuration – Grated strip/trench drain

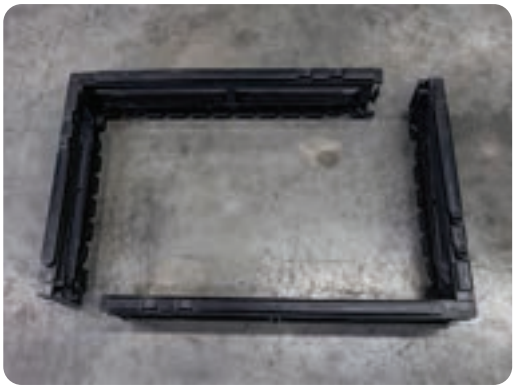
Installation Procedure

Overflow Box Assembly

1 Identify
1 x Overflow Frame (long) **PART A**
1 x Overflow Frame (short) **PART B**

2 Interlock the corner connection, as shown below. Press down and click components together

3 Repeat Step 1 and 2 for the second half



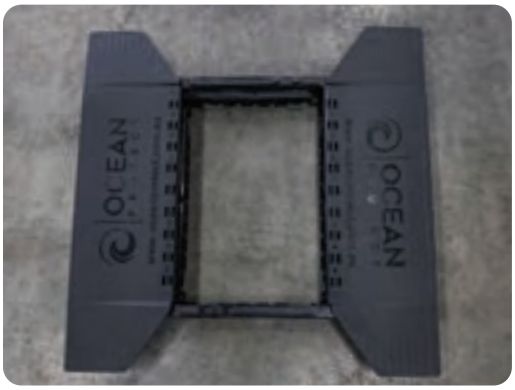
4 Interlock the ends of the two L-shaped sections of Overflow Frame simultaneously, as shown below

5 Press down on the corners to click together

Divertor Panel Installation

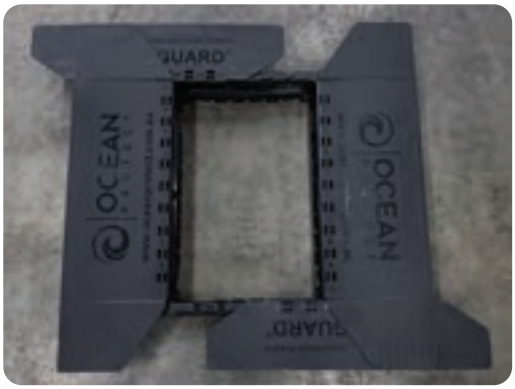
1 Identify
1 x Divertor Panel (long) **PART C**

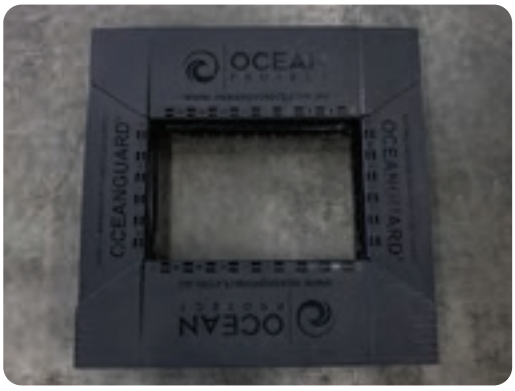
2 Align **Part C** on to the **Part A** overflow frame (long side), making sure to note the directional arrows
Slide all the way to the end of **Part A,** as shown below



3 Identify
1 x Divertor Panel (short) **PART D**

4 Align **Part D** onto **Part B** overflow frame (short side), making sure to note the directional arrows
Slide underneath the long panels installed in Step 2
Slide all the way to the end of **Part B**, as shown below





Strut Location Template

The cardboard box includes templates to assist in the installation of the OceanGuard
The Strut Location Template is the bottom panel as shown below in Step 1

1 Using a Stanley knife, safely cut along the box seam to remove the Strut Location Template panel
This template will be used to mark fixing locations on the pit wall

2 Using a Stanley knife, trim Strut Location Template to match the internal pit dimension of the strut mounting wall

NOTE: Strut mounting template can be reused on multiple pits, so long as the centre line of each pit is aligned with the centre line of the template

Strut Installation

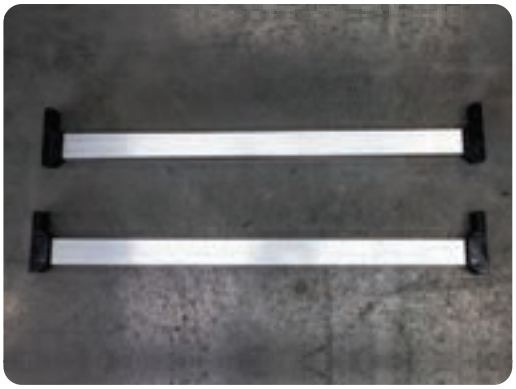
1 Select pit wall for strut mounting, measure, and mark centre line

2 Align the centreline on Strut Location Template with centreline of the pit, ensuring the top edge of the template is level with the desired finished Divertor Panel level (i.e. incoming flow invert level)

3 Hold Strut Location Template in place and drill through both marked points with 8mm masonry drill bit

4 Repeat Step 3 on opposite pit wall

5 Identify
4 x Wall Bracket/Mount
4 x 8mm Dynabolts
2 x Support Struts



6 Insert 2 x Wall Bracket into each end of the support strut

7 Align Wall Brackets with hole drilled in Step 3

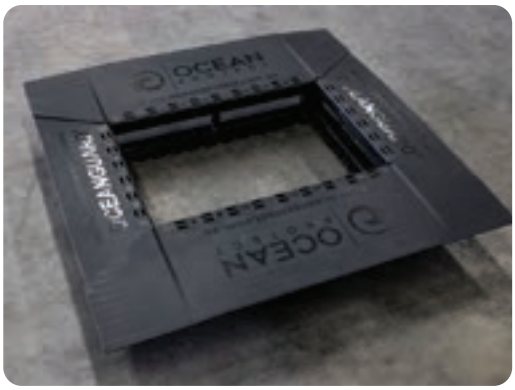
8 Seat Dynabolt in place using hammer
Repeat Steps 7 & 8 to have 2 struts in place

9 Double check spacing between struts matches the Flow Divertor internal frame width and adjust spacing if required by gently tapping struts with hammer

10 Secure struts in place by tightening the Dynabolts

Flow Divertor Install

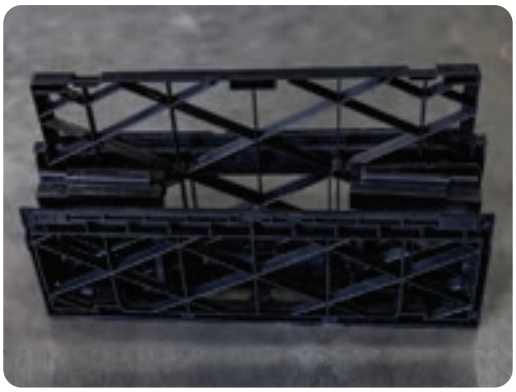
1 Return to the completed Flow Divertor



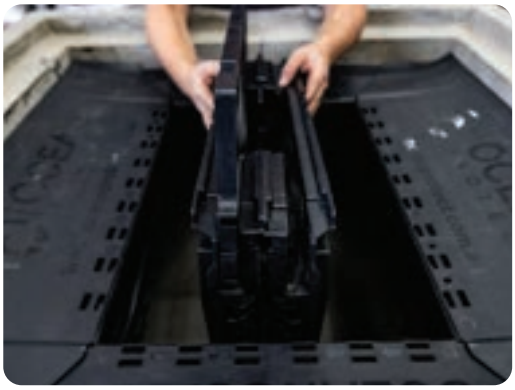
2 If Flow Divertor needs to be reduced in size to suit pit, invert the Flow Divertor and place on a flat surface
Then, using a Stanley knife, score the marked trim lines and fold back edge removing the excess

3 Lower and press flow divertor into position ensuring the underside of flow divertor is in good contact with both struts
The Divertor Panels should fit snug with the internal pit walls

4 Identify the Filtration Cage



5 Lower Filtration Cage into the centre of the Overflow Divertor frame and unfold the cage
The edges of the Filtration Cage will lock into the Overflow Divertor



6 Ensure all four edges of the Filtration cage are pushed flush against Flow Divertor and push base of Filtration Cage into position. It will click together

7 Identify the Filtration Bag and Support Ring

8 Lower the Filtration bag into the Flow Divertor ensuring a secure fit

9 Identify the 2 x Self-tapping screws which will be used to fasten the Flow Diverter Frame to the struts

10 Insert the self-tapping screws into holes located on long edge of Overflow Box
Secure in place, driving the screw into the aluminium strut below
Repeat for the opposite side of the Overflow Box

Ocean Protect supplies and maintains a complete range of filtration, hydrodynamic separation, screening and oil/water separation technologies.

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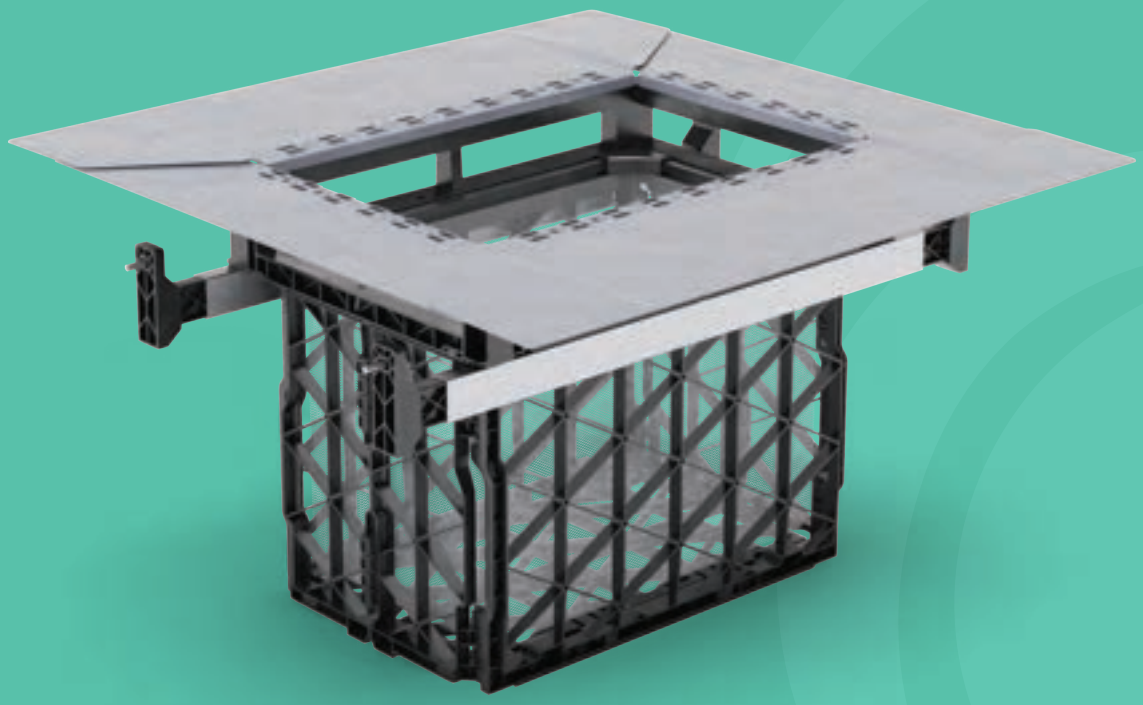
OCEAN PROTECT

OceanGuard®

Operations & Maintenance Manual



Stopping Pollution Entering Waterways

09/22

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Introduction	3
Health and Safety	4
How does it work?	5
Maintenance Procedures	6
Maintenance Services	7

Introduction

The primary purpose of stormwater treatment devices is to capture and prevent pollutants from entering waterways, maintenance is a critical component of ensuring the ongoing effectiveness of this process. The specific requirements and frequency for maintenance depends on the treatment device and pollutant load characteristics of each site. This manual has been designed to provide details on the cleaning and maintenance processes for the OceanGuard® as recommended by the manufacturer (Ocean Protect).

The OceanGuard® technology is a gully pit basket designed to fit within new and existing gully pits to remove pollution from stormwater runoff. The system has a choice of filtration liners, designed to remove gross pollutants, solids, and other attached pollutants as either a standalone technology or as part of a 'treatment train' (e.g. with StormFilter®, Jellyfish® or biofiltration). OceanGuards are highly effective, easy to install and simple to maintain.

Stormwater professionals should note that Ocean Protect is not permitted to supply OceanGuard® technologies to provide pre-treatment to proprietary stormwater treatment assets that are not provided by Ocean Protect.

Why do I need to perform maintenance?

Adhering to the inspection and maintenance schedule of any stormwater treatment device is essential to ensuring that it functions properly throughout its design life.

During each inspection and clean, details of the mass, volume and type of material that has been collected by the device should be recorded. This data will assist with the revision of future management plans and help determine maintenance interval frequency. It is also essential that qualified and experienced personnel carry out all maintenance (including inspections, recording and reporting) in a systematic manner.

Maintenance of your stormwater management system is essential to ensuring ongoing at-source control of stormwater pollution. Maintenance also helps prevent structural failures (e.g. prevents blocked outlets) and aesthetic failures (e.g. debris build up), but most importantly ensures the long term effective operation of the OceanGuard®.

Health and Safety

Access to pits containing an OceanGuard® typically requires removing (heavy) access covers/grates, but typically it is not necessary to enter into a confined space. Pollutants collected by the OceanGuard® will vary depending on the nature of your site. There is potential for these materials to be harmful. For example, sediments may contain heavy metals, carcinogenic substances or sharp objects such as broken glass and syringes. For these reasons, there should be no primary contact with the waste collect and all aspects of maintaining and cleaning your OceanGuard® require careful adherence to Occupational Health and Safety (OH&S) guidelines.

It is important to note that the same level of care needs to be taken to ensure the safety of non-work personnel, as a result it may be necessary to employ traffic/pedestrian control measures when the device is situated in, or near areas with high vehicular/pedestrian activity.

Personnel health and safety

Whilst performing maintenance on the OceanGuard®, precautions should be taken in order to minimise (or when possible prevent) contact with sediment and other captured pollutants by maintenance personnel. In order to achieve this the following personal protective equipment (PPE) is recommended:

- Puncture resistant gloves
- Steel capped safety boots
- Long sleeve clothing, overalls or similar skin protection
- Eye protection
- High visibility clothing or vest

During maintenance activities it may be necessary to implement traffic control measures. Ocean Protect recommend that a separate site specific traffic control plan is implemented as required to meet the relevant governing authority guidelines.

The OceanGuard® is designed to be maintained from surface level, without the need to enter the pit. However depending on the installation configuration, location and site specific maintenance requirements it may be necessary to enter a confined space occasionally. It is recommended that all maintenance personnel evaluate their own needs for confined space entry and compliance with relevant industry regulations and guidelines. Ocean Protect maintenance personnel are fully trained and carry certification for confined space entry.

How does it work?

OceanGuard® is designed to intercept stormwater as it enters the stormwater pits throughout a site. The OceanGuard® has diversion panels that sit flush with the pit walls, this ensures that as stormwater enters at the top of the pit it is directed to the middle of the insert where the Filtration bag is situated. The filtration bag allows for screening to occur removing 100% of pollutants greater than the opening of the filtration material (200micron, 1600micron bags available).

During larger rain events the large flows overflow slots in the flow diverter of the OceanGuard® ensure that the conveyance of stormwater is not impeded thus eliminating the potential for surface flooding. As the flow subsides, the captured pollutants are held in the OceanGuard® filtration bag. The waste then starts to dry which reduces the magnitude of organic material decomposition transitioning between maintenance intervals.

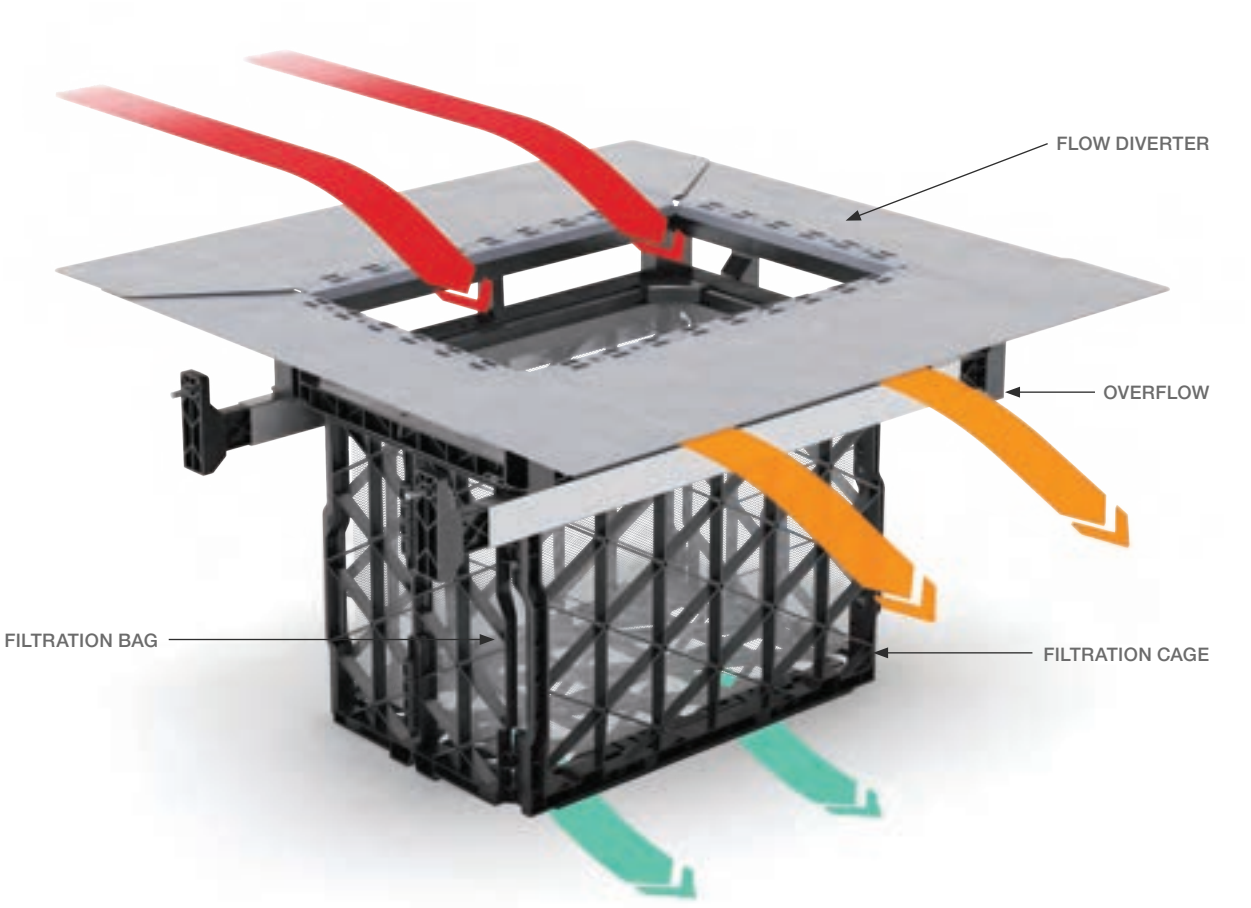

Figure 1: OceanGuard® components

Maintenance Procedures

To ensure that each OceanGuard® achieves optimal performance, it is advisable that regular maintenance is performed. The OceanGuard® requires 1-6 minor services annually (3 to 4 typical). Pending the outcome of these inspections, additional maintenance servicing may be required.

Primary types of maintenance

The table below outlines the primary types of maintenance activities that typically take place as part of an ongoing maintenance schedule for the OceanGuard®.

Service Type	Description of Typical Activities	Frequency
Minor Service	Filter bag inspection and evaluation Removal of capture pollutants Disposal of material	1-6 Times Annually
Major Service	Filter Bag Replacement Support frame rectification	As required

Maintenance requirements and frequencies are dependent on the pollutant load characteristics of each site. The frequencies provided in this document represent what the manufacturer considers to be best practice to ensure the continuing operation of the device is in line with the original design specification.

Minor Service

This service is designed to return the OceanGuard® back to optimal operating performance. This type of service can be undertaken either by hand or with the assistance of a Vacuum unit.

Hand Maintenance

1. Establish a safe working area around the OceanGuard®
2. Remove access cover/grate
3. Use two lifting hooks to remove the filtration bag
4. Empty the contents of the filtration bag into a disposal container
5. Inspect and evaluate the filtration bag
6. Inspect and evaluate remaining OceanGuard® components (i.e. flow diverter, filtration cage and supporting frame)
7. Rejuvenate filtration bag by removing pollutant build up with a stiff brush, additionally the filtration bag can be washed using high pressure water
8. Re-install filtration bag and replace access cover/grate

Vacuum Maintenance

1. Establish a safe working area around the OceanGuard®
2. Remove access cover/grate
3. Vacuum captured pollutants from the filtration bag
4. Remove filtration bag
5. Inspect and evaluate the filtration bag
6. Inspect and evaluate remaining OceanGuard® components (i.e. flow diverter, filtration cage and supporting frame)
7. Rejuvenate filtration bag by removing pollutant build up with a stiff brush, additionally the filtration bag can be washed using high pressure water
8. Re-install filtration bag and replace access cover/grate

Major Service (Filter Bag Replacement)

For the OceanGuard®, a major service is a reactionary process based on the outcomes from the minor service.

Trigger Event from Minor Service	Maintenance Action
Filtration bag inspection reveals damage	Replace the filtration bag[1]
Component inspection reveals damage	Perform rectification works and if necessary replace components[1]

[1] Replacement filtration bags and components are available for purchase from Ocean Protect

Additional Types of Maintenance

Occasionally, events on site can make it necessary to perform additional maintenance to ensure the continuing performance of the device.

Hazardous Material Spill

If there is a spill event on site, all OceanGuard® pits that potentially received flow should be inspected and cleaned. Specifically, all captured pollutants from within the filtration bag should be removed and disposed in accordance with any additional requirements that may relate to the type of spill event. All filtration bags should be rejuvenated (replaced if required) and re-installed.

Blockages

The OceanGuard's internal high flow bypass functionality is designed to minimise the potential of blockages/ flooding and this configuration has been field proven for over twenty years. Flooding caused by an OceanGuard® style of pit basket is extremely rare and in the unlikely event that flooding occurs around the stormwater pit the following steps should be undertaken to assist in diagnosing the issue and implementing the appropriate response.

1. Inspect the OceanGuard® flow diverter, ensuring that they are free of debris and pollutants
2. Perform a minor service on the OceanGuard®
3. Remove the OceanGuard® to access the pit and inspect both the inlet and outlet pipes, ensuring they are free of debris and pollutants

Major Storms and Flooding

In addition to the scheduled activities, it is important to inspect the condition of the OceanGuard® after a major storm event. The inspection should focus on checking for damage and higher than normal sediment accumulation that may result from localised erosion. Where necessary damaged components should be replaced and accumulated pollutants disposed.

Disposal of Waste Materials

The accumulated pollutants found in the OceanGuard® must be handled and disposed of in a manner that is in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. If the filtration bag has been contaminated with any unusual substance, there may be additional special handling and disposal methods required to comply with relevant government/authority/industry regulations.

Maintenance Services

With over a decade and a half of maintenance experience Ocean Protect has developed a systematic approach to inspecting, cleaning and maintaining a wide variety of stormwater treatment devices. Our fully trained and professional staff are familiar with the characteristics of each type of system, and the processes required to ensure its optimal performance.

Ocean Protect has several stormwater maintenance service options available to help ensure that your stormwater device functions properly throughout its design life. In the case of our OceanGuard®, we offer long term pay-as-you-go contracts, pre-paid once off servicing and replacement filter bags.

For more information please visit www.oceanprotect.com.au

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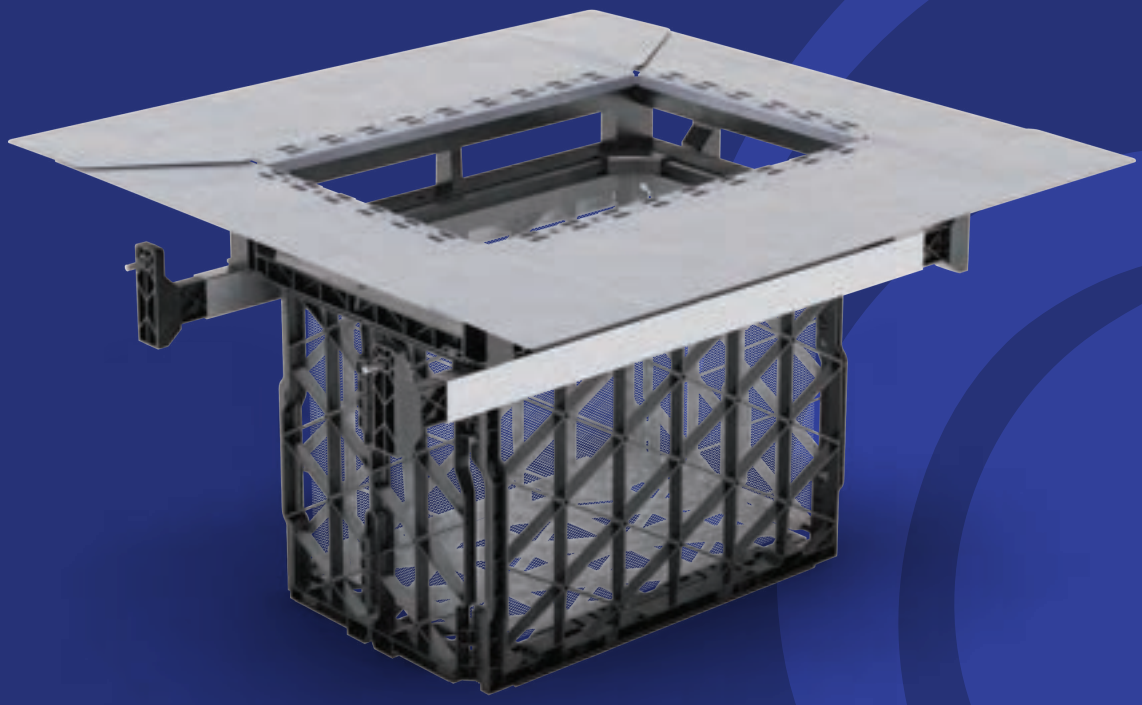
OCEAN PROTECT

OceanGuard®

Technical Design Guide



Stopping Pollution Entering Waterways

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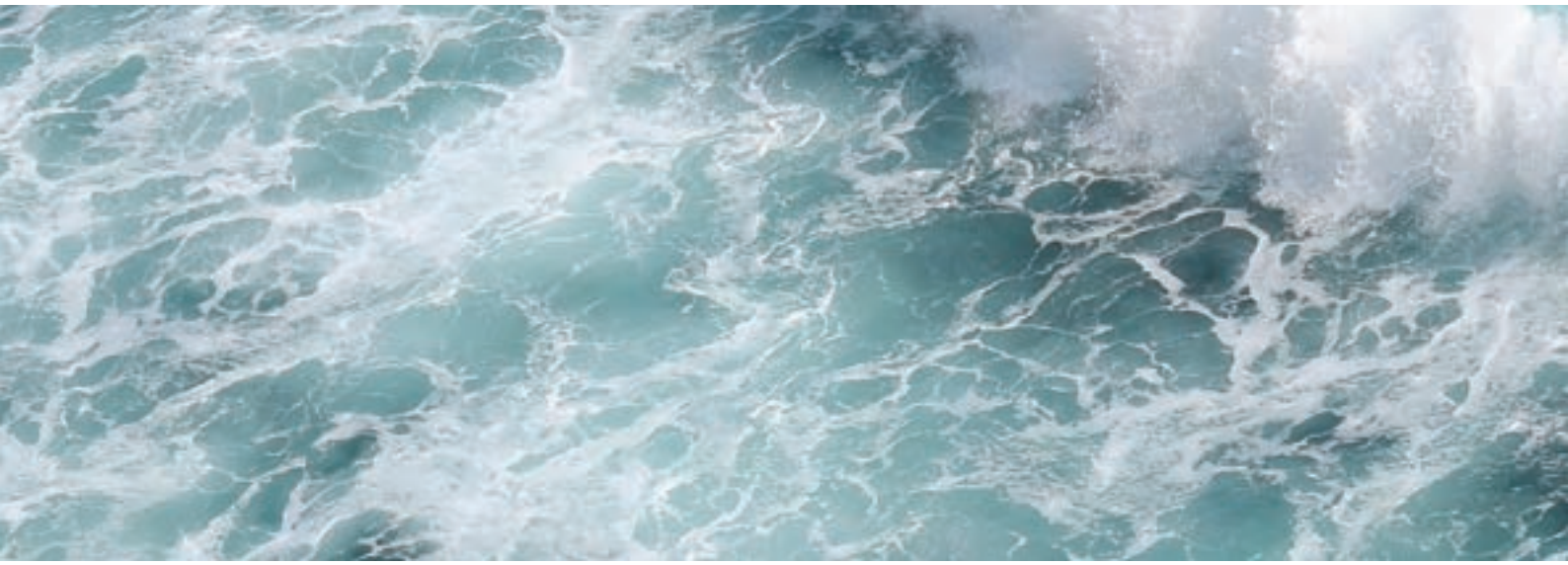

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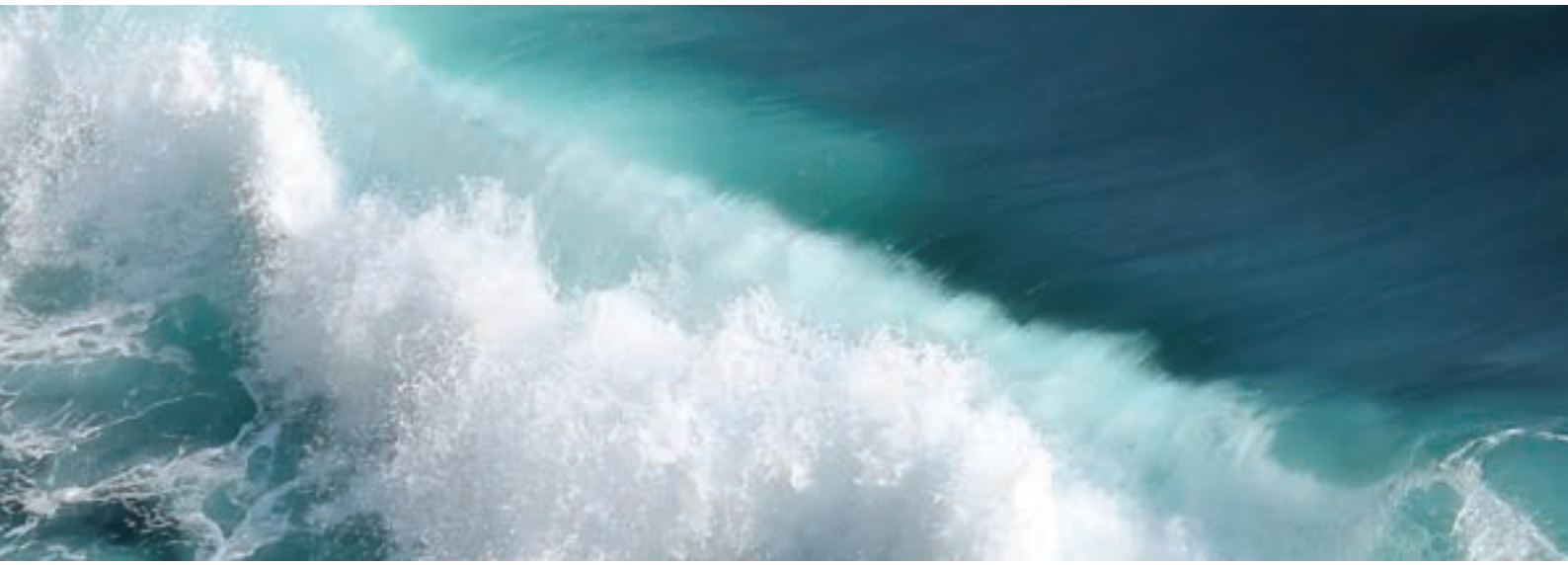
Introduction	3
Operational Overview	4
Features	4
Configurations	5
Performance	6
Maintenance	6
Design Basics	7



Introduction

The OceanGuard® technology is a gully pit basket designed to fit within new and existing stormwater pits targeting pollution in stormwater runoff. The system is offered with a choice of filtration bag liners, designed to remove gross pollutants, total suspended solids and attached pollutants. It can be applied as a stand-alone technology or as part of a treatment train with our StormFilter® or Jellyfish® filtration products.

The filtration bag, filtration cage and flow diverter work together to maximise the flow treated, pollutant capture, hydraulic efficiency and ultimately retaining captured pollutants dry. OceanGuard® pit inserts are highly effective, easy to install and simple to maintain.

Operational Overview

The OceanGuard® is installed into field or kerb inlet gully pits. The flow diverter is made from recycled plastic waste and the flow diverter panels fit snug against the pit walls directing all incoming stormwater flows into the system.

The stormwater is then filtered via direct screening through the filtration bag liner ensuring that any debris larger than the openings in the filtration bag are captured and retained.

During large storm events, the water elevation in the filtration bag can rise and high flows are internally bypassed through overflow slots in the flow diverter frame.

At the end of the storm event, pollution is retained at the base of the filtration bag, where the pollution will start to dry until the next storm event.

Features

The OceanGuard® technology has the following features:

- **Flow Diverter:** Directs flow into the unit for filtration of stormwater and includes an in-built rigid bypass to divert stormwater overflows in high-intensity and peak storm flows
- **Filtration Bag:** Removable coarse (gross pollutant removal) and fine grade (200micron) filtration bags
- **Filtration Cage:** The supporting cage that allows for the use of larger filtration bags

The OceanGuard® can also be fitted with an oil/ hydrocarbon adsorbent material (optional) to capture and retain oil and grease. The adsorbent material is contained in socks that are designed to ensure maximum contact with stormwater as it enters the gully pit.

The OceanGuard® is designed to be easily retrofitted into new and existing stormwater pits, requiring no construction or land take. The OceanGuard® is often the most practical screening solution and reduces the pollutant load and maintenance burden on downstream infrastructure.

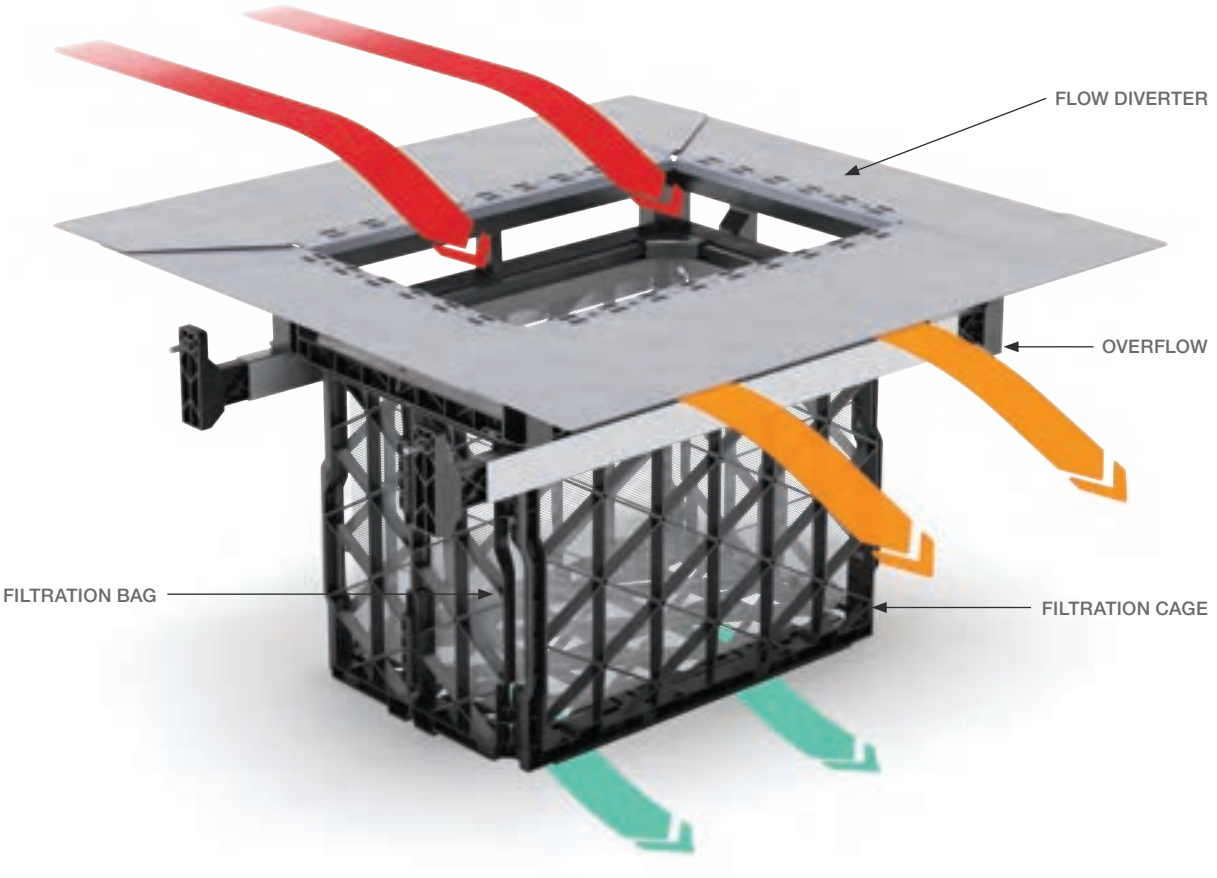


Figure 1: OceanGuard® components

Configurations

The OceanGuard® can fit a range of pits typically found in Australia including, kerb entry, rear entry with grated drain entry as well as field gully pits. There are multiple sizes to suit pits ranging in plan dimensions of *450 x 450mm – 1200 x 1200mm.* Additional custom sizes are available to suit circular and non-standard pits.

The standard OceanGuard® configuration treats surface flow only *(see Figure 2).* In some instances, it may be necessary to treat pipe flow *(see Figure 3).* Ideally, the upstream catchment area to each basket should be no more than 1000m^2 (for maintenance, structural and hydraulic reasons).

Please note that the OceanGuard® technology is not a replacement for an in-line gross pollutant trap.

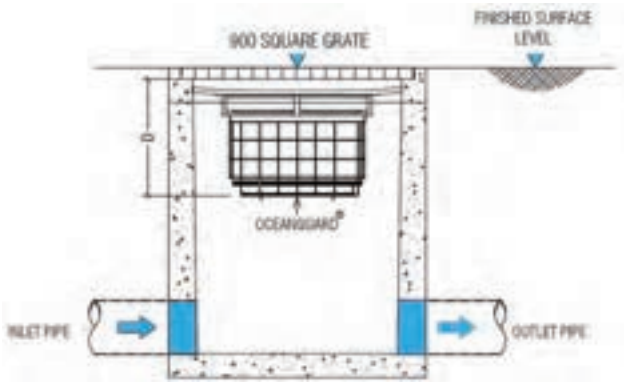


Figure 2: Standard configuration – surface flow

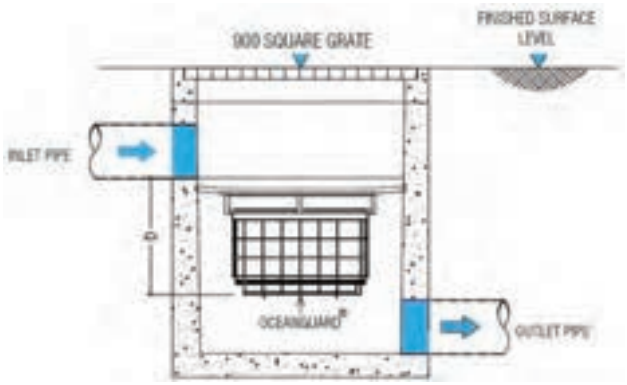
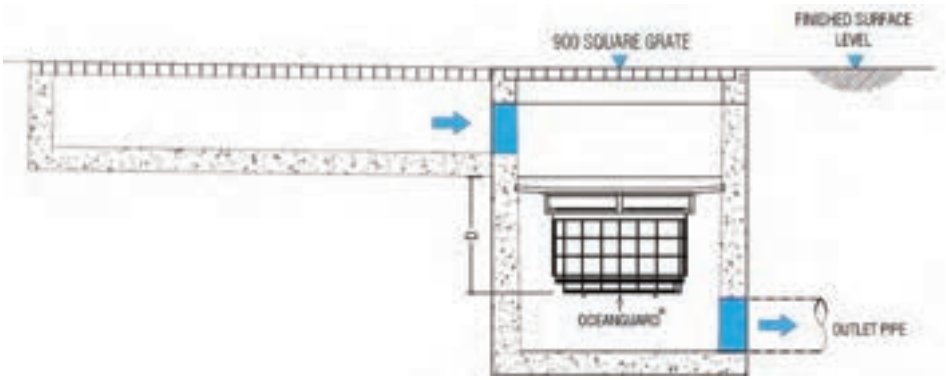


Figure 3: Example configuration – pipe flow

Another typical configuration required, is where the runoff collected by grated strip or trench drains needs to be treated *(see Figure 4).*



Performance

Typically, laboratory testing provides a means to generate hydraulic and basic performance data, but it should also be complemented with long-term field data. Gully pit baskets that operate under unrestricted flows require both a combination lab and field studies to accurately understand performance.

Ocean Protect has and is undertaking field testing locally in Australia. Further information on these studies is available in *A review of the application of OceanGuard® in Australia.*

Since 2001, the OceanGuard® (and previous generation Enviropod®) technology has been installed in a variety of applications to meet regulatory requirements set by authorities throughout Australia. Over 20,000 OceanGuard® (and previous generation Enviropod®) technologies have been installed within Australia by Ocean Protect. OceanGuard® has also been accepted by many of the most stringent stormwater quality regulators within other parts of Australia including Stormwater Australia Stormwater Australia Quality Improvement Device Evaluation Protocol (SQIDEP) verification, Blacktown City Council, Brisbane City Council and Gold Coast City Council.

Please contact your Ocean Protect representative to obtain the OceanGuard® approval status in your area.

Maintenance

Maintenance of the OceanGuard® is simple, effective and seldom requires confined space entry or specialised equipment, often being completed by hand without the need of vacuum equipment. Simply remove the OceanGuard® from the pit with the tags provided and invert the bag into a waste bin. Inspect the liner and brush by hand or spray with a pressure washer if required to rejuvenate the filtration bag. Record the information and replace the filtration bag.

Inspection & Cleaning

The OceanGuard® should be inspected at regular intervals from 1-2 months during the first year of installation to ensure optimum performance. The frequency at which the OceanGuard® will need to be maintained will depend on site activities, land uses, catchment area and this size of OceanGuard® installed, but is typically 3 to 4 times per year.

For further information please refer to the *OceanGuard® Operations and Maintenance Manual.*

Design Basics

The design requirements of any OceanGuard® system is detailed in 3 typical steps:

1. Hydraulic Design & Configuration
2. Water Quality Design
3. Mass Load Design

1 Hydraulic Design

All OceanGuard® must be designed to ensure that the hydraulic requirements of the system are met without adversely impacting the upstream hydraulics (limiting the likelihood of localised flooding).

2 Water Quality Design

Ocean Protect recommends and uses the widely endorsed Model for Urban Stormwater Improvement Conceptualisation (MUSIC), which makes it easy for correctly sizing an appropriate OceanGuard® system for your site.

A complimentary design service which includes MUSIC modelling is provided by the Ocean Protect engineering team. Simply email your project details to **design@oceanprotect.com.au** or alternatively you can always call one of our engineers for a discussion or to arrange a meeting in your office. The team will provide you with an efficient design containing details of the devices required to meet your water quality objectives together with budget estimates, product drawings and the MUSIC (.sqz) file.

Alternatively, you can download the MUSIC treatment nodes for the Ocean Protect products from our website **www.oceanprotect.com.au**

When designing/modelling an OceanGuard® system for water quality purposes in MUSIC, a single GPT node is utilised. The GPT node is utilised with relevant removal efficiencies inserted. These parameters can vary based on the jurisdiction (authority) of your project, relevant details can be obtained from Ocean Protect. When modelling, the high-flow bypass is modified in node by adding the total number of OceanGuards installed and multiplying this number by 20L/s, eg. 10 x OceanGuards = $0.2m^3/s$.

All details such as drawings, specifications and maintenance manuals can also be downloaded for integration into your project's documentation. Additionally, the Ocean Protect team is available to review your model and provide additional assistance and guidance on the configuration of the OceanGuard® system(s) for your project.

3 Mass Load Design

Always be mindful of the magnitude of upstream catchment areas paying particular attention to perceived dirty or high loading sites. The Ocean Protect team can provide assistance and details on this process.

Ocean Protect supplies and maintains a complete range of filtration, hydrodynamic separation, screening and oil/water separation technologies.

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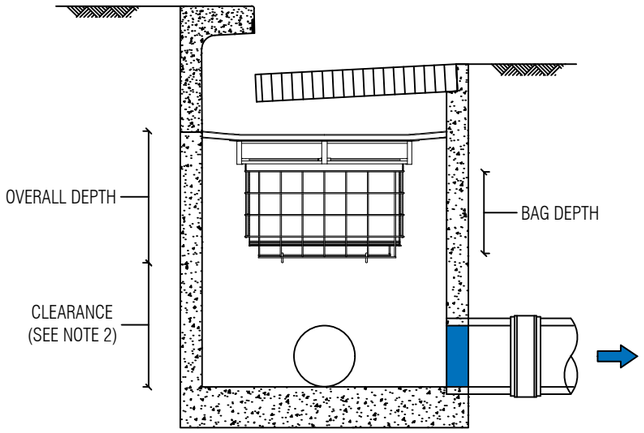
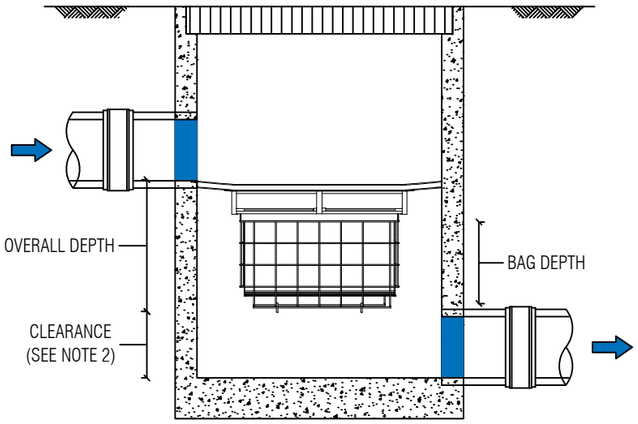
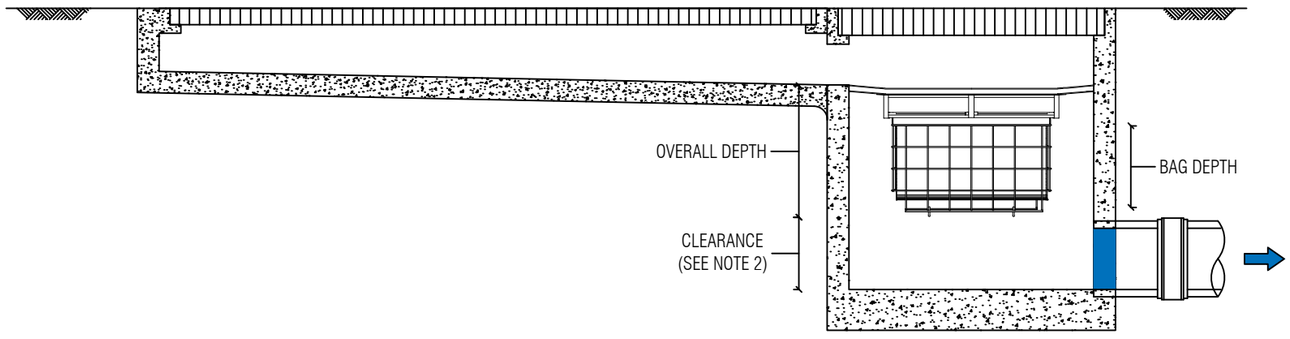


SURFACE FLOW CONFIGURATION



PIPE FLOW CONFIGURATION

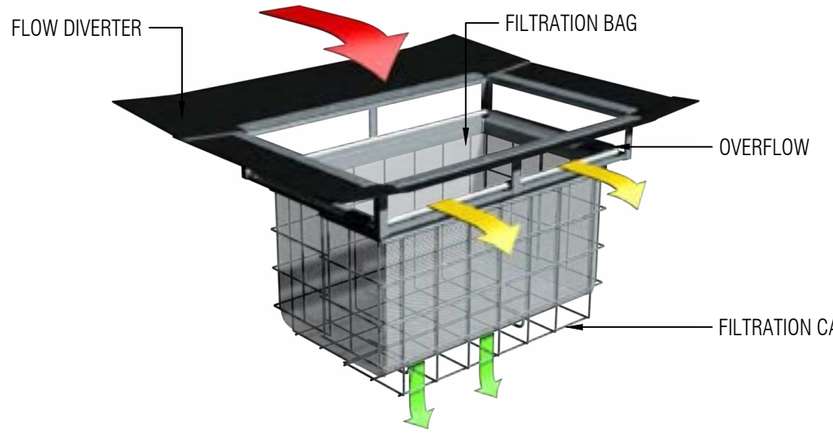


GRATED STRIP DRAIN CONFIGURATION

PLAN ID	MAXIMUM PIT PLAN DIMENSIONS
S	450mm x 450mm
M	600mm x 600mm
L	900mm x 900mm
XL	1200mm x 1200mm

DEPTH ID	BAG DEPTH	OVERALL DEPTH
1	170	270
2	300	450
3	600	700

		DEPTH ID		
		1	2	3
PLAN ID	S	■		
	M	■	■	
	L	■	■	■
	XL	■	■	■



GENERAL NOTES

1. THE MINIMUM CLEARANCE DEPENDS ON THE CONFIGURATION (SEE NOTE 2) AND THE LOCAL COUNCIL REQUIREMENTS.
2. CLEARANCE FOR ANY PIT WITHOUT AN INLET PIPE (ONLY USED FOR SURFACE FLOW) CAN BE AS LOW AS 50mm. FOR OTHER PITS, THE RECOMMENDED CLEARANCE SHOULD BE GREATER OR EQUAL TO THE PIPE OBVERT SO AS NOT TO INHIBIT HYDRAULIC CAPACITY.
3. OCEAN PROTECT PROVIDES TWO FILTRATION BAG TYPES:- 200 MICRON BAGS FOR HIGHER WATER QUALITY FILTERING AND A COARSE BAG FOR TARGETING GROSS POLLUTANTS.
4. DRAWINGS NOT TO SCALE.

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TYPCIAL ARRANGEMENTS
SPECIFICATION DRAWING

LAST MODIFIED: 18-03-19

OceanSave®

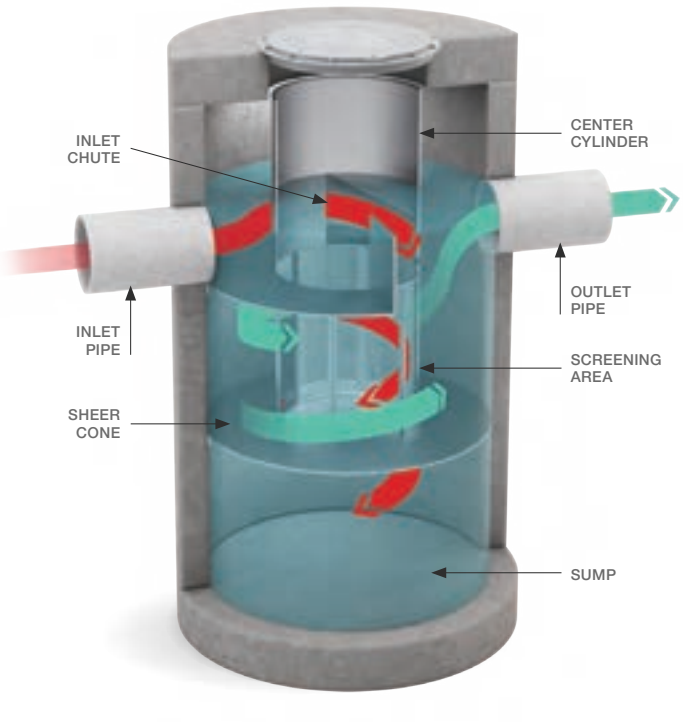
Full capture, high-capacity gross pollutant trap

The OceanSave® is a vortex type engineered stormwater treatment asset designed to remove litter, gross pollutants, sediment and associated pollutants from stormwater runoff as either a stand-alone technology or as part of a 'treatment train' (with stormwater treatment assets located downstream to provide further treatment).

The innovative screen design and specially designed internal configuration allows for higher flows than other similar technologies whilst ensuring floatables, settleable solids and neutrally buoyant pollutants are retained without screen blinding.

How does it work?

- One or more inlet pipes within a 130-degree range of the outlet pipe direct stormwater flow through a chute to the treatment chamber
- The specially designed inlet initiates a vortex at a higher flows than other similar sized vortex separators
- The specially designed screen in conjunction with swirling flow ensures screen blinding is eliminated unlike other direct screening devices
- The forces created by the vortex allow for pollutants to concentrate in the centre where they can either settle into the sump or remain floating within the screening area
- Neutrally buoyant material will also be trapped and retained
- A hydrocarbon baffle ensures that free hydrocarbons and oils are retained and prevented from escaping
- Flows that exceed the treatable flow rate are diverted to the outlet via an internal weir
- Treated and bypass flows exit via the outlet pipe



1300 354 722 enquiries@oceanprotect.com.au www.oceanprotect.com.au

OceanSave®

Features

- Vortex separator
- Innovative screen and internal configuration
- Easy to remove sectional screen panels
- Large separate storage sump
- Internal bypass and optional additional external bypass via a diversion box or pits
- Multiple pipe inlets

Benefits

- Superior pollutant removal
- Eliminates blinding and clogging
- No scour or resuspension of previously captured pollutants
- Flexibility in design
- Easy installation and maintenance
- Accepted technology

Configurations and Applications

The OceanSave® range covers most applications and needs. The fully trafficable precast concrete system can be arranged both on-line or off-line with low flow diversion. A range of diameters ensures your treatable flow rate requirement will be satisfied. This design flexibility makes the system ideal for a wide range of applications such as:

- Commercial, industrial and residential development, infill and redevelopment and stormwater quality retrofit applications
- Special projects, including highways, airports, seaports and military installations
- Pre-treatment for subsequent stormwater treatment assets (e.g. StormFilter®, biofiltration)

Maintenance

The key maintenance activity for the OceanSave® is the removal of accumulated sediment and gross pollutants (typically approximately every year) and inspection and cleaning of the screen (typically approximately every two years).

Speak to the team at Ocean Protect who can help you maintain your OceanSave®.

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OceanSave®

Operations & Maintenance Manual

Stopping Pollution Entering Waterways

03/25

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Introduction	3
Health and Safety	4
How does it work?	5
Maintenance Procedures	6
Maintenance Services	7

Introduction

The primary purpose of stormwater treatment devices is to capture and prevent pollutants from entering waterways, maintenance is a critical component of ensuring the ongoing effectiveness of this process. The specific requirements and frequency for maintenance depends on the treatment device and pollutant load characteristics of each site. This manual has been designed to provide details on the cleaning and maintenance processes of the OceanSave® as recommended by the manufacturer (Ocean Protect).

The OceanSave® is a vortex type engineered stormwater management device designed to remove litter, gross pollutants, sediment and associated pollutants from stormwater runoff. It removes all particles 5 mm and greater from stormwater flows, including neutrally buoyant material. It also removes some suspended solids and free-floating oil and grease via the internal baffle.

The OceanSave® is a system that effectively captures and retains a broad range of pollutants.

Why do I need to perform maintenance?

Adhering to the maintenance schedule of any stormwater treatment device is essential to ensuring that it works properly throughout its design life.

During each inspection and clean, details of the mass, volume and type of material that has been collected by the device should be recorded. This data will assist with the revision of future management plans and help determine maintenance interval frequency. It is also essential that qualified and experienced personnel carry out all maintenance (including inspections, recording and reporting) in a systematic manner.

Maintenance of your stormwater management system is essential to ensuring ongoing at-source control of stormwater pollution. Maintenance also helps prevent structural failures (e.g. prevents blocked outlets) and aesthetic failures (e.g. debris build up).

Health and Safety

Access to an OceanSave® unit requires removing heavy access covers/grates. Pollutants collected by the OceanSave® will vary depending on the nature of your site. There is potential for these materials to be harmful. For example, sediments may contain heavy metals, carcinogenic substances or objects such as broken glass and syringes. For these reasons, all aspects of maintaining and cleaning your OceanSave® require careful adherence to Occupational Health and Safety (OH&S) guidelines.

It is important to note that the same level of care needs to be taken to ensure the safety of non-work personnel, as a result it may be necessary to employ traffic/pedestrian control measures when the device is situated in, or near areas with high vehicular/pedestrian activity.

Personnel health and safety

Whilst performing maintenance on the OceanSave®, precautions should be taken in order to minimise (or when possible prevent) contact with sediment and other captured pollutants by maintenance personnel.
In order to achieve this the following personal protective equipment (PPE) is recommended:

- Puncture resistant gloves
- Steel capped safety boots
- Long sleeve clothing, overalls or similar skin protection
- Eye protection
- High visibility clothing or vest

During maintenance activities it may be necessary to implement traffic control measures. Ocean Protect recommend that a separate site-specific traffic control plan is implemented as required to meet the relevant governing authority guidelines.

The OceanSave® is classified as a confined space. While entry is not necessary for maintenance, there may be rare occasions when access is necessary. In such cases, all maintenance personnel should assess their specific requirements for confined space entry and ensure full compliance with applicable industry regulations and guidelines. Ocean Protect maintenance personnel are fully trained, certified, and equipped to carry out this work safely.

How does it work?

The OceanSave® employs a unique screen design that maximizes hydraulic capacity and pollutant removal whilst simultaneously cleaning the screen surface. During operation, a tangential inlet causes stormwater to swirl in the circular treatment chamber. Buoyant materials migrate to the centre of the treatment chamber and rise above the screen while non-floating pollutants are trapped in the storage sump below.

During a storm, pipe flow enters the inlet structure where it is directed tangentially to the circular screen. The system builds driving head and forces water down into the screening area. This creates a vortex action with high tangential velocities across the face of the screen relative to the normal velocities through the screen. This indirect screening feature simultaneously cleans the screen surface whilst removing debris from stormwater. Floatable material is captured in the screening zone. There is also a baffle wall outside the screening zone that allows for the storage of hydrocarbons. Sediment and settable material fall into the sump below the screening area with treated stormwater exiting through the screen to the outlet pipe.

At higher flow rates, a portion of the runoff spills over the weirs located on either side of the inlet structure without affecting the treatable flow rate of the OceanSave®. At the end of the storm, water drains down to the pipe inverts further promoting the settling of fine suspended debris into the storage sump.

Given the unique component design the device can have multiple inlet/outlet pipes coming at a range of angles generally up to 270 degrees between inlet and outlet. Furthermore, any debris that accumulates behind the screen can be cleaned at time of routine maintenance without dismantling of the screen itself. The refined design of the OceanSave® technology utilises the proven performance of the indirect vortex style gross pollutant traps whilst improving characteristics such as configuring and associated installation and maintenance.

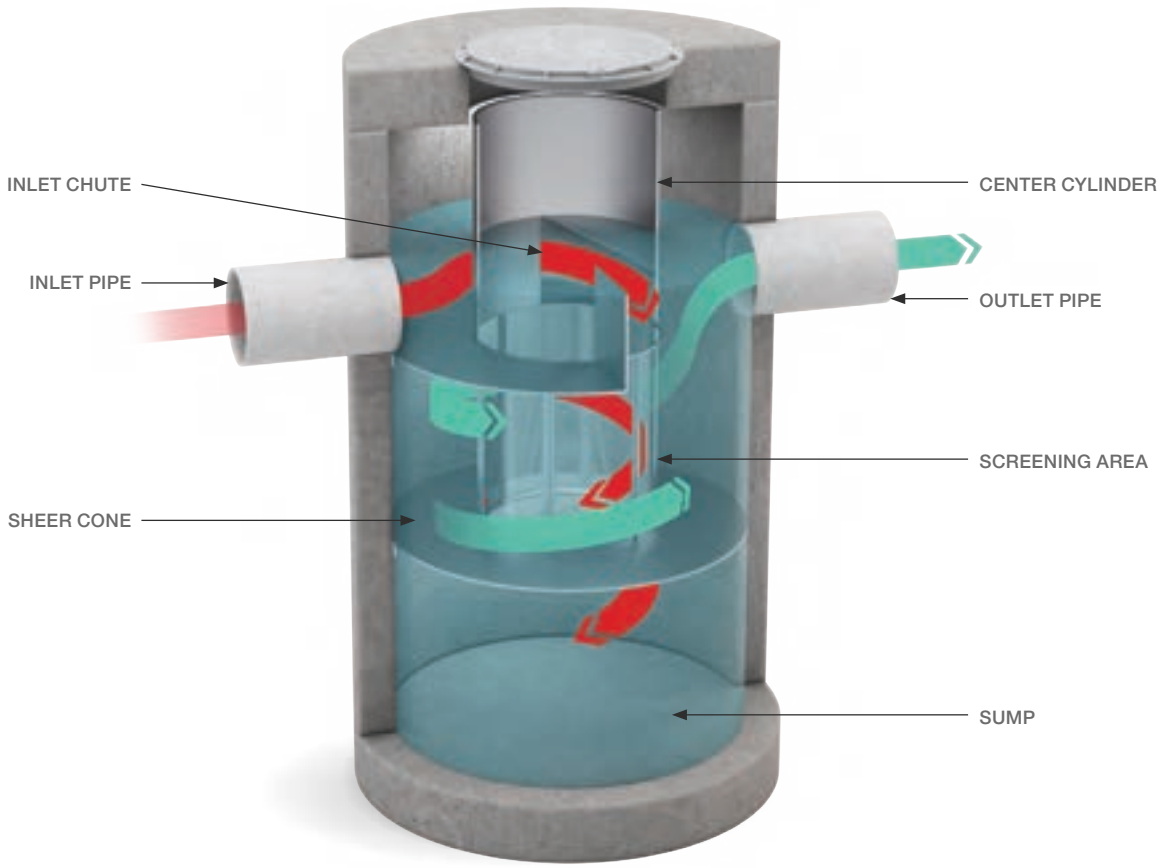

Figure 1: OceanSave® components

Maintenance Procedures

To ensure optimal performance, it is advisable that regular maintenance is performed. Typically, the OceanSave® requires a minor service every 6 months and a major service every 12 to 24 months.

Primary types of maintenance

The table below outlines the primary types of maintenance activities that typically take place as part of an ongoing maintenance schedule for the OceanSave®.

Service Type	Description of Typical Activities	Frequency
Minor Service	Visual inspection of inlet aperture Removal of large floatable pollutants Measuring of sediment depth	At 6 Months
Major Service	Removal of accumulated sediment and gross pollutants Inspection of screening element and cleaning every 2 years	At 12 Months

Maintenance requirements and frequencies are dependent on the pollutant load characteristics of each site. The frequencies provided in this document represent what the manufacturer considers to be best practice to ensure the continuing operation of the device is in line with the original design specification.

Minor Service

This service is designed to assess the condition of the device and record necessary information that will inform the activities to be undertaken during a major service.

1. Establish a safe working area around the access point
2. Remove access cover
3. Visually inspect the inlet aperture
4. Remove large floatable pollutants with a net
5. Measure and record sediment depth
6. Replace access cover

Major Service

This service is designed to return the OceanSave® device back to optimal operating performance.

1. Establish a safe working area around the access point
2. Remove access cover
3. Using a vacuum unit remove any floatable pollutants
4. Decant water until water level reaches accumulated sediment
5. Remove accumulated sediment and gross pollutants with vacuum unit (if required)
6. Inspect the screening element (every 2 years on larger units)
7. Use high pressure water to clean screen and sump area (if required)
8. Replace access cover

When determining the need to remove accumulated sediment from the OceanSave® unit, the specific sediment storage capacity for the size of unit should be considered (see OceanSave® Technical Design Guide).

Additional Types of Maintenance

The standard maintenance approach is designed to work towards keeping the OceanSave® system operational during normal conditions. From time to time, events on site can make it necessary to perform additional maintenance to ensure the continuing performance of the device.

Hazardous Material Spill

If there is a spill event on site, the OceanSave® unit that potentially received flow should be inspected and cleaned. Specifically, all captured pollutants from within the unit should be removed and disposed in accordance with any additional requirements that may relate to the type of spill event.

Blockages

The OceanSave® internal high flow bypass functionality is designed to minimise the potential of blockages/ flooding. In the unlikely event that flooding occurs around or upstream of the device location the following steps should be undertaken to assist in diagnosing the issue and determining the appropriate response.

1. Inspect the inlet aperture, ensuring that it is free of debris and pollutants
2. Decant water from OceanSave® unit if confined space entry is necessary
3. Inspect the screen and flume as well as both inlet and outlet pipes for obstructions, if present remove any built up pollutants or blockages

Major Storms and Flooding

In addition to the scheduled activities, it is important to inspect the condition of the OceanSave® after a significant major storm event. The focus is to inspect for higher than normal sediment accumulation that may result from localised erosion, where necessary accumulated pollutants should be removed and disposed.

Disposal of Waste Materials

The accumulated pollutants found in the OceanSave® must be handled and disposed of in a manner that is in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. If the system has been exposed to any hazardous or unusual substance, there may be additional special handling and disposal methods required to comply with relevant government/authority/industry regulations.

Maintenance Services

With over a decade and a half of maintenance experience Ocean Protect has developed a systematic approach to inspecting, cleaning and maintaining a wide variety of stormwater treatment devices. Our fully trained and professional staff are familiar with the characteristics of each type of system, and the processes required to ensure its optimal performance.

Ocean Protect has several stormwater maintenance service options available to help ensure that your stormwater device functions properly throughout its design life. In the case of our OceanSave®, we offer long term pay-as-you-go contracts and pre-paid once off servicing.

For more information please visit www.oceanprotect.com.au

Ocean Protect supplies and maintains a complete range of filtration, hydrodynamic separation, screening and oil/water separation technologies.

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03/25

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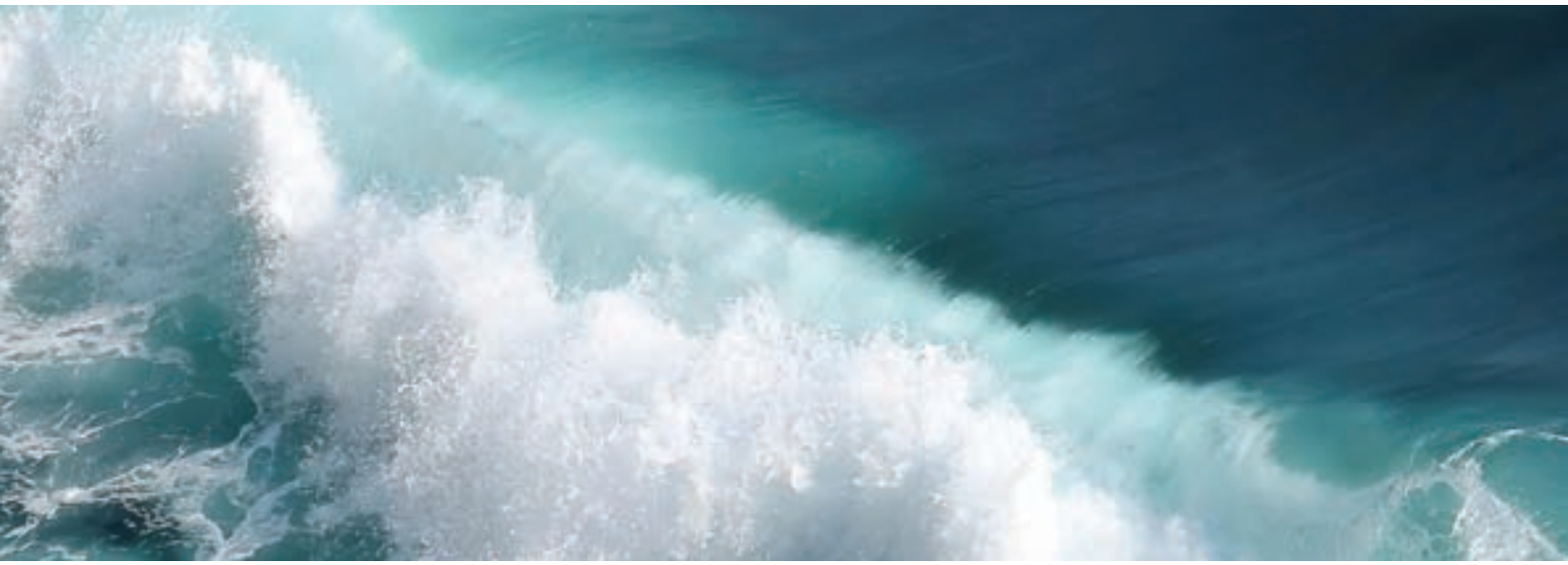
Introduction	3
Operational Overview	4
Features & Benefits	5
Configurations	6
Performance and Select Approvals	8
Maintenance	8
Design Basics	9



Introduction

The OceanSave® is a vortex type engineered stormwater management device designed to remove litter, gross pollutants, sediment and associated pollutants from stormwater runoff. It removes all particles 5 mm and greater from stormwater flows, including neutrally buoyant material. It also removes some suspended solids and free-floating oil and grease via the optional oil baffle.

The internal treatment components are made of marine grade aluminium and a specially manufactured perforated 316 stainless screen with an integrated stiffening cage to provide longevity under the toughest conditions. These components are housed in a round, precast concrete manhole. Due to its lightweight and compact design, OceanSave® is well suited for tight sites and can be used as a standalone treatment system or as a pre-treatment device in conjunction with other stormwater tertiary treatment technologies.

Operational Overview

OceanSave® employs a unique screen design that maximizes hydraulic capacity and pollutant removal whilst simultaneously cleaning the screen surface. During operation, a tangential inlet causes stormwater to swirl in the circular treatment chamber. Buoyant materials migrate to the centre of the treatment chamber and rise above the screen while non-floating pollutants are trapped in the storage sump below.

During a storm, pipe flow enters the inlet structure where it is directed tangentially to the circular screen. The system builds driving head and forces water down into the screening area. This creates a vortex action with high tangential velocities across the face of the screen relative to the normal velocities through the screen. This indirect screening feature simultaneously cleans the screen surface whilst removing debris from stormwater. Floatable material is captured in the screening zone. There is also an optional oil baffle wall outside the screening zone that allows for the storage of hydrocarbons. Sediment and settable material fall into the sump below the screening area with treated stormwater exiting through the screen to the outlet pipe.

At higher flow rates, a portion of the runoff spills over the weirs located on either side of the inlet structure without affecting the treatable flow rate of the OceanSave®. At the end of the storm, water drains down to the pipe inverts further promoting the settling of fine suspended debris into the storage sump.

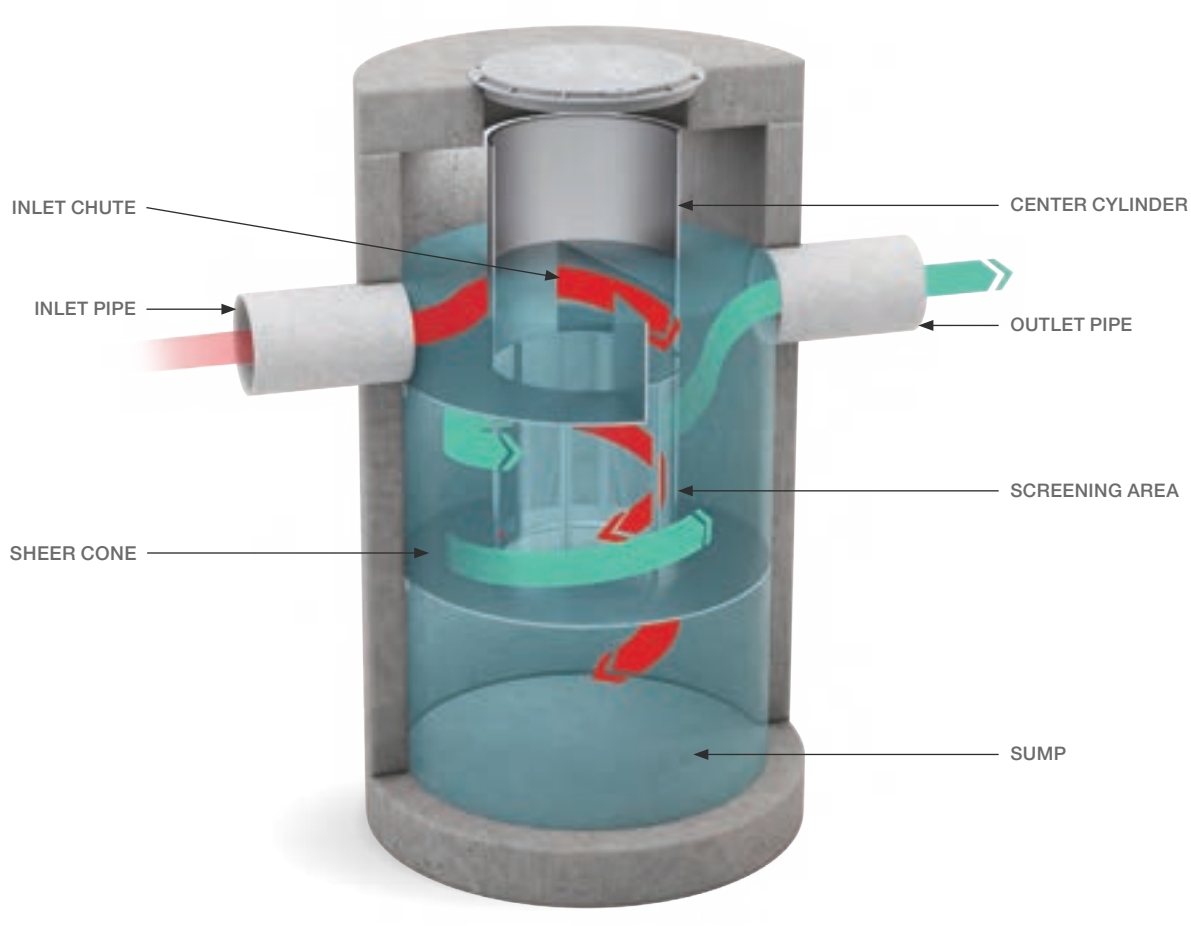


Figure 1: OceanSave® components

Features & Benefits

Each OceanSave® system consists of the following components:

- Inlet chamber featuring separation cylinder, inlet flume and bypass weirs
- Treatment chamber featuring stainless screen and optional oil baffle wall
- Storage sump

The design of the inlet chamber allows one or more inlet pipes to enter at any location around an 180° arc. The outlet orientation can varied to suit your particular site conditions – hence acting as a junction pit.

Figure 2: OceanSave® screen

Due to the inlet chamber design, the vortex rotational flow is always initiated regardless of inlet pipe orientation.

The treatment chamber features a specially manufactured expanded metal 316 stainless screen with an integrated stiffening cage for longevity. Due to the treatment chamber configuration, the system can easily be inspected for any fine silt build up behind the screen and can easily be removed via a suction hose without dismantling any internal components.

The benefits of the OceanSave® gross pollutant trap (GPT) are:

- Compact manhole design typically utilising a maximum of 3 pre-cast concrete pieces
- Single orientation for each model size – no need for offsetting the inlet pipe from the trunk line
- On-line or offline units available for each model
- Minimal on-site assembly of internal components

Pre-cast Manhole OceanSave® is pre-configured (pipe size, location, unit height etc) prior to arrival upon site for ease of installation. If required, the internal fit-out on-site simply requires affixing the integrated screen cage to the inlet chamber and sump.

.

Configurations

The standard configuration for the OceanSave® is a Pre-cast Manhole. This accommodates a wide variety of sizes and is suited to most applications. Where the site pipe flow is larger than what the inline OceanSave® manholes can accommodate, diversion chambers can be utilised to convey these larger flows. A wide range of precast and custom designed diversion structures can be used.

The offline range is denoted with '-OT' (e.g. OceanSave® OS-2300-360-OT) indicating an offline diversion box is required. See figures below for further detail.

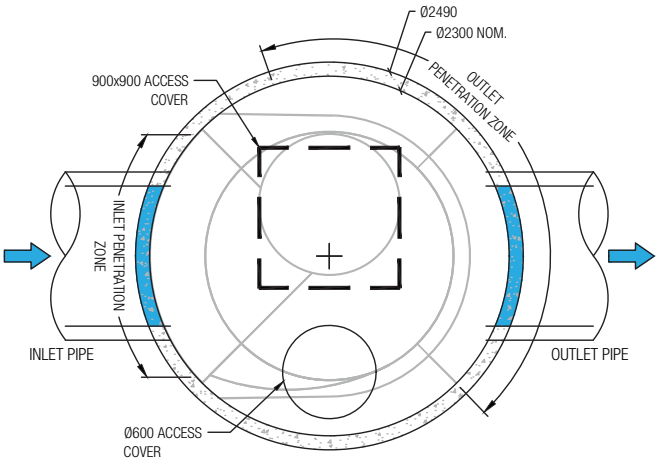


Figure 3: OceanSave® Manhole (OS-2300-200)

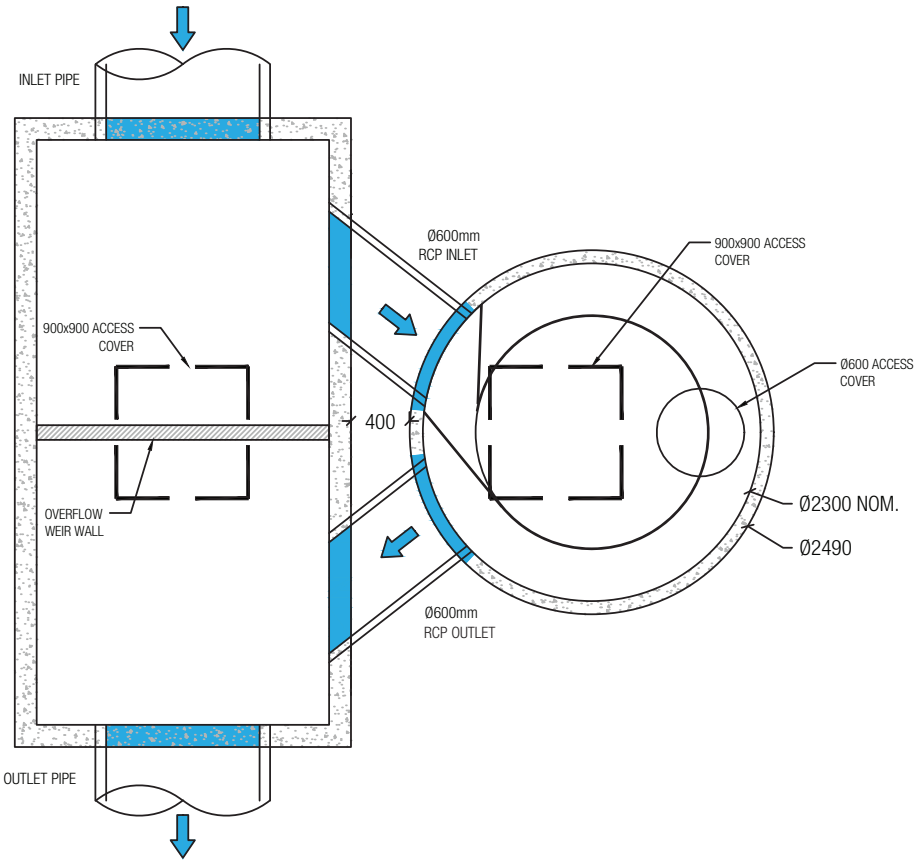


Figure 4: OceanSave-OT Offline (typical)

Online

Model	Pipe diameter range	Peak Flow *	Water quality flow rate	Typical Depth below Invert	Sump Volume *	Tank Diameter (ID)	Hydraulic Head Loss
	mm	m^3/sec	m^3/sec	m	m^3	m	mm
OS-1500-60	300 to 750	0.58	0.06	1.748	1.4	1.5	282
OS-1500-105	450 to 750	0.9	0.105	2.363	1.44	1.5	220
OS-2300-200	600 to 900	1.2	0.2	2.948	6	2.31	283
OS-2300-250	600 to 900	1.2	0.25	2.948	6	2.31	356
OS-2300-360	750 to 900	1.2	0.36	3.583	6	2.31	476
OS-3300-450	900 to 1050	1.9	0.45	3.634	12.25	3.28	308
OS-3300-580	900 to 1050	1.9	0.58	3.634	12.25	3.28	401
OS-3300-870	900 to 1050	1.9	0.87	4.253	12.25	3.28	575

*Standard design

Offline

Model	Pipe diameter range	Peak Flow *	Water quality flow rate	Typical Depth below Invert	Sump Volume *	Tank Diameter (ID)	Hydraulic Head Loss
	mm	m^3/sec	m^3/sec	m	m^3	m	mm
OS-2300-200-OT	Subject to diversion box size		0.2	2.948	6	2.31	283
OS-2300-250-OT	Subject to diversion box size		0.25	2.948	6	2.31	356
OS-2300-360-OT	Subject to diversion box size		0.36	3.583	6	2.31	476
OS-3300-450-OT	Subject to diversion box size		0.45	3.634	12.25	3.28	308
OS-3300-580-OT	Subject to diversion box size		0.58	3.634	12.25	3.28	401
OS-3300-870-OT	Subject to diversion box size		0.87	4.253	12.25	3.28	575
OS-4200-1250-OT	Subject to diversion box size		1.25	4.498	22	4.2	724
OS-4200-1600-OT	Subject to diversion box size		1.6	5.122	22	4.2	803
OS-4200-1750-OT	Subject to diversion box size		1.75	5.745	22	4.2	778

*Standard design

Table 1: OceanSave® available models

Performance and Select Approvals

Field testing both locally in Australia and overseas has been undertaken for indirect screening devices like the OceanSave®. Further research is being undertaken in Australia. The design and performance certification statement is available upon request from Ocean Protect.

Indirect screening devices like the OceanSave® have been the subject of subject of significant independent research and field performance testing. Further information on these studies is available in *A review of the application of OceanSave® in Australia.*

The OceanSave® style of gross pollutant traps have also been accepted by some of the most stringent stormwater quality regulators in North America and Australia, including Blacktown City Council.

Please contact your Ocean Protect representative to obtain the OceanSave® approval status in your area.

Maintenance

Every treatment device will eventually need routine maintenance. The question is how often and how much it will cost. Proper evaluation of long-term maintenance costs should be a consideration when selecting a manufactured treatment device.

The OceanSave® provides unobstructed access to stored pollutants, making it easy to maintain. Maintenance is a simple process using a vacuum truck, with no requirement to enter the unit. Fine silt build-up behind the screens of these devices can occur periodically. The OceanSave® has been configured in such a way to allow removal of this debris without dismantling the screen or internal components.

Maintenance support

Ocean Protect provides flexible options and contract terms. A detailed maintenance guide and mass load calculation spreadsheet is available upon request.

For further information please refer to the *OceanSave® Operations and Maintenance Manual.*

Design Basics

The OceanSave® style of gross pollutant traps has been successfully installed in a variety of applications to meet regulatory requirements set by authorities and has been available in Australia for almost 20 years.

The design requirements of any OceanSave® is detailed in 3 typical steps:

1. Hydraulic Design & Configuration
2. Water Quality Design
3. Mass Load Design

1 Hydraulic Design & Configuration

All OceanSave® GPTs must be designed to ensure that the hydraulic requirements of the system are met without adversely impacting the upstream hydraulics and eliminate any likelihood of localised flooding. *Table 1* details the hydraulic loss for model at the maximum flow rate. The designer must ensure the corresponding head loss can be catered for the proposed development site.

For an OceanSave®, the inlet and outlet pipes are located at the same invert level at the top of the inlet chamber deck.

2 Water Quality Design

Ocean Protect uses the widely endorsed Model for Urban Stormwater Improvement Conceptualisation (MUSIC), which makes it easy for correctly sizing an appropriate OceanSave® system for your site.

A complimentary design service which includes MUSIC modelling is provided by the Ocean Protect qualified engineering team. Simply email your project details to **design@oceanprotect.com.au** or alternatively you can always call one of our engineers for a discussion or to arrange a meeting in your office.

The team will provide you with a cost-effective design containing the quantity and type of components required to meet your water quality objectives together with budget estimates, product drawings and the MUSIC (*.sqz) file.

When designing your own OceanSave® GPT for water quality purposes in MUSIC a single Generic Treatment Node is required.

All details such as drawings, specifications and maintenance manuals can also be downloaded from **www.oceanprotect.com.au** for integration into your project's documentation. Additionally, the Ocean Protect team is available to review your model and provide additional assistance and guidance on the configuration of the OceanSave® system(s) for your site.

3 Mass Load Design

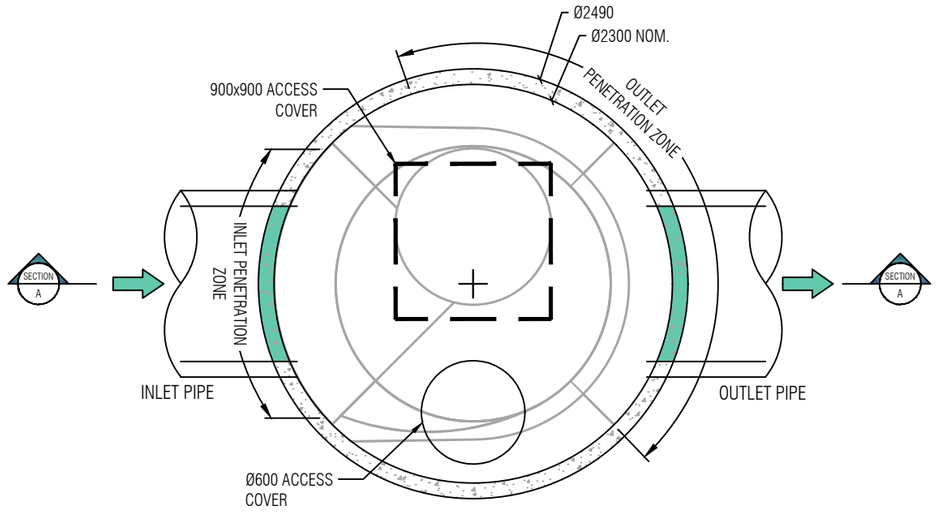
A typical solids and gross pollutant annual load can be obtained by completing a Water Quality Design undertaken most often in MUSIC. The selection of an appropriate OceanSave® model should be undertaken such that the sump capacity falls within the maintenance frequency of 4 to 12 months.

Ocean Protect supplies and maintains a complete range of filtration, hydrodynamic separation, screening and oil/water separation technologies.

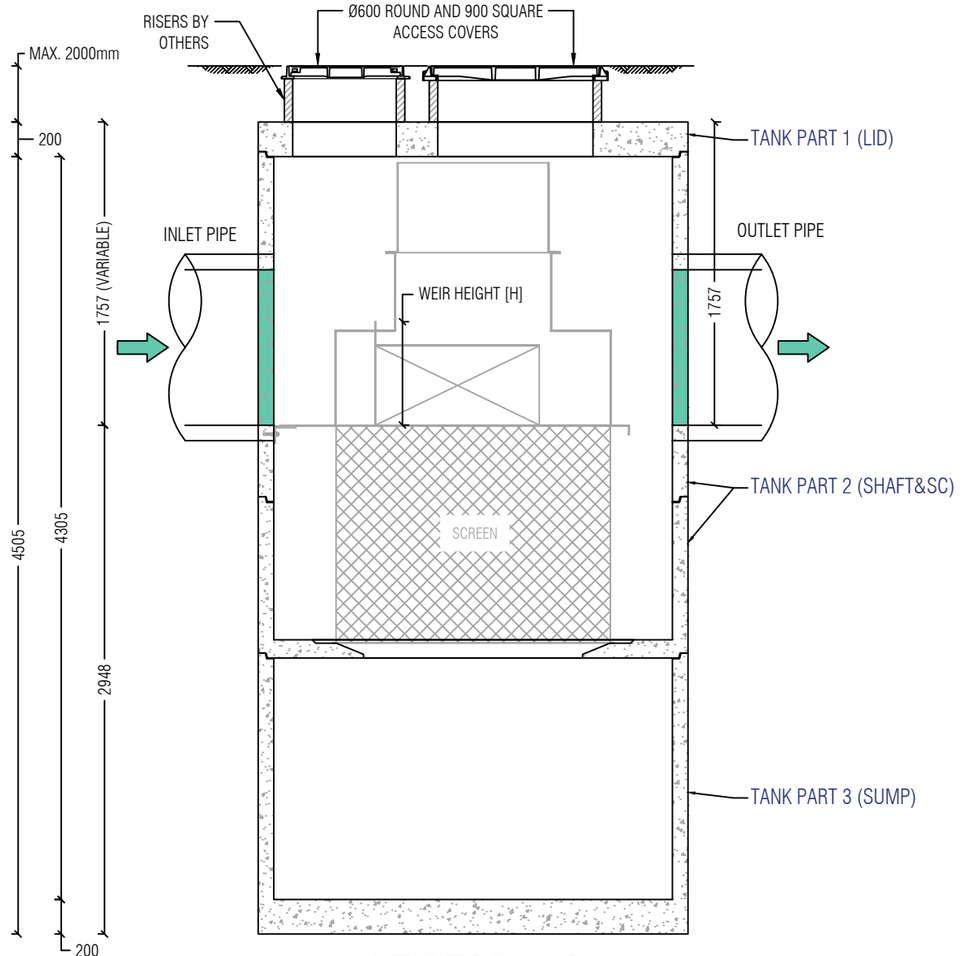
Call 1300 354 722

www.oceanprotect.com.au

NOT FOR CONSTRUCTION

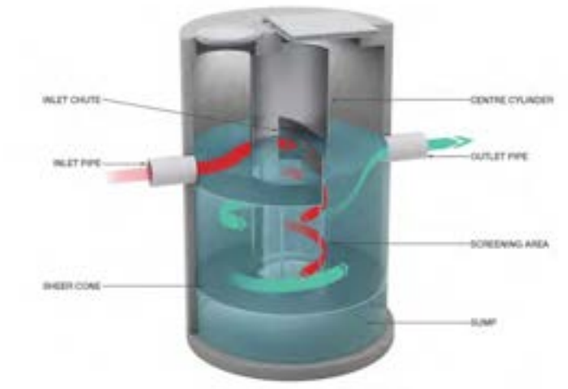


PLAN LAYOUT



SECTION A

OCEANSAVE DESIGN PARAMETERS



- IF INSTALLED ONLINE, THE INLET PIPE FLOW RATE MUST BE LESS THAN THE SPECIFIED UNIT'S LISTED PEAK HYDRAULIC FLOW RATE; AN UPSTREAM DIVERSION PIT IS REQUIRED WHERE THE INLET PIPE FLOW RATE EXCEEDS THIS VALUE.
- OCEAN PROTECT DOES NOT PROVIDE 'K' VALUES FOR HEAD LOSS CALCULATIONS. HYDRAULIC HEAD LOSS IS SPECIFIED IN THE TABLE BELOW. PLEASE CONTACT OCEAN PROTECT FOR GENERAL DESIGN AND CONFIGURATION ADVICE AND ASSISTANCE.

MAX. COMPONENT WEIGHT (kg) *MASS VARIABLE	7000
TANK LID WEIGHT (kg)	1900

NOTE: TANK SUPPLIED IN MULTIPLE PARTS TO BE JOINED ON SITE

	OS 060	OS 105	OS 200	OS 250	OS 360	OS 450	OS 580	OS 870
TREATABLE FLOW RATE (L/s)	60	105	200	250	360	450	580	870
PEAK HYDRAULIC FLOW RATE (L/s)	580	900	1200	1200	1200	1900	1900	1900
HYDRAULIC HEAD LOSS (mm)	282	220	283	356	476	308	401	575
TYPICAL WEIR HEIGHT [H] (mm)	450	450	600	700	900	750	900	1200
MIN RECOMMENDED PIPE SIZE (mm)	Ø300	Ø450	Ø600	Ø600	Ø750	Ø900	Ø900	Ø900
MAX NOMINAL PIPE SIZE (mm)	Ø750	Ø750	Ø900	Ø900	Ø900	Ø1050	Ø1050	Ø1050

GENERAL NOTES/ STRUCTURAL DESIGN CRITERIA

1. OCEANSAVE WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF THE PROJECT.
2. PRECAST STRUCTURE SUPPLIED WITH PENETRATIONS TO SUIT OUTER DIAMETER OF NOMINATED PIPE SIZE / MATERIAL.
3. PRECAST STRUCTURE SHALL MEET W80 WHEEL LOAD RATING ASSUMING A MAXIMUM EARTH COVER OF 2.0m AND A GROUND WATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. CERTIFYING ENGINEER TO CONFIRM ACTUAL GROUNDWATER ELEVATION. PRECAST STRUCTURE SHALL BE IN ACCORDANCE WITH AS3600.
4. PRECAST STRUCTURE SHALL BE PLACED ON A STABLE GROUND WITH A MINIMUM SOIL BEARING CAPACITY OF 125kPa UNDER NORMAL SERVICE CONDITION.
5. ALL WATER QUALITY TREATMENT DEVICES REQUIRE PERIODIC MAINTENANCE. REFER TO THE OPERATION AND MAINTENANCE MANUAL FOR GUIDELINES AND ACCESS REQUIREMENTS.
6. SITE-SPECIFIC PRODUCTION DRAWING WILL BE PROVIDED UPON PLACEMENT OF ORDER.
7. DRAWING NOT TO SCALE.

INSTALLATION NOTES

1. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY CERTIFYING ENGINEER.
2. CONTRACTOR TO PROVIDE ALL EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE PRECAST STRUCTURE (LIFTING DETAIL PROVIDED SEPARATELY).
3. CONTRACTOR TO INSTALL AND LEVEL THE STRUCTURE, APPLY SEALANT TO ALL JOINTS AND TO PROVIDE, INSTALL AND GROUT INLET AND OUTLET PIPES.
4. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT INTERNAL COMPONENTS DURING INSTALLATION.

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OCEAN PROTECT
OCEANSAVE 2300-200
SPECIFICATION DRAWING

LAST MODIFIED: 21-01-25

Jellyfish® Filter

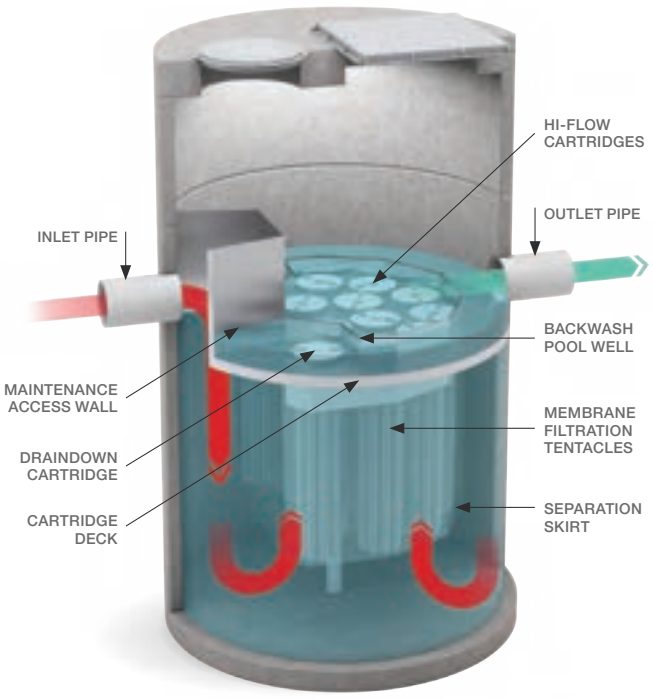
Highest Flow Rate / Lowest Head Loss

The Jellyfish® is a stormwater treatment asset that utilises membrane filtration cartridges with high filtration surface area and flow capacity, typically integrated below ground (within an underground chamber).

The Jellyfish® is designed to remove a range of pollutants, including floatables, trash, oil, debris, suspended solids, and particulate-bound pollutants (e.g. nutrients, metals and hydrocarbons).

How does it work?

- Stormwater enters the Jellyfish® through the inlet pipe, builds driving head, and traps floating pollutants behind the maintenance access wall
- As the stormwater flows downwards parallel to the separation skirt litter, debris and fine particles (such as sand) are able to settle into the sump
- The driving head causes the water to enter the filtration zone and up through the top of the cartridge(s) into the backwash pool. Once the water has filled the backwash pool, clean water overflows where it exits via the outlet pipe
- After the storm event, the filtered water in the backwash pool flows back through the high flow membrane cartridge(s) into the lower chamber. This passive backwash extends cartridge life, keeping the membrane clean for future events
- The drain down cartridge(s) located outside the backwash pool enables water levels to balance and the deck to drain dry



Jellyfish® Filter

Features and Benefits

- Large surface area membrane filtration
- High design treatment flow rate per cartridge (up to 5L/s)
- Low driving head (typically 460mm)
- Lightweight cartridges with passive backwash
- Low flux rate promotes cake filtration and reduces occlusion
- Compact system with a small footprint, lower construction cost
- Design flexibility, lower construction cost
- Easy maintenance and low life-cycle cost

Configurations and Applications

The Jellyfish® is available in a variety of configurations: precast manholes and vaults, custom tanks or in situ configurations. The system has been designed for a wide range of applications such as:

- Commercial, industrial and residential development, infill and redevelopment and stormwater quality retrofit applications
- Special projects, including highways, airports, seaports and military installations
- Pre-treatment for further subsequent stormwater management, infiltration, and stormwater harvesting and reuse

Maintenance

To ensure optimal performance, it is advisable that regular maintenance is performed. Typically, the Jellyfish® requires a service every six months, which often includes visual inspection, removal and rinsing of Jellyfish® cartridges and removal of accumulated sediment and floatables. The Jellyfish® cartridges will also need to be replaced approximately every two to five years.

Speak to the team at Ocean Protect who can help you with (or take care of) the maintenance of your Jellyfish®.

OCEAN PROTECT

Jellyfish® Filter

Operations & Maintenance Manual

Stopping Pollution Entering Waterways

11/24

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Introduction	3
Health and Safety	4
How does it work?	5
Maintenance Procedures	6
Maintenance Services	7
Appendix 1 – Jellyfish® Cartridge Schematic	9

Introduction

The primary purpose of stormwater treatment devices is to capture and prevent pollutants from entering waterways, maintenance is a critical component of ensuring the ongoing effectiveness of this process. The specific requirements and frequency for maintenance depends on the treatment device and pollutant load characteristics of each site. This manual has been designed to provide details on the cleaning and maintenance processes for the Jellyfish® Filter as recommended by the manufacturer (Ocean Protect).

The Jellyfish® Filter is a stormwater quality treatment technology featuring high surface area and high flow rate membrane filtration at low driving head. By incorporating pre-treatment with light-weight membrane filtration, the Jellyfish® Filter removes floatables, trash, oil, debris, TSS and a high percentage of particulate-bound pollutants; including phosphorus and nitrogen, metals and hydrocarbons.

Why do I need to perform maintenance?

Adhering to the maintenance schedule of any stormwater treatment device is essential to ensuring that it works properly throughout its design life.

During each inspection and clean, details of the mass, volume and type of material that has been collected by the device should be recorded. This data will assist with the revision of future management plans and help determine maintenance interval frequency.
It is also essential that suitably qualified and experienced personnel carry out all maintenance (including inspections, recording and reporting) in a systematic manner.

Maintenance of your stormwater management system is essential to ensuring ongoing at-source control of stormwater pollution. Maintenance also helps prevent structural failures (e.g. prevents blocked outlets) and aesthetic failures (e.g. debris build up), but most importantly ensures the long term effective operation of the Jellyfish®.

Health and Safety

Access to a Jellyfish® unit requires removing heavy access covers/grates, and entry into a confined space. Pollutants collected by the Jellyfish® will vary depending on the nature of your site. There is potential for these materials to be harmful. For example, sediments may contain heavy metals, carcinogenic substances or objects such as broken glass and syringes. For these reasons, all aspects of maintaining and cleaning your Jellyfish® require careful adherence to Occupational Health and Safety (OH&S) guidelines.

It is important to note that the same level of care needs to be taken to ensure the safety of non-work personnel. As a result, it may be necessary to employ traffic/ pedestrian control measures when the device is situated in, or near areas with high vehicular/pedestrian activity.

Personnel health and safety

Whilst performing maintenance on the VortCapture, precautions should be taken in order to minimise (or when possible prevent) contact with sediment and other captured pollutants by maintenance personnel. In order to achieve this the following personal protective equipment (PPE) is recommended:

- Puncture resistant gloves
- Steel capped safety boots
- Long sleeve clothing, overalls or similar skin protection
- Eye protection
- High visibility clothing or vest

During maintenance activities, it may be necessary to implement traffic control measures. Ocean Protect recommend that a separate site-specific traffic control plan is implemented as required to meet the relevant governing authority guidelines.

Whilst some aspects of Jellyfish® maintenance can be performed from surface level, there will be a need to enter the Jellyfish® pit (confined space) for both minor and major services. It is recommended that all maintenance personnel evaluate their own needs for confined space entry and compliance with relevant industry regulations and guidelines. Ocean Protect maintenance personnel are fully trained and carry certification for confined space entry applications.

How does it work?

Stormwater enters the Jellyfish® system through the inlet pipe where floatable pollutants are captured behind the maintenance access wall. As stormwater enters the treatment chamber, a separation skirt ensures the retention of oils whilst simultaneously protecting the filtration cartridges and allowing coarse particles to settle below on the chamber floor. Stormwater then passes through the Jellyfish® cartridges and onto the Jellyfish® deck, at this point the backwash pool will fill and overflow allowing treated stormwater to exit via the outlet pipe.

As the storm event subsides, the treated water held in the backwash pool passes back through the high flow cartridges into the treatment chamber. This passive backwash helps to clear the cartridge surface by dislodging sediment onto the chamber floor. The drain down cartridge(s) located outside the backwash pool enables water levels to balance, leaving the cartridge deck level free of standing water.

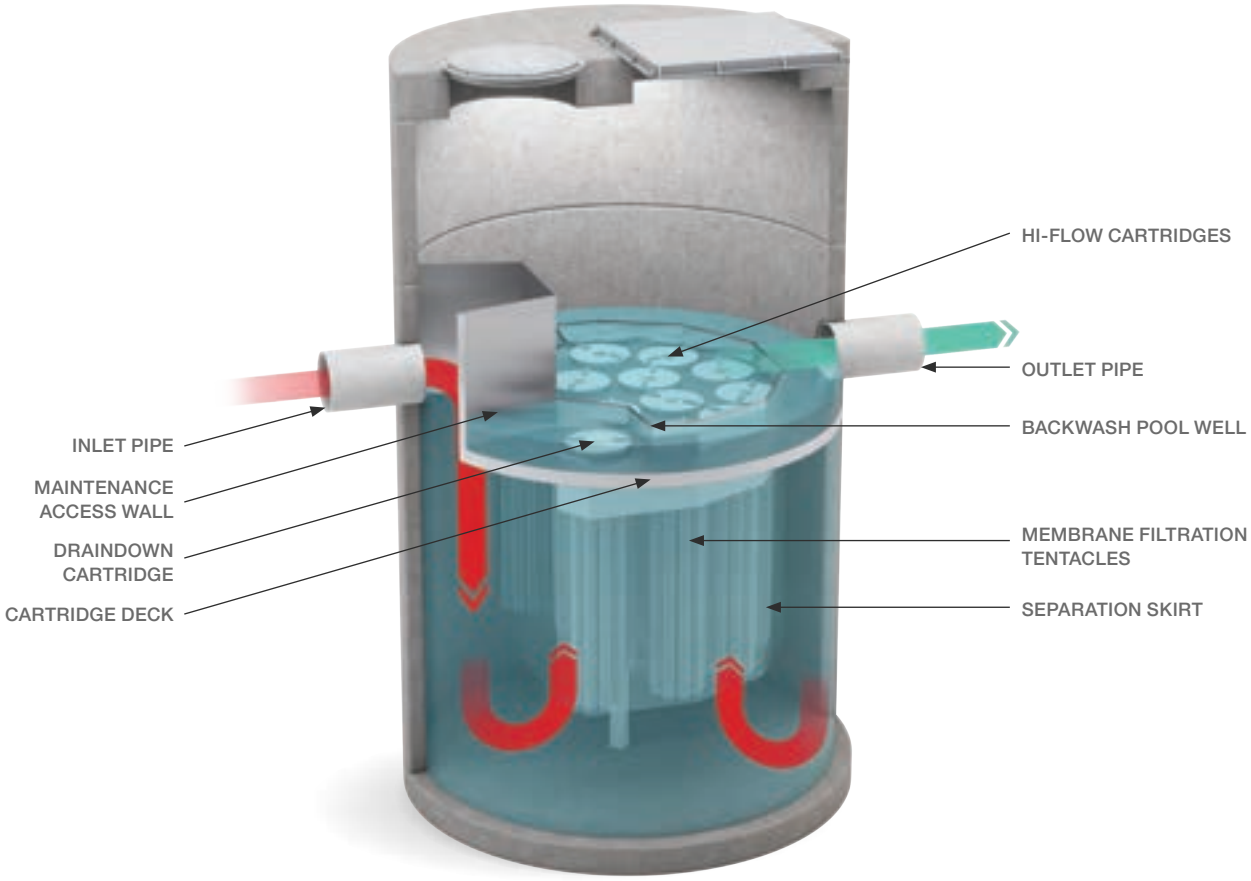


Figure 1: Jellyfish® operation

Maintenance Procedures

To ensure optimal performance, it is advisable that regular maintenance is performed. Typically the Jellyfish® requires a service every 6 months, additionally as the Jellyfish® cartridges capture pollutants they will need to be replaced (expected cartridge life is 2-5 years with a maximum cartridge life of 5 years).

Primary types of maintenance

The table below outlines the primary types of maintenance activities that typically take place as part of an ongoing maintenance schedule for the Jellyfish®.

Service Type	Description of Typical Activities	Frequency
Minor Service	Removal & rinsing of cartridges Wash down of deck level Removal of large floatable pollutants Removal of accumulated sediment (if required)	Every 6 Months
Major Service	Replacement of Jellyfish® cartridges	As required

Maintenance requirements and frequencies are dependent on the pollutant load characteristics of each site. The frequencies provided in this document represent what the manufacturer considers to be best practice to ensure the continuing operation of the device is in line with the original design specification.

Minor Service

This service is designed to assess the condition of the Jellyfish® cartridges and record necessary information that will establish whether a major service is required.

1. Establish a safe working area around the access point
2. Remove access covers
3. Using a vacuum unit or net remove any floatable gross pollutants contained behind the maintenance access wall
4. Using a vacuum unit decant the water until the level drops below the base of the cartridges
5. Remove Jellyfish® cartridges*
   a. Remove cartridge lid
   b. Remove cartridges vertically from chamber, lifting from eye nut lifting points only
   c. Replace and secure cartridge lid back into deck to reduce trip hazards during maintenance
6. Unscrew all 11 tentacles from the cartridge head plate, keep all components for reassembly*
7. Rinse each tentacle individually – *NOTE: excessive water pressure may damage the tentacles*
   a. Position tentacle in a container (to capture runoff) with the open end facing down
   b. Rinse entire length of cartridge using only low pressure water source (e.g. garden hose)
   c. Evaluate and note the condition of the tentacles
   d. Ensure runoff is disposed appropriately
   e. Re-assemble cartridges ready for reinstallation*
8. Wash down deck level to remove any built up sediment (if required)
9. Measure the level of accumulated sediment in the chamber if depth is greater than 300mm use vacuum unit to remove sediment
10. Re-install Jellyfish® cartridges
    a. Remove cartridge lid
    b. Lower cartridge into chamber, lifting from eye nut lifting points only
    c. Insert cartridge vertically into cartridge receptacle, and secure cartridge lid back in place
11. Replace access covers

**Refer Appendix 1 for Jellyfish® Cartridge Schematic*

Major Service (Filter Cartridge Replacement)

For the Jellyfish® system a major service is a reactionary process based on the outcomes from the minor service.

Trigger Event from Minor Service	Maintenance Action
Rinsing does not remove accumulated sediment from the tentacles	Replace Jellyfish® tentacles[1]
Jellyfish® tentacles are damaged	Replace Jellyfish® tentacles[1]
Jellyfish® cartridges have been in operation for 5 years	Replace Jellyfish® tentacles[1]

[1] Replacement filter tentacles and components are available for purchase from Ocean Protect

This service is designed to return the Jellyfish® device back to optimal operating performance.

1. Establish a safe working area around the access point
2. Remove access covers
3. Using a vacuum unit or net remove any floatable gross pollutants contained behind the maintenance access wall
4. Using a vacuum unit decant the water until the level drops below the base of the cartridges
5. Remove Jellyfish® cartridges*
   a. Remove cartridge lid
   b. Remove cartridges vertically from chamber, lifting from eye nut lifting points only
   c. Replace and secure cartridge lid back into deck to reduce trip hazards during maintenance
6. Unscrew all 11 tentacles from the cartridge head plate for disposal, keep all components for fixing of new tentacles to existing head plate*
7. Wash down deck level to remove any built up sediment (if required)
8. Use vacuum unit to remove accumulated sediment and pollutants in the chamber
9. Install replacement tentacles into each head plate*
10. Install Jellyfish® cartridges
    a. Remove cartridge lid
    b. Lower cartridge into chamber, lifting from eye nut lifting points only
    c. Insert cartridge vertically into cartridge receptacle, and secure cartridge lid back in place
11. Replace access covers

Additional Types of Maintenance

The standard maintenance approach is designed to work towards keeping the Jellyfish® system operational during normal conditions. From time to time, events on site can make it necessary to perform additional maintenance to ensure the continuing performance of the device.

Hazardous Material Spill

If there is a spill event on site, the Jellyfish® unit should be inspected and serviced accordingly. Specifically, all captured pollutants and liquids from within the unit should be removed and disposed in accordance with any additional requirements that may relate to the type of spill event. Additionally, it will be necessary to inspect the filter cartridges and assess their contamination, depending on the type of spill event it may be necessary to replace the filtration cartridges.

Blockages

The Jellyfish® treatment system is designed to operate in an offline arrangement, where an upstream high flow bypass structure is in used. In the unlikely event that flooding occurs upstream of the Jellyfish® system, the following steps should be undertaken to assist in diagnosing the issue and determining the appropriate response.

1. Inspect the upstream diversion structure to ensure that it is free of debris and pollutants
2. Inspect the Jellyfish® unit checking both the inlet and outlet pipes for obstructions (e.g. pollutant build-up, blockage), which if present, should be removed

Major Storms and Flooding

In addition to the scheduled activities, it is important to inspect the condition of the Jellyfish® after a major storm event. The focus is to inspect for damage and higher than normal sediment accumulation that may result from localised erosion. Where necessary, damaged components should be replaced and accumulated pollutants should be removed and disposed.

**Refer Appendix 1 for Jellyfish® Cartridge Schematic*

Disposal of Waste Materials

The accumulated pollutants found in the Jellyfish® must be handled and disposed of in a manner that is in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. If the filter cartridges have been contaminated with any unusual substance, there may be additional special handling and disposal methods required to comply with relevant government/authority/industry regulations.

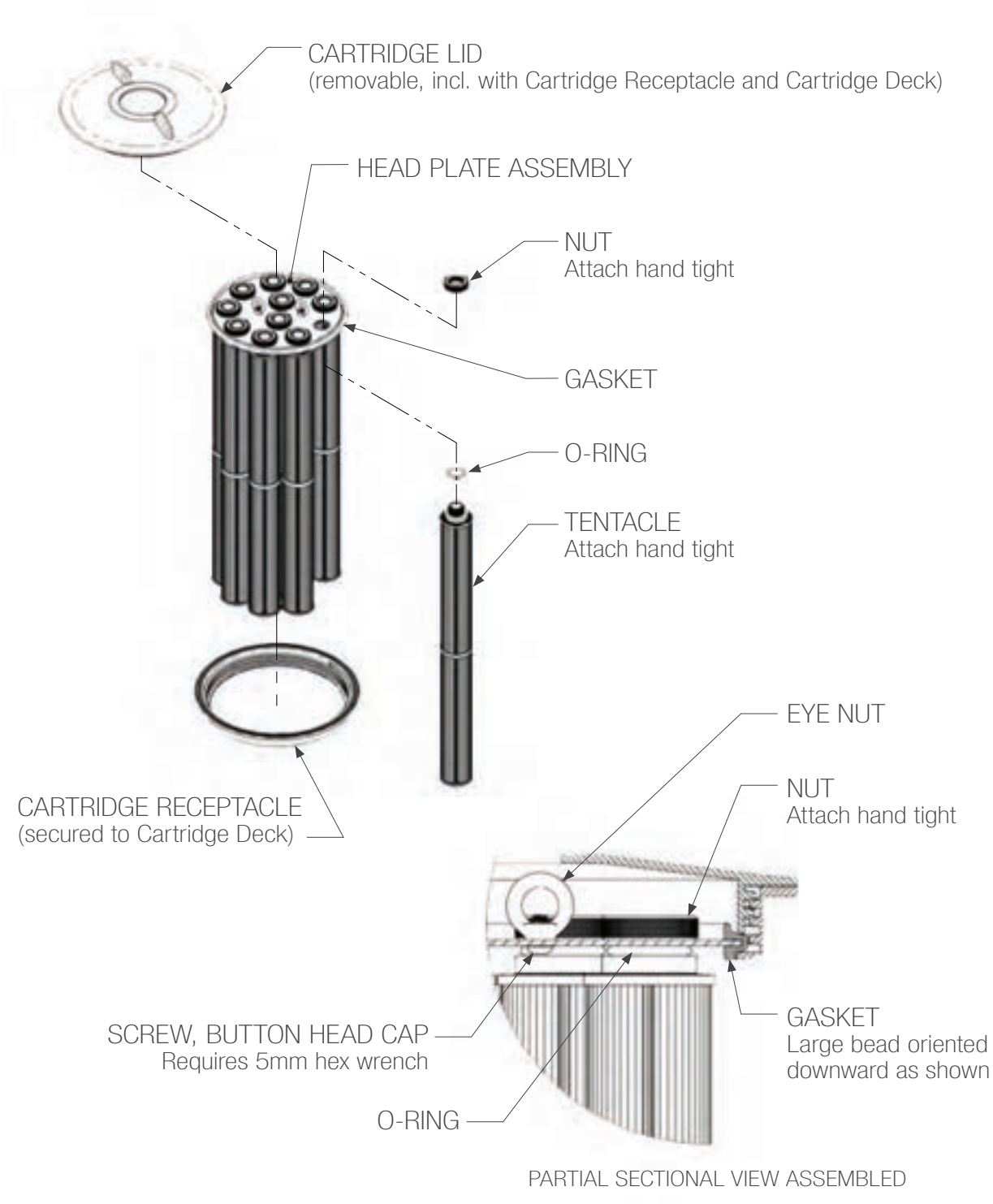
Maintenance Services

With over a decade and a half of maintenance experience, Ocean Protect has developed a systematic approach to inspecting, cleaning and maintaining a wide variety of stormwater treatment devices. Our fully trained and professional staff are familiar with the characteristics of each type of system, and the processes required to ensure its optimal performance.

Ocean Protect has several stormwater maintenance service options available to help ensure that your stormwater device functions properly throughout its design life. In the case of our Jellyfish® system we offer long term pay-as-you-go contracts, pre-paid once off servicing and replacement cartridges.

For more information please visit www.oceanprotect.com.au

Appendix 1 – Jellyfish® Cartridge Schematic



Ocean Protect supplies and maintains a complete range of filtration, hydrodynamic separation, screening and oil/water separation technologies.

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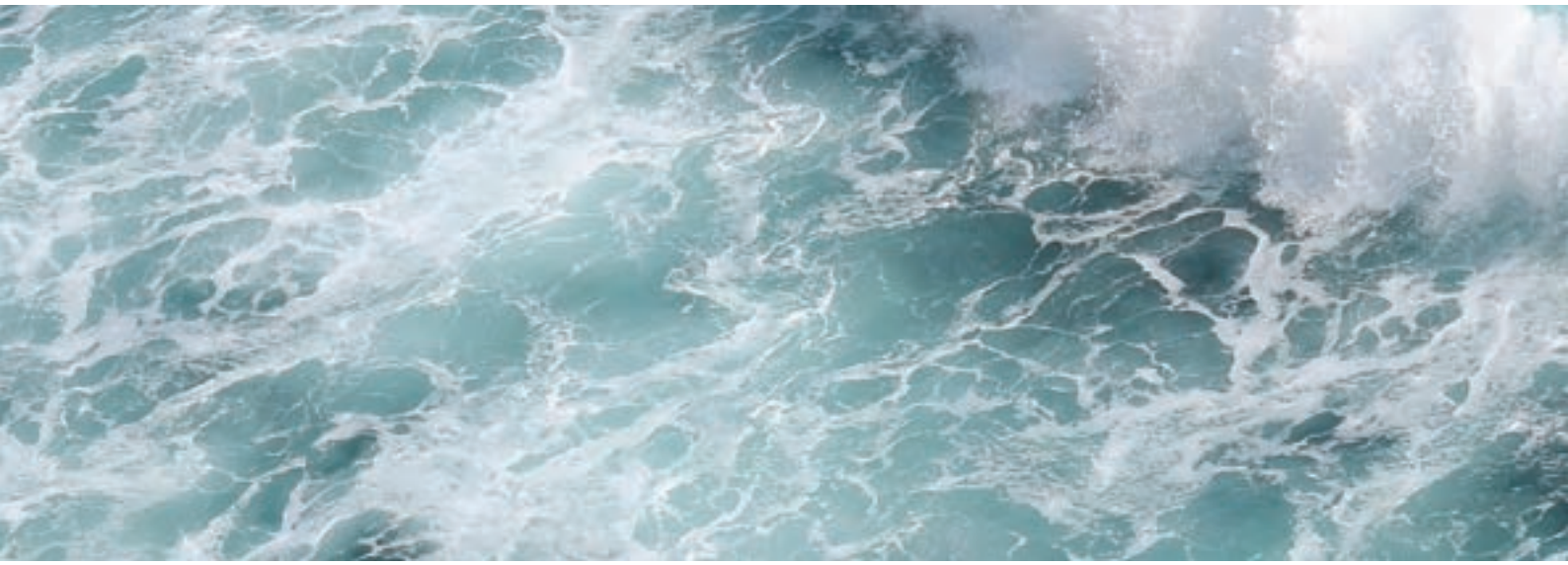
Jellyfish® Filter

Technical Design Guide

Stopping Pollution Entering Waterways

11/24



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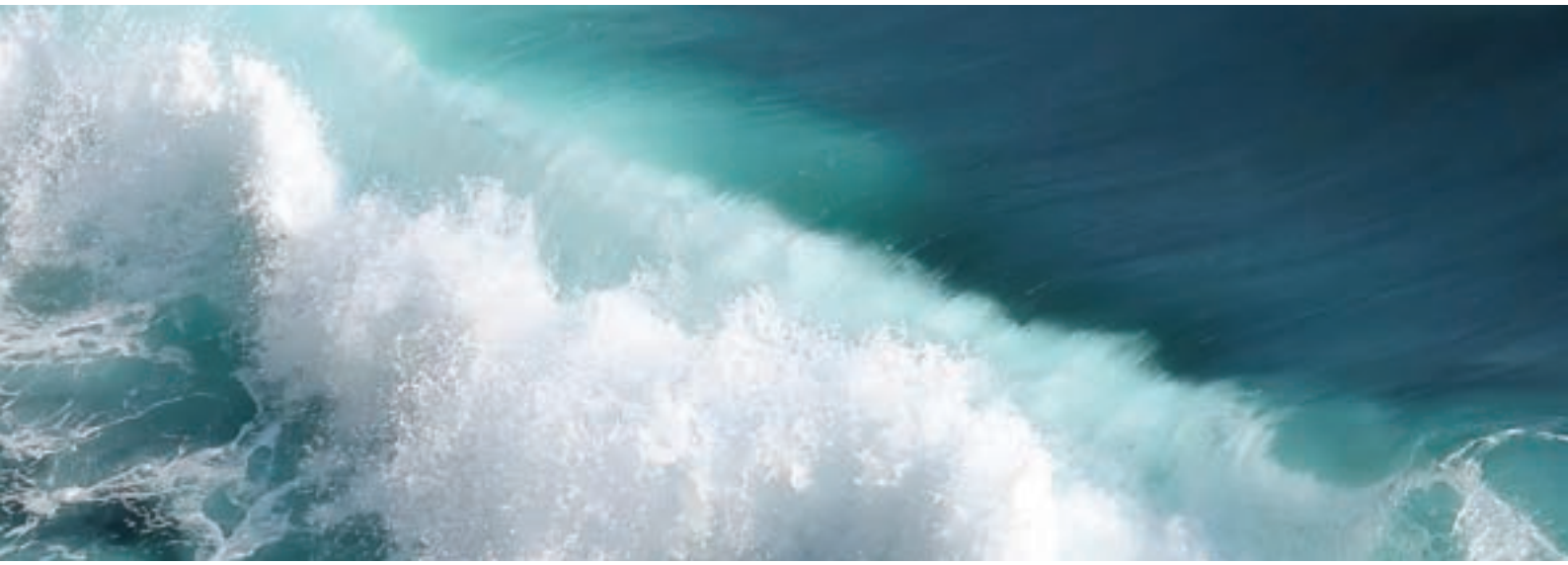
Introduction	3
Operational Overview	4
Features	5
Configurations	6
Performance and Select Approvals	7
Maintenance	7
Design Basics	8
Appendix 1 – Jellyfish® Precast Manhole Standard Models	10



Introduction

The Ocean Protect Jellyfish® is a compact, below ground stormwater treatment device, configured offline to capture pollutants in stormwater run-off. The Jellyfish® Filter uses high flow rate membrane filtration at low driving head with a large surface area to filter stormwater. By incorporating pre-treatment with light-weight membrane filtration, the Jellyfish® removes floatables, litter, oil, debris, TSS, fine silt-sized particles, and a high percentage of particulate-bound pollutants; including phosphorus, nitrogen, metals and hydrocarbons. The large surface area membrane cartridges, combined with up flow hydraulics, frequent backwashing, and rinsable/reusable cartridges ensure long-lasting performance.

Operational Overview

During a storm, the upstream bypass structure directs low flows to the Jellyfish®. The system builds driving head, traps floating pollutants behind the Maintenance Access Wall (MAW) and drives flow below the cartridge deck where a separation skirt around the cartridges isolates oil, litter and debris outside the filtration zone. As a result of the upstream driving head, water is conveyed up from the treatment chamber through membrane tentacles where filtration occurs, retaining solids and other pollutants, before entering the back wash pool above. Once the water has filled the backwash pool, water overflows the weir and exits via the outlet pipe.

Once the rain event subsides, flow direction reverses such that the water in the backwash pool flows back into the lower treatment chamber. This passive backwash drops out some of the attached solids and extends cartridge life, assisting in preparing the system for the next rainfall event.

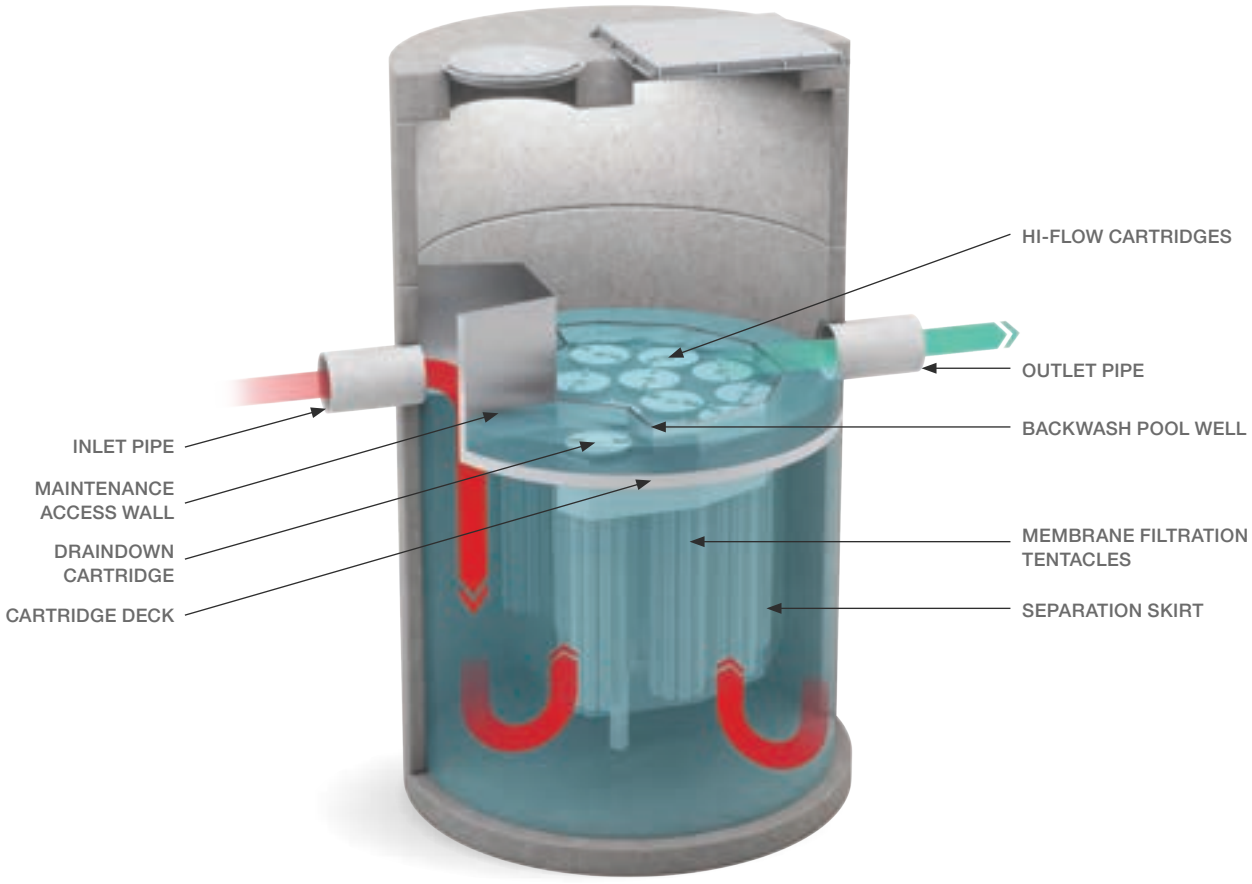


Figure 1: Jellyfish® operation

Features

Each Jellyfish® system consists of the following internal components:

- Maintenance Access Wall (MAW)
- Separation Skirt
- Filtration Zone (High-flow cartridges)
- Backwash Pool
- Drain-down cartridges

The Maintenance Access Wall creates an inlet zone for the stormwater inlet pipe. It allows for the dissipation of flows and capture of floatable pollutants whilst reducing the quantity of coarse material, solids and debris entering the Filtration Zone. The Separation Skirt provides further protection of the cartridges from coarse materials and hydrocarbons.

The High-flow and draindown cartridges are offered in a 1375mm length. Each cartridge consists of multiple pleated membranes referred to as "tentacles" that are washable and re-usable. The group of tentacles within every cartridge creates a large cumulative surface area membrane - and with a peak flux rate of 0.14L/s/m^2, it provides the most compact footprint available on the market.

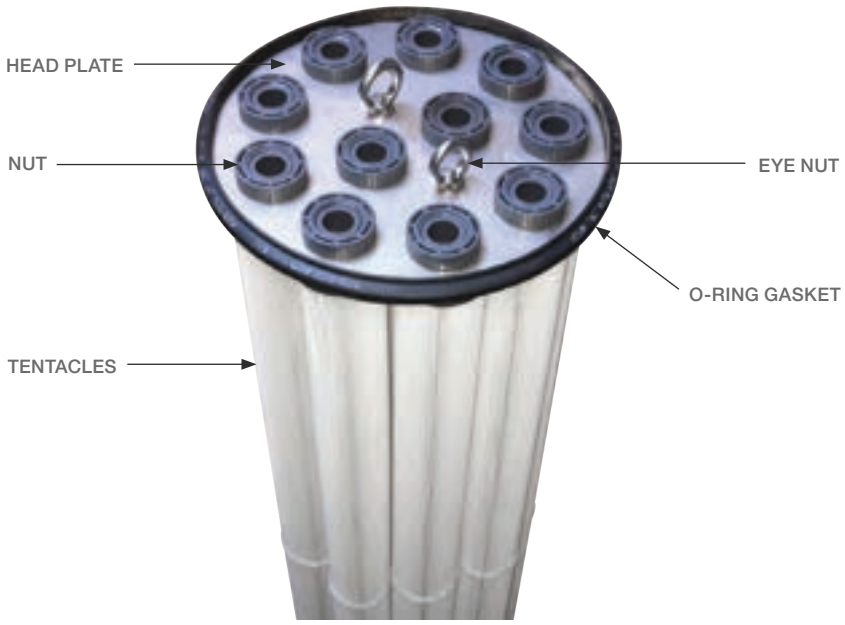


Figure 2: Jellyfish® tentacle components

There are three (3) hydraulic loss options for the Jellyfish® system. Typically, 457mm of hydraulic loss is adopted, however for lower drop sites, the designed hydraulic loss can be reduced to 305 or 229mm. The flow rates, head loss, and head drop for each system are shown in *Table 1* below.

Hydraulic Loss (mm)	Cartridge length	High flow cartridge flow rate (L/s)	Drain Down cartridge flow rate (L/s)
457	54-in (1.37m)	5	2.5
	27-in (0.686m)	2.5	1.3
305	54-in (1.37m)	3.34	1.96
	27-in (0.686m)	1.68	0.98
229	54-in (1.37m)	2.52	1.58
	27-in (0.686m)	1.27	0.79

Table 1: Jellyfish® cartridge details

Configurations

The Jellyfish® treatment system can be housed in a variety of ways such that it suits the site specific requirements for flowrate, hydraulics, accessibility and footprint restrictions. The standard configuration offered by Ocean Protect is pre-cast concrete manholes. These systems are simple to install, as they arrive on site after being manufactured offsite to suit site specific requirements (pipe size, inlet/outlet orientation, levels etc.). Larger precast or cast-in-place Jellyfish® Filter vaults are available to treat higher flows. Pre-cast Manhole Jellyfish® Filter systems are pre-configured (pipe size, location, unit height etc.) prior to arrival upon site for ease of installation.

Figure 3: Jellyfish® precast manhole

Figure 4: Jellyfish® vault

Performance and Select Approvals

While laboratory testing provides a means to generate hydraulic and basic performance data, all filtration devices should also be complemented with long-term field data evaluations. As a minimum, field studies should generally comply with a recognised field testing protocol, for example, the Technology Acceptance Reciprocity Partnership (TARP) or the Technology Assessment Protocol – Ecology (TAPE) in the USA.

To be considered valid, all field monitoring programs should be peer reviewed by a reputable third party and replicate local pollutant concentrations including soluble fractions of nutrients together with rainfall. Such field testing has been undertaken for the Jellyfish – both locally in Australia and overseas. Further information on these studies is available in *A review of the application of Jellyfish® in Australia.*

Since 2017, over 1700 Jellyfish® have been installed within Australia by Ocean Protect. These assets have been successfully installed in a variety of applications to meet regulatory requirements set by authorities throughout Australia.

Specifically, Jellyfish® has been accepted by some of the most stringent stormwater quality regulators around the globe including:

- Stormwater Australia Quality Improvement Device Evaluation Protocol (SQIDEP) verification
- Brisbane City Council
- Wollondilly Shire Council
- Campbelltown City Council
- Blacktown City Council
- Hobsons Bay City Council
- City of Port Adelaide Enfield
- City of Hobart
- Washington State Department of Ecology (TAPE) GULD – Basic
- New Jersey Corporation of Advanced Technology (NJCAT)
  - » Field Performance per TARP Tier II Protocol
- Canada ISO 14034 Environmental Management – Environmental Technology Verification (ETV)

Please contact your Ocean Protect representative to obtain the Jellyfish® approval status in your area.

Maintenance

Every filtration device will eventually need routine maintenance. The question is how often and how much it will cost. Proper evaluation of long-term maintenance costs should be a consideration when selecting a manufactured treatment device.

Jellyfish® cartridges are lightweight and reusable and minor maintenance of the filter cartridges is performed by removing, rinsing and reusing the cartridge tentacles. Vacuum extraction of captured pollutants in the sump is recommended at the same time.

Full cartridge replacement intervals differ by site due to varying pollutant loading and type, and maintenance frequency and replacement is anticipated to be every 2-5 years.

Maintenance support

Ocean Protect provides flexible options and contract terms. A detailed maintenance guide and mass load calculation spreadsheet is available upon request.

For further information please refer to the *Jellyfish® Operations and Maintenance Manual.*

Design Basics

The design requirements of any Jellyfish® system is detailed in 3 typical steps:

1. Hydraulic Design
2. Water Quality Design
3. Mass Load Design

1 Hydraulic Design

All Jellyfish® systems must be designed to ensure that the hydraulic requirements of the system are met without adversely impacting the upstream hydraulics (limiting the likelihood of localised flooding). *Table 1* (page 5) details the available head loss options. **The designer must initially select an option and ensure the corresponding head loss can be catered for.**

A Jellyfish® system is typically designed 'offline' so that treatment flows are directed to the Jellyfish tank and higher flows are bypassed via an upstream weir or raised pipe. The upstream diversion arrangement is used to create the head loss required above the outlet IL of the Jellyfish unit *(see Table 1).* Please note that the standard arrangement for a Jellyfish allows for a flexible height difference between the inlet and outlet but is typically set at 150mm.

Jellyfish® cartridges have a unique backflush mechanism that is passively activated at the end of each storm to increase the longevity of each cartridge. Consequently, captured pollutants are stored within the system and in order to minimise scour peak flows into the treatment chamber need to be limited. Specifically, when **peak flows surpass the combined cartridge treatment flow rate the system needs to be arranged off-line** with a low flow splitter designed upstream.

It is also necessary to consider the impacts that tail water/submergence has on all stormwater treatment devices. In the case of the Jellyfish®, tailwater can adversely affect the long term cartridge operation. As such measures should be implemented during design to ensure that the system can operate effectively. If this cannot be achieved on your project an alternative treatment option, such as StormFilter®, is recommended. Please contact Ocean Protect for advice and complimentary design advice.

2 Water Quality Design

Ocean Protect uses the widely endorsed Model for Urban Stormwater Improvement Conceptualisation (MUSIC), which makes it easy to correctly size an appropriate Jellyfish® system for your site.

A complimentary design service which includes MUSIC modelling is provided by the Ocean Protect engineering team. Simply email your project details to **design@oceanprotect.com.au** or alternatively you can always call one of our engineers for a discussion or to arrange a meeting in your office. The team will provide you with an efficient design containing details of the devices required to meet your water quality objectives together with budget estimates, product drawings and the MUSIC (.sqz) file.

When designing/modelling a Jellyfish® system for water quality purposes in MUSIC, a single generic treatment node is utilised. The generic treatment node is utilised with relevant removal efficiencies inserted. These parameters can vary based on the jurisdiction (authority) of your project, relevant details can be obtained from Ocean Protect. The high-flow bypass figure is adjusted within the node to represent the treatable flow rate required to obtain water quality targets. Once finalised this figure can be matched with the system flow rates provided in *Appendix 1.*

All details such as drawings, specifications and maintenance manuals can also be downloaded from **www.oceanprotect.com.au** for integration into your project's documentation. Additionally, the Ocean Protect team is available to review your model and provide additional assistance and guidance on the configuration of the Jellyfish® system(s) for your project.

3 Mass Load Design

At the completion of your water quality design process (as above), it is necessary that maintenance frequency is considered in order to prevent excessive ongoing maintenance requirements. Ocean Protect recommends a minimum minor maintenance frequency of 6 months (rinsing) for the Jellyfish®.

All filtration devices occlude overtime, consequently they have a maximum sediment capacity (TSS load). By analysing the mean annual load figures for the Jellyfish® generic treatment node, the total annual retained TSS can be determined. To determine the minimum cartridge quantity required by mass load design, the annual retained TSS should be divided by the relevant cartridge sediment capacity. The Ocean Protect team can provide assistance and details on this process.

In determining the final cartridge quantity for your project, you must utilise the largest number of cartridges obtained from undertaking Water Quality and Mass Load design steps.

Appendix 1 – Jellyfish® Precast Manhole Standard Models

54-inch (1.37m) Full Length Cartridge

Model	High flow cartridges	Drain-down cartridges	457mm Head Flow rate (L/s)	305mm Head Flow rate (L/s)	229mm Head Flow rate (L/s)
JF-900-1-1	1	1	7.5	5.3	4.1
JF-900-2-1	2	1	12.5	8.6	6.6
JF-1200-1-1	1	1	7.5	5.3	4.1
JF-1200-2-1	2	1	12.5	8.6	6.6
JF-1500-3-1	3	1	17.5	12.0	9.1
JF-1500-4-1	4	1	22.5	15.3	11.7
JF-1500-5-1	5	1	27.5	18.7	14.2
JF-2300-6-1	6	1	32.5	22.0	16.7
JF-2300-7-2	7	2	40	27.3	20.8
JF-2300-8-2	8	2	45	30.6	23.3
JF-2300-9-2	9	2	50	34.0	25.8
JF-2300-10-2	10	2	55	37.3	28.4
JF-3300-11-2	11	2	60	40.7	30.9
JF-3300-12-2	12	2	65	44.0	33.4
JF-3300-13-3	13	3	72.5	49.3	37.5
JF-3300-14-3	14	3	77.5	52.6	40.0
JF-3300-15-3	15	3	82.5	56.0	42.5
JF-3300-16-3	16	3	87.5	59.3	45.1
JF-3300-17-3	17	3	92.5	62.7	47.6
JF-3300-18-3	18	3	97.5	66.0	50.1
JF-3300-19-4	19	4	105	71.3	54.2
JF-3300-20-4	20	4	110	74.6	56.7
JF-3300-21-4	21	4	115	78.0	59.2
JF-3300-22-4	22	4	120	81.3	61.8
JF-3300-23-4	23	4	125	84.7	64.3
JF-3300-24-4	24	4	130	88.0	66.8
JF-3300-25-5	25	5	137.5	93.3	70.9
JF-3300-26-5	26	5	142.5	96.6	73.4
JF-3300-27-5	27	5	147.5	100.0	75.9
JF-3300-28-5	28	5	152.5	103.3	78.5
JF-3300-29-5	29	5	157.5	106.7	81.0

27-inch (0.686m) Half Length Cartridge

Model	High flow cartridges	Drain-down cartridges	457mm Head Flow rate (L/s)	305mm Head Flow rate (L/s)	229mm Head Flow rate (L/s)
JF-900-1-1	1	1	3.8	2.7	2.1
JF-900-2-1	2	1	6.3	4.3	3.3
JF-1200-1-1	1	1	3.8	2.7	2.1
JF-1200-2-1	2	1	6.3	4.3	3.3
JF-1500-3-1	3	1	8.8	6.0	4.6
JF-1500-4-1	4	1	11.3	7.7	5.9
JF-1500-5-1	5	1	13.8	9.4	7.1
JF-2300-6-1	6	1	16.3	11.1	8.4
JF-2300-7-2	7	2	20.1	13.7	10.5
JF-2300-8-2	8	2	22.6	15.4	11.7
JF-2300-9-2	9	2	25.1	17.1	13.0
JF-2300-10-2	10	2	27.6	18.8	14.3
JF-3300-11-2	11	2	30.1	20.4	15.6
JF-3300-12-2	12	2	32.6	22.1	16.8
JF-3300-13-3	13	3	36.4	24.8	18.9
JF-3300-14-3	14	3	38.9	26.5	20.2
JF-3300-15-3	15	3	41.4	28.1	21.4
JF-3300-16-3	16	3	43.9	29.8	22.7
JF-3300-17-3	17	3	46.4	31.5	24.0
JF-3300-18-3	18	3	48.9	33.2	25.2
JF-3300-19-4	19	4	52.7	35.8	27.3
JF-3300-20-4	20	4	55.2	37.5	28.6
JF-3300-21-4	21	4	57.7	39.2	29.8
JF-3300-22-4	22	4	60.2	40.9	31.1
JF-3300-23-4	23	4	62.7	42.6	32.4
JF-3300-24-4	24	4	65.2	44.2	33.6
JF-3300-25-5	25	5	69	46.9	35.7
JF-3300-26-5	26	5	71.5	48.6	37.0
JF-3300-27-5	27	5	74	50.3	38.2
JF-3300-28-5	28	5	76.5	51.9	39.5
JF-3300-29-5	29	5	79	53.6	40.8

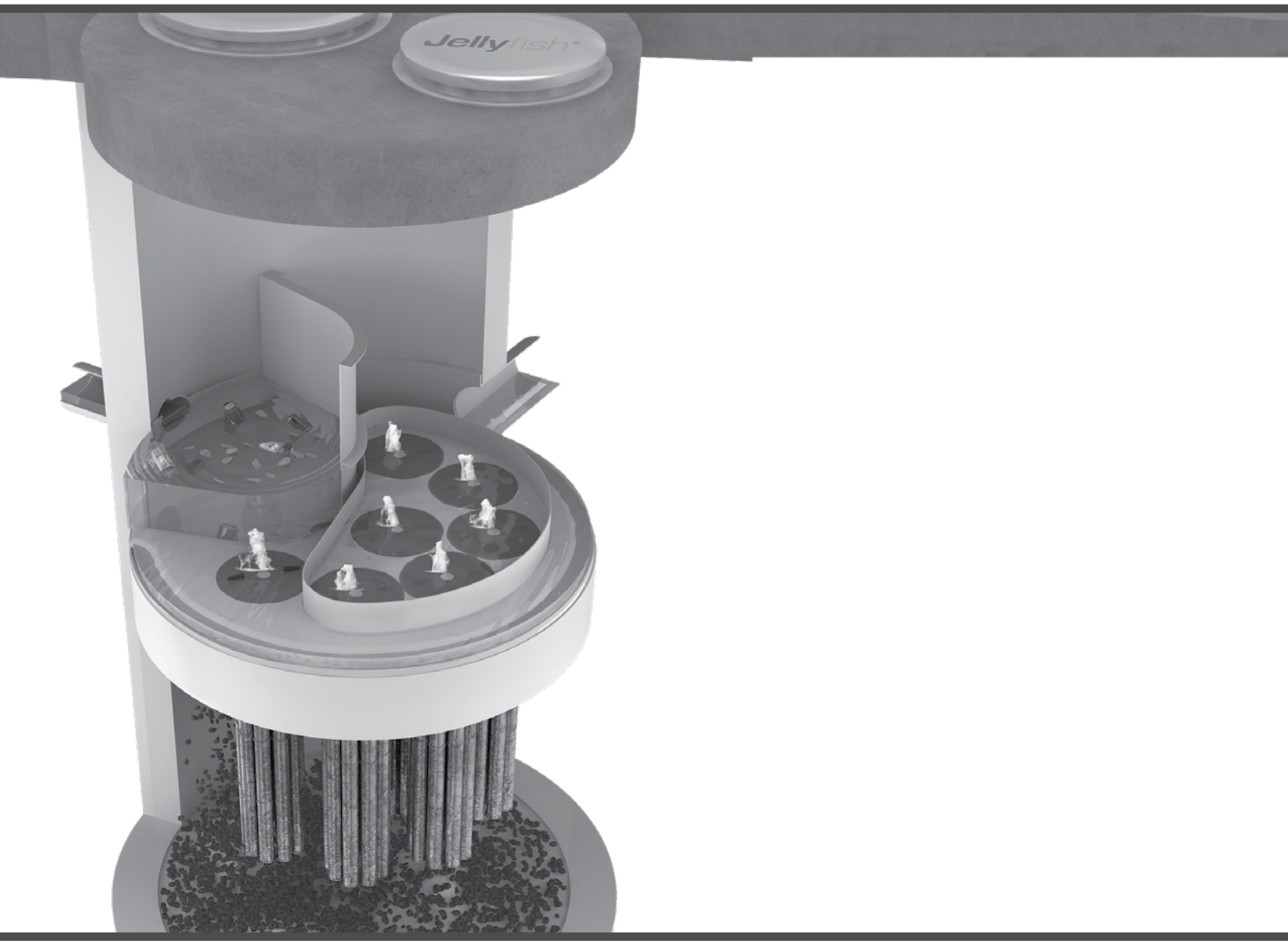
Ocean Protect supplies and maintains a complete range of filtration, hydrodynamic separation, screening and oil/water separation technologies.

Call 1300 354 722

www.oceanprotect.com.au

CONTECH®
ENGINEERED SOLUTIONS

Jellyfish® Filter Maintenance Guide



Jellyfish®

JELLYFISH® FILTER
INSPECTION & MAINTENANCE GUIDE

Jellyfish units are often just one of many structures in a more comprehensive stormwater drainage and treatment system.

In order for maintenance of the Jellyfish filter to be successful, it is imperative that all other components be properly maintained. The maintenance and repair of upstream facilities should be carried out prior to Jellyfish maintenance activities.

In addition to considering upstream facilities, it is also important to correct any problems identified in the drainage area. Drainage area concerns may include: erosion problems, heavy oil loading, and discharges of inappropriate materials.

TABLE OF CONTENTS

Inspection and Maintenance Overview 3

Inspection Procedure.....3

Maintenance Procedure.....4

Cartridge Assembly & Cleaning.....5

Inspection Process 7

1.0 Inspection and Maintenance Overview

The primary purpose of the Jellyfish® Filter is to capture and remove pollutants from stormwater runoff. As with any filtration system, these pollutants must be removed to maintain the filter's maximum treatment performance. Regular inspection and maintenance are required to insure proper functioning of the system.

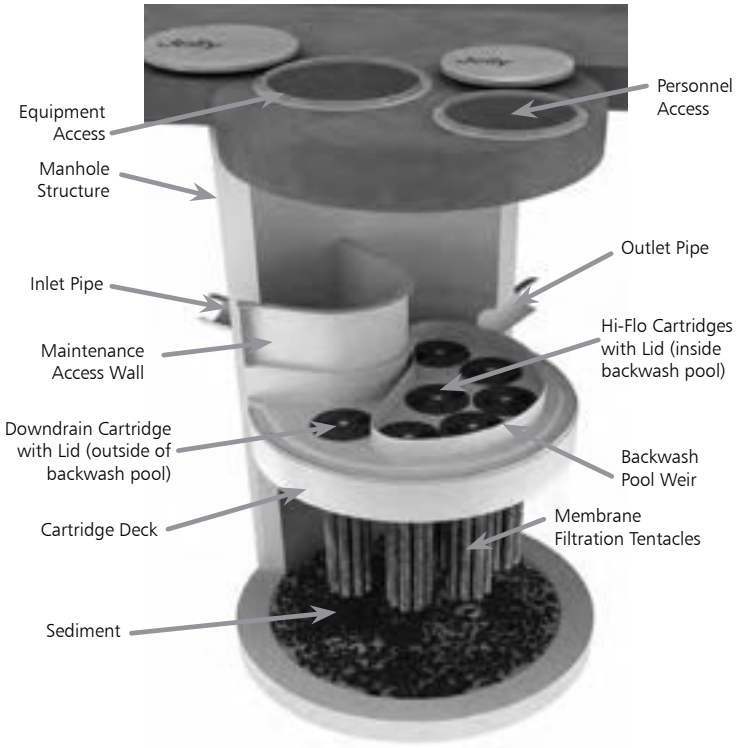
Maintenance frequencies and requirements are site specific and vary depending on pollutant loading. Additional maintenance activities may be required in the event of non-storm event runoff, such as base-flow or seasonal flow, an upstream chemical spill or due to excessive sediment loading from site erosion or extreme runoff events. It is a good practice to inspect the system after major storm events.

Inspection activities are typically conducted from surface observations and include:

- Observe if standing water is present
- Observe if there is any physical damage to the deck or cartridge lids
- Observe the amount of debris in the Maintenance Access Wall (MAW) or inlet bay for vault systems

Maintenance activities include:

- Removal of oil, floatable trash and debris
- Removal of collected sediments
- Rinsing and re-installing the filter cartridges
- Replace filter cartridge tentacles, as needed



Note: Separator Skirt not shown

2.0 Inspection Timing

Inspection of the Jellyfish Filter is key in determining the maintenance requirements for, and to develop a history of, the site's pollutant loading characteristics. In general, inspections should be performed at the times indicated below; *or per the approved project stormwater quality documents (if applicable), whichever is more frequent*.

1. A minimum of quarterly inspections during the first year of operation to assess the sediment and floatable pollutant accumulation, and to ensure proper functioning of the system.
2. Inspection frequency in subsequent years is based on the inspection and maintenance plan developed in the first year of operation. Minimum frequency should be once per year.
3. Inspection is recommended after each major storm event.
4. Inspection is required immediately after an upstream oil, fuel or other chemical spill.

3.0 Inspection Procedure

The following procedure is recommended when performing inspections:

1. Provide traffic control measures as necessary.
2. Inspect the MAW or inlet bay for floatable pollutants such as trash, debris, and oil sheen.
3. Measure oil and sediment depth in several locations, by lowering a sediment probe until contact is made with the floor of the structure. Record sediment depth, and presences of any oil layers.
4. Inspect cartridge lids. Missing or damaged cartridge lids to be replaced.
5. Inspect the MAW (where appropriate), cartridge deck and receptacles, and backwash pool weir, for damaged or broken components.

3.1 Dry weather inspections

- Inspect the cartridge deck for standing water, and/or sediment on the deck.
- No standing water under normal operating conditions.
- Standing water inside the backwash pool, but not outside the backwash pool indicates, that the filter cartridges need to be rinsed.

Inspection Utilizing Sediment Probe

- Standing water outside the backwash pool is not anticipated and may indicate a backwater condition caused by high water elevation in the receiving water body, or possibly a blockage in downstream infrastructure.
- Any appreciable sediment (≥1/16") accumulated on the deck surface should be removed.

3.2 Wet weather inspections

- Observe the rate and movement of water in the unit. Note the depth of water above deck elevation within the MAW or inlet bay.
- Less than 6 inches, flow should be exiting the cartridge lids of each of the draindown cartridges (i.e. cartridges located outside the backwash pool).
- Greater than 6 inches, flow should be exiting the cartridge lids of each of the draindown cartridges and each of the hi-flo cartridges (i.e. cartridges located inside the backwash pool), and water should be overflowing the backwash pool weir.
- 18 inches or greater and relatively little flow is exiting the cartridge lids and outlet pipe, this condition indicates that the filter cartridges need to be rinsed.

4.0 Maintenance Requirements

Required maintenance for the Jellyfish Filter is based upon results of the most recent inspection, historical maintenance records, or the site specific water quality management plan; whichever is more frequent. In general, maintenance requires some combination of the following:

1. Sediment removal for depths reaching 12 inches or greater, or within 3 years of the most recent sediment cleaning, whichever occurs sooner.
2. Floatable trash, debris, and oil removal.
3. Deck cleaned and free from sediment.
4. Filter cartridges rinsed and re-installed as required by the most recent inspection results, or within 12 months of the most recent filter rinsing, whichever occurs sooner.
5. Replace tentacles if rinsing does not restore adequate hydraulic capacity, remove accumulated sediment, or if damaged or missing. It is recommended that tentacles should remain in service no longer than 5 years before replacement.
6. Damaged or missing cartridge deck components must be repaired or replaced as indicated by results of the most recent inspection.
7. The unit must be cleaned out and filter cartridges inspected immediately after an upstream oil, fuel, or chemical spill. Filter cartridge tentacles should be replaced if damaged or compromised by the spill.

5.0 Maintenance Procedure

The following procedures are recommended when maintaining the Jellyfish Filter:

1. Provide traffic control measures as necessary.
2. Open all covers and hatches. Use ventilation equipment as required, according to confined space entry procedures. *Caution: Dropping objects onto the cartridge deck may cause damage*.
3. Perform Inspection Procedure prior to maintenance activity.
4. To access the cartridge deck for filter cartridge service, descend into the structure and step directly onto the deck. Caution: Do not step onto the maintenance access wall (MAW) or backwash pool weir, as damage may result. Note that the cartridge deck may be slippery.
5. Maximum weight of maintenance crew and equipment on the cartridge deck not to exceed 450 lbs.

5.1 Filter Cartridge Removal

1. Remove a cartridge lid.
2. Remove cartridges from the deck using the lifting loops in the cartridge head plate. Rope or a lifting device (available from Contech) should be used. *Caution: Should a snag occur, do not force the cartridge upward as damage to the tentacles may result. Wet cartridges typically weigh between 100 and 125 lbs*.
3. Replace and secure the cartridge lid on the exposed empty receptacle as a safety precaution. Contech does not recommend exposing more than one empty cartridge receptacle at a time.

5.2 Filter Cartridge Rinsing

1. Remove all 11 tentacles from the cartridge head plate. Take care not to lose or damage the O-ring seal as well as the plastic threaded nut and connector.

Cartridge Removal & Lifting Device

2. Position tentacles in a container (or over the MAW), with the threaded connector (open end) facing down, so rinse water is flushed through the membrane and captured in the container.
3. Using the Jellyfish rinse tool (available from Contech) or a low-pressure garden hose sprayer, direct water spray onto the tentacle membrane, sweeping from top to bottom along the length of the tentacle. Rinse until all sediment is removed from the membrane. *Caution: Do not use a high pressure sprayer or focused stream of water on the membrane. Excessive water pressure may damage the membrane*.

4. Collected rinse water is typically removed by vacuum hose.
5. Reassemble cartridges as detailed later in this document. Reuse O-rings and nuts, ensuring proper placement on each tentacle.

5.3 Sediment and Flotables Extraction

1. Perform vacuum cleaning of the Jellyfish Filter only after filter cartridges have been removed from the system. Access the lower chamber for vacuum cleaning only through the maintenance access wall (MAW) opening. Be careful not to damage the flexible plastic separator skirt that is attached to the underside of the deck on manhole systems. Do not lower the vacuum wand through a cartridge receptacle, as damage to the receptacle will result.
2. Vacuum floatable trash, debris, and oil, from the MAW opening or inlet bay. Alternatively, floatable solids may be removed by a net or skimmer.

Vacuuming Sump Through MAW

3. Pressure wash cartridge deck and receptacles to remove all sediment and debris. Sediment should be rinsed into the sump area. Take care not to flush rinse water into the outlet pipe.
4. Remove water from the sump area. Vacuum or pump equipment should only be introduced through the MAW or inlet bay.
5. Remove the sediment from the bottom of the unit through the MAW or inlet bay opening.

Vacuuming Sump Through MAW

6. For larger diameter Jellyfish Filter manholes (≥8-ft) and some vaults complete sediment removal may be facilitated by removing a cartridge lid from an empty receptacle and inserting a jetting wand (not a vacuum wand) through the receptacle. Use the sprayer to rinse loosened sediment toward the vacuum hose in the MAW opening, being careful not to damage the receptacle.

5.4 Filter Cartridge Reinstallation and Replacement

1. Cartridges should be installed after the deck has been cleaned. It is important that the receptacle surfaces be free from grit and debris.
2. Remove cartridge lid from deck and carefully lower the filter cartridge into the receptacle until head plate gasket is seated squarely in receptacle. ***Caution: Do not force the cartridge downward; damage may occur.***
3. Replace the cartridge lid and check to see that both male threads are properly seated before rotating approximately 1/3 of a full rotation until firmly seated. Use of an approved rim gasket lubricant may facilitate installation. See next page for additional details.
4. If rinsing is ineffective in removing sediment from the tentacles, or if tentacles are damaged, provisions must be made to replace the spent or damaged tentacles with new tentacles. Contact Contech to order replacement tentacles.

5.5 Chemical Spills

Caution: If a chemical spill has been captured, do not attempt maintenance. Immediately contact the local hazard response agency and contact Contech.

5.6 Material Disposal

The accumulated sediment found in stormwater treatment and conveyance systems must be handled and disposed of in accordance with regulatory protocols. It is possible for sediments to contain measurable concentrations of heavy metals and organic chemicals (such as pesticides and petroleum products). Areas with the greatest potential for high pollutant loading include industrial areas and heavily traveled roads. Sediments and water must be disposed of in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. This typically requires coordination with a local landfill for solid waste disposal. For liquid waste disposal a number of options are available including a municipal vacuum truck decant facility, local waste water treatment plant or on-site treatment and discharge.

Jellyfish Filter Components & Filter Cartridge Assembly and Installation

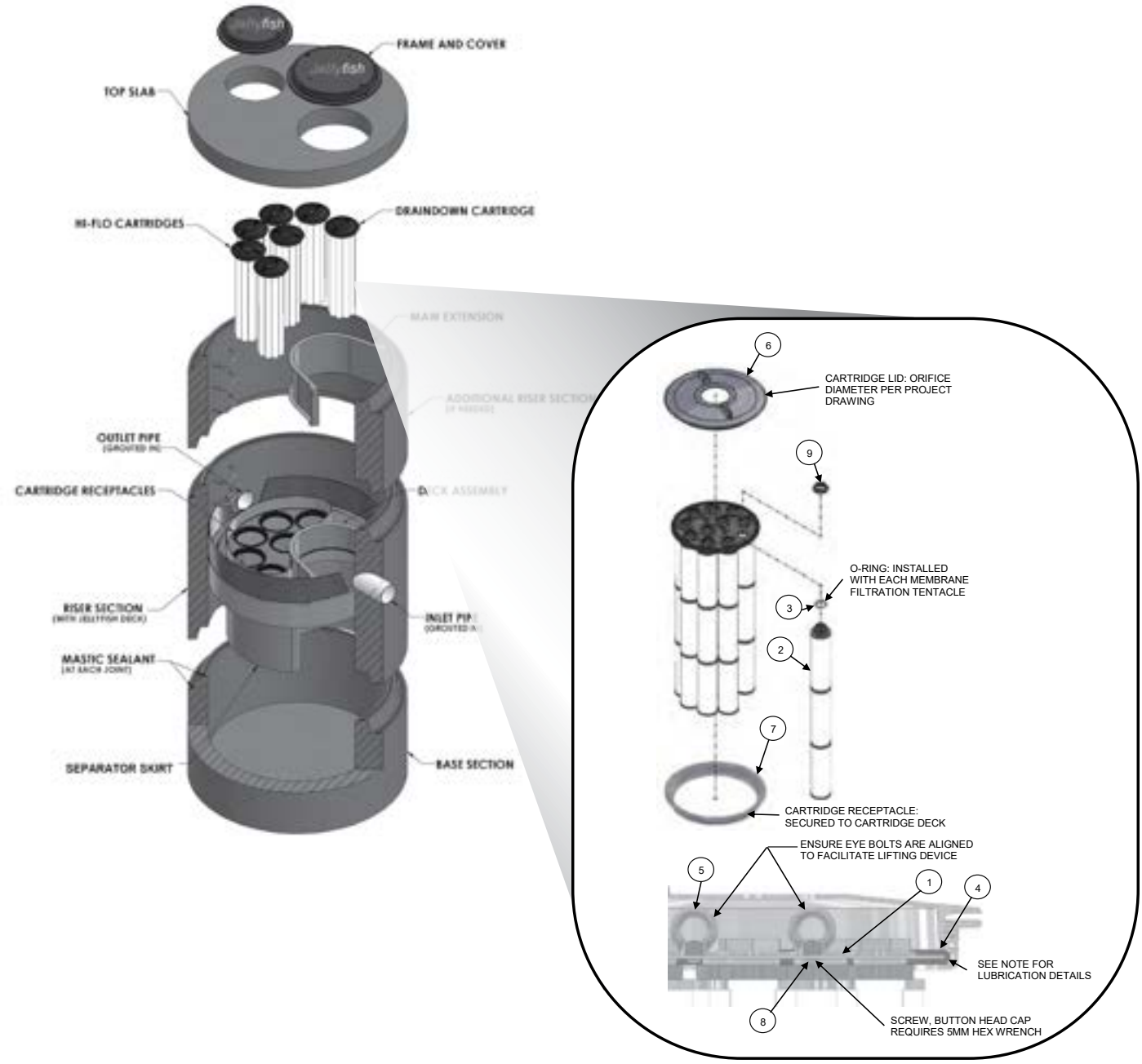


TABLE 1: BOM

ITEM NO.	DESCRIPTION
1	JF HEAD PLATE
2	JF TENTACLE
3	JF O-RING
4	JF HEAD PLATE GASKET
5	JF CARTRIDGE EYELET
6	JF 14IN COVER
7	JF RECEPTACLE
8	BUTTON HEAD CAP SCREW M6X14MM SS
9	JF CARTRIDGE NUT

TABLE 2: APPROVED GASKET LUBRICANTS

PART NO.	MFR	DESCRIPTION
78713	LA-CO	LUBRI-JOINT
40501	HERCULES	DUCK BUTTER
30600	OATEY	PIPE LUBRICANT
PSLUBXL1Q	PROSELECT	PIPE JOINT LUBRICANT

NOTES:

Head Plate Gasket Installation:
Install Head Plate Gasket (Item 4) onto the Head Plate (Item 1) and liberally apply a lubricant from Table 2: Approved Gasket Lubricants onto the gasket where it contacts the Receptacle (Item 7) and Cartridge Lide (ITem 6). Follow Lubricant manufacturer's instructions.

Lid Assembly:
Rotate Cartridge Lid counter-clockwise until both male threads drop down and properly seat. Then rotate Cartridge Lid clock-wise approximately one-third of a full rotation until Cartridge Lid is firmly secured, creating a watertight seal.

Jellyfish Filter Inspection and Maintenance Log

Owner:				Jellyfish Model No:		
Location:				GPS Coordinates:		
Land Use:	Commercial:		Industrial:		Service Station:	
	Roadway/Highway:		Airport:		Residential:	

Date/Time:						
Inspector:						
Maintenance Contractor:						
Visible Oil Present: (Y/N)						
Oil Quantity Removed:						
Floatable Debris Present: (Y/N)						
Floatable Debris Removed: (Y/N)						
Water Depth in Backwash Pool						
Draindown Cartridges externally rinsed and recommissioned: (Y/N)						
New tentacles put on Draindown Cartridges: (Y/N)						
Hi-Flo Cartridges externally rinsed and recommissioned: (Y/N)						
New tentacles put on Hi-Flo Cartridges: (Y/N)						
Sediment Depth Measured: (Y/N)						
Sediment Depth (inches or mm):						
Sediment Removed: (Y/N)						
Cartridge Lids intact: (Y/N)						
Observed Damage:						
Comments:						

Support

- Drawings and specifications are available at www.conteches.com/jellyfish.
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Appendix S Structural Calculations

Calculation Sheet – Drainage Headwall

Project Information

Project Name: Parramatta Light Rail Stage 2 Enabling Works
Location: Melrose Park
Client: John Holland
Designer: [redacted]
Date: 10 August 2025

1. Design Basis

Applicable Standards and Guidelines

TfNSW Specifications:

- D&C R11 – Stormwater Drainage
- R53 – Concrete (if cast-in-situ)
- B80 – Reinforcement and embedded items

Australian Standards:

- AS 5100 – Bridge Design
- AS/NZS 4671 – Steel Reinforcing Materials
- AS 3600 – Concrete Structures
- AS 3725 – Loads on buried pipes
- TfNSW Standard Drawings – Headwall configurations

2. Design Criteria

General Parameters

Design Life: 100 years
Soil Bearing Capacity: 150 kPa Allowable Bearing Pressure
Exposure Classification: B1

Structural Loads

Dead Load: Self-weight of headwall
Live Load: 20 kPa surcharge (on headwall only)
Earth Pressure: Active/passive lateral soil pressure
Impact Load: No applicable

Material Properties

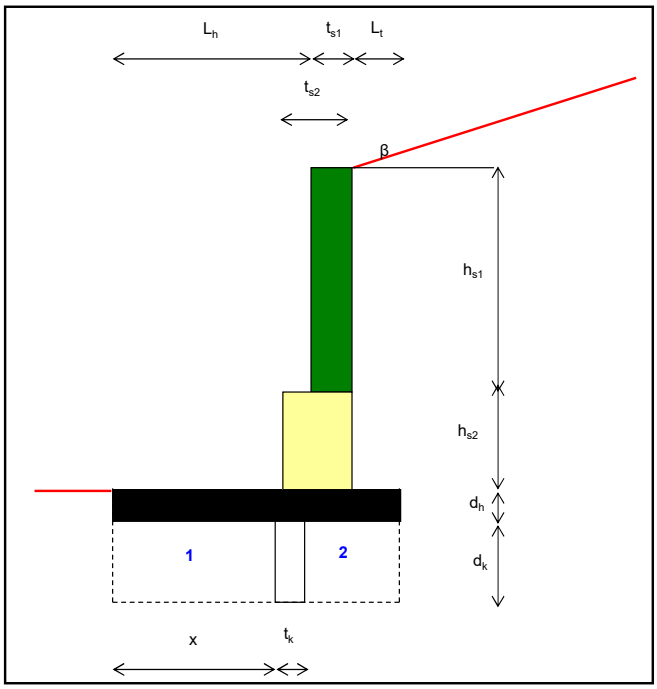
Concrete Grade: 40 MPA
Reinforcement Type: N16 and N12 Grade 500 conventional reinforcement
Cover to Reinforcement: Minimum 45 mm

3. Results

Please refer to the document on Overleaf.

Cantilever Retaining Wall (Reverse)

Traditional Method



Properties

Unit Weight of Soil, γ_{soil}	20.00	kN/m3
Unit Weight of Concrete, γconcrete	24.50	kN/m3
Unit Weight of Water, γwater	9.81	kN/m3
Strength of Soil, Φ	30.00	°
Strength of Soil at base, Φbase	30.00	
Coefficient of Friction, μ	0.36	
Slope of Backfill, β	1:3	
	0.33	

Wall Parameters

Height of Stem, h_{s1}	2.45	m
Thickness of Stem, t_{s1}	0.30	m
Height of Thickened Stem, h_{s2}	0.00	m
Thickness of Thickened Stem, t_{s2}	0.00	m
Length of Heel, Lh	2.80	m
Depth of Heel, d_h	0.30	m
Is there a toe?	Yes	
Length of toe, L_t	0.15	m
Depth of toe, d_t	0.30	m
Is there a key?	Yes	
Depth of key, d_k	0.30	m
Thickness of key, t_k	0.30	m
Position of key, x	2.70	m
x_{max}	2.95	m

OK

Design Parameters

Overturning Soil State	Ka	
Active Soil Coefficient, Ka	0.33	
Passive Soil Coefficient, Kp	3.00	
Total Height of Wall, z	2.800	m
Height of Liquid Presure, z_w	Yes	
	0.93	m
Is surcharge applied ?	Yes	
Surcharge, σ	20.00	kPa

	Force	Distance	Moment	
Overturning Effects - Horizontal				
Earth Pressure (Active)	11.61	1.56	18.07	
Earth Pressure (Active)	11.61	0.47	5.42	
Earth Pressure (Active)	1.48	0.31	0.46	
Liquid Pressure	4.27	0.31	1.33	
Surcharge	18.67	1.40	26.13	
	47.65		51.41	
Restoring Effects - Vertical				
Stem	18.01	2.95	53.12	
Thickened Stem	0.00	2.50	0.00	
Heel	22.79	1.55	35.32	
Toe	1.10	3.18	3.50	
Soil on Toe	7.35	3.18	23.34	
Key	2.21	2.85	6.28	
Soil 1	16.20	1.35	21.87	*
Soil 2	1.50	0.13	0.19	*
	69.15		143.62	
Restoring Effects - Horizontal				
Earth Pressure (Passive)	6.08	0.10	-0.61	

Overturning		
Overturning Effects, OTM	51.41	kN.m
Restoring Effects, RM	142.82	kN.m
	2.778	
Factor of Safety ≤ 2	Adequate	
Sliding		
Overturning Effects, OT	104.83	kN
Restoring Effects, R	162.47	kN
	1.550	
Factor of Safety ≤ 1.5	Adequate	
Bearing		
Length of Base	3.25	m
Eccentricity, e	0.27	m
Bearing Pressure, P max	24	kPa
min	8	kPa

DESIGN FORCES

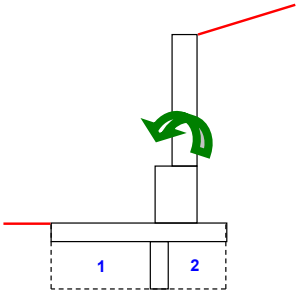
Shear at Bottem of Stem	63	kN
Shear atTransfer of Stem	0	kN
0	58	kN.m
0	0	kN.m
Bearing, Pmax	24	kPa

1.5Ep + 1.20Lp + 1.5Q ULS

Cantilever Retaining Wall

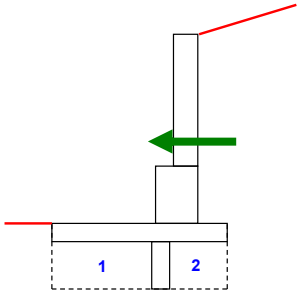
Traditional Design

Design



OVERTURNING

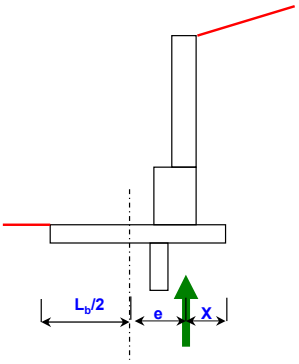
Overturning Effect	51.41	kN.m
Restoring Effect	142.82	kN.m
Factor of Safety	2.78	



SLIDING

Overturning Effect	47.65	kN/m	2.2	m long headwall
	104.83	kN		
Restoring Effect	31.24	kN/m	5.2	m concrete apron
	162.47	kN		
Factor of Safety	1.55			

A 2.2-meter long headwall resisted by a 5.2-meter long concrete apron.

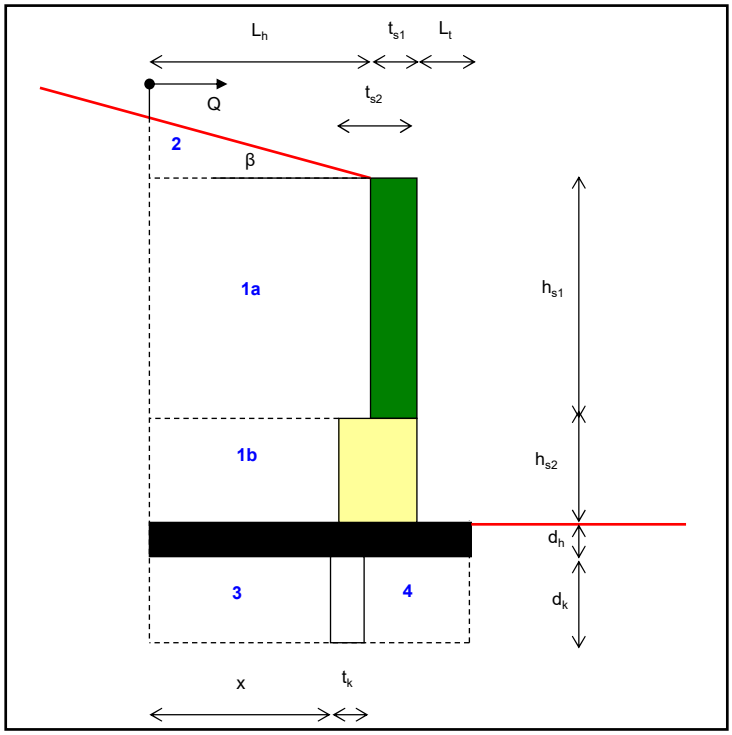


BEARING

Position of Reaction, X	1.35	m
Length of Base, Lb	3.25	m
Eccentricity, e	0.27	m
Maximum Bearing, Pmax	23.82	kPa
Minimum Bearing, Pmin	7.84	kPa

Cantilever Retaining Wall

Traditional Method



Properties

Unit Weight of Soil, γ_{soil}	20.00	kN/m3
Unit Weight of Concrete, γconcrete	24.50	kN/m3
Unit Weight of Water, γwater	9.81	kN/m3
Strength of Soil, Φ	30.00	°
Coefficient of Friction, μ	0.36	
Slope of Backfill, β	1:3	
	0.33	

Wall Parameters

Height of Stem, h_{s1}	1.60	m
Thickness of Stem, t_{s1}	0.25	m
Height of Thickened Stem, h_{s2}	0.00	m
Thickness of Thickened Stem, t_{s2}	0.00	m
Length of Heel, Lh	2.60	m
Depth of Heel, dh	0.30	m
Is there a toe?	No	
Length of toe, L_t	1.00	m
Depth of toe, d_t	0.30	m
Is there a key?	Yes	
Depth of key, d_k	0.60	m
Thickness of key, t_k	0.30	m
Position of key, x	2.00	m
x_{max}	2.55	m

OK

Design Parameters

Overturning Soil State	Ka	
Active Soil Coefficient, Ka	0.33	
Passive Soil Coefficient, Kp	3.00	
Total Height of Wall, z	2.767	m
Height of Liquid Presure, z_w	Yes	
	1.38	m
Is surcharge applied beyond Point Q?	Yes	
Surcharge, σ	25.00	kPa

	Force	Distance	Moment
Overturning Effects - Horizontal			
Earth Pressure (Active)	25.51	0.92	23.53
Liquid Pressure	9.39	0.46	4.33
Surcharge	23.06	1.38	31.89
	57.96		59.75
Restoring Effects - Vertical			
Stem	9.80	0.13	1.23
Thickened Stem	0.00	0.00	0.00
Heel	20.95	1.43	29.85
Soil 1a	83.20	1.55	128.96
Soil 1a	0.00	1.43	0.00
Soil 2	16.90	1.98	33.52
Toe	0.00	0.00	0.00
Key	4.41	0.70	3.09
Soil 3			
Soil 4			
Surcharge	169.00	1.55	261.95
	304.26		458.59

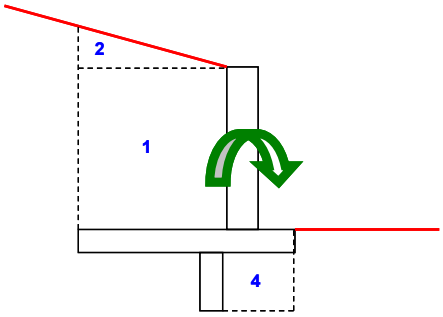
Overturning		
Overturning Effects, OTM	59.75	kN.m
Restoring Effects, RM	465.88	kN.m
	7.80	
Factor of Safety ≤ 1.5	**Adequate**	
Sliding		
Overturning Effects, OT	57.96	kN
Restoring Effects, R	135.04	kN
	2.33	
Factor of Safety ≤ 1.5	**Adequate**	
Bearing		
Length of Base	2.85	m
Eccentricity, e	0.09	m
Bearing Pressure, P max	127	kPa
min	86	kPa

Restoring Effects - Horizontal			
Earth Pressure (Passive)	24.30	0.30	7.29

Cantilever Retaining Wall

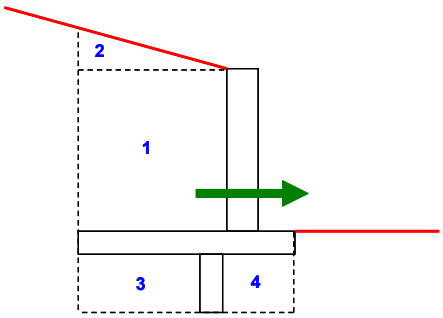
Traditional Design

Design



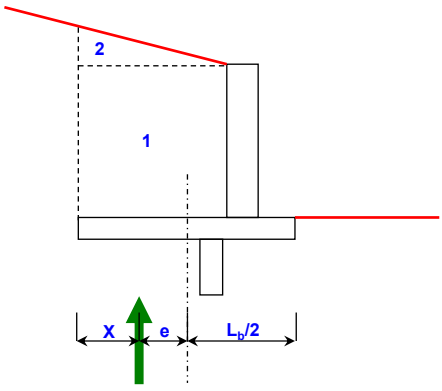
OVERTURNING

Overturning Effect	59.75	kN.m
Restoring Effect	465.88	kN.m
Factor of Safety	7.80	



SLIDING

Overturning Effect	57.96	kN
Restoring Effect	135.04	kN
Factor of Safety	2.33	



BEARING

Position of Reaction, X	1.33	m
Length of Base, Lb	2.85	m
Eccentricity, e	0.09	m
Maximum Bearing, Pmax	127.03	kPa
Minimum Bearing, Pmin	86.49	kPa

ALL IN ONE SECTION DESIGN - BY PETALUX PTY LTD

LICENCED TO :

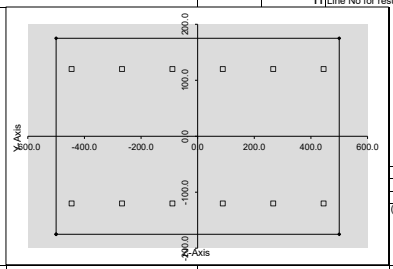
Input File:

Job: PLR2EW | **No.** | **Designer:** CC | **Comment:** Drainage Headwall

1 Member No
A Member End
11 Line No for results

DISPLAY CHARTS: 0 1-Yes, 0-No
ROTATE SECTION (deg) = 0

Y web min -225 mm
Y web max 225 mm



SECTION GENERATE

R	R-Rectangular, C-Circular
350	mm, Section Depth (Diameter)
1000	mm, Section Width
201	mm2, Bar Area
55	mm, Bar Offset to CL
6	No of Bars Top (Total for Circular)
6	No of Bars Bottom
	No of Bars Left
	No of Bars Right
12	mm, Tie Diameter (16 = default)

Concrete Stress Block

1 (1-CEB, 2-Rectangular, 3-User Defined)

Concrete 28 th day Characteristic Compressive Strength

40 MPa, fc'	42.98 MPa, fcmi	47.75 MPa, fcm	32608 MPa, Ec	User Defined Web Effective Depth do, mm
0.8 Max Φ Bending		0.7 Φ Shear		
Reinforcement		1 β3 Shear		0
500 MPa fy		500 MPa, fsyf		
200000 MPa Es		PROPERTIES FOR TORSION:		
Prestress		AS5100.5-RMS Interim 2015		
1790 MPa fp		40829250 mm3, Jt		B - Beam
1465 MPa fpy		246021 mm2, At		S - Slab
195000 MPa Ep		2372 mm, ut		B
0.05 εpy		2.26 mm2/mm		Asv/s
0 PS Stress-Strain Curve		mm2/mm		Asw/s
MPa, User defined max. stress at ULS for unbonded tendons		°, User defined angle Θv		

Applied External Forces

ULS				SLS		Span/Depth
N*, kN	V*, kN	M*x(T),kNm	M*z, kNm	N, kN	Mz, kNm	Ratio
0	50		121	0	80	13.9
(-ve) compression				(-ve) compression		

Pv, kN (Shear Force due to primary PS only) 0 (sign opposite to V* - increases shear capacity) (sign same as V* - increases shear load)

Vertical Comp Sterss-PS,MPa 1

OUTSIDE SECTION COORDINATES		INSIDE SECTION COORDINATES		CIRCULAR VOID COORDINATES			REINFORCEMENT			PRESTRESS				TENDON DUCTS		
Z co-ord, mm	Y co-ord, mm	Z co-ord, mm	Y co-ord, mm	Z co-ord, mm	Y co-ord, mm	Diameter, mm	Z co-ord, mm	Y co-ord, mm	Area, mm2	Z co-ord, mm	Y co-ord, mm	Area, mm2	Force Eff, kN	No off	Diameter, mm	Bonded (1 / 0)
-500	-175						-445	120	201							
-500	175						-267	120	201							
500	175						-89	120	201							
500	-175						89	120	201							
-500	-175						267	120	201							
							445	120	201							
							-445	-120	201							
							-267	-120	201							
							-89	-120	201							
							89	-120	201							
							267	-120	201							
							445	-120	201							

ULS				SLS		Applied External Forces					Pure Bending AS5100-2004
N*, kN	V*, kN	M*x, kNm	M*z, kNm	N, kN	Mz, kNm						
0	50		121	0	80		0	deg, RotationAngle			
(-ve) compression				(-ve) compression							ku
BENDING			Area of Compress Zone,mm2	Steel in Compress Zone, %	do, mm	Section Depth H, mm	ku	Resultant Tension Force T kN	Depth to T / Effective Depth d mm	Resultant Compress Force C kN	0.179
					295						Mud, kNm
					Depth to		0.179				0
			36750	0.00	Neutral	350					Φ
Nu kN	ΦNu kN	Mu kNm	ΦMu kNm	Φ Bending	axis dn, mm	kuo	Curvature				0.800
											ΦMu
0	0	183	146	0.8	36.7	0.125	8.166E-05	963	205.3	963	146

								Concrete stresses due to Ps only			
Depth to C mm	Lever Arm Between T and C dv mm	Compress Force Concrete Cc kN	Compress Force Steel Cs kN	Tension Force Steel Ts kN	Tension Force PS Tp kN	Eccentr of PS Force e mm	Eccentr of PS Area ea mm	Bottom Edge MPa	Top Edge MPa	C.G of Section MPa	C.G. of PS Force MPa
15.1	190.2	963	0	963	0	0		0.00	0.00	0.00	0.00

Max Strain in PS	Max Stress in PS MPa	Max Strain in Steel (Tensile)	Max Stress in Steel (Tensile) MPa	Max Strain in Steel (Compress)	Max Stress in Steel (Compress) MPa	Area of PS in Tensile Zone mm2	Area of PS in Compr Zone mm2	Area of Steel in Tensile Zone mm2	Area of Steel in Compr Zone mm2	Cracking Moment Mcr kNm	Minimum Strength Required Muo min kNm
0.0000E+00	0.00	2.1090E-02	500.00	0.0000E+00	0.00	0	0	2412	0	81	97

SHEAR AS5100-RMS Interim 2015 (DESIGN MODE)

			Flexure-Shear Cracking								
			Ast mm2	Apt mm2						Effective Web Width Shear bv mm	Basic Concrete Stength Vucb =Vuc-Vo kN
			2412	0							
Vumax kN	Φ Shear	ΦVumax kN	do mm	Vuc kN	Vo kN	Mo kNm	beta1	beta2	beta3		
2360	0.700	1652	295.0	292	0	0	1.4355	1	1	1000.0	292

Web-shear cracking											
Vt kN	Depth to Vt mm	Principle Tensile Stress Limit MPa		Governing Vuc kN	ΦVuc kN	Minimum Shear Reinf mm2/mm	Vumin kN	ΦVumin kN	Required Vus kN	Θv deg	Required Shear Reinf Asv mm2/mm
0	0	0		292	204	0.75894664	478	335		30	0

SHEAR AS5100-RMS Interim 2015 (CHECK MODE)

Applied Modified Shear Force Vm* kN	Θv deg	Nominated Shear Reinf Asv mm2/mm	Governing Vuc kN	ΦVuc kN	Vus kN	ΦVus kN	Vu kN	ΦVu kN
50	30	2.26	292	204	577	404	869	608

TORSION AS5100-RMS Interim 2015 (DESIGN MODE)

Φ Torsion							Longitudinal Reinforcement for Torsion			
							Tensile Zone		Compressive Zone	
Tumax kNm	ΦTumax kNm	Tuc kNm	ΦTuc kNm	Θt deg	Area of a Single Tie Leg Asw mm2/mm	Minimum Area of a Single Leg Asw min mm2/mm	Tus kNm	Force kN	Reinf. Area mm2	Force kN	Reinf. Area mm2

TORSION AS5100-RMS Interim 2015 (CHECK MODE)

T*/Φtus	Required Closed Tie Area Asw mm2/mm	Nominated Closed Tie Area Asw mm2/mm	Tus kNm	T*/ΦTumax + V*/ΦVumax			

SERVICEABILITY - GROSS SECTION ANALYSYS

At Cracking - **Mcr** sls and **N**sls				At Decompression - **Mdc** sls and **N**sls				**PS** only			
	Conctrete Stresses				Conctrete Stresses				Conctrete Stresses		
Mcr kNm	Top MPa	Bottom MPa	Curvature	Mdc kNm	Top MPa	Bottom MPa	Curvature	P.e kNm	Top MPa	Bottom MPa	Curvature
81	3.79	-3.79	6.1907E-07								

For Applied **M**sls and **N**sls			**SERVICEABILITY - CRACKED SECTION ANALYSYS**								
Conctrete Stresses					Top Fibre		Bot Fibre	Lowest PS Layer		Lowest Reinf. Layer	
Top MPa	Bottom MPa	Curvature	Curvature	dn, mm	Strain	Stress,MPa	Strain	Strain	Stress,MPa	Strain	Stress,MPa
3.75	-3.75	6.1125E-07	5.0555E-06	57	0.00028751	9.84	-0.0014819	0.000000	0.00	0.00120385	240.77

0.69 %, Reinforcement percentage

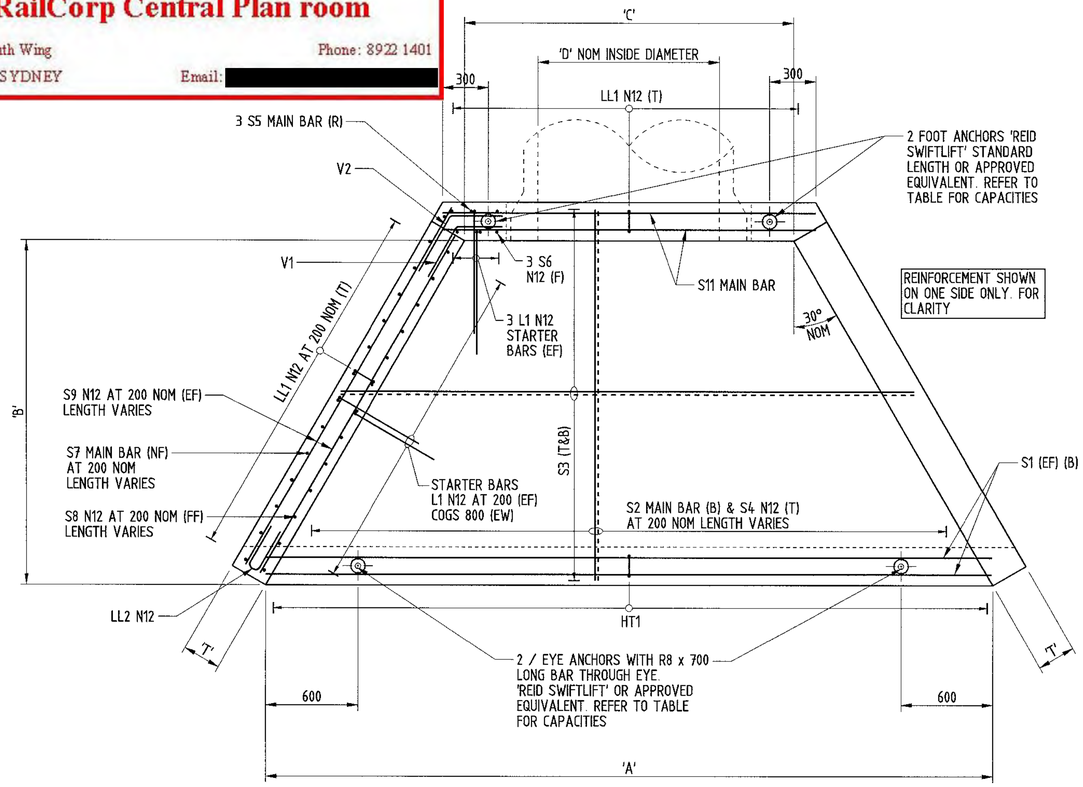
Input File: C:\Temp\Miho\Temp\Des\RW10-N1 12N36 + 12N32, N20 helix@85.xlsm

Job: PLR2EW — 1 Member No

No. — **Designer:** CC — A Member End

Comment: Drainage Headwall — 11 Line No for results

UNCONTROLLED COPY
Please check for latest revision at
RailCorp Central Plan room
Level 1 South Wing
477 Pitt St, SYDNEY
Phone: 8922 1401
Email: [redacted]

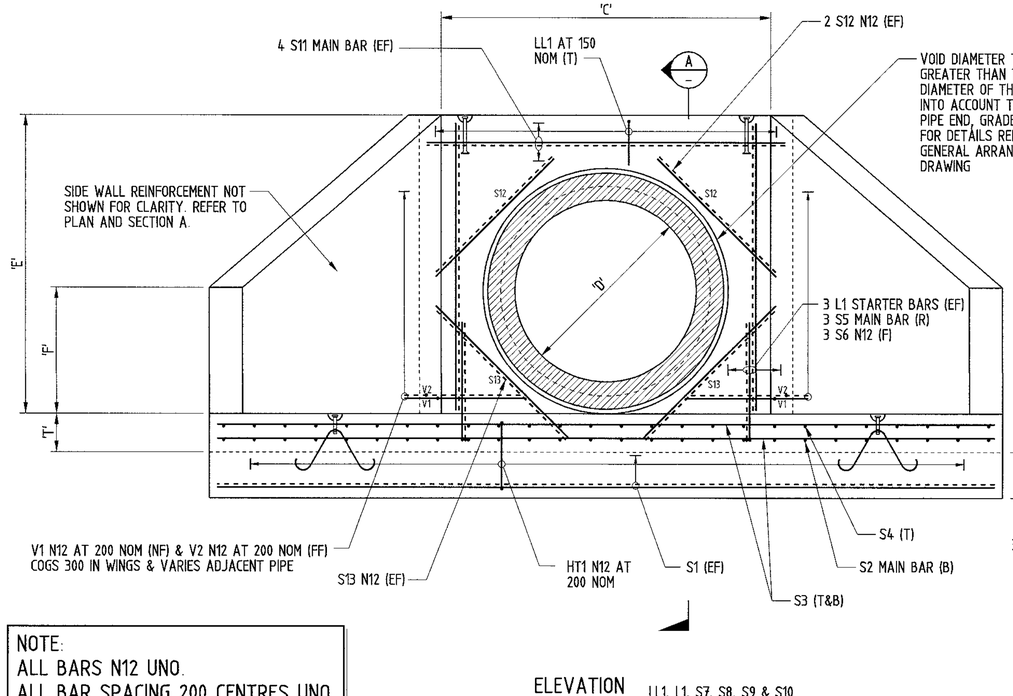


REINFORCEMENT SHOWN ON ONE SIDE ONLY. FOR CLARITY

PLAN
SCALE 1:20

S10, S12 & S13 NOT SHOWN FOR CLARITY

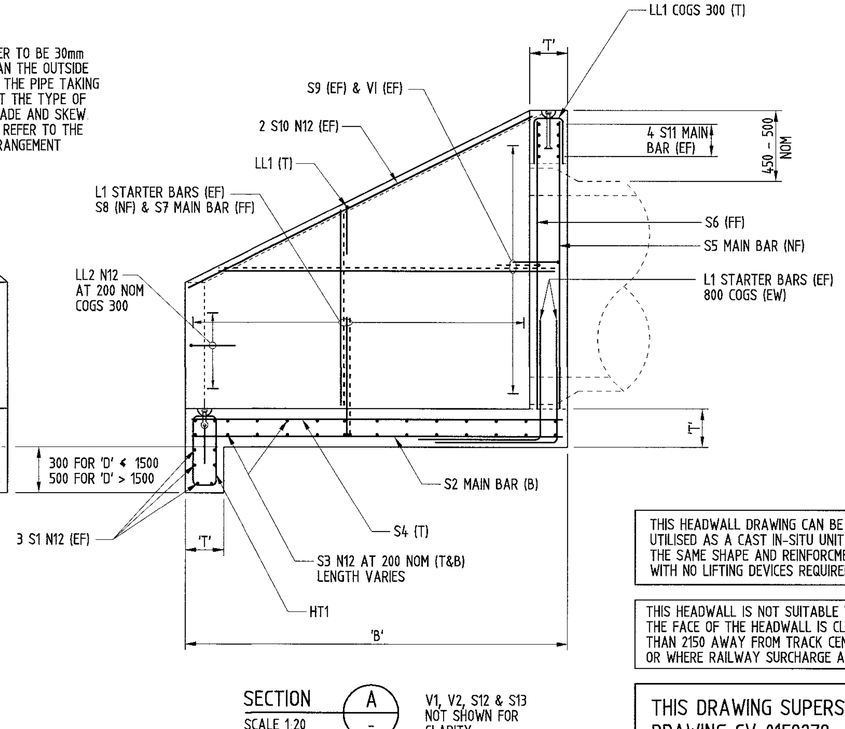
REAR FACE REINFORCEMENT SHOWN DASHED



NOTE:
ALL BARS N12 UNO.
ALL BAR SPACING 200 CENTRES UNO.
ALL COGS 300 UNO.

ELEVATION
SCALE 1:20

LL1, L1, S7, S8, S9 & S10 NOT SHOWN FOR CLARITY

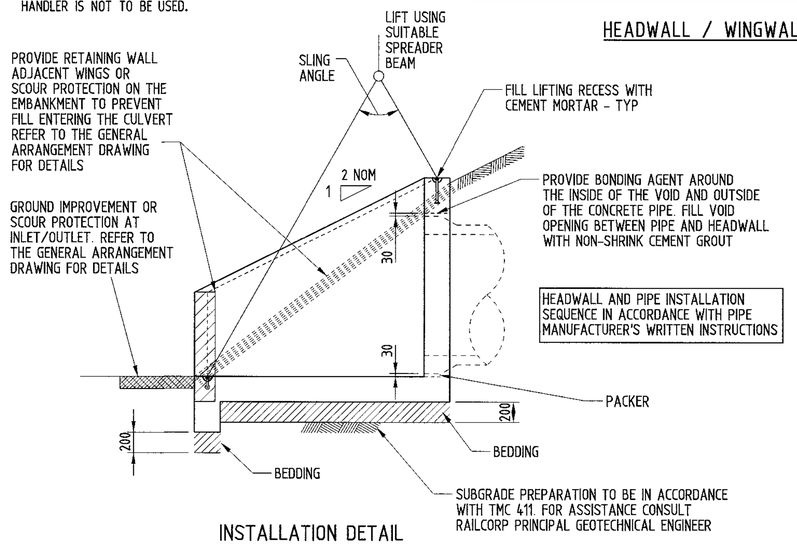


SECTION A
SCALE 1:20

V1, V2, S12 & S13 NOT SHOWN FOR CLARITY

HANDLING

1. LIFTING ANCHORS TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS.
2. UNITS ARE TO BE LIFTED ONLY AT THE LIFTING POINTS PROVIDED.
3. MAXIMUM SLING ANGLE FOR LIFTING ROPES IS 90°.
4. A SPREADER BEAM SPANNING ACROSS THE HEADWALL IS REQUIRED FOR ALL LIFTS
5. THE MANUFACTURER/CONTRACTOR IS TO ENSURE THAT LIFTING CAPACITIES ARE NOT EXCEEDED DURING STRIPPING AND HANDLING.
6. UNITS MARKED ✳ ARE TO BE INSTALLED WITH A CRANE ONLY. AN EXCAVATOR, BACKHOE OR OTHER TERRAIN HANDLER IS NOT TO BE USED.



INSTALLATION DETAIL
SCALE 1:30

PIPE DIA. 'D'	'A'	'B'	'C'	'E'	'F'	'T'	S2, S5, S7 & S11 MAIN BAR	MASS (T)	ANCHORS (T)
675	3400	1600	1550	1350	550	200	N16 EF	5.4	5 TONNE EACH
750	3600	1700	1650	1450	600			6.0	
825	3800	1800	1700	1500	600			6.4	10 TONNE EACH
900	4275	2100	1850	1650	600			7.8	
1050	4500	2100	2050	1850	800			8.7	
1200 ✳	4750	2250	2150	1950	825	250	N16 EF	12.1	20 TONNE EACH
1350 ✳	5200	2450	2350	2150	925			14.1	
1500 ✳	5650	2650	2600	2350	1025		N20 EF	16.5	
1650 ✳	5950	2750	2750	2500	1125		N24 EF	18.6	
1800 ✳	6350	2950	2950	2700	1225		N32 EF	21.1	

HEADWALL / WINGWALL DIMENSIONS & MAIN BAR REINFORCEMENT

NOTES

GENERAL

1. DIMENSIONS SHALL NOT BE SCALED FROM THIS DRAWING.

DESIGN

1. DESIGN CODE : AS 3600 CONCRETE STRUCTURES
2. LOADING: HEADWALL DESIGNED FOR ACTIVE EARTH PRESSURE AND R20 VEHICLE LOADING (AS PER ESC 550)
3. INTERACTION BETWEEN PIPE AND HEADWALL HAS BEEN CONSIDERED IN THE DESIGN.
4. NO RAILWAY LIVE LOAD SURCHARGE
5. FOUNDATION ULTIMATE BEARING CAPACITY = 250 kPa MIN.

CONCRETE

1. ALL CONCRETE WORK SHALL COMPLY WITH AS 3600
2. CONCRETE 28 DAY COMPRESSIVE STRENGTH f'c = 32 MPa.
3. EXPOSURE CLASSIFICATION = B1
4. 25mm CHAMFERS & FILLETS SHALL BE PROVIDED TO ALL EXPOSED EDGES AND CORNERS UNO.

REINFORCEMENT

1. ALL REINFORCEMENT BARS SHALL BE IN ACCORDANCE WITH AS/NZS 4671, WHERE
   N DENOTES GRADE 500N DEFORMED RIBBED BAR
   R DENOTES GRADE 250N PLAIN ROUND BAR.
2. CLEAR COVER TO REINFORCEMENT SHALL BE 50mm.
3. ALL PIN DIAMETERS SHALL BE 4 TIMES THE BAR DIAMETER (4D).
4. COGS AND HOOKS SHALL BE IN ACCORDANCE WITH AS 3600.
5. SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN POSITIONS SHOWN OR AS APPROVED IN WRITING BY THE SUPERINTENDENT.
6. WELDING OF REINFORCEMENT IS PROHIBITED.
7. STEEL BAR CHAIRS ARE PROHIBITED.

BEDDING

1. SELECTED BACKFILL BEDDING MATERIAL SHALL BE DGB20 AND COMPLY WITH RTA SPECIFICATION 3051
2. BEDDING SHALL BE PLACED IN LAYERS NOT EXCEEDING 150mm COMPACTED THICKNESS AND SHALL BE COMPACTED TO NOT LESS THAN 95% STANDARD COMPACTION DETERMINED IN ACCORDANCE WITH AS 1289.
3. ALL BEDDING SHALL HAVE A NEUTRAL pH VALUE IN THE RANGE OF 6 - 10 pH AND RESISTIVITY 3000 OHM/cm OR GREATER.

BACKFILL BEHIND HEADWALL

1. BACKFILL AND ADEQUATELY COMPACT FREE DRAINING GRANULAR MATERIAL BEHIND CULVERT HEADWALL.

NON SHRINK GROUT

1. NON SHRINK GROUT SHALL BE MBT SELTEX OR APPROVED EQUIV WITH A MINIMUM 7 DAY COMPRESSIVE STRENGTH OF 30MPa.

REFERENCES

HEADWALLS TO SUIT PIPES 225-600mm DIAMETER ..... CV 0497068

THIS HEADWALL DRAWING CAN BE UTILISED AS A CAST IN-SITU UNIT. ADOPT THE SAME SHAPE AND REINFORCMENT WITH NO LIFTING DEVICES REQUIRED

THIS HEADWALL IS NOT SUITABLE WHERE THE FACE OF THE HEADWALL IS CLOSER THAN 2150 AWAY FROM TRACK CENTRELINE OR WHERE RAILWAY SURCHARGE APPLIES.

THIS DRAWING SUPERSEDES DRAWING CV 0159279

AMD	REFERENCE	DESCRIPTION	VERIFIED SIGN./DATE	APPROVED SIGN./DATE

RailCorp
ASSET MANAGEMENT GROUP
Engineering Standards & Services Division
BRIDGES & STRUCTURES SERVICES SECTION

DRAWN [redacted]
DESIGNED
DRG CHECK
DESIGN CHECK
APPROVED

RailCorp Design accepted for use by RailCorp [redacted] 12/2/09

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STANDARD
ALL LINES
PIPE CULVERTS
HEADWALLS TO SUIT PIPES 675-1800mm DIAMETER
PRECAST REINFORCED CONCRETE DETAILS ©

FILE No. F2008/26944	SHEET 1 OF 1	A1
STATUS: FOR CONSTRUCTION		
	CV 0497069	A

DF 801+554

WARNING SCANNED IMAGE

File Plotted N:\Groups\Civ_des\Online1\std drgs\headwalls\standard precast headwalls 2.dgn
Plot Date & Time 12-FEB-2009 10:25
Plotted by hudson
ACAD plotted by civildesign on 12/02/2009 at 09:33:13 AM

Calculation Sheet – Pit Lid Modification

Project Information

Project Name: Parramatta Light Rail Stage 2 Enabling Works
Location: Hills Road
Client: John Holland
Designer: [redacted]
Date: 10 August 2025

1. Design Basis

Applicable Standards and Guidelines

TfNSW Specifications:
- D&C R11 – Stormwater Drainage
- B80 – Reinforcement and embedded items

Australian Standards:
- AS 5100 – Bridge Design
- AS/NZS 4671 – Steel Reinforcing Materials
- AS 3600 – Concrete Structures
- CoPC Standard Drawings

2. Design Criteria

General Parameters

Design Life: 50 years
Exposure Classification: B1

Structural Loads

Dead Load: 300mm thick pit lid and 600 mm concrete pavement depth
Live Load: 20 kPa surcharge

Material Properties

Concrete Grade: 40 MPA
Reinforcement Type: N16 and N12 Grade 500 conventional reinforcement
Cover to Reinforcement: Minimum 45 mm

3. Results

Assuming one-way distribution and simply supported over 2.2m span length.

Meet Limit State design requirements.

Please refer to the document on Overleaf.

ALL IN ONE SECTION DESIGN - BY PETALUX PTY LTD

LICENCED TO :

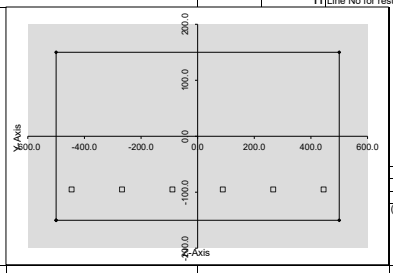
Input File:

Job: PLR2EW | **No.** | **Designer:** | **Comment:** Pit Lid Hills Road

1 Member No
A Member End
11 Line No for results

DISPLAY CHARTS: 0 1-Yes, 0-No
ROTATE SECTION (deg) = 0

Y web min -225 mm
Y web max 225 mm



SECTION GENERATE

R	R-Rectangular, C-Circular
300	mm, Section Depth (Diameter)
1000	mm, Section Width
201	mm2, Bar Area
55	mm, Bar Offset to CL
	No of Bars Top (Total for Circular)
6	No of Bars Bottom
	No of Bars Left
	No of Bars Right
12	mm, Tie Diameter (16 = default)

Concrete Stress Block

1 (1-CEB, 2-Rectangular, 3-User Defined)

Concrete 28 th day Characteristic Compressive Strength

40	MPa, fc'	42.98	MPa, fcmi	47.75	MPa, fcm	32608	MPa, Ec

0.8	Max Φ Bending	0.7	Φ Shear	User Defined Web Effective Depth do, mm
Reinforcement		1	β3 Shear	
500	MPa fy	500	MPa, fsyf	0
200000	MPa Es	PROPERTIES FOR TORSION:		
Prestress		AS5100.5-RMS Interim 2015		
1790	MPa fp	29997000	mm3, Jt	B - Beam
1465	MPa fpy	200121	mm2, At	S - Slab
195000	MPa Ep	2272	mm, ut	B
0.05	εpy	2.26	mm2/mm	Asv/s
0	PS Stress-Strain Curve		mm2/mm	Asw/s
	MPa, User defined max. stress at ULS for unbonded tendons		°, User defined angle Θv	

Applied External Forces

ULS				SLS		Span/Depth
N*, kN	V*, kN	M*x(T),kNm	M*z, kNm	N, kN	Mz, kNm	Ratio
0	50		32	0	20	13.9
(-ve) compression				(-ve) compression		

Pv, kN	(Shear Force due to primary PS only)	Vertical Comp Sterss-PS,MPa
0	(sign opposite to V* - increases shear capacity)	
	(sign same as V* - increases shear load)	1

OUTSIDE SECTION COORDINATES		INSIDE SECTION COORDINATES		CIRCULAR VOID COORDINATES			REINFORCEMENT			PRESTRESS				TENDON DUCTS		
Z co-ord, mm	Y co-ord, mm	Z co-ord, mm	Y co-ord, mm	Z co-ord, mm	Y co-ord, mm	Diameter, mm	Z co-ord, mm	Y co-ord, mm	Area, mm2	Z co-ord, mm	Y co-ord, mm	Area, mm2	Force Eff, kN	No off	Diameter, mm	Bonded (1 / 0)
-500	-150						-445	-95	201							
-500	150						-267	-95	201							
500	150						-89	-95	201							
500	-150						89	-95	201							
-500	-150						267	-95	201							
							445	-95	201							

ULS				SLS		Applied External Forces					Pure Bending AS5100-2004
N*, kN	V*, kN	M*x, kNm	M*z, kNm	N, kN	Mz, kNm						
0	50		32	0	20		0	deg, RotationAngle			
(-ve) compression				(-ve) compression							ku
BENDING			Area of Compress Zone,mm2	Steel in Compress Zone, %	do, mm	Section Depth H, mm	ku	Resultant Tension Force T kN	Depth to T / Effective Depth d mm	Resultant Compress Force C kN	0.094
					245						Mud, kNm
					Depth to Neutral axis dn, mm		0.094				0
			23100	0.00		300					Φ
Nu kN	ΦNu kN	Mu kNm	ΦMu kNm	Φ Bending		kuo	Curvature				0.800
											ΦMu
0	0	142	114	0.8	23.0	0.094	0.00013037	603	245.0	603	114

								Concrete stresses due to Ps only			
Depth to C mm	Lever Arm Between T and C dv mm	Compress Force Concrete Cc kN	Compress Force Steel Cs kN	Tension Force Steel Ts kN	Tension Force PS Tp kN	Eccentr of PS Force e mm	Eccentr of PS Area ea mm	Bottom Edge MPa	Top Edge MPa	C.G of Section MPa	C.G. of PS Force MPa
9.5	235.5	603	0	603	0	0		0.00	0.00	0.00	0.00

Max Strain in PS	Max Stress in PS MPa	Max Strain in Steel (Tensile)	Max Stress in Steel (Tensile) MPa	Max Strain in Steel (Compress)	Max Stress in Steel (Compress) MPa	Area of PS in Tensile Zone mm2	Area of PS in Compr Zone mm2	Area of Steel in Tensile Zone mm2	Area of Steel in Compr Zone mm2	Cracking Moment Mcr kNm	Minimum Strength Required Muo min kNm
0.0000E+00	0.00	2.8941E-02	500.00	0.0000E+00	0.00	0	0	1206	0	59	71

SHEAR AS5100-RMS Interim 2015 (DESIGN MODE)

			Flexure-Shear Cracking								
			Ast mm2	Apt mm2						Effective Web Width Shear bv mm	Basic Concrete Stength Vucb =Vuc-Vo kN
			1206	0							
Vumax kN	Φ Shear	ΦVumax kN	do mm	Vuc kN	Vo kN	Mo kNm	beta1	beta2	beta3		
1960	0.700	1372	245.0	212	0	0	1.4905	1	1	1000.0	212

Web-shear cracking											
Vt kN	Depth to Vt mm	Principle Tensile Stress Limit MPa		Governing Vuc kN	ΦVuc kN	Minimum Shear Reinf mm2/mm	Vumin kN	ΦVumin kN	Required Vus kN	Θv deg	Required Shear Reinf Asv mm2/mm
0	0	0		212	149	0.75894664	367	257		30	0

SHEAR AS5100-RMS Interim 2015 (CHECK MODE)

Applied Modified Shear Force Vm* kN	Θv deg	Nominated Shear Reinf Asv mm2/mm	Governing Vuc kN	ΦVuc kN	Vus kN	ΦVus kN	Vu kN	ΦVu kN
50	30	2.26	212	149	480	336	692	484

TORSION AS5100-RMS Interim 2015 (DESIGN MODE)

			Φ Torsion		Area of a Single Tie Leg Asw mm2/mm	Minimum Area of a Single Leg Asw min mm2/mm		Longitudinal Reinforcement for Torsion			
								Tensile Zone		Compressive Zone	
Tumax kNm	ΦTumax kNm	Tuc kNm	ΦTuc kNm	Θt deg			Tus kNm	Force kN	Reinf. Area mm2	Force kN	Reinf. Area mm2

TORSION AS5100-RMS Interim 2015 (CHECK MODE)

T*/Φtus	Required Closed Tie Area Asw mm2/mm	Nominated Closed Tie Area Asw mm2/mm	Tus kNm	T*/ΦTumax + V*/ΦVumax			

SERVICEABILITY - GROSS SECTION ANALYSYS

At Cracking - **Mcr** sls and **N**sls				At Decompression - **Mdc** sls and **N**sls				**PS** only			
	Conctrete Stresses				Conctrete Stresses				Conctrete Stresses		
Mcr kNm	Top MPa	Bottom MPa	Curvature	Mdc kNm	Top MPa	Bottom MPa	Curvature	P.e kNm	Top MPa	Bottom MPa	Curvature
59	3.89	-3.79	7.3085E-07								

For Applied **M**sls and **N**sls			**SERVICEABILITY - CRACKED SECTION ANALYSYS**								
Conctrete Stresses					Top Fibre		Bot Fibre	Lowest PS Layer		Lowest Reinf. Layer	
Top MPa	Bottom MPa	Curvature	Curvature	dn, mm	Strain	Stress,MPa	Strain	Strain	Stress,MPa	Strain	Stress,MPa
1.32	-1.29	2.4822E-07	1.872E-06	51	9.5135E-05	3.45	-0.0004665	0.000000	0.00	0.0003635	72.70

0.40 %, Reinforcement percentage

Input File:

Job: PLR2EW — 1 Member No

No. — **Designer:** CC — A Member End

Comment: Pit Lid Hills Road — 11 Line No for results