Prepared for
AMPOL Refineries (QLD) Pty Ltd
ABN: 46 008 425 581

AECOM

Site Based Stormwater Management Plan

Ampol Future Fuels Gasoline Desulfurisation Project

21-Jul-2026
Ampol Future Fuels Gasoline Desulfurisation Project
Doc No. XY21024-18-Y09-0102

Site Based Stormwater Management Plan

Ampol Future Fuels Gasoline Desulfurisation Project

Client: AMPOL Refineries (QLD) Pty Ltd

ABN: 46 008 425 581

Prepared by

AECOM Australia Pty Ltd
Turrbal and Jagera Country, Level 8, 540 Wickham Street, PO Box 1307, Fortitude Valley QLD 4006, Australia
T +61 1800 868 654 www.aecom.com
ABN 20 093 846 925

In association with

AMPOL Refineries (QLD) Pty Ltd

21-Jul-2026

Job No.: 60680098

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 and ISO45001.

Quality Information

Document	Site Based Stormwater Management Plan
Ref	60680098
Date	21-Jul-2026
Originator	Samuel Swift
Checker/s	Rocco Vivarelli
Verifier/s	Rocco Vivarelli

Revision History

Rev	Revision Date	Details	Approved	
			Name/Position	Signature
6	21 July 2026	Amendment - Revision to address required changes to treatment design	Mitch Ryan Project Manager	

Professional Registration

This document includes professional services that require approval from a registered professional.

Registration Scheme	Discipline / Area of Practice	Name of Registered Professional*	Signature	Registration No.	Date
Board of Professional Engineers of Queensland	Civil Engineer	Rocco Vivarelli		34843	21/07/2026

* The registered professional must be the originator of this work or have provided direct supervision to the originator.

Assumptions and Standard Limitations

The following apply to this Site Based Stormwater Management Plan (SBSMP):

- The plan has been prepared based on discussions with and information provided by Ampol (including preliminary layout plans) at the time of writing. Additionally, the report has been prepared according to the assumed project description (Refer Section 4). AECOM understands that the proposed development may change as a result of detailed design and engineering input from others. Subsequent review and revision of this report may be required.
- The plan has been prepared based on the legislation, policies, assessment benchmarks and guidelines in force at the time of writing.

Standard Limitations

AECOM Australia Pty Ltd (AECOM) has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of Ampol Refineries (QLD) Pty Ltd and only those third parties who have been authorised in writing by AECOM to rely on this Report.

It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this Report.

It is prepared in accordance with the scope of work and for the purpose outlined in the contract/scoping template dates dated 1 March 2022.

Where this Report indicates that information has been provided to AECOM by third parties, AECOM has made no independent verification of this information except as expressly stated in the Report. AECOM assumes no liability for any inaccuracies in or omissions to that information.

This Report was prepared between 5 April 2026 and 8 July 2026 and is based on the conditions encountered and information reviewed at the time of preparation. AECOM disclaims responsibility for any changes that may have occurred after this time.

This Report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties. This Report does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.

Except as required by law, no third party may use or rely on this Report unless otherwise agreed by AECOM in writing. Where such agreement is provided, AECOM will provide a letter of reliance to the agreed third party in the form required by AECOM.

To the extent permitted by law, AECOM expressly disclaims and excludes liability for any loss, damage, cost, or expenses suffered by any third party relating to or resulting from the use of, or reliance on, any information contained in this Report. AECOM does not admit that any action, liability, or claim may exist or be available to any third party.

Except as specifically stated in this section, AECOM does not authorise the use of this Report by any third party. It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the site.

Any estimates of potential costs which have been provided are presented as estimates only as at the date of the Report. Any cost estimates that have been provided may therefore vary from actual costs at the time of expenditure.

Table of Contents

Executive Summary

This Site Based Stormwater Quality Management Plan (SBSMP) has been prepared to support a Development Application (DA) to Brisbane City Council (BCC) to facilitate the Ampol Future Fuels Gasoline Desulfurisation Project (the Project) at Ampol's Lytton oil refinery. The Project is required to accommodate changes in fuel standards as regulated by the Commonwealth Government, in particular the requirement that the sulfur content in transport fuels to be not more than 10 parts per million (ppm).

The Brisbane City Plan 2014 stormwater code requires new development to provide a stormwater management system which is designed in compliance with the standards in the Infrastructure Design Planning Scheme Policy. These requirements have the following components:

1. Erosion and sediment control measures, which will be addressed separately during the construction phase, and are not addressed in this report.
2. Permanent water quality controls to achieve the minimum reductions in total pollutant load, for the Post-Development case in accordance with Table B of Appendix 2 of the State Planning Policy (DILGP, 2017).

The Project includes the following:

- Establishment and subsequent removal of a temporary construction village, noting that fill imported for the temporary construction village is proposed to remain.
- New access roads, carparking and laydown area.
- Establishment of a new tank within the existing tank farm.
- Plant upgrades and associated works including amine plant, Prime-G SHU/splitter plant, Prime-G SHDS plant, switch room and transformers and cooling tower.
- Stormwater treatment devices.

The total project area impacted by this development is 9.78 hectares (ha). The development comprises several categories of land uses:

- Areas that drain to the site stormwater drainage network that would be assessed against the State Planning Policy (DILGP, 2017).
- Areas excluded from the assessment include areas draining to the existing Northern Wastewater Treatment Plant and discharged under the Environmental Authority (EPPR00536213) for that facility.
- Temporary construction areas subject to separate construction-phase requirements under State Planning Policy provisions (DILGP, 2017).

The key functional elements of the stormwater management strategy proposed for each of the proposed development areas includes:

- Where there is an elevated risk of chemical hazards, these areas are separated from the stormwater network by bunding and drained to the existing Northern Wastewater Treatment Plant.
- Stormwater runoff from areas developed during the project would be treated by a combination of:
  - Vegetated buffer strips and swales where practicable.
  - Atlan FlowGuard (formerly Hydrochannel) stormwater treatment devices.
  - An ephemeral wetland in the western area.

MUSIC modelling was undertaken to assess the increase in pollutants generated by the new impervious surfaces, and the treatment efficiency of the proposed treatment devices. Results indicated that with the implementation of the proposed treatment devices, the water quality objectives for the Post-Development case would be met.

1.0 Introduction

Ampol Refineries (QLD) Pty Ltd (Ampol) is progressing a major upgrade to its oil refinery located in Lytton, Queensland, to accommodate changes in fuel standards as regulated by the Commonwealth Government. This upgrade is referred to as the Ampol Future Fuels Gasoline Desulfurisation Project (the Project). The Project is located at the existing Ampol Lytton refinery at 50 Pritchard Street, Lytton, located within the Brisbane City Council (BCC) Local Government Area (LGA).

The Project requires a range of approvals and permits under planning and environmental legislation, including the *Planning Act 2016* (Planning Act), the *Environmental Protection Act 1994* (EP Act) and the *Building Act 1975* (Building Act) and *Plumbing and Drainage Act 2018* (P&D Act).

AECOM Australia Pty Ltd (AECOM) was commissioned by Ampol to prepare a Site Based Stormwater Quality Management Plan (SBSMP) to support development approval for the Project.

This version (Revision 6) of the SBSMP has been updated to reflect changes to the stormwater treatment methodology which are required in response to site-specific factors. Description of the changes made to this SBSMP are described in Section 1.4.

1.1 Project Overview

The change to the fuel standards necessitates a significant upgrade to the Ampol Lytton oil refinery. Fuels sold in the Australian domestic market are regulated by the Commonwealth Government and these regulations are subject to change, consistent with global trends. Sulfur limits in Australian gasoline are currently restricted to 150 parts per million (ppm) for regular grade (91 RON), and 50 ppm for premium grades (95 and 98 RON). The sulfur content of diesel is restricted to 10 ppm.

In May 2021, the Commonwealth Government passed legislation that required the sulfur content in transport fuels to be not more than 10 ppm by 15 December 2025. This change in legislation aligned the sulfur content of all gasoline grades with that of diesel.

On the 29 July 2022 the Commonwealth Government amended the Fuel Quality Standards (Petrol) Determination 2019. This amendment imposed an obligation on Ampol to ensure that the upgrade is complete, and the new gasoline quality was available at the retail pumps by 15 December 2025.

On 12 March 2026, the Commonwealth Government announced temporary petrol standard changes to support increased petrol supply. Under this measure, petrol sold in Australia may contain up to 50 parts per million (ppm) of sulfur. The temporary measure was announced to be in effect until 30 September 2026 and will be followed by a three-month transitional period. During the transition period, petrol containing up to 40ppm sulfur may be supplied until 31 December 2026. The temporary petrol standard amendments are included in the Fuel Quality Standards (Petrol) Determination 2024.

From 1 January 2027, all petrol grades supplied across Australia must comply with the 10ppm sulfur limit introduced on 15 December 2025. The Project schedule therefore is incredibly compressed in order to meet the timeframes imposed by the Commonwealth Government.

The Lytton oil refinery processes approximately 109,000 barrels/day of predominantly low sulfur crude oil to produce a variety of fuel products for the Australian fuels market. Lytton is one of only two oil refineries (with the Viva Energy-operated Geelong oil refinery) remaining in Australia. Therefore, the Project is economically and socially significant to Queensland and Australia through the provision of refinement capacity and fuel security.

1.2 Project Description

The proposed Lytton oil refinery upgrade is critical to closely align Australia's fuel quality with industrial standards and will provide Australians with health, environmental and vehicle benefits.

The Project has been designed in accordance with Ampol's operational objectives and with respect to the existing planning and environmental constraints on the site. The new refinery process elements are the foundation of the Project and will be appropriately co-located adjacent to existing refinery

infrastructure. To support the installation and operation of the new process elements, ancillary works will be undertaken/completed throughout Project site.

During the construction phase, a peak number of approximately 300 construction workers will be on site during the construction period. Throughout this phase, large process modules and equipment were transported to the site from the Port of Brisbane via existing major transport routes (e.g. Port Drive). This equipment will be positioned on site. Once construction is complete, the new process area will be commissioned and any temporary components will be removed from the site.

Whilst the Project seeks to enable the production of higher quality fuels, the operational workforce will remain largely unchanged.

Key work elements of the Project are summarised below:

- Early works and site enabling works:
  - Demolition of existing buildings (carried out under a separate development application).
  - Earthworks, vegetation clearing and other civil works for new processing area construction footprint near refinery, adjacent temporary construction hardstand and equipment laydown facility, and a temporary construction village south of the refinery.
  - Construction of a temporary construction village including offices and new underground utilities (workers accommodation will not be located on site).
  - Earthworks, vegetation clearing and other civil works related to the permanent relocation of road access (to main gate) and adjacent operational car parking proximate to the existing refinery.
  - Earthworks, vegetation clearing and other civil works related to the permanent relocation of the balance of operational car parking further west along South Street. This operational car parking will be displaced due to the new processing area and temporary construction laydown facility. Following construction, this laydown area will be re-graded and hydroseeded (refer Section 5.7.1), remaining as open space used occasionally for temporary storage.
  - Relocation or refurbishment of some critical operational facilities (social club, alky breathing air station, welding workshop, etc).
- Construction of a new processing area involving:
  - Consolidation of sulfur emissions outlet involving the rerouting of sulfur components from existing fired heater and boiler stacks (14 stacks in total) to a new single stack.
  - Earthworks and other civil works to establish access roads and a suitable building pad for the installation of the new process elements listed below.
    - Amine plant
    - Prime-G SHU/splitter plant
    - Prime-G SHDS plant
    - Switch room and transformers
    - Cooling tower
    - First flush interceptor pit.
  - Construction of a jet fuel storage tank in existing tank farm to support the optimisation of the existing tank farm and to address new fuel storage requirements of the Project.

1.3 Site Location

The Project site is within the existing Ampol Lytton refinery boundaries located at 50 Pritchard Street, Lytton. The Project site in relation to regional and local context is shown in Figure 1-1 and Figure 1-2.

The existing refinery is primarily located on Lot 1 on SP282377, Lot 4 on RP852211, Lot 437 on RP104399, Lot 732 on SP142208 and Lot 1 on RP104475, with associated and ancillary infrastructure included on adjoining and surrounding parcels. Land tenure property parcels are shown in Figure 1-3.

The Project is located on Lot 1 on SP282377, Lot 4 on RP852211 and Lot 437 on RP104399. The Project will be located on land owned by Ampol. The Project seeks to expand the refinery operations consistent with the special industry zoning and the land use envisaged and expected for the site. The Project location ensures the upgrade is appropriately co-located with respect to existing refinery plant/elements and seeks to further improve and rationalise existing site access and operational car parking.

1.3.1 Affected Lots

Land tenure relevant to the Project is described in Table 1.

Table 1 Land tenure relevant to the Project

Property description & address	Tenure	Owner
Lot 1 on SP282377 50 South Street, Lytton	Freehold	Ampol Refineries (QLD) Pty Ltd
Lot 4 on RP852211 48 South Street, Lytton	Freehold	Ampol Refineries (QLD) Pty Ltd
Lot 437 on RP104399 41 South Street, Lytton	Freehold	Ampol Refineries (QLD) Pty Ltd

1.4 Amendments to this Management Plan

AECOM previously provided a SBSMP (version 3, dated 14 Feb 2023) which was approved as part of the development approval for the Project. Since approval of the Project and SBSMP (version 3), changes to the Project, stormwater catchments and stormwater treatment have been realised. These changes impacted catchment delineation and stormwater routing across the development site and therefore necessitated a review of the approach to stormwater management and stormwater quality treatment.

In addition, further investigations completed during construction and since the preparation of the prior SBSMP (version 3) identified limitations for the use and installation of approved stormwater treatment devices. In particular, it was identified by Ampol and civil contractors that site conditions were a constraint that would prevent the use and installation of gross pollutant traps (GPTs), especially due to the deep excavations required, the presence of Energex underground high voltage electrical cables, and a shallow groundwater table across the site.

To support a minor change application for the Project for consideration by BCC, this SBSMP has been updated (version 6) to address the changes to the Project which are relevant to stormwater. The changes addressed in this revised SBSMP are summarised as follows:

- South Street realignment catchment:
  - The South Street realignment is no longer an element of the Project, and this catchment area (1.22 ha) has therefore been excluded from consideration in this updated SBSMP.
- Process area catchment:
  - This area will be fully bunded and drain to the Northern Wastewater Treatment Plant instead of outfall 1. Therefore, this area and associated pollutant loading has been excluded from MUSICx modelling.
- Construction Village Area:
  - The temporary construction village buildings in the western area of site are to be removed, but the earth fill pad on which the temporary construction village was constructed will remain. The earth fill pad is to remain in place following the removal of construction village buildings and associated temporary works and Ampol have advised that the remaining surface (type 2.3

road base) will be scarified and covered with an additional 100 mm of topsoil prior to being hydroseeded. The proposed finished surface gradient of this area is such that sheet flow runoff will be directed from south to north, not on the angle indicated in the previous SBSMP (version 3). Updated MUSICx modelling has reflected these changes, including changes to levels, surface treatment and gradient of the construction village earth fill pad.

- Western carpark:
  - The constructed grade differs from the angular flows indicated in the previous SBSMP (version 3), with sheet flow expected to occur from south to north across the surface. Updated MUSICx modelling has reflected this change in routing.
- Main gatehouse carpark and road realignment:
  - The constructed grade of this area indicates multiple overland flow paths instead of the uniform east to west flow indicated in the previous SBSMP (version 3). Updated MUSICx modelling has reflected this change in routing.
- Swales:
  - A series of small swales have been installed to the west of the western carpark, and another continuous swale has been constructed along the northern perimeter of the western carpark and construction village. Additional swales have also been constructed throughout the GTU area. These swale features have been considered.
- Depth limitations for stormwater treatment devices:
  - Consideration of the groundwater table in conjunction with tidal effects dictates that the installation of GPTs is not economically practical. The presence of Energex cables throughout site further restricts the potential for excavation. This SBSMP employs a revised approach to stormwater treatment, avoiding the use of GPTs.

Incorporating the necessary updates for these changes, this SBSMP has been developed according to pre-lodgement advice provided by BCC (A006973777, 29 April 2026) and should satisfy Performance Outcomes (PO) PO16 and PO17 of the Stormwater Code (Brisbane City Council, 2014). The recommended stormwater treatment solution for the Project has been selected following consideration of multiple design options for stormwater treatment, as discussed in Section 6.2.

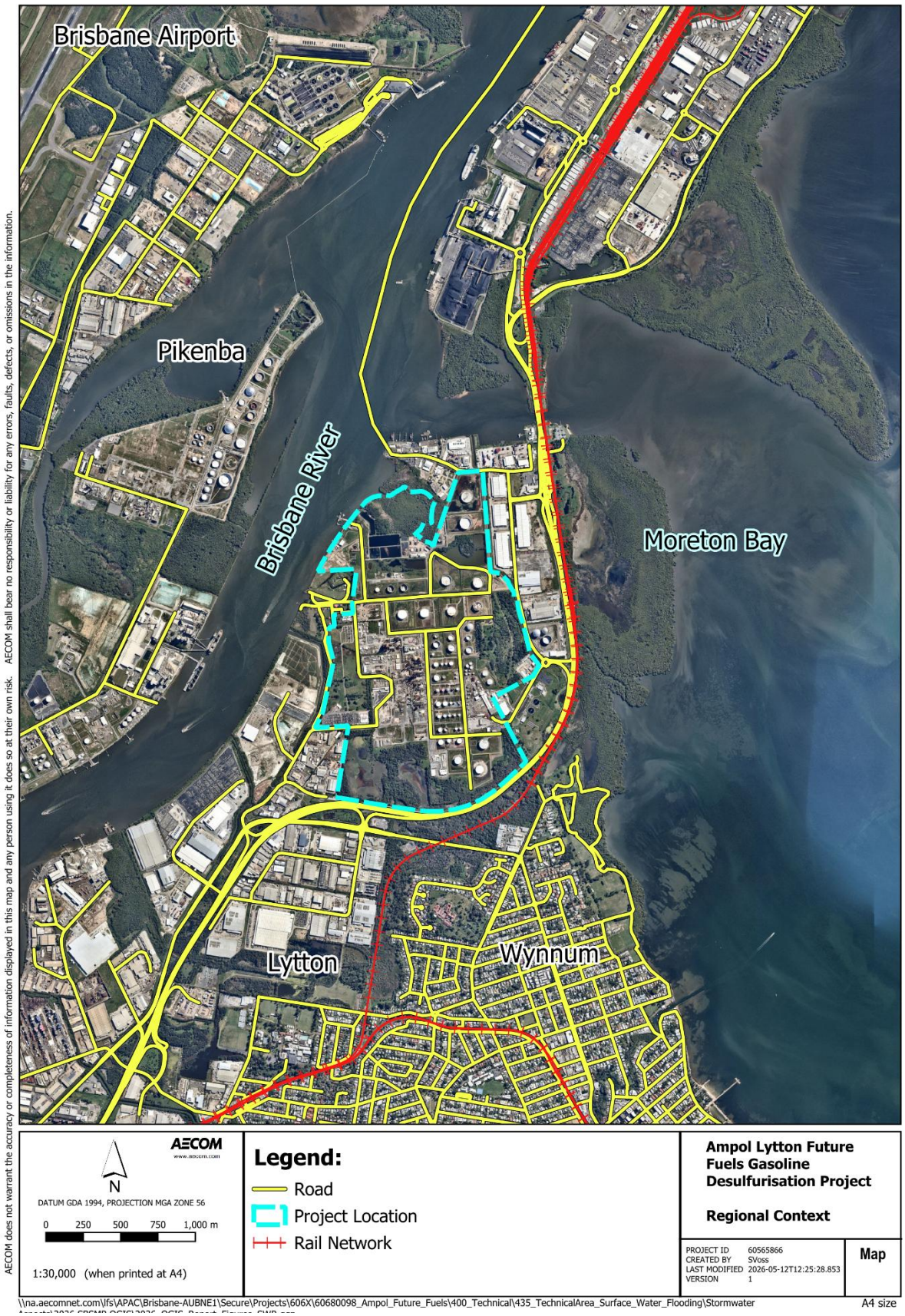

Figure 1-1 Site Location Regional Context

Figure 1-2 Project Site Local Context

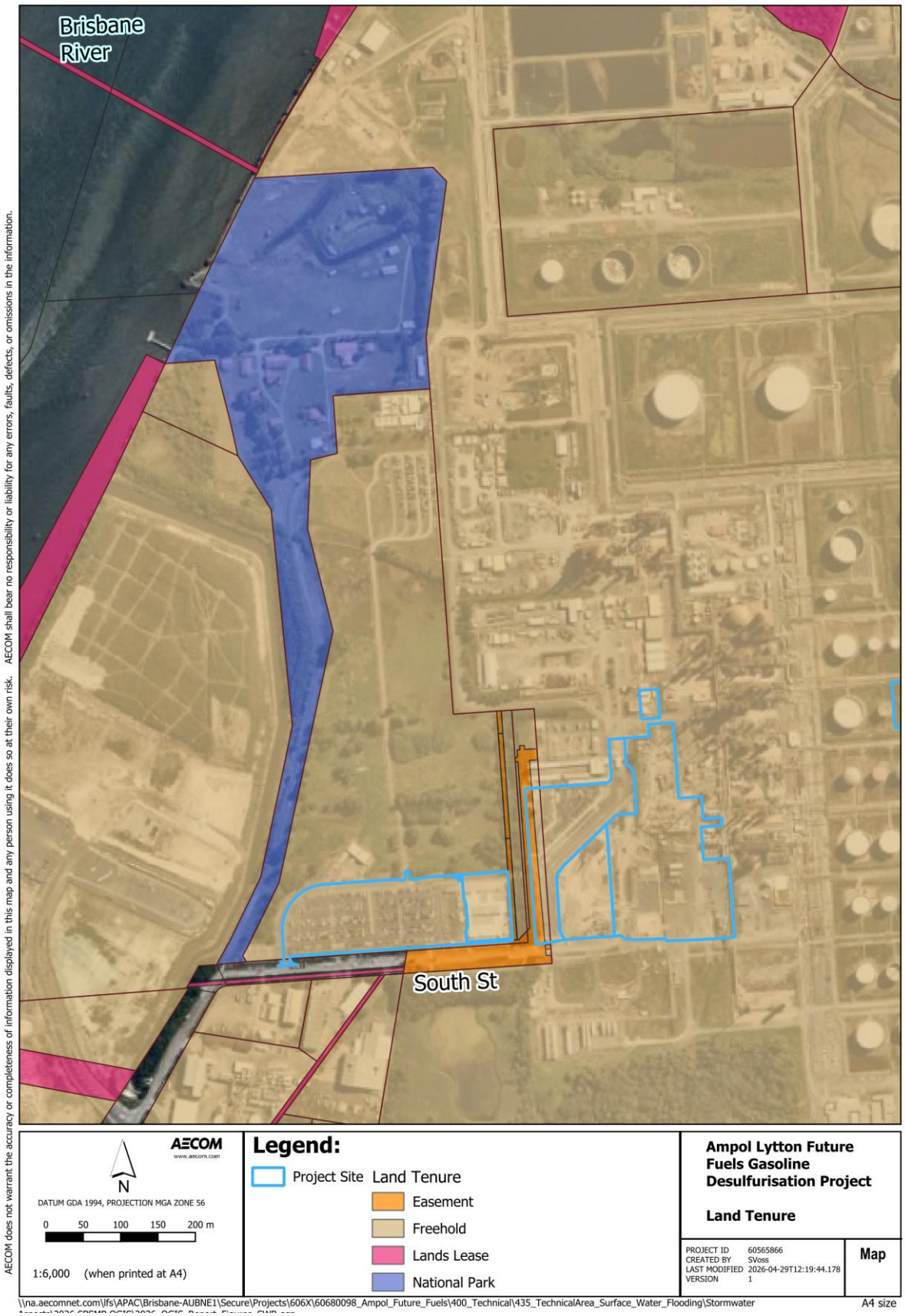

Figure 1-3 Project Site Land Tenure

2.0 Water Quality Impact Assessment

2.1 Site Based Stormwater Quality Management Plan Requirements

Acceptable Outcome (AO) 16 of the Brisbane City Plan 2014 (City Plan) stormwater code requires new development to provide a stormwater management system which is designed in compliance with the standards in the Infrastructure Design Planning Scheme Policy. These requirements have the following components:

- Erosion and sediment control measures (Note: Erosion and Sediment Control will be addressed separately during the construction phase, and therefore erosion and sediment control measures are not addressed in this report).
- Permanent water quality controls. Water quality objectives for methods to achieve the minimum reductions in total pollutant load, for the Post-Development case in accordance with Table B of Appendix 2 of the State Planning Policy (DILGP, 2017) and shall be identified in the SBSMP. Minimum reductions in mean annual load from unmitigated development (%) for Southeast Queensland in accordance with the State Planning Policy (DILGP, 2017) are presented in Table 2. This assessment is addressed in this report.
- Limit the peak 1-year Average Recurrence Interval (ARI) event discharge within the receiving waterway to the Pre-Development peak 1-year ARI event discharge. Note: This is an operation phase requirement for discharge controls to limit the peak 1-year ARI. However, it is not applicable to sites that discharge into tidal waters where there would be no risk of waterway erosion. Since this site discharges into an estuary that is affected by tidal waters, this requirement is not applicable for this site and is not addressed in this report.

Table 2 Recommended Load Reduction Targets Source: State Planning Policy (DILGP, 2017)

	Gross Pollutants [1] (>5 mm)	Total Suspended Solids (TSS)	Total Phosphorous (TP)	Total Nitrogen (TN)
Minimum reductions in mean annual loads unmitigated development (%)	90	80	60	45

Note 1: This target was not assessed as gross pollutants are unlikely to be generated by the site. It has highly restricted access, is not subject to activities typical of urban development, and it would not be meaningful to extrapolate modelled results to this site for gross pollutants.

The SBSMP has been prepared in line with the guidance provided by the following:

- Brisbane City Plan stormwater code, PO16/AO16.
- State Planning Policy (Table B of Appendix 2) (DILGP, 2017).
- Healthy Land and Water (2018) MUSIC Modelling Guidelines, Healthy Land and Water Limited, Brisbane, Queensland.
- Healthy Waterways (2006) Water Sensitive Urban Technical Design Guidelines for Southeast Queensland. Version1).
- Online MUSICX Version .50.1 User Guide (Updated 30 October 2025)

The SBSMP assesses compliance with the Brisbane City Council stormwater code.

3.0 Existing Stormwater Management Plan

This report has been developed as an addendum to the existing Lytton Refinery Stormwater Management Plan (SMP) (Ampol, 2026) which describes the operating stormwater principles and infrastructure, under which the Ampol Lytton site is managed. This report should be read in conjunction with the existing SMP (Ampol, 2026).

Currently, this addendum report relates to the proposed development of the Project, which is the subject of the development application. Pending the approval of the proposed development, and subsequent detailed design of the proposed development elements, this SBSMP addendum may require revision, and adoption within the Ampol Lytton site operations.

The existing SMP (Ampol, 2026) describes the following key aspects of stormwater management:

- Site catchments and stormwater management processes for each defined catchment (Refer Figure 3-2).
- Stormwater System: Describes the overall stormwater system at the Ampol Lytton site, which is utilised to manage stormwater generated over different site surfaces. Key infrastructure includes:
    - Stormwater Retention System for high-risk catchments draining to the Northern Wastewater Treatment Plant (Refer Figure 3-1 for process diagram and Figure 3-2 shows the extent of catchment 8a which drains to this facility).
    - Oily Water Sewer.
    - Acid Water Sewer.
- Stormwater Discharge Monitoring procedures and requirements.

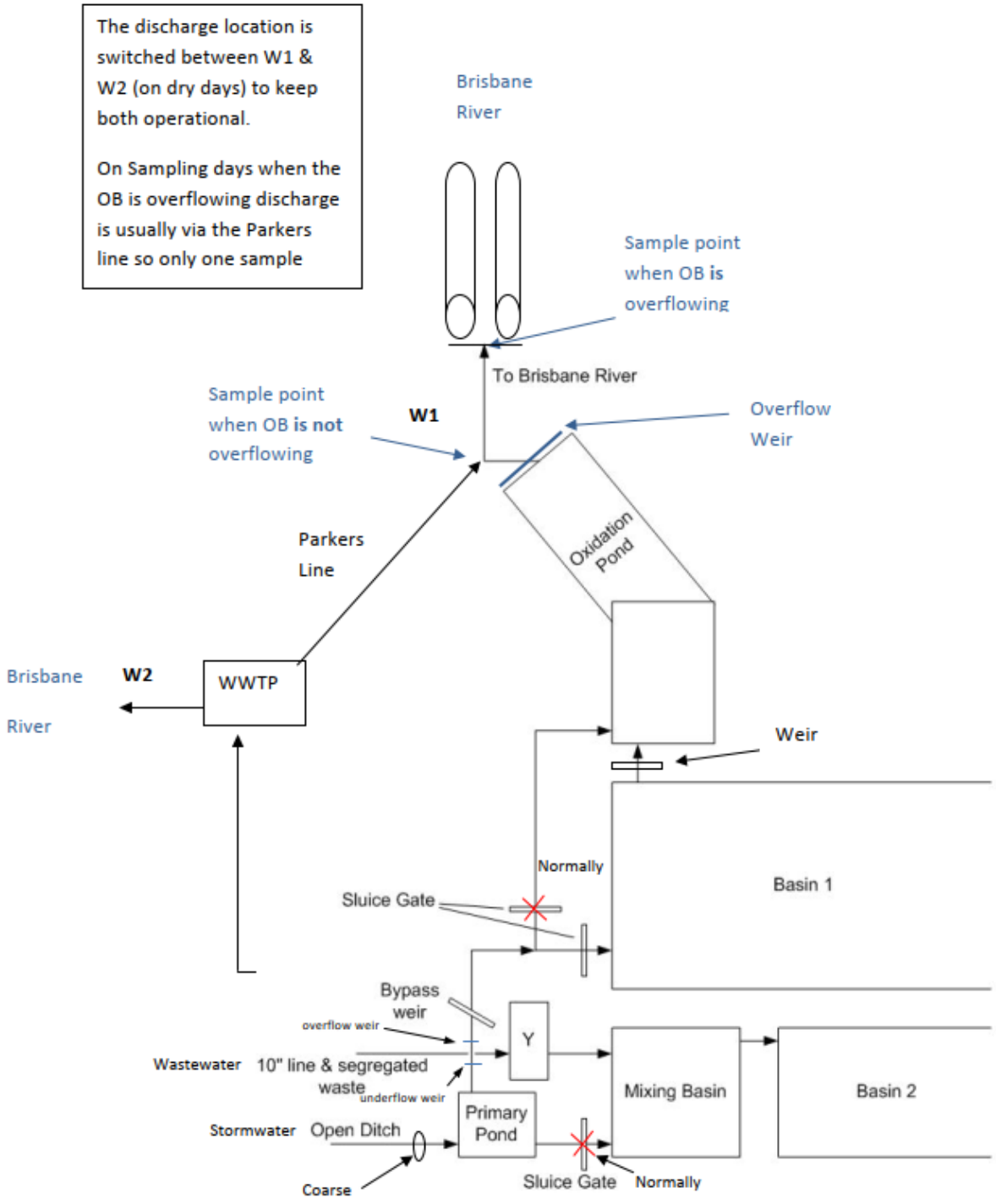

Figure 3-1 Stormwater Retention System Diagram (Normal Operation)

Figure 3-2 Existing Stormwater Catchments and Site Contours (Ampol, 2026)

4.0 Site Development

4.1 Site Elements

The proposed Project site development is broken into distinct work phases, work areas and Project elements, many of which have already been completed. Figure 4-1 shows the two key work areas and Figure 4-2 shows the location of site features. The key areas are described as follows:

- Western Area:
  - Car and Truck Park Development:

    The car and truck park development is permanent infrastructure to provide operational and construction workforce parking. The expected configuration of the parking is as a prepared hardstand surface, with spray seal applied. A pedestrian access route runs along the south perimeter of the car park development, with offshoots providing access into the parking spaces.

    The completed surface is graded south to north, as to direct flows from overland flooding, stormtide events, and surface runoff into the swale running along the northern perimeter of the asset. There are design options for the central swale (oriented in the north to south direction) with respect to whether this swale will remain open or be replaced with culverts and sealed over. MUSIC modelling has therefore considered both design options.
  - Construction Village:

    The temporary construction village will be removed from site following completion of the construction phase for the Project. Ampol has confirmed that all buildings, foundations and pavement will be removed from this area, leaving only the earth fill pad. The remaining fill pad surface (type 2.3 road base) is to be scarified and covered in 100 mm of topsoil before being hydroseeded.
- Eastern Area:
  - Main Gatehouse Carpark and road realignment:

    The main gatehouse carpark upgrade was a formalisation and realignment of existing site areas. This involved:

    - Existing main gatehouse carpark was rearranged to accommodate the realignment of the main access road to accommodate the construction hardstand and laydown area.
    - Demolition of existing buildings, and relocation of clubhouse.
  - Construction Laydown:

    The construction laydown area is immediately adjacent to the new process areas, and is to be initially constructed as a gravel surface, providing a staging point for materials and construction plant during the construction phase. This construction laydown is the primary laydown for refining infrastructure delivered to the site. As with the construction village area, Ampol has confirmed that following completion of construction the surface of the laydown area (type 2.3 road base) is to be scarified, covered with an additional 100 mm of topsoil and hydroseeded. However, prior to application of topsoil and hydroseeding, this area will also be re-graded as to provide a ridgeline as discussed in Table 3 in Section 5.3. Future usage of this laydown area post construction is to be restricted as described in Table 5 in Section 5.7.1.
  - GTU Roadway and 18S2 Tank Area Surrounds:

    The Main GTU Road (refer Figure 4-3) will be elevated on a bund surrounding a portion of the processing area, to the east of the construction laydown. The road will be graded such that surface runoff flows away from the processing area, and into the swale of varying width to be constructed along the outer edge of the road. This swale flows into additional swales to be constructed within the area surrounding the 18S2 Tank, and conveying flows beneath South Street through an existing winged headwall and culvert. Additional portions of road to the east

of the Main GTU Road use kerb and channel drains and a pit to direct flows into the swales surrounding the 18S2 Tank.

- New Process Area (raised and graded to drain to the Northern Wastewater Treatment Plant):

  The new process area contains the specific refining infrastructure required for the Project. The refining infrastructure will include:

  - Amine plant.
  - Prime-G SHU/splitter plant.
  - Prime-G SHDS plant.
  - New internal access roads.
  - Cooling tower.

  The area is proposed to be constructed utilising fill earthworks and/or bunding as necessary to control surface runoff flows and provide suitable immunity to defined flood events, including stormtide and overland flow events, to mitigate the potential for inundation and to provide first instance containment consistent with site approaches for the management of hazardous chemicals. The area is proposed to comprise hardstand with vehicular access to the process area by roll-over to separate this catchment from the stormwater drainage. Drainage would consist of a capture and pump system to hold and discharge the required stormwater to the refinery open ditch for processing through the refinery WWTP under the Environmental Authority for that facility.

  The remainder of the process area upgrades include a hardstand (compacted gravel, concrete or bitumen) containing infrastructure associated with the future fuels project which does not contain hazardous chemicals, such as a switch room and transformers.

- New Jet Tank:

  A new tank is proposed to the east of the main proposed development area, within the existing bunded tank-farm of the Ampol Lytton refinery site.

Delivery of large modules and equipment to the Project site is expected to be via Port of Brisbane using existing major transport routes including South Street.

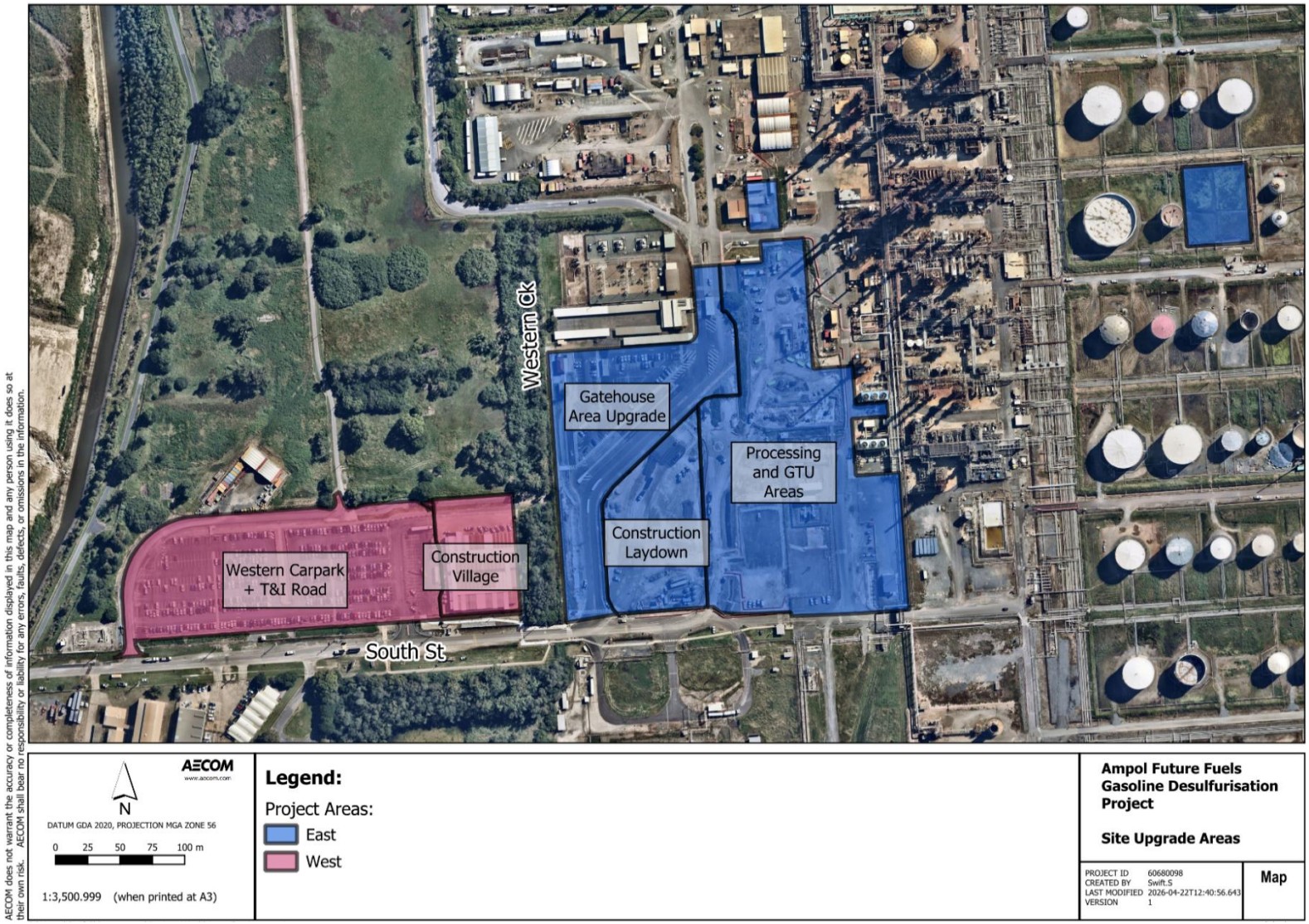

Figure 4-1: Key Project site areas

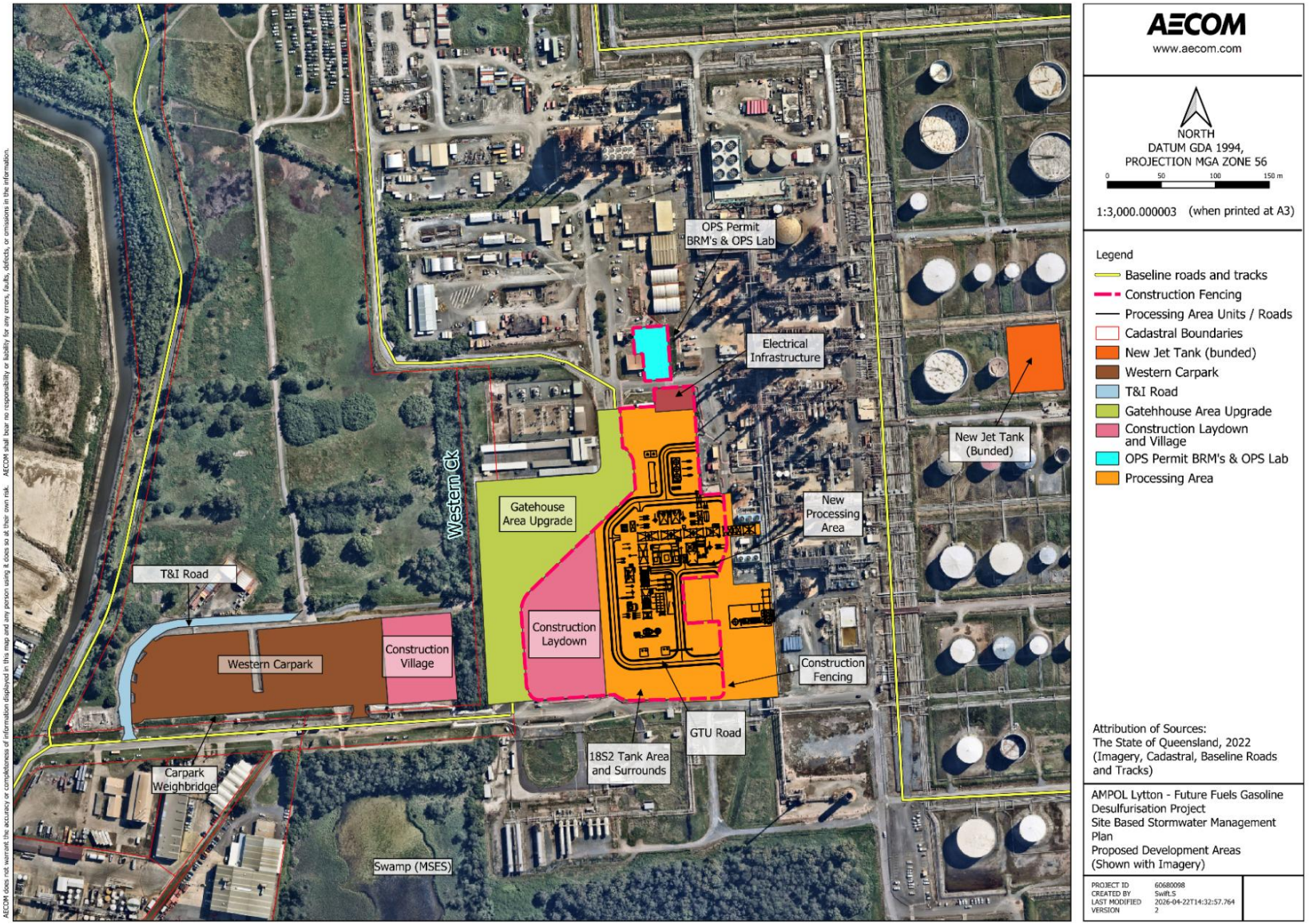

Figure 4-2: Location of key development areas and site features

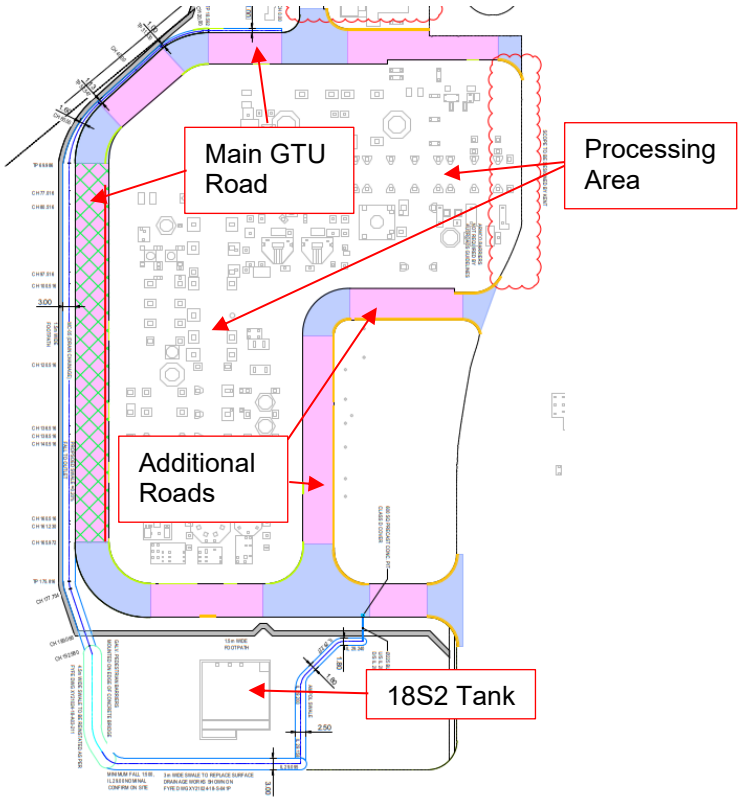

Figure 4-3: Proposed GTU Road Layout (refer Figure 4-2 for location of these features within broader project context)

4.2 Construction Sequencing

The Project construction phase will generally comprise the following sequence:

1. Early works and site enabling works:
    a. Demolition of existing buildings.
    b. Relocation of road access (to main gate) and operational car parking.
    c. Relocation of some critical operational facilities (social club, breathing air station, welding workshop, etc).
    d. Preliminary earthworks for construction areas and for the temporary construction village, laydown facility and associated construction car parking. Earthworks will primarily involve filling using material from licensed quarries.
    e. Pedestrian access from the temporary construction village to the construction area via a new bridge over the waterway corridor.
2. Establishment of the temporary construction village including new access roads/points, carparking, laydowns and office/crib facilities (workers accommodation will not be located on site).
3. Establishment of a new jet tank in existing tank farm.
4. Establishment of the plant upgrades and associated works.
5. Removal of construction village and all associated paved surfaces and footings. The fill volume in this area is to be retained, with a swale to be constructed to the north of the area (refer section 5.7.1.1). The construction laydown area and remaining construction village area surface will then be hydroseeded following surface scarification, application of topsoil, and re-grading where required as per Section 4.1.

4.3 Project Catchments Discharging to Stormwater

The total Project catchment area of this development that discharges to stormwater is 5.34 ha. For the purposes of the SBSMP, these catchments have been categorised into three land-use pollutant source classification types (Figure 4-4), which impact the assessment. Flow routing from the pollutant source catchments, together with proposed flow conveyance and water quality treatment measures are indicated in Section 6.3.

Areas that drain to the site stormwater drainage network will be assessed against the State Planning Policy (DILGP 2017) to determine if pollutant reduction targets would be met. These areas include:

- Site areas – site areas comprising upgrades to buildings, pavements and car parks that discharge to the stormwater drainage system.
- Construction areas – Though the construction village and laydown areas are to be hydroseeded following completion of construction, they will not be entirely pervious and runoff is expected. Runoff generated from these areas will contribute to pollutant loads and hence these areas have been included in the assessment.

AECOM
www.aecom.com

NORTH
DATUM GDA 1994,
PROJECTION MGA ZONE 56

0 25 50 75 100 m

1:1,750 (when printed at A3)

Legend:

Source Area Classification:
- Carpark/Road
- Industrial Ground
- Hydroseeded Hardstand

AMPOL Lytton - Future Fuels Gasoline Desulfurisation Project
Site Based Stormwater Management Plan
Catchment Delineation and Source Types

PROJECT ID	60680098
CREATED BY	Swift.S
LAST MODIFIED	2026-06-29T16:54:17.484
VERSION	2

Figure 4-4: Drainage catchment pollution source classification. Refer Figure 6-1 for flow routing

4.4 Catchments Discharging to the Northern Wastewater Treatment Plant

Process areas that do not drain to the site stormwater drainage network were excluded from the assessment against the State Planning Policy (DILGP 2017). These areas were those areas raised and graded to drain to the existing northern water treatment plant.

Catchments where new processing units will be installed would be graded such that any spills cannot flow to the receiving environment. All runoff would drain to the existing Northern Wastewater Treatment Plant and discharged under the Environmental Authority (EPPR00536213) for that facility. Sub-catchments that discharge to the Northern Wastewater Treatment Plant were excluded from the assessment of pollutant loads because these areas are treated by the plant and will not contribute to generating pollutants to the stormwater discharges.

The key treatment process in the Northern Wastewater Treatment Plant facility is the biotreater. The biotreater allows microorganisms to consume organic materials in the wastewater, which are then removed from the liquid in the clarifier and disposed of as sludge.

The wastewater treatment processes for the refinery's process water streams at this facility include (refer Figure 4-5):

- Oil-water separator for removal of free-floating oils.
- Mixing Basin - An equalising basin of 11,000 m^3 capacity providing an approximate residence time of 7 days. Sludge is removed from the basin via an on-line sludge removal process.
- Retention Basins – A retention basin of 23,000 m^3 capacity providing a residence time of about 15 days provides further treatment/degradation of pollutants. Additional balancing storage is available from water collected in a second detention basin, and in the surplus volumes of bunded areas of Tank 05. Water in balancing storages is pumped back to the retention basin when capacity becomes available.
- Depurator – Air flotation is used to remove oil and suspended matter, and pH is balanced.
- Biotreater – Incorporates a digester to process activated sludge.
- Clarifier – Removes any remaining suspended solids.
- Digester – Sludge is further reduced by an anaerobic digester and then dried on sludge drying beds.
- The remaining liquid is discharged via the refinery outfall or returned to the retention basins if required.

Figure 4-5 Northern Wastewater Treatment Plant treatment facility indicated by red dashed line

Release water quality discharge limits for the Northern Wastewater Treatment Plant facility are set by the Environmental Authority for this facility. The Environmental Authority includes requirements for discharge locations, monitoring of discharge volumes, limits for water quality loads, percentiles and maximum values for concentrations of discharges, which includes: total organic carbon, dissolved oxygen, pH, nutrients, faecal coliforms, surfactants, total petroleum hydrocarbons, phenolic compounds, sulphide, and other toxicants and heavy metals.

The areas of the existing site that would be part of the Project that currently discharge to the Northern Wastewater Treatment Plant total approximately 87 ha. The size of the proposed process area from the Project to be discharged to the wastewater treatment plant is approximately 2.22 ha. This represents a potential increase of approximately 2.5 %. Note that this catchment area will be minimised to the extent practicable during detailed design.

If required, a balancing storage can be included in the design to accommodate the additional runoff from the new processing area to the treatment plant. The balancing storage would be engaged when the plant was at capacity, and would hold runoff until it could be treated by the plant. Balancing storage is currently available in a detention basin associated with the plant, and in the surplus volumes of bunded areas of Tank 05. Water in balancing storages is pumped back to the Northern Wastewater Treatment Plant when capacity becomes available. There may be sufficient balancing storage available in the existing facilities, or additional balancing storage could be created.

5.0 Stormwater Management Plan

5.1 Purpose

5.1.1 BCC Development Application Requirements

For areas that drain to the 'water retention ponds' (the Northern Wastewater Treatment Plant), water quality is discharged to this treatment plant and managed under the site's Environmental Authority.

For areas of the site that drain to the stormwater drainage network (and then to Western Creek and the Brisbane River) City Plan provisions relevant to stormwater quality apply.

Pre-lodgement advice provided by BCC states that, to support the DA, the SBSMP is required to ensure that the proposal demonstrates compliance with the relevant City Plan codes, provisions, and other standards. Section B of the Stormwater Code states that because the size of the proposed site is greater than 2,500 m^2, there is a requirement to address PO16/AO16 of the code (Brisbane City Council, 2014). The acceptable outcome for this requirement is:

> *Development provides a stormwater management system which is designed in compliance with the standards in the infrastructure design planning scheme policy*.

In accordance with Section 7.9.3 of the Infrastructure Design Planning Scheme Policy, a Site-Based Stormwater Quality Management Plan is to be prepared with pollutant export modelling using MUSIC (v4 or newer). The MUSICx model associated with this document will be provided to BCC in accordance with pre-lodgement advice.

A SBSMP must be prepared to assess the impacts and describe mitigation measures for compliance with stormwater treatment (pollutant reduction) targets. Water quality objectives for the Post-Development case are in accordance with Table B of Appendix 2, Table B of the State Planning Policy (DILGP, 2017).

Other relevant stormwater code responses are reported in the Development Application Report (AECOM, 2022).

5.1.2 Environmental Authority Requirements

The requirements for the Site Based Stormwater Management Plan as defined in Environmental Authority EPPR00536213 are as follows:

The registered operator must develop and implement a stormwater management plan which details how the suitable operator of this environmental authority will effectively manage the carrying out of the environmentally relevant activities and shall include at least the works to be implemented and the timetable proposed to address at least the following issues:

a) *prevention and/or minimisation of incident stormwater and stormwater runoff from contacting wastes or contaminants.*

b) *diversion of upstream runoff away from areas containing wastes or contaminants.*

c) *procedures for treatment, re-use or recycling of contaminated stormwater.*

d) *minimise the use of town water for cleaning of any spillages or waste.*

e) *installation of pollution control equipment such as oil separators, silt and rubbish traps, and stormwater diversion systems, sedimentation ponds and settling pits.*

f) *paving and roofing of contaminated areas where practicable.*

g) *setting of appropriate release criteria for stormwater and monitoring of stormwater releases from the approved place.*

h) *provision for contaminated stormwater:*

   1) *removed from the licensed place/s and disposed of in a manner which does not cause environmental harm; and/or*

   2) *reused/recycled in a manner which does not cause environmental harm.*

5.2 Objectives

To meet the requirements of Environmental Authority EPPR00536213 and to remain consistent with the Lytton Refinery SMP (Ampol, 2026), the following five objectives been adopted as the basis for this stormwater management plan amendment. The objectives have been divided into two different categories, infrastructure based and procedural based.

Infrastructure Based

- Objective 1: Avoid contamination of the stormwater in the first instance.
- Objective 2: Minimise the quantity of potentially hazardous stormwater.
- Objective 3: Treat any contaminated stormwater to render it less or non-hazardous.

Procedural Based

- Objective 4: To ensure the integrity of the stormwater infrastructure and that it is in effective working order.
- Objective 5: To ensure appropriate response in the event of an emergency.

5.3 Potential Stormwater Quantity and Quality Impacts

Stormwater runoff generated within the proposed development area is likely to be impacted by contaminants, with the quantity and type of contaminants depending upon the operations occurring within each area. Project catchments are described in Table 3, with their delineation and routing shown in Figure 6-1.

It is noted that the proposed development application includes a new jet tank, to be located within the existing tank farms on the eastern side of the Ampol Lytton site. This jet tank area has been excluded from this SBSMP and associated MUSICx stormwater quality treatment modelling, as it is understood that rainfall and runoff are contained entirely within an existing bunded area and directed to the Northern Wastewater Treatment Plant, meaning there are no implications to stormwater management resulting from the construction of this asset.

Project areas draining to the Northern Wastewater Treatment Plant have also been excluded from MUSICx modelling, as discharge requirements for this facility are set by the relevant Environmental Authority. These requirements are beyond the scope of this document, and is not discussed further.

Table 3: Summary of project stormwater catchments

Project Area	Catchment Name	Size (ha)	Assumed Future Imperviousness	Description	Discharge location
Western Area	Western carpark (west of central swale)	0.83	100%, Bitumen	Surface runoff sheet flows south to north.	Outfall 3 / Western Creek
	Western carpark (east of central swale)	1.00	100%, Bitumen	Surface runoff sheet flows south to north.	
	Construction Village Area	0.41	10%, Hydroseeded with topsoil over road base, intermittent storage of equipment/materials	Surface runoff sheet flows south to north.	
	T&I Road	0.25	100%, Bitumen	Surface runoff conveyed into swales using kerb drain.	
Eastern Area	Gatehouse Carpark Upgrade	0.35	100%, Bitumen	Surface runoff sheet flows into trench drains.	Outfalls 1 and 2 / Western Creek
	Main Access Road Realignment	0.84	100%, Hardstand	Surface runoff from south portion sheet flows westwards into swale or directly into Western Creek. Northern portion sheet flows enter trench drain directed to outfall 2.	Outfall 2 / Western Creek
	Current Laydown	0.83	10%, Hydroseeded with topsoil over road base, intermittent storage of equipment/materials	Split into 4 sub-areas, with a ridgeline enforced through surface grading (Figure 6-1). Two sub-areas drain to outfall 2, and the remaining two drain to the south diversion.	Outfall 2 and South Diversion / Western Creek
	GTU Main Road	0.26	100%, Bitumen	Graded such that all surface runoff flows into the adjacent swale, away from the processing area.	South Diversion / Western Creek
	GTU Additional Roads	0.11	100%, Bitumen	Kerb and channel drains capture surface runoff, diverting it into a pit and then into swales.	
	18S2 Tank Surrounds	0.38	100%, Hardstand	18S2 Tank is fully bunded. Flows from surrounding area enter swale network and are directed to the south diversion.	
	Main GTU Area	0.90		Fully bunded.	Northern WWTP
	Amine Area	0.06			

Project Area	Catchment Name	Size (ha)	Assumed Future Imperviousness	Description	Discharge location
	Cooling Tower Area	0.1			
	Switch Room Area	0.03			
	Sub 11A/B Area	0.73			
	Sub Room 26 Area	0.37			
	18S2 Tank Area	0.03			
Total Area		**7.48**			

For the purposes of this assessment, the proposed development areas have been classified as comprising the following general use ***types***, with different expected contaminants and different treatment approaches accordingly:

- Construction areas:

  The principal concern for water quality during the construction phase including the temporary construction areas is addressing the risk of sediment mobilisation, with the potential for increased runoff generation, suspended solids and erosion from cleared/trafficked areas. Construction phase erosion and sediment controls would be applied.

- Process areas:

  These areas contain processing and refining infrastructure associated with the beneficiation of fuel under the Project. These areas have the potential to contain chemicals associated with processing and refining operations, such as oils and hydrocarbons, amine and other hazardous substances.

- Site areas:

  These areas include infrastructure associated with site operations, such as roads and electrical infrastructure, but do not contain processing and refining infrastructure. These areas have the potential to generate pollutants commensurate with stormwater runoff from typical urban development resulting mostly from the movement of vehicles and atmospheric deposition. Pollutants that may accumulate on these impervious surfaces include oils and hydrocarbons, particulate heavy metals, nutrients such as nitrogen and phosphorus and suspended solids.

5.4 Construction Phase Erosion and Sediment Control Principles

Erosion and sediment control mitigation would be provided during the construction phase. Mitigation measures would be designed and applied in accordance with the IECA (2008) Best Practice Erosion and Sediment Control guideline document. Control measures would be implemented to minimise risks associated with erosion and sedimentation and entry of materials to drainage lines and waterways. Controls that would be considered, include:

- Identification of upslope run-on waters from undisturbed areas of catchment and diversion of these around un-stabilised areas of the site.
- Sediment management devices, such as fencing, hay bales or sandbags, coir logs and graded or lined earth or sandbag diversion bunds and banks.
- Measures to divert or capture and filter water prior to discharge, such as drainage diversion channels and sediment sumps or traps.
- Scour protection and energy dissipaters at locations of high erosion risk.
- Installation of measures at key work entry and exit points to minimise movement of material onto adjoining roads, such as rumble grids or wheel wash bays, or regular sweeping.
- Location and storage of construction materials, fuels, and chemicals, including controls. Controls may include:
  - cover before significant weather events
  - bunds
  - diversion of offsite flows away from storage
  - stabilised laydowns
  - storage clear of frequently flooded low-lying areas and from residential areas.
- Stabilisation of the surface of batters and drains, including temporary works and diversions. Treatment of any detained waters, followed by discharge to downstream receiving waterways.

5.5 Operation Phase Stormwater Management Principles

The overall stormwater management principles for each of the defined development types is as follows:

- Process areas:
  - Containment of stormwater within bunding and/or raised earthworks pad.
  - Transfer of stormwater via hydraulic controls to the stormwater retention system (Northern Wastewater Treatment Plant).
  - Treatment of stormwater and subsequent discharge via the licensed discharge points (W1 and W2).
- Site areas:
  - Collection of stormwater within stormwater drainage network.
  - Transfer of stormwater-to-stormwater treatment devices.
  - Treatment, followed by discharge of stormwater to downstream receiving waterways.

5.6 Operation Phase Stormwater Treatment Devices

Operation phase stormwater treatment devices proposed for the site and construction areas include:

- Vegetated buffer strips which slow and treat surface runoff that sheet flows across the vegetated surface.
- Vegetated swales which slow and treat surface runoff as the water travels downstream through the vegetation within.
- Ephemeral wetlands which capture and hold water to a maximum extended detention depth for a set duration, allowing vegetation to treat the water within. Outflow rate and the detention period are controlled by a specialised outlet structure. Ephemeral wetlands hold no permanent body of water.
- Atlan FlowGuard (formerly Hydrochannel) Devices (refer Figure 5-1). The FlowGuard is a SQIDEP verified and certified stormwater treatment device that can be placed within a grated trench drain of 300 mm width and at least 450 mm depth. They can also be arranged in pits of varying dimensions. Stormwater treatment occurs in two stages within these devices, with solids and particulates settled in the first stage, and dissolved contaminants absorbed into the filter medium in the second (Atlan Stormwater, 2026).

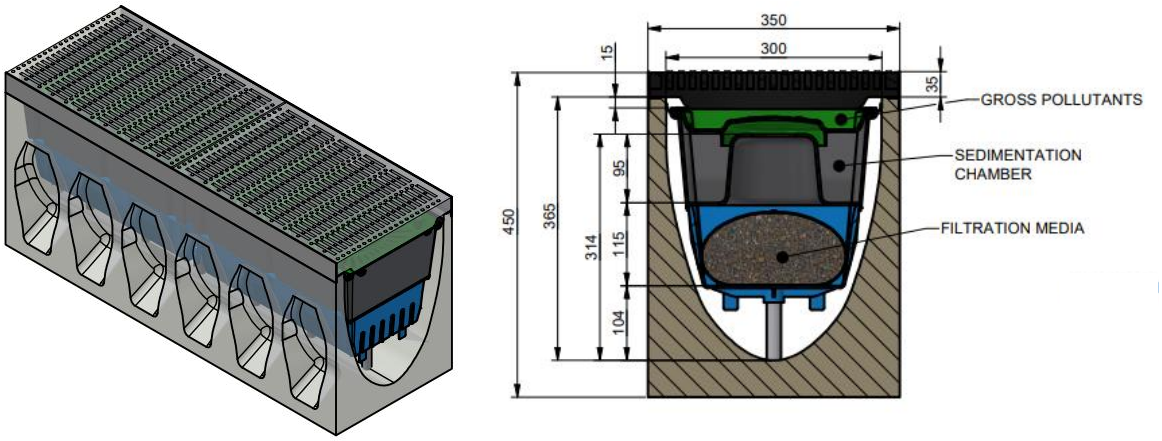

Figure 5-1: Atlan FlowGuard device installed in a grated trench drain

5.7 Stormwater Management Strategy

This section provides an overview and details of the stormwater management strategy and measures included in this SBSMP, developed to achieve the stormwater management objectives (refer Section 5.2). This strategy has been based upon the site drainage plan shown in Figure 6-1. This was developed by AECOM based on as built and design drawings and TIN surfaces provided by Ampol. As such, swales, bunding, and most surface grading was determined prior to commencement of this revised SBSMP and associated MUSICx modelling.

The key functional elements of the stormwater management strategy proposed for each of the proposed development areas include:

- Bunds (pre-determined).
- Formalised collection drains and pipes (pre-determined).
- Buffer strips (pre-determined).
- Vegetated swales both in Ampol designed or as-built rock-lined swales and a new construction at the northern edge of the construction village area.
- Existing Northern Wastewater Treatment Plant (stormwater retention system) for bunded areas and the process areas diverted away from stormwater drainage.
- Atlan FlowGuard devices in trench drains as needed.
- Ephemeral wetland in the existing swale to the north of the Western carpark.

It is noted that this stormwater management strategy has been based on preliminary drawings. Should further design result in substantial changes to the proposed layout and associated infrastructure, this stormwater management strategy would need to be revised. For example, if grass swales cannot be accommodated at some locations in the design, this may be offset by increasing the number of FlowGuard devices elsewhere.

5.7.1 Stormwater Management Measures

A summary of the key functional elements comprising the stormwater management strategy in each of the development areas requiring treatment is provided in Table 4 to Table 6 below.

Table 4: Stormwater Management Measures for Eastern Area Sub-Areas Draining to Northern Wastewater Plant

Type	Details and dimensions
Perimeter bund / Raised Earthworks Pad	The minimum elevation of the process area containing refining infrastructure, achieved through either raised earthworks or perimeter bunding will be in excess of 3.1 m AHD, consistent with the Storm tide inundation hazard at Year 2100.
Perimeter catch drains	Nominal sized perimeter drains and grading of the surface areas are required to report runoff generated within the area to the sump and pump.
Sump & Pump	A sump & pump feature is proposed to collect runoff generated within the area, sized to contain the equivalent volume generated during a 10 % AEP, 24-hour duration rainfall event. Runoff volumes exceeding this capacity would overflow by passing through an underflow/overflow weir (to trap floating hydrocarbons) and would discharge to the stormwater drainage network.
Pipe	Runoff collected within the sump and pump will be transferred to the existing drainage systems which convey runoff to the existing Northern Wastewater Treatment Plant.

Table 5: Stormwater Management Measures for Eastern Area Sub-Areas Draining to Stormwater

Type	Details and dimensions
Adjusted surface grading and hydroseeding	A ridgeline enforced in the laydown area will split the area into additional sub-areas to split flows between surrounding treatment devices (refer Figure 6-1). Following re-grading, this surface will be hydroseeded to increase perviousness and therefore reduce runoff generation. The effectiveness of these adjustments is highly dependent on the use of the area, with stored equipment likely to impact collection, flow and treatment of runoff. Additionally, storage of impervious materials and equipment may increase the volume of first flush flows, thus increasing pollutant loads beyond what has been modelled as compliant. Therefore, it is recommended that equipment is only stored temporarily, and not placed across overland flow paths within this area. Ongoing monitoring of the surface after large rainfall events is also advised to ensure flow behaviour is as anticipated.
Vegetated buffer strips	Vegetated buffer strips will be maintained to the west and south of the laydown area as per the area breakdown provided by Ampol. Though the perviousness of the laydown area is set to increase, the buffer strips are still considered a valuable asset to treat flows resulting from temporary increases in impervious area as a result of equipment storage on the laydown.
Vegetated and non-vegetated swales	Vegetated swales will be located as per Figure 6-1 and vegetated to a height of 0.3 m. Swales which will not be vegetated include the narrow (<1.60 m width) northern portion of the GTU swale and the 1.80 m width swale to the east of the 18S2 tank. These swales are sufficiently small as to decrease the value to be gained from vegetation, and have not been modelled as they are not expected to confer any benefit to stormwater treatment. Additional swale details are provided in Appendix A.
Atlan FlowGuard	The Atlan FlowGuard stormwater treatment system uses a modular design to first eliminate solids and particulates, before contaminants are absorbed in the filter media. These can be installed in drainage pits of in 300mm wide grated drains. The drain separating the gatehouse carpark and main access road is to be filled with FlowGuard devices along its entire length.
Discharge	Existing drain system (to Western Creek) via Outfalls 1 and 2, and the South Diversion.

Table 6: Stormwater Management Measures for Western Area Draining to Stormwater:

Type	Details and dimensions
Ephemeral wetland	A 1,968 m^2 ephemeral wetland with an extended detention depth of 0.4 m is to be constructed in the swale running along the northern edge of the carpark and construction village area. This asset is critical to achieving nitrogen reduction targets for the site, and therefore a detention time of 114.5 hours is required for this asset. This is achieved through the design of a specialised outlet system with a maximum flow rate equivalent to a 36 mm pipe. This wetland has no sediment pond and therefore relies on sediment removal in the upstream vegetated swales to maintain functionality and reduce maintenance requirements. Kerb drain will be required to ensure T&I Road runoff will be diverted into upstream swales.
Vegetated swales	A series of short swales will be located along the western edge of the carpark as per Figure 6-1 and vegetated to a height of 0.2 m. An additional section of swale with vegetation up to 0.3 m will be located upstream of the wetland to provide essential sediment removal. The construction village area will also have a swale with 0.4 m high vegetation running adjacent to the northern edge. This swale is graded to transport flows east to west, removing sediment and performing some treatment prior to discharge into the wetland. Further details on this asset are presented in Section 5.7.1.1 below. Additional swale details are provided in Appendix A.
Atlan FlowGuard	The Atlan FlowGuard stormwater treatment system uses a modular design to first eliminate solids and particulates, before contaminants are absorbed in the filter media. These can be installed in drainage pits of in 300mm wide grated drains. The filter cartridges assessed require a minimum channel depth of 350mm. The finished surface level of the car park is 2.1 m AHD. Mean High Water Springs (MHWS) for the site is about 0.9 m AHD, and would be higher with any storm surge. MHWS is considered an acceptable design outcome for water quality devices. Therefore, the site has 2.1 - 0.9 = 1.2 m of level change available, sufficient to drain the FlowGuard devices. A total length of 82 m of FlowGuard devices are to be installed in grated trench drains on the northern edge of the carpark, to the west of the central swale. 122 m of FlowGuard devices are also to be installed on the northern edge to the right of the swale. These devices are located as such to capture surface flows which sheet flow south to north across the carpark. For the eastern side of the carpark, the channel in which these devices are installed can discharge at suitable intervals into the wetland downstream. For the western side, the channel should route flows such that they discharge into the swale upstream of the wetland for additional treatment. These devices should have a kerb located to the north to optimise runoff capture and treatment, reduce bypass and risk of decreased treatment effectiveness in major flow events, and reduce sediment deposition into the wetland. Alternatively, the trench drain could be offset from the edge of the carpark, and the surface graded such that the trench is within a low point.
Discharge	Existing drain system (to Western Creek) via Outfall 3

5.7.1.1 Construction Village Area Swale

A vegetated swale is required to intercept surface runoff from the construction village area to both reduce sediment deposition into the downstream wetland, and to capture and direct flows into the wetland in a controlled manner via an outlet structure, thus preventing erosion of the wetland bank slope. The swale capacity was determined based on a rational method calculation for 20% AEP event runoff from the construction village area, which produced a maximum flow of 0.11 m^3/s. Key criteria for the design are as follows:

- The downstream invert level of the swale outlet must be above the extended detention depth level of the wetland at the discharge location. This prevents water stored in the wetland from backwatering into the swale and impacting conveyance.
- There must be a stable embankment separating the swale and wetland. This must also be accessible for maintenance (by mower), hydroseeded as per the remainder of the construction village area, and graded as to convey flows towards the swale.
- Swale batters must not be steeper than 4:1 (H:V) for both stability and asset safety.

Pending refinement in detailed design, the swale will be 60 m long, with a top width of 4.0 m, a base width of 0.7 m, a depth of 0.4 m and a vegetation height of 0.4 m. The grade will be 0.5 %.

Figure 5-2 presents a hypothetical arrangement for the swale, with invert levels estimated from survey data provided by Ampol. A rock-lined channel is advised for the swale outlet as to protect against erosion.

Figure 5-2: Construction Village area swale hypothetical arrangement

6.0 Stormwater Quality Assessment

6.1 Methodology

Sub-catchments draining to the stormwater network have been delineated as per Figure 6-1 using design and as-built surfaces and drawings and aerial photography (Nearmap, 2026). Sub-catchments that are discharged to the Northern Wastewater Treatment Plant were excluded from the assessment.

The MUSICx software package was used assess the impacts of the proposed development on receiving environments, and determine suitable Water Sensitive Urban Design (WSUD) measures. This software was developed by eWater and is now considered the standard method for determining compliance with water quality targets within the stormwater industry. MUSICx is primarily a rainfall-runoff model specifically designed to estimate the pollutants generated by urban development, and the pollutant removal efficiency of any proposed treatment devices.

6.2 Stormwater Quality Treatment Options Considered

The emergence of additional site constraints restricting excavation (refer Section 1.4) has impacted the feasibility of the previously approved stormwater management system prepared by AECOM, and render the use of any GPT devices impractical. Three updated design options addressing these additional constraints were considered as follows:

1. Drop kerb to a bioretention garden upstream of the swale to the north of the western carpark.
2. Installation of trench drain with FlowGuard devices running along the northern perimeter of the carpark, discharging at intervals into the swale to the north.
3. Construction of an ephemeral wetland in the existing swale to the north of the western carpark.

Option 1 was not deemed suitable as it would require a reduction in carpark area and significant excavation works. Option 2 and option 3 were both improvements upon option 1, but nitrogen reduction targets could still not be achieved with these measures alone.

As such, it was determined that a combination of options 2 and 3 would be the preferred treatment approach.

6.3 Stormwater Quality Treatment Recommended Solution

Combining treatment options 2 and 3 was determined to be a suitable solution as pollutant reduction targets are achieved with minimal additional excavation, and the FlowGuard devices remain clear of groundwater and tidal effects. The wetland was designed specifically to fit within an existing swale to the north of the western area, and the FlowGuard devices are able to be installed in a trench drain such that the capacity of the western carpark is not impacted beyond temporary closures during the construction phase. Figure 6-1 presents the layout of the recommended solution.

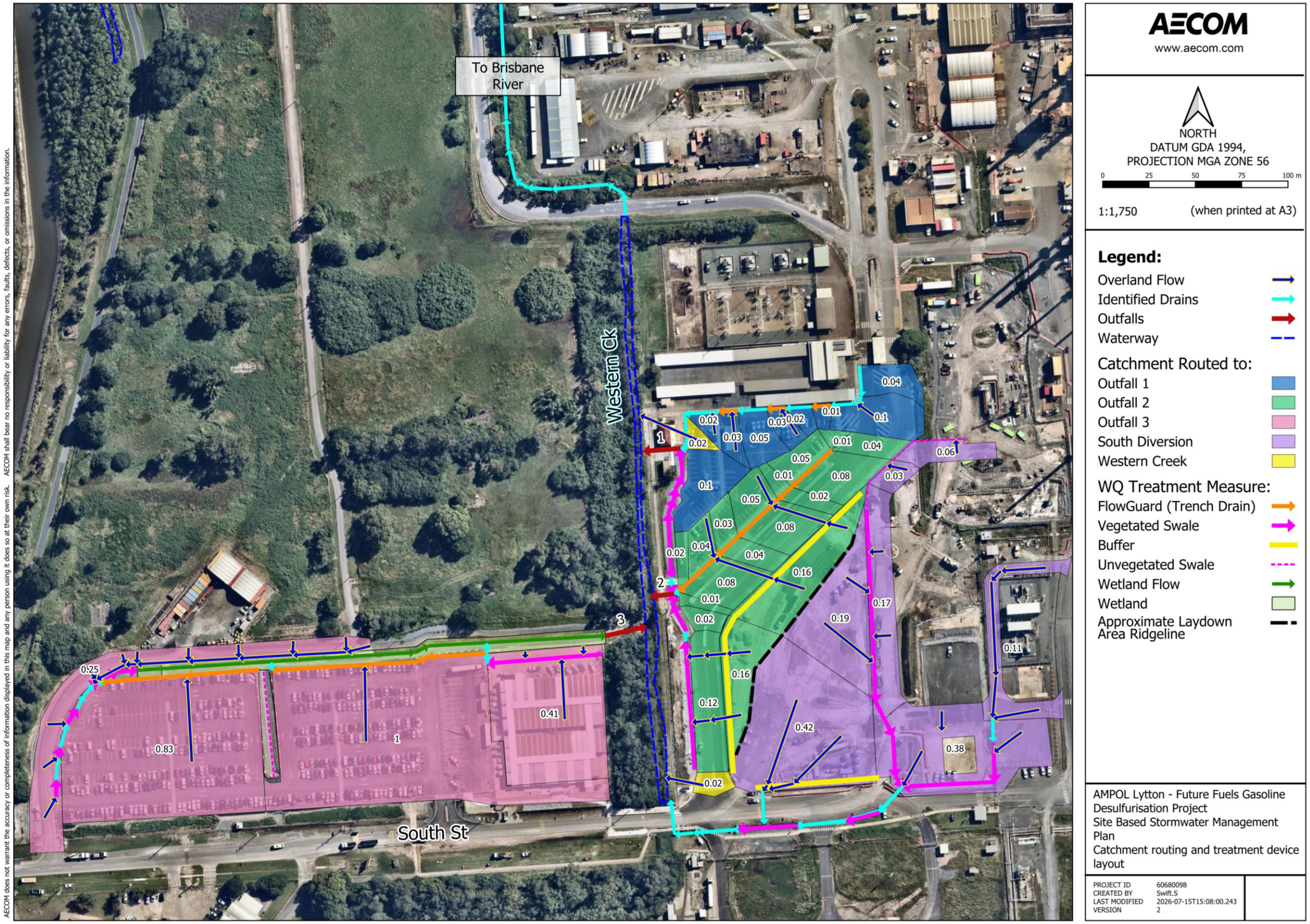

Figure 6-1: Catchment (ha) routing and proposed treatment device layout

6.4 Model Setup

Modelling was based on the contributing catchment areas for the project. The catchments were modelled for the Post-Development scenario (MUSIC model layout is illustrated in Figure 6-2 and Figure 6-3). The rainfall period assessed was Jan 1980 to Dec 1989 from Brisbane Aero Station as required by and based on the MUSIC Modelling Guidelines (Water By Design, 2018), using six-minute time-step data.

6.4.1 Source Nodes

Total project areas discharging to the stormwater network (Figure 6-1) were input into the model as per Figure 6-2 and Figure 6-3. A conservative impervious value of 100% was chosen for most catchments, with the exception being the hydroseeded catchments which were assigned 10% imperviousness. Values for pollutant generation parameters for the Post-Development source areas indicated in Figure 4-4 were specified based on Water by Design (2018) recommendations for the land use types outlined in Table 7.

Table 7: Guideline values for pollutant export parameter classifications for MUSICx (Water By Design, 2018)

Source Area Classification (refer Figure 4-4)	Corresponding Guidelines Pollutant Export Parameter Classification
Carpark/Road	Industrial Roads
Industrial Ground	Industrial Ground Level
Hydroseeded Hardstand	Industrial Ground Level

Table 8 presents the pervious area parameters applied to the hydroseeded (grassed) areas. These are adjusted from the default values provided in the MUSIC modelling guidelines for commercial and industrial land use value to account for the scarification of the surface and added topsoil and hydroseeding.

Table 8: MUSICx pervious area source node parameters

Parameter	Guideline Values	Adjusted Values
Rainfall Threshold (mm)	1	1
Soil Storage Capacity (mm)	18	150
Initial Storage (% Capacity)	10	10
Field Capacity	80	150
Infiltration Capacity Coefficient A	243	243
Infiltration Capacity Coefficient B	0.6	0.6
Initial Depth (mm)	50	50
Daily Recharge Rate (%)	0	0
Daily Baseflow Rate (%)	31	31
Daily Deep Seepage Rate (%)	0	0

Soil storage capacity was increased to account for the 100 mm of topsoil to be applied to the surface, and the scarification of the road base below. Setting the field capacity equal to the storage value means no soil moisture is lost to groundwater recharge (eWater, 2026). This was considered appropriate due to uncertainty regarding the depth of scarification of the road base beneath, and the expectation that recharge would be insignificant due to the low perviousness of the material beneath. In the absence of advice in the current modelling guidelines (Water By Design, 2018), the draft 2026 guidelines stipulate that any infiltrated water which becomes baseflow can be diverted to the downstream node, as it is expected to have a negligible impact upon model outcomes (Healthy Land & Water, 2026). As such, the

allocation of flows between baseflow and surface runoff is expected to be inconsequential to modelling results.

6.4.2 Treatment Nodes

Treatment nodes were set up with reference to the relevant MUSIC modelling guidelines (Water By Design, 2018) using the parameters summarised in Table 9.

Table 9 Parameters used for treatment nodes

Site Area	Name	Details / dimensions
Eastern Area	Buffer Strips	• South Buffer: 1. Percentage of upstream area buffered: 100% 2. Buffer Area (% of upstream impervious area): 49% 3. Exfiltration rate: 0 mm/h • West Buffer A (north section): 1. Percentage of upstream area buffered: 100% 2. Buffer Area (% of upstream impervious area): 49% 3. Exfiltration rate: 0 mm/h • West Buffer B (south section): 1. Percentage of upstream area buffered: 100% 2. Buffer Area (% of upstream impervious area): 49% 3. Exfiltration rate: 0 mm/h Buffer area with consideration for increased perviousness of laydown area has been modelled as the maximum value possible for input into MUSIC model.
	Vegetated Swales	Multiple swales are modelled in this project area, with dimensions obtained from drawings and design surfaces provided by Ampol. Swales were conservatively modelled using only half of the design swale length in cases where sheet flow enters the swales along the length of the feature. For all swales modelled (refer Table 5), a vegetation height of 0.3 m was assigned, alongside an exfiltration rate of 0 mm/h. Refer Appendix A for the attributes of all modelled swales.
	Atlan FlowGuard	244 mm x 500 mm x 300 mm Atlan FlowGuard devices with a high flow bypass of 0.122 m^3/s installed in the trench drain between the main access road and gatehouse carpark. 60 mm x 500 mm x 300 mm Atlan FlowGuard devices installed in 3 x 10 m sections each with a high flow bypass of 0.01 m3/s in the trench drain to the north of the gatehouse carpark upgrade. All FlowGuard devices use Concentration Based Capture Efficiency as per the following: • TSS: Input 100 mg/L, output 12 mg/L • TP: Input 10.0 mg/L, output 31 mg/L • TN: Input 100 mg/L, output 33 mg/L
Western Area	Vegetated Swales	Three segments of swales on the western edge of the carpark were modelled upstream of a 24 m segment of swale which is to be kept upstream of the proposed wetland as to remove sediment from the T&I road inflows. As per Section 5.7.1.1, an additional swale is recommended to be constructed near the northern edge of the construction village area to provide additional treatment and control flows entering the wetland. Dimensions for existing swales were obtained from drawings and design surfaces provided by Ampol. Vegetation heights were assigned to the different swales as per Table 6, and the

Site Area	Name	Details / dimensions
		exfiltration rate for all swales is 0 mm/h. Refer Appendix A for the attributes of all modelled swales.
	Ephemeral Wetland	An ephemeral wetland is to be constructed within the existing swale along the northern edge of the carpark and construction village with the following details: • Low flow bypass: 0 m^3/s • High flow bypass: 100 m^3/s • Inlet pond volume: 0 m^3/s • Surface area: 1968 m^3/s • Extended detention depth: 0.4 m • Permanent pool volume: 0 m^3 • Initial volume: 0 m^3 • Exfiltration rate: 0 m^3/s • Evaporative loss as % of PET: 125% • Equivalent pipe diameter: 36 mm • Overflow weir width: 200 m (to be refined in detailed design) • Notional detention time: 115 hours.
	Atlan FlowGuard	164 x 500 mm x 300 mm Atlan FlowGuard devices with a high flow bypass of 0.082 m^3/s are to be installed in trench drain at the northern edge of the carpark to the west of the central swale. 244 x 500 mm x 300 mm Atlan FlowGuard devices with a high flow bypass of 0.122 m^3/s are to be installed in trench drain at the northern edge of the carpark to the east of the central swale. All FlowGuard devices use Concentration Based Capture Efficiency as per the following: • TSS: Input 100 mg/L, output 12 mg/L • TP: Input 10.0 mg/L, output 31 mg/L • TN: Input 100 mg/L, output 33 mg/L

Figure 6-2: Western area MUSICx model layout

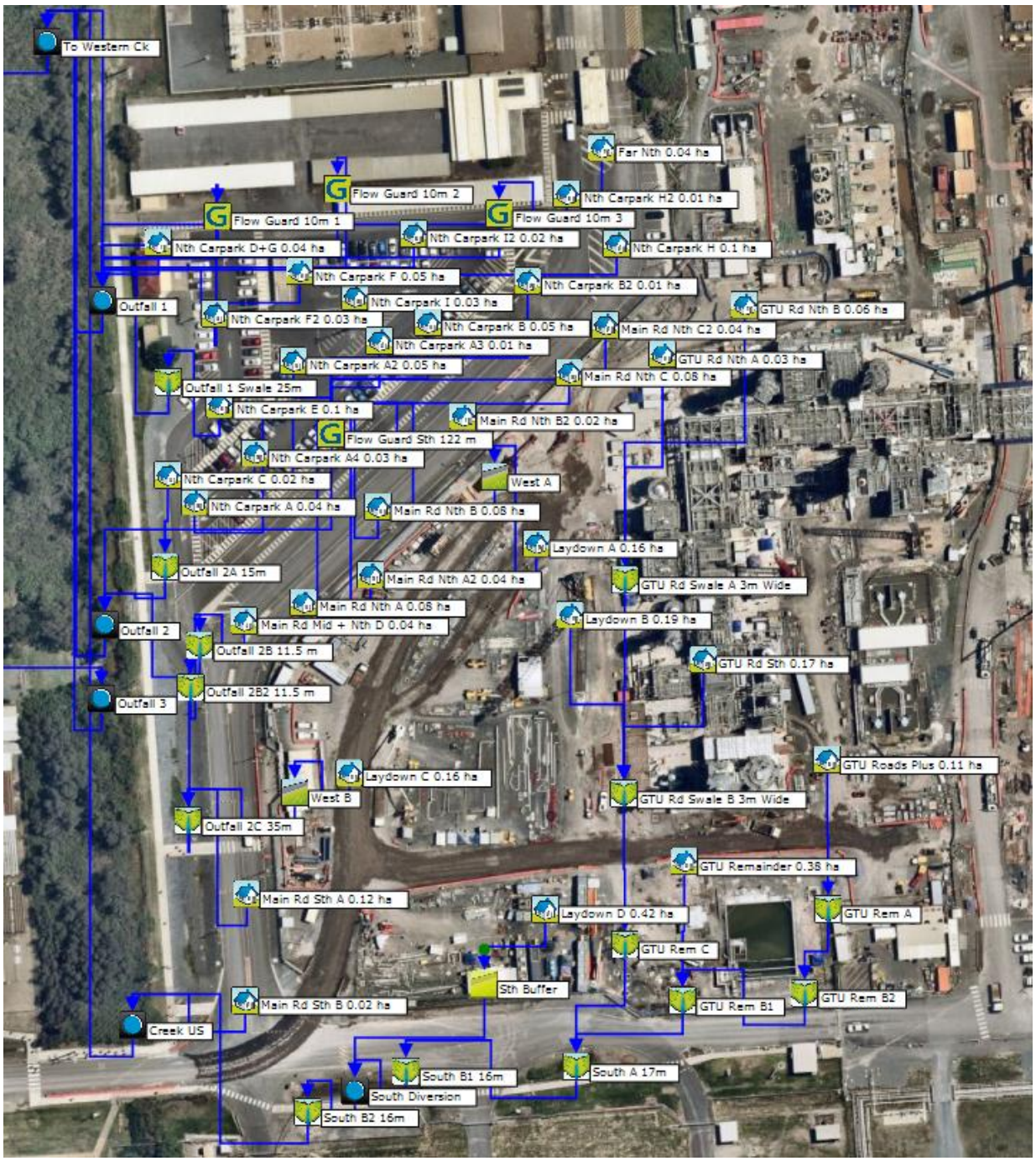

Figure 6-3: Eastern area MUSICx model layout

6.4.3 MUSIC Model Results

Areas subject to development that drain to the stormwater drainage network were assessed to determine if the treatment proposed would be adequate to mitigate the increase in pollutants resulting from the Project.

MUSIC modelling results presented in Table 10 indicate that the treatment provisions will be sufficient to meet the pollutant reduction targets in the scenario wherein the western carpark central swale is not filled in.

Table 10: Western carpark swale remaining open MUSICx modelling results

Pollutant	Source	Residual Load	Reduction (% reduction)	Target (% reduction)	Target met?
Total Suspended Solid (TSS kg/year)	17,070	2,621	84.64	80	Yes
Total Phosphorous (TP kg/year)	30.82	8.086	73.77	60	Yes
Total Nitrogen (TN kg/year)	105.8	57.48	45.67	45	Yes

As mentioned in Section 4.1, there are design options for the central swale (oriented in the north to south direction) with respect to whether this swale will remain open or be replaced with culverts and sealed over. For either option, flow capacity will be maintained. In light of these design options, consideration has therefore been given to the increase in impervious surface and consequential pollutant loading that would arise from this change.

A secondary MUSICx model was created, in which an additional 0.05 ha of impervious surface was added to the western carpark. Modelling operated on the assumption that the additional paved area would have a central crown, with resultant flows split between the sections of FlowGuard on each side. Modelling results presented in Table 11 demonstrate that compliance can be achieved with no additional treatment devices.

Table 11: Backfilling and paving of the western carpark swale MUSICx modelling results

Pollutant	Source	Residual Load	Reduction (% reduction)	Target (% reduction)	Target met?
Total Suspended Solid (TSS kg/year)	17,180	2,604	84.84	80	Yes
Total Phosphorous (TP kg/year)	31.08	8.179	73.69	60	Yes
Total Nitrogen (TN kg/year)	107.2	58.23	45.67	45	Yes

7.0 Future Works

The tasks below are recommended to be undertaken as part of detailed design in order to satisfy the stormwater management measures identified in this document:

- Review of this Site Based Stormwater Management Plan against detailed design of proposed development elements, recognising the potential need to modify the drainage layout and proposed stormwater treatment strategy to accommodate any changes and to optimise the design.
- Subsequent sizing of stormwater infrastructure subject to identified site hydraulic requirements (e.g., perimeter drains. pipes, culverts, process area sump and pump).
- Review and inclusion of changed or additional Development Approval stormwater conditions resulting from the application.

8.0 Maintenance Requirements

Regular inspection and maintenance works will be imperative to the continued performance of the stormwater treatment assets, both vegetated and otherwise. It is recognised that regular inspections minimise maintenance and rectification requirements, whilst infrequent inspection typically increases such requirements.

The recommended maintenance effort and frequency will be defined by the detailed design consultants and is expected to require input from individuals skilled in engineering, landscaping, and horticulture.

An overview of expected general maintenance requirements is provided in Table 12 below.

Table 12: General maintenance requirements for WSUD features

Maintenance for Vegetated Stormwater Assets (Swales and Wetlands) (Water By Design, 2012)	Maintenance for Atlan FlowGuard Devices (Atlan, 2026)
• Repairing erosion • Clearing inlet and outlet structures • Sediment, litter, and debris removal • Managing mosquitoes and birds • Managing high or low water levels • Responding to hazardous chemical spills • Revegetation • Weed and algae control	• Empty sedimentation box • Change filter unit • Replacement of rubber seals and other essential components as required

9.0 Recommendations and Conclusion

The documented stormwater treatment design presents a practical and constructable system for achieving compliance with water quality objectives in accordance with the performance outcomes of the City Plan Stormwater Code, and the State Planning Policy.

It is recommended that a detailed design of the WSUD elements is developed for the Project by Ampol's design consultants and issued for construction.

10.0 References

Atlan. (2026). *FlowGuard Operation and Maintenance Manual.* Sydney: Atlan Stormwater.

Atlan Stormwater. (2026). *FlowGuard*. Retrieved from Atlan Stormwater: https://atlanstormwater.com/au/flowguard

Brisbane City Council. (2014). *Brisbane City Plan.* Brisbane: Brisbane City Council.

eWater. (2026, May 14). Retrieved from MUSICX User Guide: https://ewater.atlassian.net/wiki/spaces/MX1/overview?homepageId=56328199

Healthy Land & Water. (2026). *MUSIC Modelling Guidelines Working Draft V4.0.* Brisbane: Healthy Land and Water.

Nearmap. (2026, February 17). *Nearmap*. Retrieved from Nearmap.

Water By Design. (2012). *Maintaining Vegetated Stormwater Assets.* Brisbane: Water By Design.

Water By Design. (2018). *MUSIC Modelling Guidelines.* Brisbane: SEQ Health Waterways Partnership.

Appendix A

Vegetated Swale Properties and Layout

Appendix A Vegetated Swale Properties and Layout

Table 13 presents the parameters of all modelled vegetated swales with the layout shown in Figure 10-1. All swales were modelled with a low flow bypass of 0 m^3/s and an exfiltration rate of 0 mm/h.

Table 13: MUSICx model vegetated swale parameters (refer Figure 10-1)

Name	Map ID	Length (m)	Bed Slope (%)	Base Width (m)	Top Width (m)	Depth (m)	Vegetation Height (m)
Outfall 1 Swale 25m	8	25	0.55	1	5.4	0.53	0.3
Outfall 2A 15m	13	15	0.9	1	6.2	0.55	0.3
Outfall 2B 11.5 m	14	11.5	0.3	1	5.25	0.25	0.3
Outfall 2C 35m	7	35	0.16	1	3.53	0.34	0.3
South A 17m	5	17	0.52	1	6	0.89	0.3
South B1 16m	6	16	0.52	1	8	0.89	0.3
GTU Rd Swale A 3m Wide	16	48	0.2	0	3	0.35	0.3
GTU Rem C	18	25	0.2	0	4.5	0.435	0.3
GTU Rem B1	12	25	0.2	0	3	0.4	0.3
GTU Rem B2	9	25	0.2	0	3	0.4	0.3
GTU Rem A	10	20	0.2	0	2.15	0.4	0.3
GTU Rd Swale B 3m Wide	17	75	0.2	0	3	0.35	0.3
South B2 16m	11	16	0.52	1	8	0.89	0.3
Swale 1	1	6	1.66	1	2	0.3	0.2
Swale 2	2	6	0.33	1	2	0.3	0.2
Swale 3	3	10	0.3	1	2	0.3	0.2
Swale 4	4	24	0.33	1	3	0.39	0.25
Outfall 2B2 11.5 m	15	11.5	0.3	1	5.25	0.25	0.3
Construction Village Area Swale	19	30	0.5	0.7	4.0	0.4	0.4

AECOM
www.aecom.com

NORTH
DATUM GDA 1994,
PROJECTION MGA ZONE 56

0 25 50 75 100 m

1:1,650 (when printed at A3)

Legend:

Vegetated Swale Map ID:

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19

AMPOL Lytton - Future Fuels Gasoline Desulfurisation Project
Site Based Stormwater Management Plan
Vegetated Swale Layout

PROJECT ID	60680098
CREATED BY	Swift.S
LAST MODIFIED	2026-06-11T09:58:50.631
VERSION	2

Figure 10-1: Vegetated swale layout

Appendix B

BCC Stormwater Code Responses

9.4.9 Stormwater code

Following a pre-lodgement meeting between Ampol and BCC, BCC provided the project with prelodgement advice (dated 29 April 2026).
The advice references some of the outcomes of BCC's stormwater code, as noted below. The following responses describe how the project intends to achieve the performance or acceptable outcomes for those issues identified as applicable to the site in the pre-lodgement advice.

9.4.9.3 Performance outcomes and acceptable outcomes

Table 9.4.9.3.A—Performance outcomes and acceptable outcomes

Performance outcomes	Acceptable outcomes	Response
Section A—If for a material change of use, reconfiguring a lot, operational work or building work Note—Compliance with the performance outcomes and acceptable outcomes in this section should be demonstrated by the submission of a site-based stormwater management plan for high risk development only.		
PO1 Development provides a stormwater management system which achieves the integrated management of stormwater to: (a) minimise flooding; (b) protect environmental values of receiving waters; (c) maximise the use of water sensitive urban design; (d) minimise safety risk to all persons; (e) maximise the use of natural waterway corridors and natural channel design principles. Editor's note—The stormwater management system to be developed to address PO1 is not intended to require management of stormwater quality.	**AO1** Development provides a stormwater management system designed in compliance with the Infrastructure design planning scheme policy.	The proposed design has been developed with reference to the BCC pre-lodgement advice and in compliance with the infrastructure design planning scheme policy, Section 7. The design will seek to avoid off-site impacts to flows and flooding, environmental values or safety risk to persons.

Performance outcomes	Acceptable outcomes	Response
PO2 Development ensures that the stormwater management system and site work does not adversely impact flooding or drainage characteristics of premises which are up slope, down slope or adjacent to the site.	**AO2.1** Development does not result in an increase in flood level or flood hazard on up slope, down slope or adjacent premises.	Modelling completed as part of the Flood and Coastal Hazard Report (AECOM, 2023) suggest limited impacts to upstream, downstream or adjacent premises.
	AO2.2 Development provides a stormwater management system which is designed in compliance with the standards in the Infrastructure design planning scheme policy.	N/A
PO3 Development ensures that the stormwater management system does not direct stormwater run-off through existing or proposed lots and property where it is likely to adversely	**AO3.1** Development ensures that the location of the stormwater drainage system is contained within a road reserve, drainage reserve, public pathway, park or waterway corridor.	N/A

Performance outcomes	Acceptable outcomes	Response
affect the safety of, or cause nuisance to properties.	**AO3.2** Development provides a stormwater management system which is designed in compliance with the standards in the Infrastructure design planning scheme policy.	N/A
	AO3.3 Development obtains a lawful point of discharge in compliance with the standards in the Infrastructure design planning scheme policy.	Development will retain the existing lawful points of discharge into Brisbane River via the unnamed western creek and the existing northern wastewater treatment plant (located within Ampol property).
	AO3.4 Where on private land, all underground stormwater infrastructure is secured by a drainage easement.	N/A
PO4 Development provides a stormwater management system which has sufficient capacity to safely convey run-off taking into account increased run-off from impervious surfaces and flooding in local catchments.	**AO4.1** Development provides a stormwater conveyance system which is designed to safely convey flows in compliance with the standards in the Infrastructure design planning scheme policy.	N/A
	AO4.2 Development provides sufficient area to convey run-off which will comply with the standards in the Infrastructure design planning scheme policy.	N/A
PO5 Development designs stormwater channels, creek modification works, bridges, culverts and	**AO5** Development ensures the design of stormwater channels, creek	N/A

Performance outcomes	Acceptable outcomes	Response
major drains to protect and enhance the value of the waterway corridor or drainage path for fauna movement.	modifications or other infrastructure, permits terrestrial and aquatic fauna movement.	
PO6 Development ensures that location and design of stormwater detention and water quality treatment: (a) minimises risk to people and property; (b) provides for safe access and maintenance; (c) minimises ecological impacts to creeks and waterways.	**AO6.1** Development locates stormwater detention and water quality treatment: (a) outside of a waterway corridor; (b) offline to any catchment not contained within the development.	Throughout the design process, Ampol has sought to balance the operational and construction requirements with the sensitive environmental of the Project site. The initial location of the construction village and western car park necessitated the construction of a new pedestrian bridge over the mapped waterway corridor. Following consideration of environmental, heritage and flooding matters, the construction village was relocated closer to South Street. This removed the need to disturb the waterway corridor to accommodate the bridge. The current location of the construction village provides greater accessibility to the new processing area for construction workers. The construction village will not be directly located within the banks of the waterway and will be within a disturbed area that is of little ecological value. Furthermore, a Construction Environmental Management Plan (CEMP), suitable erosion and sediment control measures and drainage will be provided to protect nearby receiving waters. In this instance, the construction village is suitably located and minimises impacts to creeks and waterways.
	AO6.2 Development providing for stormwater detention and water quality treatment devices are designed in compliance with the standards in the Infrastructure design planning scheme policy.	Water quality treatment devices are to be designed in compliance with the standards in the infrastructure design planning scheme policy. WSUD features would be designed in accordance with BCC Standard Drawings where applicable, and the proprietary products recommended have been approved for use in the BCC area.

Performance outcomes	Acceptable outcomes	Response
PO7 Development is designed, including any car parking areas and channel works to: (a) reduce property damage; (b) provide safe access to the site during the defined flood event.	**AO7.1** Development (including any ancillary structures and car parking areas) is located above minimum flood immunity levels in Table 9.4.9.3.B, Table 9.4.9.3.C, Table 9.4.9.3.D, Table 9.4.9.3.E and Table 9.4.9.3.F. Note—Compliance with this acceptable outcome can be demonstrated by the submission of a hydraulic and hydrology report identifying flood levels and development design levels (as part of a site-based stormwater management plan).	Modelling for the Flood and Coastal Hazard Report (AECOM 2023) has been done to demonstrate that development is located above flood immunity levels.
	AO7.2 Development including the road network provides a stormwater management system that provides safe pedestrian and vehicle access in accordance with the standards in the Infrastructure design planning scheme policy.	N/A
PO8 Development designs stormwater channels, creek modification works and the drainage network to protect and enhance the environmental values of the waterway corridor or drainage path.	**AO8.1** Development ensures natural waterway corridors and drainage paths are retained.	N/A
	AO8.2 Development provides the required hydraulic conveyance of the drainage channel and floodway, while maximising its potential to maximise	N/A

Performance outcomes	Acceptable outcomes	Response
	environmental benefits and minimise scour. Editor's note—Guidance on natural channel design principles can be found in the Council's publication Natural channel design guidelines.	
	AO8.3 Development provides stormwater outlets into waterways, creeks, wetlands and overland flow paths with energy dissipation to minimise scour in compliance with the standards in the Infrastructure design planning scheme policy.	N/A
	AO8.4 Development ensures that the design of modifications to the existing design of new stormwater channels, creeks and major drains is in compliance with the standards in the Infrastructure design planning scheme policy.	N/A
PO9 Development is designed to manage run-off and peak flows by minimising large areas of impervious material and maximising opportunities for capture and re-use.	**AO9** No acceptable outcome is prescribed.	N/A
PO10 Development ensures that there is sufficient site area to accommodate an effective stormwater management system.	**AO10** No acceptable outcome is prescribed.	N/A

Performance outcomes	Acceptable outcomes	Response
Note—Compliance with the performance outcome should be demonstrated by the submission of a site-based stormwater management plan for high-risk development only.		
PO11 Development provides for the orderly development of stormwater infrastructure within a catchment, having regard to the: (a) existing capacity of stormwater infrastructure within and external to the site, and any planned stormwater infrastructure upgrades; (b) safe management of stormwater discharge from existing and future up-slope development; (c) implication for adjacent and down-slope development.	**AO11.1** Development with up-slope external catchment areas provides a drainage connection sized for ultimate catchment conditions that is directed to a lawful point of discharge.	N/A
	AO11.2 Development ensures that existing stormwater infrastructure that is undersized is upgraded in compliance with the Local government infrastructure plan and the standards in the Infrastructure design planning scheme policy.	N/A
PO12 Development provides stormwater infrastructure which: (a) remains fit for purpose for the life of the development and maintains full functionality in the design flood event; (b) can be safely accessed and maintained cost effectively; (c) ensures no structural damage to existing stormwater infrastructure.	**AO12.1** The stormwater management system is designed in compliance with the Infrastructure design planning scheme policy.	N/A
	AO12.2 Development provides a clear area with a minimum of 2m radius from the centre of an existing manhole cover and with a minimum height clearance of 2.5m.	N/A

Performance outcomes	Acceptable outcomes	Response
PO13 Development ensures that all reasonable and practicable measures are taken to manage the impacts of erosion, turbidity and sedimentation, both within and external to the development site from construction activities, including vegetation clearing, earthworks, civil construction, installation of services, rehabilitation, revegetation and landscaping to protect: (a) the environmental values and water quality objectives of waters; (b) waterway hydrology; (c) the maintenance and serviceability of stormwater infrastructure. Note—The Infrastructure design planning scheme policy outlines the appropriate measures to be taken into account to achieve the performance outcome.	**AO13** No acceptable outcome is prescribed.	N/A
PO14 Development ensures that: (a) unnecessary disturbance to soil, waterways or drainage channels is avoided; (b) all soil surfaces remain effectively stabilised against erosion in the short and long term.	**AO14** No acceptable outcome is prescribed.	N/A
PO15 Development does not increase:	**AO15** No acceptable outcome is prescribed.	N/A

Performance outcomes	Acceptable outcomes	Response
(a) the concentration of total suspended solids or other contaminants in stormwater flows during site construction; (b) run-off which causes erosion either on site or off site.		
Section B—Additional performance outcomes and acceptable outcomes which apply to high-risk development, being one or more of the following: (a) a material change of use for an urban purpose which involves greater than 2,500m^2 of land that: (i) will result in an impervious area greater than 25% of the net developable area; or (ii) will result in 6 or more dwellings. (b) reconfiguring a lot for an urban purpose that involves greater than 2,500m^2 of land and will result in 6 or more lots; (c) operational work for an urban purpose which involves disturbing greater than 2,500m^2 of land.		The proposed site is greater than 2,500m2 therefore the applicant is required to address P016/A016 of the Stormwater Code and prepare a Site Based Stormwater Quality Management Plan with pollutant export modelling using MUSIC (≥ Vers 4) in accordance with Section 7.9.3 of the Infrastructure Design Planning Scheme Policy
PO16 Development ensures that the entry and transport of contaminants into stormwater is avoided or minimised to protect receiving water environmental values. Note—Prescribed water contaminants are defined in the *Environmental Protection Act 1994*. Note—Compliance with the performance outcome should be demonstrated by the submission of a site-based stormwater management plan for high-risk development only.	**AO16** Development provides a stormwater management system which is designed in compliance with the standards in the Infrastructure design planning scheme policy.	A site-based stormwater management plan (SBSMP) has been prepared to assess the impacts and describe mitigation measures for compliance with stormwater treatment (pollutant reduction) targets. Water quality objectives for the post developed case are in accordance with Table B of Appendix 3 of the State Part 9 – Development Codes (Stormwater) Effective 30 June 2014 Planning Policy (DSDIP, 2014) and are identified in the SBSMP.

Performance outcomes	Acceptable outcomes	Response
PO17 Development ensures that: (a) the discharge of wastewater to a waterway or external to the site is avoided; or (b) if the discharge cannot practicably be avoided, the development minimises wastewater discharge through re-use, recycling, recovery and treatment. Note—The preparation of a wastewater management plan can assist in demonstrating achievement of this performance outcome. Editor's note—This code does not deal with sewerage which is the subject of the Wastewater code.	**AO17** No acceptable outcome is prescribed.	N/A - no wastewater discharges