TTW Structural Civil Traffic Façade

Stormwater Management Report

Griffith University HaTRIC

Prepared for Griffith University / 24 March 2026

256048

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV-2026-GCP-4617

Date: 02.06.2026

Queensland Government

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Contents

1.0 The Site

1.1 General

The HaTRIC site is located within the Gold Coast Health and Knowledge Precinct and is designated as a Special development area precinct.

The site was utilised by Translink as a bus layover facility and then as a bus station during the 2018 Commonwealth Games. Since then, it has been used as a short-term construction base for surrounding works within the Commonwealth Games Village precinct.

The existing site is approximately 90% hardstand with an asphalt surface. The hardstand area generally grades toward the south-east with a gradient of approximately 6%. A large, raised strip of asphalt has been placed along the eastern boundary. This section is approximately 200mm higher than the remainder of the hardstand and is bound by a concrete v-drain along the eastern boundary.

The western frontage with Parklands Drive has a grassed embankment that grades down to the hardstand at the northern end and a flatter section at the southern end with an electrical substation. The northern boundary is bound by Nexus Way with a fully formed asphalt pavement, kerb and channel and a full width concrete footpath. The eastern frontage is bound by Bonner Street that has a fully formed asphalt pavement, kerb and channel, recessed parking bays and a 1.5m wide strip footpath. The southern frontage is bound by Knowledge Street that has a fully formed asphalt pavement, kerb and channel, large sealed driveway crossing and a short section of 1.5m wide strip footpath on the eastern end of the crossing.

The site is fully serviced with stormwater, sewer and water connections to the south-east corner of the existing site.

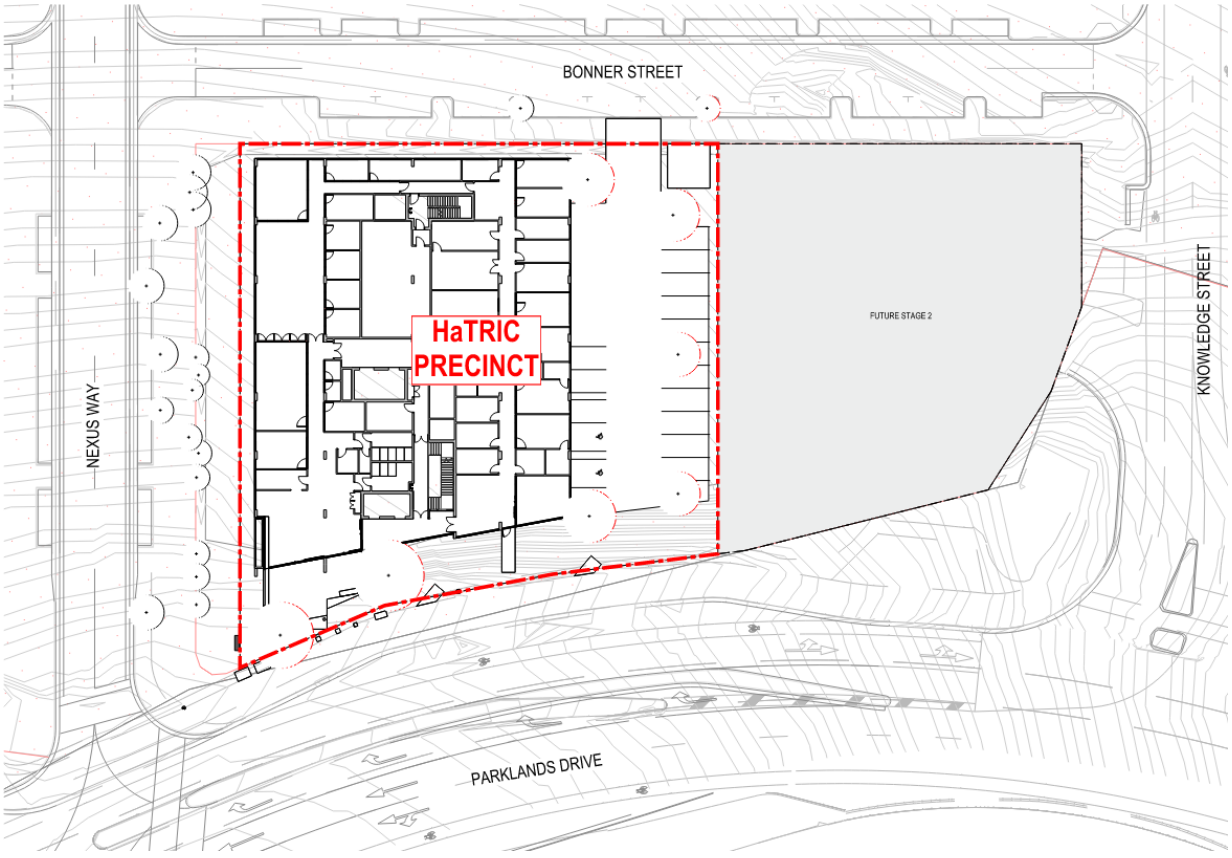


Figure 1: Proposed Site Plan

1.2 Site Constraints

The major constraints identified include –

- Existing service connections are located adjacent to the future Stage 2 works area;
- Retention structures will be required along the Nexus Way and Parklands Drive frontages;
- The proposed vehicular access from Bonner Street will reduce the number of on-street parking spaces

2.0 Geotechnical Conditions

2.1 Geotechnical Investigations

Reference should be made to the geotechnical investigation report prepared by Butler Partners dated 2 May 2019 (Report 018-172A) included in Appendix A. This report provides input values for erosion and sediment control parameters, earthworks batter stability and subgrade strength for civil engineering design.

2.2 Typical Ground Conditions

Table 1 provides a summary of ground conditions on the site as per Butler Partners investigations. It was further noted that 'strength inversions' (i.e. weaker material underlying stronger material) were encountered in the soil and rock at a number of locations. The proposed development is to have a ground floor at RL20.5 AHD, with perimeter retention required to the Parklands Drive, Nexus Way and Bonner Street elevations.

Table 1: Summary of Subsurface Conditions

Reduced Level of Base of Layer (m)	Description
RL18.0 to RL22.5	**PAVEMENT GRAVEL** – a fill layer of pavement gravel (between 0.5m and 1.3m thick) was generally encountered underlying a 100mm to 200mm thick bituminous concrete surface in all bores. A second layer of bituminous concrete was encountered in Bore 1 at 0.3m depth approximately.
RL16.3 to RL20.0	**CLAYEY SILT** – encountered only in Bores 4 to 6 underlying the fill (or interbedded with metasiltstone rock in Bore 7) and varying in strength between very stiff and hard.
–	**METASILTSTONE** – extremely weathered, extremely low to low strength.

Table 1 - Excerpt from Butler Partners Geotechnical Investigation Report 018-172A dated 2 May 2019

2.3 Groundwater

Butler Partners Geotechnical Investigation Report 018-172A dated 2 May 2019 noted that free groundwater was not encountered during bore hole drilling. Groundwater observations made in the groundwater monitoring well at RL14.3m. The report notes that it would be prudent to confirm groundwater levels prior to construction.

3.0 Existing Infrastructure

3.1 Existing

The HaTRIC site is fully serviced with stormwater, sewer and water connections to the south-east corner of the existing site.

Existing stormwater infrastructure surrounds the HaTRIC site. The site is serviced by a grated inlet pit at the south-east corner of the site that connects to a gully pit at the corner of Bonner Street and Knowledge Street with a 450mm diameter stormwater pipe. The existing inlet pit provides a lawful point of discharge for the site as a whole.

4.0 Stormwater Drainage

4.1 Quantity

The stormwater drainage pipe sizing for site drainage has been designed in accordance with QUDM for a 10% AEP 5 minute rainfall event with overland flow designed for a 1% AEP event. (The QUDM requirement is greater than the GU design guideline)

The existing and proposed site plans shown on Sketches 256048-TTW-00-SK-CI-0021 and 256048-TTW-00-SK-CI-0022 identify the total impervious and pervious areas in the existing (pre-development) and proposed (post-development) scenarios. The peak design discharges from all AEP design events from 63% AEP to 1% AEP are listed below in Tables 2 and 3 for the pre-development and post-development conditions. A comparison of the peak discharges is shown in Table 4 that identifies that the peak discharge in the post-development scenario will be less or equal to the pre-development flows in all design events.

As there is no increase in runoff predicted from the site, it is not proposed to provide any detention on the development site.

PRE-DEVELOPMENT FLOWS

Catchment Design Flows						
Storm (AEP)	**Area (ha)**	**Fraction Impervious (fi)**	**tc (min)**	**Rainfall Intensity (mm/hr)**	**Coefficients of Runoff (C)**	**Q (m3/s)**
63.2%	0.4381	0.82	5.0	144.5	0.69	0.121
39.3%	0.4381	0.82	5.0	181.0	0.73	0.162
18.1%	0.4381	0.82	5.0	226.2	0.82	0.226
10%	0.4381	0.82	5.0	262.0	**0.86**	0.275
5%	0.4381	0.82	5.0	301.6	0.91	0.333
2%	0.4381	0.82	5.0	355.9	0.99	0.430
1%	0.4381	0.82	5.0	398.2	1.00	0.485

Table 2 – Pre-Development Flows for Stormwater Design Events

POST-DEVELOPMENT FLOWS

Catchment Design Flows						
Storm (AEP)	**Area (ha)**	**Fraction Impervious (fi)**	**tc (min)**	**Rainfall Intensity (mm/hr)**	**Coefficients of Runoff (C)**	**Q (m3/s)**
63.2%	0.4381	0.77	5.0	144.5	0.68	0.120
39.3%	0.4381	0.77	5.0	181.0	0.73	0.160
18.1%	0.4381	0.77	5.0	226.2	0.81	0.223
10%	0.4381	0.77	5.0	262.0	**0.85**	0.272
5%	0.4381	0.77	5.0	301.6	0.90	0.329
2%	0.4381	0.77	5.0	355.9	0.98	0.425
1%	0.4381	0.77	5.0	398.2	1.00	0.485

Table 3 – Post-Development Flows for Stormwater Design Events

FLOW COMPARISONS

Storm (AEP)	Pre-Development Flow	Post-Development Flow	Difference Q (m3/s)
63.2%	0.121	0.120	-0.001
39.3%	0.162	0.160	-0.002
18.1%	0.226	0.223	-0.002
10%	0.275	0.272	-0.003
5%	0.333	0.329	-0.004
2%	0.430	0.425	-0.005
1%	0.485	0.485	0.000

Table 4 – Comparison of Pre=-Development and Post-Development Flows for Stormwater Design Events

The downstream stormwater drainage network at the corner of Bonner Street and Knowledge Street has been designed to cater for the developed flows.

To provide an independent legal point of discharge to the existing drainage network in Bonner Street for the HaTRIC site it has been proposed to construct a new stormwater main in Bonner Street to service the HaTRIC site directly. This will negate the requirement to place an underground pipe in the future stage area that would restrict any future development and require an easement if the site were to be subdivided.

4.2 Quality

4.2.1 Water Quality Objectives

The proposed development will require site stormwater treatment to meet the state water quality objectives within the State Planning Policy (SPP-July 2017).

Pollutant	Load Based Reduction Target (%)
Total suspended solids	80
Total phosphorus	60
Total nitrogen	45
Gross pollutants	90

Table 5 – Adopted Water Quality Objectives

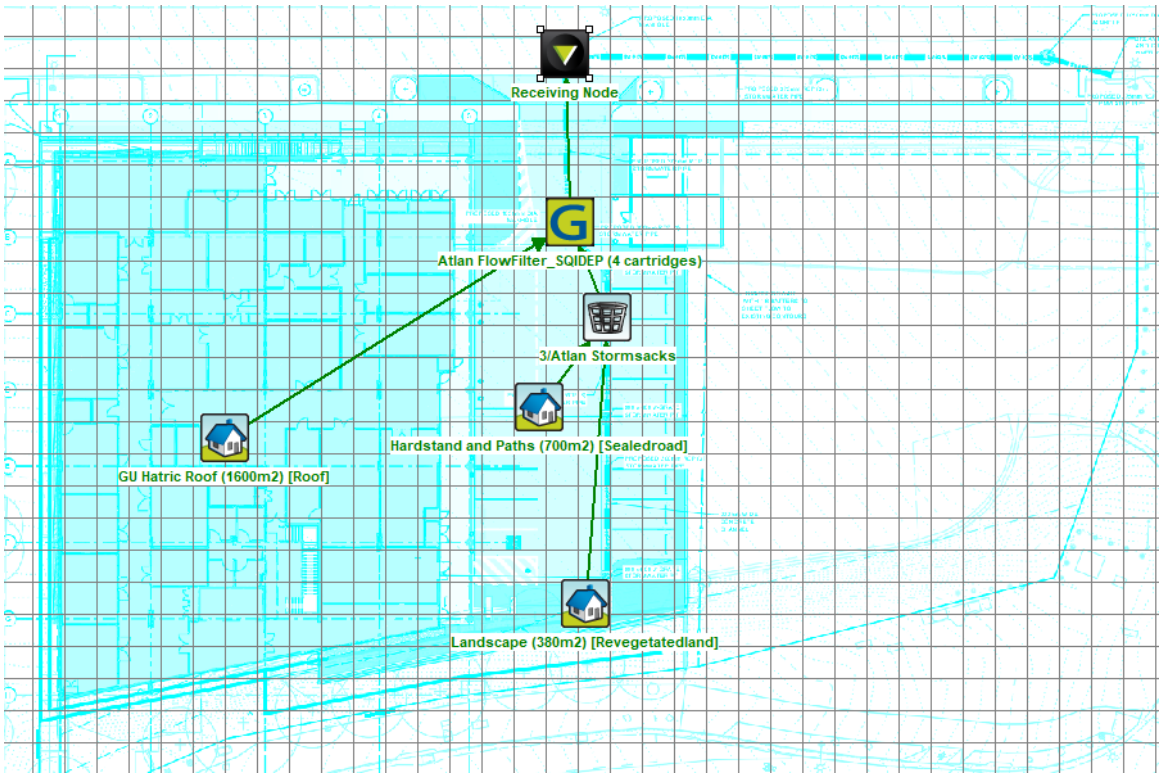
Based upon the proposed development characteristics it is proposed to that the stormwater quality treatment be:

- A series of proprietary water quality devices from companies such as ATLAN FlowFilters and Stormsacks.

4.2.2 Treatment System

In order to satisfy the water quality objectives, the current area requires stormwater quality treatment to help treat the stormwater runoff generated by the site. The MUSIC model layout is shown below:

Figure 1 – MUSIC Treatment Train Model



4.2.3 Model Results

The predicted average pollutant loads discharging from the site are detailed in the table below. The results indicate that the proposed stormsacks and filters will provide sufficient treatment to meet the State Water Policy water quality objectives.

Pollutant	Source Load	Residual Load	Achieved Reduction (%)	Required Reduction (%)
Proposed Treatment Conditions				
Flow (ML/yr)	2.88	2.88	0	0
Total Suspended Solids (kg/yr)	368	31.8	91.3	80
Total Phosphorous (kg/yr)	0.864	0.108	87.5	60
Total Nitrogen (kg/yr)	6.74	3.55	47.3	45
Gross Pollutants (kg/yr)	63.4	1.41	97.8	90

Table 6 – Estimated Annual Pollutant Loads

5.0 Construction Phase Management

5.1 Water Quality Controls

The likely pollutants during the construction phase will be:

Pollutant	Sources
Litter	Paper, construction packaging, food packaging, cement bags, off cuts.
Sediment	Unprotected exposed soils and stockpiles during earthworks and building.
Hydrocarbons	Fuel and oil spills, leaks from construction equipment.
Toxic materials	Cement slurry, asphalt prime, solvents, cleaning agents, washwaters (e.g. from tile works).
PH altering substances	Acid sulphate soils, cement slurry and wash waters.

Table 7 – Pollutants Typically Generated During the Construction Phase

There are no specific WQO levels for the construction phase so control and minimisation of pollutants will be provided as per the list below of general water quality controls to be implemented for this stage of the development:

- A single wash-down area and entry/exit pad will be provided at the construction site entrance to minimise the amount of sediment being tracked off the site.
- Sediment fences are to be installed upstream and downstream of all disturbed areas and stockpiles prior to earthworks commencing.
- All freshwater upstream of disturbed areas and stockpiles is to be diverted around the disturbed area to minimise the amount of sediment mobilisation.
- Diversion of freshwater around the roadway construction will consist of a sediment fence running parallel to the roadway on both sides with straw bale check dams at no more than 15m intervals and at the entry point of existing gully pits.
- Buffer zones around the perimeter of the site shall remain grassed prior to landscaping so as to reduce sediment transport.
- Stockpiles and storage areas shall be located on flat ground away from areas subject to concentrated runoff. Perimeter banks, catch drains or sediment fences shall be constructed upstream and downstream of all stockpiles to protect them from upstream runoff and trap sediments respectively.
- Monitoring of new stormwater drains and infrastructure (including the stormwater quality improvement devices) to ensure they are free of sediment and debris.
- Monitoring of new stormwater drains and infrastructure (including the stormwater quality improvement devices) to ensure they are free of sediment and debris.
- The Contractor will engage the services of a sub-contractor to provide on-going maintenance
- Topsoil and grass seed shall be applied to the disturbed areas and maintained until well established as soon as possible after the completion of the works

5.2 Maintenance Plans

Maintenance during the construction and defects liability period will be carried out routinely and will involve the following duties:

- Emptying any on-site refuse bins.
- Cleaning up any oil and grease spills on the road or pavement with suitable materials such as absorbents, bunds, handling equipment and then ensure proper disposal.
- Maintaining the footpath and open spaces by replacing dead plants and topping up mulching when necessary.
- Generally keeping the paved areas and gully grates free of debris.
- Stormwater gully pits and improvement devices to be checked every week and within 24 hours of expected rain and within 18 hours after every rainfall event.

5.3 Maintenance Plans

Key stormwater quality improvement devices requiring maintenance during the operational phase of the project are the landscaped buffer areas, rainwater tank and the bio-retention devices. Detailed procedures for the maintenance of these devices are to be contained in an Operational Management and Maintenance Report.

Maintenance requirements for landscaped areas consist of:

- Regular visual inspections at monthly maximum intervals to ensure:
  - Sufficient vegetation
  - No erosion has occurred
  - Any clean-up is undertaken.
- Additional inspections are required between 24 hours and 72 hours after the cessation of rainfall if the total rainfall on any day exceeds 30mm.
- Regular mowing/harvesting to ensure vegetation is maintained at acceptable levels
- Removal of litter

Maintenance of the bio-retention system consists of:

- Regular visual inspections of the filter baskets and stormfilters devices at monthly maximum intervals to ensure
  - No clogging has occurred
  - Any clean-up is undertaken.
- Additional inspections are required between 24 hours and 72 hours after the cessation of rainfall if the total rainfall on any day exceeds 30mm.
- Removal of litter within the chamber as required

6.0 Water Quality Monitoring Program

The critical issue during construction is sediment control, although the discharge of trash and gross pollutants will also need to be managed. Monitoring will be aimed at these pollutants with regular inspections required, particularly after rainfall events.

The operational monitoring will consist of monitoring the condition of the rainwater tank in accordance with the manufacturer's specifications and visual inspection of the stormwater structures, silt fences and sediment control devices.

7.0 Design Criteria

7.1 Design Standards

The civil engineering design will be in accordance with the latest revision of all relevant Australian Design Standards, Codes and other statutory Authority requirements. As a minimum requirement, the design shall be based on, but not limited to;

- Griffith University Design Guidelines
- Gold Coast City Council - Policy 11: Land Development Guidelines
- Queensland Urban Drainage Manual
- Institution of Engineers Australia. 1996, Soil Erosion and Sediment Control, Engineering Guidelines for Queensland Construction Sites. June 1996.
- AS 3798 - Guidelines on Earthworks for Commercial and Residential Developments
- AS 3500.3 - Stormwater Drainage
- AS 2890.1 - Off Street car parking
- AS 2890.2 - Commercial Parking Facilities
- AS 1742 - Manual of Uniform Traffic Control Devices.

Prepared and Authorised by

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Technical Director

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Appendix A

Geotechnical Report

Butler Partners Geotechnical Investigation Report 018-172A dated 2 May 2019

Appendix B

Civil Developed Design Drawings

BONNER STREET

8.0

LEGEND

IMPERVIOUS SURFACE = 3579m²

PERVIOUS SURFACE = 802m²

PARKLANDS DRIVE

NOT FOR CONSTRUCTION

0.0 3.0 6.0 9.0 12.0m
1:150 A1 1:300 A3

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Rev	Description	Eng Draft	Date

Rev	Description	Eng Draft	Date

Rev	Description	Eng Draft	Date

Client: GRIFFITH UNIVERSITY

Engineer: TTW www.ttwengineers.com

Project: GRIFFITH UNIVERSITY HATRIC GOLD COAST HEALTH & KNOWLEDGE PRECINCT

Drawing Title: DRAINAGE SURFACE PLAN EXISTING

Scale at A1	Drawn	Designed	Approved
1:150	OR	JO	JO

Project No	Originator	Zone	Type	Role	Sheet No.	Rev
256048	TTW	00	SK	CI	00021	

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BONNER STREET

PARKLANDS DRIVE

CANOPY BELOW

RL+43.500

CONCEALED EAVES GUTTER

RL+19.350

METAL PITCHED ROOF

5°

RL+24.327

OUTDOOR PLANT BELOW

RL+43.079

SAFETY LINE FOR ACCESS TO TANKED ROOF TERRACES

METAL PITCHED ROOF

LINE OF LOUVRED SCREEN

RL+42.750

8.0

5.4

2.6 TYP.

LEGEND

IMPERVIOUS SURFACE = 3379m²

PERVIOUS SURFACE = 1002m²

0.0 3.0 6.0 9.0 12.0m
1:150 A1 1:300 A3

AMENDED IN RED
By: Elizabeth Piper
Date: 29/05/2026

Queensland Government

NOT FOR CONSTRUCTION

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Rev	Description	Eng Draft	Date

Client: GRIFFITH UNIVERSITY

Engineer: TTW www.ttwengineers.com

Project: GRIFFITH UNIVERSITY HATRIC GOLD COAST HEALTH & KNOWLEDGE PRECINCT

Drawing Title: DRAINAGE SURFACE PLAN PROPOSED

Scale at A1	Drawn	Designed	Approved
1:150	OR	JO	JO

Project No	Originator	Zone	Type	Role	Sheet No.	Rev
256048	TTW	00	SK	CI	00022	

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