

Environmental Assessment Report

Department of Education
6 Full Cohort Program – Lowood State High School

July 2018



Document history

| Version | Date | Status | Key changes made | Author/s | Reviewer/s |
|----------------|-------------|---------------|-------------------------|-----------------|-------------------|
| 1.0 | 26/06/2018 | Draft | Document development | CS | CH |
| 1.1 | 26/07/2018 | Final | For Issue | CS | NW |

Abbreviations

| | |
|--------|--|
| AHD | Australian Height Datum |
| ANEF | Australian Noise Exposure Forecast |
| ARI | Average Recurrence Interval |
| AS | Australian Standards |
| ASS | Acid Sulfate Soils |
| BCA | Building Code of Australia |
| CLR | Contaminated Land Register |
| DES | Department of Environment and Science |
| DHPW | Department of Housing and Public Works |
| DoE | Department of Education |
| DSDMIP | Department of State Development, Manufacturing, Infrastructure and Planning |
| DTMR | Department of Transport and Main Roads |
| EMR | Environmental Management Register |
| EPA | <i>Environmental Protection Act 1994</i> |
| EPBC | <i>Environmental Protection and Biodiversity Conservation Act 1999 (Cth)</i> |
| GFA | Gross Floor Area |
| NCA | <i>Nature Conservation Act 1992</i> |
| PA | <i>Planning Act 2016</i> |
| PR | <i>Planning Regulation 2017</i> |
| PWD | People with Disability |
| QDC | Queensland Development Code |
| SEQRP | South East Queensland Regional Plan |
| SEQ | South East Queensland |
| SHS | State High School |
| SPP | State Planning Policy |
| SRC | Somerset Regional Council |
| VMA | <i>Vegetation Management Act 1999</i> |

Table of Contents

| | |
|---|-----------|
| PART A – EXECUTIVE SUMMARY | 6 |
| 1 Infrastructure Proposal..... | 6 |
| PART B – INTRODUCTION | 9 |
| 2 Legislative Context | 10 |
| 2.1 The Planning Act 2016 | 10 |
| PART C – SITE DETAILS | 11 |
| 3 Subject Site..... | 11 |
| 3.1 Property Snapshot | 11 |
| 3.2 Ownership and Tenure | 11 |
| 3.3 Location | 11 |
| 3.4 Surrounding Land Uses | 11 |
| 3.5 Easements and Encumbrances | 11 |
| 3.6 Topography | 13 |
| 3.7 Socio-economic Profile | 13 |
| 4 Infrastructure Characteristics | 14 |
| 4.1 Transport Network | 14 |
| 4.2 Services | 14 |
| PART D – DESIGNATION PROPOSAL | 16 |
| 5 Proposed Designation | 16 |
| 5.1 Description under the Planning Regulation 2017 | 16 |
| 5.2 Intent of Designation | 16 |
| 5.3 Project History | 16 |
| 5.4 Site Selection | 17 |
| 5.5 Proposal Description and Details | 17 |
| 5.6 Designation Process | 19 |
| PART E – LOCAL AND STATE PLANNING PROVISIONS..... | 20 |
| 6 Planning Assessment | 20 |
| 6.1 Local Planning Framework | 20 |
| 6.2 Planning Scheme Provisions | 20 |
| 6.3 Use Definition | 20 |
| 6.4 Zoning | 21 |

| | | |
|--|---------------------------------|-----------|
| 6.5 | Overlays | 22 |
| 7 | State Planning Framework | 24 |
| 7.1 | The Planning Act 2016 | 24 |
| 7.2 | State Planning Policy | 24 |
| 7.3 | Regional Planning | 28 |
| PART F – ENVIRONMENTAL ASSESSMENT | | 30 |
| 8 | Environmental Assessment | 30 |
| 8.1 | Road Infrastructure | 30 |
| 8.2 | Services Infrastructure | 34 |
| 8.3 | Flora and Fauna | 37 |
| 8.4 | Soils and Geology | 40 |
| 8.5 | Heritage and Native Title | 42 |
| 8.6 | Natural Hazards | 43 |
| 8.7 | Socio-economic Impacts | 44 |
| 8.8 | Construction Impacts | 44 |
| 8.9 | Operational Impacts | 47 |
| PART G – CONSULTATION | | 50 |
| 9 | Consultation Engagement | 50 |
| 9.1 | Stakeholders | 50 |
| 9.2 | Community Engagement Plan | 50 |
| 9.3 | Initial Consultation | 51 |
| PART H – CONCLUSION | | 53 |
| PART I – APPENDICES | | 54 |

PART A – EXECUTIVE SUMMARY

1 Infrastructure Proposal

With reference to section 36(3) of the *Planning Act 2016*, the below sets out the matters required as part of the Infrastructure Proposal, and prepared in accordance with the Minister's Guidelines and Rules, Chapter 7—Guidelines for the process for environmental assessment and consultation for making or amending a Ministerial designation.

| Matter | Proposal Details | |
|---|--|--|
| a) the site description including the location of the premises proposed to be designated; | Real property description: | Lot 89 on CC3323 |
| | Property address: | Prospect Street, Lowood |
| | Registered owner: | The State of Queensland (represented by the Department of Education) |
| | Tenure: | Freehold |
| | Site area: | 7.765 ha |
| | Google Earth co-ordinates: | Lat: -27.468498° Long: 152.582692° |
| b) any existing uses on the premises proposed to be designated; | Lot 89 on CC3323 is currently improved with the existing Lowood SHS. | |
| c) existing uses on adjoining sites; | Existing uses on adjoining sites include: <ul style="list-style-type: none"> • North: Prospect Street • East: Urban Utilities Depot • South: Vacant grazing land • West: Low density residential properties | |
| d) the type of infrastructure; | 6 educational facilities | |
| e) information about the nature, scale and intensity of the infrastructure and each use proposed; | <i>Drawings at Appendix 5 – Proposal Plans</i> | |
| f) the intended outcomes of the proposed uses on the site; | <p>In 2007 the non-compulsory Prep Year was introduced to Queensland schools and in the following year the Year 1 starting age was subsequently raised. Consequently, a smaller cohort of students, often referred to as the half cohort, was introduced to Queensland state schools.</p> <p>Over the following years this cohort of students has increased in size and across the state schooling sector now reflects approximately two thirds the size of a usual year level cohort.</p> <p>In 2015, this smaller cohort of students entered Year 8 along with the first group of Year 7 students in secondary schools as part of the Flying Start suite of reforms. The half cohort, currently in Year 10, will enter Senior Secondary in 2018 and will exit the system at the end of the 2019 school</p> | |

| | | |
|---|--|--|
| | <p>year, creating six full cohorts across secondary schools for the first time in 2020.</p> <p>An analysis of infrastructure requirements for 2020 indicates additional capacity is needed in a number of schools across the State, including Lowood State High School. To accommodate the six full cohorts in 2020, it is proposed to provide the school with a new Learning Centre incorporating a number of learning spaces and associated spaces</p> | |
| <p>g) any anticipated impacts on the surrounding infrastructure network (both state and local);</p> | <p>Nil. Impacts on surrounding infrastructure will be fully explored in the Environmental Assessment Report (EAR).</p> | |
| <p>h) a list of the applicable state interests as identified by the infrastructure entity and a statement about how they relate to the infrastructure proposal;</p> | <p>BIODIVERSITY</p> <ul style="list-style-type: none"> • MSES – Regulated vegetation (intersecting a watercourse) | <p>Two watercourse traverse the site which are identified as containing regulated vegetation (intersecting a watercourse).</p> <p>The proposed Manual Arts Building and future two space demountable building is not within the MSES identified area.</p> |
| | <p>CULTURAL HERITAGE</p> | <p>The proposed development is located within an area subject to previous clearing, therefore, the nature of the activity is likely to be classified as ‘area previously subject to significant disturbance – Category 4’, under the <i>Aboriginal Cultural Heritage Act 2003</i> (ACHA), section 28 Duty of Care Guidelines. Subject to measures set out in paragraph 5.6 – 5.12, under Category 4 of the Duty of Care Guidelines, the proposed activates can proceed without further cultural heritage assessment.</p> <p>It should be noted that any Aboriginal cultural heritage, if found, is protected under the ACHA even if DES has not recorded it. Contract documents will include provisions for works to cease and the relevant Aboriginal Party to be contacted if evidence of Aboriginal cultural heritage is encountered during site works.</p> |
| | <p>WATER QUALITY</p> <ul style="list-style-type: none"> • Water supply buffer area • Water resource catchment | <p>The site is in the water supply buffer area and water resource catchment area.</p> <p>A stormwater management plan has been prepared and included at Appendix 11.</p> |
| | <p>NATURAL HAZARDS RISK AND RESILIENCE</p> <ul style="list-style-type: none"> • Flood hazard area – Local Government flood mapping area | <p>With reference to the Planning Scheme the site is not identified within any flood hazard overlay and no impacts are therefore anticipated.</p> |
| | <p>Refer to Appendix 6 – State Interest Trigger Maps</p> | |

| | |
|---|---|
| <p>i) a statement about any relevant regional plans and state development areas that are applicable to the site and how they are relevant to the infrastructure proposal;</p> | <p>The relevant regional plan is the South East Queensland Regional Plan. The site is in the Urban Footprint land use category. The site is not included in a state development area.</p> <hr/> <p>Refer to Appendix 6 – State Interest Trigger Maps</p> |
| <p>j) sufficient information to address the requirements of section 36(1) of the Act;</p> | <p>The proposed infrastructure meets the criteria in section 36 of the <i>Planning Act 2016</i> as the infrastructure will satisfy budgetary commitments for the supply of infrastructure.</p> <p>Refer to the Capital Statement 2017-18 for the funding commitments relating to the <i>Six Full Cohorts – 2020 Ready</i> program: https://s3.budget.qld.gov.au/budget/papers/3/3-Capital-outlays-by-entity.pdf</p> |
| <p>k) a proposed consultation strategy for the proposed designation that has taken into account the level of impact of the infrastructure proposal and that includes a method for consultation with directly affected landowners, adjoining landowners, and identified Native Title parties, differentiated from general public consultation;</p> | <p>Refer to Part G – Consultation</p> |
| <p>l) any other matter the infrastructure entity considers relevant to the request.</p> | <p>Nil</p> |

PART B – INTRODUCTION

In accordance with the requirements of the *Planning Act 2016* (PA), it is proposed to undertake an Infrastructure Designation of land within the Somerset Regional Council (SRC) local government area on behalf of the Department of Education (DoE) for the Lowood State High School (SHS).

The proposed designation applies to land located at 34 Prospect Street, Lowood and alternatively described as Lot 89 on CC3323.

In accordance with *Six Full Cohorts – 2020 Ready* program, the Queensland Government is committed to building fit for purpose learning environments that support educational outcomes. The program provides a capital investment of \$250 million over two years for new classrooms and other infrastructure in the State's secondary schools. The purpose of this is to cater for the 17,000 additional students expected by the 2020 calendar year.

The following scope of works is proposed at Lowood SHS:

- construction of a new Manual Arts Building;
- a vehicle link to the Manual Arts Building via the existing track within the school; and
- provide covered link access from the new building to the spine of the school.

The proposed works are intended to future proof the school while providing facilities that improve the amenity of the Lowood SHS consistent with current standards and sited with consideration of the functionality of the buildings, and connection with existing and planned future buildings.

Building and Asset Services' (BAS) Town Planning Unit has prepared this Environmental Assessment Report (EAR) to provide information in the assessment of the proposed Ministerial designation of land for community infrastructure.

2 Legislative Context

2.1 The Planning Act 2016

A list of infrastructure is set out in Schedule 5 of the *Planning Regulation 2017* (PR).

The PA prescribes the way in which a designation can be undertaken. Chapter 2, Part 5 of the PA (refer **Appendix 1**) prescribes that a Minister, before designating land for infrastructure, must be satisfied that for development the subject of the proposed designation:

- the infrastructure will satisfy statutory requirements, or budgetary commitments, for the supply of the infrastructure; or
- there is or will be a need for the efficient and timely supply of the infrastructure.

One way in which the requirements for adequate environmental assessment and public consultation may be met is for the assessment of the proposal to be carried out in accordance with the guidelines made by the chief executive under the PA, section 36(3). The applicable guideline is the *Minister's Guidelines and Rules* (July 2017) and is available at <https://www.statedevelopment.qld.gov.au/>. In particular, Chapter 7—Guidelines for the process for environmental assessment and consultation for making or amending a Ministerial designation outlines the five-step process which includes:

1. Planning and Preparation;
2. Minister's Acknowledgement;
3. Draft Environmental Assessment Report;
4. Consultation and State Interest Review; and
5. Finalise Environmental Assessment.

It is noted that BAS has held pre-lodgement discussions with the Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP) regarding an alternative designation process to that described above. It is recognised the proposed development is considered 'low risk' and as such a streamlined approach has been agreed and includes:

1. Pre-lodgement Meeting;
2. Environmental Assessment Report;
3. Consultation and State Interest Review; and
4. Final Assessment and Minister Decision.

The EAR has been drafted in accordance with the Chapter 7 of the *Minister's Guidelines and Rules* and has been prepared to generally align with Step 2 of the alternative designation process.

The effect of a Ministerial designation is that the use of the site for the described community infrastructure and services may proceed despite the local government's planning scheme.

This designation will be undertaken in accordance with Chapter 2, Part 5 of the PA.

PART C – SITE DETAILS

3 Subject Site

3.1 Property Snapshot

| Site Overview | |
|----------------------------|--|
| Street Address | 34 Prospect Street, Lowood |
| Real Property Description | Lot 89 on CC3323 |
| Site Area | 7.765 ha |
| Local Government Authority | Somerset Regional Council |
| Current Land Use | Educational Establishment |
| Regional Plan | South East Queensland Regional Plan 2017 |

3.2 Ownership and Tenure

The allotment is freehold and owned by the State of Queensland (represented by the Department of Education and Training).

3.3 Location

The site is located within the Somerset Regional Council local government area. As illustrated in Figure 1 and Figure 2, the site consists of a single allotment with an area of 7.765 hectares.

The site is currently improved with the Lowood SHS, which from DoE records was established in 1983 and comprises of various school buildings, ancillary outbuildings/ structures and infrastructure with a street frontage of 271m to Prospect Street.

3.4 Surrounding Land Uses

The school is boarded by Prospect Street on the northern boundary, with Lowood State Primary School on the northern side of Prospect Street.

The western boundary of the school interfaces low-density residential lots, three of which are vacant and 11 improved with low set residential dwellings.

The eastern boundary is shared with an Urban Utilities Depot and large vacant lot, and the southern boundary is shared with a large lot uses for grazing land.

3.5 Easements and Encumbrances

There are no easements or encumbrances burdening the site.

A copy of the Certificate of Title, Survey Plan and Smart Map is in **Appendix 3** for reference.



Figure 1. Site Aerial

Source: DSDMIP SARA

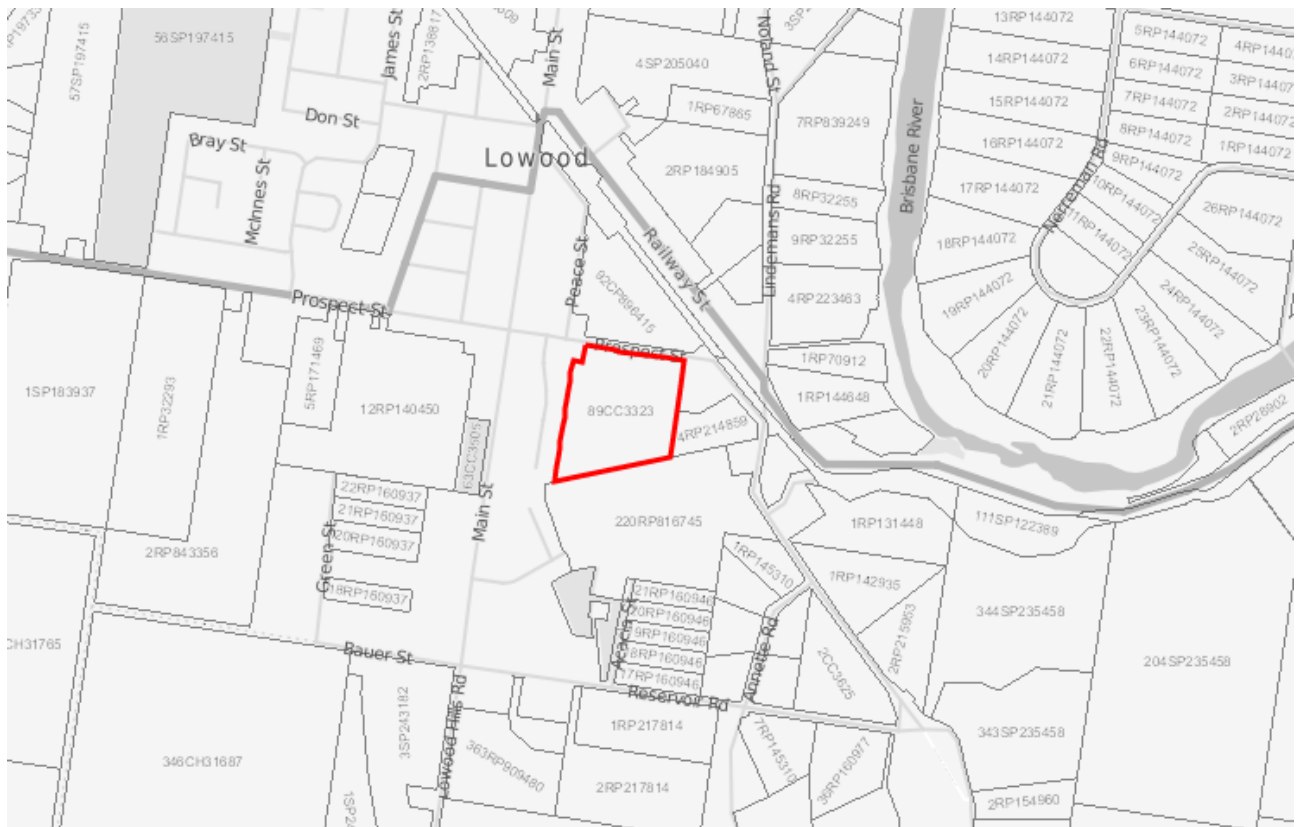


Figure 2. Site Context

Source: DSDMIP SARA

3.6 Topography

The subject site has a fall of approximately 20m across the site. The highest point is at the south-western corner at 70m AHD, with the lowest point at the north-eastern corner, being 50m AHD.



Figure 3. Site Contours

Source: Queensland Globe, 2016

A contour and detail survey of the development area is included in **Appendix 4** for reference.

3.7 Socio-economic Profile

3.7.1 Somerset Regional Council Local Government Area Profile

Somerset Regional Council local government area (LGA) is located within the South East Queensland Region of Queensland. Neighbouring LGAs include Ipswich, Brisbane, Lockyer Valley, Moreton Bay, Sunshine Coast, Gympie and South Burnett.

The Somerset LGA has a resident population of approximately 24,597 persons (as at the 2016 Census date).

3.7.2 Lowood Profile

Lowood is a township located approximately 30km north-west of Ipswich and 65km west of the Brisbane CBD. As at the 2016 Census, 14,052 people were recorded as residing in Lowood.

The median age of people in Lowood is 39 years. Children aged 0–14 made up 22.6% of the population and people aged 65 and over made up 15.2% of the population, respectively.

Of the families in Lowood, 42.2% were couple families with children, 38.2% were couple families without children and 18.2% were one parent families.

4 Infrastructure Characteristics

The below provides a description of the existing infrastructure characteristics relating to the subject site. Further discussion on potential impacts and mitigation measures from the proposed development are discussed in further detail in Part F – Environmental Assessment.

4.1 Transport Network

4.1.1 Existing Road Network

The site has road frontage of 271m to Prospect Street, which is identified as a minor road. Prospect Street intersects with Main Street approximately 200m from the school boundary. Both Prospect Street and Main Street connect to Glamorgan Vale Road, which links up with the Brisbane Valley Highway.

4.1.2 Existing Public Transport Network

There is one existing bus stop located 1.1km north of the Lowood SHS, on Railway Street. The bus stop is serviced by Route 529 which runs to Ipswich Central.

Further to the above, the school also provides dedicated bus services for the school population, and services the following areas:

| Bus Services | | |
|--------------|---|---------------------------------------|
| Route ID | Servicing | Frequency |
| 21 | Fernvale, Dundas | one (1) morning and afternoon service |
| 9 | Patrick Estate, Willaura Drive/ Gatton Esk Road | one (1) morning and afternoon service |
| 17 | Fernvale, Glamorgan Vale, Marburf | one (1) morning and afternoon service |
| 18 | Brisbane Valley, Honeywood Estate Fernvale | one (1) morning and afternoon service |
| 3 | Blue Gum Drive, Mt Tarampa, Lockyer Waters | one (1) morning and afternoon service |
| 1 | Atkinson Dam, Coominya, Clarendon | one (1) morning and afternoon service |
| 2 | Eagle Rise, Rifle Range, Clarendon | one (1) morning and afternoon service |
| 8 | Tarampa, Prenzlau, Minden | one (1) morning and afternoon service |
| 14 | Brightview, Lockrose, Regency Downs | one (1) morning and afternoon service |
| 16 | Wivenhoe Pocket, Brookside Estate Fernvale | one (1) morning and afternoon service |
| 20 | Fernvale Old Estate | one (1) morning and afternoon service |

4.1.3 Existing Active Transport Network

An existing footpath is provided along the Prospect Street frontage of the school, continuing to Main Street and leading to the town of Lowood.

Most higher order roads within 800m of the subject site (i.e. 10-minute walking distance) have a concrete footpath on at least one side. There is a children's crossing on Prospect Street in proximity to the main pedestrian access to the subject site.

Key active transport related matters noted during our inspection are summarised below:

- some sections of Prospect Street that are used for student set-down / pick-up are not located adjacent to footpaths;

- a crossing guard is only stationed at the Prospect Street children's crossing for short periods (i.e. around the start and end of school each day) however students cross Prospect Street throughout the day as the school utilises the Hall which is located at Lowood State School which is located on the northern side of Prospect Street; and
- no formalised cycle infrastructure is provided on the existing road network; however, there is sufficient width to accommodate cyclists.

4.2 Services

4.2.1 Water Infrastructure

With reference to Queensland Urban Utilities' mapping, the school has access to water infrastructure via a water pipeline connection off Prospect Street.

Refer to **Appendix 9** for a copy of the service infrastructure plans.

4.2.2 Sewer Infrastructure

With reference to Queensland Urban Utilities' mapping, the school has access to sewer infrastructure, via a pipeline connection which crosses Prospect Street.

Refer to **Appendix 9** for a copy of the service infrastructure plans.

4.2.3 Stormwater Infrastructure

The stormwater runoff from the site currently drains in a distributed manner across the site and will immediately connect with the water in the ephemeral watercourse which passes through the school site and then continues to flow northeast towards the Brisbane River.

4.2.4 Electricity Infrastructure

The existing site power supply to the school is fed via a Pad-mount Transformer (rated at 500kVA) and is located adjacent the street frontage near the Administration building. The existing site electrical reticulation is predominantly provided by underground pit and conduit systems.

4.2.5 Telecommunications Infrastructure

The existing Centre of Network is located within Resource centre with the Main Distribution Frame/ Campus Distributor located within Administration Block.

The existing telecommunication network cabling reticulates via underground communications conduits and pits systems and also via surface mounted conduits on the underside of covered links and undercrofts.

PART D – DESIGNATION PROPOSAL

5 Proposed Designation

5.1 Description under the Planning Regulation 2017

The proposal seeks to designate the site as follows:

Lowood State High School

34 Prospect Street, Lowood

Lot 89 on CC3323

Pursuant to Chapter 2, Part 5 of the PA, it is proposed to designate the land described above for infrastructure. Ministerial designation is proposed in order to facilitate the efficient allocation of resources and enable the timely supply of the community infrastructure. The proposed community infrastructure is best described in the *Planning Regulation 2017*, Schedule 5, Part 2 as:

6 educational facilities

5.2 Intent of Designation

The designation affirms the existing use of the site as an educational establishment, and will facilitate the immediate planned works at the school and future planned developments on the site consistent with the designation purpose.

Educational and community facilities are defined as community infrastructure under Schedule 5 of the *Planning Regulation 2017*, being assets necessary to support the community and for the public benefit. The proposed community infrastructure will facilitate the efficient and timely supply of infrastructure; and satisfy statutory requirements and budgetary commitments of the State for the supply of community infrastructure.

5.3 Project History

In 2007 the non-compulsory Prep Year was introduced to Queensland schools and in the following year the Year 1 starting age was subsequently raised. Consequently, a smaller cohort of students, often referred to as the half cohort, was introduced to Queensland state schools.

Over the following years this cohort of students has increased in size and across the state schooling sector now reflects approximately two thirds the size of a usual year level cohort.

In 2015, this smaller cohort of students entered Year 8 along with the first group of Year 7 students in secondary schools as part of the Flying Start suite of reforms. The half cohort, currently in Year 9, will enter Senior Secondary in 2018 and will exit the system at the end of the 2019 school year, creating six full cohorts across secondary schools for the first time in 2020.

An analysis of infrastructure requirements for 2020 indicates additional capacity is needed in number of schools across the State, including Lowood SHS. To accommodate the six full cohorts in 2020, it is proposed to provide the school with a new Manual Arts building.

The *Six Full Cohorts – 2020 Ready* program is a Queensland Government commitment to delivering fit for purpose learning environments that support educational outcomes. The program provides a capital investment of \$250 million over two years for new classrooms and other

infrastructure in the State's secondary schools to cater for the 17,000 additional students expected by the 2020 calendar year.

To align with the *Six Full Cohorts – 2020 Ready* program, the DoE has made a funding commitment of approximately \$2.5 million to deliver the following:

- construction of a new Manual Arts Building;
- a vehicle link to the Manual Arts Building via the existing track within the school; and
- provide covered link access from the new building to the spine of the school.

5.4 Site Selection

The DoE and lead architect led an informal planning analysis to determine the most suitable location for the proposed development at Lowood SHS. As part of this process consultation was undertaken with relevant stakeholders, such as the school community and Parent's and Citizens' (P&C) Association to discuss key requirements and needs for the school. In particular it is noted the analysis has consideration of the following:

- delivering the new building within the existing manual arts cluster area of the school;
- the existing topographic conditions over the site;
- providing a link to the existing service road to allow for deliveries to the new building; and
- ensure amenity of existing facilities are not compromised by the proposed works.

On the basis of the above, the location of the new building was considered the most appropriate location for the proposed development.

5.5 Proposal Description and Details

The proposal seeks to undertake the following works at Lowood SHS:

- construction of a new Manual Arts Building;
- a vehicle link to the Manual Arts Building via the existing track within the school; and
- provide covered link access from the new building to the spine of the school.

The proposed works are intended to future proof the school while providing facilities that improve the amenity of Lowood SHS consistent with current standards and sited with consideration of the functionality of the buildings, and connection with existing and planned future buildings.

The works relating to a new Manual Arts Building will ensure the school is able to address current capacity challenges and foreseeable expansion of capacity. The facilities location is within the existing cluster area of manual arts facilities which ensures suitable access and integration between the learning environments.

The building design solution is to deliver educationally functional, comfortable, healthy facilities that inspire student learning and support the delivery of modern curriculum initiatives. In addition to the above the proposal adds value to the brief and existing facilities whilst producing a cost effective scheme.

5.5.1 School Population

At present, the school has a student enrolment capacity (SEC) to accommodate 849 students and a built capacity (BLT) to accommodate for 1,032 students. Furthermore, a two (2) space demountable building was also placed onsite to accommodate for the increase in student enrolments for the 2018 calendar year.

Based on DoE forecasts for the proposed development, inclusive of the recent addition of the two (2) space demountable building, the school will provide for an ultimate SEC of approximately 919 students and BLT of 1,117 students. The proposed building ensures the Lowood SHS is able to meet the population growth demands for the 2020 calendar year.

It is noted the DoE references the SEC when considering the number of students a school can optimally accommodate within existing learning spaces. These learning spaces are generally designed with a larger capacity (being the BLT) to ensure that any unforeseen or increase in students for a particular year can still accommodate enrolments where necessary.

Where student enrolments exceed the SEC then the DoE will seek to investigate opportunities for new infrastructure to accommodate the increase in student population growth.

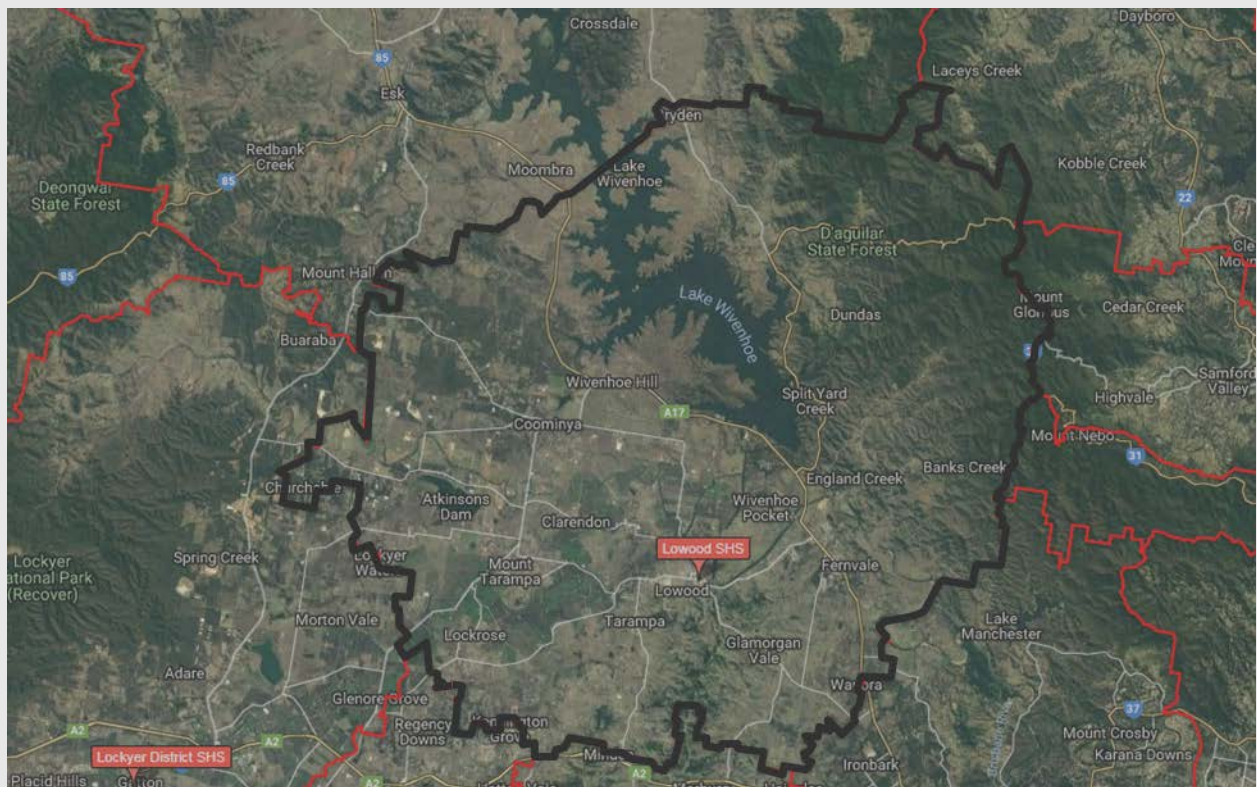
5.5.2 Hours of Operation

Lowood SHS classes start from 8:55am and finish at 3:00pm, with office hours open from 8:15am until 3:30pm.

5.5.3 School Catchment Area

The Lowood SHS has a large catchment area extending from Bryden in the north, Banks Creek in the east, Prezlau in the south and Churchable in the west.

School Catchment Area



Source: DoE

Legend

- School Catchment Areas
- Lowood SHS Catchment Area

5.5.4 Vehicle and Bicycle Parking

The site currently provides a total of 47 marked onsite car parking spaces, made up of 16 spaces in the north eastern corner of the site and 31 spaces in the north western corner of the site. Student drop-off and pick-ups operate at the front of the school off Prospect Street.

All staff travel via private vehicles to access the school and parking is fully contained within the available spaces.

5.5.5 Pedestrian Facilities

An existing footpath runs along the Prospect Street frontage of the school, which continues to Main Street and connecting to the main town centre of Lowood.

No formalised cycle infrastructure is provided on the existing road network; however, there is sufficient width to accommodate cyclists.

5.6 Designation Process

In accordance with the alternative designation process as agreed with DSDMIP, this EAR has been prepared with the intention to support the consultation and state interest review stage being undertaken with those stakeholders identified in Part G – Consultation of this report. Section 9.2 also includes an approved Community Engagement Plan in which this Infrastructure Designation will follow.

Although an alternative process, this EAR has been drafted in accordance with the Chapter 7 of the *Minister's Guidelines and Rules*.

Once information gathered as part of this stage is collated, the DSDMIP will undertake a final assessment of the proposed development before consideration by the Minister for State Development, Manufacturing, Infrastructure and Planning.

PART E – LOCAL AND STATE PLANNING PROVISIONS

6 Planning Assessment

In terms of development under the PA, the designation is proposed to be undertaken in accordance with Chapter 2, Part 5 of the Act. The effect of the designation, if made, is that the use of the site for the designated infrastructure and service will be exempt from the local government's planning scheme.

In relation to any building works, these will be accepted development in accordance with Schedule 7, Part 1, item 2 of the PR.

6.1 Local Planning Framework

Where land is not designated for infrastructure, any development involving a material change of use should have regard to the requirements of the relevant planning scheme. Whilst the intended designation will result in development being exempt from assessment against the planning scheme, consideration has still been given to its relevant provisions.

The *Somerset Region Council Planning Scheme* (Planning Scheme) commenced on 1 March 2016 and is the relevant planning scheme for the site.

6.2 Planning Scheme Provisions

The below table provides a summary of the key planning scheme provisions relevant to the site.

| Planning scheme information | |
|-----------------------------|--|
| Planning scheme | <i>Somerset Region Planning Scheme</i> |
| Area classification | Community Facilities Zone |
| Local area plan | N/A |
| Overlays | <ul style="list-style-type: none"> • Biodiversity – Biodiversity corridor • Catchment area: Higher risk catchment area • High impact management area • Infrastructure - Sewage treatment plant buffer • Scenic amenity – Scenic route section (500m buffer) |

6.3 Use Definition

With reference to the Planning Scheme, Schedule 1 Definitions, the proposal for a new building within an established school is classified under 'Educational Establishment' and defined below.

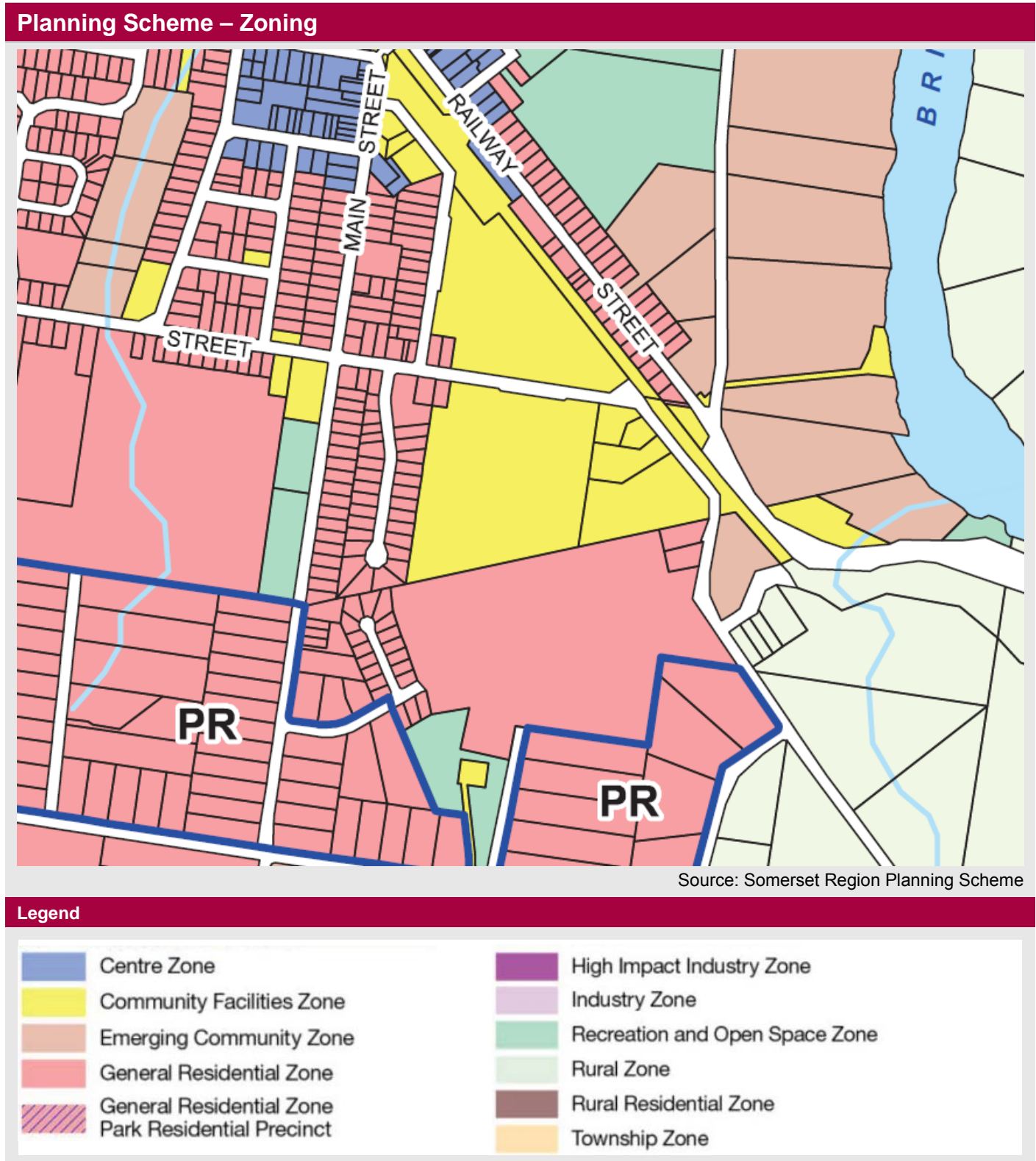
Educational Establishment: means the use of premises for —

(a) training and instruction to impart knowledge and develop skills; or

(b) student accommodation, before or after school care, or vacation care, if the use is ancillary to the use in paragraph (a)

6.4 Zoning

Under Part 6 of the Planning Scheme the subject site is identified within the CF5 Community Facilities (Education Purpose) Zone, as indicated in the figure below.



The purpose of the Community Facilities zone is to provide for community-related uses and activities whether publicly or private owned and operated. An education facility is considered accepted development within the Community Facilities zone.

The following are the key outcomes relevant to development within the Community facilities zone:

- *Development for a non-residential use serves a local community facility need only, such as a child care centre or a substation, and is of a bulk and scale that is compatible with and integrates with the built form intent for the Low density residential zone.*
- *Development responds to land constraints, mitigates any adverse impacts on environmental values and addresses other specific characteristics, as identified by overlays affecting the site or in codes applicable to the development.*

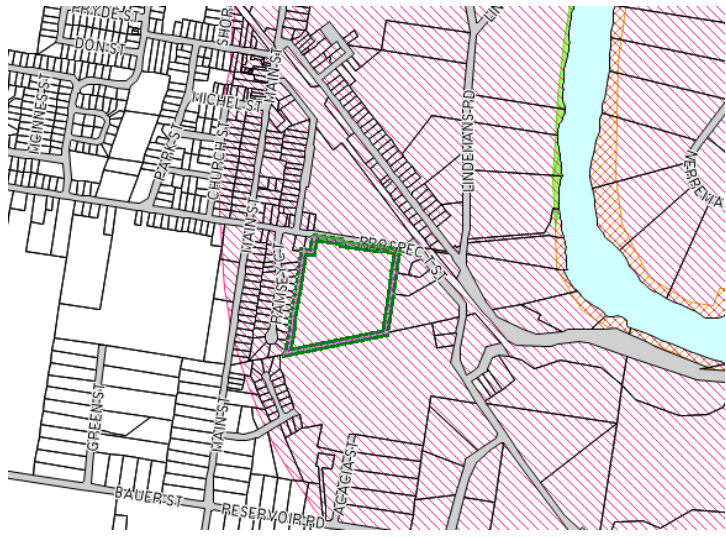
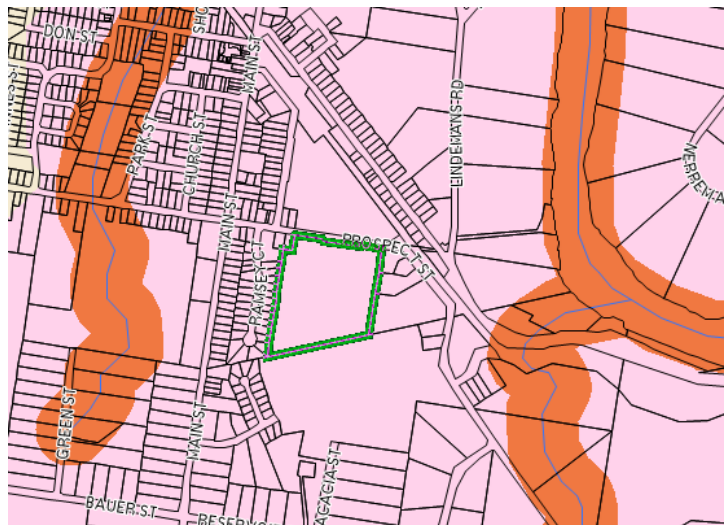
6.4.1 Local Plan

The site is not located within a local plan area under the Planning Scheme.

6.5 Overlays

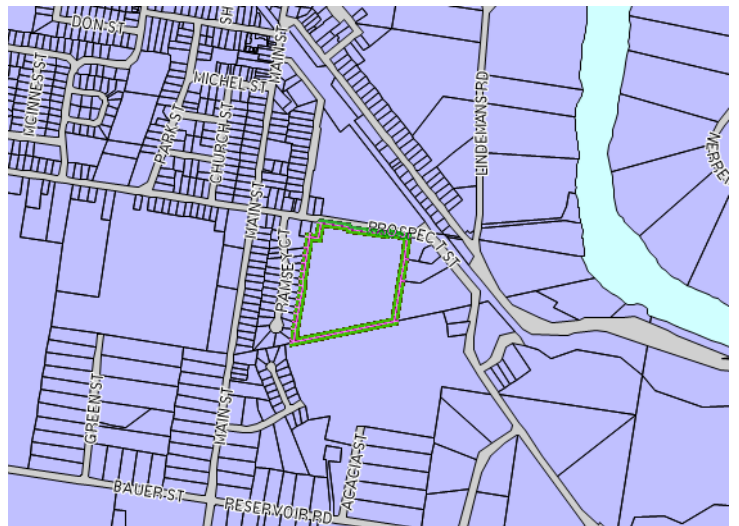
The planning scheme identifies physical constraints affecting development through the inclusion of overlays. Where a site is affected by a Council constraint, additional development limitations may be placed over the property/s by the Planning Scheme.

It is noted that the site is affected by the overlays listed in the table below.

| Constraint | Overlay map |
|--|--|
| <p>Biodiversity</p> <ul style="list-style-type: none"> • The site is mapped within the Biodiversity Corridor area |  |
| <p>Catchment management</p> <ul style="list-style-type: none"> • The site is within the High Risk Catchment Area (Water Supply Buffer) |  |

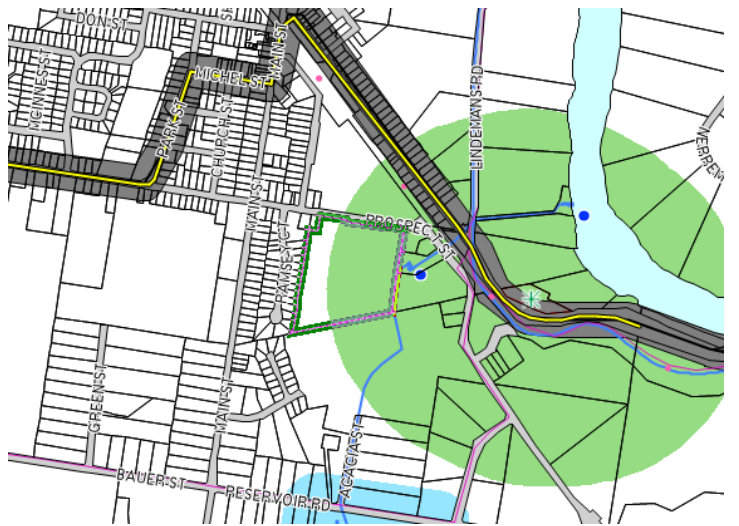
High Impact Activities Management Area

- The site is located within the High Activities Management Area



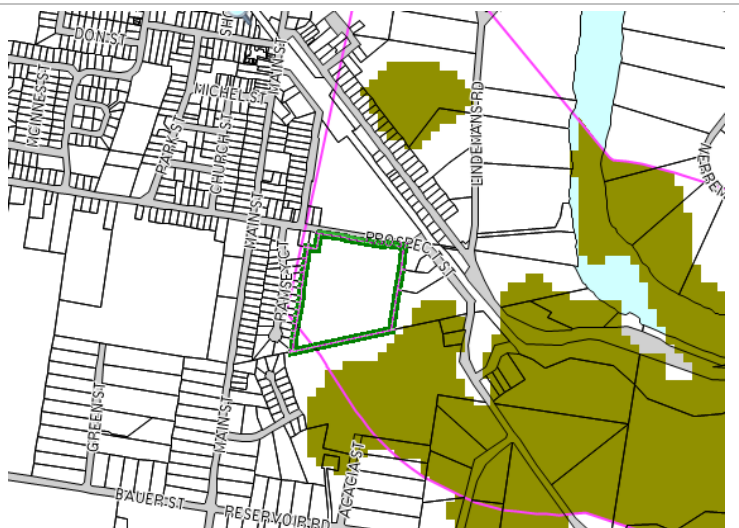
Infrastructure

- The eastern half of the site is within the Sewage Treatment Plant Buffer (500m area)



Scenic Amenity

- The Scenic Route Section 500m buffer intersects the south-western corner of the site.



7 State Planning Framework

7.1 The Planning Act 2016

Under Schedule 2 of the PA, a state interest means an interest that the Minister considers—

- affects an economic or environmental interest of the state or a part of the state’ or
- affects the interest of ensuring that the purpose of the Act is achieved.

The State Planning Policy (SPP) is the overarching document which promotes the state’s interests in land use planning and development. Under section 8(4) (a) of the PA the SPP has effect throughout Queensland and sits above regional plans and planning schemes in the hierarchy of planning instruments.

7.2 State Planning Policy

The SPP applies to the extent relevant when designating premises for infrastructure. When making or amending a designation, the Planning Minister must have regard to the relevant parts of the SPP as shown in the table below.

| Application of the SPP | Who is responsible | Parts of the SPP that are applicable, to the extent relevant | | | | | | |
|---|----------------------------|--|--------|---------------------------------|-------------------------------|--------|--------------------|--------------------|
| | | Part A, B & C | Part D | Part E: State interest policies | Part E: Assessment benchmarks | Part F | Part G: Appendix 1 | Part G: Appendix 2 |
| Designating premises for infrastructure | State and local government | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

Consideration of how the proposal meets the relevant parts of the SPP are discussed in further detail below.

7.2.1 The Guiding Principles

OUTCOME FOCUSED

Clearly focus on the delivery of outcomes

- *Plans and development outcomes integrate and balance the economic, environmental and social needs of current and future generations in order to achieve ecological sustainability.*
- *Plans express clear performance outcomes for development, supported by a range of acceptable outcomes, where possible.*
- *Innovative and flexible approaches to design and development are supported and encouraged when consistent with a plan’s strategic intent.*
- *Decision making ensures that, where acceptable, when outcomes are satisfied by development, then the relevant performance outcome is taken to be satisfied in full. Performance outcomes may still be satisfied, even though an associated acceptable outcome is not met.*
- *Plans and development outcomes support stated objectives, needs and aspirations of the community at the state, regional and local level.*

The proposal seeks to designate the site for the purposes of delivering improved educational facilities for the school. The designation considers economic, environmental and social needs of current and future generations through the delivery of the infrastructure.

INTEGRATED

Reinforce the role of local planning schemes as the integrated, comprehensive statement of land use policy and development intentions for a local area

- *Plans coordinate and integrate land use policy for a local area by considering:

 - international agreements, such as the UNESCO world heritage listing of the Great Barrier Reef and Ramsar Convention
 - national, state, regional and local matters, to the extent relevant.*
- *Plans integrate land use, resource management and infrastructure needs and considerations.*
- *Plans support a 15 year supply of land for development.*
- *The zoning of land reflects and responds to the characteristics of the land that constrain its use.*
- *Overlays should be compatible with and not operate either individually or cumulatively to prevent or restrict land from being used for the purpose for which it has been zoned.*
- *Plans include a performance-based assessment of development against a clear hierarchy of policies linked to the achievement of realistic and long-term strategic planning.*

Not applicable as the proposal is for an Infrastructure Designation and not for plan making.

EFFICIENT

Support the efficient determination of appropriate development

- *Plans and assessment processes result in development outcomes that are certain, responsive and performance-based.*
- *Plans regulate development only to the extent necessary to address potential impacts. When applied, plans adopt the lowest appropriate level of assessment required to efficiently and effectively address those impacts.*
- *The level of assessment for development is proportionate to the potential impacts and level of risk of the development being regulated and a plan's strategic intent and purpose of the relevant zone, local plan and/or precinct, for instance development that is:

 - minor, low-risk and that is encouraged or contemplated in a zone should be identified as accepted development
 - consistent and in accordance with the broad intent of a zone and able to be assessed against assessment benchmarks, should be identified as code assessable development
 - contrary to the intent of a zone, requires public input or is unforeseen by a planning scheme, should be identified as impact assessable development and assessed against a broader range of matters.*

The proposal seeks to designate the site for the purposes of providing improved educational facilities at Lowood SHS. The designation forwards the efficient and timely delivery of infrastructure while ensuring that subsequent works on the site can proceed without assessment against the *Somerset Region Planning Scheme*.

POSITIVE

Enable positive responses to change, challenges and opportunities

- *Contemporary information, challenges and community needs and aspirations are reflected through up-to-date plans.*
- *Evidence and objectively assessed needs form a basis for planning that uses the best available knowledge.*
- *Plans are written using clear, concise and positive language to describe what outcomes are sought, required or encouraged in a particular location, rather than what is to be avoided, prevented or discouraged.*

- *Community health and wellbeing, and resilience and adaptability to change (including economic change, social change, and climate change adaptation and mitigation), are promoted in plans and development outcomes.*
- *Plans adopt a performance-based approach to development assessment to allow for innovation and flexibility in how development in a local area can be achieved.*
- *Plans are drafted to ensure that development is assessed on its individual merits.*

Not applicable as the proposal is for an Infrastructure Designation and not for plan making.

ACCOUNTABLE

Promote confidence in the planning system through plans and decisions that are transparent and accountable

- *Plans and development outcomes reflect balanced community views and aspirations based on a clear understanding of the importance of the community's involvement in plan making.*
- *Plans resolve competing state and local interests through using an evidence-based approach, which balances community needs, views and aspirations.*
- *Reasonable, logical and fair development decisions are supported by clear and transparent planning schemes.*
- *Plans only seek to regulate land use and planning outcomes and do not address matters regulated outside of the planning system, for instance building work regulated under the Building Act 1975 (unless permitted).*
- *Obtaining access to planning information is simple and direct, capitalising on opportunities presented by information technology.*

The infrastructure designation process is proposed in accordance with Chapter 2 of the PA. Development of plans and assessment of impacts has had due consideration to relevant state and local plans and mapping and consultation with relevant State agency stakeholders, political representatives, local government and the community will occur as part of this process.

7.2.2 State Interest Statements

The following table lists the State interests contained in the SPP relevant to the subject site.

| State Planning Policy | Applicability |
|--|---------------|
| Planning for Liveable Communities and Housing | |
| Liveable Communities | N/A |
| Housing Supply and Diversity | N/A |
| Planning for Economic Growth | |
| Agriculture | N/A |
| Development and Construction | N/A |
| Mining and Extractive Resources | N/A |
| Tourism | N/A |
| Planning for the Environment and Heritage | |
| Biodiversity | Yes |
| Coastal Environment | N/A |
| Cultural Heritage | N/A |
| Water Quality | Yes |

| Planning for Safety and Resilience to Hazards | |
|---|-----|
| Emissions and Hazardous Activities | N/A |
| Natural Hazards Risk and Resilience | Yes |
| Planning for Infrastructure | |
| Energy and Water Supply | N/A |
| Infrastructure Integration | N/A |
| Transport Infrastructure | N/A |
| Strategic Airports and Aviation Facilities | N/A |
| Strategic Ports | N/A |

7.2.3 SPP Interactive Mapping System

Relevant state interests as identified in section 7.2.2 are further described in the following table, as obtained from the SPP Interactive Mapping System:

| State Interest | Mapping Layer |
|---|---------------|
| <p>Biodiversity</p> <p>The site is mapped within the MSES – Regulated Vegetation (intersection a water course) area.</p> <p>The proposed development will not adversely impact the affected areas identified onsite.</p> | |
| <p>Water Quality</p> <p>The site is within the water resource catchment and water supply buffer area and reference should be made with the SPP, including the SPP Code: Water Quality.</p> <p>A Stormwater Management Plan (SMP) has been prepared for the proposal (refer Appendix 9) and confirms that stormwater runoff from the site will remain generally unaltered. A small amount of stormwater and roof water will be piped close to the property boundary but will discharge across the boundary in a distributed manner that is not considered to change the characteristics in a manner that may impact downstream properties.</p> | |

Natural Hazards Risk and Resilience

The site is within the Flood hazard area – Local Government flood mapping.

A Detailed Flood Impact Assessment has been carried out for the proposal and is attached within **Appendix 9**.

The existing classrooms and maintenance shed are affected by flooding. Depths are generally less than 0.2m across the site. The Brisbane River Catchment Flood Study was completed in 2017. A review of the study shows that the site sits approximately 140m west of the ARI Brisbane River flood event inundation and is not affected during that event.



7.2.4 Stormwater Management Design Objectives

Information on how the proposal meets the SPP stormwater management design objectives is discussed further in Part F – Environmental Assessment.

7.3 Regional Planning

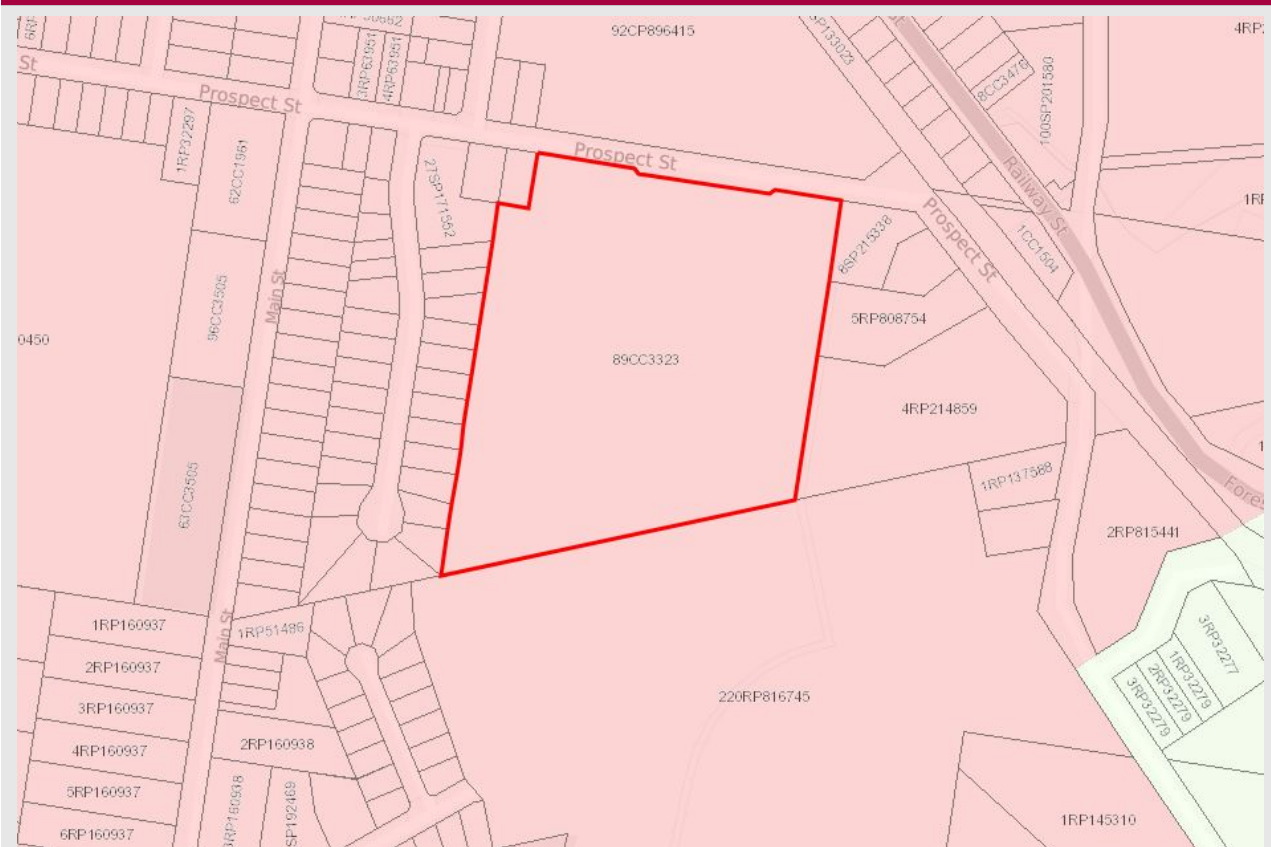
The site is included within the Urban Footprint of the *South East Queensland Regional Plan 2017*.

The Urban Footprint identifies land within which the region's urban development needs to 2041 can be accommodated in a way consistent with the goals, elements and strategies of *Shaping SEQ*.

The Urban Footprint identifies land that can meet the Region's urban development needs seeks to incorporate the full range of urban uses including housing, industry, business, infrastructure, community facilities and other integral components of well-planned urban environments, such as local areas for sport and recreation and urban open space.

The Lowood SHS and proposed scope of works are considered consistent with the intent of the Regional Plan, providing additional community infrastructure that supports the existing and future residential community.

Regional Plan – Urban Footprint



Source: DSDMIP SARA

Legend

- Site Boundary
- Urban Footprint

PART F – ENVIRONMENTAL ASSESSMENT

8 Environmental Assessment

Before designating land for infrastructure, the Minister must be satisfied that adequate environmental assessment, including adequate consultation, has been carried out in relation to the development that is subject to the designation.

The environmental assessment must have regard to—

- all planning instruments that relate to the premises; and
- any assessment benchmarks, other than in planning instruments, that relate to the development that is the subject of the designation or amendment; and
- if the premises are in a State development area under the *State Development Act*—any approved development scheme for the premises under that Act; and
- if the premises are in a priority development area under the *Economic Development Act 2012*—any development scheme for the priority development area under that Act; and
- any properly made submissions made as part of the consultation carried out under section 37; and
- the written submissions of any local government.

This section of the Report provides an environmental assessment of impacts the development or use may generate, and ways in which those environmental impacts are being managed or mitigated. Regard is given to natural and physical resources, as well as short and long term effects and impacts on the environment and community from both the construction and operational phase of the proposal. The range of matters considered includes:

- infrastructure, traffic and transport;
- flora and fauna;
- soils and geology;
- conservation and heritage values;
- natural resources and hazards; and
- health, safety, amenity and social impacts.

Reference should also be made to Part E – Local and State Planning Provisions with regards to mapping relevant to the subject site.

8.1 Road Infrastructure

8.1.1 Site Access and Traffic

Context

The site is not in proximity to a state-controlled road. The site has frontage to Prospect Street, which is a Local Road. The school has primary road frontage along Prospect Street, with vehicle access via two existing crossovers at the easternmost and westernmost points of the school which provides for all movements. The school also has a drop-off area along the Prospect Street frontage, stretching for approximately 100m.

Proposal

Based on DoE forecasts for Lowood SHS, the current student capacity (being 849 students) and anticipated growth to 919 students results in a potential overall increase of up to 70 students and 11 FTE staff. The proposed development ensures the Lowood SHS is able to meet the population growth demands for the 2020 calendar year.

Site investigations of the school noted the following during the afternoon school peak period::

- students were predominately picked up from the northern side of Prospect Street, on either sides of the existing crossing between the high school and primary school;
- some students were picked up towards the western side on the school side of Prospect Street however its use was somewhat limited by vehicles that were parked in this area for the afternoon pick-up period; and
- the central and eastern sides on the school side of Prospect Street were largely used by school buses.

It is expected the central and eastern areas on the school side of Prospect Street would be more heavily used to set-down students prior to school noting that:

- student set-down is typically more spread out than pick-up; and
- school bus arrivals are more spread out than departures and these areas are therefore unlikely to be fully occupied by buses whereas school buses queue in these areas during the afternoon prior to school finishing and most depart at 3:10pm, close to the end of the peak afternoon pick-up period which was observed to be around 3:15pm.

A traffic report has been prepared and included in **Appendix 12** and notes the following:

- the assessment considers potential development related traffic impacts during:
 - 2018 base year (when traffic survey data was captured);
 - 2020 future year (assumed 'Year of Opening' for the proposed expansion).
- traffic growth rates applied were based on a review of TMR traffic census data recorded at site 32101 (600m west of Slip Gully Td 32.78) which is located on Forest-Hill – Fernvale Road adopted a 2.5% background traffic growth rate at Prospect Street and Forest-Hill – Fernvale Road/ Railway Street);
- a 60:40 in:out split for the morning peak and 40:60 in:out split in the afternoon peak periods has been adopted and based on the ultimate 919 SEC, results show the estimated peak hour demands to result in 50 trips in the morning peak (30 in and 20 out) and 29 trips in the afternoon peak (12 in and 18 out) periods;
- a SIDRA analysis was conducted for the Prospect Street and Forest-Hill – Fernvale Road/ Railway Street intersection based on the two development scenario years and notes:
 - average delays at the intersection may increase by approximately 4% due to the proposed expansion.
 - as delays are expected to increase by less than 5%, the GTIA does not require any mitigation works to offset impacts associated with the expansion.
 - the intersection operates well below the practical operating capacity for priority-controlled intersections (DOS<0.80) regardless of the expansion.

Actions and Recommendations

The traffic analysis indicates the proposed expansion will not have a significant impact on the operation of the signalised intersection and no intersection upgrades are warranted.

8.1.2 Car Parking

Context

The school currently provides sealed and unsealed car parking areas which are located:

- Eastern Access – which provides 16 formal car parking spaces and a number of informal parking spaces which line the length of the internal road towards the rear of the school; and
- Western Access – which provides 31 formal car parking spaces and a number of informal parking spaces to the grassed areas to the western boundary.

Proposal

With reference to Council's Transport and Parking (TAPs) Code it is noted there is a parking provision of 1 space per 2 staff. Based on the increase of 11 FTE staff as a result of the proposed increase in student population, an additional six (6) car parking spaces is required to accommodate for the additional demand associated with the expansion.

It is noted that under the *Six Full Cohorts – 2020 Ready* program, funding is directly related to delivery of infrastructure relating to the new learning facility and additional parking is therefore not included as part of this proposal.

However it is recognised the existing informal parking areas is likely to have sufficient capacity to support the additional six (6) car parking spaces.

Nevertheless, the DoE has considered the recommendations for additional parking and will ensure future programs of work as undertaken by the school has appropriate considerations to provide formalised car parking within the school site.

Actions and Recommendations

The current formal and informal parking provision within the school is considered sufficient to support the growth forecasts for the school, with the predictions for the immediate term (to the 2020 calendar year) resulting in an increase of 11 FTE staff and 70 students over 3 years.

However the DoE will ensure future programs of work as undertaken by the school has appropriate consideration to deliver the future car park with provision of up to six (6) car parking spaces.

8.1.3 Public Transport Infrastructure

Context

The use of public transport is a preferred travel mode and highly encouraged by the school, for students, staff and visitors. At present the school buses setdown within the central (via the dedicated setdown area) and western sides on the school side of Prospect Street.

Proposal

The school utilises a number of dedicated bus services which setdown in front of the school on Prospect Street. These include:

| Bus Services | | |
|--------------|---|---------------------------------------|
| Route ID | Servicing | Frequency |
| 21 | Fernvale, Dundas | one (1) morning and afternoon service |
| 9 | Patrick Estate, Willaura Drive/ Gatton Esk Road | one (1) morning and afternoon service |
| 17 | Fernvale, Glamorgan Vale, Marburf | one (1) morning and afternoon service |

| | | |
|----|--|---------------------------------------|
| 18 | Brisbane Valley, Honeywood Estate Fernvale | one (1) morning and afternoon service |
| 3 | Blue Gum Drive, Mt Tarampa, Lockyer Waters | one (1) morning and afternoon service |
| 1 | Atkinson Dam, Coominya, Clarendon | one (1) morning and afternoon service |
| 2 | Eagle Rise, Rifle Range, Clarendon | one (1) morning and afternoon service |
| 8 | Tarampa, Prenzlau, Minden | one (1) morning and afternoon service |
| 14 | Brightview, Lockrose, Regency Downs | one (1) morning and afternoon service |
| 16 | Wivenhoe Pocket, Brookside Estate Fernvale | one (1) morning and afternoon service |
| 20 | Fernvale Old Estate | one (1) morning and afternoon service |

With reference to the traffic assessment in **Appendix 12**, it is noted that a large proportion of students utilised the existing school bus services and the high patronage indicates the school is well serviced by the existing services. As such, it is not anticipated that the proposed expansion at the school will trigger the need for any modifications to existing school bus routes or the need for additional services. However, it is recommended that demands be monitored and if warranted, additional routes and/or services be investigated.

Actions and Recommendations

The existing number of bus services is sufficient to support the school population and as such there is no material impact anticipated to the public transport infrastructure.

The DoE will continue to monitor existing school bus routes services, and where demand is warranted, provide additional routes and/or services.

8.1.4 Active Transport Infrastructure

Context

As a semi-rural township, the provision of active transport infrastructure is not considered a prominent feature within Lowood.

An existing footpath is provided along the Prospect Street frontage of the school, continuing to Main Street and leading to the town of Lowood.

Most higher order roads within 800m of the subject site (i.e. 10-minute walking distance) have a concrete footpath on at least one side. There is a children's crossing on Prospect Street in proximity to the main pedestrian access to the subject site.

Key active transport related matters noted during our inspection are summarised below:

- some sections of Prospect Street that are used for student set-down / pick-up are not located adjacent to footpaths;
- a crossing guard is only stationed at the Prospect Street children's crossing for short periods (i.e. around the start and end of school each day) however students cross Prospect Street throughout the day as the school utilises the Hall which is located at Lowood State School which is located on the northern side of Prospect Street; and
- no formalised cycle infrastructure is provided on the existing road network; however, there is sufficient width to accommodate cyclists.

Proposal

The predicted school population growth will not have any material impact to the active transport networks external to the school site.

However with reference to the traffic assessment in **Appendix 12**, site observations noted the following as matters for further consideration:

- consider an additional 14 bicycle parking spaces as calculated from Austroads Guide to Traffic Management (GTTM), Part 11 to accommodate the increase in school population numbers;
- consider modifications to the existing children’s crossing on Prospect Street to include:
 - recommend displaying ‘CHILDREN CROSSING flags (R3-3)’ for the duration of school zone operating times to facilitate student movements, in particular from the high school to the Hall at the primary school across the road.
 - if they can be appropriately lit and, subject to review of potential impacts on vehicle manoeuvring, cyclists etc., install kerb extensions adjacent to the crossing.
 - install a pedestrian fence in front of the path that connects from Prospect Street to the school’s Administration building to encourage pedestrians to use the children’s crossing.
 - replace the existing W6-3 signs on approach to the crossing with new W6-3 signs which include an orange border.
 - mark ‘SCHOOL X’ on the road pavement adjacent to the W6-3 and W8-22 signs that are located on the eastern side of the crossing, as the signs are blocked by school buses at the set-down points.
- where not provided, install 1.5m wide footpaths on Prospect Street adjacent to the set-down / pick-up areas.

Actions and Recommendations

The proposed works are not considered to have a material impact to the existing active transport infrastructure or network.

The DoE, as part of future program works at the school, will consider the following:

- where no footpath is currently provided, construct 1.5m wide footpaths on Prospect Street adjacent to student set-down / pick-up areas;
- monitor bicycle usage numbers and demands and where warranted, provide a minimum 14 bicycle parking spaces in accordance with Austroads GTTM Part 11; and
- maintain the existing children’s crossing on Prospect Street however consider modifications to the existing arrangements to improve safety and movements.

8.2 Services Infrastructure

8.2.1 Water Infrastructure

Context

With reference to Council’s infrastructure mapping (refer **Appendix 9**) the school has access to water infrastructure via a water pipeline connection off Prospect Street.

Proposal

The existing water infrastructure is considered to have sufficient capacity to cater for the proposed development.

Actions and Recommendations

The adequacy, capability and location of the existing water infrastructure to service the proposed development will be confirmed prior to the construction phase.

8.2.2 Sewer Infrastructure

Context

With reference to Queensland Urban Utilities' mapping, the school has access to sewer infrastructure, via a pipeline connection which crosses Prospect Street.

Refer to **Appendix 9** for a copy of the service infrastructure plans.

Proposal

The existing network is considered to have sufficient capacity to cater for the proposed development.

Actions and Recommendations

The adequacy, capability and location of the existing sewer infrastructure to service the proposed development will be confirmed prior to the construction phase.

8.2.3 Stormwater Infrastructure

Context

With reference to the flood impact assessment and stormwater management report in **Appendix 10**, the lawful point of discharge for stormwater runoff drains in a distributed manner across the site that immediately connects with the water in the ephemeral watercourse which passes through the school site and then continues to flow northeast towards the Brisbane River.

Proposal

The location of the proposed manual arts building is currently located on a grassed area which contains a small storage shed and mature vegetation. The total development area from the proposed works will result in an increase of approximately 1,800m² of impervious area on the site.

Given the increase, the proposed development will seek to include the following stormwater treatment measures:

- rainwater harvesting for toilet use and outdoor watering with 2 x 5 KL rainwater tanks on the new buildings which are internally plumbed;
- construction of a small bio-retention landscaped area east of the new buildings which will remove phosphorus and nitrogen from the stormwater; and
- drainage from the western parking area to be collected and discharged into the proposed bio-retention area.

With reference to the Flood Impact Assessment and Stormwater Management Plan in **Appendix 10**, the stormwater runoff from the site will generally remain unaltered. A small amount of stormwater and roof water will be piped close to the property boundary but will be discharged across the boundary in a distributed manner due to the construction of a level spreader. The stormwater leaving the site will join immediately with the water in the ephemeral watercourse which passes through the site and continues to flow northeast towards the Brisbane River.

Actions and Recommendations

The proposed development shall incorporate the stormwater management measures as summarised above and as described in the Stormwater Management Plan in **Appendix 9**.

Local drainage should be incorporated to reduce local overland flow from the south entering the building.

8.2.4 Electricity Infrastructure

Context

The existing site power supply to the school is fed via a Pad-mount Transformer (rated at 500kVA) and is located adjacent the street frontage near the Administration building. The existing site electrical reticulation is predominantly provided by underground pit and conduit systems.

Proposal

The electrical supply appears adequate to cater for the proposed new electrical loads.

The existing Supply Authority transformer is unlikely to require upgrading based on current and future loads. Generally, the Supply Authority will be notified of the proposed maximum demand to enable them to determine if an upgrade of the Grid infrastructure is required. Once the Supply Authority has performed a desk top study and if they are not satisfied with the existing supply, additional associated design costs may be required and are generally paid for by the client DoE.

In this instance, a request for supply availability (CX18PRO0381477Q) has been submitted to Energex and they have confirmed that an upgrade is not required.

The proposed new buildings shall be served from the new main switchboard via new circuit breakers and sub-main cables. It is proposed that the new buildings are to be served from the main switchboard to a new distribution board in each building via new underground conduit and pit systems. Refer to site reticulation site plans for additional information.

Actions and Recommendations

The adequacy, capability and location of the existing electricity infrastructure to service the proposed development will be confirmed with Energex prior to the construction phase.

8.2.5 Telecommunications Infrastructure

Context

The existing Centre of Network is located within Resource centre with the Main Distribution Frame/ Campus Distributor located within Administration Block.

The existing telecommunication network cabling reticulates via underground communications conduits and pits systems and also via surface mounted conduits on the underside of covered links and undercrofts.

Proposal

The existing Centre of Network appears adequate to cater for the proposed new FOBOT patch panels and Fibre connections to service the new works.

The existing Main Distribution Frame/ Campus Distributor requires an extension to service the proposed new works with category 3 copper cabling.

The telecommunications copper cables shall be distributed via surface mounted communications conduits on the underside of covered links and under crofts. Data communication fibre cables shall be distributed via surface mounted communications conduits on the underside of covered links and under crofts.

Actions and Recommendations

The adequacy, capability and location of the existing telecommunications infrastructure to service the proposed development will be confirmed prior to the construction phase.

8.3 Flora and Fauna

8.3.1 Vegetation Management Act 1999

Context

Vegetation clearing is predominantly regulated under the *Vegetation Management Act 1999* (VMA) and the PA. A development permit is required to clear where the clearing is not exempt clearing work through the *Planning Regulation 2017*, or where it cannot be carried out under a self-assessable vegetation clearing code or an area management plan under the VMA.

Many routine vegetation management activities can be carried out as exempt clearing work listed in the *Planning Regulation 2017*, or through an self-assessable vegetation clearing code or an area management plan (AMP). The need for a development approval depends on the type of vegetation; the land tenure of the land (e.g. freehold or Indigenous land); the location, extent and purpose of the proposed clearing; and who is proposing to do the clearing (e.g. state government body, landholder).

Proposal

With respect to the school, the site is not identified under any regulated vegetation mapping. The Department of Environment and Science (DES) regulated vegetation management mapping shows the entire site free of remnant vegetation (refer to **Appendix 6**).

If vegetation clearing is required for the proposed development, it will be considered “operational works” under the PA. Operational works carried out by or on behalf of a public sector entity authorised under State law to carry out the work is exempt development (PA Section 232 (2) as prescribed under Schedule 4 of the *Planning Regulation 2017*) and therefore development approval is not required for these activities.

Actions and Recommendations

Vegetation that is not required to be cleared for the proposed development should be protected from construction impacts in accordance with the *AS 4970-2009 Protection of Trees on Development Sites*.

8.3.2 Environmental Protection and Biodiversity Conservation Act 1999

Context

The purpose of the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) is to ensure the protection and management of nationally and internationally important flora, fauna, ecological communities and heritage places as defined in the EPBC Act.

Proposal

The federal EPBC Protected Matters Report identified some EPBC species (or their habitat) which may be present within a 1km radius of the site including including two critically endangered ecological communities, five critically endangered, seven endangered and 13 vulnerable fauna species, seven vulnerable flora species and a number of migratory species.

Actions and Recommendations

The presence of any invasive, declared or pest species (flora or fauna) will be confirmed prior to commencement of construction. If found, these will be removed in accordance with legislative requirements.

8.3.3 Nature Conservation Act 1992

Context

The *Nature Conservation Act 1992* (NCA) protects all plants that are native to Australia. The *Nature Conservation (Wildlife Management) Regulation 2006* regulates the clearing of protected plants in Queensland.

Proposal

The NCA Wildlife Online database indicates records of one vulnerable species (koala – *Phascolarctos cinereus*) being present within a 1km radius of the site (refer to **Appendix 7**).

The DES Protected Plants Flora Survey Trigger Map also notes the site is not mapped as a ‘high risk’ area under the Protected Plants Flora Survey Trigger Map (refer to **Appendix 6**).

Actions and Recommendations

Trees and other vegetation to be removed should be confirmed and inspected for hollows and nests by a suitably qualified person prior to clearing. If hollows, nests or other potential breeding places are present, they must be assessed by a suitably qualified person to determine if they are breeding places in accordance with the NCA. If any breeding places are located within the development footprint a Species Management Plan (SMP) must be approved by DES prior to impacting on the breeding place. Mitigation measures such as the establishment of nest boxes (or other relevant measures) prior to tree clearing may also be required under the SMP.

If any clearing is proposed, and where the vegetation is considered ‘in the wild’, then a flora survey of the clearing impact area must be undertaken prior to any potential clearing works. This survey is to comply with all requirements of the Flora Survey Guidelines.

8.3.4 Protected and Vulnerable Areas

Context

The map of referable wetlands is a state-wide regulatory map under the *Environmental Protection Regulation 2008*. It identifies the location of wetland protection areas (WPA) in Great Barrier Reef (GBR) catchments and also identifies wetlands of high ecological significance (HES) and general ecological significance (GES) across the state.

Proposal

With reference to the relevant state interest trigger maps in **Appendix 5**, the site is not mapped as ‘Fish Habitat’, ‘Waterways for Waterway Barrier Works’ or ‘Referable Wetlands’ under the *Fisheries Act 1994* or the *Environmental Protection Act 1994*.

There are no mapped waterways or referable wetlands identified on the school site.

Actions and Recommendations

DoE will ensure the Contractor, prior to works commencing on site, prepares and implements a Construction Environmental Management Plan to ensure matters such as sediment control,

surface water runoff, dust and noise are managed and protects the surrounding environment from nuisance and harm associated with this development.

8.3.5 Koala Conservation

Context

The *State Government Supported Community Infrastructure Koala Conservation Policy 2017* (The Policy) regulates the planning and delivery of all Queensland Government supported infrastructure projects, as listed under Schedule 5 of the *Planning Regulation 2017*, and applies to land within the South East Queensland Koala Protection Area (SEQKPA) which result in:

- the clearing of native vegetation that will result in a total cleared area of less than 500m²;
- a new building and any reasonably associated infrastructure with a total development footprint of less than 500m²;
- an extension to an existing building and any reasonably associated infrastructure if the extension results in a total development footprint of less than 500m²;
- extracting gravel, rock or sand from an area of less than 5,000m²; and
- excavating or filling an area of less than 5,000m².

Where a proposed development is located within the SEQKPA and meets any of the above criteria, then a Koala Self-Assessable Management Plan needs to be prepared.

Proposal

The subject site is located within the Somerset Regional Council and therefore sits outside of the SEQKPA. A Koala Self-Assessment and Conservation Management Plan is therefore not required.

Actions and Recommendations

No further actions or recommendations are considered necessary.

8.3.6 Invasive Species

Context

The *Queensland Biosecurity Act 2014* refers to 'Designated Biosecurity Matter' which includes pest plants and animals. These are further classified as either 'Prohibited' or 'Restricted':

- Prohibited Matter is biosecurity matter not currently present or known to be present in Queensland. It is prohibited because it may have a significant adverse effect on a biosecurity consideration if it did enter Queensland.
- Restricted Matter is biosecurity matter found in Queensland that may have adverse effects on biosecurity consideration if conditions or restrictions under the Act were not imposed.

Prohibited Plants are listed in Schedule 1 Part 3 and Prohibited Animals are listed in Schedule 1 Part 4 of the *Biosecurity Act 2014*. Restricted Plants and Restricted Animals are also listed in Schedule 2 Part 2 of the *Biosecurity Act 2014*.

Proposal

The EPBC Protected Matters Report as included in **Appendix 7** identified invasive fauna and invasive flora species within 1km radius of the site.

With respect to the above, it is noted the school site is well maintained and therefore unlikely that any declared species will be present on the site.

Actions and Recommendations

Prior to works commencing on site, the DoE will ensure the Contractor undertakes a site inspection to confirm presence of any pest plants and/ or animals. If found, these will be removed in accordance with legislative requirements.

8.4 Soils and Geology

8.4.1 Geotechnical Conditions

Context

Investigations into the ground conditions are required prior to any development works on the site. The investigations should be carried out to establish the nature and type of subsurface material at the site to allow engineering assessment of site classification (AS2870); earthworks recommendations; rock excavatability; groundwater control; and suitable foundation types.

Proposal

A geotechnical investigation has been prepared and included in **Appendix 12** and notes the following:

- the subsurface profile encountered typically comprised uncontrolled fill (sandy/ gravelly clay) and residual silty sand and clay, weathered sandstone and sandstone;
- although groundwater was not encountered during the time of investigation, inflow might be countered during piling and provision should be made by the Contractor to include provision for the use of temporary steel liners (if required) to remove groundwater;
- given the presence of the mature trees where the proposed building is to be sited, reference is made to AS 2870 and the site in its present state would be given a 'Class P' (problem site) classification requiring design by engineering principles;
- it is recommended all cut and fill batters incorporate crest and toe drainage, and be covered with topsoil and vegetation to provide long term erosion protection;
- any short term vertical cuts (i.e. trenches) of up to 1.2 m may be undertaken in any controlled filling or natural competent soils;
- it is expected that excavated materials to about 0.5m depth will comprise medium to high plasticity clays and with the exception of the topsoil, could be re-used as structural filling once appropriately blended and moisture conditioned;
- depending on site preparation earthworks carried out, either high or deep level footings would be appropriate for the site. If 'controlled' filling is placed as per the recommendations in this report, the upper level footings (pads, strips or raft), could also be adopted for the site;
- structural footings and slab design should consider the classification following bulk earthworks and include slab stiffening;
- foundations bearing on differing strata will experience differential settlements which may require extending foundations to uniform bearing strata; and
- should structural design loads be such that high level footing are not suitable foundations, bored piles are expected to be a suitable footing option.

Actions and Recommendations

The DoE will ensure the Contractor, as part of detailed design, has consideration to the recommendations as noted in the Geotechnical Report and otherwise confirms the ground conditions and building requirements as detailed design progresses.

8.4.2 Erosion Risk

Context

The release of sediments or other contaminants to water is an offence under the *Environmental Protection Act 1994*. All activities that expose soil have the potential to result in release of sediment to waterways or stormwater systems.

Proposal

To minimise the risk of releasing sediment (and other contaminants) to waters during construction and to meet the General Environmental Duty under the *Environmental Protection Act 1994*, a site erosion and sediment control plan (ESCP) is to be prepared in accordance with the IECA Best Practice Erosion and Sediment Control prior to commencing construction.

Actions and Recommendations

The DoE will ensure the Contractor prepares an ESCP that addresses the erosion risks identified for the site, and that the Plan is implemented and monitored throughout the construction phase for the proposed development.

8.4.3 Acid Sulfate Soils

Context

The site is on land between 50m – 70m AHD and not within a low-lying coastal area. The site is not mapped as being affected by acid sulfate soils (ASS) in any local or state mapping.

Proposal

The proposal will involve minor earthworks and is not anticipated to result in any disturbance or impacts to ASS.

Actions and Recommendations

No further actions or recommendations are considered necessary.

However, if potential or actual ASS is identified during construction, an ASS investigation should be carried out and managed in accordance with an ASS management plan. Should development works involve the removal of 100m³ or more; or filling of 500m³ or more of the material with an average depth off >0.5m, then the SPP State Interest – Water Quality will be triggered.

8.4.4 Contaminated Land

Context

With reference to **Appendix 8**, the site is not listed on the Environmental Management Register (EMR) or Contaminated Land Register (CLR).

Proposal

The proposal will not involve any EMR activities nor involve uses which could contaminate the land.

Actions and Recommendations

No further actions or recommendations are considered necessary.

8.5 Heritage and Native Title

8.5.1 Historical Heritage

Context

The site is not listed on the Local or State Heritage register. A search of the Australian Government's Australian Heritage Places indicated that the site is not listed on the database.

Proposal

As no heritage values exist on site the proposed development will have no further impacts.

Actions and Recommendations

No further actions or recommendations are considered necessary.

8.5.2 Cultural Heritage

Context

The *Aboriginal Cultural Heritage Act 2003* (ACHA) requires that a person must exercise Due Diligence and reasonable precaution before undertaking an activity which may harm Aboriginal Cultural Heritage. The ACHA – Duty of Care Guidelines (the Guidelines) was gazetted in April 2004 to provide guidance on actions required to demonstrate compliance with this Act.

Proposal

Search results from the Department of Aboriginal and Torres Strait Islander Partnership (DATSIP) cultural heritage database shows no records of indigenous cultural heritage within 1km of school site. It should be noted that the absence of recorded Aboriginal cultural heritage places reflects a lack of previous cultural heritage surveys of the area. Therefore, the search is not likely to reflect a true picture of the Aboriginal cultural heritage values of the area.

The proposed development is to be located within an area subject to previous clearing. Therefore, the nature of the activity is likely to be classified as 'area previously subject to significant disturbance' – Category 4, under the ACHA, Section 28 Duty of Care Guidelines. Subject to measures set out in paragraph 5.6-5.12 under Category 4 of the Duty of Care Guidelines, the proposed activities can proceed without further cultural heritage assessment.

Actions and Recommendations

No further actions or recommendations are considered necessary.

However it should be noted that any Aboriginal cultural heritage, if found, is protected under the ACHA even if DEHP has not recorded it. Contract documents should include provisions for works to cease and the relevant Aboriginal Party to be contacted if evidence of Aboriginal cultural heritage is encountered during site works.

8.5.3 Native Title

Context

Native title recognises the traditional rights and interests to land and waters of Aboriginal and Torres Strait Islander people in accordance with the *Native Title Act 1993* (NTA).

Proposal

The proposed development will require confirmation of native title prior to works proceeding.

Actions and Recommendations

DoE will ensure Native Title is undertaken and confirmed prior to construction.

8.6 Natural Hazards

8.6.1 Flooding

Context

The existing classrooms and maintenance shed are affected by flooding, with depths generally less than 0.2m across the site. The Brisbane River Catchment Flood Study was completed in 2017 with a review of the study noting that the site sits approximately 140m west of the ARI Brisbane River flood event inundation and is not affected during that event.

Proposal

A Detailed Flood Impact Assessment and Stormwater Management Plan has been prepared for the proposal and is included as **Appendix 10**.

Flood modelling has been undertaken for the proposed development area, and has considered the existing and proposed development based on the 10, 20, 50 and 100 year ARI events. The design incorporates new drainage measures which will ultimately reduce the flooding issues on the site for all events.

Furthermore the modelling also notes that existing flood impacts to the adjoining Block F and Block E, which are to the immediate north of the proposed manual arts building, will no longer be impacted.

Actions and Recommendations

Whilst the proposed pipe drainage reduces flooding for the new building, the minimum floor level for the new building is recommended to be 61.0m AHD. In addition, local drainage should be incorporated to reduce local overland flow runoff from the south entering the new building.

8.6.2 Bushfire

Context

The site is not mapped under local or state mapping as affected by bushfire hazards.

Proposal

The proposed building site is not mapped under local or state mapping as affected by bushfire hazards. The proposal will not result in any bushfire impacts.

Actions and Recommendations

No further actions or recommendations are considered necessary.

8.6.3 Landslip

Context

The site is not mapped as affected by landslip.

Proposal

The proposal will involve minor earthworks to accommodate the proposed new facilities however will not result in the creation of any potential landslip areas over the site.

Actions and Recommendations

No further actions or recommendations are considered necessary.

8.7 Socio-economic Impacts

8.7.1 Socio-economic Profile

Context

Consideration should be given to the social and economic impacts from the proposed development, which includes matters such as employment opportunities, access to services, quality of education and the demographics profile.

Proposal

The Lowood SHS will continue to provide positive socio-economic impacts, including:

- continued long-term educational and associated (i.e. trades) employment opportunities;
- investment of \$2.5 million and the associated benefits to the economy;
- improved educational facilities that meets the projected population growth;
- meeting the demographic profile and providing the community with access to educational services; and
- focus on delivering quality education, with a curriculum that caters for the varied needs and skills of students.

Actions and Recommendations

No further actions or recommendations are considered necessary.

8.8 Construction Impacts

8.8.1 Construction Management

Context

During development and construction it is essential to minimise impacts on students, staff, neighbouring residents and the general public. Consideration for the planning of construction works within an operating school environment is paramount.

Proposal

A Construction Environmental Management Plan (CEMP) is to be prepared for the development. The plan will include at a minimum default noise standards detailed in the *Environmental*

Protection Act 1994, dust mitigation methods, waste control and erosion and sediment control plans.

Actions and Recommendations

The DoE will ensure a CEMP is prepared during detailed design and that the Contractor implements and acts in accordance with the Plan during construction.

8.8.2 Hours of Construction Operation

Context

The site is located in an urban area and construction activities should be within appropriate hours to avoid impacts to nearby residences.

Proposal

Unless otherwise approved in any development approvals and/or statutory permits, works must comply as a minimum with default noise standard detailed in the *Environmental Protection Act 1994* including:

- on a business day or Saturday, before 6.30am or after 6.30pm; or
- on any other day, at any time.

Actions and Recommendations

The DoE will ensure the default noise standards are included as part of the Contractor's CEMP.

8.8.3 Traffic

Context

Traffic associated with construction activities may create nuisance impacts to nearby properties and amenity.

Proposal

Traffic associated with construction activities will require internal service road access via the access points from Prospect Street.

Actions and Recommendations

With reference to Section 8.8.2, DoE will ensure the hours of construction operation are included as part of the Contractor's CEMP.

8.8.4 Air Quality

Context

Construction activities may cause air quality impacts (i.e. dust) to nearby properties.

Proposal

Potential air quality impacts will be treated with water and/ or appropriate procedures to limit the likelihood of discomfort to any students, staff and neighbouring personnel.

Actions and Recommendations

The DoE will ensure appropriate air quality management procedures are included as part of the Contractor's CEMP.

8.8.5 Noise

Context

The school adjoins sensitive uses in residential dwellings to the immediate west and will likely result in potential noise impacts from construction vehicles and development activities.

Proposal

Potential noise impacts during the construction stage will be identified during detailed design and appropriate mitigation measures included to ensure noise is minimised where possible. As noted in section 8.8.2, DoE will ensure the hours of construction operation are included as part of the CEMP and adhered to by the Contractor.

Actions and Recommendations

With reference to section 8.8.2, DoE will ensure the hours of construction operation are included as part of the Contractor's CEMP.

8.8.6 Light

Context

Potential lighting impacts from construction activities to neighbouring properties needs consideration.

Proposal

Unless otherwise approved, construction hours will be limited to the days and hours as specified under the *Environmental Protection Act 1994*, and listed in section 8.8.2 of this Report.

Given the proposed operation times for construction, the proposed works is unlikely to generate any adverse lighting impacts.

Actions and Recommendations

No further actions or recommendations are considered necessary.

8.8.7 Hazardous Materials

Context

According to the Built Environment Materials Information Register (BEMIR) records, a number of school buildings and structures are listed on the school asbestos register as containing potential asbestos materials.

Proposal

The proposed development involves the construction of a new manual arts facility and only a small storage shed will require removal as part of the proposed development works.

Actions and Recommendations

Development activities which involves demolition of existing structures will be subject to a hazardous materials survey to identify the presence of asbestos, lead or other materials hazardous to human health. Where such materials are identified, demolition and removal is to be undertaken by a suitably licenced contractor.

8.8.8 Waste

Context

Construction waste and hazardous materials must be appropriately disposed of during construction activities to avoid impacts to the surrounding built and natural environment.

Proposal

Any regulated waste generated during construction will be handled and disposed of appropriately and in accordance with the requirements of the *Environmental Protection Act 1994*.

Actions and Recommendations

It is unlikely the activity will generate any regulated waste. Waste that will be generated by the proposed development is to be confirmed during the planning and design stage. Waste management facilities are to be designed and provided, or modified (if existing), in conjunction with a waste management plan if necessary.

8.9 Operational Impacts

8.9.1 Traffic

Context

Traffic associated with the school has potential to cause impacts to the continuing operation of the road network, in addition to nearby properties and amenity.

Proposal

The proposed works relating to the Lowood SHS will result in only a minor increase in traffic movements to, and from, the school. Based on the school population growth forecasts, it is expected that the total SEC is expected to accommodate for up to 919 students and 80 FTE staff by the 2020 calendar year. This represents an overall increase of 70 students and 11 FTE staff, which only equates to an average of 23.33 students and 3.66 staff per year and is therefore not considered significant enough to impact on the existing traffic network.

The traffic analysis indicates the proposed expansion will not have a significant impact on the operation of the external road network and no upgrades are therefore warranted.

Actions and Recommendations

As noted in section 8.1.1, 8.1.2 and 8.1.3, the proposed works is will result in a minor increase in school population and is not anticipated to have a material impact to the existing operation of the road or traffic network.

It is recommended the school undertakes monitoring of future traffic movements at the school and if required, manage or modify internal traffic arrangements to mitigate any external impacts.

8.9.2 Air Quality

Context

The existing school does not produce any emissions, gasses or negative air quality impacts.

Proposal

The proposed scope of works is for educational uses which aims to provide improved learning facilities for the school population. The proposal will not result in any emissions, gasses or negative air quality impacts.

Actions and Recommendations

No further actions or recommendations are considered necessary.

8.9.3 Noise

Context

The proposed development has the potential to create noise impacts due to workshop noise and mechanical plant, in particular to:

- R1 – which includes the residential properties to the western boundary (at Ramsey Court); and
- R2 – which includes the residential properties to the east (at Glamorgan Vale Road).

Proposal

An Acoustic Report has been prepared and included in **Appendix 10**.

The existing residences to the west of the school are located approximately 229m from the northern opening of the construction courtyard and the existing residences to the south-east of the school are located approximately 211m from the southern wall of the dust plant room.

With regards to potential noise impacts from the workshop, noise levels from the construction courtyard, materials store, workshop and dust plant room have been calculated at the nearest residences. A summary of the calculations of the predicted noise levels from each room onto the nearest receivers are presented in the table below:

| Summary of Predicted Noise Levels at Sensitive Recievers | | |
|--|------------------------------------|--------------|
| Noise Source | Predicted Noise Level, $L_{eq}dBA$ | |
| | Residence R1 | Residence R2 |
| Courtyard | 33 | 33 |
| Workshop | 35 | 36 |
| Materials Store | 26 | 25 |
| Dust Plant Room | 28 | 30 |
| TOTAL | 38 | 39 |

Calculations have assumed all windows and doors are open in each of the areas except the dust plant room. It was assumed that the dust plant room would be a fully enclosed space. Any openings in the enclosure (e.g. for ventilation) may require acoustic attenuation. It is noted that at this stage the specific plant room equipment is unknown and will require further investigations as detailed design progresses.

Further to the above, the manual arts building is also likely to include mechanical plant which could generate noise impacts. At this stage the mechanical design is not complete and will require further investigations as detailed design progresses.

Actions and Recommendations

A noise assessment has been conducted for the proposed manual arts building at Lowood SHS. The following recommendations will be undertaken by DoE:

- predicted noise emission levels at the nearest sensitive receivers from activities occurring within the manual arts building are predicted to comply with the relevant criteria with windows and doors open, based on the construction described in Section 6.2 of the Acoustic Assessment;
- the requirement for acoustic attenuation of openings can be revised later once dust plant room equipment has been specified and noise data provided; and
- mechanical plant is to be designed, selected and located to achieve a daytime noise limit of 38 dBA_{Leq,adj,T} outside adjoining residential dwellings.

8.9.4 Light

Context

The Lowood SHS operates during normal business hours, with school operating from 8:55am and finishing at 3:00pm, and office hours operating from 8:15am until 3:30pm.

Proposal

The proposal is not considered to result in the generation of adverse lighting impacts. Lighting will be provided to the facility, including the parking area, in accordance with the applicable Australian Standards.

Actions and Recommendations

No further actions or recommendations are considered necessary.

8.9.5 Safety and Security

Context

All schools require appropriate safety and security measures and should be prepared in accordance with DoE's *Security Design Requirements*. The design of the Security System will address the functional, installation and technical upgrade and expandability requirements that provides for future proofing, flexibility and expandability.

Proposal

The Lowood SHS has a security risk rating of 'Low'. The risk report to determine appropriate physical and/ or electronic security measures is yet to be finalised by the DoE.

Actions and Recommendations

The DoE and relevant school stakeholders will confirm appropriate physical and/ electronic security measures for inclusion within the cost plan for the proposed scope of works and ensure it is prepared in accordance with DoE's *Security Design Requirements* for a 'Low' risk site.

PART G – CONSULTATION

9 Consultation Engagement

9.1 Stakeholders

The stakeholders relevant for consultation with regards to the proposed designation includes:

Affected Parties

- Somerset Regional Council.

State Government Departments

- Department of State Development, Manufacturing, Infrastructure and Planning.

Elected Representatives

- Mayor Graeme Lehmann– Somerset Regional Council;
- Mr James (Jim) McDonald – State Electoral District of Lockyer; and
- Mr Scott Buchholz MP – Federal Electoral Division of Wright.

Stakeholders

- Adjoining landowners; and
- Surrounding landowners.

Native Title Party

- Jinibara and Yuggera Ugarapul People

School Representatives

- Principal –Lowood SHS; and
- Lowood SHS Parent’s and Citizens’ (P&C) Association.

9.2 Community Engagement Plan

The following community engagement plan has been adopted as part of this Infrastructure Designation process.

| Activity | Description | Stakeholder Group | Actions |
|-------------------------------------|--|---------------------------|----------------------------|
| Prior to public notification | | | |
| Email | Email seeking advice about infrastructure requirements. | Somerset Regional Council | Email Meet if requested |
| Meeting | If stakeholder requests a meeting, a meeting will be conducted to present the project and discuss matters of interest to the stakeholder—in particular impacts on local government infrastructure. | Somerset Regional Council | Meet if requested. |

| During public notification | | | |
|-------------------------------------|--|--|--|
| Public notice | Place public notice in local newspaper | Broader community | Prepare and book public notice |
| Street signage | Place street signage to the Prospect Street frontage | Broader community | Prepare and erect public notice signage to street |
| Update web content | Update DHPW web page with information about the Infrastructure Designation proposal, including the EAR and details about the engagement process. | Broader community | Prepare content update Publish content update |
| Letters to stakeholders | Prepare letters that outline the Infrastructure Designation proposal and the engagement process. Distribute the letters. | Affected parties and stakeholders | Prepare letter Distribute |
| Email address and telephone contact | Email: infrastructuredesignation@dsmip.qld.gov.au Phone: 1300 967 433 Submissions during public notification can be made online or by infrastructuredesignation@dsmip.qld.gov.au | Affected parties, stakeholders and broader community | Publish contact information in relevant public notices and letters |

9.3 Initial Consultation

Prior to the commencement of the Infrastructure Designation, the DoE and key Lowood SHS representatives undertook initial consultation activities with:

| Stakeholder Group | Date | Description |
|---|------------|---|
| Somerset Regional Council | 10/04/2018 | <ul style="list-style-type: none"> Provide email correspondence to SRC with information on Infrastructure Designation Proposal; |
| | 30/04/2018 | <ul style="list-style-type: none"> Correspondence received from SRC; and EAR addresses issues as identified in correspondence. |
| DSDMIP | 07/06/2018 | <ul style="list-style-type: none"> Provide email correspondence to DSDMIP with information on Infrastructure Designation Proposal |
| | 21/06/2018 | <ul style="list-style-type: none"> Pre-lodgement meeting to discuss proposal; Confirm school capacity and technical reporting requirements (i.e. traffic); and Confirm relevant stakeholder groups and consultation strategy. |
| Lowood SHS Principal, Deputy Principal, Business Manager and Infrastructure Officer | 15/03/2018 | <ul style="list-style-type: none"> Project Start-up meeting to discuss commencement of project; Overview of facilities brief provided with space allocations and functions confirmed with school; and Existing services capacity discussed; Building location and layout initial discussions; Room Data Sheets provided to the school for preparation; |

| | |
|------------|--|
| | <ul style="list-style-type: none"> • Communication, approvals and timelines discussed. |
| 29/03/2018 | <ul style="list-style-type: none"> • Relocatable building location discussed between school and planning officer; • Presentation of 3 different layouts for the new building and amenities and for DoE and the school to decide. |
| 20/04/2018 | <ul style="list-style-type: none"> • Revised preliminary plan presented and discussed; • Planning Officer and Head of Department to visit Highfields school to assist with equipment selection; • School requested layout changes; • Timelines for layout approval discussed and agreed. |
| 20/06/2018 | <ul style="list-style-type: none"> • SDPP Presented to the school for sign off; • School requested some changes to equipment and layout; • School and Planning Officer signed SDPP, on the basis that the layout is updated in accordance with school requests |
| 22/06/2018 | <ul style="list-style-type: none"> • School received and acknowledged the revised layout. |

PART H – CONCLUSION

This EAR has been prepared by BAS, on behalf of DoE, seeking an Infrastructure Designation of land for Lowood SHS, located at 34 Prospect Street, Lowood and otherwise described as Lot 89 on CC3323

The PA prescribes the way in which a designation can be undertaken. Chapter 2, Part 5 of the PA prescribes that a Minister, before designating land for infrastructure, must be satisfied that for development the subject of the proposed designation:

- the infrastructure will satisfy statutory requirements, or budgetary commitments, for the supply of the infrastructure; or
- there is or will be a need for the efficient and timely supply of the infrastructure.

Educational and community facilities are defined as community infrastructure under Schedule 5, Part 2 of the *Planning Regulation 2017*, being assets necessary to support the community and for the public benefit. The proposed designation as part of this proposal is therefore best described as:

6 educational facilities

The designation affirms the existing use of the site as an educational establishment, and will facilitate the immediate planned works at the school and future planned developments on the site consistent with the designation purpose. The proposed infrastructure will facilitate the efficient and timely supply of infrastructure; and satisfy statutory requirements and budgetary commitments of the State for the supply of community infrastructure.

The assessment provided within the EAR provides key details with respect to Lowood SHS and has undertaken an assessment of the proposed infrastructure against the relevant statutory frameworks, incorporating local and state assessment criteria and Commonwealth legislation.

PART I – APPENDICES

The following is a list of appendices to this Environmental Assessment Report:

| | |
|-------------|--|
| Appendix 1 | Extracts from the <i>Planning Act 2016</i> |
| Appendix 2 | Designation Flowchart |
| Appendix 3 | Property Information |
| Appendix 4 | Contour and Detail Survey |
| Appendix 5 | Proposal Plans |
| Appendix 6 | State Interest Trigger Mapping |
| Appendix 7 | EPBC Protected Matters Report & NCA Wildlife Online Report |
| Appendix 8 | CLR & EMR Search |
| Appendix 9 | Service Infrastructure Plans |
| Appendix 10 | Stormwater Management Plan |
| Appendix 11 | Traffic Assessment |
| Appendix 12 | Geotechnical Investigation |
| Appendix 13 | Acoustic Assessment |

Appendix 1

Extracts from Planning Act 2016



Part 5 Designation of premises for development of infrastructure

35 What is a designation

- (1) A *designation* is a decision of the Minister, or a local government, (a *designator*) that identifies premises for the development of 1 or more types of infrastructure that are prescribed by regulation.
- (2) A designation may include requirements about any or all of the following—
 - (a) works for the infrastructure (the height, shape, bulk, landscaping, or location of works, for example);
 - (b) the use of premises, for example—
 - (i) vehicular and pedestrian access to, and circulation on, premises; and
 - (ii) operating times for the use; and
 - (iii) ancillary uses;
 - (c) lessening the impact of the works or use (environmental management procedures, for example).
- (3) The chief executive may, by notice, require a local government to include a matter in subsection (2) in a designation made by the local government.

Note—

For the effect of a designation on the categorisation of development, see section 44(6)(b).

36 Criteria for making or amending designations

- (1) To make a designation, a designator must be satisfied that—
 - (a) the infrastructure will satisfy statutory requirements, or budgetary commitments, for the supply of the infrastructure; or

-
- (b) there is or will be a need for the efficient and timely supply of the infrastructure.
 - (2) To make or amend a designation, if the designator is the Minister, the Minister must also be satisfied that adequate environmental assessment, including adequate consultation, has been carried out in relation to the development that is the subject of the designation or amendment.
 - (3) The Minister may, in guidelines prescribed by regulation, set out the process for the environmental assessment and consultation.
 - (4) The Minister is taken to be satisfied of the matters in subsection (2) if the process in the guidelines is followed.
 - (5) However, the Minister may be satisfied of the matters in another way.
 - (6) Sections 10 and 11 apply to the making or amendment of the guidelines as if the guidelines were a State planning policy.
 - (7) To make or amend a designation, a designator must have regard to—
 - (a) all planning instruments that relate to the premises; and
 - (b) any assessment benchmarks, other than in planning instruments, that relate to the development that is the subject of the designation or amendment; and
 - (c) if the premises are in a State development area under the State Development Act—any approved development scheme for the premises under that Act; and
 - (ca) if the premises are in a priority development area under the *Economic Development Act 2012*—any development scheme for the priority development area under that Act; and
 - (d) any properly made submissions made as part of the consultation carried out under section 37; and
 - (e) the written submissions of any local government.

37 Process for making or amending designation

- (1) This section is about the process for—
 - (a) making a designation for premises; or
 - (b) amending a designation for premises, including by amending—
 - (i) the area of the premises; or
 - (ii) the type of infrastructure for which the premises were designated.
- (2) If the Minister proposes to make or amend a designation, the Minister must give notice of the proposal to the affected parties.
- (3) However, the Minister need not give the notice to an owner of premises if—
 - (a) a notice has already been given to the owner as part of the consultation for an assessment under section 36(2); or
 - (b) the Minister can not notify the owner after making reasonable efforts.
- (4) The notice must invite the affected parties to make submissions about the proposal to the Minister within a period of at least 15 business days after the notice is given.
- (5) If, after considering any properly made submissions, the Minister decides not to proceed with the proposal, the Minister must give a decision notice to the affected parties.
- (6) If a local government proposes to make or amend a designation, the local government must follow the process in the designation process rules, before the local government makes or amends the designation.
- (7) Sections 10 and 11 apply to the making or amendment of the designation process rules as if the designation process rules were a State planning policy.
- (8) In this section—

designation process rules means rules made by the Minister and prescribed by regulation.

38 Process after making or amending designation

- (1) If, after considering any properly made submissions, the designator decides to make or amend a designation, the designator must publish a gazette notice that states—
 - (a) that the designation has been made or amended; and
 - (b) a description of the designated premises; and
 - (c) the type of infrastructure for which the premises were designated; and
 - (d) for an amendment—the nature of the amendment.
- (2) The designator must give the following things to each affected party and the chief executive—
 - (a) a copy of the gazette notice;
 - (b) a notice of any requirements included in the designation under section 35(2);
 - (c) a notice of how the designator dealt with any properly made submissions.

39 Duration of designation

- (1) A designation stops having effect on the day (the *end day*) that is 6 years after the designation starts to have effect, unless—
 - (a) on the end day—
 - (i) a public sector entity owns, or has an easement for the same purpose as the designation over, the designated premises; or
 - (ii) another entity owns, or has an easement over, the designated premises and construction of the infrastructure for which the premises were designated started before the end day; or

- (b) before the end day—
 - (i) a public sector entity gave a notice of intention to resume the designated premises under the Acquisition Act, section 7; or
 - (ii) a public sector entity signed an agreement to take designated premises under the Acquisition Act or to otherwise buy the premises; or
 - (iii) the designator complies with subsection (3).
- (2) The designator may extend the duration of a designation, for up to 6 years, by publishing a gazette notice about the extension before the designation stops having effect.
- (3) The designator must give notice of the extension of the designation to—
 - (a) if the Minister is the designator—each of the affected parties and the chief executive; or
 - (b) if a local government is the designator—the owner of the premises and the chief executive.
- (4) If a public sector entity discontinues proceedings to resume designated premises, either before or after the end day, the designation stops having effect on the day when the proceedings are discontinued.

40 Repealing designation—designator

- (1) A designator may repeal a designation made by the designator by publishing a gazette notice that states—
 - (a) that the designation is repealed; and
 - (b) a description of the designated premises; and
 - (c) the type of infrastructure for which the premises were designated; and
 - (d) the reasons for the repeal.
- (2) The designator must give a copy of the notice to—

-
- (a) if the Minister is the designator—each of the affected parties and the chief executive; or
 - (b) if a local government is the designator—the owner of the premises and the chief executive.
- (3) Any development started under the designation may be completed as if the designation had not been repealed.
 - (4) Subject to any requirements under section 35(2), a use of the premises that is the natural and ordinary consequence of the development is taken to be a lawful use.

41 Repealing designation—owner’s request

- (1) An owner of an interest in designated premises may request a designator to repeal a designation made by the designator on the basis that the designation is causing the owner hardship.
- (2) Subsection (1) does not apply if—
 - (a) the premises are subject to an easement for the infrastructure for which the premises are designated; or
 - (b) the designation also applies to other premises and relates to a land corridor for the infrastructure; or
 - (c) the premises are a road.
- (3) The request must be in writing, and contain any information that the guidelines made under section 36(3) require.
- (4) The designator must, within 40 business days after receiving the request—
 - (a) repeal the designation, using the process under section 40; or
 - (b) decide to refuse the request; or
 - (c) decide to take other action that the designator considers appropriate in the circumstances.
- (5) The designator must, within 5 business days after making a decision under subsection (4)(b) or (c), give a decision notice to the owner.

42 Noting designation in planning scheme

- (1) This section applies if a local government—
 - (a) makes, amends, extends or repeals a designation; or
 - (b) receives a notice about the Minister making, amending, extending or repealing a designation.
- (2) The local government must include a note about the making, amendment, extension or repeal in—
 - (a) the local government’s planning scheme; and
 - (b) any planning scheme that the local government makes before the designation stops having effect.
- (3) The note must—
 - (a) identify the premises that were designated; and
 - (b) describe the type of infrastructure for which the premises were designated; and
 - (c) state the day when the designation, amendment, extension or repeal started to have effect.
- (4) The local government must include the note in the planning scheme in a way that ensures the other provisions of the scheme that apply to the designated premises remain effective.
- (5) To remove any doubt, it is declared that—
 - (a) the note is not an amendment of a planning scheme; and
 - (b) a designation is taken to be part of a planning scheme; and
 - (c) a designation is not the only way that a planning scheme may identify infrastructure; and
 - (d) a designation does not affect the provisions of a planning scheme that apply to designated premises, even after the designation stops having effect.

Appendix 2

Designation Flowchart

Indicative process

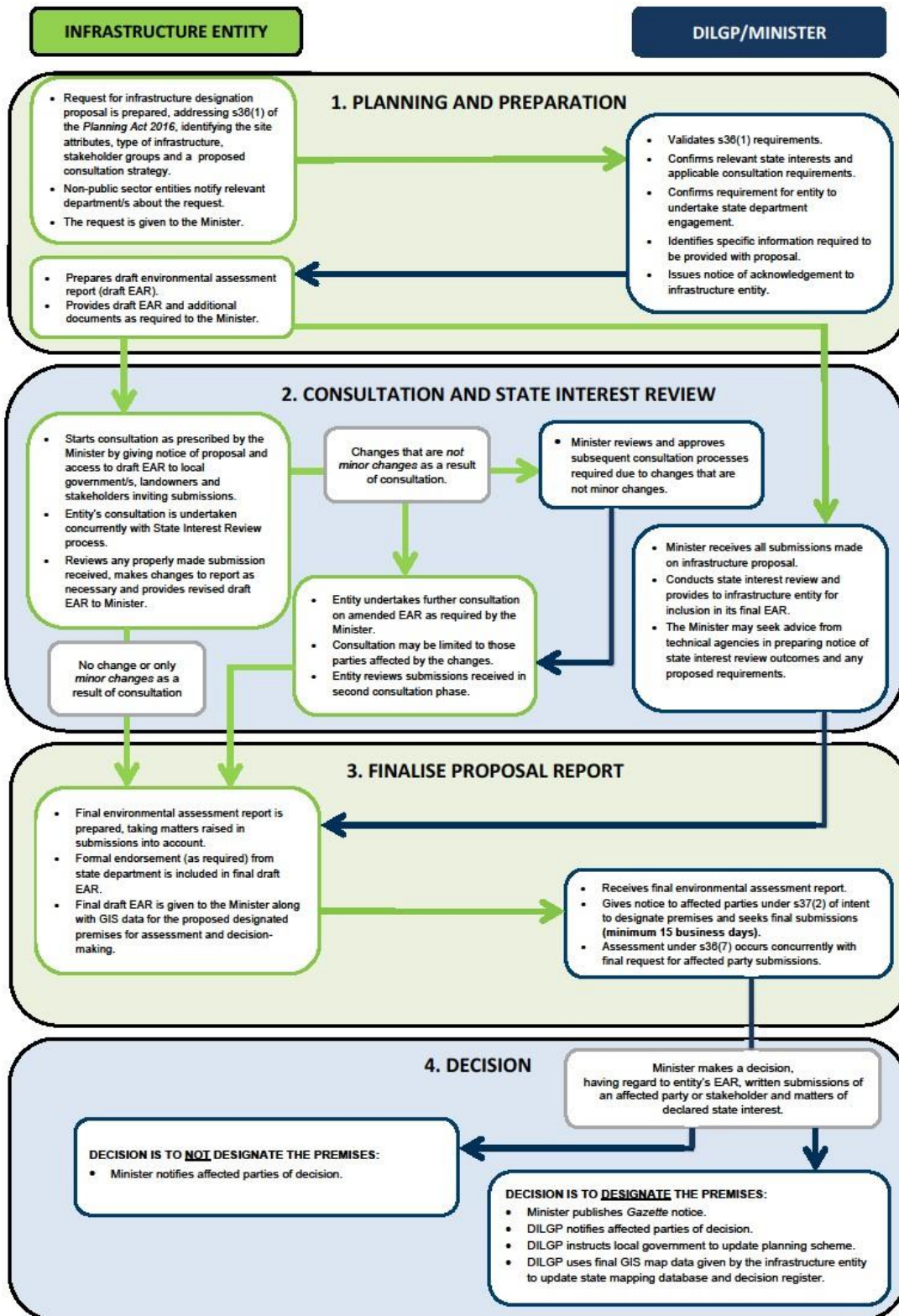


Figure 3: Flow chart of the ministerial designation process under the MGR

Appendix 3

Property Information

CURRENT TITLE SEARCH

DEPT OF NATURAL RESOURCES AND MINES, QUEENSLAND

Request No: 27762117

Search Date: 16/01/2018 16:09

Title Reference: 50564989

Date Created: 22/07/2005

Previous Title: 40046508

REGISTERED OWNER

Dealing No: 708842605 22/07/2005

THE STATE OF QUEENSLAND

(REPRESENTED BY DEPARTMENT OF EDUCATION AND TRAINING)

ESTATE AND LAND

Estate in Fee Simple

LOT 89 CROWN PLAN CC3323

Local Government: SOMERSET

EASEMENTS, ENCUMBRANCES AND INTERESTS

1. Rights and interests reserved to the Crown by
Deed of Grant No. 40046508 (Lot 89 on CP CC3323)

ADMINISTRATIVE ADVICES - NIL

UNREGISTERED DEALINGS - NIL

CERTIFICATE OF TITLE ISSUED - No

Corrections have occurred - Refer to Historical Search

** End of Current Title Search **

COPYRIGHT THE STATE OF QUEENSLAND (DEPT OF NATURAL RESOURCES AND MINES) [2018]
Requested By: SMIS .

FOR OPENING NOTIFICATIONS SEE BACK

D.M.S. Form 5.8.9

204

PERMANENT MARKS

| P.M. | Bearing | Dist. | Number |
|--------|---------|-------|--------|
| 1- OPM | 233°15' | 4.975 | 72054 |
| 5- OPM | 134°54' | 4.25 | 72056 |

GG 1983.2.931
AREA TO BE OPENED
AS ROAD
 (2, 6, 7, 4) **440m²**

REFERENCE MARKS

| Stn | To | Bearing | Dist. | Brand |
|-----|-----|---------|-------|-------|
| 1 | OIP | 0°0' | 1.0 | |
| 2 | Pin | 0°0' | 1.0 | |
| 4 | Pin | 0°0' | 1.0 | |
| 5 | OIP | 0°0' | 1.0 | |

TRAVERSES ETC

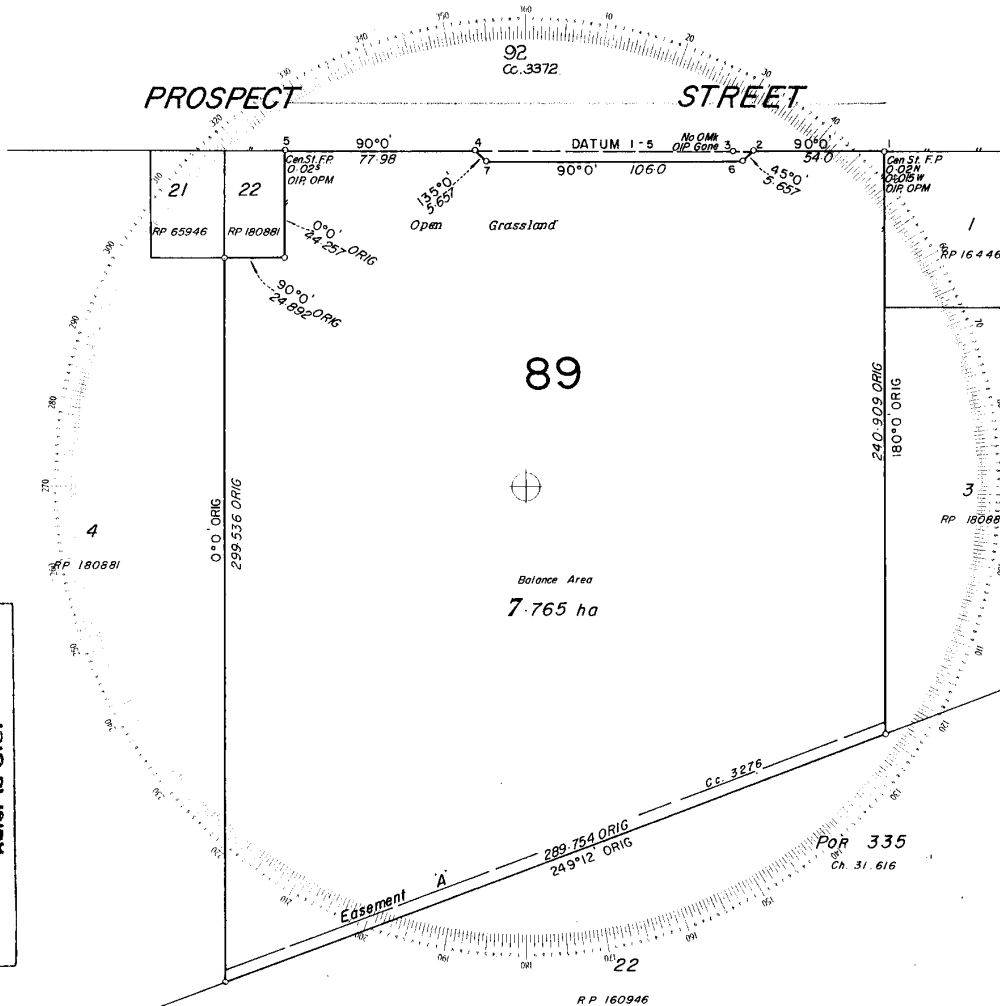
| Line | Bearing | Dist. |
|------|---------|-------|
| 2-3 | 270°0' | 8.0 |
| 2-4 | 270°0' | 114.0 |

Branded Peg placed at Stations
 2, 4, 6, and 7

DRAWING OF PLAN MUST BE RESTRICTED TO THE SPACE INSIDE THE BLUE LINES

For Additional Plans & Documents Refer to C.S.P.

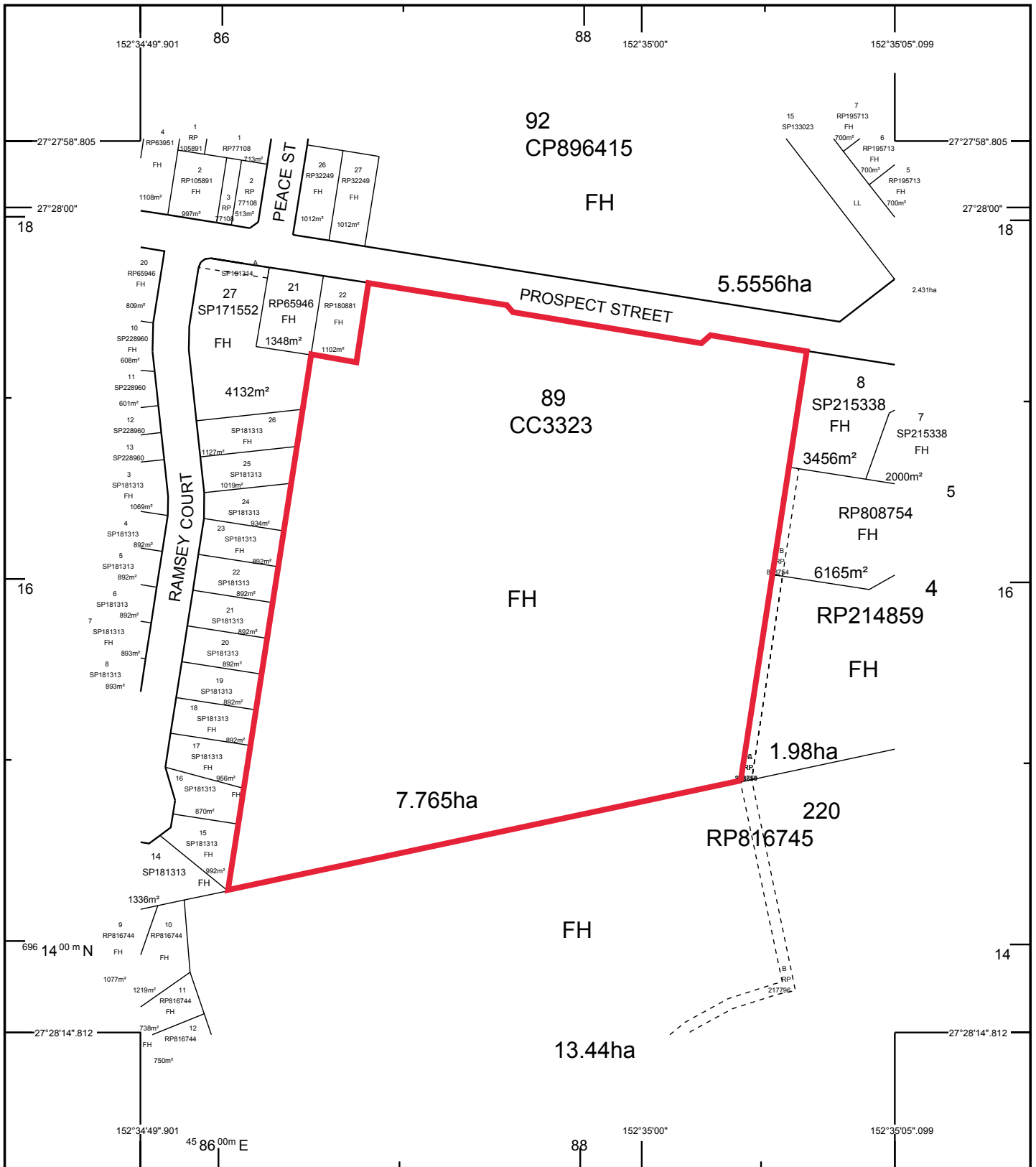
DRAWING OF PLAN MUST BE RESTRICTED TO THE SPACE INSIDE THE BLUE LINES



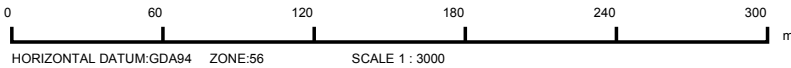
Original information has been copied and compiled from plan Cc.3276 in the Department of Mapping and Surveying.

| | | | | | |
|--|--|--------------|------------------------------------|--|---|
| I, Ernest Joseph Ian Hargrave hereby certify that the company have surveyed the land comprised in this plan (either personally or by personally) for whose work the company accept responsibility, that the plan is accurate, that the said survey was performed in accordance with the Surveyors Act 1977 and the Surveyors Regulation 1978 and that the said survey was completed on 28.1.82. Ernest Joseph Ian Hargrave Licensed Surveyor Date 28.1.82 SURVEY RECORDS ARE F/Ns. LOGGED | MERIDIAN LINE PLAN BEARING A.M.G. BEARING Vide Cc.3276 | | PLAN OF PORTION 89 SCALE 1:1500 | | PARISH TARAMPA County Churchill L.A. District Ipswich |
| | AUTHORITY LAB. 2949/82 D.M.S. REF. K1/202 DRAWN B.A.W. REGISTERED 25.7.83 CHARTED STRONG ROOM MAP REF. TH LOWOOD & 7443-332 | PLAN Cc.3323 | | | |

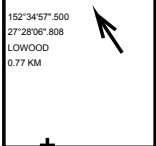
CROWN COPYRIGHT RESERVED, DEPARTMENT OF MAPPING AND SURVEYING, QUEENSLAND.



STANDARD MAP NUMBER
9443-33242



MAP WINDOW POSITION & NEAREST LOCATION



SUBJECT PARCEL DESCRIPTION

| | |
|------------------|-------------------|
| DCDB | |
| Lot/Plan | 89/CC3323 |
| Area/Volume | 7.765ha |
| Tenure | FREEHOLD |
| Local Government | SOMERSET REGIONAL |
| Locality | LOWOOD |
| Segment/Parcel | 6326/26 |

CLIENT SERVICE STANDARDS

| | |
|---|------------|
| PRINTED (dd/mm/yyyy) | 16/01/2018 |
| DCDB | 15/01/2018 |
| Users of the information recorded in this document (the Information) accept all responsibility and risk associated with the use of the Information and should seek independent professional advice in relation to dealings with property. | |
| Despite Department of Natural Resources and Mines(DNRM)'s best efforts, DNRM makes no representations or warranties in relation to the Information, and, to the extent permitted by law, exclude or limit all warranties relating to correctness, accuracy, reliability, completeness or currency and all liability for any direct, indirect and consequential costs, losses, damages and expenses incurred in any way (including but not limited to that arising from negligence) in connection with any use of or reliance on the Information | |
| For further information on SmartMap products visit http://nrw.qld.gov.au/property/mapping/blinmap | |

SmartMap

An External Product of
SmartMap Information Services
Based upon an extraction from the
Digital Cadastral Data Base

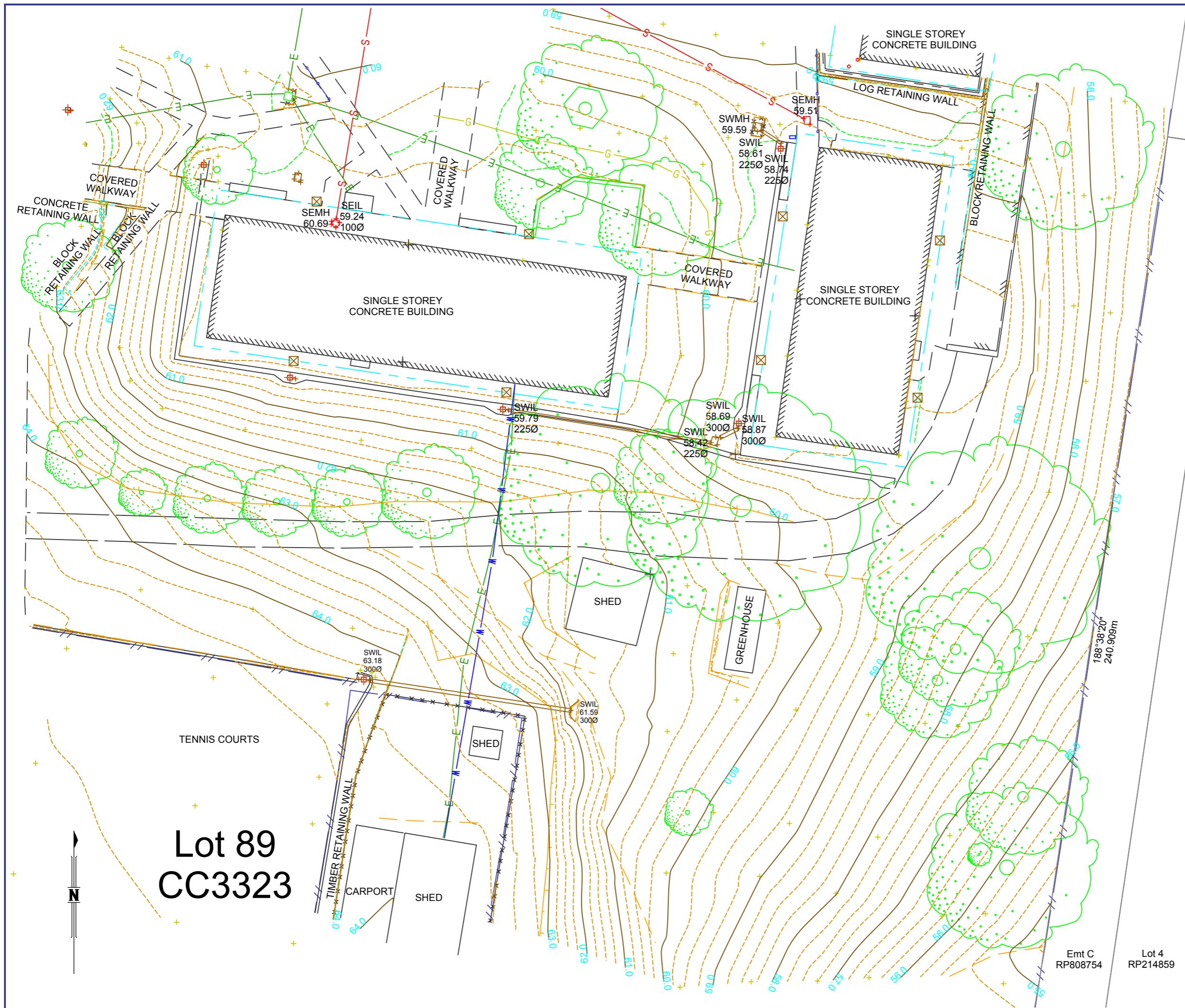


(c) The State of Queensland,
(Department of Natural
Resources and Mines) 2018.



Appendix 4

Contour + Detail Survey



| FEATURE | DESCRIPTION | FEATURE | DESCRIPTION |
|----------|------------------|----------|--------------------|
| [Symbol] | Building Line | [Symbol] | Parking Meter |
| [Symbol] | Roof Ridgeline | [Symbol] | Traffic Light |
| [Symbol] | Ret Wall Base | [Symbol] | Traffic Pit |
| [Symbol] | Ret Wall Top | [Symbol] | Sign |
| [Symbol] | Comms Conduit | [Symbol] | Sewer Manhole |
| [Symbol] | Comms OHead | [Symbol] | Sewer Located |
| [Symbol] | Comms Located | [Symbol] | Sewer Pipe |
| [Symbol] | Cms Not Located | [Symbol] | Sew Not Located |
| [Symbol] | Comms Pillar | [Symbol] | Down Pipe |
| [Symbol] | Comms Pits | [Symbol] | Kerb Adapter |
| [Symbol] | PSM | [Symbol] | Field Inlet- G Pit |
| [Symbol] | Survey Control | [Symbol] | Swtr Manhole |
| [Symbol] | Elec Conduit | [Symbol] | Swtr Located |
| [Symbol] | Elec Pole HV | [Symbol] | Open Drain |
| [Symbol] | Elec Pole LV | [Symbol] | Swtr Pipe |
| [Symbol] | Elec Pole- Light | [Symbol] | Swtr Not Located |
| [Symbol] | Stay Pole | [Symbol] | Creek Invert |
| [Symbol] | Light | [Symbol] | Creek Toe Bank |
| [Symbol] | Elec UG located | [Symbol] | Creek Top Bank |
| [Symbol] | Elec Pits | [Symbol] | Creek Waterline |
| [Symbol] | Elec Not Located | [Symbol] | Change of Grade |
| [Symbol] | Elec Overhead | [Symbol] | Toe of Bank |
| [Symbol] | Gate | [Symbol] | Top of Bank |
| [Symbol] | Guard Rail | [Symbol] | Waterline |
| [Symbol] | Handrail | [Symbol] | Driveway |
| [Symbol] | Fence line | [Symbol] | Footpath |
| [Symbol] | Centre of gate | [Symbol] | Conc Slab Edge |
| [Symbol] | Bollard | [Symbol] | Wtr Not Located |
| [Symbol] | Cattle Grid | [Symbol] | Water Conduit |
| [Symbol] | Gas Conduit | [Symbol] | Fire Hydrant |
| [Symbol] | Gas Located | [Symbol] | Water Meter |
| [Symbol] | Gas Valve | [Symbol] | Water Valve |
| [Symbol] | Gas Marker | [Symbol] | Water Located |
| [Symbol] | Gas Not Located | [Symbol] | Tap |
| [Symbol] | Garden Edge | [Symbol] | Kerbline |
| [Symbol] | Tree Canopy | [Symbol] | Road Crown |
| [Symbol] | Tree | [Symbol] | Edge of Bitumen |
| [Symbol] | Post Box | [Symbol] | Edge of Gravel |
| [Symbol] | Fuel Fitting | [Symbol] | Kerb Invert |
| [Symbol] | Fuel Conduit | [Symbol] | Median Kerfbase |
| [Symbol] | Fuel Located | [Symbol] | Photo Point |
| [Symbol] | | [Symbol] | Borehole |
| [Symbol] | | [Symbol] | Railway Line |

- NOTES:
1. Drawn to scale on an A3 sheet.
 2. All levels are in metres on the Australian Height Datum referred to PM 72054 - RL52.424m AHD situated in Prospect Street.
 3. Contour Interval: 0.25m
 4. All dimensions are vide title and subject to confirmation by survey.
 5. The location of services is approximate only and is plotted from surface installations and the relevant authority records. The exact nature and location of these services should be confirmed prior to construction.
 6. Area vide title : 7.765 ha.

Level datum: AHD Derived (PM72054)
Horiz datum: MGA Derived DCDB (3/2018)
Coord Origin: MGA (Plane 1:1) NE Corner of Site
Meridian: +8.3820 CC3323 - Meas

Title:
PLAN OF DETAIL SURVEY OF
Part of Lot 89 on CC3323
Lowood State High School
Prospect Street, Lowood

| | | | |
|---------------|-------------------------------|-----------|-------|
| Client: | RPS Project Management | | |
| Locality: | Lowood | | |
| Local Gov: | Somerset Regional | | |
| Surveyed By: | MWF | Approved: | JJH |
| Date Created: | 14/03/18 | Scale: | 1:300 |
| File Ref: | 180175 | | |
| Plan No: | 180175_001_DET | | |

Lot 89
CC3323

Emt C
RP808754
Lot 4
RP214859

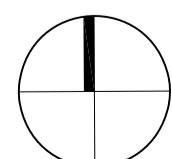
Appendix 5

Proposal Plans



PRELIMINARY

NORTH



1 EXISTING OVERALL SITE PLAN
SCALE 1:1000 @ A1

BARCODE

GENERAL NOTES

1. IF IN DOUBT, JUST ASK.
2. USE FIGURED DIMENSIONS, DO NOT SCALE FROM DRAWINGS.
3. CONFIRM ALL RELEVANT DIMENSIONS, LEVELS AND DETAILS ON SITE PRIOR TO COMMENCEMENT OF ALL WORK. CONFIRM SETBACKS TO ALL ALIGNMENTS.
4. THESE ARCHITECTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ENGINEERING AND OTHER CONSULTANT'S DRAWINGS AND SPECIFICATIONS. ANY DISCREPANCIES SHALL BE REFERRED TO THE ARCHITECT FOR DECISION BEFORE PROCEEDING WITH THE WORK.
5. DESIGN AND CONSTRUCTION TO COMPLY WITH CURRENT STANDARD BUILDING BY-LAWS, BUILDING ACT, BUILDING AMENDMENT ACT, BUILDING AND OTHER LEGISLATION AMENDMENT ACT, QUEENSLAND DEVELOPMENT CODE, BUILDING CODE OF AUSTRALIA, CURRENT AUSTRALIAN STANDARDS, STATUTORY REQUIREMENTS, ORDINANCES, LOCAL GOVERNMENT REQUIREMENTS, RELEVANT BUILDING AUTHORITIES AND ALL CONTRACT DOCUMENTATION.
6. CARRY OUT WORK IN A SAFE MANNER IN ACCORDANCE WITH APPLICABLE STATUTORY REGULATIONS, BY-LAWS OR RULES. COMPLY WITH RELEVANT STATE OCCUPATIONAL HEALTH AND SAFETY ACTS INCLUDING ASSOCIATED REGULATIONS AND CODES OF PRACTICE. CONTRACTOR IS RESPONSIBLE FOR OCCUPATIONAL HEALTH AND SAFETY OF SITE PERSONNEL AND GENERAL PUBLIC IN ACCORDANCE WITH LEGISLATIVE REQUIREMENTS, INDUSTRIAL AGREEMENTS AND ACCEPTED INDUSTRY PRACTICE.
7. TIMBER CONSTRUCTION TO COMPLY WITH AS1700 DOMESTIC TIMBER CONSTRUCTION IN NON-CYCLONIC LOCATIONS SHALL BE IN ACCORDANCE WITH AS3700.
8. ALL BRICKWORK AND BLOCKWORK SHALL BE IN ACCORDANCE WITH AS3700.
9. ALL PROPRIETARY PRODUCTS AND SYSTEMS TO BE INSTALLED TO MANUFACTURER'S SPECIFICATION AND INSTRUCTIONS.
10. THESE DRAWINGS ARE THE COPYRIGHT OF 8i ARCHITECTURE PTY LTD AND MAY NOT BE USED, RETAINED OR REPRODUCED WITHOUT WRITTEN AUTHORITY.
11. 'AS-BUILT' INDICATES WORKS THAT ARE GENERALLY IN ACCORDANCE WITH THE ARCHITECTURAL DOCUMENTATION AT PROJECT COMPLETION AND EXCLUDES CONCEALED WORKS THAT WERE NOT SPECIFICALLY INSPECTED.

DIMENSIONS

Use figured dimensions, DO NOT SCALE.
Check all dimensions & levels on site before fabrication or set out.

AMENDMENTS

| ISSUE | DATE | SUBJECT | AUTH | CHK |
|-------|----------|-----------------------|------|-----|
| A | 05.03.18 | SITE PLAN PRELIMINARY | SL | |
| B | 11.05.18 | PRELIM ARCH SDPP | JH | |
| | | | | |
| | | | | |
| | | | | |

DRAWINGS INDEXING SYSTEM

- FOR PROJECT SERVICES, PLANS AND RECORDS USE ONLY
- | | |
|--|--|
| <input type="checkbox"/> CEILING PLANS | <input type="checkbox"/> MISCELLANEOUS DETAILS |
| <input type="checkbox"/> CONSTRUCTION DETAILS | <input type="checkbox"/> OTHER |
| <input type="checkbox"/> ELEVATIONS | <input type="checkbox"/> PLAY STRUCTURES |
| <input type="checkbox"/> EXTERNAL WORKS | <input type="checkbox"/> ROOF PLAN |
| <input type="checkbox"/> FITOUTS | <input type="checkbox"/> SECTIONS |
| <input type="checkbox"/> FLOOR PLAN | <input type="checkbox"/> SETOUT PLAN |
| <input type="checkbox"/> FURNITURE & EQUIPMENT | <input type="checkbox"/> SITE PLAN |
| <input type="checkbox"/> HYDRAULICS | <input type="checkbox"/> STANDARDS |
| <input type="checkbox"/> MASTER PLAN | |



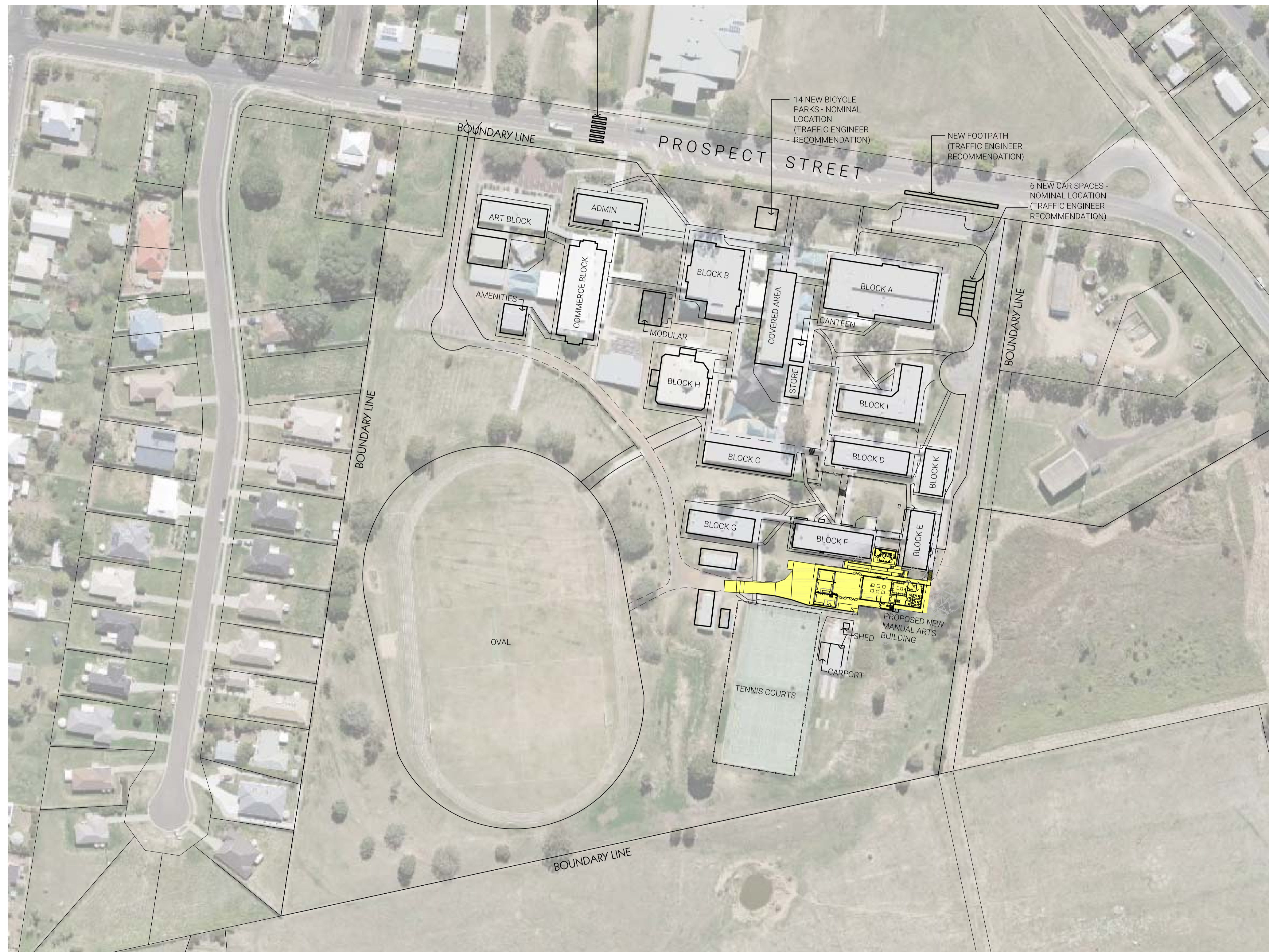
CLIENT
Department of Education and Training
© The State of Queensland 2005

8i Architects
Suite 24, 200 Moggill Road,
Taringa, Qld, 4068
ph: (07) 3217 7100
web: www.8i.net.au
ABN 76 793 485 967

| | |
|------------------------|------------|
| SL | March 2018 |
| DRAWN | DATE |
| HN | March 2018 |
| DISCIPLINE TEAM LEADER | DATE |
| AUTHORISED FOR ISSUE | DATE |

LOWOOD STATE HIGH SCHOOL
34 PROSPECT STREET,
LOWOOD, QLD 4311
EXISTING OVERALL SITE PLAN
MANUAL ARTS EXTENSION

| | | | |
|--------------------|-------------|-------------------------|-------|
| SCALE | 1:1000 | AT | A1 |
| MASTER SITE NUMBER | 00000 | CLIENT REFERENCE NUMBER | XXXXX |
| DRAWING NUMBER | 1806 / SK01 | ISSUE | B |
| | | SHEET NO | - |



PRELIMINARY

NORTH

 1 PROPOSED OVERALL SITE PLAN
 SCALE 1:1000 @ A1

FORM BPRS F101C

BARCODE

GENERAL NOTES
 1. IF IN DOUBT, JUST ASK.
 2. USE FIGURED DIMENSIONS. DO NOT SCALE FROM DRAWINGS.
 3. CONFIRM ALL RELEVANT DIMENSIONS, LEVELS AND DETAILS ON SITE PRIOR TO COMMENCEMENT OF ALL WORK. CONFIRM SETBACKS TO ALL ALIGNMENTS.
 4. THESE ARCHITECTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ENGINEERING AND OTHER CONSULTANT'S DRAWINGS AND SPECIFICATIONS. ANY DISCREPANCIES SHALL BE REFERRED TO THE ARCHITECT FOR DISCUSSION BEFORE PROCEEDING WITH THE WORK.
 5. DESIGN AND CONSTRUCTION TO COMPLY WITH CURRENT STANDARD BUILDING BY-LAWS, BUILDING ACT, BUILDING AMENDMENT ACT, BUILDING AND OTHER LEGISLATION AMENDMENT ACT, QUEENSLAND DEVELOPMENT CODE, BUILDING CODE OF AUSTRALIA, CURRENT AUSTRALIAN STANDARDS, STATUTORY REQUIREMENTS, ORDINANCES, LOCAL GOVERNMENT REQUIREMENTS, RELEVANT BUILDING AUTHORITIES AND ALL CONTRACT DOCUMENTATION.
 6. CARRY OUT WORK IN A SAFE MANNER IN ACCORDANCE WITH APPLICABLE STATUTORY REGULATIONS BY-LAWS OR IN ACCORDANCE WITH RELEVANT STATE OCCUPATIONAL HEALTH AND SAFETY ACTS INCLUDING ASSOCIATED REGULATIONS AND CODES OF PRACTICE. CONTRACTOR IS RESPONSIBLE FOR OCCUPATIONAL HEALTH AND SAFETY OF SITE PERSONNEL AND GENERAL PUBLIC IN ACCORDANCE WITH LEGISLATIVE REQUIREMENTS, INDUSTRIAL AGREEMENTS AND ACCEPTED INDUSTRY PRACTICE.
 7. TIMBER CONSTRUCTION TO COMPLY WITH AS1720. DOMESTIC TIMBER CONSTRUCTION IN NON-CYCLONE LOCATIONS SHALL BE IN ACCORDANCE WITH AS3700.
 8. ALL BRICKWORK AND BLOCKWORK SHALL BE IN ACCORDANCE WITH AS3700.
 9. ALL PROPRIETARY PRODUCTS AND SYSTEMS TO BE INSTALLED TO MANUFACTURER'S SPECIFICATION AND INSTRUCTIONS.
 10. THESE DRAWINGS ARE THE COPYRIGHT OF 8i ARCHITECTURE PTY LTD AND MAY NOT BE USED, RETAINED OR REPRODUCED WITHOUT WRITTEN AUTHORITY.
 11. 'AS-BUILT' INDICATES WORKS THAT ARE GENERALLY IN ACCORDANCE WITH THE ARCHITECTURAL DOCUMENTATION AT PROJECT COMPLETION AND EXCLUDES CONCEALED WORKS THAT WERE NOT SPECIFICALLY INSPECTED.

DIMENSIONS
 Use figured dimensions, DO NOT SCALE.
 Check all dimensions & levels on site before fabrication or set out.

AMENDMENTS

| ISSUE | DATE | SUBJECT | AUTH | CHK |
|-------|----------|-------------------------------|------|-----|
| A | 05.03.18 | SITE PLAN PRELIMINARY | SL | |
| B | 04.05.18 | REVISIONS | SL | |
| C | 11.05.18 | PRELIM ARCH SDPP | JH | |
| D | 06.06.18 | TRAFFIC CONSULTANT AMENDMENTS | JH | |

- DRAWINGS INDEXING SYSTEM**
 FOR PROJECT SERVICES, PLANS AND RECORDS USE ONLY
- | | |
|--|--|
| <input type="checkbox"/> CEILING PLANS | <input type="checkbox"/> MISCELLANEOUS DETAILS |
| <input type="checkbox"/> CONSTRUCTION DETAILS | <input type="checkbox"/> OTHER |
| <input type="checkbox"/> ELEVATIONS | <input type="checkbox"/> PLAY STRUCTURES |
| <input type="checkbox"/> EXTERNAL WORKS | <input type="checkbox"/> ROOF PLAN |
| <input type="checkbox"/> FITOUTS | <input type="checkbox"/> SECTIONS |
| <input type="checkbox"/> FLOOR PLAN | <input type="checkbox"/> SETOUT PLAN |
| <input type="checkbox"/> FURNITURE & EQUIPMENT | <input type="checkbox"/> SITE PLAN |
| <input type="checkbox"/> HYDRAULICS | <input type="checkbox"/> STANDARDS |
| <input type="checkbox"/> MASTER PLAN | |

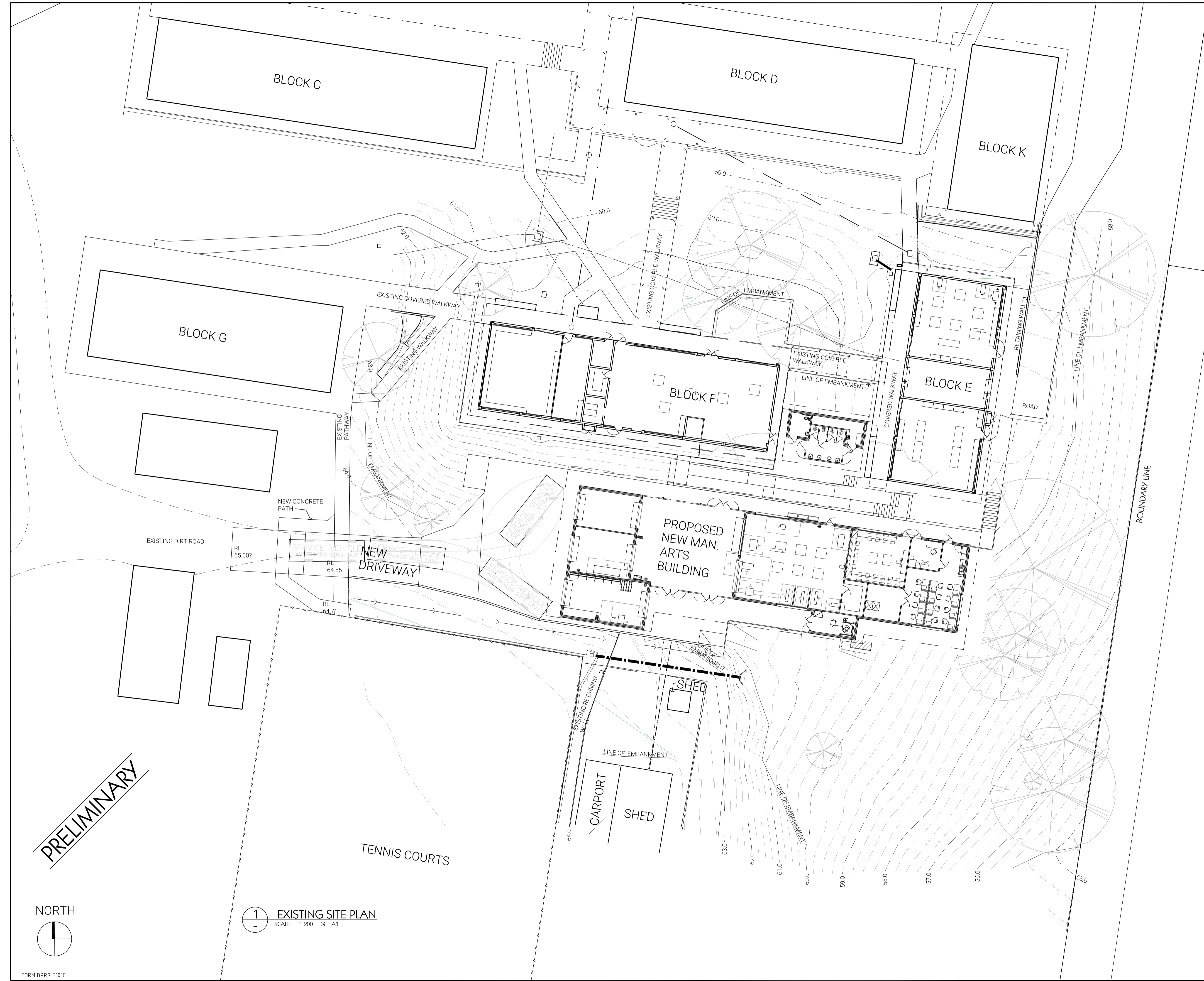
CLIENT
 Department of Education and Training
 © The State of Queensland 2005

8i Architects
 Suite 24, 200 Moggill Road,
 Taringa, Qld, 4068
 ph: (07) 3217 7100
 web: www.8i.net.au
 ABN 76 793 485 967

| | |
|------------------------|------------|
| SL | March 2018 |
| DRAWN | DATE |
| HN | March 2018 |
| DISCIPLINE TEAM LEADER | DATE |
| AUTHORISED FOR ISSUE | DATE |

LOWOOD STATE HIGH SCHOOL
 34 PROSPECT STREET,
 LOWOOD, QLD 4311
 PROPOSED OVERALL
 SITE PLAN
 MANUAL ARTS EXTENSION

| | | | |
|--------------------|-------------|-------------------------|-------|
| SCALE | 1:1000 | AT | A1 |
| MASTER SITE NUMBER | 00000 | CLIENT REFERENCE NUMBER | XXXXX |
| DRAWING NUMBER | 1806 / SK02 | ISSUE | D |
| | | SHEET NO | - |



BARCODE

GENERAL NOTES

1. IF IN DOUBT, JUST ASK.
2. USE FIGURED DIMENSIONS, DO NOT SCALE FROM DRAWINGS.
3. CONFIRM ALL RELEVANT DIMENSIONS, LEVELS AND DETAILS ON SITE PRIOR TO COMMENCEMENT OF ALL WORK. CONFIRM SETBACKS TO ALL ALIGNMENTS.
4. THESE ARCHITECTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ENGINEERING AND OTHER CONSULTANT'S DRAWINGS AND SPECIFICATIONS. ANY DISCREPANCIES SHALL BE REFERRED TO THE ARCHITECT FOR DISCUSSION BEFORE PROCEEDING WITH THE WORK.
5. DESIGN AND CONSTRUCTION TO COMPLY WITH CURRENT STANDARD BUILDING BY-LAWS, BUILDING ACT, BUILDING AMENDMENT ACT, BUILDING AND OTHER LEGISLATION AMENDMENT ACT, QUEENSLAND DEVELOPMENT CODE, BUILDING CODE OF AUSTRALIA, CURRENT AUSTRALIAN STANDARDS, STATUTORY REQUIREMENTS, ORDINANCES, LOCAL GOVERNMENT REQUIREMENTS, RELEVANT BUILDING AUTHORITIES AND ALL CONTRACT DOCUMENTATION.
6. CARRY OUT WORK IN A SAFE MANNER IN ACCORDANCE WITH APPLICABLE STATUTORY REGULATIONS, BY-LAWS OR RULES. COMPLY WITH RELEVANT STATE OCCUPATIONAL HEALTH AND SAFETY ACTS INCLUDING ASSOCIATED REGULATIONS AND CODES OF PRACTICE. CONTRACTOR IS RESPONSIBLE FOR OCCUPATIONAL HEALTH AND SAFETY OF SITE PERSONNEL AND GENERAL PUBLIC IN ACCORDANCE WITH LEGISLATIVE REQUIREMENTS, INDUSTRIAL AGREEMENTS AND ACCEPTED INDUSTRY PRACTICE.
7. TIMBER CONSTRUCTION TO COMPLY WITH AS1720. DOMESTIC TIMBER CONSTRUCTION IN NON-CYCLONE LOCATIONS SHALL BE IN ACCORDANCE WITH AS3684.
8. ALL BRICKWORK AND BLOCKWORK SHALL BE IN ACCORDANCE WITH AS3700.
9. ALL PROPRIETARY PRODUCTS AND SYSTEMS TO BE INSTALLED TO MANUFACTURER'S SPECIFICATION AND INSTRUCTIONS.
10. THESE DRAWINGS ARE THE COPYRIGHT OF AN ARCHITECTURE PTY LTD AND MAY NOT BE USED, REPRODUCED OR REPRODUCED WITHOUT WRITTEN AUTHORITY.
11. 'AS-BUILT' INDICATES WORKS THAT ARE GENERALLY IN ACCORDANCE WITH THE ARCHITECTURAL DOCUMENTATION AT PROJECT COMPLETION AND EXCLUDES CONCEALED WORKS THAT WERE NOT SPECIFICALLY INSPECTED.

DIMENSIONS

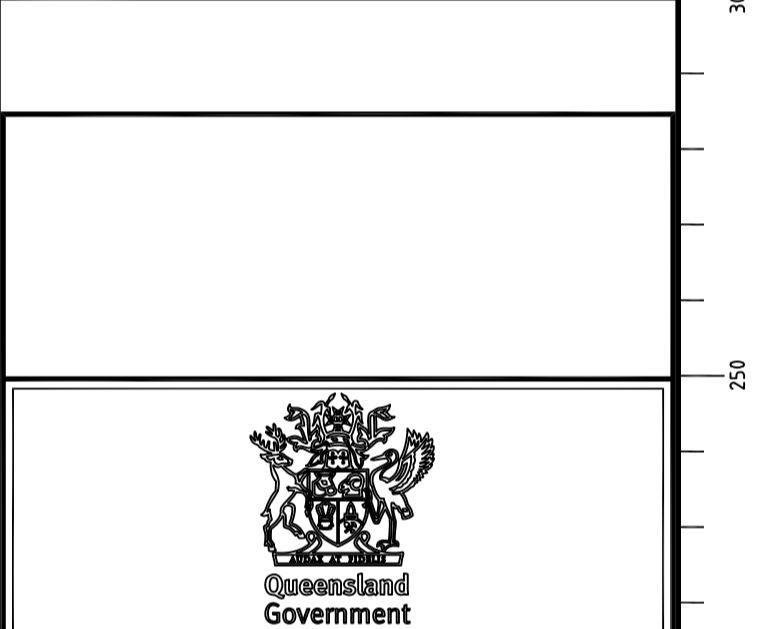
Use figured dimensions, DO NOT SCALE.

Check all dimensions & levels on site before fabrication or set out.

AMENDMENTS

| ISSUE | DATE | SUBJECT | AUTH | CHK |
|-------|----------|------------------|------|-----|
| A | 17.04.18 | PRELIMINARY | JH | |
| B | 01.05.18 | PRELIMINARY | JH | |
| C | 11.05.18 | PRELIM ARCH SDPP | JH | |
| D | 04.06.18 | AMENDMENTS | JH | |

- DRAWINGS INDEXING SYSTEM**
FOR PROJECT SERVICES, PLANS AND RECORDS USE ONLY
- | | |
|--|--|
| <input type="checkbox"/> CEILING PLANS | <input type="checkbox"/> MISCELLANEOUS DETAILS |
| <input type="checkbox"/> CONSTRUCTION DETAILS | <input type="checkbox"/> OTHER |
| <input type="checkbox"/> ELEVATIONS | <input type="checkbox"/> PLAY STRUCTURES |
| <input type="checkbox"/> EXTERNAL WORKS | <input type="checkbox"/> ROOF PLAN |
| <input type="checkbox"/> FITTINGS | <input type="checkbox"/> SECTIONS |
| <input type="checkbox"/> FLOOR PLAN | <input type="checkbox"/> SETOUT PLAN |
| <input type="checkbox"/> FURNITURE & EQUIPMENT | <input type="checkbox"/> SITE PLAN |
| <input type="checkbox"/> HYDRAULICS | <input type="checkbox"/> STANDARDS |
| <input type="checkbox"/> MASTER PLAN | |



CLIENT

Department of Education and Training

The State of Queensland 2005

8i Architects
Suite 24, 200 Moggill Road,
Taringa, Qld, 4068
ph: (07) 3217 7100
web: www.8i.net.au
ABN 76 793 485 967

| | |
|------------------------|------------|
| SL | March 2018 |
| DRAWN | DATE |
| HN | March 2018 |
| DISCIPLINE TEAM LEADER | DATE |
| AUTHORISED FOR ISSUE | DATE |

LOWOOD STATE HIGH SCHOOL

34 PROSPECT STREET,
LOWOOD, QLD 4311

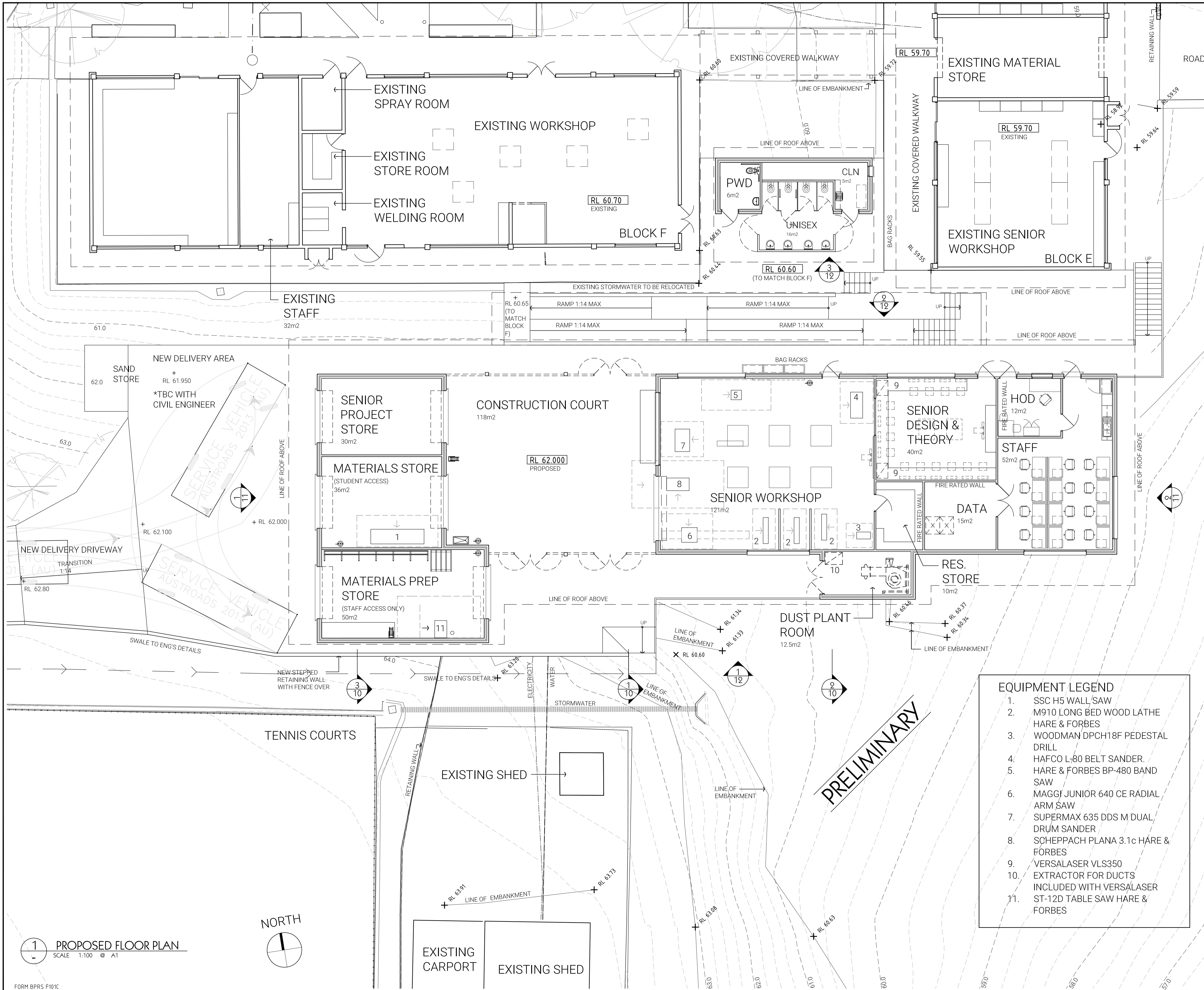
SITE PLAN MANUAL ARTS

| | | | |
|--------------------|-------------|-------------------------|-------|
| SCALE | 1:200 | AT | A1 |
| MASTER SITE NUMBER | 00000 | CLIENT REFERENCE NUMBER | XXXXX |
| DRAWING NUMBER | 1806 / SK03 | ISSUE | D |
| | | SHEET NO | - |

PRELIMINARY

NORTH

1 EXISTING SITE PLAN
SCALE 1:200 @ A1



GENERAL NOTES

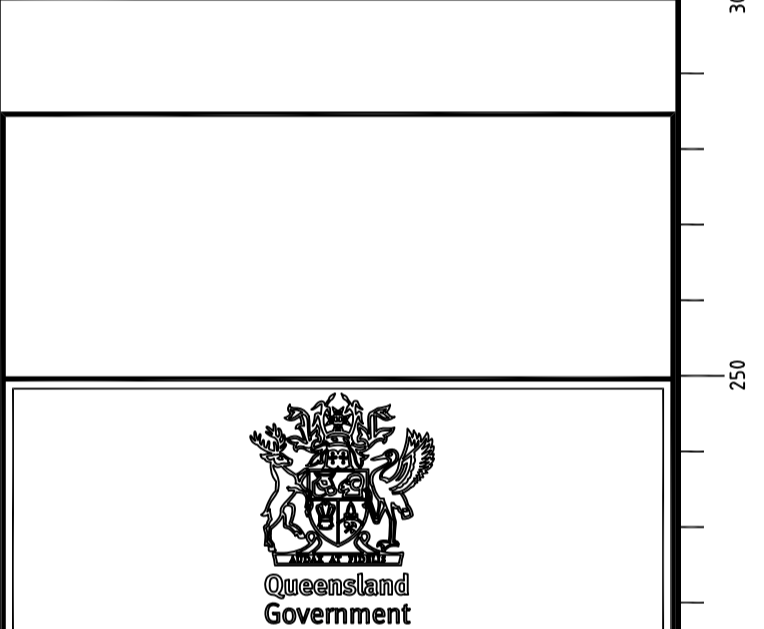
- IF IN DOUBT, JUST ASK.
- USE FIGURED DIMENSIONS, DO NOT SCALE FROM DRAWINGS.
- CONFIRM ALL RELEVANT DIMENSIONS, LEVELS AND DETAILS ON SITE PRIOR TO COMMENCEMENT OF ALL WORK. CONFIRM SETBACKS TO ALL ALIGNMENTS.
- THESE ARCHITECTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ENGINEERING AND OTHER CONSULTANT'S DRAWINGS AND SPECIFICATIONS. ANY DISCREPANCIES SHALL BE REFERRED TO THE ARCHITECT FOR DISCUSSION BEFORE PROCEEDING WITH THE WORK.
- DESIGN AND CONSTRUCTION TO COMPLY WITH CURRENT STANDARD BUILDING BY-LAWS, BUILDING ACT, BUILDING AMENDMENT ACT, BUILDING AND OTHER LEGISLATION AMENDMENT ACT, QUEENSLAND DEVELOPMENT CODE, BUILDING CODE OF AUSTRALIA, CURRENT AUSTRALIAN STANDARDS, STATUTORY REQUIREMENTS, ORDINANCES, LOCAL GOVERNMENT REQUIREMENTS, RELEVANT BUILDING AUTHORITIES AND ALL CONTRACT DOCUMENTATION.
- CARRY OUT WORK IN A SAFE MANNER IN ACCORDANCE WITH APPLICABLE STATUTORY REGULATIONS, BY-LAWS OR RULES. COMPLY WITH RELEVANT STATE OCCUPATIONAL HEALTH AND SAFETY ACTS INCLUDING ASSOCIATED REGULATIONS AND CODES OF PRACTICE. CONTRACTOR IS RESPONSIBLE FOR OCCUPATIONAL HEALTH AND SAFETY OF SITE PERSONNEL AND GENERAL PUBLIC IN ACCORDANCE WITH LEGISLATIVE REQUIREMENTS, INDUSTRIAL AGREEMENTS AND ACCEPTED INDUSTRY PRACTICE.
- TIMBER CONSTRUCTION TO COMPLY WITH AS1720 DOMESTIC TIMBER CONSTRUCTION IN NON-CYCLONIC LOCATIONS SHALL BE IN ACCORDANCE WITH AS1848.
- ALL BRICKWORK AND BLOCKWORK SHALL BE IN ACCORDANCE WITH AS3700.
- ALL PROPRIETARY PRODUCTS AND SYSTEMS TO BE INSTALLED TO MANUFACTURER'S SPECIFICATION AND INSTRUCTIONS.
- THESE DRAWINGS ARE THE COPYRIGHT OF 8i ARCHITECTS PTY LTD AND MAY NOT BE USED, REPRODUCED OR REPRODUCED WITHOUT WRITTEN AUTHORITY.
- AS-BUILT INDICATES WORKS THAT ARE GENERALLY IN ACCORDANCE WITH THE ARCHITECTURAL DOCUMENTATION AT PROJECT COMPLETION AND EXCLUDES CONCEALED WORKS THAT WERE NOT SPECIFICALLY INSPECTED.

DIMENSIONS
Use figured dimensions, DO NOT SCALE.
Check all dimensions & levels on site before fabrication or set out.

AMENDMENTS

| ISSUE | DATE | SUBJECT | AUTH | CHK |
|-------|----------|--------------------------|------|-----|
| A | 17.04.18 | PRELIMINARY | JH | |
| B | 01.05.18 | PRELIMINARY | JH | |
| C | 11.05.18 | PRELIM ARCH SDPP | JH | |
| D | 14.05.18 | REVISED EQUIPMENT LAYOUT | HN | |
| E | 23.05.18 | REVISED EQUIPMENT LAYOUT | HN | |
| F | 25.05.18 | REVISED EQUIPMENT LAYOUT | HN | |
| G | 29.05.18 | ADDED EQUIPMENT | HN | |
| H | 04.06.18 | AMENDMENT | HN | |

- DRAWINGS INDEXING SYSTEM FOR PROJECT SERVICES, PLANS AND RECORDS USE ONLY**
- CEILING PLANS
 - CONSTRUCTION DETAILS
 - ELEVATIONS
 - EXTERNAL WORKS
 - FITTINGS
 - FLOOR PLAN
 - FURNITURE & EQUIPMENT
 - HYDRAULICS
 - MASTER PLAN
 - MISCELLANEOUS DETAILS
 - OTHER
 - PLAY STRUCTURES
 - ROOF PLAN
 - SECTIONS
 - SETOUT PLAN
 - SITE PLAN
 - STANDARDS



CLIENT
Department of Education and Training
© The State of Queensland 2005

8i Architects
Suite 24, 200 Moggill Road,
Taringa, Qld, 4068
ph: (07) 3217 7100
web: www.8i.net.au
ABN 76 793 485 967

| | | | |
|------------------------|----|------|------------|
| DRAWN | SL | DATE | March 2018 |
| DISCIPLINE TEAM LEADER | HN | DATE | March 2018 |
| AUTHORISED FOR ISSUE | | DATE | |

LOWOOD STATE HIGH SCHOOL
34 PROSPECT STREET,
LOWOOD, QLD 4311

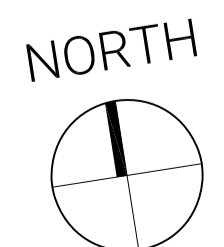
FLOOR PLAN
MANUAL ARTS EXTENSION

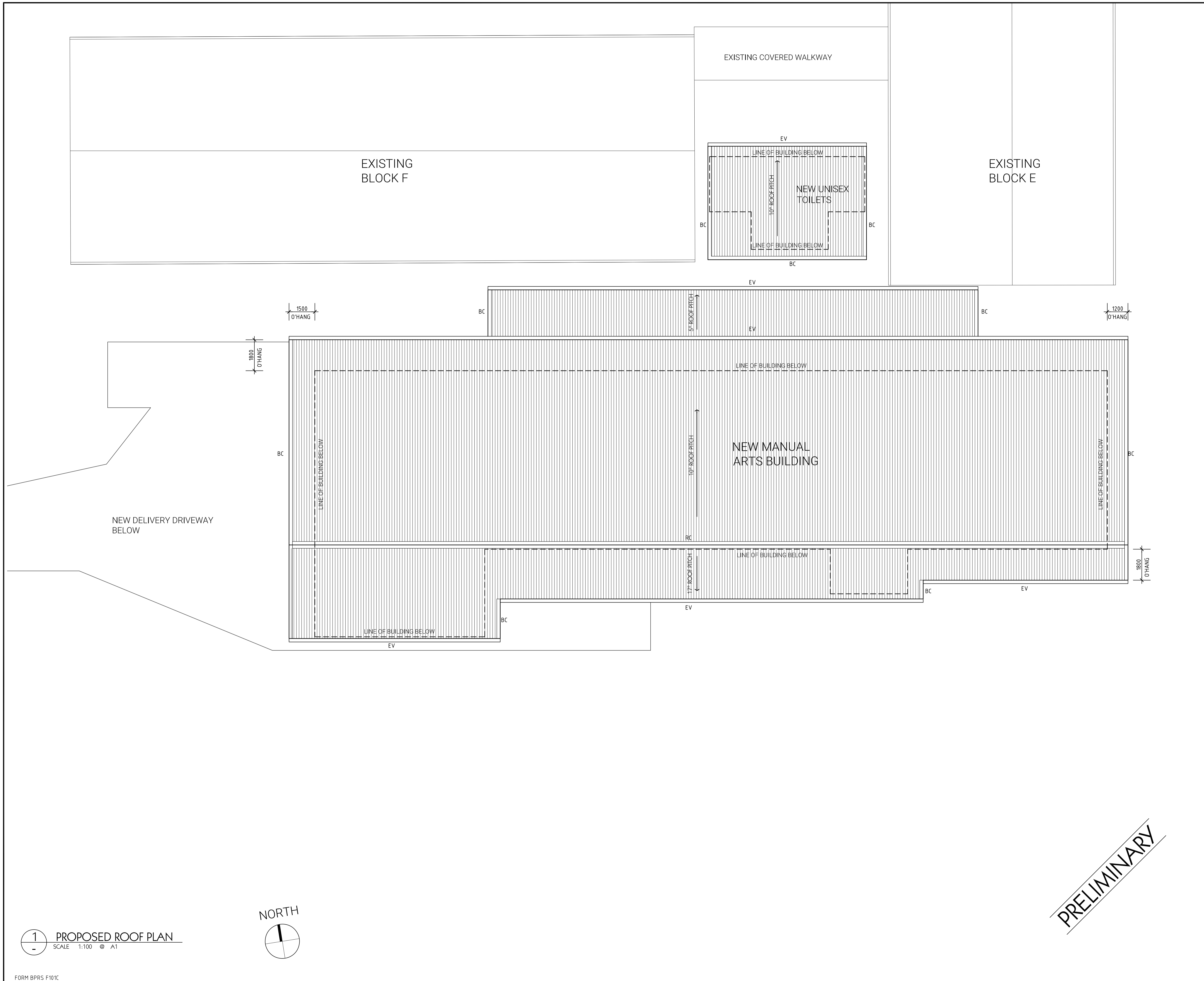
| | | | |
|--------------------|-------------|-------------------------|-------|
| SCALE | 1:100 | AT | A1 |
| MASTER SITE NUMBER | 00000 | CLIENT REFERENCE NUMBER | XXXXX |
| DRAWING NUMBER | 1806 / SK04 | ISSUE | H |
| | | SHEET NO | - |

- EQUIPMENT LEGEND**
- SSC H5 WALL SAW
 - M910 LONG BED WOOD LATHE HARE & FORBES
 - WOODMAN DPCH18F PEDESTAL DRILL
 - HAFCO L-80 BELT SANDER.
 - HARE & FORBES BP-480 BAND SAW
 - MAGGI JUNIOR 640 CE RADIAL ARM SAW
 - SUPERMAX 635 DDS M DUAL DRUM SANDER
 - SCHEPPACH PLANA 3.1c HARE & FORBES
 - VERSALASER VLS350
 - EXTRACTOR FOR DUCTS INCLUDED WITH VERSALASER
 - ST-12D TABLE SAW HARE & FORBES

PRELIMINARY

1 PROPOSED FLOOR PLAN
SCALE 1:100 @ A1





BARCODE

GENERAL NOTES

- IF IN DOUBT, JUST ASK.
- USE FIGURED DIMENSIONS, DO NOT SCALE FROM DRAWINGS.
- CONFIRM ALL RELEVANT DIMENSIONS, LEVELS AND DETAILS ON SITE PRIOR TO COMMENCEMENT OF ALL WORK. CONFIRM SETBACKS TO ALL ALIGNMENTS.
- THESE ARCHITECTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ENGINEERING AND OTHER CONSULTANT'S DRAWINGS AND SPECIFICATIONS. ANY DISCREPANCIES SHALL BE REFERRED TO THE ARCHITECT FOR DISCUSSION BEFORE PROCEEDING WITH THE WORK.
- DESIGN AND CONSTRUCTION TO COMPLY WITH CURRENT STANDARD BUILDING BY-LAWS, BUILDING ACT, BUILDING AMENDMENT ACT, BUILDING AND OTHER LEGISLATION AMENDMENT ACT, QUEENSLAND DEVELOPMENT CODE, BUILDING CODE OF AUSTRALIA, CURRENT AUSTRALIAN STANDARDS, STATUTORY REQUIREMENTS, ORDINANCES, LOCAL GOVERNMENT REQUIREMENTS, RELEVANT BUILDING AUTHORITIES AND ALL CONTRACT DOCUMENTATION.
- CARRY OUT WORK IN A SAFE MANNER IN ACCORDANCE WITH APPLICABLE STATUTORY REGULATIONS, BY-LAWS OR RULES. COMPLY WITH RELEVANT STATE OCCUPATIONAL HEALTH AND SAFETY ACTS INCLUDING ASSOCIATED REGULATIONS AND CODES OF PRACTICE. CONTRACTOR IS RESPONSIBLE FOR OCCUPATIONAL HEALTH AND SAFETY OF SITE PERSONNEL AND GENERAL PUBLIC IN ACCORDANCE WITH LEGISLATIVE REQUIREMENTS, INDUSTRIAL AGREEMENTS AND ACCEPTED INDUSTRY PRACTICE.
- THESE CONSTRUCTIONS TO COMPLY WITH AS1710 DOMESTIC TIMBER CONSTRUCTION IN NON-CYCLONIC LOCATIONS SHALL BE IN ACCORDANCE WITH AS1710.
- ALL BRICKWORK AND BLOCKWORK SHALL BE IN ACCORDANCE WITH AS3700.
- ALL PROPRIETARY PRODUCTS AND SYSTEMS TO BE INSTALLED TO MANUFACTURER'S SPECIFICATION AND INSTRUCTIONS.
- THESE DRAWINGS ARE THE COPYRIGHT OF 8i ARCHITECTURE PTY LTD AND MAY NOT BE USED, RETAINED OR REPRODUCED WITHOUT WRITTEN AUTHORITY.
- AS-BUILT INDICATES WORKS THAT ARE GENERALLY IN ACCORDANCE WITH THE ARCHITECTURAL DOCUMENTATION AT PROJECT COMPLETION AND EXCLUDES CONCEALED WORKS THAT WERE NOT SPECIFICALLY INSPECTED.


DIMENSIONS
Use figured dimensions, DO NOT SCALE.
Check all dimensions & levels on site before fabrication or set out.

AMENDMENTS

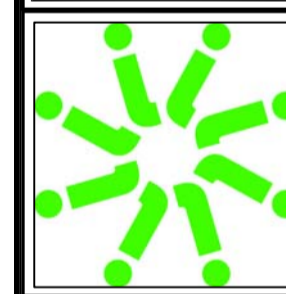
| ISSUE | DATE | SUBJECT | AUTH | CHK |
|-------|----------|------------------|------|-----|
| A | 11.05.18 | PRELIM ARCH SDPP | JH | |

DRAWINGS INDEXING SYSTEM FOR PROJECT SERVICES, PLANS AND RECORDS USE ONLY

| | |
|--|--|
| <input type="checkbox"/> CEILING PLANS | <input type="checkbox"/> MISCELLANEOUS DETAILS |
| <input type="checkbox"/> CONSTRUCTION DETAILS | <input type="checkbox"/> OTHER |
| <input type="checkbox"/> ELEVATIONS | <input type="checkbox"/> PLAY STRUCTURES |
| <input type="checkbox"/> EXTERNAL WORKS | <input type="checkbox"/> ROOF PLAN |
| <input type="checkbox"/> FITOUTS | <input type="checkbox"/> SECTIONS |
| <input type="checkbox"/> FLOOR PLAN | <input type="checkbox"/> SETOUT PLAN |
| <input type="checkbox"/> FURNITURE & EQUIPMENT | <input type="checkbox"/> SITE PLAN |
| <input type="checkbox"/> HYDRAULICS | <input type="checkbox"/> STANDARDS |
| <input type="checkbox"/> MASTER PLAN | |



CLIENT
Department of Education and Training
© The State of Queensland 2005



8i Architects
Suite 24, 200 Moggill Road,
Taringa, Qld, 4068
ph: (07) 3217 7100
web: www.8i.net.au
ABN 76 793 485 967

| | |
|------------------------|------------|
| SL | March 2018 |
| DRAWN | DATE |
| HN | March 2018 |
| DISCIPLINE TEAM LEADER | DATE |
| AUTHORISED FOR ISSUE | DATE |

LOWOOD STATE HIGH SCHOOL

34 PROSPECT STREET,
LOWOOD, QLD 4311

FLOOR PLAN
MANUAL ARTS EXTENSION
OPTION 2c

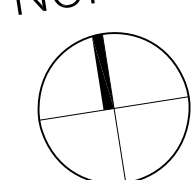
| | | | |
|--------------------|-------------|-------------------------|-------|
| SCALE | 1:100 | AT | A1 |
| MASTER SITE NUMBER | 00000 | CLIENT REFERENCE NUMBER | XXXXX |
| DRAWING NUMBER | 1806 / SK05 | ISSUE | A |
| | | SHEET NO | - |

PRELIMINARY

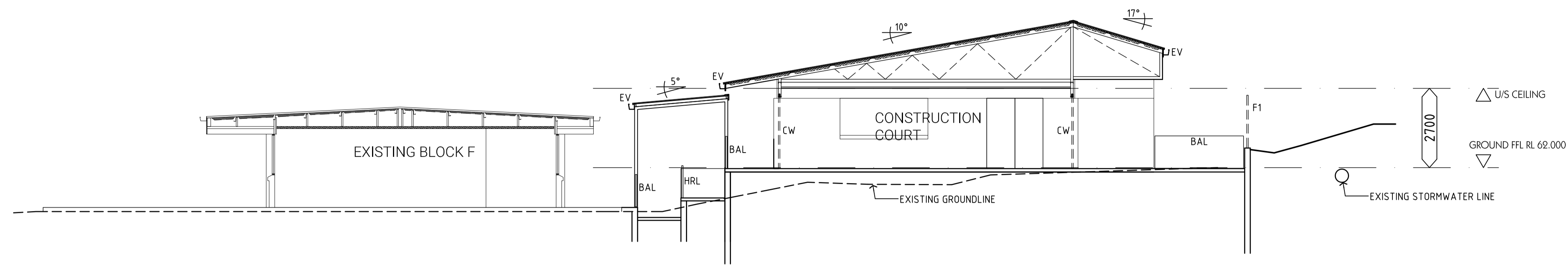
1 PROPOSED ROOF PLAN

SCALE 1:100 @ A1

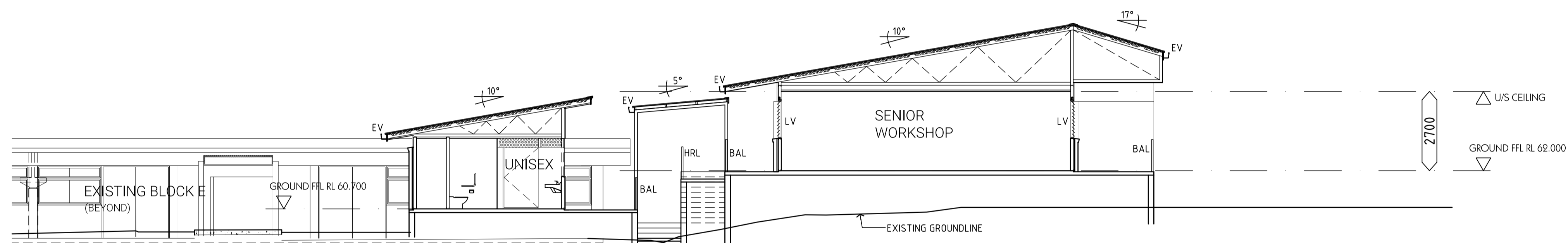
NORTH



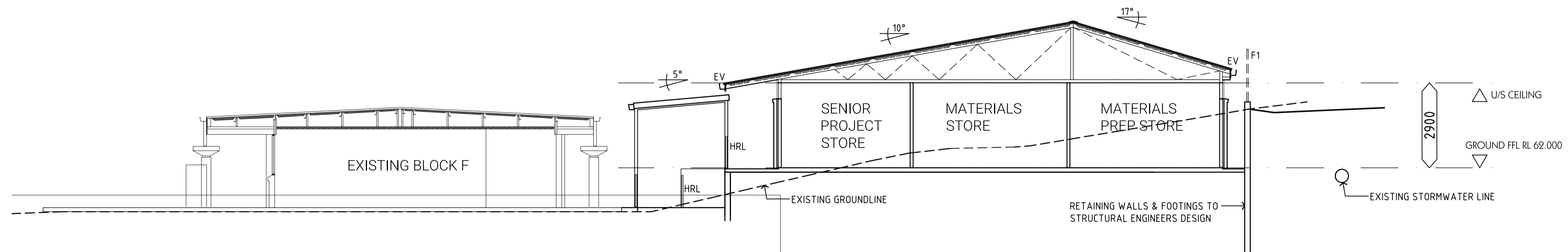
FORM BPRS F101C



1 PROPOSED SECTION 1
SCALE 1:100 @ A1



2 PROPOSED SECTION 2
SCALE 1:100 @ A1



3 PROPOSED SECTION 3
SCALE 1:100 @ A1

PRELIMINARY

LEGEND

- | | | | | | |
|------|---|-----|---|----|---|
| BAL | 1100H HOT DIP GALVANISED BALUSTRADE | CO1 | COLORBOND CLADDING ON BATTEN. CORRUGATION ORIENTATED VERTICAL. | TR | DOOR THRESHOLD TO COMPLY WITH AS1428.1-2009 |
| BC | COLORBOND BIRD BARGE CAPPING. 50mm EXTENSION BEYOND FASCIA. | CO2 | FEATURE COLOUR COLORBOND CLADDING CORRUGATION ORIENTATED VERTICAL. | | |
| BRK | SELECTED MASONRY BRICKWORK | HR | 50 DIA HANDRAIL | | |
| BLK | PAINTED MASONRY BLOCKWORK | LV | LOUVRES | | |
| CC01 | PAINTED CONCRETE COLUMN | LV2 | POWDERCOATED FIXED ALUMINIUM PLANT ROOM VENTILATION LOUVRES | | |
| CFC | PAINTED EXPRESSED JOINT COMPRESSED FIBRE CEMENT SHEETING. | LV3 | MOTORISED LOUVRES | | |
| CW | CHAINWIRE FENCE ENCLOSURE | MEC | MECHANICAL EXTRACT VENT | | |
| EV | COLORBOND EAVES GUTTER ON EXTERNAL BRACKETS WITH LEAF GUARD. | RS | COLORBOND 0.48BMT TRIMDEK ROOF SHEETING ON R2.3 ROOF INSULATION & SISALATION ON SAFETY MESH TO COMPLY WITH THE BCA SECT. J. | | |
| DP | PAINTED PVC DOWNPIPE WITH 2000mm HIGH PROTECTION GUARD TO HYD. ENG'S DETAILS. | SCN | 2100H PERFORATED POWDERCOATED METAL SCREEN | | |
| F1 | 1800H FENCE | | | | |

BARCODE

GENERAL NOTES

- IF IN DOUBT, JUST ASK.
- USE FIGURED DIMENSIONS, DO NOT SCALE FROM DRAWINGS.
- CONFIRM ALL RELEVANT DIMENSIONS, LEVELS AND DETAILS ON SITE PRIOR TO COMMENCEMENT OF ALL WORK. CONFIRM SETBACKS TO ALL ALIGNMENTS.
- THESE ARCHITECTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ENGINEERING AND OTHER CONSULTANT'S DRAWINGS AND SPECIFICATIONS. ANY DISCREPANCIES SHALL BE REFERRED TO THE ARCHITECT FOR DISCUSSION BEFORE PROCEEDING WITH THE WORK.
- DESIGN AND CONSTRUCTION TO COMPLY WITH CURRENT STANDARD BUILDING BY-LAWS, BUILDING ACT, BUILDING AMENDMENT ACT, BUILDING AND OTHER LEGISLATION AMENDMENT ACT, QUEENSLAND DEVELOPMENT CODE, BUILDING CODE OF AUSTRALIA, CURRENT AUSTRALIAN STANDARDS, STATUTORY REQUIREMENTS, ORDINANCES, LOCAL GOVERNMENT REQUIREMENTS, RELEVANT BUILDING AUTHORITIES AND ALL CONTRACT DOCUMENTATION.
- CARRY OUT WORK IN A SAFE MANNER IN ACCORDANCE WITH APPLICABLE STATUTORY REGULATIONS, BY-LAWS OR RULES. COMPLY WITH RELEVANT STATE OCCUPATIONAL HEALTH AND SAFETY ACTS INCLUDING ASSOCIATED REGULATIONS AND CODES OF PRACTICE. CONTRACTOR IS RESPONSIBLE FOR OCCUPATIONAL HEALTH AND SAFETY OF SITE PERSONNEL AND GENERAL PUBLIC IN ACCORDANCE WITH LEGISLATIVE REQUIREMENTS, INDUSTRIAL AGREEMENTS AND ACCEPTED INDUSTRY PRACTICE.
- THREE CONSTRUCTION TO COMPLY WITH AS1700 DOMESTIC TIMBER CONSTRUCTION IN NON-CYCLONIC LOCATIONS SHALL BE IN ACCORDANCE WITH AS1700.
- ALL BRICKWORK AND BLOCKWORK SHALL BE IN ACCORDANCE WITH AS3700.
- ALL PROPRIETARY PRODUCTS AND SYSTEMS TO BE INSTALLED TO MANUFACTURER'S SPECIFICATION AND INSTRUCTIONS.
- THESE DRAWINGS ARE THE COPYRIGHT OF 8i ARCHITECTURE PTY LTD AND MAY NOT BE USED, REPRODUCED OR REPRODUCED WITHOUT WRITTEN AUTHORITY.
- 'AS-BUILT' INDICATES WORKS THAT ARE GENERALLY IN ACCORDANCE WITH THE ARCHITECTURAL DOCUMENTATION AT PROJECT COMPLETION AND EXCLUDES CONCEALED WORKS THAT WERE NOT SPECIFICALLY INSPECTED.

DIMENSIONS
Use figured dimensions, DO NOT SCALE.
Check all dimensions & levels on site before fabrication or set out.

AMENDMENTS

| ISSUE | DATE | SUBJECT | AUTH | CHK |
|-------|----------|------------------|------|-----|
| A | 11.05.18 | PRELIM ARCH SDPP | JH | |

DRAWINGS INDEXING SYSTEM
FOR PROJECT SERVICES, PLANS AND RECORDS USE ONLY

| | |
|--|--|
| <input type="checkbox"/> CEILING PLANS | <input type="checkbox"/> MISCELLANEOUS DETAILS |
| <input type="checkbox"/> CONSTRUCTION DETAILS | <input type="checkbox"/> OTHER |
| <input type="checkbox"/> ELEVATIONS | <input type="checkbox"/> PLAY STRUCTURES |
| <input type="checkbox"/> EXTERNAL WORKS | <input type="checkbox"/> ROOF PLAN |
| <input type="checkbox"/> FITOUTS | <input type="checkbox"/> SECTIONS |
| <input type="checkbox"/> FLOOR PLAN | <input type="checkbox"/> SETOUT PLAN |
| <input type="checkbox"/> FURNITURE & EQUIPMENT | <input type="checkbox"/> SITE PLAN |
| <input type="checkbox"/> HYDRAULICS | <input type="checkbox"/> STANDARDS |
| <input type="checkbox"/> MASTER PLAN | |



CLIENT
Department of Education and Training
© The State of Queensland 2005

8i Architects
Suite 24, 200 Moggill Road,
Taringa, Qld, 4068
ph: (07) 3217 7100
web: www.8i.net.au
ABN 76 793 485 967

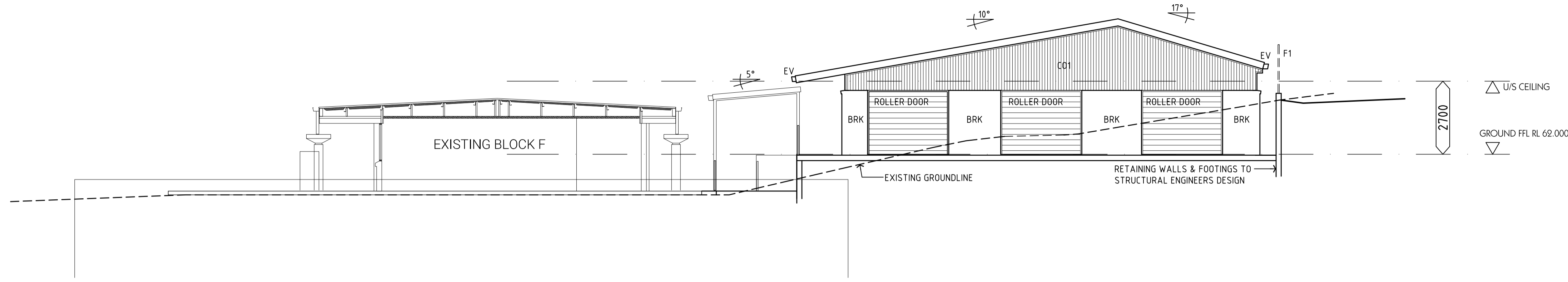
| | |
|------------------------|------------|
| SL | March 2018 |
| DRAWN | DATE |
| HN | March 2018 |
| DISCIPLINE TEAM LEADER | DATE |
| AUTHORISED FOR ISSUE | DATE |

LOWOOD STATE HIGH SCHOOL
34 PROSPECT STREET,
LOWOOD, QLD 4311

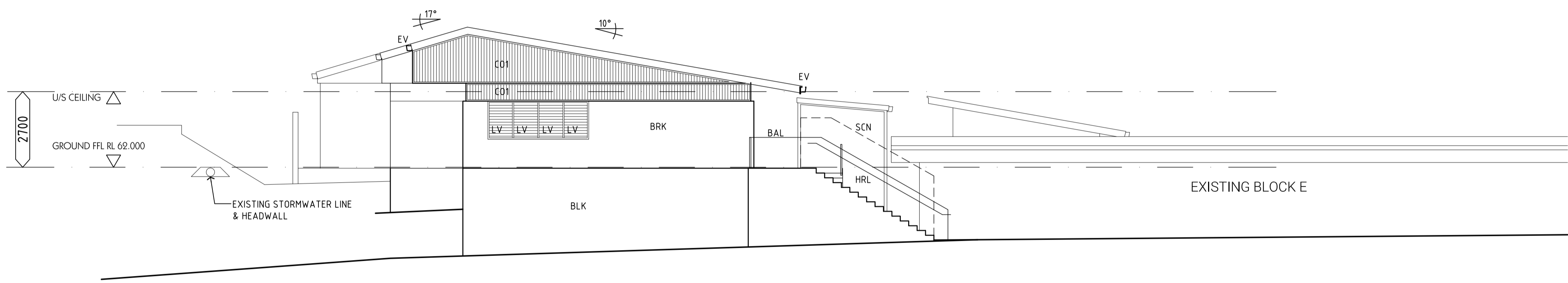
**SECTIONS
MANUAL ARTS EXTENSION**

SCALE 1:100 AT A1

| | |
|---------------------------------|----------------------------------|
| MASTER SITE NUMBER 00000 | CLIENT REFERENCE NUMBER XXXXX |
| DRAWING NUMBER 1806 / SK1010 | ISSUE SHEET NO A - |



1 PROPOSED ELEVATION 1 (WEST)
SCALE 1:100 @ A1



2 PROPOSED ELEVATION 2 (EAST)
SCALE 1:100 @ A1

PRELIMINARY

- LEGEND**
- BAL 1100H HOT DIP GALVANISED BALUSTRADE
 - BC COLORBOND BIRD BARGE CAPPING. 50mm EXTENSION BEYOND FASCIA.
 - BRK SELECTED MASONRY BRICKWORK
 - BLK PAINTED MASONRY BLOCKWORK
 - CC01 PAINTED CONCRETE COLUMN
 - CFC PAINTED EXPRESSED JOINT COMPRESSED FIBRE CEMENT SHEETING.
 - CW CHAINWIRE FENCE ENCLOSURE
 - EV COLORBOND EAVES GUTTER ON EXTERNAL BRACKETS WITH LEAF GUARD.
 - DP PAINTED PVC DOWNPIPE WITH 2000mm HIGH PROTECTION GUARD TO HYD. ENG'S DETAILS.
 - F1 1800H FENCE
 - CO1 COLORBOND CLADDING ON BATTEN. CORRUGATION ORIENTATED VERTICAL.
 - CO2 FEATURE COLOUR COLORBOND CLADDING CORRUGATION ORIENTATED VERTICAL.
 - HR 50 DIA HANDRAIL
 - LV LOUVRES
 - LV2 POWDERCOATED FIXED ALUMINIUM PLANT ROOM VENTILATION LOUVRES
 - LV3 MOTORISED LOUVRES
 - MEC MECHANICAL EXTRACT VENT
 - RS COLORBOND 0.48BMT TRIMDEK ROOF SHEETING ON R2.3 ROOF INSULATION & SISALATION ON SAFETY MESH TO COMPLY WITH THE BCA SECT. J.
 - SCN 2100H PERFORATED POWDERCOATED METAL SCREEN
 - TR DOOR THRESHOLD TO COMPLY WITH AS14.28.1-2009

BARCODE

- GENERAL NOTES**
- IF IN DOUBT, JUST ASK.
 - USE FIGURED DIMENSIONS, DO NOT SCALE FROM DRAWINGS.
 - CONFIRM ALL RELEVANT DIMENSIONS, LEVELS AND DETAILS ON SITE PRIOR TO COMMENCEMENT OF ALL WORK. CONFIRM SETBACKS TO ALL ALIGNMENTS.
 - THESE ARCHITECTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ENGINEERING AND OTHER CONSULTANT'S DRAWINGS AND SPECIFICATIONS. ANY DISCREPANCIES SHALL BE REFERRED TO THE ARCHITECT FOR DISCUSSION BEFORE PROCEEDING WITH THE WORK.
 - DESIGN AND CONSTRUCTION TO COMPLY WITH CURRENT STANDARD BUILDING BY-LAWS, BUILDING ACT, BUILDING AMENDMENT ACT, BUILDING AND OTHER LEGISLATION AMENDMENT ACT, QUEENSLAND DEVELOPMENT CODE, BUILDING CODE OF AUSTRALIA, CURRENT AUSTRALIAN STANDARDS, STATUTORY REQUIREMENTS, ORDINANCES, LOCAL GOVERNMENT REQUIREMENTS, RELEVANT BUILDING AUTHORITIES AND ALL CONTRACT DOCUMENTATION.
 - CARRY OUT WORK IN A SAFE MANNER IN ACCORDANCE WITH APPLICABLE STATUTORY REGULATIONS, BY-LAWS OR RULES. COMPLY WITH RELEVANT STATE OCCUPATIONAL HEALTH AND SAFETY ACTS INCLUDING ASSOCIATED REGULATIONS AND CODES OF PRACTICE. CONTRACTOR IS RESPONSIBLE FOR OCCUPATIONAL HEALTH AND SAFETY OF SITE PERSONNEL AND GENERAL PUBLIC IN ACCORDANCE WITH LEGISLATIVE REQUIREMENTS, INDUSTRIAL AGREEMENTS AND ACCEPTED INDUSTRY PRACTICE.
 - TIMBER CONSTRUCTION TO COMPLY WITH AS1700 DOMESTIC TIMBER CONSTRUCTION IN NON-CYCLONIC LOCATIONS SHALL BE IN ACCORDANCE WITH AS3700.
 - ALL BRICKWORK AND BLOCKWORK SHALL BE IN ACCORDANCE WITH AS3700.
 - ALL PROPRIETARY PRODUCTS AND SYSTEMS TO BE INSTALLED TO MANUFACTURER'S SPECIFICATION AND INSTRUCTIONS.
 - THESE DRAWINGS ARE THE COPYRIGHT OF 8i ARCHITECTURE PTY LTD AND MAY NOT BE USED, RETAINED OR REPRODUCED WITHOUT WRITTEN AUTHORITY.
 - "AS-BUILT" INDICATES WORKS THAT ARE GENERALLY IN ACCORDANCE WITH THE ARCHITECTURAL DOCUMENTATION AT PROJECT COMPLETION AND EXCLUDES CONCEALED WORKS THAT WERE NOT SPECIFICALLY INSPECTED.

DIMENSIONS
Use figured dimensions, DO NOT SCALE.
Check all dimensions & levels on site before fabrication or set out.

AMENDMENTS

| ISSUE | DATE | SUBJECT | AUTH | CHK |
|-------|----------|------------------|------|-----|
| A | 11.05.18 | PRELIM ARCH SDPP | JH | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

DRAWINGS INDEXING SYSTEM
FOR PROJECT SERVICES, PLANS AND RECORDS USE ONLY

- CEILING PLANS
- CONSTRUCTION DETAILS
- ELEVATIONS
- EXTERNAL WORKS
- FITOUTS
- FLOOR PLAN
- FURNITURE & EQUIPMENT
- HYDRAULICS
- MASTER PLAN
- MISCELLANEOUS DETAILS
- OTHER
- PLAY STRUCTURES
- ROOF PLAN
- SECTIONS
- SETOUT PLAN
- SITE PLAN
- STANDARDS

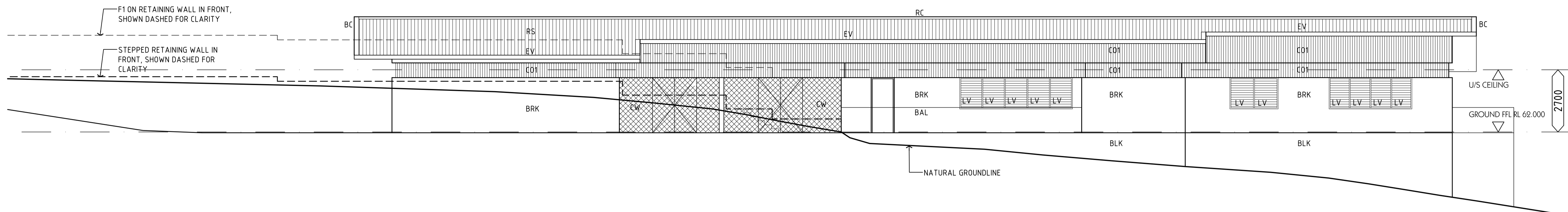
CLIENT
Department of Education and Training
© The State of Queensland 2005

8i Architects
Suite 24, 200 Moggill Road,
Taringa, Qld, 4068
ph: (07) 3217 7100
web: www.8i.net.au
ABN 76 793 485 967

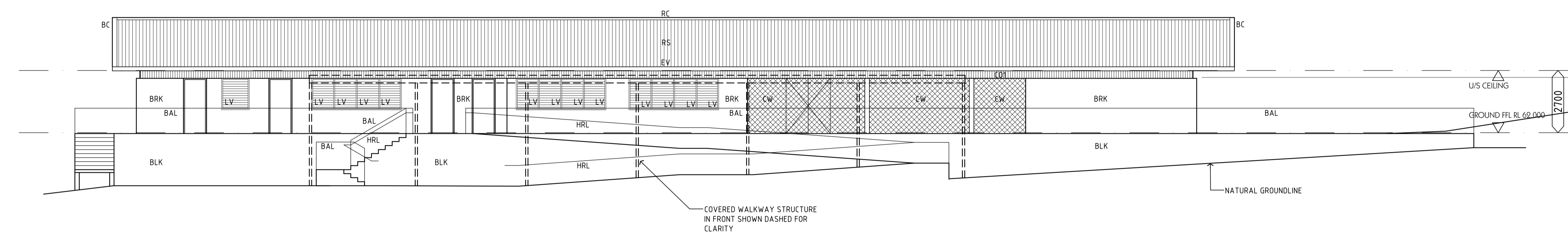
| | |
|------------------------|------------|
| SL | March 2018 |
| DRAWN | DATE |
| HN | March 2018 |
| DISCIPLINE TEAM LEADER | DATE |
| AUTHORISED FOR ISSUE | DATE |

LOWOOD STATE HIGH SCHOOL
34 PROSPECT STREET,
LOWOOD, QLD 4311
ELEVATIONS
MANUAL ARTS EXTENSION

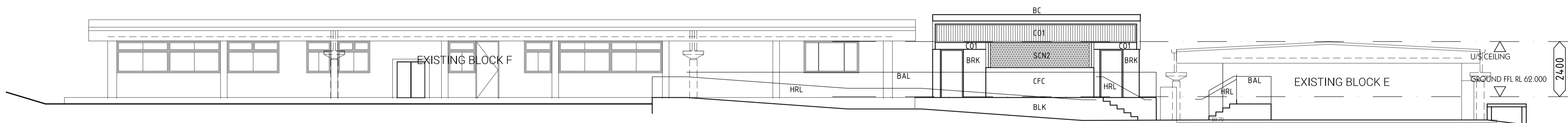
| | | | |
|--------------------|--------------|-------------------------|-------|
| SCALE | 1:100 | AT | A1 |
| MASTER SITE NUMBER | 00000 | CLIENT REFERENCE NUMBER | XXXXX |
| DRAWING NUMBER | 1806 / SK011 | ISSUE | A |
| | | SHEET NO | - |



1 PROPOSED ELEVATION 3 (SOUTH)
SCALE 1:100 @ A1



2 PROPOSED ELEVATION 4 (NORTH)
SCALE 1:100 @ A1



3 PROPOSED ELEVATION 5 (SOUTH- AMENITIES)
SCALE 1:100 @ A1

- LEGEND**
- BAL 1100H HOT DIP GALVANISED BALUSTRADE
 - BC COLORBOND BIRD BARGE CAPPING 50mm EXTENSION BEYOND FASCIA
 - BRK SELECTED MASONRY BRICKWORK
 - BLK PAINTED MASONRY BLOCKWORK
 - CO1 PAINTED CONCRETE COLUMN
 - CFC PAINTED EXPRESSED JOINT COMPRESSED FIBRE CEMENT SHEETING
 - CW CHAINWIRE FENCE ENCLOSURE
 - EV COLORBOND EAVES GUTTER ON EXTERNAL BRACKETS WITH LEAF GUARD
 - DP PAINTED PVC DOWNPIPE WITH 2000mm HIGH PROTECTION GUARD TO HYD. ENG'S DETAILS.
 - F1 1800H FENCE
 - CO1 COLORBOND CLADDING ON BATTEN. CORRUGATION ORIENTATED VERTICAL.
 - CO2 FEATURE COLOUR COLORBOND CLADDING CORRUGATION ORIENTATED VERTICAL.
 - HR 50 DIA HANDRAIL
 - LV LOUVRES
 - LV2 POWDERCOATED FIXED ALUMINIUM PLANT ROOM VENTILATION LOUVRES
 - LV3 MOTORISED LOUVRES
 - MEC MECHANICAL EXTRACT VENT
 - RC COLORBOND RIDGE CAPPING
 - RS COLORBOND 0.488MT TRIMDEK ROOF SHEETING ON R2.3 ROOF INSULATION & SISALATION ON SAFETY MESH TO COMPLY WITH THE BCA SECT. J.
 - SCN 2100H PERFORATED POWDERCOATED METAL SCREEN
 - SCN2 PERFORATED POWDERCOATED METAL SCREEN
 - TR DOOR THRESHOLD TO COMPLY WITH AS1428.1-2009

PRELIMINARY

BARCODE

GENERAL NOTES

- IF IN DOUBT, JUST ASK.
- USE FIGURED DIMENSIONS, DO NOT SCALE FROM DRAWINGS.
- CONFIRM ALL RELEVANT DIMENSIONS, LEVELS AND DETAILS ON SITE PRIOR TO COMMENCEMENT OF ALL WORK. CONFIRM SETBACKS TO ALL ALIGNMENTS.
- THESE ARCHITECTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ENGINEERING AND OTHER CONSULTANT'S DRAWINGS AND SPECIFICATIONS. ANY DISCREPANCIES SHALL BE REFERRED TO THE ARCHITECT FOR DECISION BEFORE PROCEEDING WITH THE WORK.
- DESIGN AND CONSTRUCTION TO COMPLY WITH CURRENT STANDARD BUILDING BY-LAWS, BUILDING ACT, BUILDING AMENDMENT ACT, BUILDING AND OTHER LEGISLATION AMENDMENT ACT, QUEENSLAND DEVELOPMENT CODE, BUILDING CODE OF AUSTRALIA, CURRENT AUSTRALIAN STANDARDS, STATUTORY REQUIREMENTS, ORDINANCES, LOCAL GOVERNMENT REQUIREMENTS, RELEVANT BUILDING AUTHORITIES AND ALL CONTRACT DOCUMENTATION.
- CARRY OUT WORK IN A SAFE MANNER IN ACCORDANCE WITH APPLICABLE STATUTORY REGULATIONS, BY-LAWS OR RULES, COMPLY WITH RELEVANT STATE OCCUPATIONAL HEALTH AND SAFETY ACTS INCLUDING ASSOCIATED REGULATIONS AND CODES OF PRACTICE. CONTRACTOR IS RESPONSIBLE FOR OCCUPATIONAL HEALTH AND SAFETY OF SITE PERSONNEL AND GENERAL PUBLIC IN ACCORDANCE WITH LEGISLATIVE REQUIREMENTS, INDUSTRIAL AGREEMENTS AND ACCEPTED INDUSTRY PRACTICE.
- THESE DRAWINGS ARE THE COPYRIGHT OF 8i ARCHITECTURE PTY LTD AND MAY NOT BE USED, RETAINED OR REPRODUCED WITHOUT WRITTEN AUTHORITY.
- CONSTRUCTION TO COMPLY WITH AS1700 DOMESTIC TIMBER CONSTRUCTION IN NON-CYCLONIC LOCATIONS SHALL BE IN ACCORDANCE WITH AS3700.
- ALL BRICKWORK AND BLOCKWORK SHALL BE IN ACCORDANCE WITH AS3700.
- ALL PROPRIETARY PRODUCTS AND SYSTEMS TO BE INSTALLED TO MANUFACTURER'S SPECIFICATION AND INSTRUCTIONS.
- THESE DRAWINGS ARE THE COPYRIGHT OF 8i ARCHITECTURE PTY LTD AND MAY NOT BE USED, RETAINED OR REPRODUCED WITHOUT WRITTEN AUTHORITY.
- 'AS-BUILT' INDICATES WORKS THAT ARE GENERALLY IN ACCORDANCE WITH THE ARCHITECTURAL DOCUMENTATION AT PROJECT COMPLETION AND EXCLUDES CONCEALED WORKS THAT WERE NOT SPECIFICALLY INSPECTED.

DIMENSIONS
Use figured dimensions, DO NOT SCALE.
Check all dimensions & levels on site before fabrication or set out.

AMENDMENTS

| ISSUE | DATE | SUBJECT | AUTH | CHK |
|-------|----------|------------------|------|-----|
| A | 11.05.18 | PRELIM ARCH SDPP | JH | |

DRAWINGS INDEXING SYSTEM
FOR PROJECT SERVICES, PLANS AND RECORDS USE ONLY

| | |
|--|--|
| <input type="checkbox"/> CEILING PLANS | <input type="checkbox"/> MISCELLANEOUS DETAILS |
| <input type="checkbox"/> CONSTRUCTION DETAILS | <input type="checkbox"/> OTHER |
| <input type="checkbox"/> ELEVATIONS | <input type="checkbox"/> PLAY STRUCTURES |
| <input type="checkbox"/> EXTERNAL WORKS | <input type="checkbox"/> ROOF PLAN |
| <input type="checkbox"/> FITOUTS | <input type="checkbox"/> SECTIONS |
| <input type="checkbox"/> FLOOR PLAN | <input type="checkbox"/> SETOUT PLAN |
| <input type="checkbox"/> FURNITURE & EQUIPMENT | <input type="checkbox"/> SITE PLAN |
| <input type="checkbox"/> HYDRAULICS | <input type="checkbox"/> SITE PLAN |
| <input type="checkbox"/> MASTER PLAN | <input type="checkbox"/> STANDARDS |

CLIENT
Department of Education and Training
© The State of Queensland 2005

8i Architects
Suite 24, 200 Moggill Road,
Taringa, Qld, 4068
ph: (07) 3217 7100
web: www.8i.net.au
ABN 76 793 485 967

| | |
|------------------------|------------|
| SL | March 2018 |
| DRAWN | DATE |
| HN | March 2018 |
| DISCIPLINE TEAM LEADER | DATE |
| AUTHORISED FOR ISSUE | DATE |

LOWOOD STATE HIGH SCHOOL
34 PROSPECT STREET,
LOWOOD, QLD 4311

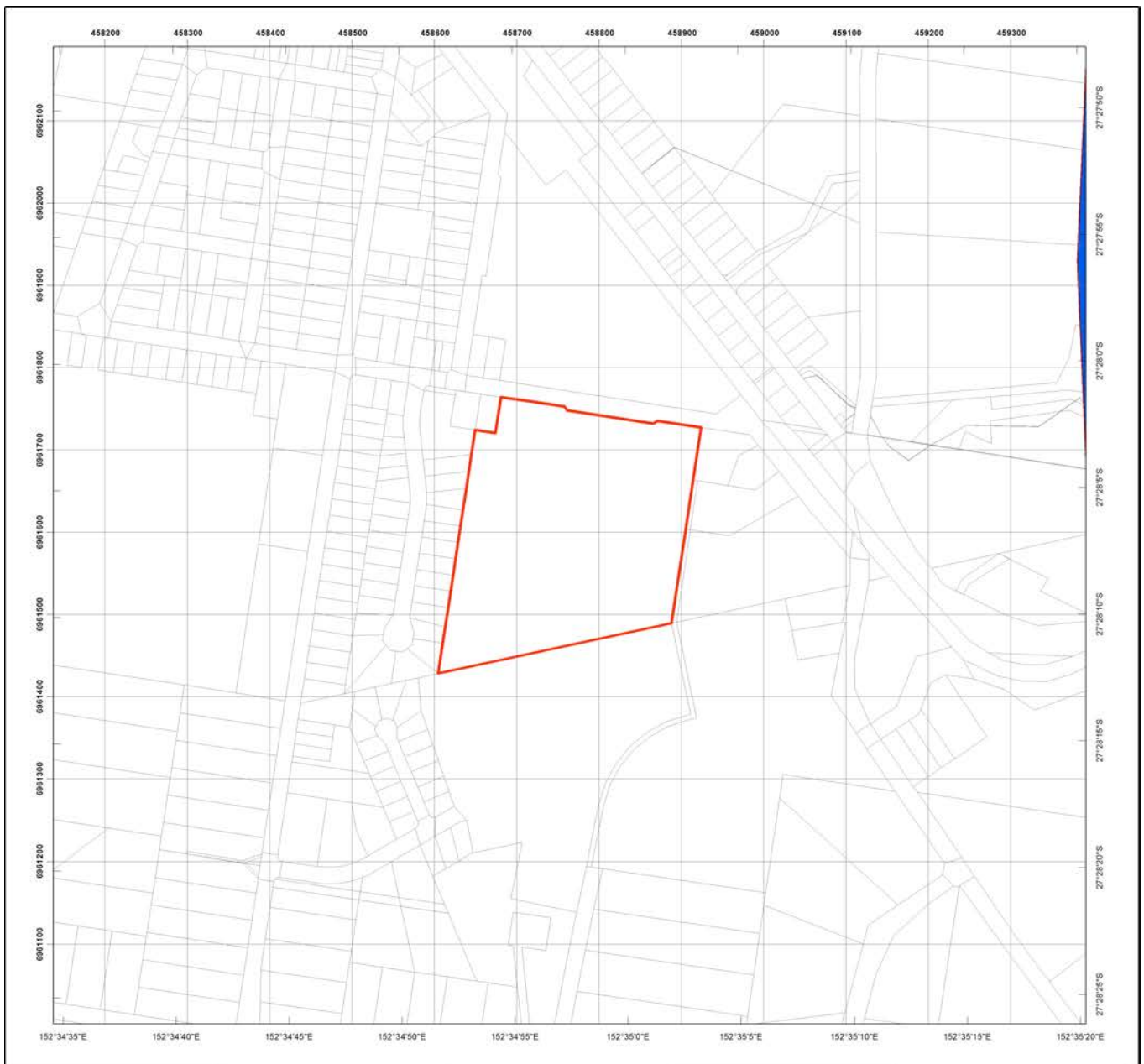
**ELEVATIONS
MANUAL ARTS EXTENSION**

| | | | |
|--------------------|--------------|-------------------------|-------|
| SCALE | 1:100 | AT | A1 |
| MASTER SITE NUMBER | 00000 | CLIENT REFERENCE NUMBER | XXXXX |
| DRAWING NUMBER | 1806 / SK012 | ISSUE | A |
| | | SHEET NO | - |

Appendix 6

State Interest Trigger Maps

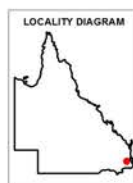
5.1 Regulated vegetation management map



Regulated Vegetation Management Map

Legend

- Lot and Plan
- Category A area (Vegetation offsets/compliance notices/VDecs)
- Category B area (Remnant vegetation)
- Category C area (High-value regrowth vegetation)
- Category R area (Reef regrowth watercourse vegetation)
- Category X area (Exempt clearing work on Freehold, Indigenous and Leasehold land)
- Water
- Area not categorised
- Cadastral line
- Property boundaries shown are provided as a locational aid only



This product is projected into:
GDA 1994 MGA Zone 56

Disclaimer:

While every care is taken to ensure the accuracy of this product, the Department of Natural Resources, Mines and Energy makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the product being inaccurate or incomplete in any way and for any reason.

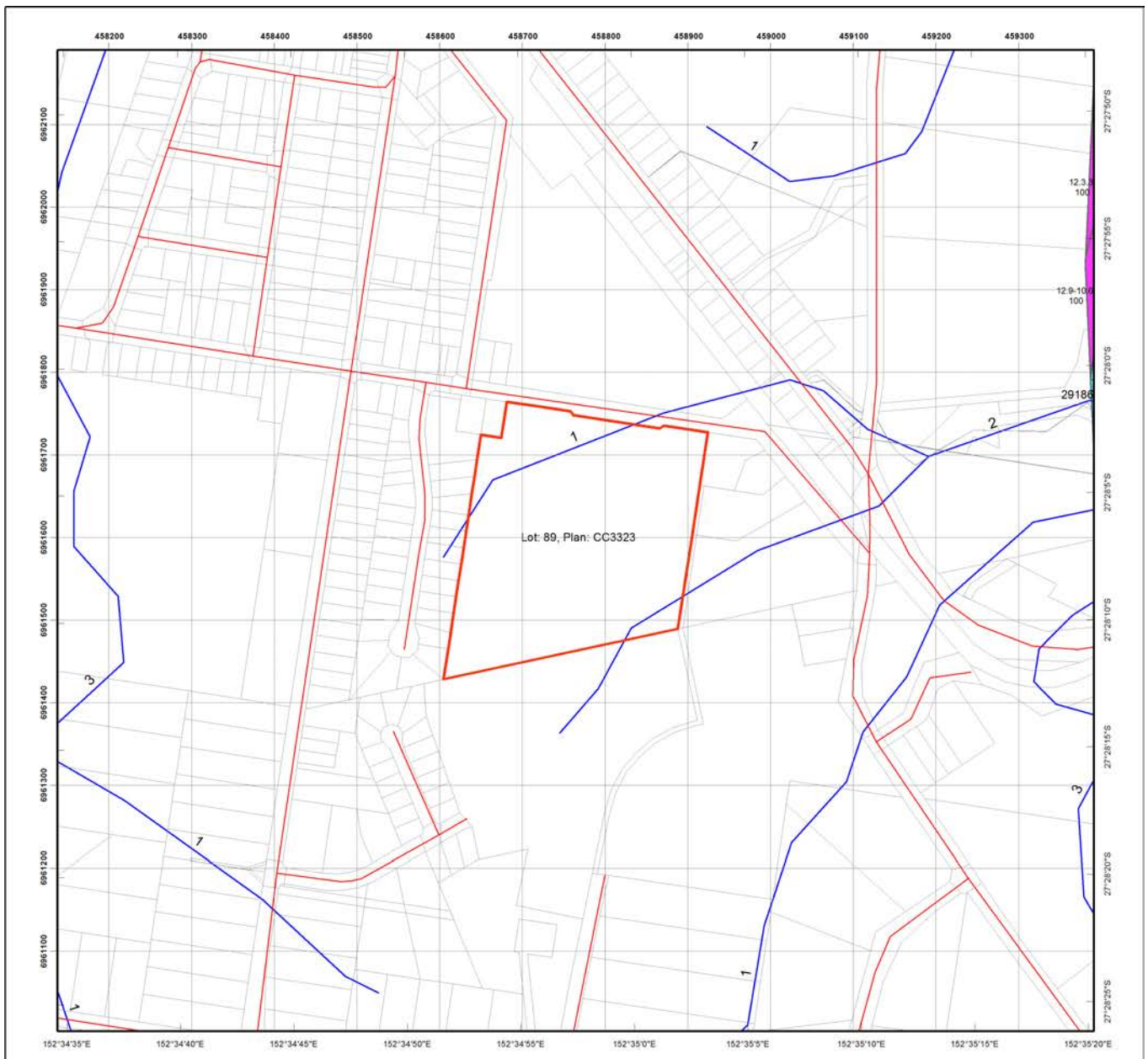
Additional information required for the assessment of vegetation values is provided in the accompanying "Vegetation Management Supporting map". For further information go to the web site: www.dnrme.qld.gov.au or contact the Department of Natural Resources, Mines and Energy.

Digital data for the regulated vegetation management map is available from the Queensland Spatial Portal at <http://www.information.qld.gov.au/>

This map is updated on a monthly basis to ensure new PMAVs are included as they are approved.



5.2 Vegetation management supporting map



Vegetation Management Supporting Map

Legend

- Lot and Plan
- Category A or B area containing endangered regional ecosystems
- Category A or B area containing of concern regional ecosystems
- Category A or B area that is a least concern regional ecosystem
- Category A or B area containing remnant vegetation
- Category A or B area under Section 20AH
These areas are edged in yellow and filled with the remnant RE Status
- Category C area containing endangered regional ecosystems
- Category C area containing of concern regional ecosystems
- Category C area that is a least concern regional ecosystem
- Category C area containing high value regrowth vegetation
- Category C area under Section 20AI
These areas are edged in purple and filled with the remnant RE Status
- Non Remnant
- Water
- Wetland on the vegetation management wetlands map
- Essential habitat on the essential habitat map
- Essential habitat species record
- Watercourses and drainage features on the vegetation management watercourse and drainage features map
(Stream order shown as black number against stream where available)
- Roads
- National Parks, State Forest and other reserves
- Cadastral line
- Property boundaries shown are provided as a locational aid only



0 40 80 120 160 200 m

This product is projected into:
GDA 1994 MGA Zone 56

Labels for Essential Habitat are centred on the area of enquiry.

Regional ecosystem linework has been compiled at a scale of 1:100 000, except in designated areas where a compilation scale of 1:50 000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100 000 is +/- 100 metres.

Disclaimer:

While every care is taken to ensure the accuracy of this product, the Department of Natural Resources, Mines and Energy makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the product being inaccurate or incomplete in any way and for any reason.

Additional information may be required for the purposes of land clearing or assessment of a regional ecosystem map or PMAV applications. For further information go to the web site: www.dnrme.qld.gov.au or contact the Department of Natural Resources, Mines and Energy.

Digital data for the vegetation management watercourse and drainage feature map, vegetation management wetlands map, essential habitat map and the vegetation management remnant and regional ecosystem map are available from the Queensland Spatial Portal at <http://www.information.qld.gov.au/>








5.3 Land suitability map

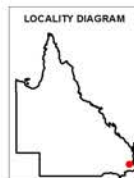


Land Suitability Overview Map

Legend

-  Lot and Plan
-  Cadastral Boundaries
-  Land suitability mapping 1:100,000 scale or better (Category 2 or 3*)
-  Land suitability mapping greater than 1:100,000 scale (Category 4)
-  No mapping available (Category 4)

* Category 3 applies to applications where there is some land resource mapping or information available however it either does not cover the entire area, or the land suitability mapping and information does not identify the land as suitable for the proposed crop and management systems.



This product is projected into:
GDA 1994 MGA Zone 56

Important information

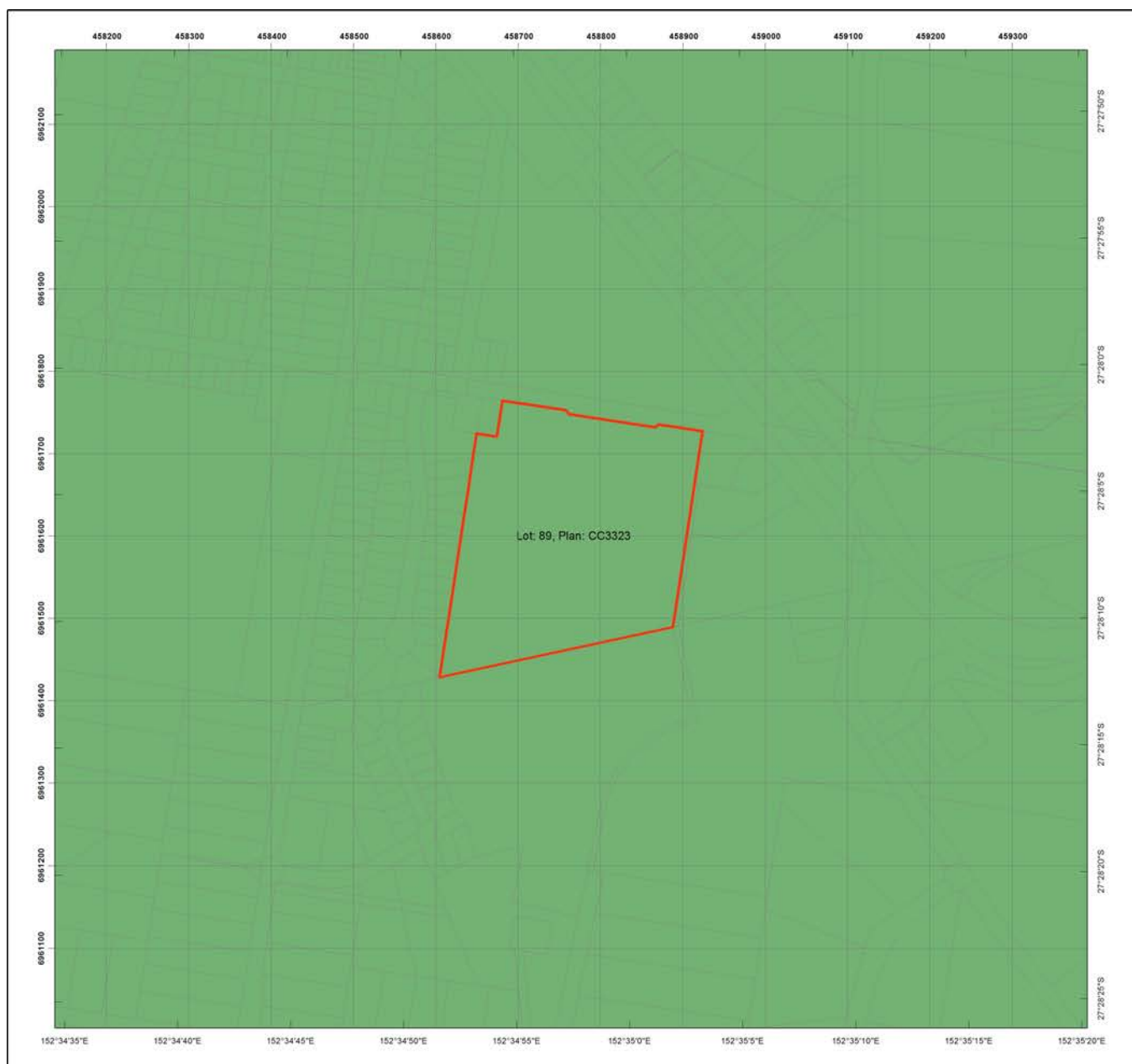
The Land Suitability Overview Map assists with identifying the Land Suitability category under the high value and irrigated high value agriculture vegetation clearing purpose. This map provides detailed land suitability, agricultural land classification, or soil and land resource mapping data where it is available on the selected lots. Where no data is available, the maps will be blank, with no mapping visible.

Further information on these categories is available in the Guideline for applying to clear for high-value or irrigated high-value agriculture (www.dnrme.qld.gov.au).

Disclaimer






All persons and organisations by using this map take all responsibility for assessing the relevance and accuracy of the map contents for their purpose and accept all risks associated with its use. The State of Queensland (as represented by the Department of Natural Resources, Mines and Energy) makes no representations or warranties in relation to the map contents, and, to the extent permitted by law, excludes or limits all warranties relating to correctness, accuracy, reliability, completeness or currency and all disclaims all liability for any direct, indirect and consequential costs, losses, damages and expenses incurred in any way (including but not limited to that arising from negligence) in connection with any use of or reliance on the map contents.

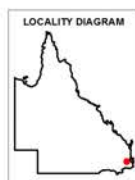
5.4 Coastal/non coastal map



Coastal/Non Coastal Map

Legend

-  Lot and Plan
-  Coastal
-  Non Coastal
-  Cadastral line
-  Property boundaries shown are provided as a locational aid only



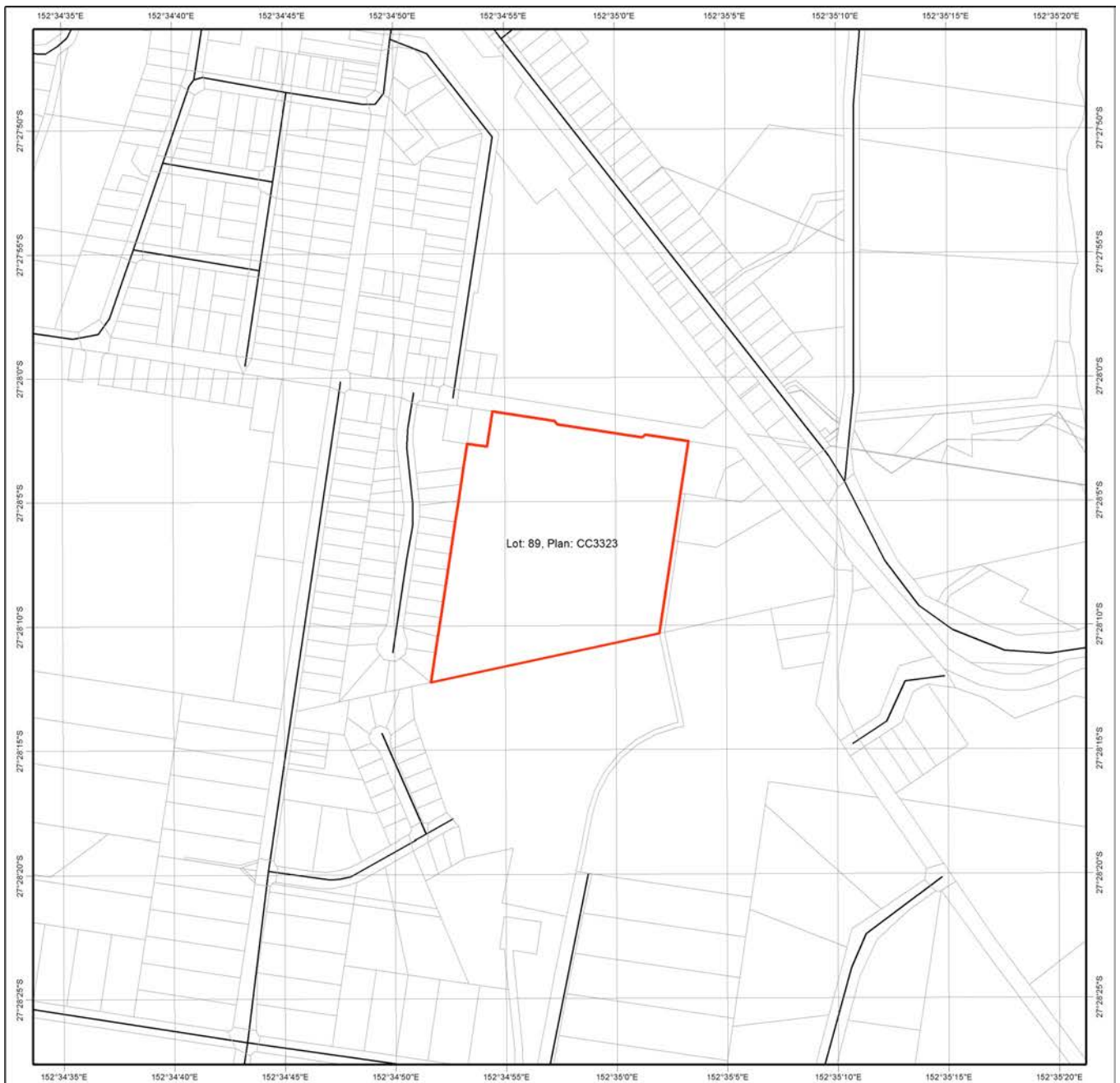
This product is projected into:
GDA 1994 MGA Zone 56

Disclaimer:

While every care is taken to ensure the accuracy of this product, the Department of Natural Resources, Mines and Energy makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the product being inaccurate or incomplete in any way and for any reason.



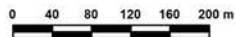
5.5 Protected plants map administered by DES



Protected Plants Flora Survey Trigger Map

Legend

- Lot and Plan
- High risk area
- Cadastral line
Property boundaries shown are provided as a locational aid only
- Freeways / motorways / highways
- Secondary roads / streets



This product is projected into:
GDA 1994 MGA Zone 56

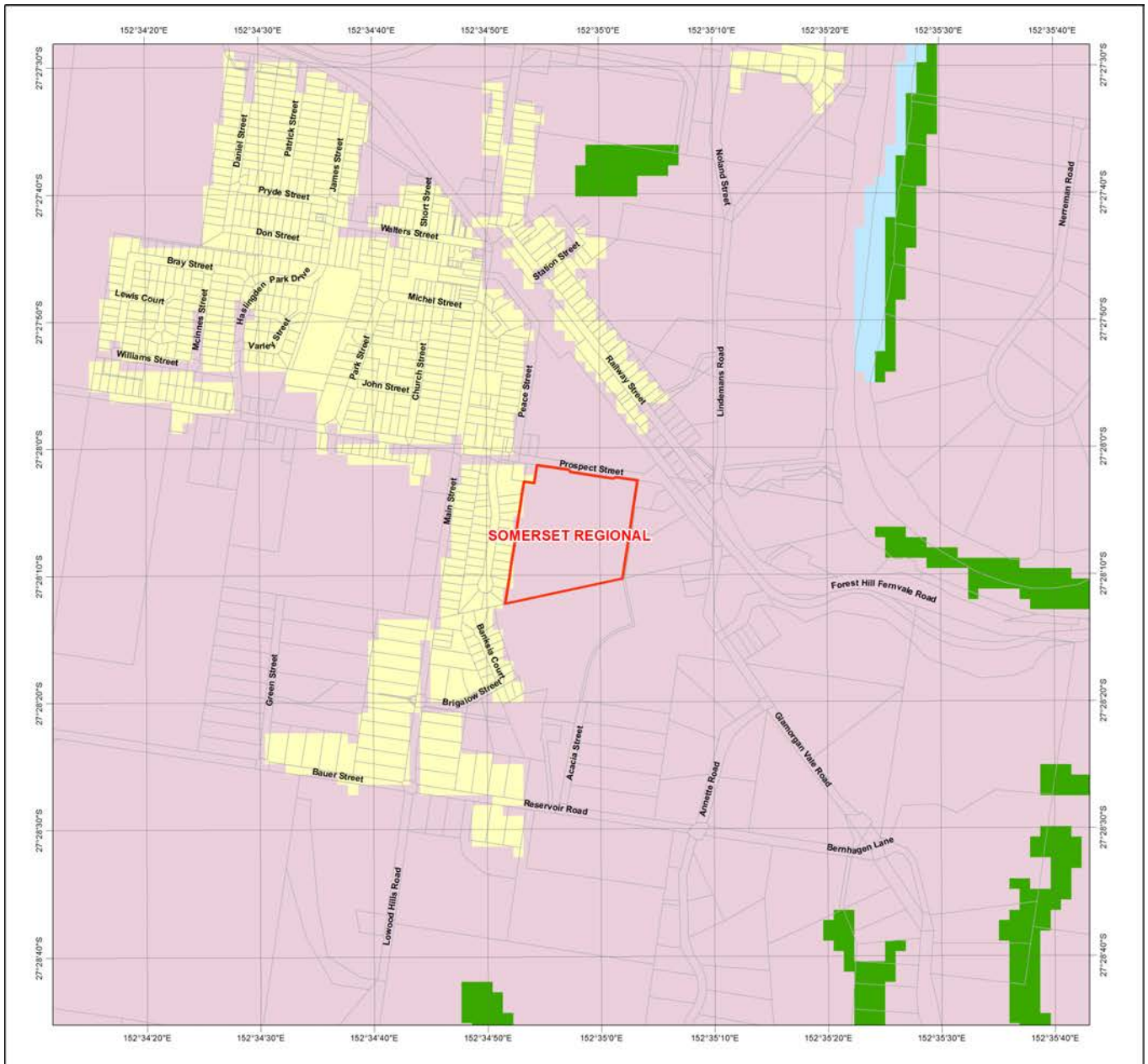
This map shows areas where particular provisions of the Nature Conservation Act 1992 apply to the clearing of protected plants.

This map is produced at a scale relevant to the size of the area selected and should be printed as A4 size in portrait orientation.

For further information or assistance with interpretation of this product, please contact the Department of Environment and Science at palm@ehp.qld.gov.au

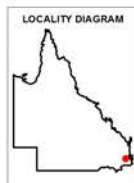
Disclaimer:

While every care is taken to ensure the accuracy of the data used to generate this product, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaim all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damages) and costs which might be incurred as a consequence of reliance on the data, or as a result of the data being inaccurate or incomplete in any way and for any reason.



Koala Habitat in South East Queensland

- Lot and Plan
- Koala SPP - Habitat Values**
- Bushland Habitat**
- High Value Bushland
- Medium Value Bushland
- Low Value Bushland
- Suitable for Rehabilitation**
- High Value Rehabilitation
- Medium Value Rehabilitation
- Low Value Rehabilitation
- Other Areas of Value**
- High Value Other
- Medium Value Other
- Low Value Other
- Generally not suitable
- Water
- South East Queensland Koala Habitat Values western SEQ**
- Bushland Habitat
- Suitable for rehabilitation
- Other areas of value
- Generally not suitable
- Water
- Cadastral Boundaries
- Local Government Boundaries



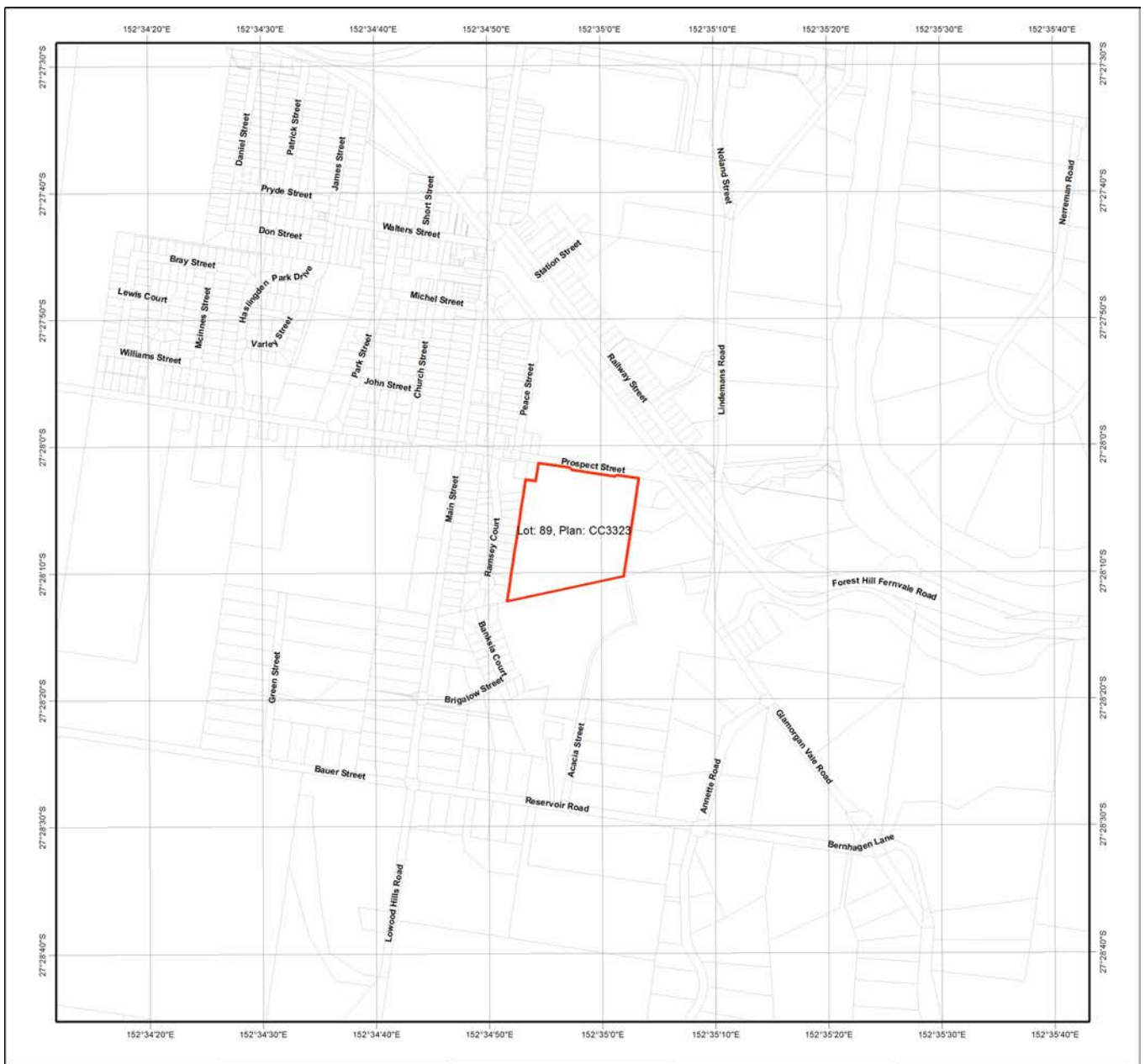
This product is projected into GDA 1994 MGA Zone 56

While every care is taken to ensure the accuracy of this data, the State of Queensland makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the data being inaccurate or incomplete in any way and for any reason. Due to varying sources of data, spatial locations may not coincide when overlaid.

In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.

Based on or contains data provided by the State of Queensland 2010.

Note - These maps are not regulatory. Regulatory maps and requirements can be downloaded from the DES website. Further information in relation to regulatory requirements for development and planning activities should be sought from the relevant Local Government Authority or the Department of Environment and Science.



Coastal Hazard Areas Map Erosion Prone Area

Legend

- Lot and Plan
- Erosion due to storm impact and long term trends including sediment supply deficit and channel migration
- Erosion from permanent tidal inundation due to sea level rise
- Coastal Management District
- Coastal Building Lines



This product is projected into GDA 1994 MGA Zone 56

Notes

1. The areas shown on this map are indicative of the extent of erosion and permanent inundation defined by erosion prone area plans declared under the Coastal Protection and Management Act 1995. Only the declared erosion prone area plans should be used for development assessment. To determine the actual position of the erosion prone area a registered surveyor or geotechnical consultant may be required if there is any doubt.

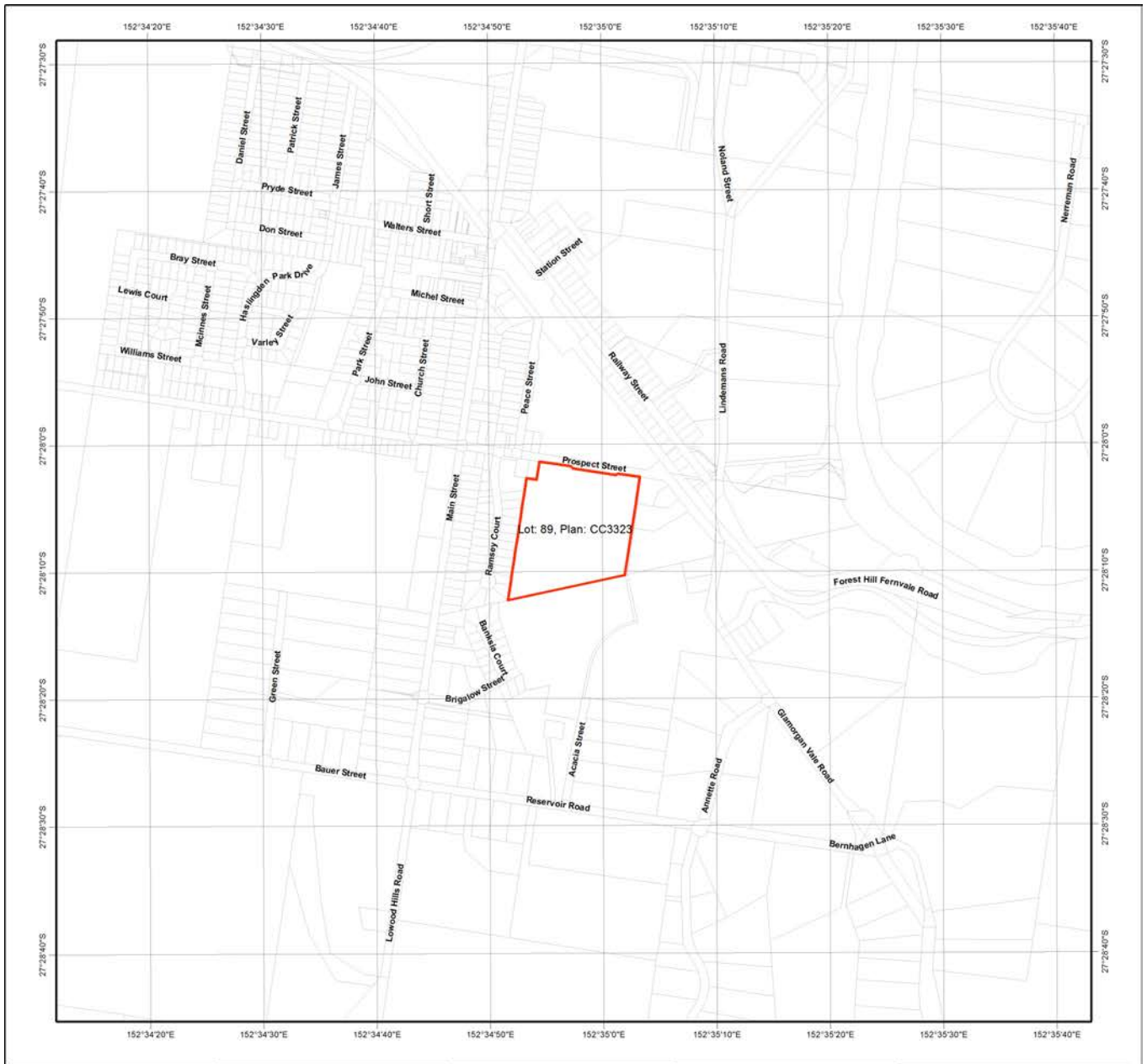
2. Erosion prone area plans for each local government area and a comprehensive description of their determination are available from the Department of Environment and Science website.

Version 7 - October 2016

Disclaimer

Whilst every care is taken to ensure the accuracy of this product, the Department of Environment and Science makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you may incur as a result of the product being inaccurate or incomplete in any way and for any reason. This map is intended to be printed on an A4 page.

© The State of Queensland, 2018



Coastal Hazard Areas Map Storm Tide Inundation Area

Legend

- Lot and Plan
- High hazard area (greater than 1.0m water depth)
- Medium hazard area (less than 1.0m water depth)
- Coastal Management District
- Coastal hazard data not available in this area
- Coastal Building Lines

* Regional default values for a 100yr ARI inundation level including 0.8m sea level rise.



Notes

1. A default storm tide inundation level of 1.5 m HAT in South East Queensland regional planning area and 2 m HAT for the remainder of Queensland is used where projected storm tide inundation levels have not been determined locally.
2. The high hazard area may coincide with the area of permanent inundation - refer to the Erosion Prone Area map.
3. The map should be used as a guide only. Field surveys are recommended to verify feature boundaries.

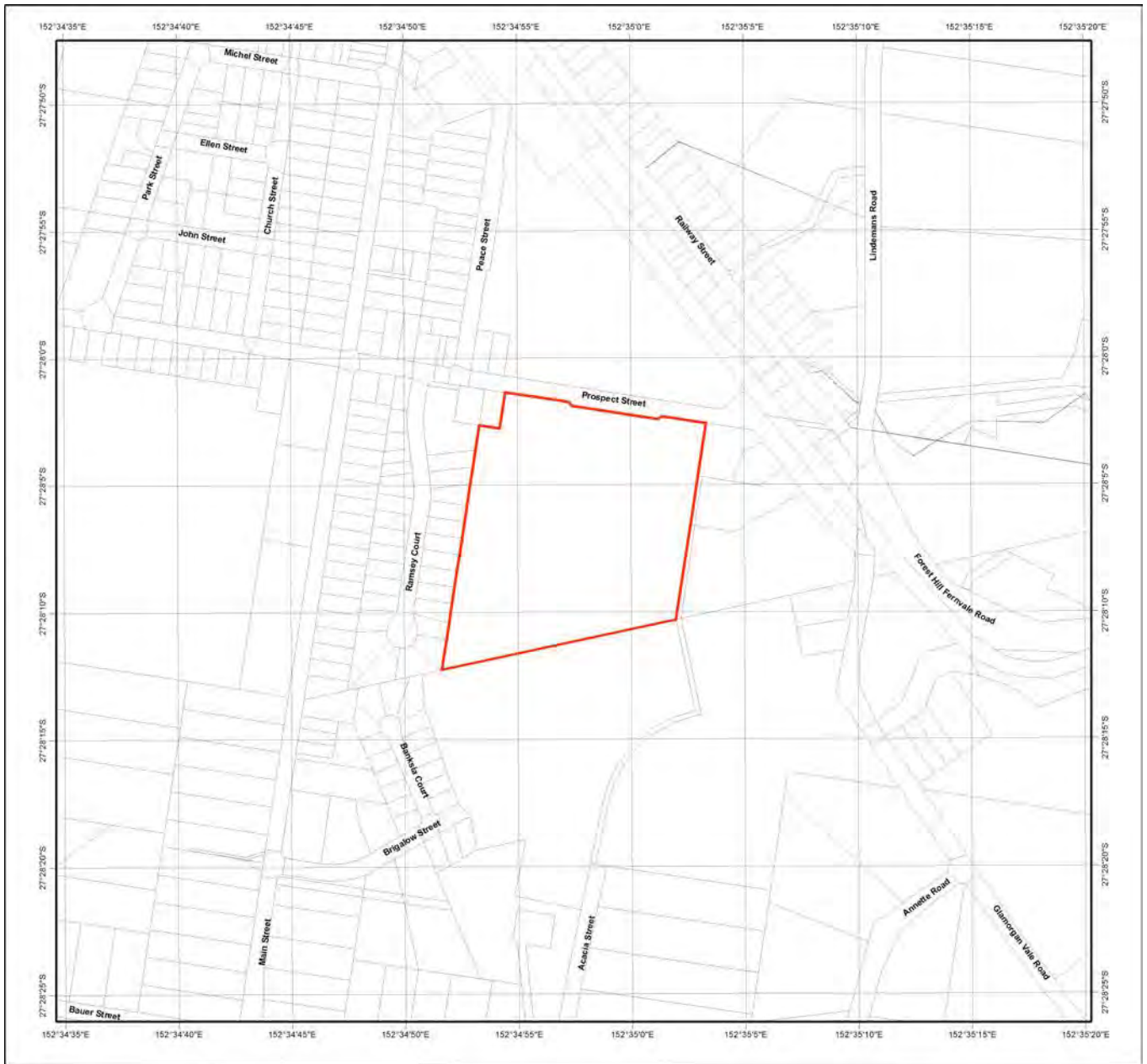
Version 4 - July 2015

Disclaimer

Whilst every care is taken to ensure the accuracy of this product, the Department of Environment and Science makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you may incur as a result of the product being inaccurate or incomplete in any way and for any reason. This map is intended to be printed on an A4 page.

© The State of Queensland, 2018

This product is projected into GDA 1994 MGA Zone 56



Map of Referable Wetlands Wetland Protection Areas

-  Lot and Plan
-  Cadastral Boundary
- Wetland Protection Areas**
-  Wetland
-  Trigger Area



Note:
This map shows the location of wetland protection areas which are defined under the Environmental Protection Regulation 2008. Within wetland protection areas, certain types of development involving high impact earthworks are made assessable under Schedule 3 of the Sustainable Planning Regulation 2009.

The Department of State Development, Manufacturing, Infrastructure and Planning is the State Assessment Referral Agency (SARA) under Schedule 7 of the Sustainable Planning Regulation 2009 for assessable development involving high impact earthworks within wetland protection areas. The Department of Environment and Science is a technical agency.

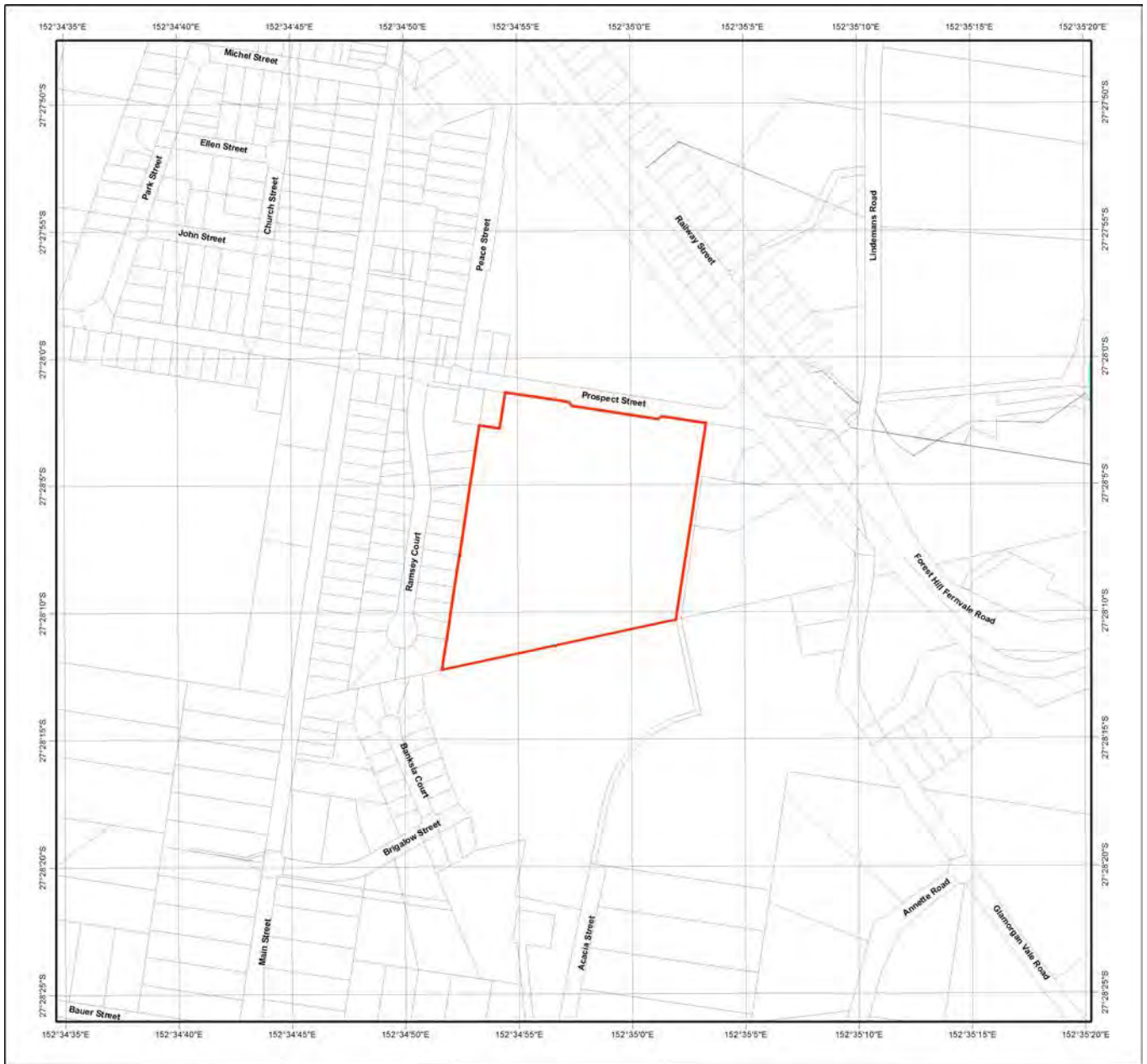
The policy outcome and assessment criteria for assessing these applications are described in the State Development Assessment Provisions (SDAP) *Module 11: Wetlands and wild rivers*.

This map is produced at a scale relevant to the size of the lot on plan identified and should be printed at A4 size in portrait orientation. Consideration of the effects of mapped scale is necessary when interpreting data at a large scale.





For further information or assistance with interpretation of this product, please contact the Department of Environment and Science, email planning.support@des.qld.gov.au.

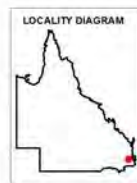
This product is projected into GDA 1994 MGA Zone 56

© The State of Queensland, 2018



Map of Referable Wetlands for the Environmental Protection Act 1994

-  Lot and Plan
-  Cadastral Boundary
-  HES Wetland
-  GES Wetland



Note:
This map shows the location of wetlands on the Map of Referable Wetlands which are defined under the Environmental Protection Regulation 2008.

Wetlands are assessed for ecological significance using the environmental values for wetlands in section 81A of the Environmental Protection Regulation 2008. Wetlands are considered either High Ecological Significance (HES) or of General Ecological Significance (GES) for the purposes of the environmental values.

This map is produced at a scale relevant to the size of the lot on plan identified and should be printed at A4 size in portrait orientation. Consideration of the effects of mapped scale is necessary when interpreting data at a large scale.

For further information or assistance with interpretation of this product, please contact the Department of Environment and Science, email planning.support@des.qld.gov.au.

© The State of Queensland, 2018

This product is projected into GDA 1994 MGA Zone 56



State Planning Policy

Making or amending a local planning instrument
and designating land for community infrastructure

Date: 07/06/2018

Department of State
Development, Manufacturing,
Infrastructure and Planning

© The State of Queensland 2018.

0 140 280 420 560

Metres

Disclaimer:

This map has been prepared with due care based on the best available information at the time of publication. However, the State of Queensland (acting through the department) makes no representations, either express or implied, that the map is free from errors, inconsistencies or omissions. Reliance on information contained in this map is the sole responsibility of the user. The State disclaims responsibility for any loss, damage or inconvenience caused as a result of reliance on information or data contained in this map.




Queensland
Government

Legend


Drawn Polygon Layer

Override 1


Cadastre (10k)

 Cadastre (10k)


MSES - Regulated vegetation (intersecting a watercourse)

 MSES - Regulated vegetation (intersecting a watercourse)


MSES - High ecological value waters (watercourse)

 MSES - High ecological value waters (watercourse)


MSES - Wildlife habitat

 MSES - Wildlife habitat


MSES - Strategic environmental areas (designated precinct)

 MSES - Strategic environmental areas (designated precinct)


MSES - High ecological significance wetlands

 MSES - High ecological significance wetlands


MSES - High ecological value waters (wetland)

 MSES - High ecological value waters (wetland)

MSES - Legally secured offset area (offset register)

 MSES - Legally secured offset area (offset register)


MSES - Legally secured offset area (regulated vegetation offsets)

 MSES - Legally secured offset area (regulated vegetation offsets)


MSES - Protected areas (estate)

 MSES - Protected areas (estate)

MSES - Protected areas (nature refuge)

 MSES - Protected areas (nature refuge)

MSES - Marine park

 MSES - Marine park


MSES - Declared fish habitat area

 MSES - Declared fish habitat area

MSES - Regulated vegetation (category B)

 MSES - Regulated vegetation (category B)


MSES - Regulated vegetation (category C)

 MSES - Regulated vegetation (category C)

MSES - Regulated vegetation (category R)

 MSES - Regulated vegetation (category R)

MSES - Regulated vegetation (essential habitat)

 MSES - Regulated vegetation (essential habitat)

MSES - Regulated vegetation (wetland)

 MSES - Regulated vegetation (wetland)



Date: 07/06/2018
Department of State
Development, Manufacturing,
Infrastructure and Planning

© The State of Queensland 2018.

State Planning Policy
Making or amending a local planning instrument
and designating land for community infrastructure

Disclaimer:

This map has been prepared with due care based on the best available information at the time of publication. However, the State of Queensland (acting through the department) makes no representations, either express or implied, that the map is free from errors, inconsistencies or omissions. Reliance on information contained in this map is the sole responsibility of the user. The State disclaims responsibility for any loss, damage or inconvenience caused as a result of reliance on information or data contained in this map.



Date: 07/06/2018

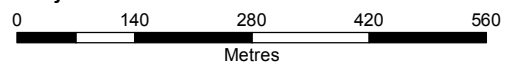
State Planning Policy

Making or amending a local planning instrument
and designating land for community infrastructure



Department of State
Development, Manufacturing,
Infrastructure and Planning

© The State of Queensland 2018.



Disclaimer:


This map has been prepared with due care based on the best available information at the time of publication. However, the State of Queensland (acting through the department) makes no representations, either express or implied, that the map is free from errors, inconsistencies or omissions. Reliance on information contained in this map is the sole responsibility of the user. The State disclaims responsibility for any loss, damage or inconvenience caused as a result of reliance on information or data contained in this map.

Legend


Drawn Polygon Layer

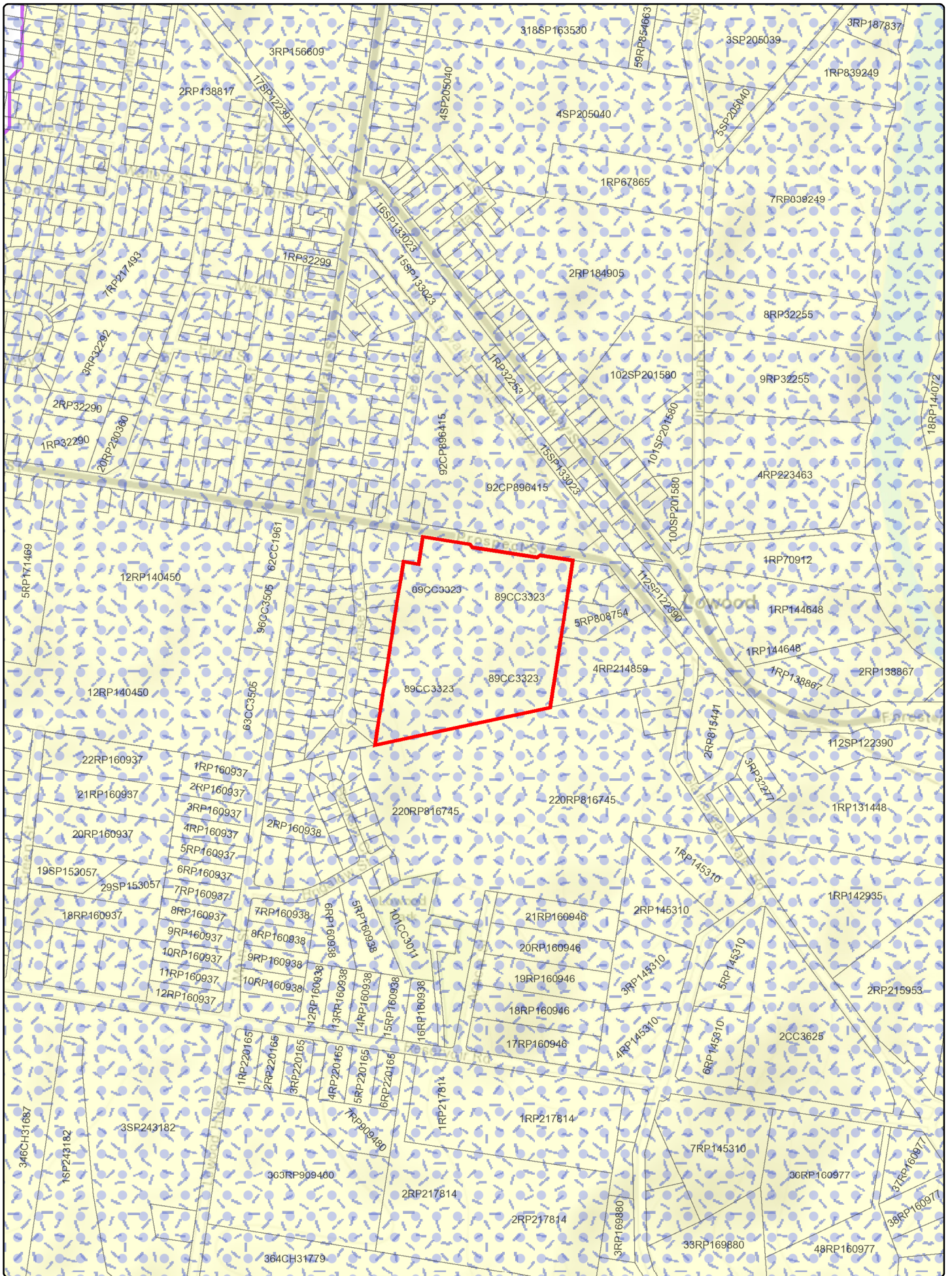
Override 1

Cadastre (10k)

 Cadastre (10k)

Flood hazard area - local government flood mapping area

 Flood hazard area - local government flood mapping area



State Planning Policy

Making or amending a local planning instrument
and designating land for community infrastructure

Date: 07/06/2018

Department of State
Development, Manufacturing,
Infrastructure and Planning

© The State of Queensland 2018.

0 140 280 420 560
Metres

Disclaimer:

This map has been prepared with due care based on the best available information at the time of publication. However, the State of Queensland (acting through the department) makes no representations, either express or implied, that the map is free from errors, inconsistencies or omissions. Reliance on information contained in this map is the sole responsibility of the user. The State disclaims responsibility for any loss, damage or inconvenience caused as a result of reliance on information or data contained in this map.




Legend


Drawn Polygon Layer

Override 1


Cadastre (10k)

 Cadastre (10k)


Slightly disturbed waters

 Slightly disturbed waters


Climatic regions - stormwater management design objectives

 Climatic regions - stormwater management design objectives


Urban water supply storage

 Urban water supply storage


High ecological value water areas

 High ecological value water areas

Water resource catchments

 Water resource catchments

Water supply buffer area

 Water supply buffer area



Date: 07/06/2018

Department of State
Development, Manufacturing,
Infrastructure and Planning

© The State of Queensland 2018.

State Planning Policy

Making or amending a local planning instrument
and designating land for community infrastructure

Disclaimer:

This map has been prepared with due care based on the best available information at the time of publication. However, the State of Queensland (acting through the department) makes no representations, either express or implied, that the map is free from errors, inconsistencies or omissions. Reliance on information contained in this map is the sole responsibility of the user. The State disclaims responsibility for any loss, damage or inconvenience caused as a result of reliance on information or data contained in this map.

Appendix 7

EPBC Protected Matters Report and NCA Wildflame Report





EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 25/01/18 18:06:27

[Summary](#)

[Details](#)

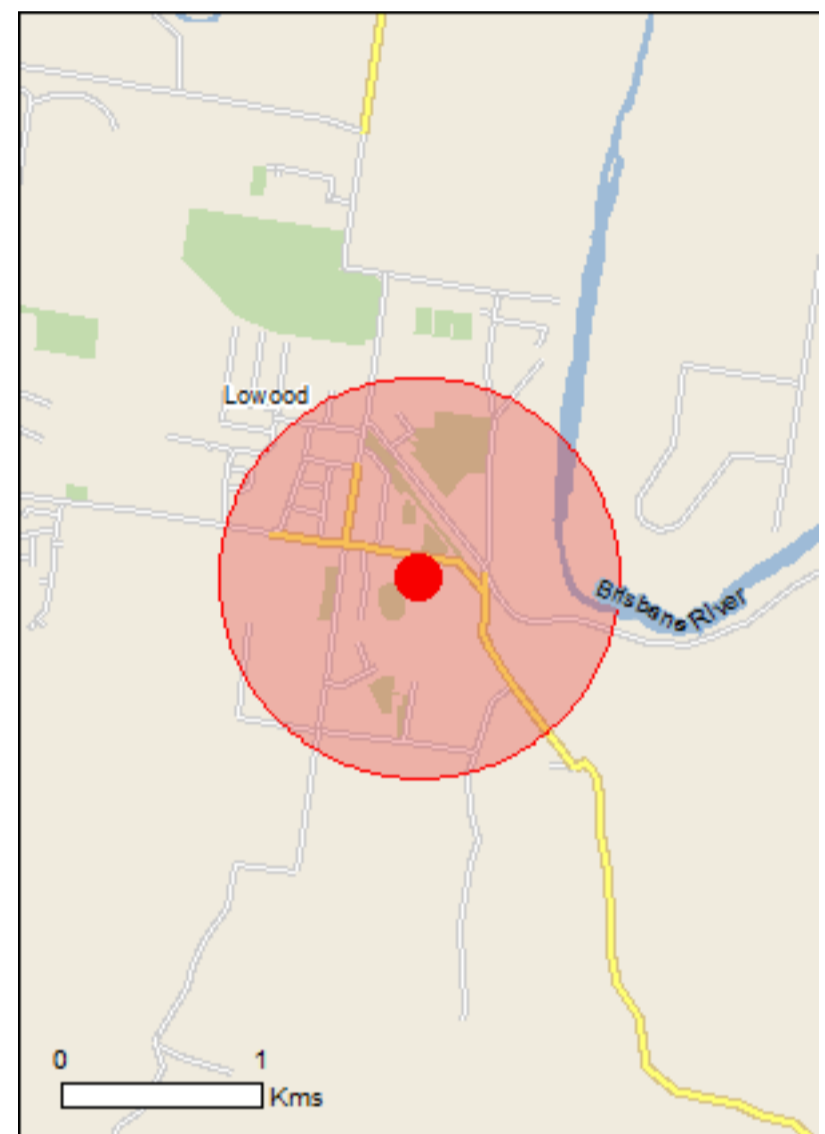
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

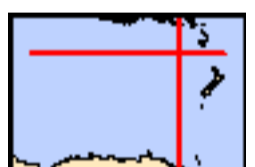
[Acknowledgements](#)



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

[Coordinates](#)

[Buffer: 1.0Km](#)



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

| | |
|---|------|
| World Heritage Properties: | None |
| National Heritage Places: | None |
| Wetlands of International Importance: | None |
| Great Barrier Reef Marine Park: | None |
| Commonwealth Marine Area: | None |
| Listed Threatened Ecological Communities: | 2 |
| Listed Threatened Species: | 32 |
| Listed Migratory Species: | 16 |

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

| | |
|--|------|
| Commonwealth Land: | None |
| Commonwealth Heritage Places: | None |
| Listed Marine Species: | 23 |
| Whales and Other Cetaceans: | None |
| Critical Habitats: | None |
| Commonwealth Reserves Terrestrial: | None |
| Commonwealth Reserves Marine: | None |

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

| | |
|--|------|
| State and Territory Reserves: | None |
| Regional Forest Agreements: | None |
| Invasive Species: | 42 |
| Nationally Important Wetlands: | None |
| Key Ecological Features (Marine) | None |

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities

[[Resource Information](#)]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

| Name | Status | Type of Presence |
|--|-----------------------|--------------------------------------|
| Brigalow (Acacia harpophylla dominant and co-dominant) | Endangered | Community known to occur within area |
| Lowland Rainforest of Subtropical Australia | Critically Endangered | Community may occur within area |

Listed Threatened Species

[[Resource Information](#)]

| Name | Status | Type of Presence |
|---|-----------------------|--|
| Birds | | |
| Anthochaera phrygia Regent Honeyeater [82338] | Critically Endangered | Foraging, feeding or related behaviour may occur within area |
| Botaurus poiciloptilus Australasian Bittern [1001] | Endangered | Species or species habitat likely to occur within area |
| Calidris ferruginea Curlew Sandpiper [856] | Critically Endangered | Species or species habitat may occur within area |
| Dasyornis brachypterus Eastern Bristlebird [533] | Endangered | Species or species habitat may occur within area |
| Erythrotriorchis radiatus Red Goshawk [942] | Vulnerable | Species or species habitat known to occur within area |
| Geophaps scripta scripta Squatter Pigeon (southern) [64440] | Vulnerable | Species or species habitat known to occur within area |
| Grantiella picta Painted Honeyeater [470] | Vulnerable | Species or species habitat may occur within area |
| Lathamus discolor Swift Parrot [744] | Critically Endangered | Species or species habitat may occur within area |
| Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat may occur within area |
| Poephila cincta cincta Southern Black-throated Finch [64447] | Endangered | Species or species habitat may occur within area |

| Name | Status | Type of Presence |
|---|-----------------------|--|
| Rostratula australis Australian Painted Snipe [77037] | Endangered | Species or species habitat likely to occur within area |
| Turnix melanogaster Black-breasted Button-quail [923] | Vulnerable | Species or species habitat likely to occur within area |
| Fish | | |
| Maccullochella mariensis Mary River Cod [83806] | Endangered | Translocated population known to occur within area |
| Neoceratodus forsteri Australian Lungfish, Queensland Lungfish [67620] | Vulnerable | Species or species habitat known to occur within area |
| Insects | | |
| Argynnis hyperbius inconstans Australian Fritillary [88056] | Critically Endangered | Species or species habitat may occur within area |
| Mammals | | |
| Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183] | Vulnerable | Species or species habitat likely to occur within area |
| Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331] | Endangered | Species or species habitat may occur within area |
| Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184] | Endangered | Species or species habitat may occur within area |
| Petauroides volans Greater Glider [254] | Vulnerable | Species or species habitat may occur within area |
| Petrogale penicillata Brush-tailed Rock-wallaby [225] | Vulnerable | Species or species habitat likely to occur within area |
| Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104] | Vulnerable | Species or species habitat known to occur within area |
| Potorous tridactylus tridactylus Long-nosed Potoroo (SE mainland) [66645] | Vulnerable | Species or species habitat may occur within area |
| Pteropus poliocephalus Grey-headed Flying-fox [186] | Vulnerable | Roosting known to occur within area |
| Plants | | |
| Bosistoa transversa Three-leaved Bosistoa, Yellow Satinheart [16091] | Vulnerable | Species or species habitat likely to occur within area |
| Dichanthium setosum bluegrass [14159] | Vulnerable | Species or species habitat likely to occur within area |
| Macadamia integrifolia Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326] | Vulnerable | Species or species habitat may occur within area |
| Macadamia tetraphylla Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland Nut [6581] | Vulnerable | Species or species habitat may occur within area |

| Name | Status | Type of Presence |
|--|-----------------------|--|
| Rhaponticum australe Austral Cornflower, Native Thistle [22647] | Vulnerable | Species or species habitat likely to occur within area |
| Samadera bidwillii Quassia [29708] | Vulnerable | Species or species habitat likely to occur within area |
| Thesium australe Austral Toadflax, Toadflax [15202] | Vulnerable | Species or species habitat likely to occur within area |
| Reptiles | | |
| Delma torquata Adorned Delma, Collared Delma [1656] | Vulnerable | Species or species habitat may occur within area |
| Furina dunmalli Dunmall's Snake [59254] | Vulnerable | Species or species habitat may occur within area |
| Listed Migratory Species | | [Resource Information] |
| * Species is listed under a different scientific name on the EPBC Act - Threatened Species list. | | |
| Name | Threatened | Type of Presence |
| Migratory Marine Birds | | |
| Apus pacificus Fork-tailed Swift [678] | | Species or species habitat likely to occur within area |
| Migratory Terrestrial Species | | |
| Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651] | | Species or species habitat may occur within area |
| Hirundapus caudacutus White-throated Needletail [682] | | Species or species habitat known to occur within area |
| Monarcha melanopsis Black-faced Monarch [609] | | Species or species habitat known to occur within area |
| Monarcha trivirgatus Spectacled Monarch [610] | | Species or species habitat may occur within area |
| Motacilla flava Yellow Wagtail [644] | | Species or species habitat may occur within area |
| Myiagra cyanoleuca Satin Flycatcher [612] | | Species or species habitat known to occur within area |
| Rhipidura rufifrons Rufous Fantail [592] | | Species or species habitat likely to occur within area |
| Migratory Wetlands Species | | |
| Actitis hypoleucos Common Sandpiper [59309] | | Species or species habitat may occur within area |
| Calidris acuminata Sharp-tailed Sandpiper [874] | | Species or species habitat may occur within area |
| Calidris ferruginea Curlew Sandpiper [856] | Critically Endangered | Species or species habitat may occur within area |

| Name | Threatened | Type of Presence |
|---|-----------------------|--|
| Calidris melanotos Pectoral Sandpiper [858] | | Species or species habitat may occur within area |
| Gallinago hardwickii Latham's Snipe, Japanese Snipe [863] | | Species or species habitat may occur within area |
| Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat may occur within area |
| Pandion haliaetus Osprey [952] | | Species or species habitat likely to occur within area |
| Tringa nebularia Common Greenshank, Greenshank [832] | | Species or species habitat likely to occur within area |

Other Matters Protected by the EPBC Act

Listed Marine Species [\[Resource Information \]](#)

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

| Name | Threatened | Type of Presence |
|--|-----------------------|--|
| Birds | | |
| Actitis hypoleucos Common Sandpiper [59309] | | Species or species habitat may occur within area |
| Anseranas semipalmata Magpie Goose [978] | | Species or species habitat may occur within area |
| Apus pacificus Fork-tailed Swift [678] | | Species or species habitat likely to occur within area |
| Ardea alba Great Egret, White Egret [59541] | | Breeding known to occur within area |
| Ardea ibis Cattle Egret [59542] | | Species or species habitat may occur within area |
| Calidris acuminata Sharp-tailed Sandpiper [874] | | Species or species habitat may occur within area |
| Calidris ferruginea Curlew Sandpiper [856] | Critically Endangered | Species or species habitat may occur within area |
| Calidris melanotos Pectoral Sandpiper [858] | | Species or species habitat may occur within area |
| Cuculus saturatus Oriental Cuckoo, Himalayan Cuckoo [710] | | Species or species habitat may occur within area |
| Gallinago hardwickii Latham's Snipe, Japanese Snipe [863] | | Species or species habitat may occur within area |
| Haliaeetus leucogaster White-bellied Sea-Eagle [943] | | Species or species |

| Name | Threatened | Type of Presence |
|---|-----------------------|--|
| Hirundapus caudacutus White-throated Needletail [682] | | habitat likely to occur within area Species or species habitat known to occur within area |
| Lathamus discolor Swift Parrot [744] | Critically Endangered | Species or species habitat may occur within area |
| Merops ornatus Rainbow Bee-eater [670] | | Species or species habitat may occur within area |
| Monarcha melanopsis Black-faced Monarch [609] | | Species or species habitat known to occur within area |
| Monarcha trivirgatus Spectacled Monarch [610] | | Species or species habitat may occur within area |
| Motacilla flava Yellow Wagtail [644] | | Species or species habitat may occur within area |
| Myiagra cyanoleuca Satin Flycatcher [612] | | Species or species habitat known to occur within area |
| Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat may occur within area |
| Pandion haliaetus Osprey [952] | | Species or species habitat likely to occur within area |
| Rhipidura rufifrons Rufous Fantail [592] | | Species or species habitat likely to occur within area |
| Rostratula benghalensis (sensu lato) Painted Snipe [889] | Endangered* | Species or species habitat likely to occur within area |
| Tringa nebularia Common Greenshank, Greenshank [832] | | Species or species habitat likely to occur within area |

Extra Information

Invasive Species

[[Resource Information](#)]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

| Name | Status | Type of Presence |
|------|--------|------------------|
|------|--------|------------------|

| Name | Status | Type of Presence |
|--|--------|--|
| Birds | | |
| Acridotheres tristis Common Myna, Indian Myna [387] | | Species or species habitat likely to occur within area |
| Anas platyrhynchos Mallard [974] | | Species or species habitat likely to occur within area |
| Carduelis carduelis European Goldfinch [403] | | Species or species habitat likely to occur within area |
| Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803] | | Species or species habitat likely to occur within area |
| Lonchura punctulata Nutmeg Mannikin [399] | | Species or species habitat likely to occur within area |
| Passer domesticus House Sparrow [405] | | Species or species habitat likely to occur within area |
| Streptopelia chinensis Spotted Turtle-Dove [780] | | Species or species habitat likely to occur within area |
| Sturnus vulgaris Common Starling [389] | | Species or species habitat likely to occur within area |
| Frogs | | |
| Rhinella marina Cane Toad [83218] | | Species or species habitat likely to occur within area |
| Mammals | | |
| Bos taurus Domestic Cattle [16] | | Species or species habitat likely to occur within area |
| Canis lupus familiaris Domestic Dog [82654] | | Species or species habitat likely to occur within area |
| Capra hircus Goat [2] | | Species or species habitat likely to occur within area |
| Felis catus Cat, House Cat, Domestic Cat [19] | | Species or species habitat likely to occur within area |
| Lepus capensis Brown Hare [127] | | Species or species habitat likely to occur within area |
| Mus musculus House Mouse [120] | | Species or species habitat likely to occur within area |
| Oryctolagus cuniculus Rabbit, European Rabbit [128] | | Species or species habitat likely to occur within area |
| Rattus norvegicus Brown Rat, Norway Rat [83] | | Species or species habitat likely to occur within area |
| Rattus rattus Black Rat, Ship Rat [84] | | Species or species |

| Name | Status | Type of Presence |
|---|--------|---|
| <p><i>Sus scrofa</i> Pig [6]</p> | | <p>habitat likely to occur within area</p> <p>Species or species habitat likely to occur within area</p> |
| <p><i>Vulpes vulpes</i> Red Fox, Fox [18]</p> | | <p>Species or species habitat likely to occur within area</p> |
| Plants | | |
| <p><i>Alternanthera philoxeroides</i> Alligator Weed [11620]</p> | | <p>Species or species habitat likely to occur within area</p> |
| <p><i>Anredera cordifolia</i> Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]</p> | | <p>Species or species habitat likely to occur within area</p> |
| <p><i>Asparagus africanus</i> Climbing Asparagus, Climbing Asparagus Fern [66907]</p> | | <p>Species or species habitat likely to occur within area</p> |
| <p><i>Asparagus asparagoides</i> Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]</p> | | <p>Species or species habitat likely to occur within area</p> |
| <p><i>Cabomba caroliniana</i> Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]</p> <p><i>Chrysanthemoides monilifera</i> Bitou Bush, Boneseed [18983]</p> | | <p>Species or species habitat likely to occur within area</p> <p>Species or species habitat may occur within area</p> |
| <p><i>Cryptostegia grandiflora</i> Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]</p> | | <p>Species or species habitat likely to occur within area</p> |
| <p><i>Dolichandra unguis-cati</i> Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]</p> | | <p>Species or species habitat likely to occur within area</p> |
| <p><i>Eichhornia crassipes</i> Water Hyacinth, Water Orchid, Nile Lily [13466]</p> | | <p>Species or species habitat likely to occur within area</p> |
| <p><i>Hymenachne amplexicaulis</i> Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]</p> | | <p>Species or species habitat likely to occur within area</p> |
| <p><i>Lantana camara</i> Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]</p> | | <p>Species or species habitat likely to occur within area</p> |
| <p><i>Lycium ferocissimum</i> African Boxthorn, Boxthorn [19235]</p> | | <p>Species or species habitat likely to occur within area</p> |
| <p><i>Opuntia</i> spp. Prickly Pears [82753]</p> | | <p>Species or species habitat likely to occur within area</p> |
| <p><i>Parkinsonia aculeata</i> Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]</p> | | <p>Species or species habitat likely to occur within area</p> |
| <p><i>Parthenium hysterophorus</i> Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]</p> | | <p>Species or species habitat likely to occur within area</p> |

| Name | Status | Type of Presence |
|---|--------|--|
| Rubus fruticosus aggregate Blackberry, European Blackberry [68406] | | Species or species habitat likely to occur within area |
| Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483] | | Species or species habitat likely to occur within area |
| Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665] | | Species or species habitat likely to occur within area |
| Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624] | | Species or species habitat likely to occur within area |
| Solanum elaeagnifolium Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323] | | Species or species habitat likely to occur within area |
| Reptiles | | |
| Hemidactylus frenatus Asian House Gecko [1708] | | Species or species habitat likely to occur within area |
| Ramphotyphlops braminus Flowerpot Blind Snake, Brahminy Blind Snake, Cacing Besi [1258] | | Species or species habitat likely to occur within area |

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-27.46806 152.5832

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- [-Natural history museums of Australia](#)
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- [-Other groups and individuals](#)

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.



Queensland Government

Wildlife Online Extract

Search Criteria: Species List for a Specified Point

Species: All

Type: Native

Status: All

Records: All

Date: All

Latitude: -27.4680

Longitude: 152.5832

Distance: 1

Email: retherington@ausecology.com

Date submitted: Thursday 25 Jan 2018 16:03:40

Date extracted: Thursday 25 Jan 2018 16:10:43

The number of records retrieved = 43

Disclaimer

As the DSITIA is still in a process of collating and vetting data, it is possible the information given is not complete. The information provided should only be used for the project for which it was requested and it should be appropriately acknowledged as being derived from Wildlife Online when it is used.

The State of Queensland does not invite reliance upon, nor accept responsibility for this information. Persons should satisfy themselves through independent means as to the accuracy and completeness of this information.

No statements, representations or warranties are made about the accuracy or completeness of this information. The State of Queensland disclaims all responsibility for this information and all liability (including without limitation, liability in negligence) for all expenses, losses, damages and costs you may incur as a result of the information being inaccurate or incomplete in any way for any reason.

| Kingdom | Class | Family | Scientific Name | Common Name | I | Q | A | Records |
|---------|-------------------|-------------------|--|----------------------------|---|----|---|---------|
| animals | birds | Accipitridae | <i>Circus assimilis</i> | spotted harrier | | C | | 6 |
| animals | birds | Accipitridae | <i>Pandion cristatus</i> | eastern osprey | | SL | | 1 |
| animals | birds | Anatidae | <i>Nettapus coromandelianus</i> | cotton pygmy-goose | | C | | 5 |
| animals | birds | Anatidae | <i>Anas superciliosa</i> | Pacific black duck | | C | | 1 |
| animals | birds | Ardeidae | <i>Bubulcus ibis</i> | cattle egret | | C | | 1 |
| animals | birds | Halcyonidae | <i>Todiramphus pyrrhopygius</i> | red-backed kingfisher | | C | | 1 |
| animals | birds | Hirundinidae | <i>Cheramoeca leucosterna</i> | white-backed swallow | | C | | 1 |
| animals | birds | Meliphagidae | <i>Plectorhyncha lanceolata</i> | striped honeyeater | | C | | 1 |
| animals | birds | Meliphagidae | <i>Philemon citreogularis</i> | little friarbird | | C | | 1 |
| animals | birds | Psittacidae | <i>Trichoglossus chlorolepidotus</i> | scaly-breasted lorikeet | | C | | 1 |
| animals | birds | Rallidae | <i>Porzana pusilla</i> | Baillon's crane | | C | | 1 |
| animals | birds | Scolopacidae | <i>Calidris melanotos</i> | pectoral sandpiper | | SL | | 2 |
| animals | birds | Strigidae | <i>Ninox connivens</i> | barking owl | | C | | 1 |
| animals | birds | Threskiornithidae | <i>Platalea flavipes</i> | yellow-billed spoonbill | | C | | 2 |
| animals | mammals | Phascolarctidae | <i>Phascolarctos cinereus</i> | koala | | V | V | 8 |
| animals | mammals | Pteropodidae | <i>Pteropus poliocephalus</i> | grey-headed flying-fox | | C | V | 44 |
| animals | mammals | Pteropodidae | <i>Pteropus scapulatus</i> | little red flying-fox | | C | | 19 |
| animals | mammals | Pteropodidae | <i>Pteropus alecto</i> | black flying-fox | | C | | 49 |
| animals | mammals | Pteropodidae | <i>Pteropus sp.</i> | | | | | 1 |
| animals | ray-finned fishes | Anguillidae | <i>Anguilla reinhardtii</i> | longfin eel | | | | 1 |
| animals | ray-finned fishes | Apogonidae | <i>Glossamia aprion</i> | mouth almighty | | | | 1 |
| animals | ray-finned fishes | Ariidae | <i>Neoarius graeffei</i> | blue catfish | | | | 1 |
| animals | ray-finned fishes | Atherinidae | <i>Craterocephalus marjoriae</i> | silverstreak hardyhead | | | | 1 |
| animals | ray-finned fishes | Atherinidae | <i>Craterocephalus stercusmuscarum</i> | flyspecked hardyhead | | | | 1 |
| animals | ray-finned fishes | Clupeidae | <i>Nematalosa erebi</i> | bony bream | | | | 1 |
| animals | ray-finned fishes | Eleotridae | <i>Hypseleotris galii</i> | firetail gudgeon | | | | 1 |
| animals | ray-finned fishes | Eleotridae | <i>Hypseleotris compressa</i> | empire gudgeon | | | | 1 |
| animals | ray-finned fishes | Hemiramphidae | <i>Arrhamphus sclerolepis</i> | snubnose garfish | | | | 1 |
| animals | ray-finned fishes | Melanotaeniidae | <i>Melanotaenia duboulayi</i> | crimsonspotted rainbowfish | | | | 1 |
| animals | ray-finned fishes | Plotosidae | <i>Tandanus tandanus</i> | freshwater catfish | | | | 1 |
| animals | ray-finned fishes | Pseudomugilidae | <i>Pseudomugil signifer</i> | Pacific blue eye | | | | 1 |
| animals | ray-finned fishes | Terapontidae | <i>Leiopotherapon unicolor</i> | spangled perch | | | | 1 |
| animals | reptiles | Agamidae | <i>Pogona barbata</i> | bearded dragon | | C | | 1 |
| animals | reptiles | Colubridae | <i>Tropidonophis mairii</i> | freshwater snake | | C | | 1/1 |
| animals | reptiles | Colubridae | <i>Boiga irregularis</i> | brown tree snake | | C | | 1/1 |
| animals | reptiles | Elapidae | <i>Tropidechis carinatus</i> | rough-scaled snake | | C | | 1/1 |
| animals | reptiles | Elapidae | <i>Hoplocephalus stephensii</i> | Stephens' banded snake | | C | | 1 |
| animals | reptiles | Elapidae | <i>Pseudonaja nuchalis sensu lato</i> | western brown snake | | C | | 1 |
| animals | reptiles | Typhlopidae | <i>Anilius wiedii</i> | brown-snouted blind snake | | C | | 1/1 |
| animals | reptiles | Typhlopidae | <i>Anilius ligatus</i> | robust blind snake | | C | | 1/1 |
| plants | higher dicots | Asteraceae | <i>Chrysocephalum apiculatum</i> | yellow buttons | | C | | 1/1 |
| plants | higher dicots | Asteraceae | <i>Senecio quadridentatus</i> | cotton fireweed | | C | | 1/1 |
| plants | higher dicots | Loranthaceae | <i>Benthamina alyxifolia</i> | | | C | | 1/1 |

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992*. The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ().

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999*. The values of EPBC are Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Extinct in the Wild (XW) and Vulnerable (V).

Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).

This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.

This number is output as 999 if it equals or exceeds this value.

Appendix 8

CLR & EMR Search



Department of Environment and Heritage Protection (EHP)
ABN 46 640 294 485
400 George St Brisbane, Queensland 4000
GPO Box 2454, Brisbane QLD 4001, AUSTRALIA
www.ehp.qld.gov.au

SEARCH RESPONSE
ENVIRONMENTAL MANAGEMENT REGISTER (EMR)
CONTAMINATED LAND REGISTER (CLR)

Rohan Etherington
PO Box 594
Morningside QLD 4170

Transaction ID: 50432503 EMR Site Id: 24 January 2018
Cheque Number:
Client Reference:

This response relates to a search request received for the site:
Lot: 89 Plan: CC3323
PROSPECT Street
LOWOOD

EMR RESULT

The above site is NOT included on the Environmental Management Register.

CLR RESULT

The above site is NOT included on the Contaminated Land Register.

ADDITIONAL ADVICE

All search responses include particulars of land listed in the EMR/CLR when the search was generated.
The EMR/CLR does NOT include:-

1. land which is contaminated land (or a complete list of contamination) if EHP has not been notified
2. land on which a notifiable activity is being or has been undertaken (or a complete list of activities) if EHP has not been notified

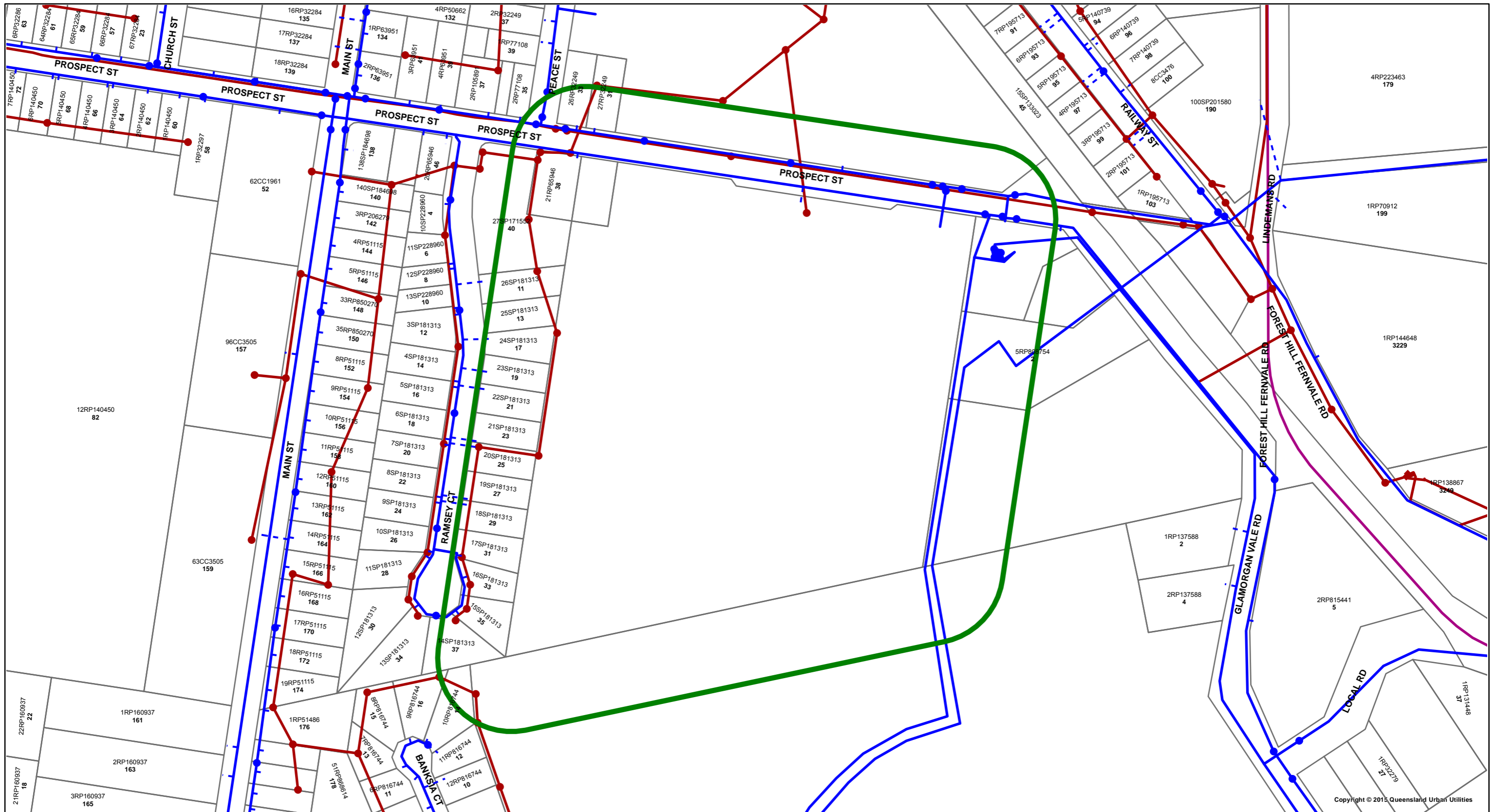
If you have any queries in relation to this search please phone 13QGOV (13 74 68)

Administering Authority

Appendix 9

Service Infrastructure Plans

Queensland Urban Utilities - Water & Sewer Infrastructure



Copyright © 2015 Queensland Urban Utilities

Copyright © 2015 Queensland Urban Utilities

DBYD - Queensland Urban Utilities Water & Sewer Infrastructure

DBYD Reference No: 68269589

Date DBYD Ref Received: 5/02/2018 11:13:00 AM
Date DBYD Job to Commence: 7/02/2018 12:00:00 AM
Date DBYD Map Produced: 5/02/2018
This Map is valid for 30 days

Produced By: Queensland Urban Utilities



Sewer

- Infrastructure
- ◆ Major Infrastructure
- Network Pipelines
- Recycled Water Pipelines
- ▨ Network Structures

Water

- Infrastructure
- ◆ Major Infrastructure
- Network Pipelines
- ▨ Network Structures



Map Scale

1:2500

The plans are indicative and approximate only and provided without warranties of any kind, express or implied including in relation to accuracy, completeness, correctness, currency or fitness for purpose.

QUU takes no responsibility and accepts no liability for any loss, damage, costs or liability that may be incurred by any person acting in reliance on the information provided on the plans.

This plan should be used as guide only. Any dimensions should be confirmed on site by the relevant authority.

Based on or contains data provided by the State of Queensland (Department of Natural Resources and Mines) [2012]. In consideration of the State permitting the use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws. © State of Queensland Department of Natural Resources and Mines [2012]

For further information, please call Queensland Urban Utilities on 13 26 57 (7am-7pm weekdays). Faults and emergencies 13 23 64 (24/7). www.urbanutilities.com.au ABN 86 673 835 011

**Seqwater
Dial Before You Dig
Utility Notification Response Form**

DBYD Enquiry Number: 68269590 **DBYD Enquiry Date:** 05/02/2018
Location: 34 Prospect Street Lowood
Enquirer's Name: Ausecology - Mr Rohan Etherington
Enquirer's Address: Unit 6 19 King Street
Response Email: retherington@ausecology.com

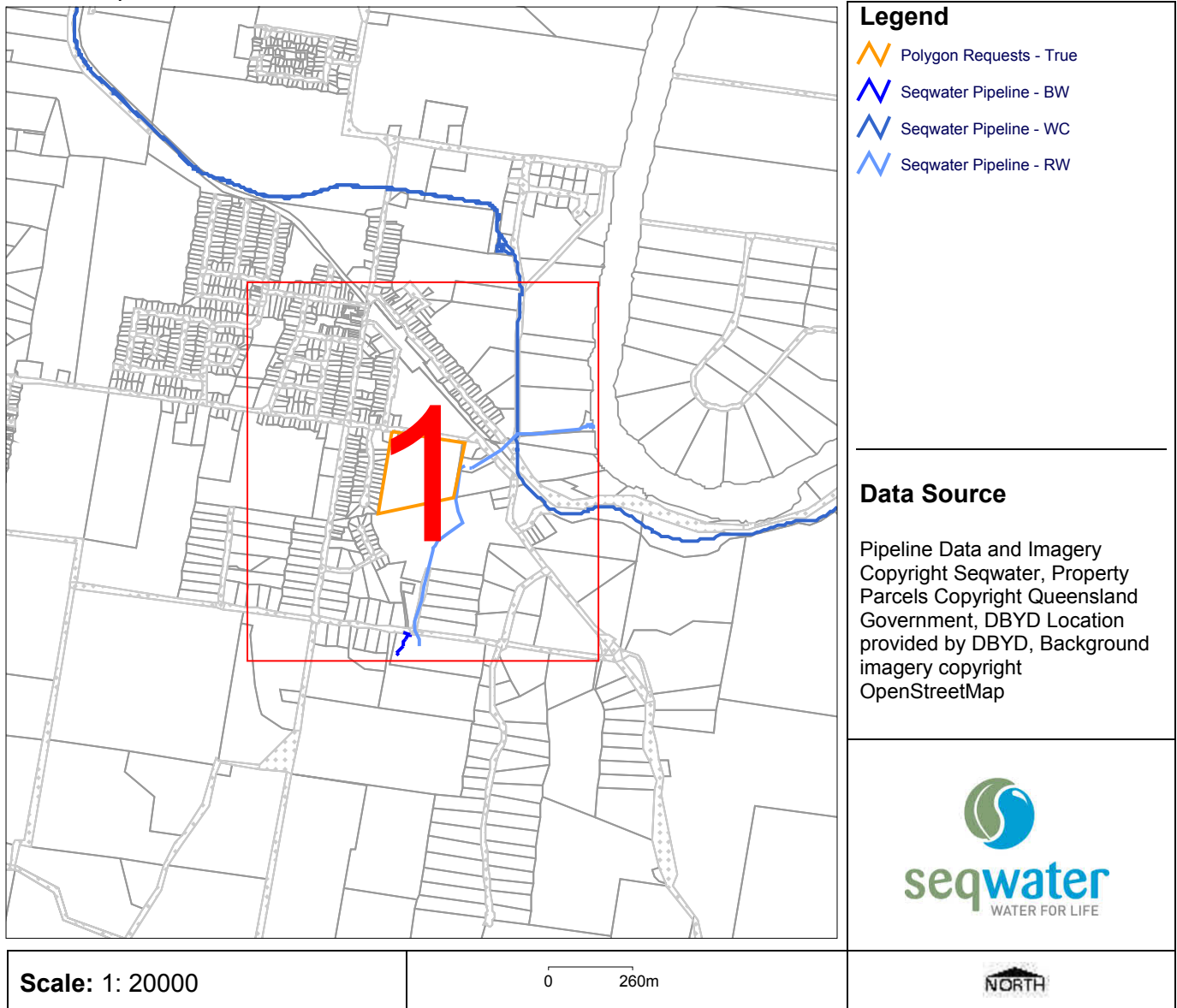
Thank you for the notification of your proposed works or interest in Seqwater's underground infrastructure at the above location. Seqwater operates and maintains bulk water infrastructure in the area and can advise that this infrastructure is: **AFFECTED**

is affected by your proposed works or your interest. (Planning & Design, 23)

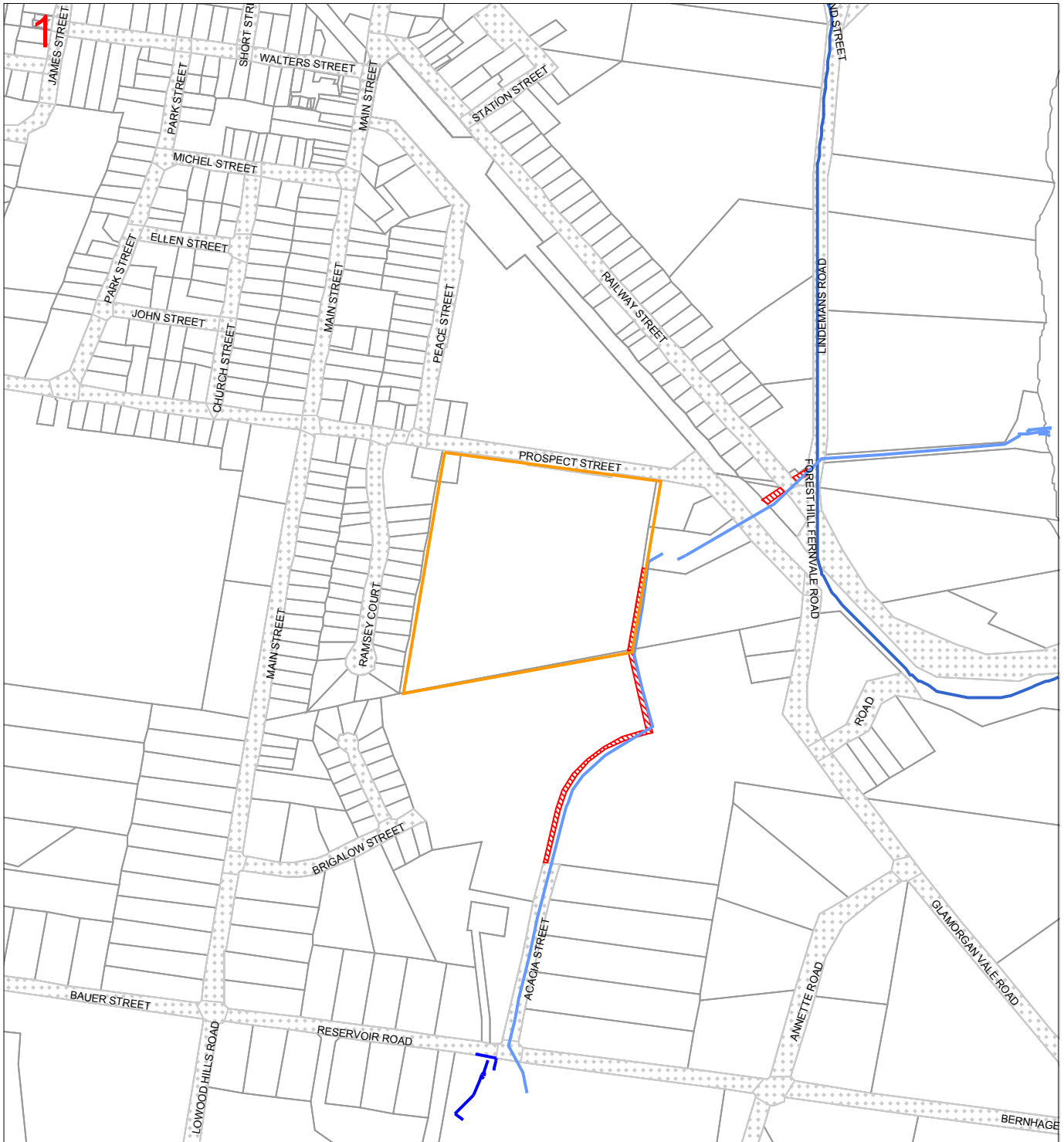
Accordingly, you must read, understand and comply with the **attached CONDITIONS**. Failure to comply with the **CONDITIONS** may expose you to both legal and financial penalties.

Seqwater's written consent will be required where the proposed works are within a Seqwater easement or otherwise interfere with, build over, interfere with access to, increase or reduce the cover over, or change the surface of land in a way causing ponding of water over an access chamber for Seqwater's infrastructure.

For your reference the location of Seqwater's infrastructure in the area of your interest is indicated on the Map below:



Seqwater makes no representation or warranty as to the accuracy, completeness, reliability or suitability of the, maps, GIS data and any other information (**Information**) provided by Seqwater for any specific purpose and disclaims any responsibility or liability for any expenses, losses, damages and costs which may be suffered or incurred as a result of or in connection with using or relying on the data or the Information provided by Seqwater. The user acknowledges that use of the Information is subject to the user's own investigations and due diligence to verify the accuracy, completeness, reliability and suitability for the relevant purpose. Please ensure the map attached accurately represents the location of proposed works. If you have any queries, please contact Seqwater.



Seq ID: 68269590 **Map:** 1

Scale: 1: 6000



Map Key:

1

Legend

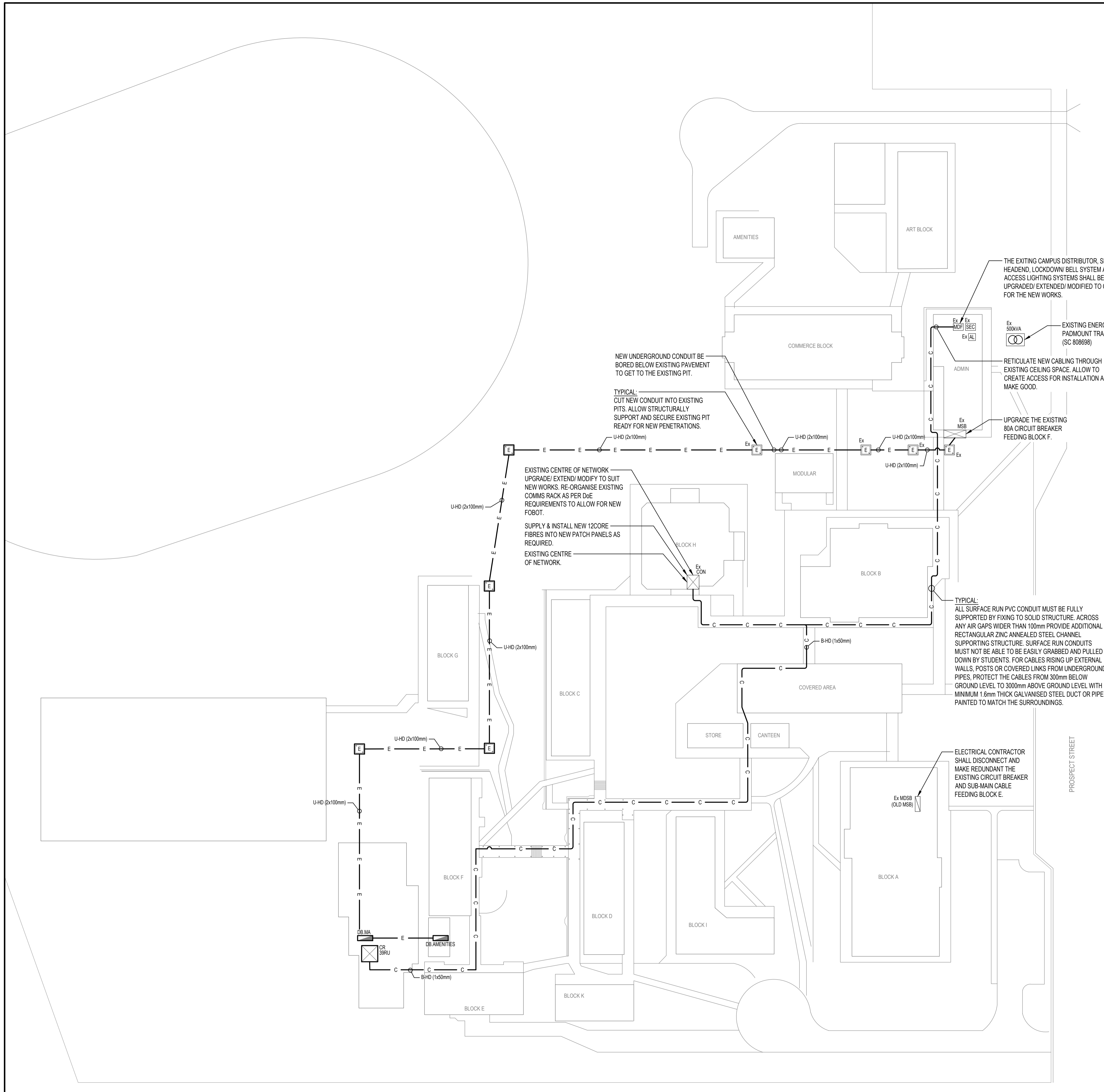
- Polygon Requests - True
- Seqwater Easements
- Seqwater Pipeline - BW
- Seqwater Pipeline - WC
- Seqwater Pipeline - RW

Data Source

Pipeline Data and Imagery Copyright Seqwater,
 Property Parcels Copyright QLD Government, DBYD
 Location provided by DBYD, Background imagery
 copyright OpenStreetMap



Seqwater makes no representation or warranty as to the accuracy, completeness, reliability or suitability of the maps, GIS data and any other information (Information) provided by Seqwater for any specific purpose and disclaims any responsibility or liability for any expenses, losses, damages and costs which may be suffered or incurred as a result of or in connection with using or relying on the data or the Information provided by Seqwater. The user acknowledges that use of the Information is subject to the user's own investigations and due diligence to verify the accuracy, completeness, reliability and suitability for the relevant purpose.



SITE PLAN LAYOUT
SCALE - 1:500



BARCODE

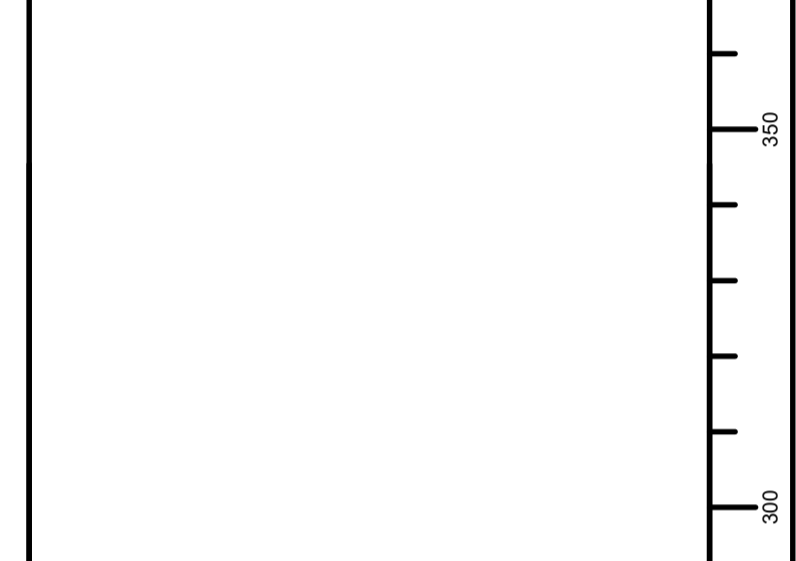
ISSUED AS
SDPP ISSUE

AMENDMENTS

| ISSUE | DATE | SUBJECT | AUTHORISED |
|-------|----------|------------|------------|
| 1 | 14-03-18 | SDPP ISSUE | PT |
| 2 | 31-05-18 | FINAL SDPP | PT |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

DRAWING INDEX SYSTEM
FOR BUILDING and ASSET SERVICES USE ONLY

| | |
|--|---|
| <input type="checkbox"/> AUDIO VISUAL SYSTEMS | <input type="checkbox"/> MASTER ANTENNA TELEVISION |
| <input type="checkbox"/> COMMUNICATIONS | <input type="checkbox"/> NOTES |
| <input type="checkbox"/> ELECTRONIC SECURITY | <input type="checkbox"/> OTHER |
| <input type="checkbox"/> FIRE DETECTION/EWS | <input type="checkbox"/> POWER-OUTLETS/CONNECTIONS |
| <input type="checkbox"/> GENERATING SETS | <input type="checkbox"/> SITE PLAN |
| <input type="checkbox"/> LEGEND | <input type="checkbox"/> STANDARDS |
| <input type="checkbox"/> LIFTS | <input type="checkbox"/> SWITCHBOARDS/CONTROL PANELS |
| <input type="checkbox"/> LIGHTING/EMERGENCY LIGHTING | <input type="checkbox"/> UNINTERRUPTIBLE POWER SUPPLY |
| <input type="checkbox"/> LIGHTNING PROTECTION | |



- DRAWING NOTES:
- COORDINATE VERY CLOSELY IN THIS LOCATION (NOTE: NOT LIMITED TO THESE LOCATIONS) WITH CIVIL/HYDRAULIC/LANDSCAPING SITE PLAN DOCUMENTATION AND ASSOCIATED CONTRACTORS TO AVOID IN-GROUND CLASHES.
 - WARNING! SERVICES CLASHES WITH EXISTING CONCRETE & LANDSCAPING IN THIS AREA REQUIRES UNDERBORING OR OTHER PRECISE TRENCHING METHODS. TRACE OUT EXISTING UNDERGROUND SERVICES ETC.
 - COORDINATE ONSITE THE FINAL LOCATION AND POWER LOADS WITH THE HYDRAULIC DOCUMENTATION AND HYDRAULIC CONTRACTOR.

WARNING - POTENTIAL CLASH WITH EXISTING PAVING, TREE ROUTES, CONCRETE FOUNDATIONS ETC. COORDINATE ONSITE FOR RELOCATION/LOWERING METHODOLOGY FOR ALL ASSOCIATED CABLES AND ASSOCIATED PIT/S

DIAL BEFORE YOU DIG
www.1100.com.au

NOTE: ELECTRICAL CONTRACTOR MUST OBTAIN ALL EXISTING UNDERGROUND SERVICES INSTALLED IN ALL LOCATIONS THEY ARE PERFORMING WORKS. PHONE DBYD SERVICE LOCATIONS ON 1100 FOR DETAILS, AND PERFORM TRACING OF UNDERGROUND SERVICES WHERE DBYD INFO IS INSUFFICIENT

IMPORTANT

ALL TENDERERS MUST VISIT SITE TO ENSURE ALL INCIDENTALS HAVE BEEN COVERED WITHIN THE TENDER PRICE. NO VARIATIONS WILL BE GIVEN TO A NONCONFORMING TENDER IN THIS REGARDS.

DURING TENDERING AND INSTALLATION REVIEW SURVEY PLANS, DBUD DETAILS, LANDSCAPE DOCUMENTATION, ARCHITECTURAL'S, CIVIL PLANS & HYDRAULIC PLANS TO ENSURE COORDINATION HAS BEEN PRICED AND ALLOWED FOR. MAKE ANY ALLOWANCES REQUIRED TO RE-DIVERT THE CURRENTLY SHOWN DIAGRAMMATIC CONDUIT LAYOUT AS REQUIRED FOR A FULLY FUNCTIONAL AND COMPLIANT SYSTEM.

ELECTRICAL, SECURITY & COMMUNICATION CONTRACTORS MUST OBTAIN A FULL SET OF DoE/EDUCATION STANDARDS & PROVIDE AS REQUIRED.

| | |
|---------------------------|---------------|
| DRAWN JR | DATE MAY 2018 |
| DISCIPLINE TEAM LEADER PY | DATE MAY 2018 |
| AUTHORISED FOR ISSUE JC | DATE MAY 2018 |

LOWOOD STATE HIGH SCHOOL
34 PROSPECT STREET, LOWOOD, QLD, 4311

ELECTRICAL SERVICES
SITE PLAN LAYOUT

| | |
|--------------------------------|-------------------------|
| SCALE 1:500 | AT A1 |
| MASTER SITE NUMBER | CLIENT REFERENCE NUMBER |
| DRAWING NUMBER 18059-SDPP-E100 | ISSUE SHEET NO 2 |

Appendix 10

Stormwater Management Plan





MRG
WATER CONSULTING PTY LTD

**DETAILED FLOOD IMPACT ASSESSMENT
AND
STORMWATER MANAGEMENT REPORT**

Lowood State High School

MAY 2018



| Report Name | Date | Revision No. |
|--|---------------------------|---------------------|
| Detailed Flood Impact Assessment and Stormwater Management Report for Lowood State High School | 15 th May 2018 | 2342/Rev 1 |

Director: Mark Gibson
BE Civil, MIWM, FIEAust, CPEng, RPEQ, NER, APEC Engineer
E mark@mrgwater.com.au
M 0418 569 362

Engineer: Nathan Fulcher
BE Chem/Mat
E nathan@mrgwater.com.au
M 0481 544 295



1.0 INTRODUCTION

MRG Water Consulting Pty Ltd was commissioned by RPS on behalf of the Department of Education and Training (DET) to prepare a Detailed Flood Impact and Stormwater Management Assessment Report for the proposed manual arts classroom extensions at the Lowood State High School. The site is located on Prospect Street and sits at the downstream end of a small catchment to the southwest of it as shown on Figure 1 below. The catchment drains to the Brisbane River which is located to the east.

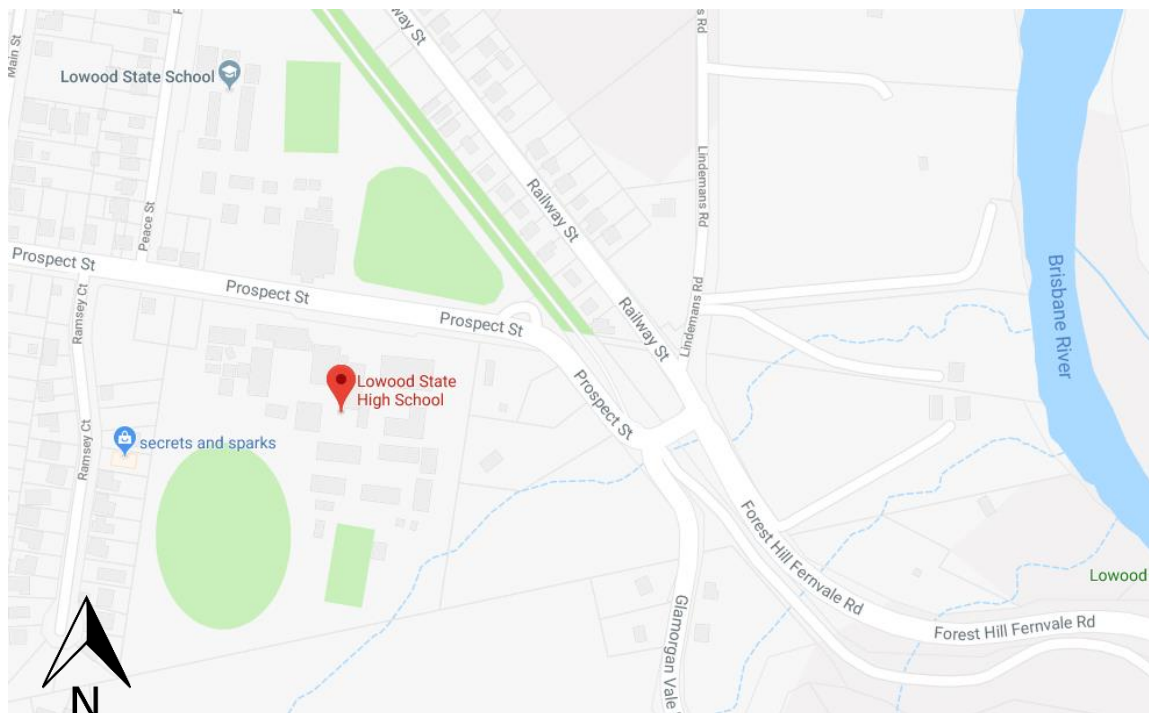


Figure 1 - Locality Plan

It is proposed to construct a new Manual Arts Building at the southern end of the school as shown on the client plans in Appendix A. Figure 2 shows the existing site bounded in yellow and the location of the proposed buildings. Stormwater discharges from the upstream catchment to the southwest, flow overland across the site in a north easterly direction.

The purpose of this report is to:

- 1) Calculate the peak 10, 20, 50 and 100 year ARI water levels, depths and velocities across the existing and developed site;
- 2) Determine if the site requires detention and demonstrate the site has a lawful point of discharge and ;
- 3) Determine the requisite floor level for the proposed new building;
- 4) Outline required drainage and earthworks to ensure the building is flood free; and
- 5) Meet the requirements of the State Planning Policy (2017) by designing a stormwater treatment train to mitigate the effects of the proposed building on stormwater pollutants.



Figure 2 - Aerial View of Existing Site



2.0 HYDROLOGY

2.1. RATIONAL METHOD

The new buildings have a small upstream catchment, as shown on Figure 3. The peak stormwater discharges from the 11.83 ha catchment have been calculated using the Rational Method, at Point 1 on Figure 3. The Rational Method calculations were completed in accordance with the parameters recommended in the Queensland Urban Drainage Manual (QUDM, 2017).

Rainfall intensities were obtained from the 2016 Rainfall IFD Data System which was created for the release of Australian Rainfall and Runoff (2016). The 2016 IFDs are based on a more extensive data base, with more than 30 years of additional rainfall data and data from extra rainfall stations (when compared to ARR 1987). The 2016 IFDs are more accurate estimates, combining contemporary statistical analysis and techniques with an expanded rainfall database. By combining contemporary statistical analyses and techniques with an expanded database, the new 2016 IFDs provide more accurate design rainfall estimates for Australia (<http://arr.ga.gov.au/arr-guideline>). The new rainfall intensities are found in Appendix B of this report.

The catchment is approximately 5% impervious. A 'C₁₀ Runoff Coefficient' of 0.483 was adopted to reflect the pervious nature of the upstream catchment. The time of concentration t_c was calculated at Point 1 to be 19 minutes.

Development of the site increases the impervious area in the catchment by 1%. The A 'C₁₀ Runoff Coefficient' of 0.487 was adopted to reflect the increased impervious area of the upstream catchment. The development does not change the time of concentration.

Table 2.1 lists the peak discharges at Point 1 on **Error! Reference source not found.** for both existing and developed site conditions. Further details of the time of concentration and Rational Method calculations can be found in Appendix B of this report.

Development of the site increases peak discharges at Point 1 by 0.025 m³/s or 0.8%. This is considered to be relatively insignificant and will be discussed further in Section 3 of this report.



Table 2.1 - Rational Method Peak Discharges

| ARI (years) | Peak Discharge (m ³ /s) | | Increases due to development of the site (m ³ /s) |
|-------------|------------------------------------|----------------|--|
| | Existing Site | Developed Site | |
| 1 | 0.710 | 0.716 | 0.006 (0.8%) |
| 2 | 0.890 | 0.898 | 0.007 (0.8%) |
| 5 | 1.402 | 1.414 | 0.012 (0.8%) |
| 10 | 1.667 | 1.680 | 0.014 (0.8%) |
| 20 | 2.033 | 2.050 | 0.017 (0.8%) |
| 50 | 2.628 | 2.650 | 0.022 (0.8%) |
| 100 | 3.047 | 3.073 | 0.025 (0.8%) |

3.0 LAWFUL POINT OF DISCHARGE

3.1. TEST FOR LAWFUL DISCHARGE

QUDM (2017, p. 3-10) outlines the criteria or questions to determine if the site has a lawful point of discharge. The first criteria is:

- I. Will the proposed development alter the site's stormwater discharge characteristics in a manner that may substantially damage a third party property?

Response to (I): The stormwater runoff from the site will generally remain unaltered. A small amount of stormwater and roof water will be piped close to the property boundary but will be discharged across the boundary in a distributed manner (such as sheet flow) due to the construction of a level spreader. The stormwater leaving the site will join immediately with the water in the ephemeral watercourse which passes through the school site and then continues to flow northeast towards the Brisbane River.

In addition, the increase in peak stormwater discharges is less than one percent. These increases will not cause a worsening on the downstream site or roads before entering the Brisbane River.

The proposed development will not alter the site's stormwater discharge characteristics in a manner that may substantially damage the downstream property.

Therefore the site is considered to have a lawful point of discharge at its eastern boundary. No other criteria of QUDM (2017) need to be considered. No stormwater detention is needed for the site.

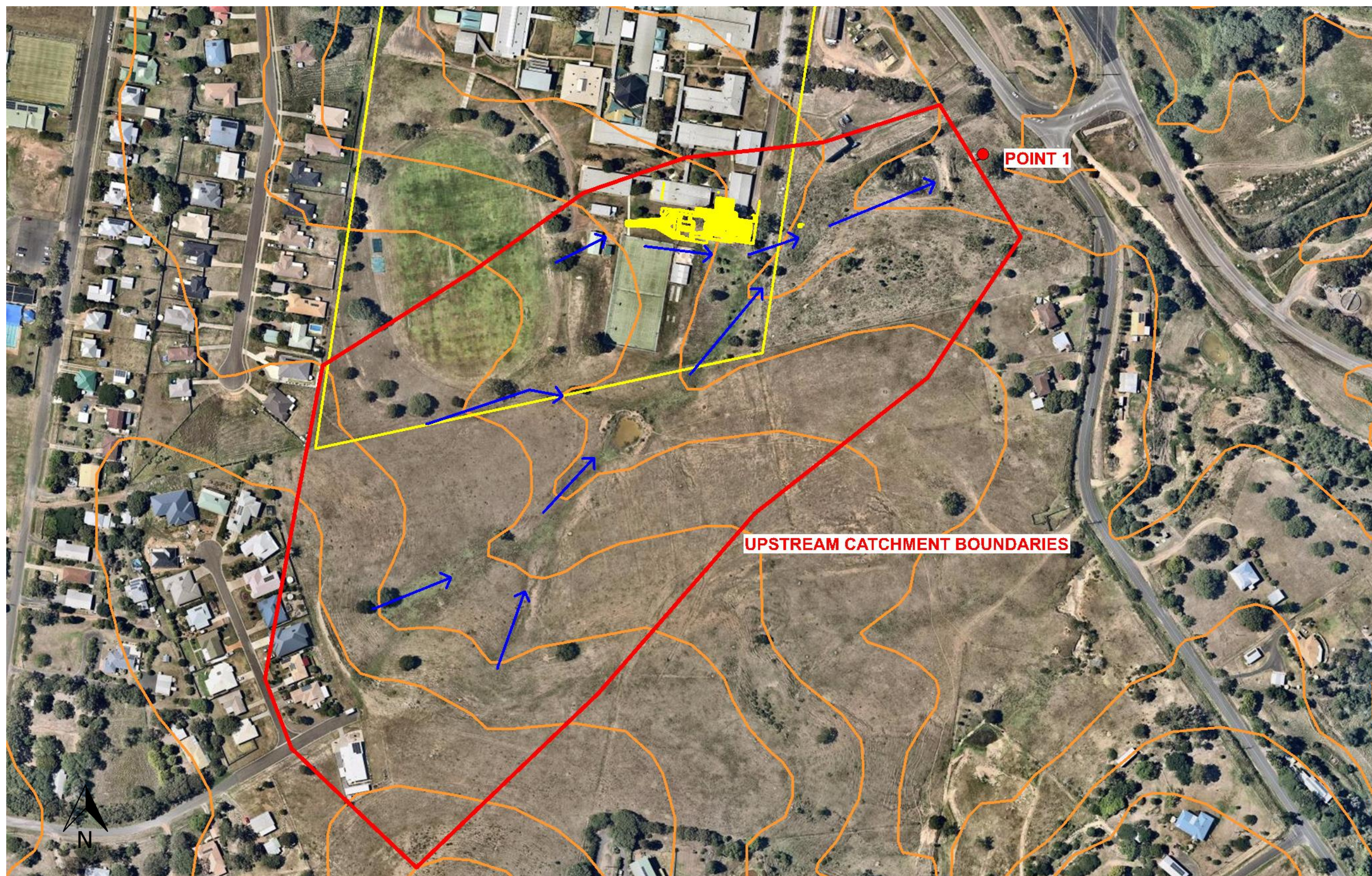


Figure 3 - Upstream Catchment Boundaries, Scale 1:2500 @ A3



4.0 RAFTS HYDROLOGIC MODEL

4.1. GENERAL

A RAFTS hydrologic model was set up for the catchment to determine the hydrographs of stormwater discharges that will form the inflow boundaries of the TUFLOW hydraulic model. These discharges will be discussed further in Section 5 of this report.

RAFTS, is a non-linear routing hydrologic model which calculates flood hydrographs from storm rainfall hyetographs. It can be used for the analysis and management of both urban and rural watersheds and the design of flood storages and river analysis works. RAFTS can also assist with the design of smaller urban drainage systems, on-site detention systems, and large detention basins. A schematic representation of the RAFTS model layout is shown on Figure 4.

4.2. MODEL SETUP

The model was run for the 10, 20, 50 and 100 year ARI design storms, for the 25, 60, 90 and 120 minute rainfall events. It was found that the 60 minute storm was critical for all event. The B_x lag parameter used in the RAFTS model was 1.3 and continuing losses of 2.5 and 0 mm/hr were used for the pervious and impervious sub-catchments respectively. Table 4.1 shows the RAFTS model parameters used in the calibrated RAFTS model for each storm event.

Table 4.1 - RAFTS Model Parameters ARI

| ARI (years) | B_x | Critical Storm Duration (min) | Initial Pervious Loss (mm) | Continuing Pervious Loss (mm/hr) | Initial Impervious Loss (mm) | Continuing Impervious Loss (mm/hr) |
|-------------|-------|-------------------------------|----------------------------|----------------------------------|------------------------------|------------------------------------|
| 10 | 1.3 | 60 | 4 | 2.5 | 0 | 0 |
| 20 | 1.3 | 60 | 4 | 2.5 | 0 | 0 |
| 50 | 1.3 | 60 | 0 | 2.5 | 0 | 0 |
| 100 | 1.3 | 60 | 0 | 2.5 | 0 | 0 |

Upon completion of the model, the RAFTS time series at each sub-catchment for the critical storm events were exported. Details of the modelling is found in Appendix C of this report.

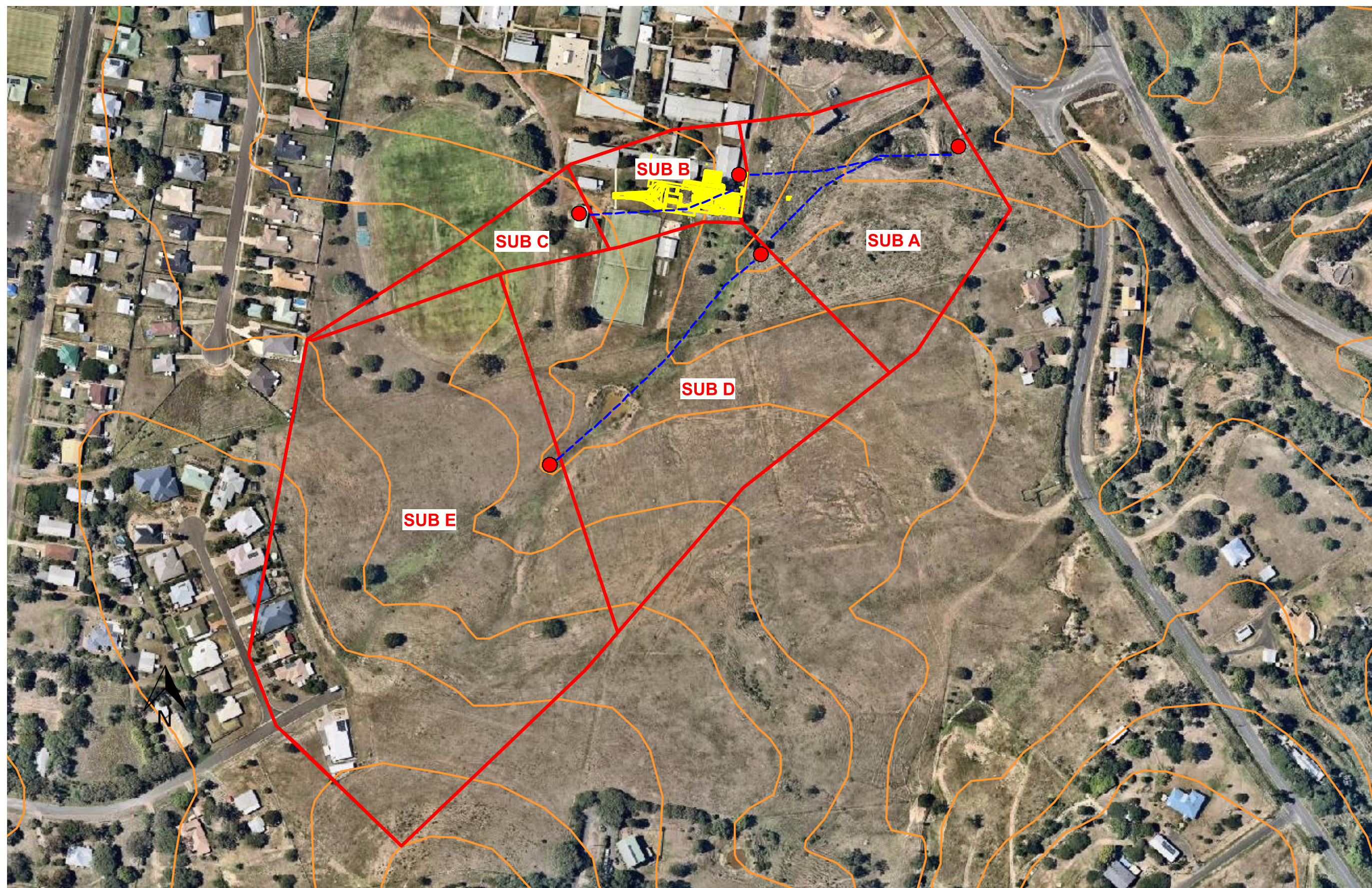


Figure 4 - RAFTS Model Layout, Scale 1:2500 @ A3



5.0 HYDRAULIC MODELLING – TUFLOW

5.1. GENERAL

To calculate the water levels, depths and impacts of the development on adjoining properties, a TUFLOW hydraulic model was set up for the site and surrounding properties. TUFLOW is a computer program for simulating depth-averaged, two and one-dimensional free-surface flows that occurs from floods and tides. TUFLOW stands for Two-dimensional Unsteady FLOW. It incorporates the full functionality of the ESTRY 1D network based on the full one-dimensional (1D) free-surface flow equations. TUFLOW is specifically orientated towards establishing flow patterns in coastal waters, estuaries, rivers, floodplains and urban areas where the flow patterns are essentially 2D in nature and cannot or would be awkward to represent using a 1D network model.

5.2. EXISTING MODEL

The TUFLOW 2D Domain was orientated to align with flow lines traversing the site, generally flowing in an east-west direction. The model was run on a 1 m grid. A lattice with grid size of 400 m x 350 m was used in the model and was specified in the geometry control file called **Existing_1m.tgc**.

The 3d terrain surface was defined using detailed survey supplemented with QIS 5 m contour maps (for areas outside the proposed building area). The surface was then converted into a text grid file labeled **ELEVATION.txt** in preparation to be read into the TUFLOW model.

The Manning’s roughness values were entered into the model to represent surface roughness of the modeled area. Generally, the cells were set to a materials code of 1, which represents short grass. The Materials file **2d_mat_Existing.MIF** was updated in MapInfo (GIS software) to read in blockages, roads, concrete and other surfaces used to improve the accuracy of the model. Table 5.1 shows the codes used to represent various surface types.

Table 5.1 - TUFLOW Material Codes

| Code | Land Use | Manning’s n |
|------|-----------------------|-------------|
| 1 | Short grass | 0.035 |
| 2 | Roads | 0.020 |
| 3 | Building Obstructions | 0.200 |
| 4 | Concrete | 0.013 |
| 5 | Thick vegetation | 0.100 |

The material codes were saved in the **Materials.tmf** file.



Existing classrooms were modeled as blockages in the TUFLOW model. The details of these blockages and elevation changes were saved as **2d_zsh_existing.MIF**.

Three boundary conditions were formed along the perimeter of the code polygon. Two were placed along the upstream perimeter of the code polygon and assigned a QT relationship to provide the inflows from SUB C and SUB E. The final boundary condition was placed along the downstream perimeter of the code polygon and assigned an HQ relationship with a normal depth of 0.05. In addition to these boundary conditions, three SA boundaries were utilized for the local flows from SUB A, SUB B and SUB D. These boundary conditions and SA conditions were stored in the boundary condition control file **Existing.tbc**.

The TUFLOW control file **Lowood_~e1~_~e2~_~s1~_001.tcf** was used to run the model. The model was run for 1.5 hours with a starting time step of 1 seconds. The model used a 2nd order HPC solution scheme.

5.3. DEVELOPED MODEL

The developed scenario was modelled into TUFLOW by copying the existing model and applying the relevant modifications. The proposed modifications required the construction of new classrooms and car parking area, as shown on Figure 5. The existing sheds were removed. The classrooms were assumed to be filled beneath and were modelled as blockages in the **2d_zsh_developed_001.MIF** layer.

To improve the flooding problems on the site and to minimize future problems, the underground drainage around the site has been designed as shown on Figure 5.

In addition, a level spreader is proposed at the downstream (eastern) end of Pipe 4, to ensure stormwater spreads in a manner that replicates overland flow prior to crossing the downstream property boundary.

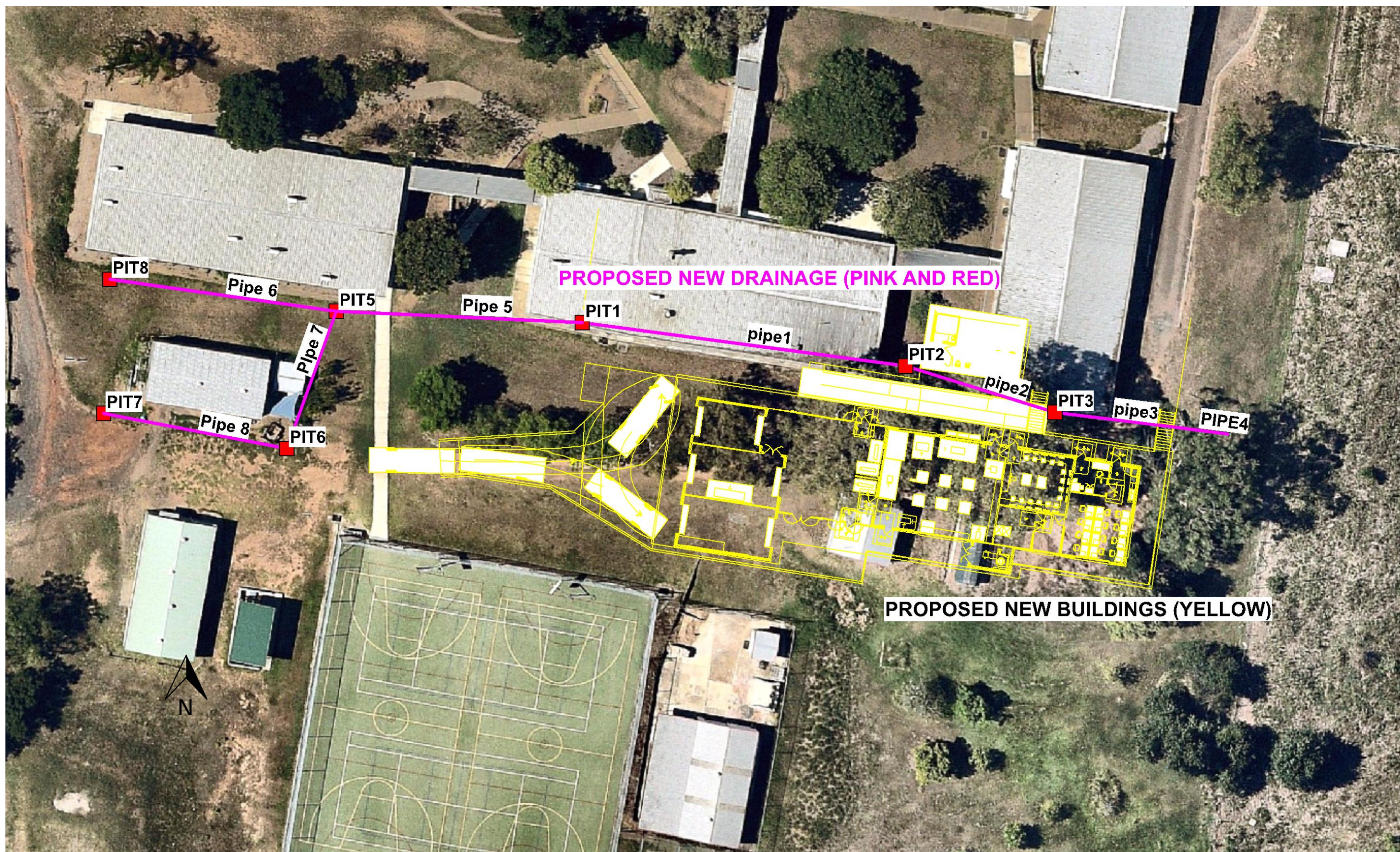


Figure 5 - Proposed Building and Drainage Upgrades, Scale 1:400 @ A3



5.4. RESULTS

Figure 6 to Figure 9 show output results from the TUFLOW hydraulic model for the 10, 20, 50 and 100 year ARI events for the existing site. The velocity vectors have been turned on to better understand the flood behaviour. The existing classrooms and maintenance shed is affected by flooding. Depths generally are less than 0.2 m across the site.

Figure 10 to Figure 13 show output results from the TUFLOW hydraulic model for the 10, 20, 50 and 100 year ARI events for the developed site. It can be seen that the proposed drainage will reduce the flooding issues on the site for all events.

Figure 14 and Figure 15 show water levels for the existing and developed site. Even though the pipe drainage reduces flooding for the new building the minimum floor level for the new building is recommended to be 61.0 m AHD. In addition, local drainage should be incorporated to reduce local overland runoff from the south entering the new building.

5.5. BRISBANE RIVER FLOOD STUDY

The Brisbane River Catchment Flood Study was completed in 2017. A review of the study shows that the site sits approximately 140 west of the 100 year ARI Brisbane River flood event inundation and is not affected during that event.

Therefore the minimum floor level of 61 m AHD is recommended for the new building.

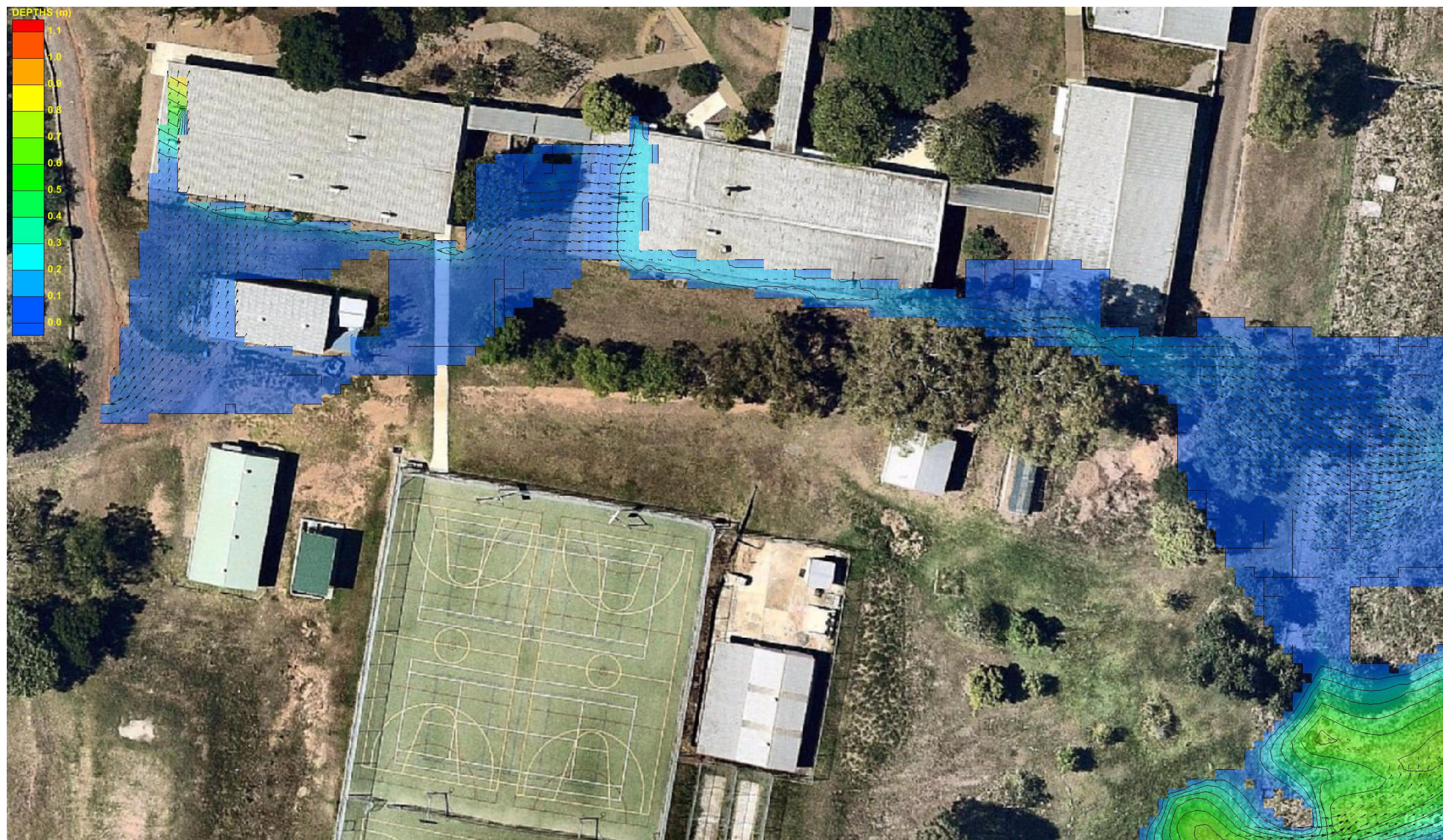


Figure 6 - Existing Site, 10 year ARI Depths

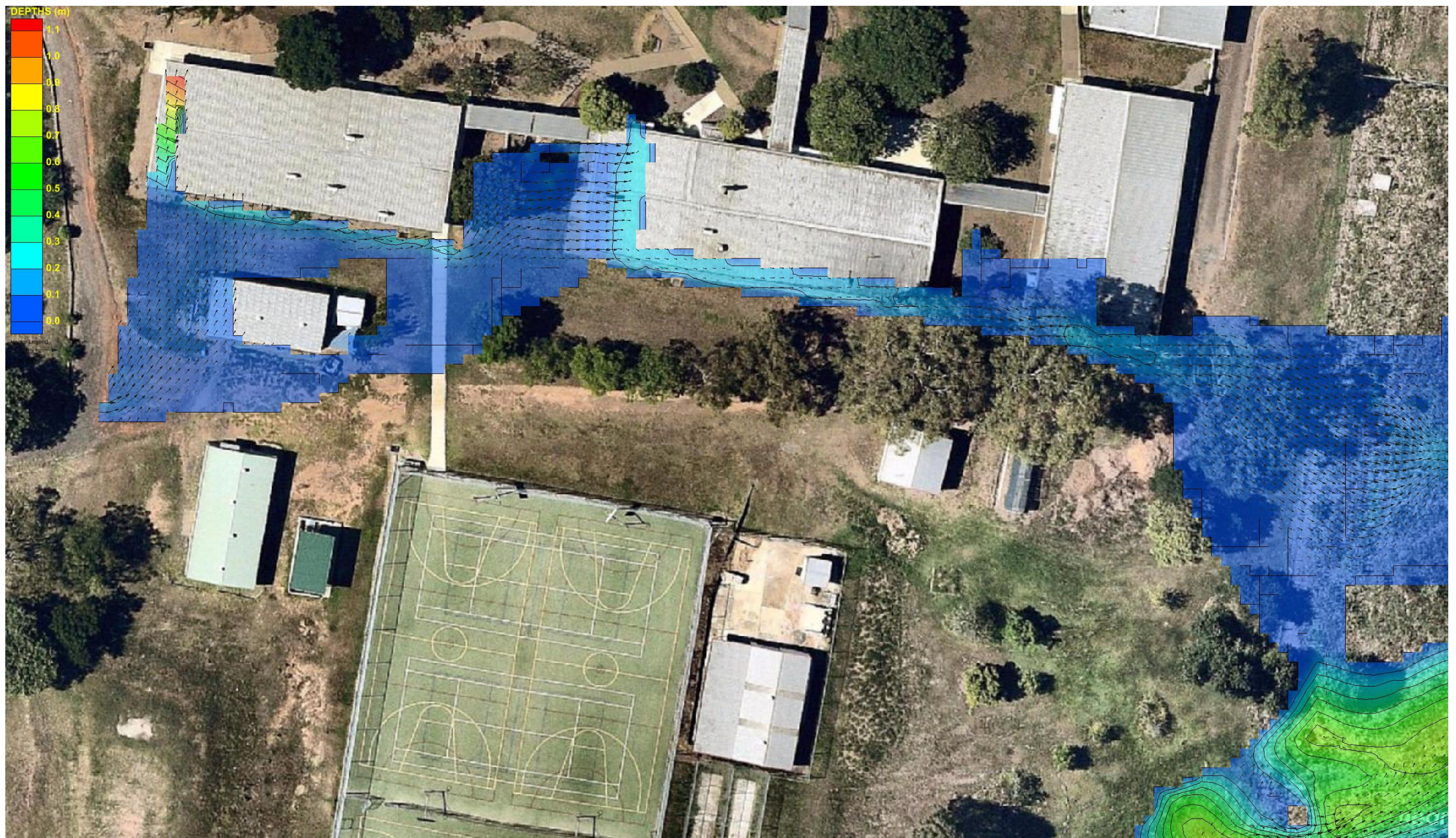


Figure 7 -Existing Site, 20 year ARI Depths

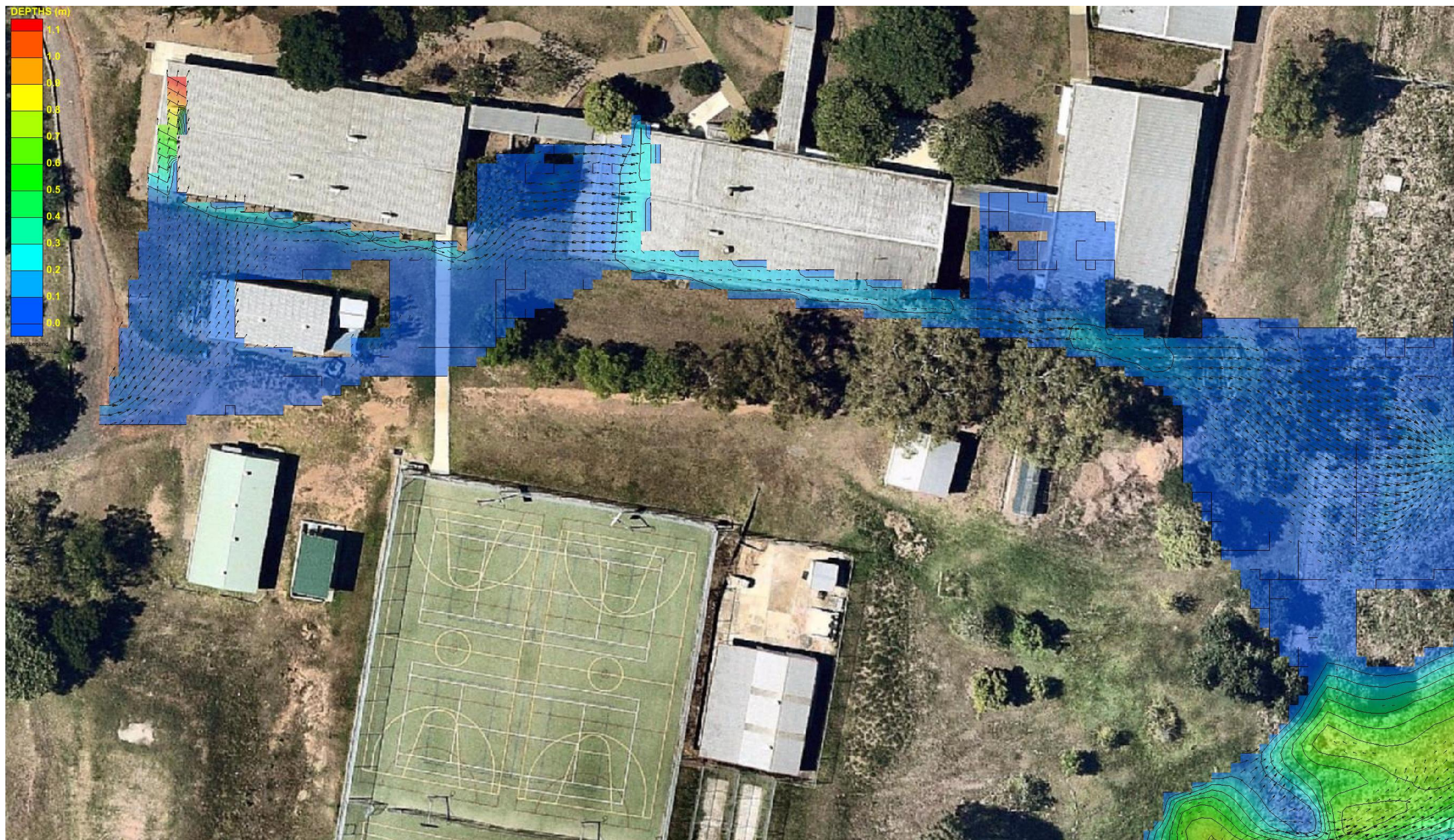


Figure 8 - Existing Site, 50 year ARI Depths

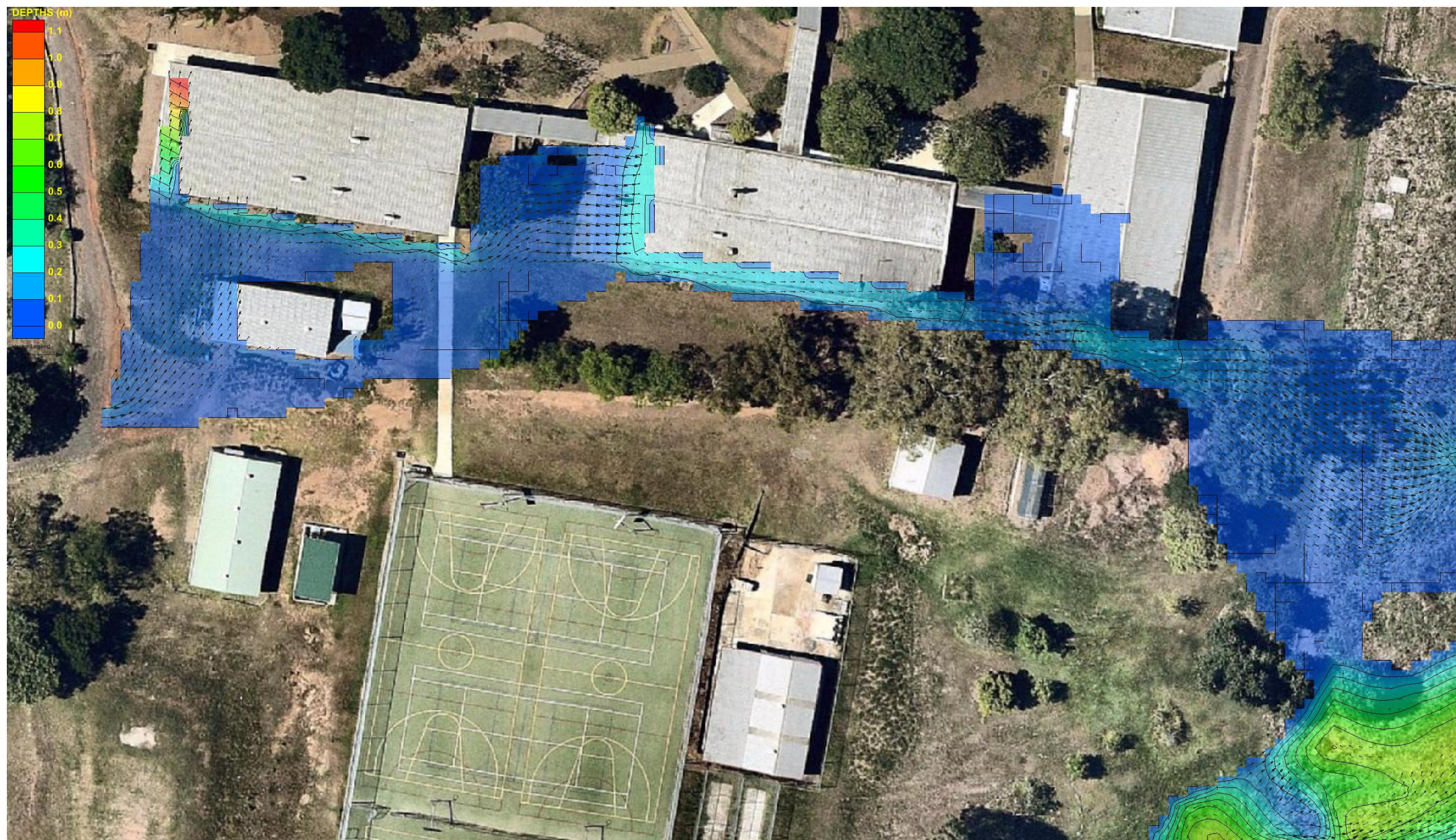


Figure 9 - Existing Site, 100 year ARI Depths

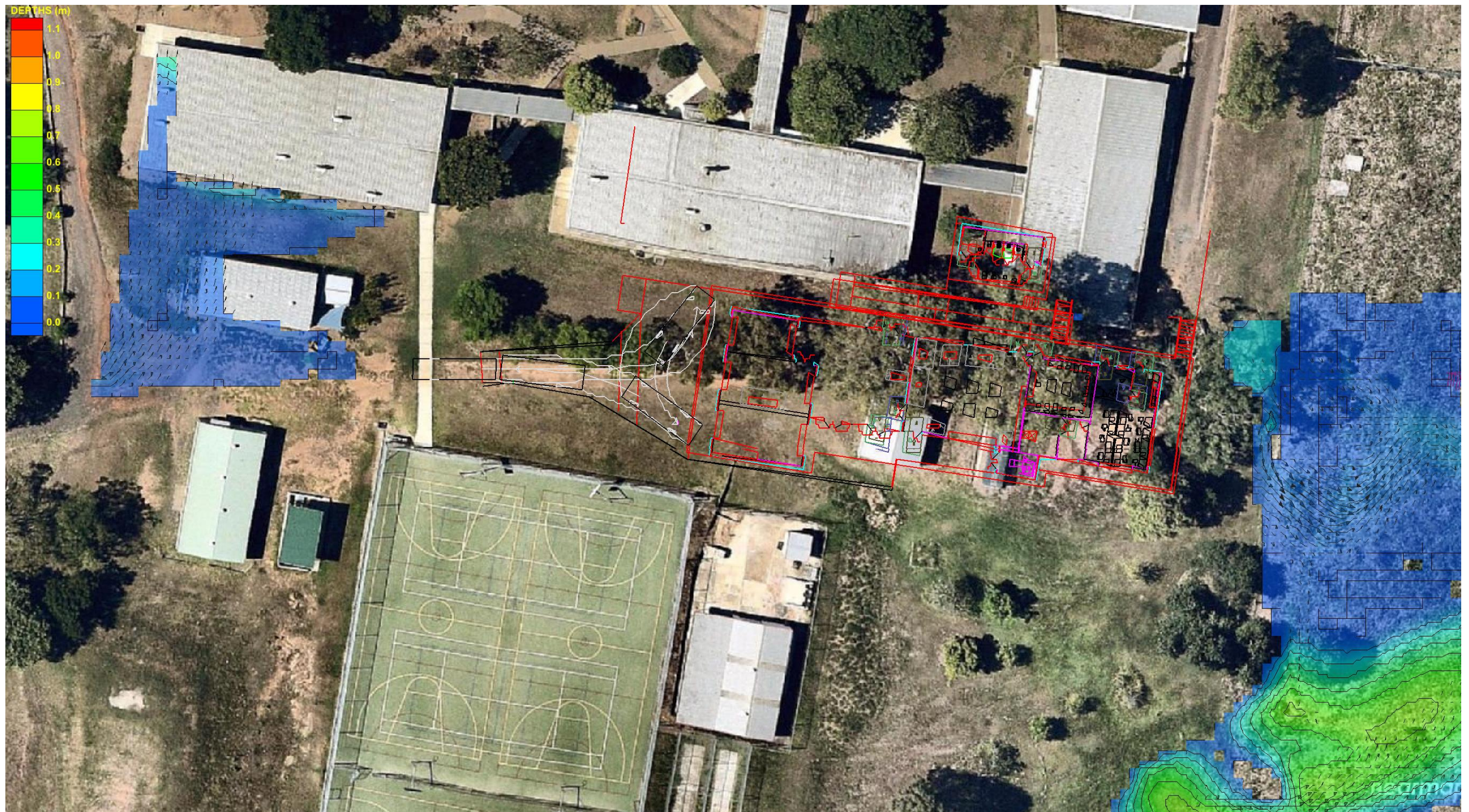


Figure 10 - Developed Site, 10 year ARI Depths



Figure 11 - Developed Site, 20 year ARI Depths

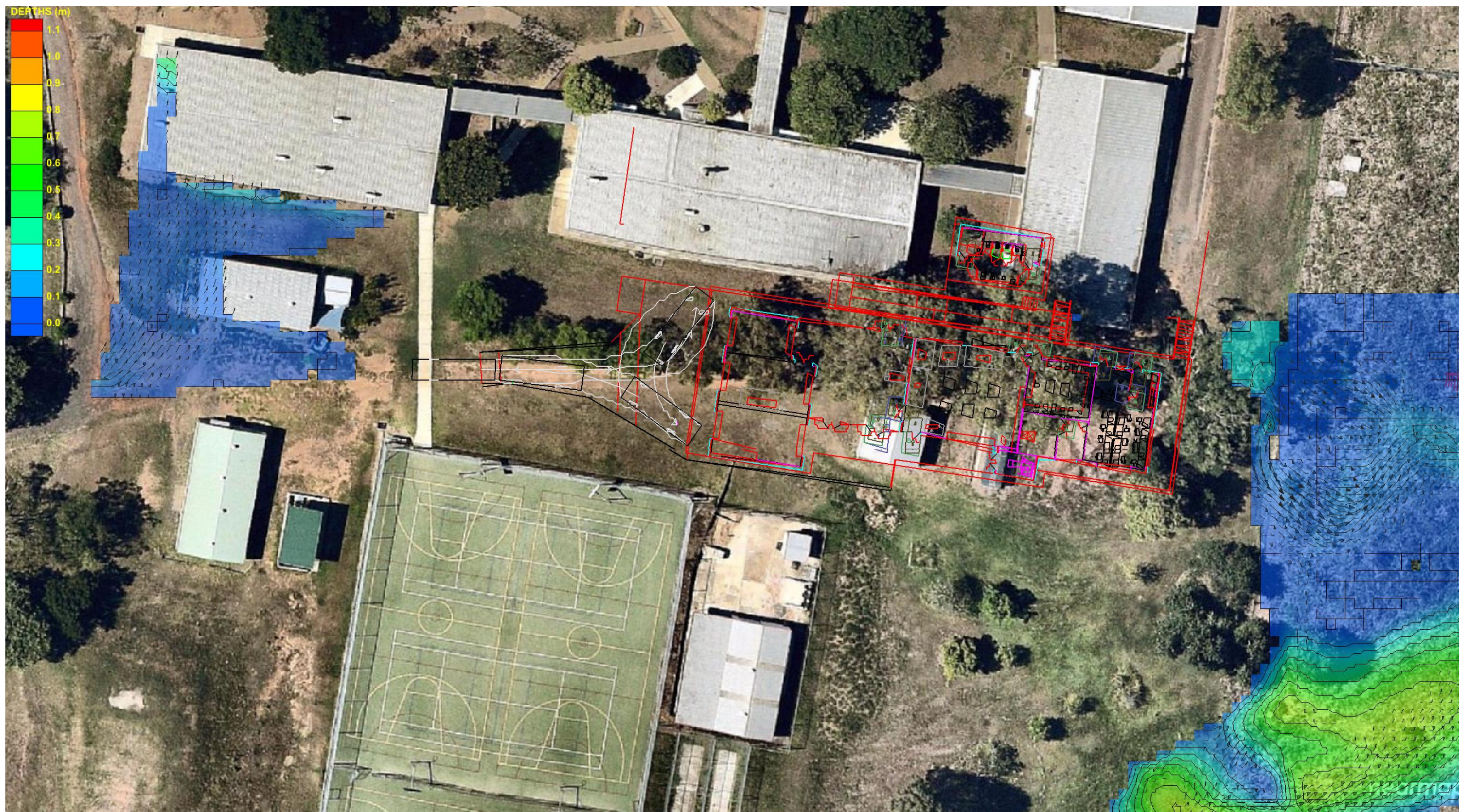


Figure 12 - Developed Site, 50 year ARI Depths

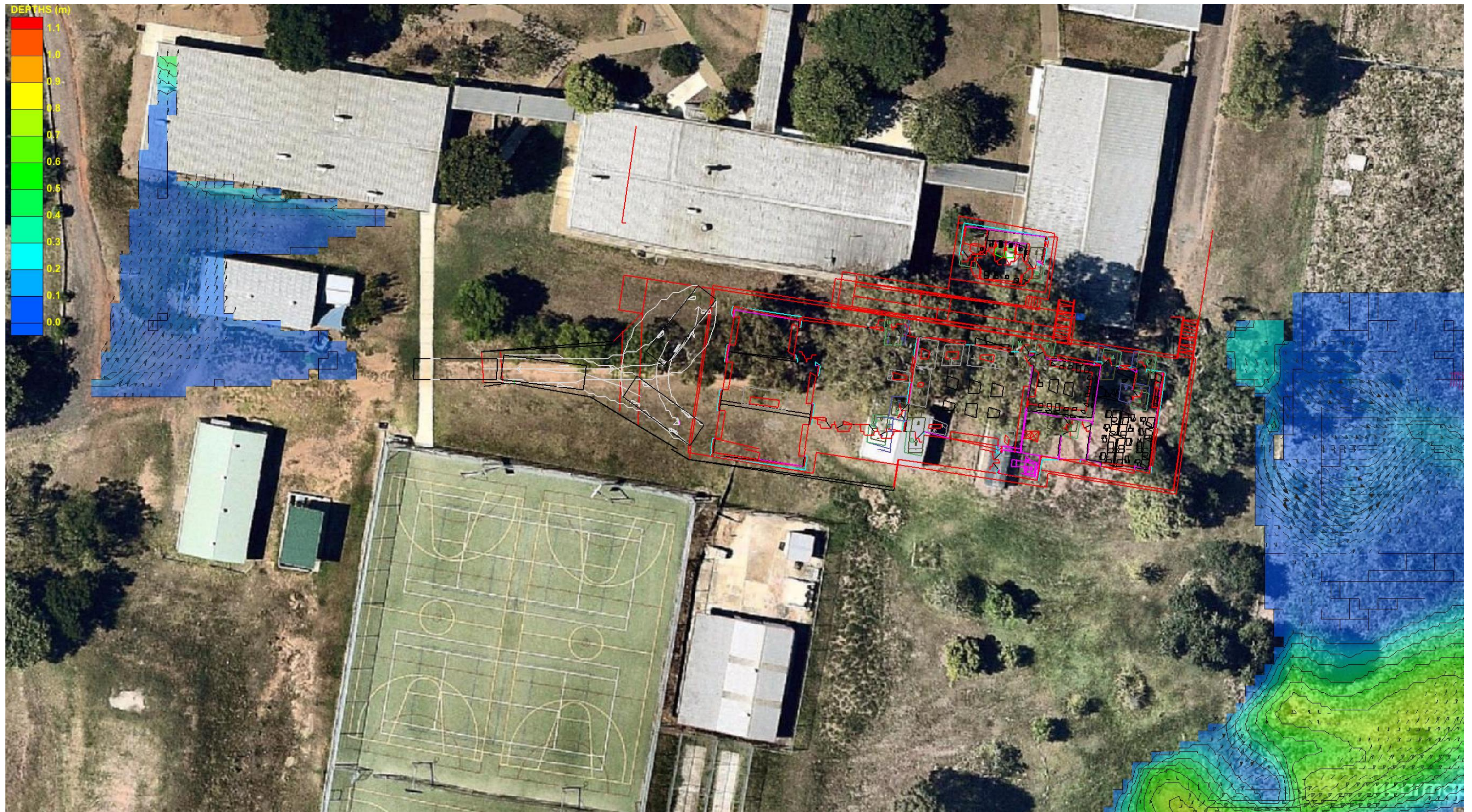


Figure 13 - Developed Site, 100 year ARI Depths

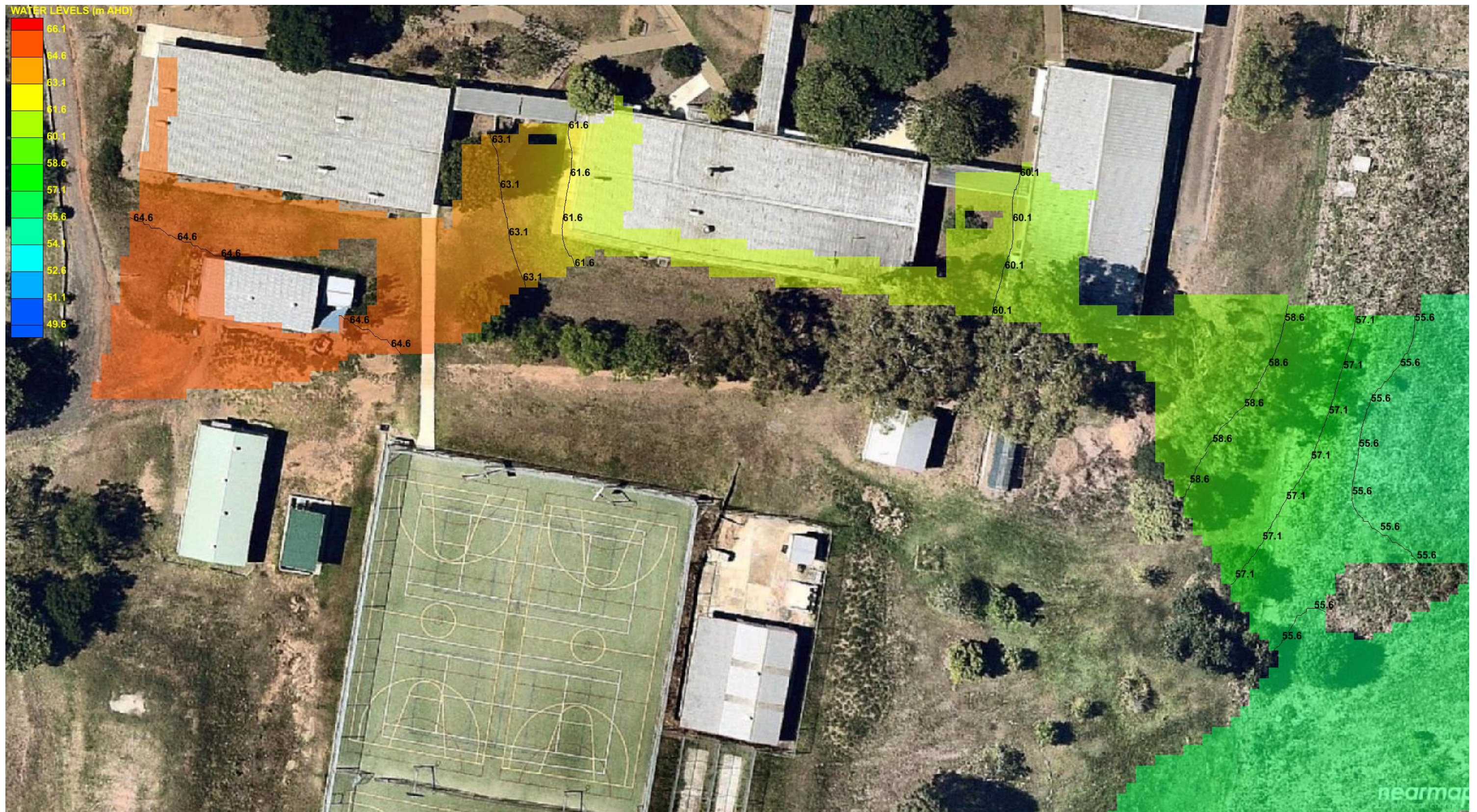


Figure 14 - Existing Site, 100 year ARI Water Levels

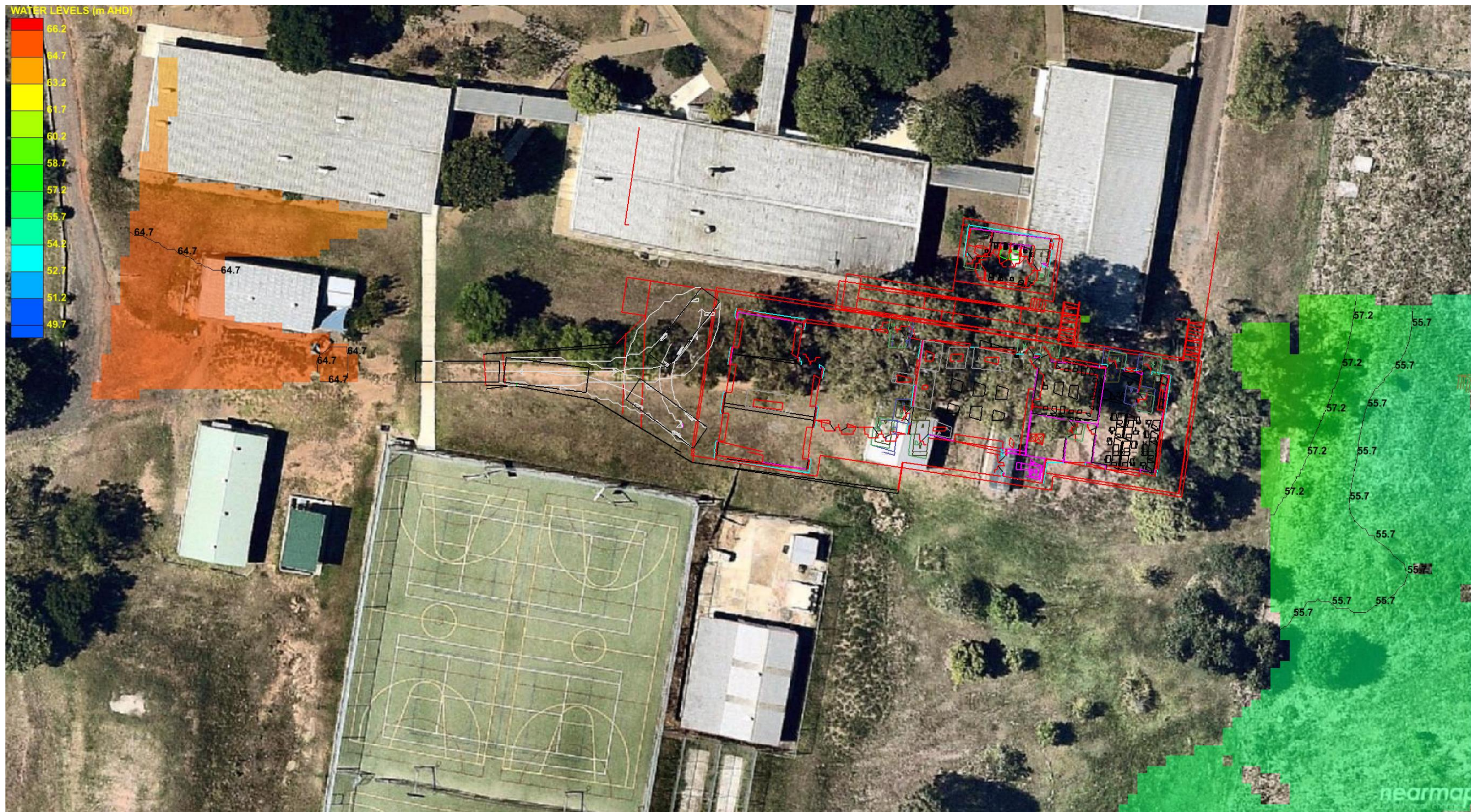


Figure 15 - Developed Site, 100 year ARI Water Levels

6.0 WATER QUALITY

6.1. STATE PLANNING POLICY 2017 (SPP)

SPP (2017) was intended to ensure that developments are planned, designed, constructed and operated to manage stormwater in ways that help protect the water environmental values specified in the Environmental Protection (Water) Policy (EPP Water) 2009. The development triggers SPP as the reconfigured lot exceeds 2500 m².

The SPP (2017, p. 46) states that the stormwater quality guidelines apply for

- 1) *a material change of use for an urban purpose that involves premises 2500 metres² or greater in size and;*
 - (a) *will result in six or more dwellings; or*
 - (b) *will result in an impervious area greater than 25 per cent of the net developable area; or*
- 2) *reconfiguring a lot for an urban purpose that involves premises 2500 metres² or greater in size and will result in six or more lots; or*
- 3) *operational works for an urban purpose that involves disturbing a land area 2500 metres² or greater in size.*

The total operational works are likely an area less than 2000 m², (1800 m² likely). Thus the stormwater quality requirements do not apply to this development.

However the development will still try to follow the SPP (2017) principles that the development minimizes adverse impacts on environmental values or alteration of the local hydrology.

6.2. STORMWATER MANAGEMENT – CONSTRUCTION PHASE

During the construction phase of developments various pollutants are generated. Pollutants have the potential to enter downstream systems through stormwater runoff, affecting the quality of the receiving environment. Table 6.1 outlines the major sources of pollutants.

The development will ensure that pollutants from the construction phase of the development do not enter the downstream waterways by use of sediment and erosion control fences, grass swales, bunds, sediment basins, regular clean up and adequate bins on site.

Stormwater quality treatment during the construction stage of the development will be detailed in the site's Erosion and Sediment Control Plan and will form part of the Civil Engineering Operational Works Drawings.



Table 6.1 - Major sources of pollutants during Construction Phases of Development

| Construction Phase | Operational Phase |
|---|---|
| Litter from construction packaging, paper, food packaging, off cuts, etc. | Litter - paper. |
| Sediment - from erosion of exposed soils and stockpiles. | Sediment - from erosion of exposed soils and stockpiles |
| Hydrocarbons - from fuel and oil spills, leaks from construction equipment. | Oxygen demanding substances - organic matter. |
| Toxic Materials - cement slurry, solvents, cleaning agents, wash waters. | Nutrients. |
| pH altering substances - cement slurry, wash waters. | |

6.3. STORMWATER MANAGEMENT – OPERATIONAL PHASE

Table 6.2 shows the load based stormwater quality objectives that will be strived for during the Operational Phase of the development. The report will detail the proposed water sensitive urban design devices that will treat stormwater runoff generated from within the site to meet these objectives.

Table 6.2 - Operational Stage Water Quality Objectives (WQO's)

| Pollutant | WQO's, (Load-Based) |
|------------------|---------------------|
| Suspended Solids | 80% (Removal) |
| Total Phosphorus | 60%(Removal) |
| Total Nitrogen | 45% (Removal) |
| Gross Pollutants | 90% (Removal) |

6.4. MUSIC WATER QUALITY MODEL

An assessment of the stormwater quality was undertaken for the proposed building additions. The mean annual pollutant loads of key pollutants from the new buildings were obtained by setting up a MUSIC model for the proposed development. MUSIC (version 6.3) is the Model for Urban Stormwater Improvement Conceptualisation, developed by the MUSIC Development Team of the CRC for Catchment Hydrology.

MUSIC has the ability to simulate the quality of runoff from catchments ranging from a single house block up to many square kilometres, and also the effect of a wide range of treatment facilities on the quality of runoff downstream. By simulating the performance of stormwater quality improvement measures, MUSIC determines if proposed systems can meet specified load based water quality objectives (WQO's).



Within this report only the hardstand areas of new buildings, paths and carparks will be considered as sources for pollutants.

The following sections identify the assumptions used in generating a stormwater quality model for the new buildings. Figure 16 shows the model layout of the development used in the MUSIC model. The model used spilt catchments for residential catchments as specified in Water by Design (2010, p.16). While the development is not for residential purposes, the residential classification is a best fit for the pollutant export equations used in the assessment. The model name for the proposed site is "Lowood_v1.sqz." Rainfall data adopted for modelling is based on Table 6.3.

Table 6.3 - MUSIC Rainfall Data

| Catchment Properties | |
|----------------------|--------------------------|
| Rainfall Station | 40223 |
| Et Station | User-defined monthly PET |
| Start Date | 01/01/1980 12:00 AM |
| End Date | 31/12/1989 11:54 PM |
| Modelling Time Step | 6 Minutes |

The MUSIC model was run for a period over 10 years of historical rainfall, from 1st January 1980 to 31 December 1989 with a 6 minute time step.

6.5. SOURCE NODE POLLUTANT CHARACTERISTICS

The source node pollutant characteristics and soil properties adopted for the MUSIC model are detailed in Table 6.4 and Table 6.5.

Table 3.4 - Split Source Node Pollutant Generation Characteristics for Residential

| Flow Type | Land Use | TSS log ₁₀ values | | TP log ₁₀ values | | TN log ₁₀ values | |
|----------------------|-----------------|------------------------------|--------|-----------------------------|--------|-----------------------------|--------|
| | | Mean | St.dev | Mean | St.dev | Mean | St.dev |
| Baseflow Parameters | Roof | N/A | N/A | N/A | N/A | N/A | N/A |
| Stormflow Parameters | | 1.30 | 0.39 | -0.89 | 0.31 | 0.26 | 0.23 |
| Baseflow Parameters | Roads/Car Parks | 1.00 | 0.34 | -0.97 | 0.31 | 0.20 | 0.20 |
| Stormflow Parameters | | 2.43 | 0.39 | -0.30 | 0.31 | 0.26 | 0.23 |
| Baseflow Parameters | Ground | 1.00 | 0.34 | -0.97 | 0.31 | 0.20 | 0.20 |
| Stormflow Parameters | | 2.18 | 0.39 | -0.47 | 0.31 | 0.26 | 0.23 |

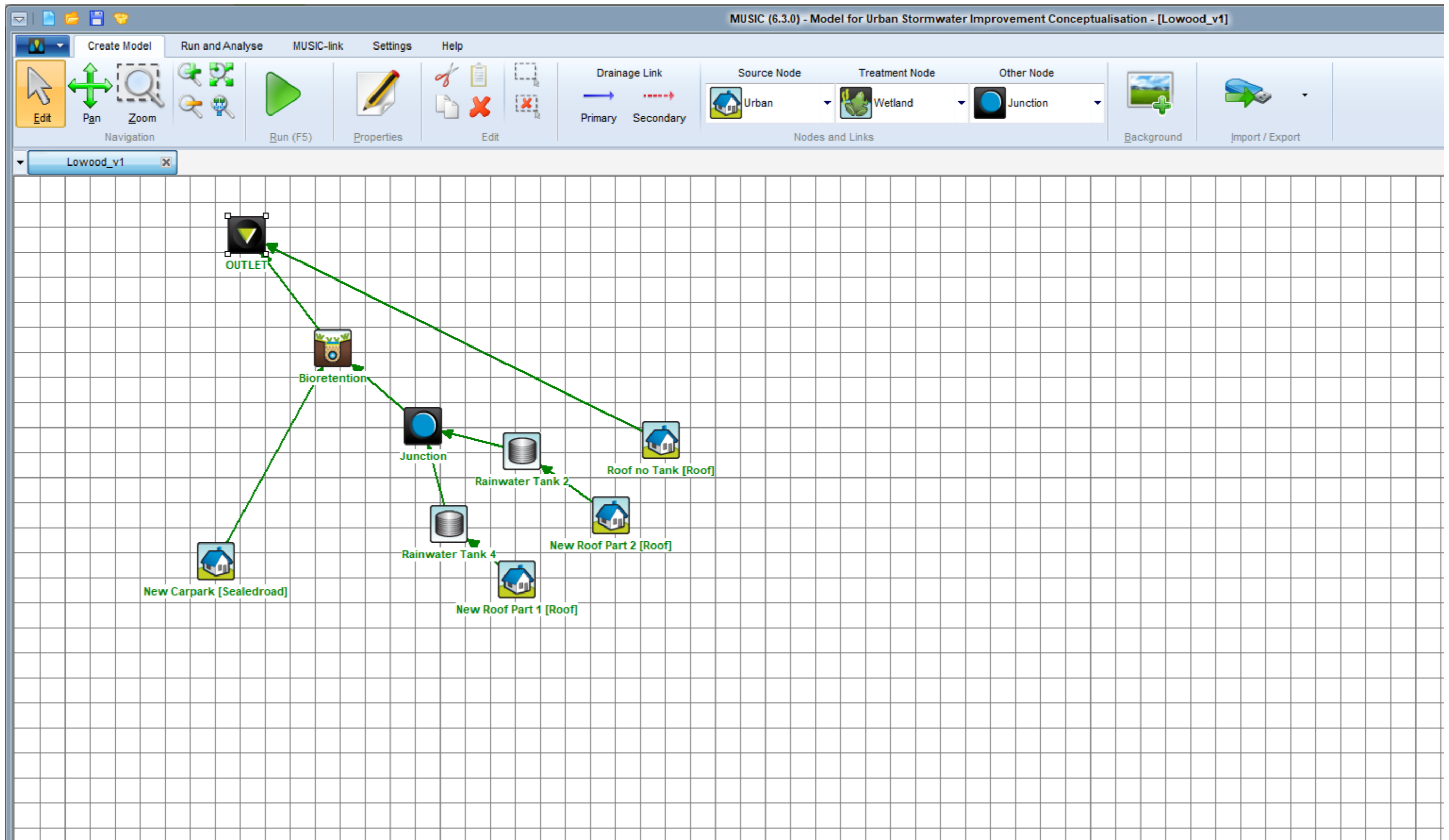


Figure 16 - MUSIC Model Layout

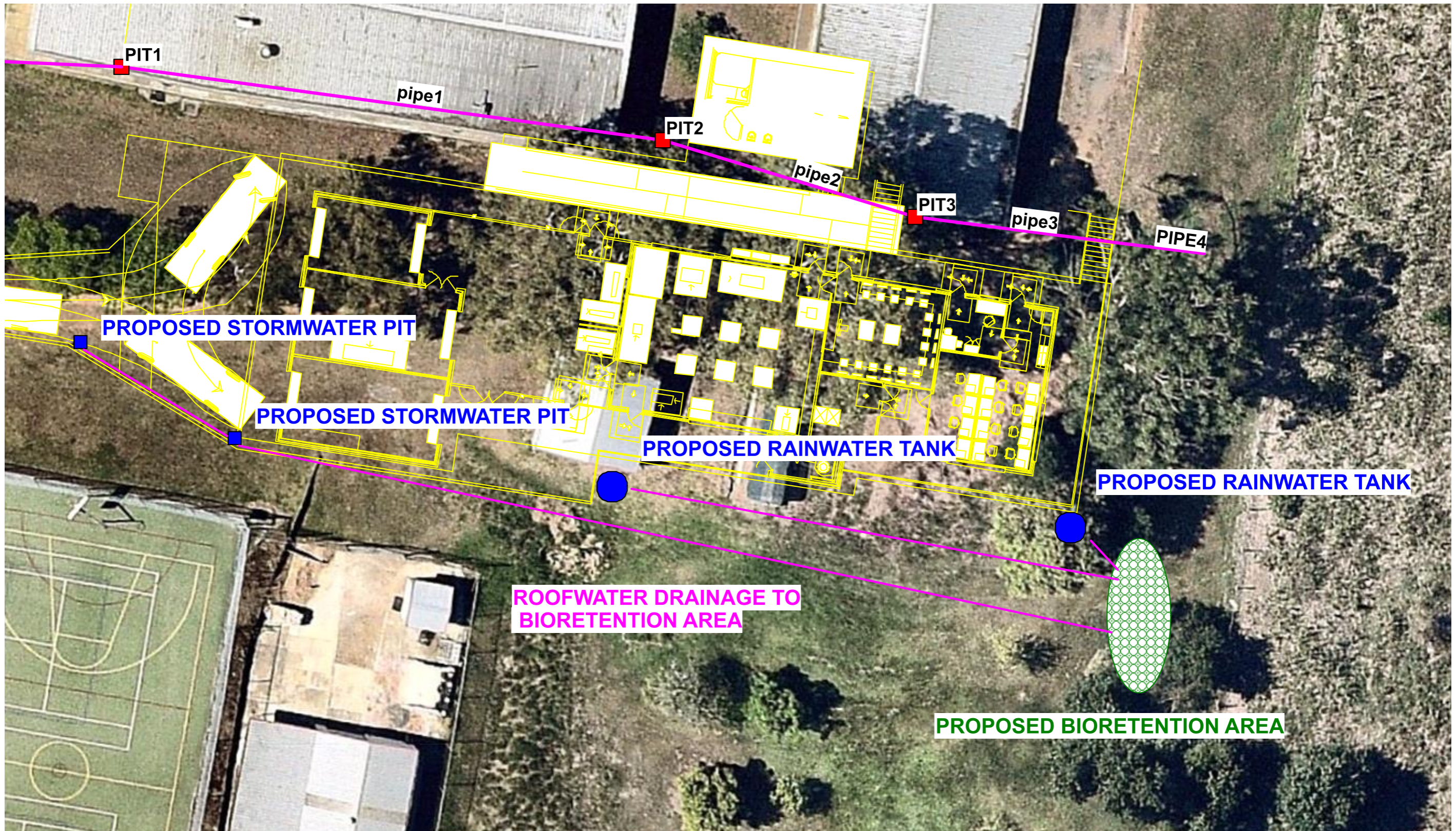


Figure 17 - Proposed Stormwater Quality Treatment Measures



Table 6.5 - Source Node Soil Characteristics for Residential Land Use

| Land Use | Urban Residential |
|-------------------------------------|-------------------|
| Rainfall threshold (mm) | 1.0 |
| Soil storage capacity (mm) | 500 |
| Initial storage (% capacity) | 10 |
| Field capacity (mm) | 200 |
| Infiltration capacity coefficient a | 211 |
| Infiltration capacity exponent b | 5.0 |
| Initial depth (mm) | 50 |
| Daily recharge rate (%) | 28 |
| Daily baseflow rate (%) | 27 |
| Daily deep seepage rate (%) | 0 |

6.6. POLLUTANT EXPORT RESULTS – UNMITIGATED SITE

The MUSIC model was run for the unmitigated site to assess impacts. Table 6.6 shows the mean annual pollutant loads predicted for the site.

Table 3.6 - MUSIC Modelling Results, Unmitigated Site

| Pollutant | Mean Annual Pollutant Loads (kg/yr) | SPP WQO's (% removal) |
|------------------|-------------------------------------|-----------------------|
| TSS | 129 | 80 |
| TP | 0.324 | 60 |
| TN | 3.49 | 45 |
| Gross Pollutants | 31.6 | 90 |

6.7. PROPOSED STORMWATER QUALITY TREATMENT MEASURES

The general features of the stormwater quality treatment measures are as follows:

- Rainwater harvesting for toilet use and outdoor watering with 2 x 5 KL rainwater tanks on the new buildings which are internally plumbed.
- The construction of a small bioretention landscaped area east of the new buildings which will remove phosphorus and nitrogen from the stormwater.



- Drainage from the western parking area to be collected and discharged into the proposed bioretention area.

Figure 17 shows the proposed location of these treatment measures.

6.8. BIORETENTION AREA

The relevant parameters used for the proposed bioretention area are displayed in Table 3.8.

Table 3.8 - Proposed Bioretention Basin Parameters

| Input Parameters | Value |
|---|-------|
| Extended Detention Depth (m) | 0.3 |
| Surface Area (m ²) | 30 |
| Filter Area (m ²) | 20 |
| Saturated Hydraulic Conductivity (mm/hr) | 200 |
| Filter Depth (m) | 0.7 |
| TN Content of Filter Media (mg/kg) | 800 |
| Orthophosphate Content of Filter media (mg/kg) | 40 |
| Exfiltration Rate (mm/hr) | 3.6 |
| Is Base Lined? | No |
| Vegetated with Effective Nutrient Removal Plants? | Yes |
| Overflow Weir Width (m) | 2 |
| Underdrain Present? | Yes |
| Submerged Zone with Carbon Present? | No |

6.9. RAINWATER TANK

The site proposes to install a 5 kL rainwater tank on each building which will be internally plumbed. The tank will be used for toilet flushing and garden watering.

The stormwater use for irrigation was calculated using 30 kL per year.

Indoor demand includes water re-use from water tanks used to flush toilets. Although there are no exact recommendations on water consumption for toilets in schools, it has been assumed that the water usage for flushing toilets is 16.5 litres per person in the building, five days a week (assuming 30 people using the new building). This internal use was divided across the two proposed tanks.

**6.10. WATER QUALITY ASSESSMENT – MITIGATED SITE**

Table 6.9 outlines the effectiveness of the MUSIC Model Treatment System in achieving the set of Water Quality Objectives (WQO's) for pollutant reduction for the development. The model achieved the pollutant load WQO's required by SPP (2017) for all areas except gross pollutants. Schools however have a litter policy and it is expected that school policies will make up for this shortfall.

Detailed results of the MUSIC modelling recorded in the MRT report are found in Appendix E.

Table 3.9 - MUSIC Model Results

| | Sources | Residual Load | % Reduction | SPP (2017) WQO's (%) |
|------------------|---------|---------------|-------------|----------------------|
| TSS (kg/yr) | 129 | 17 | 85.9 | 80 |
| TP (kg/yr) | 0.324 | 0.113 | 65.1 | 60 |
| TN (kg/yr) | 3.49 | 1.57 | 55.1 | 45 |
| Gross Pollutants | 31.6 | 4.28 | 86.4 | 90 |

6.11. MAINTENANCE

Regular maintenance required for the bioretention areas typically consist of:

- Regular and storm event inspections to ensure:
 - Sufficient vegetation is still established;
 - No erosion has occurred; and
 - Any clean up required is undertaken.
- Regular harvesting to ensure vegetation is maintained at acceptable levels; and
- Removal of litter and sediment build up.

A maintenance plan for each of them follows.



MAINTENANCE PLAN DETAILS

BIORETENTION AREA

| SCHEDULE OF SITE VISITS | | | | | | | | | | | | | |
|-------------------------|-----------|---|---|---|---|---|---|---|---|---|---|---|---|
| Purpose of Visit | Frequency | J | F | M | A | M | J | J | A | S | O | N | D |
| Routine inspection | 12/year | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Annual inspection | 1/year | | | | ✓ | | | | | | | | |
| Routine maintenance | 2/year | | | | ✓ | | | | | | ✓ | | |

The above schedule is a guideline only. Routine clean out and maintenance should be scheduled based on the outcome of routine inspection.

| INSPECTION | |
|------------|---|
| 1. | Routine Inspection |
| 1.1 | Routine inspection should be carried out on a regular monthly basis. The purpose of the inspection is to indicate when maintenance of the bio-retention system is required. |
| 1.2 | Inspections should consider erosion, condition of vegetation, ponded water, sediment build up. |
| 1.3 | Complete appropriate Maintenance Form. |
| 2. | Annual Inspection |
| 2.1 | Once a year, the condition of the bio-retention system should be closely inspected. Any damage or problems should be noted on the Maintenance Form for action. |

| ROUTINE MAINTENANCE | |
|---------------------|--|
| 1. | Purpose |
| 1.1 | Routine maintenance of the bioretention area involves weed control and the collection of any litter and removal of dead or diseased vegetation. |
| 2. | Weed Management |
| 2.1 | If weeds have been observed during routine inspection, these weeds should be removed from the bioretention area. Weeding generally involves manual removal of perennial species. |
| 2.2 | The aim is to remove the weeds, including the roots, when the weeds are less than 3 months old; otherwise weeds infestation rapidly occurs and is difficult to control. |
| 2.3 | Herbicides should <u>not</u> be used, as they would contaminate the downstream receiving waters. |
| 2.4 | Weeds should be disposed offsite at an appropriate waste management facility. |
| 2.5 | Replant appropriate plant species, where necessary, in areas that have been extensively weeded. |



| | |
|-----|---|
| 3. | Watering |
| 3.1 | Regular watering is essential for the establishment and healthy growth of plants. The following watering program should be implemented but should be adjusted to suit site conditions. <ul style="list-style-type: none">• Week 1-2 3 watering per week;• Week 3-6 2 watering per week; and• Week 7-12 1 watering per week. |
| 4. | Litter Management |
| 4.1 | Remove and dispose of litter that may be visible around the bioretention area. |
| 5. | Dead or Diseased Vegetation |
| 5.1 | Remove or dispose of any dead or diseased vegetation within bioretention area. |



7.0 CONCLUSION

This report has assessed the hydraulic modelling for the site at Lowood State High School during the critical 10, 20, 50 and 100 year ARI storm events.

Figure 6 to Figure 9 show output results from the TUFLOW hydraulic model for the 10, 20, 50 and 100 year ARI events for the existing site. The existing classrooms and maintenance shed are affected by flooding. Depths generally are less than 0.2 m across the site.

Figure 10 to Figure 13 show output results from the TUFLOW hydraulic model for the 10, 20, 50 and 100 year ARI events for the developed site. It can be seen that the proposed drainage will reduce the flooding issues on the site for all events.

The Brisbane River Catchment Flood Study was completed in 2017. A review of the study shows that the site sits approximately 140 west of the 100 year ARI Brisbane River flood event inundation and is not affected during that event.

Figure 14 and Figure 15 show water levels for the existing and developed site. Even though the pipe drainage reduces flooding for the new building the minimum floor level for the new building is recommended to be 61.0 m AHD.

In addition, local drainage should be incorporated to reduce local overland runoff from the south entering the new building.

Although the new buildings are exempt from the SPP (2017), the proposed stormwater treatment meets the requirements of the SPP (2017) for suspended sediment, phosphorus and nitrogen.

Mark Gibson

BE Civil, MIWM, FIEAust, CPEng, NER, APEC Engineer, IntPE(Aus), RPEQ 6722

Director

E mark@mrgwater.com.au

M 0418 569 362

LIST OF APPENDICES

APPENDIX A – Design Plans

APPENDIX B – Rational Method Calculations

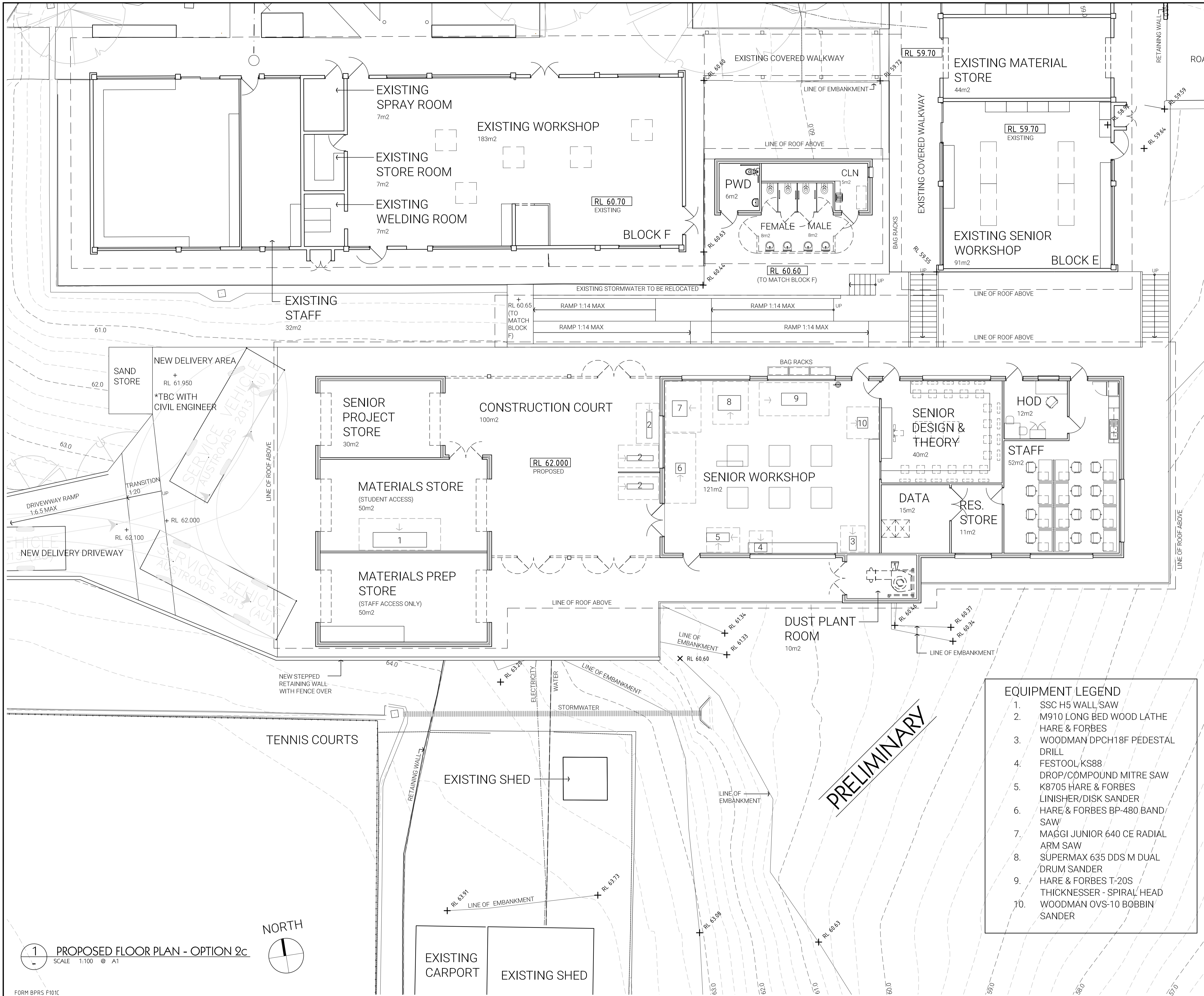
APPENDIX C – RAFTS Model Files

APPENDIX D – TUFLOW Model Files

APPENDIX E – MUSIC Model Files

APPENDIX A

Design Plans



GENERAL NOTES

1. IF IN DOUBT, JUST ASK.
2. USE FIGURED DIMENSIONS, DO NOT SCALE FROM DRAWINGS.
3. CONFIRM ALL RELEVANT DIMENSIONS, LEVELS AND DETAILS ON SITE PRIOR TO COMMENCEMENT OF ALL WORK. CONFIRM SETBACKS TO ALL ALIGNMENTS.
4. THESE ARCHITECTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ENGINEERING AND OTHER CONSULTANT'S DRAWINGS AND SPECIFICATIONS. ANY DISCREPANCIES SHALL BE REFERRED TO THE ARCHITECT FOR DISCUSSION BEFORE PROCEEDING WITH THE WORK.
5. DESIGN AND CONSTRUCTION TO COMPLY WITH CURRENT STANDARD BUILDING BY-LAWS, BUILDING ACT, BUILDING AMENDMENT ACT, BUILDING AND OTHER LEGISLATION AMENDMENT ACT, QUEENSLAND DEVELOPMENT CODE, BUILDING CODE OF AUSTRALIA, CURRENT AUSTRALIAN STANDARDS, STATUTORY REQUIREMENTS, ORDINANCES, LOCAL GOVERNMENT REQUIREMENTS, RELEVANT BUILDING AUTHORITIES AND ALL CONTRACT DOCUMENTATION.
6. CARRY OUT WORK IN A SAFE MANNER IN ACCORDANCE WITH APPLICABLE STATUTORY REGULATIONS, BY-LAWS OR RULES. COMPLY WITH RELEVANT STATE OCCUPATIONAL HEALTH AND SAFETY ACTS INCLUDING ASSOCIATED REGULATIONS AND CODES OF PRACTICE. CONTRACTOR IS RESPONSIBLE FOR OCCUPATIONAL HEALTH AND SAFETY OF SITE PERSONNEL AND GENERAL PUBLIC IN ACCORDANCE WITH LEGISLATIVE REQUIREMENTS, INDUSTRIAL AGREEMENTS AND ACCEPTED INDUSTRY PRACTICE.
7. TIMBER CONSTRUCTION TO COMPLY WITH AS1720. DOMESTIC TIMBER CONSTRUCTION IN NON-CYCLONIC LOCATIONS SHALL BE IN ACCORDANCE WITH AS1884.
8. ALL BRICKWORK AND BLOCKWORK SHALL BE IN ACCORDANCE WITH AS3700.
9. ALL PROPRIETARY PRODUCTS AND SYSTEMS TO BE INSTALLED TO MANUFACTURER'S SPECIFICATION AND INSTRUCTIONS.
10. THESE DRAWINGS ARE THE COPYRIGHT OF AN ARCHITECTURE PTY LTD AND MAY NOT BE USED, REPRODUCED OR REPRODUCED WITHOUT WRITTEN AUTHORITY.
11. 'AS-BUILT' INDICATES WORKS THAT ARE GENERALLY IN ACCORDANCE WITH THE ARCHITECTURAL DOCUMENTATION AT PROJECT COMPLETION AND EXCLUDES CONCEALED WORKS THAT WERE NOT SPECIFICALLY INSPECTED.

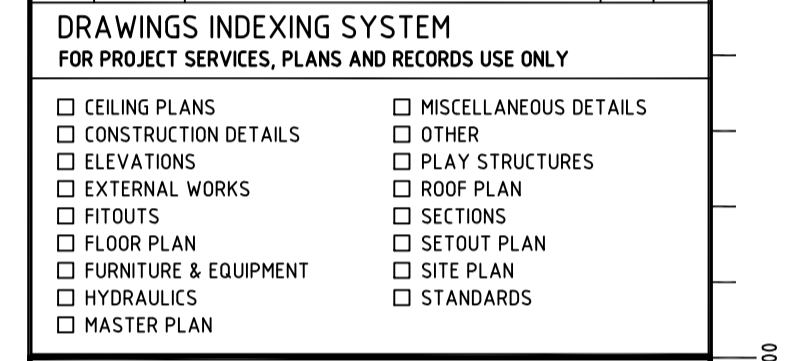
DIMENSIONS
Use figured dimensions, DO NOT SCALE.
Check all dimensions & levels on site before fabrication or set out.

AMENDMENTS

| ISSUE | DATE | SUBJECT | AUTH | CHK |
|-------|----------|-------------|------|-----|
| A | 17.04.18 | PRELIMINARY | JH | |
| B | 01.05.18 | PRELIMINARY | JH | |

DRAWINGS INDEXING SYSTEM FOR PROJECT SERVICES, PLANS AND RECORDS USE ONLY

| | |
|--|--|
| <input type="checkbox"/> CEILING PLANS | <input type="checkbox"/> MISCELLANEOUS DETAILS |
| <input type="checkbox"/> CONSTRUCTION DETAILS | <input type="checkbox"/> OTHER |
| <input type="checkbox"/> ELEVATIONS | <input type="checkbox"/> PLAY STRUCTURES |
| <input type="checkbox"/> EXTERNAL WORKS | <input type="checkbox"/> ROOF PLAN |
| <input type="checkbox"/> FITTINGS | <input type="checkbox"/> SECTIONS |
| <input type="checkbox"/> FLOOR PLAN | <input type="checkbox"/> SETOUT PLAN |
| <input type="checkbox"/> FURNITURE & EQUIPMENT | <input type="checkbox"/> SITE PLAN |
| <input type="checkbox"/> HYDRAULICS | <input type="checkbox"/> STANDARDS |
| <input type="checkbox"/> MASTER PLAN | |



CLIENT
Department of Education and Training
The State of Queensland 2005

8i Architects
Suite 24, 200 Moggill Road,
Taringa, Qld, 4068
ph: (07) 3217 7100
web: www.8i.net.au
ABN 76 793 485 967

| | | | |
|------------------------|----|------|------------|
| DRAWN | SL | DATE | March 2018 |
| DISCIPLINE TEAM LEADER | HN | DATE | March 2018 |
| AUTHORISED FOR ISSUE | | DATE | |

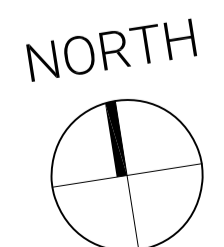
LOWOOD STATE HIGH SCHOOL
34 PROSPECT STREET,
LOWOOD, QLD 4311
FLOOR PLAN
MANUAL ARTS EXTENSION
OPTION 2c

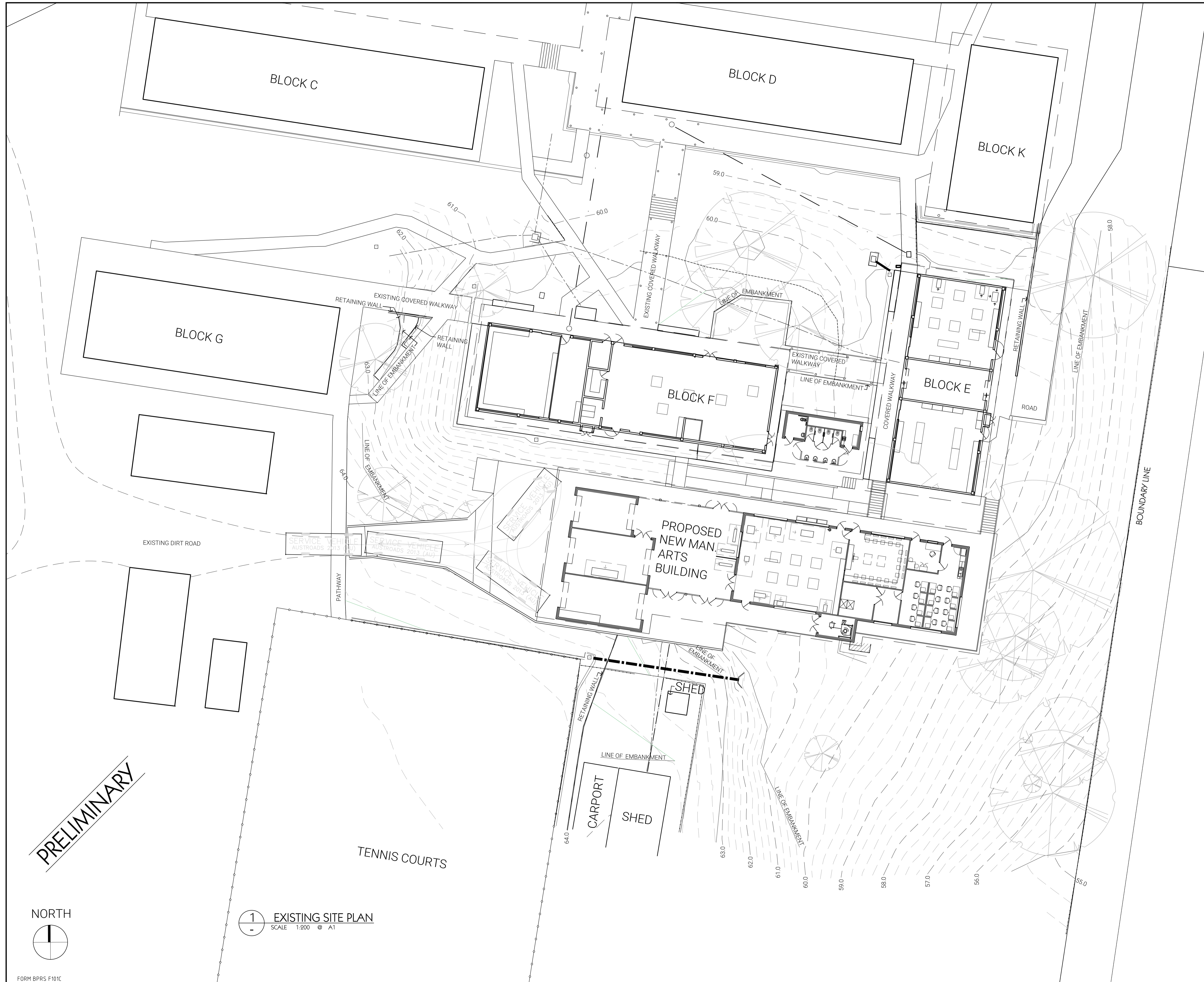
| | | | |
|--------------------|--------------|-------------------------|-------|
| SCALE | 1:100 | AT | A1 |
| MASTER SITE NUMBER | 00000 | CLIENT REFERENCE NUMBER | XXXXX |
| DRAWING NUMBER | 1806 / SK05c | ISSUE | B |
| | | SHEET NO | - |

- EQUIPMENT LEGEND**
1. SSC H5 WALL SAW
 2. M910 LONG BED WOOD LATHE HARE & FORBES
 3. WOODMAN DPCH18F PEDESTAL DRILL
 4. FESTOOL KS88 DROP/COMPOUND MITRE SAW
 5. K8705 HARE & FORBES LINISHER/DISK SANDER
 6. HARE & FORBES BP-480 BAND SAW
 7. MAGGI JUNIOR 640 CE RADIAL ARM SAW
 8. SUPERMAX 635 DDS M DUAL DRUM SANDER
 9. HARE & FORBES T-20S THICKNESSER - SPIRAL HEAD
 10. WOODMAN OVS-10 BOBBIN SANDER

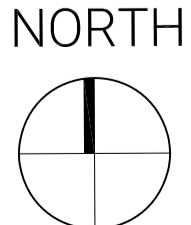
PRELIMINARY

1 PROPOSED FLOOR PLAN - OPTION 2c
SCALE 1:100 @ A1





PRELIMINARY



1 EXISTING SITE PLAN
SCALE 1:200 @ A1

BARCODE

GENERAL NOTES
 1. IF IN DOUBT, JUST ASK.
 2. USE FIGURED DIMENSIONS, DO NOT SCALE FROM DRAWINGS.
 3. CONFIRM ALL RELEVANT DIMENSIONS, LEVELS AND DETAILS ON SITE PRIOR TO COMMENCEMENT OF ALL WORK. CONFORM SETBACKS TO ALL ALIGNMENTS.
 4. THESE ARCHITECTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ENGINEERING AND OTHER CONSULTANT'S DRAWINGS AND SPECIFICATIONS. ANY DISCREPANCIES SHALL BE REFERRED TO THE ARCHITECT FOR DISCUSSION BEFORE PROCEEDING WITH THE WORK.
 5. DESIGN AND CONSTRUCTION TO COMPLY WITH CURRENT STANDARD BUILDING BY-LAWS, BUILDING ACT, BUILDING AMENDMENT ACT, BUILDING AND OTHER LEGISLATION AMENDMENT ACT, QWENGL AND DEVELOPMENT CODE, BUILDING CODE OF AUSTRALIA, CURRENT AUSTRALIAN STANDARDS, STATUTORY REQUIREMENTS, ORDINANCES, LOCAL GOVERNMENT REQUIREMENTS, RELEVANT BUILDING AUTHORITIES AND ALL CONTRACT DOCUMENTATION.
 6. CARRY OUT WORK IN A SAFE MANNER IN ACCORDANCE WITH APPLICABLE STATUTORY REGULATIONS, BY-LAWS OR RULES. COMPLY WITH RELEVANT STATE OCCUPATIONAL HEALTH AND SAFETY ACTS INCLUDING ASSOCIATED REGULATIONS AND CODES OF PRACTICE. CONTRACTOR IS RESPONSIBLE FOR OCCUPATIONAL HEALTH AND SAFETY OF SITE PERSONNEL AND GENERAL PUBLIC IN ACCORDANCE WITH LEGISLATIVE REQUIREMENTS, INDUSTRIAL AGREEMENTS AND ACCEPTED INDUSTRY PRACTICE.
 7. TIMBER CONSTRUCTION TO COMPLY WITH AS1720. DOMESTIC TIMBER CONSTRUCTION IN NON-CYCLONE LOCATIONS SHALL BE IN ACCORDANCE WITH AS1848.
 8. ALL BRICKWORK AND BLOCKWORK SHALL BE IN ACCORDANCE WITH AS3700.
 9. ALL PROPRIETARY PRODUCTS AND SYSTEMS TO BE INSTALLED TO MANUFACTURER'S SPECIFICATION AND INSTRUCTIONS.
 10. THESE DRAWINGS ARE THE COPYRIGHT OF AN ARCHITECTURE PTY LTD AND MAY NOT BE USED, REPRODUCED OR REPRODUCED WITHOUT WRITTEN AUTHORITY.
 11. 'AS-BUILT' INDICATES WORKS THAT ARE GENERALLY IN ACCORDANCE WITH THE ARCHITECTURAL DOCUMENTATION AT PROJECT COMPLETION AND EXCLUDES CONCEALED WORKS THAT WERE NOT SPECIFICALLY INSPECTED.

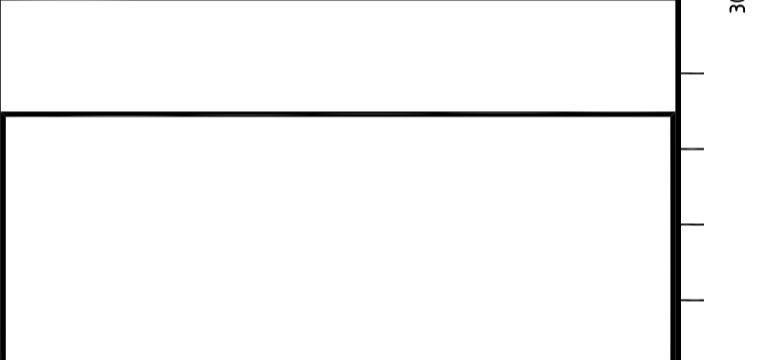
DIMENSIONS
 Use figured dimensions, DO NOT SCALE.
 Check all dimensions & levels on site before fabrication or set out.

AMENDMENTS

| ISSUE | DATE | SUBJECT | AUTH | CHK |
|-------|----------|-------------|------|-----|
| A | 17.04.18 | PRELIMINARY | JH | |
| B | 01.05.18 | PRELIMINARY | JH | |

DRAWINGS INDEXING SYSTEM
 FOR PROJECT SERVICES, PLANS AND RECORDS USE ONLY

- CEILING PLANS
- ELEVATIONS
- EXTERNAL WORKS
- FITTINGS
- FLOOR PLAN
- FURNITURE & EQUIPMENT
- HYDRAULICS
- MASTER PLAN
- MISCELLANEOUS DETAILS
- OTHER
- PLAY STRUCTURES
- ROOF PLAN
- SECTIONS
- SETOUT PLAN
- SITE PLAN
- STANDARDS



CLIENT
Department of Education and Training
 © The State of Queensland 2005

8i Architects
 Suite 24, 200 Moggill Road,
 Taringa, Qld, 4068
 ph: (07) 3217 7100
 web: www.8i.net.au
 ABN 76 793 485 967

| | |
|------------------------|------------|
| SL | March 2018 |
| DRAWN | DATE |
| HN | March 2018 |
| DISCIPLINE TEAM LEADER | DATE |
| AUTHORISED FOR ISSUE | DATE |

LOWOOD STATE HIGH SCHOOL
 34 PROSPECT STREET,
 LOWOOD, QLD 4311

**SITE PLAN
 MANUAL ARTS**

| | | | |
|--------------------|-------------|-------------------------|-------|
| SCALE | 1:200 | AT | A1 |
| MASTER SITE NUMBER | 00000 | CLIENT REFERENCE NUMBER | XXXXX |
| DRAWING NUMBER | 1806 / SK03 | ISSUE | B |
| | | SHEET NO | - |

APPENDIX B

Rational Method Calculations

RATIONAL METHOD CALCULATIONS

Project: Lowood State High School, Lowood Qld

Location of Discharge: Point 1

Catchment Condition: Existing Site/Developed upstream

Other Comments:



| | | | | | |
|-----------------------------------|--------------|--|--|--------------|----|
| Time of Concentration | 19.0 minutes | | | | |
| | CU | | | Total | |
| Sub-Catchment Areas | 11.830 | | | 11.83 | ha |
| C10 Runoff Coefficients | 0.48 | | | | |
| 10yr 1hr Intensity (mm/hr) | 50.90 | | | | |

| ARI (years) | Rainfall | | Fy | Runoff Coefficients | | | Discharges (cumecs) | | | TOTAL |
|----------------|----------------------|---------------|------|---------------------|------|------|------------------------|-------|-------|-------|
| | Intensity (mm/hr) | Depth (mm) | | CU | 0 | 0 | CU | 0 | 0 | |
| 1 | 55.9 | 18 | 0.80 | 0.39 | 0.00 | 0.00 | 0.710 | 0.000 | 0.000 | 0.71 |
| 2 | 66.0 | 21 | 0.85 | 0.41 | 0.00 | 0.00 | 0.890 | 0.000 | 0.000 | 0.89 |
| 5 | 93.0 | 29 | 0.95 | 0.46 | 0.00 | 0.00 | 1.402 | 0.000 | 0.000 | 1.40 |
| 10 | 105.0 | 33 | 1.00 | 0.48 | 0.00 | 0.00 | 1.667 | 0.000 | 0.000 | 1.67 |
| 20 | 122.0 | 39 | 1.05 | 0.51 | 0.00 | 0.00 | 2.033 | 0.000 | 0.000 | 2.03 |
| 50 | 144.0 | 46 | 1.15 | 0.56 | 0.00 | 0.00 | 2.628 | 0.000 | 0.000 | 2.63 |
| 100 | 160.0 | 51 | 1.20 | 0.58 | 0.00 | 0.00 | 3.047 | 0.000 | 0.000 | 3.05 |

| | | |
|---------------------------------|------------|-----------------------|
| Upper Catchment Slope | 5.0% | |
| Standard Inlet Time | 13 min | |
| Channel Travel Length | 520 metres | |
| Channel Fall | 42 metres | |
| Travel Time | 3 min | Equiv Travel Velocity |
| Delta for | 2.0 | 1.44 m/s |
| Time of Concentration @ u/s bdy | 19.0 | |

Table B1

RATIONAL METHOD CALCULATIONS

Project: Lowood State High School, Lowood Qld
Location of Discharge: Point 1
Catchment Condition: Developed Site/Developed upstream
Other Comments:



| | | | | |
|-----------------------------------|---------------------|-------------------|--------------|--------------|
| Time of Concentration | 19.0 minutes | | | |
| | Urban | Open Space | Rural | Total |
| Sub-Catchment Areas | 11.830 | | | 11.83 |
| C10 Runoff Coefficients | 0.49 | | | |
| 10yr 1hr Intensity (mm/hr) | 50.90 | | | |

| ARI (years) | Rainfall | | Fy | Runoff Coefficients | | | Discharges (cumecs) | | | |
|-------------|-------------------|------------|------|---------------------|------------|-------|---------------------|------------|-------|-------------|
| | Intensity (mm/hr) | Depth (mm) | | Urban | Open Space | Rural | Urban | Open Space | Rural | TOTAL |
| 1 | 55.9 | 18 | 0.80 | 0.39 | 0.00 | 0.00 | 0.716 | 0.000 | 0.000 | 0.72 |
| 2 | 66.0 | 21 | 0.85 | 0.41 | 0.00 | 0.00 | 0.898 | 0.000 | 0.000 | 0.90 |
| 5 | 93.0 | 29 | 0.95 | 0.46 | 0.00 | 0.00 | 1.414 | 0.000 | 0.000 | 1.41 |
| 10 | 105.0 | 33 | 1.00 | 0.49 | 0.00 | 0.00 | 1.680 | 0.000 | 0.000 | 1.68 |
| 20 | 122.0 | 39 | 1.05 | 0.51 | 0.00 | 0.00 | 2.050 | 0.000 | 0.000 | 2.05 |
| 50 | 144.0 | 46 | 1.15 | 0.56 | 0.00 | 0.00 | 2.650 | 0.000 | 0.000 | 2.65 |
| 100 | 160.0 | 51 | 1.20 | 0.58 | 0.00 | 0.00 | 3.073 | 0.000 | 0.000 | 3.07 |

| | |
|---------------------------------|------------|
| Upper Catchment Slope | 5.0% |
| Standard Inlet Time | 13 min |
| Channel Travel Length | 520 metres |
| Channel Fall | 42 metres |
| Travel Time | 3 min |
| Delta for | 2.0 |
| Time of Concentration @ u/s bdy | 19.0 |

Equiv Travel Velocity
1.44 m/s

Table B2



Location

Label: Lowood, Qld

Easting: 459312

Northing: 6961442

Zone: 56

Latitude: Nearest grid cell: 27.4625 (S)

Longitude: Nearest grid cell: 152.5875 (E)

IFD Design Rainfall Intensity (mm/h)

Issued: 11 May 2018

Rainfall intensity for Durations, Exceedance per Year (EY), and Annual Exceedance Probabilities (AEP).
[FAQ for New ARR probability terminology](#)

| Duration | Annual Exceedance Probability (AEP) | | | | | | |
|----------|-------------------------------------|-------|------|------|------|------|------|
| | 63.2% | 50%# | 20%* | 10% | 5% | 2% | 1% |
| 1 min | 126 | 144 | 199 | 237 | 274 | 324 | 362 |
| 2 min | 102 | 116 | 160 | 192 | 224 | 266 | 300 |
| 3 min | 96.5 | 109 | 151 | 180 | 210 | 249 | 279 |
| 4 min | 92.5 | 105 | 145 | 173 | 201 | 237 | 266 |
| 5 min | 89.0 | 101 | 140 | 166 | 193 | 227 | 255 |
| 10 min | 74.0 | 84.3 | 117 | 139 | 160 | 189 | 211 |
| 15 min | 62.8 | 71.6 | 99.3 | 118 | 136 | 161 | 179 |
| 30 min | 43.2 | 49.2 | 68.2 | 81.3 | 94.2 | 112 | 125 |
| 45 min | 33.2 | 37.7 | 52.3 | 62.4 | 72.5 | 86.0 | 96.6 |
| 1 hour | 27.2 | 30.8 | 42.6 | 50.9 | 59.3 | 70.4 | 79.3 |
| 2 hour | 16.4 | 18.5 | 25.4 | 30.4 | 35.4 | 42.2 | 47.7 |
| 3 hour | 12.1 | 13.7 | 18.8 | 22.4 | 26.1 | 31.2 | 35.2 |
| 6 hour | 7.40 | 8.34 | 11.4 | 13.6 | 15.8 | 18.9 | 21.4 |
| 12 hour | 4.67 | 5.27 | 7.25 | 8.65 | 10.1 | 12.1 | 13.8 |
| 24 hour | 3.01 | 3.43 | 4.79 | 5.76 | 6.76 | 8.22 | 9.40 |
| 48 hour | 1.92 | 2.21 | 3.16 | 3.87 | 4.62 | 5.69 | 6.59 |
| 72 hour | 1.43 | 1.66 | 2.42 | 3.00 | 3.62 | 4.50 | 5.25 |
| 96 hour | 1.14 | 1.32 | 1.95 | 2.44 | 2.97 | 3.71 | 4.35 |
| 120 hour | 0.943 | 1.09 | 1.62 | 2.04 | 2.49 | 3.13 | 3.67 |
| 144 hour | 0.797 | 0.922 | 1.38 | 1.73 | 2.11 | 2.67 | 3.12 |
| 168 hour | 0.685 | 0.790 | 1.18 | 1.48 | 1.81 | 2.29 | 2.68 |

Note:

The 50% AEP IFD **does not** correspond to the 2 year Average Recurrence Interval (ARI) IFD. Rather it corresponds to the 1.44 ARI.

* The 20% AEP IFD **does not** correspond to the 5 year Average Recurrence Interval (ARI) IFD. Rather it corresponds to the 4.48 ARI.

This page was created at **17:28 on Friday 11 May 2018 (AEST)**

© [Copyright](#) Commonwealth of Australia 2018, Bureau of Meteorology (ABN 92 637 533 532) | [Disclaimer](#) | [Privacy](#) | [Accessibility](#)

APPENDIX C

RAFTS Model Files

ESTIMATED TIME TO PEAK (MINS) = 38.00

Lowood SHS

Results for period from 9: 0.0 30/ 4/2010
to 15: 0.0 30/ 4/2010

#####

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 60.
RETURN PERIOD (YRS) = 20.
BX = 1.3000
TOTAL OF FIRST SUB-AREAS (ha) = 10.57
TOTAL OF SECOND SUB-AREAS (ha) = 1.26
TOTAL OF ALL SUB-AREAS (ha) = 11.83

SUMMARY OF CATCHMENT AND RAINFALL DATA

| Link Link Label No. | Catch. Area | | Slope | | % Impervious | | Pern | | B | |
|------------------------------|-------------|--------|-------|-------|--------------|-------|------|------|-------|-------|
| | #1 | #2 | #1 | #2 | #1 | #2 | #1 | #2 | #1 | #2 |
| | (ha) | | (%) | | (%) | | | | | |
| SUB C 1.000 | 0.4835 | 0.0254 | 2.000 | 2.000 | 0.000 | 100.0 | .060 | .025 | .0317 | .0004 |
| SUB B 1.001 | 0.3063 | 0.3063 | 1.000 | 1.000 | 0.000 | 100.0 | .060 | .025 | .0353 | .0021 |
| SUB E 2.000 | 4.876 | 0.5418 | 5.000 | 5.000 | 0.000 | 100.0 | .060 | .025 | .0667 | .0013 |
| SUB D 2.001 | 3.001 | 0.3334 | 5.000 | 5.000 | 0.000 | 100.0 | .060 | .025 | .0518 | .0010 |
| SUB A 1.002 | 1.905 | 0.0488 | 5.000 | 5.000 | 0.000 | 100.0 | .060 | .025 | .0409 | .0004 |

| Link Link Label | Average Intensity | Init. Loss | | Cont. Loss | | Excess Rain | | Peak | Time | Lag mins |
|-----------------------|-------------------|--------------|-------|--------------|-------|--------------|--------|-------------------|------------|-------------|
| | (mm/h) | #1 (mm) | #2 | #1 (mm/h) | #2 | #1 (mm) | #2 | Inflow (m^3/s) | to Peak | |
| SUB C .5000 | 59.300 | 4.000 | 0.000 | 2.500 | 0.000 | 53.092 | 59.300 | 0.0912 | 39.00 | |
| SUB B 1.000 | 59.300 | 4.000 | 0.000 | 2.500 | 0.000 | 53.092 | 59.300 | 0.2283 | 25.00 | |
| SUB E 2.000 | 59.300 | 4.000 | 0.000 | 2.500 | 0.000 | 53.092 | 59.300 | 0.8865 | 40.00 | |
| SUB D 1.000 | 59.300 | 4.000 | 0.000 | 2.500 | 0.000 | 53.092 | 59.300 | 1.477 | 38.00 | |
| SUB A 0.000 | 59.300 | 4.000 | 0.000 | 2.500 | 0.000 | 53.092 | 59.300 | 2.043 | 38.00 | |

Run completed at: 14th May 2018 15:54:35

APPENDIX D

TUFLOW Model Files

! Comments and blank lines are allowed in this file
! First value is the Mat or fric value, the second is the Manning's n value
!Maximum of 20 different values

1, 0.035, 0, 0 ! Material 1 - shortgrass
2, 0.020, 0, 0 ! Material 2 - Roads
3, 0.200, 0, 0 ! Material 3 - Building Obstructions
4, 0.013, 0, 0 ! Material 4 - Concrete
5, 0.150, 0, 0 ! Material 5 - High Set hOUSE with battens
6, 0.1, 0, 0 ! Material 6 - Thick, dense vegetation
!7, 0.1 ! Material 7 - High Set House with Carports used for storage

```
! Global Default Settings
Start Time == 0 ! Unless Start Time is subsequently repeated all start at
time 0

! ARI definitions
Define Event == 100yr
BC Event Source == ~ARI~ | 100yr
If Scenario == EXIST
    Output Folder == C:\TUFLOW\2342 TUFLOW\results\Existing\2d\100yr
    1D Output Folder == c:\TUFLOW\2342 TUFLOW\results\Existing\1d\100yr
    Write Check Files == C:\TUFLOW\2342 TUFLOW\check\Existing\2d\ ! write
    check files to this folder (ensure there is a "\" as the last character)
    Else If Scenario == DEV
        Output Folder == C:\TUFLOW\2342 TUFLOW\results\Developed\2d\100yr
        1D Output Folder == c:\TUFLOW\2342 TUFLOW\results\Developed\1d\100yr
        Write Check Files == C:\TUFLOW\2342 TUFLOW\check\Developed\2d\ ! write
        check files to this folder (ensure there is a "\" as the last character)
    End If
End Define

Define Event == 050yr
BC Event Source == ~ARI~ | 050yr
If Scenario == EXIST
    Output Folder == C:\TUFLOW\2342 TUFLOW\results\Existing\2d\050yr
    1D Output Folder == c:\TUFLOW\2342 TUFLOW\results\Existing\1d\050yr
    Write Check Files == C:\TUFLOW\2342 TUFLOW\check\Existing\2d\ ! write
    check files to this folder (ensure there is a "\" as the last character)
    Else If Scenario == DEV
        Output Folder == C:\TUFLOW\2342 TUFLOW\results\Developed\2d\050yr
        1D Output Folder == c:\TUFLOW\2342 TUFLOW\results\Developed\1d\100yr
        Write Check Files == C:\TUFLOW\2342 TUFLOW\check\Developed\2d\ ! write
        check files to this folder (ensure there is a "\" as the last character)
    End If
End Define

Define Event == 020yr
BC Event Source == ~ARI~ | 020yr
If Scenario == EXIST
    Output Folder == C:\TUFLOW\2342 TUFLOW\results\Existing\2d\020yr
    !1D Output Folder == c:\TUFLOW\2342 TUFLOW\results\Existing\1d\020yr
    Write Check Files == C:\TUFLOW\2342 TUFLOW\check\Existing\2d\ ! write
    check files to this folder (ensure there is a "\" as the last character)
    Else If Scenario == DEV
        Output Folder == C:\TUFLOW\2342 TUFLOW\results\Developed\2d\020yr
        1D Output Folder == c:\TUFLOW\2342 TUFLOW\results\Developed\1d\100yr
        Write Check Files == C:\TUFLOW\2342 TUFLOW\check\Developed\2d\ ! write
        check files to this folder (ensure there is a "\" as the last character)
    End If
End Define

Define Event == 010yr
BC Event Source == ~ARI~ | 010yr
If Scenario == EXIST
    Output Folder == C:\TUFLOW\2342 TUFLOW\results\Existing\2d\010yr
    1D Output Folder == c:\TUFLOW\2342 TUFLOW\results\Existing\1d\010yr
    Write Check Files == C:\TUFLOW\2342 TUFLOW\check\Existing\2d\ ! write
    check files to this folder (ensure there is a "\" as the last character)
    Else If Scenario == DEV
        Output Folder == C:\TUFLOW\2342 TUFLOW\results\Developed\2d\010yr
        1D Output Folder == c:\TUFLOW\2342 TUFLOW\results\Developed\1d\100yr
```

```
Write Check Files == C:\TUFLOW\2342 TUFLOW\check\Developed\2d\ ! write
check files to this folder (ensure there is a "\" as the last character)
End If
End Define
```

```
!
```

```
! Storm duration definitions
```

```
Define Event == 15min
BC Event Source == ~durn~ | 25min
End Time == 0.5
End Define
```

```
Define Event == 25min
BC Event Source == ~durn~ | 25min
End Time == 0.75
End Define
```

```
Define Event == 30min
BC Event Source == ~durn~ | 30min
End Time == 1
End Define
```

```
Define Event == 60min
BC Event Source == ~durn~ | 60min
End Time == 1
End Define
```

```
Define Event == 90min
BC Event Source == ~durn~ | 90min
End Time == 7
End Define
```

```
! Note this duration is lengthened to allow for pre burst rainfall event.
```

```
Define Event == 120min
BC Event Source == ~durn~ | 120min
End Time == 3
End Define
```

```
Define Event == 180min
BC Event Source == ~durn~ | 120min
End Time == 4
End Define
```

```
Define Event == 1440min
BC Event Source == ~durn~ | 120min
End Time == 30
End Define
```

```
!
```

```
! Tide definitions
```

```
!Define Event == MSL
!BC Event Source == ~tide~ | MSL
!End Define
```

```
!Define Event == MHWS
!BC Event Source == ~tide~ | MHWS
!End Define
```

File: W:\MRG Jobs\2342 Lowood State High School\Tuflow\runs\Lowood_Events.tef
14/05/2018, 10:12:58 PM

```
!Define Event == MLWS  
!BC Event Source == ~tide~ | MLWS  
!End Define
```

File: W:\MRG Jobs\2342 Lowood State High School\TufLOW\runs\Lowood_~e1~_~e2~_~s1~_001.tcf 15/05/2018, 8:57:58 AM

```
MI Projection == ..\model\mi\Projection.mif
!Write Empty MI Files == ..\model\mi\empty

Solution Scheme == HPC
Hardware == GPU

Geometry Control File == ..\model\Existing_1m.tgc

Start 1D Domain
  Pit Inlet Database == ..\bc_dbase\Pit_Database.csv
  Output Interval (s) == 60 ! Output every 1 minutes. Note the (s) is
    required to output indicate value is in seconds
  Timestep == 0.25 ! Set 1D timestep to be half the 2D timestep
! Else If Scenario == EXIST
!Read MI Network == ..\model\mi\1d_nwk_culverts.mif
!Output Folder == C:\TUFLOW\2244 TUFLOW\results\Existing\1d ! Output 1D
results to this folder
! Write Check Files == C:\TUFLOW\2244 TUFLOW\check\Existing\1d\
  If Scenario == Dev
Read MI Network == ..\model\mi\1d_nwk_pipes.mif
!Read MI Network == ..\model\mi\1d_pit_dev.mif
!Output Folder == C:\TUFLOW\2244 TUFLOW\results\Developed\1d ! Output 1D
results to this folder
Write Check Files == C:\TUFLOW\2342 TUFLOW\check\Developed\1d\
End If
End 1D Domain

Log Folder == log
!Output Folder == C:\TUFLOW\2244 TUFLOW\results\Existing\2d ! output
Existing results to this folder
!Write Check Files == C:\TUFLOW\2244 TUFLOW\check\Existing\2d\ ! write
check files to this folder (ensure there is a "\" as the last character)

Read Materials File == ..\model\materials.tmf

BC Control File == ..\model\Existing.tbc
BC Database == ..\bc_dbase\bc_dbase.csv

Event File == Lowood_Events.tef

!Read MI PO == ..\model\mi\2d_po_rational.MIF
!Start Time Series Output == 0
!Time Series Output Interval == 30

!Start Time == 0 ! start simulation at 0 hours
!End Time == 1.5 ! end simulation at 5 hours
Timestep Initial == 1
Map Output Data Types == h V q d MB1 ! output levels, velocities, unit
flows, depths, mass error
Map Output Interval == 60 ! output SMS data every 30 sec
Store Maximums and Minimums == ON MAXIMUMS ONLY ! save peak values only
Map Output Format == XMDF DAT
!Mass Balance Corrector == ON
Cell Wet/Dry Depth == 0.0002
```

File: W:\MRG Jobs\2342 Lowood State High School\Tuflow\model\Existing_lm.tgc
14/05/2018, 9:49:02 PM

```
Origin == 458705, 6961345 ! bottom left corner of grid
Orientation == 459066, 6961345 ! another point along the x-axis of the grid
Cell Size == 1 ! cell size in metres
Grid Size (X,Y) == 400, 350 ! grid dimensions in metres

Set Code == 0 ! Makes all grid cells active
Read MI Code == ..\model\mi\2d_code_Existing.MIF

Set Zpts == 100
Read GRID Zpts == W:\MRG Jobs\2342 Lowood State High
School\Tuflow\model\mi\DEM\ELEVATION.txt

Set Mat == 1 ! Sets every cell to a material value of 1
If Scenario == DEV
    !Read MI Mat == ..\model\mi\2d_mat_stage_1.MIF !Adds concrete areas from
    development
    Read MI Mat == ..\model\mi\2d_mat_Existing.MIF
Else If Scenario == EXIST
    Read MI Mat == ..\model\mi\2d_mat_Existing.MIF
Else
    Pause == Scenario not recognised
End If

!Read MI FC Shape == mi\2d_fcsh_Fences.MIF ! Add fence blockages

If Scenario == DEV
    Read MI Z Shape == mi\2d_zsh_existing_minus_sheds.MIF
    Read MI Z Shape == mi\2d_zsh_developed.MIF ! Adds building blockages
    Else If Scenario == EXIST
        Read MI Z Shape == mi\2d_zsh_existing.MIF
    Else
        Pause == Scenario not recognised
End If
```

```
If Scenario == DEV
  Read MI BC == ..\model\mi\2d_bc_Boundaries_dev.MIF
  Read MI SA == ..\model\mi\2d_sa_Boundaries.MIF
  !Read MI SA == ..\model\mi\2d_sa_Boundaries_dev.MIF
  Else If Scenario == EXIST
    Read MI BC == ..\model\mi\2d_bc_Boundaries.MIF
    Read MI SA == ..\model\mi\2d_sa_Boundaries.MIF
  Else
    Pause == Scenario not recognised
End If
```

File: W:\MRG Jobs\2342 Lowood State High School\Tuflow\runs\All_existing_runs
.bat 14/05/2018, 5:19:42 PM

```
"C:\TUFLOW\TUFLOW.2018-03-AA\2018-03-AA\TUFLOW_iSP_w64.exe" -b -e1 100yr -e2  
60min -s1 EXIST "W:\MRG Jobs\2342 Lowood State High  
School\Tuflow\runs\Lowood_~e1~_~e2~_~s1~_001.tcf"  
"C:\TUFLOW\TUFLOW.2018-03-AA\2018-03-AA\TUFLOW_iSP_w64.exe" -b -e1 050yr -e2  
60min -s1 EXIST "W:\MRG Jobs\2342 Lowood State High  
School\Tuflow\runs\Lowood_~e1~_~e2~_~s1~_001.tcf"  
"C:\TUFLOW\TUFLOW.2018-03-AA\2018-03-AA\TUFLOW_iSP_w64.exe" -b -e1 020yr -e2  
60min -s1 EXIST "W:\MRG Jobs\2342 Lowood State High  
School\Tuflow\runs\Lowood_~e1~_~e2~_~s1~_001.tcf"  
"C:\TUFLOW\TUFLOW.2018-03-AA\2018-03-AA\TUFLOW_iSP_w64.exe" -b -e1 010yr -e2  
60min -s1 EXIST "W:\MRG Jobs\2342 Lowood State High  
School\Tuflow\runs\Lowood_~e1~_~e2~_~s1~_001.tcf"  
stop
```

File: W:\MRG Jobs\2342 Lowood State High School\Tuflow\runs\All_developed_run
.s.bat 15/05/2018, 9:57:58 AM

```
"C:\TUFLOW\TUFLOW.2018-03-AA\2018-03-AA\TUFLOW_iSP_w64.exe" -b -e1 100yr -e2  
60min -s1 DEV "W:\MRG Jobs\2342 Lowood State High  
School\Tuflow\runs\Lowood_~e1~_~e2~_~s1~_001.tcf"  
"C:\TUFLOW\TUFLOW.2018-03-AA\2018-03-AA\TUFLOW_iSP_w64.exe" -b -e1 050yr -e2  
60min -s1 DEV "W:\MRG Jobs\2342 Lowood State High  
School\Tuflow\runs\Lowood_~e1~_~e2~_~s1~_001.tcf"  
"C:\TUFLOW\TUFLOW.2018-03-AA\2018-03-AA\TUFLOW_iSP_w64.exe" -b -e1 020yr -e2  
60min -s1 DEV "W:\MRG Jobs\2342 Lowood State High  
School\Tuflow\runs\Lowood_~e1~_~e2~_~s1~_001.tcf"  
"C:\TUFLOW\TUFLOW.2018-03-AA\2018-03-AA\TUFLOW_iSP_w64.exe" -b -e1 010yr -e2  
60min -s1 DEV "W:\MRG Jobs\2342 Lowood State High  
School\Tuflow\runs\Lowood_~e1~_~e2~_~s1~_001.tcf"  
stop
```

APPENDIX E

MUSIC Model Files

Source nodes

Location,New Roof Part 1,New Carpark,Roof no Tank,New Roof Part 2
ID,2,3,4,5
Node Type,UrbanSourceNode,UrbanSourceNode,UrbanSourceNode,UrbanSourceNode
Zoning Surface Type,Roof,Sealedroad,Roof,Roof
Total Area (ha),0.039,0.021,0.016,0.042
Area Impervious (ha),0.039,0.021,0.016,0.042
Area Pervious (ha),0,0,0,0
Field Capacity (mm),80,80,80,80
Pervious Area Infiltration Capacity coefficient - a,200,200,200,200
Pervious Area Infiltration Capacity exponent - b,1,1,1,1
Impervious Area Rainfall Threshold (mm/day),1,1,1,1
Pervious Area Soil Storage Capacity (mm),120,120,120,120
Pervious Area Soil Initial Storage (% of Capacity),25,25,25,25
Groundwater Initial Depth (mm),10,10,10,10
Groundwater Daily Recharge Rate (%),25,25,25,25
Groundwater Daily Baseflow Rate (%),5,5,5,5
Groundwater Daily Deep Seepage Rate (%),0,0,0,0
Stormflow Total Suspended Solids Mean (log mg/L),1.3,2.43,1.3,1.3
Stormflow Total Suspended Solids Standard Deviation (log
mg/L),0.32,0.32,0.32,0.32
Stormflow Total Suspended Solids Estimation
Method,Stochastic,Stochastic,Stochastic,Stochastic
Stormflow Total Suspended Solids Serial Correlation,0.95,0.95,0.95,0.95
Stormflow Total Phosphorus Mean (log mg/L),-0.89,-0.3,-0.89,-0.89
Stormflow Total Phosphorus Standard Deviation (log mg/L),0.25,0.25,0.25,0.25
Stormflow Total Phosphorus Estimation
Method,Stochastic,Stochastic,Stochastic,Stochastic
Stormflow Total Phosphorus Serial Correlation,0.95,0.95,0.95,0.95
Stormflow Total Nitrogen Mean (log mg/L),0.3,0.34,0.3,0.3
Stormflow Total Nitrogen Standard Deviation (log mg/L),0.19,0.19,0.19,0.19
Stormflow Total Nitrogen Estimation
Method,Stochastic,Stochastic,Stochastic,Stochastic
Stormflow Total Nitrogen Serial Correlation,0.95,0.95,0.95,0.95
Baseflow Total Suspended Solids Mean (log mg/L),1.1,1.2,1.1,1.1
Baseflow Total Suspended Solids Standard Deviation (log
mg/L),0.17,0.17,0.17,0.17
Baseflow Total Suspended Solids Estimation
Method,Stochastic,Stochastic,Stochastic,Stochastic
Baseflow Total Suspended Solids Serial Correlation,0.94,0.94,0.94,0.94
Baseflow Total Phosphorus Mean (log mg/L),-0.82,-0.85,-0.82,-0.82
Baseflow Total Phosphorus Standard Deviation (log mg/L),0,0.31,0,0
Baseflow Total Phosphorus Estimation
Method,Stochastic,Stochastic,Stochastic,Stochastic
Baseflow Total Phosphorus Serial Correlation,0.94,0.94,0.94,0.94
Baseflow Total Nitrogen Mean (log mg/L),0.32,0.11,0.32,0.32
Baseflow Total Nitrogen Standard Deviation (log mg/L),0.12,0.12,0.12,0.12
Baseflow Total Nitrogen Estimation
Method,Stochastic,Stochastic,Stochastic,Stochastic
Baseflow Total Nitrogen Serial Correlation,0.94,0.94,0.94,0.94
Flow based constituent generation - enabled,Off,Off,Off,Off
Flow based constituent generation - flow file, , , ,
Flow based constituent generation - base flow column, , , ,
Flow based constituent generation - pervious flow column, , , ,
Flow based constituent generation - impervious flow column, , , ,
Flow based constituent generation - unit, , , ,
OUT - Mean Annual Flow (ML/yr),0.495,0.267,0.203,0.533
OUT - TSS Mean Annual Load (kg/yr),12.2,93.9,5.47,17.9
OUT - TP Mean Annual Load (kg/yr),76.2E-3,0.136,28.3E-3,84.1E-3
OUT - TN Mean Annual Load (kg/yr),1.21,0.691,0.501,1.09

OUT - Gross Pollutant Mean Annual Load (kg/yr),10.4,5.62,4.28,11.2
Rain In (ML/yr),0.53791,0.289644,0.220681,0.579287
ET Loss (ML/yr),0.042912,0.023106,0.017605,0.046213
Deep Seepage Loss (ML/yr),0,0,0,0
Baseflow Out (ML/yr),0,0,0,0
Imp. Stormflow Out (ML/yr),0.494998,0.266537,0.203076,0.533075
Perv. Stormflow Out (ML/yr),0,0,0,0
Total Stormflow Out (ML/yr),0.494998,0.266537,0.203076,0.533075
Total Outflow (ML/yr),0.494998,0.266537,0.203076,0.533075
Change in Soil Storage (ML/yr),0,0,0,0
TSS Baseflow Out (kg/yr),0,0,0,0
TSS Total Stormflow Out (kg/yr),12.197,93.9051,5.46709,17.8731
TSS Total Outflow (kg/yr),12.197,93.9051,5.46709,17.8731
TP Baseflow Out (kg/yr),0,0,0,0
TP Total Stormflow Out (kg/yr),0.076238,0.135741,0.028304,0.084092
TP Total Outflow (kg/yr),0.076238,0.135741,0.028304,0.084092
TN Baseflow Out (kg/yr),0,0,0,0
TN Total Stormflow Out (kg/yr),1.20696,0.691245,0.500738,1.08823
TN Total Outflow (kg/yr),1.20696,0.691245,0.500738,1.08823
GP Total Outflow (kg/yr),10.4323,5.61742,4.27994,11.2348

No Imported Data Source nodes

USTM treatment nodes

Location,Rainwater Tank 4,Rainwater Tank 2,Bioretention
ID,6,7,8

Node Type,RainWaterTankNode,RainWaterTankNode,BioRetentionNodeV4

Lo-flow bypass rate (cum/sec),0,0,0

Hi-flow bypass rate (cum/sec),100,100,100

Inlet pond volume,0,0,

Area (sqm),2.5,2.5,30

Initial Volume (m³),0,0,

Extended detention depth (m),0.2,0.2,0.3

Number of Rainwater tanks,1,1,

Permanent Pool Volume (cubic metres),5,5,

Proportion vegetated,0,0,

Equivalent Pipe Diameter (mm),75,75,

Overflow weir width (m),10,10,2

Notional Detention Time (hrs),23.7E-3,23.7E-3,

Orifice Discharge Coefficient,0.6,0.6,

Weir Coefficient,1.7,1.7,1.7

Number of CSTR Cells,2,2,3

Total Suspended Solids - k (m/yr),400,400,8000

Total Suspended Solids - C* (mg/L),12,12,20

Total Suspended Solids - C** (mg/L),12,12,

Total Phosphorus - k (m/yr),300,300,6000

Total Phosphorus - C* (mg/L),0.13,0.13,0.13

Total Phosphorus - C** (mg/L),0.13,0.13,

Total Nitrogen - k (m/yr),40,40,500

Total Nitrogen - C* (mg/L),1.4,1.4,1.4

Total Nitrogen - C** (mg/L),1.4,1.4,

Threshold Hydraulic Loading for C** (m/yr),3500,3500,

Horizontal Flow Coefficient, , ,3

Reuse Enabled,On,On,Off

Max drawdown height (m),1.5,1.5,

Annual Demand Enabled,On,On,Off

Annual Demand Value (ML/year),0.03,0.03,

Annual Demand Distribution,PETSubRain,PETSubRain,

Annual Demand Monthly Distribution: Jan, , ,

Annual Demand Monthly Distribution: Feb, , ,

Annual Demand Monthly Distribution: Mar, , ,
Annual Demand Monthly Distribution: Apr, , ,
Annual Demand Monthly Distribution: May, , ,
Annual Demand Monthly Distribution: Jun, , ,
Annual Demand Monthly Distribution: Jul, , ,
Annual Demand Monthly Distribution: Aug, , ,
Annual Demand Monthly Distribution: Sep, , ,
Annual Demand Monthly Distribution: Oct, , ,
Annual Demand Monthly Distribution: Nov, , ,
Annual Demand Monthly Distribution: Dec, , ,
Daily Demand Enabled,On,On,Off
Daily Demand Value (ML/day),0.000177,0.000176,
Custom Demand Enabled,Off,Off,Off
Custom Demand Time Series File, , ,
Custom Demand Time Series Units, , ,
Filter area (sqm), , ,20
Filter perimeter (m), , ,1
Filter depth (m), , ,0.7
Filter Median Particle Diameter (mm), , ,
Saturated Hydraulic Conductivity (mm/hr), , ,200
Infiltration Media Porosity, , ,0.35
Length (m), , ,
Bed slope, , ,
Base Width (m), , ,
Top width (m), , ,
Vegetation height (m), , ,
Vegetation Type, , ,Vegetated with Effective Nutrient Removal Plants
Total Nitrogen Content in Filter (mg/kg), , ,800
Orthophosphate Content in Filter (mg/kg), , ,40
Is Base Lined?, , ,No
Is Underdrain Present?, , ,Yes
Is Submerged Zone Present?, , ,No
Submerged Zone Depth (m), , ,
B for Media Soil Texture,-9999,-9999,13
Proportion of upstream impervious area treated, , ,
Exfiltration Rate (mm/hr),0,0,3.6
Evaporative Loss as % of PET,0,0,100
Depth in metres below the drain pipe, , ,
TSS A Coefficient, , ,
TSS B Coefficient, , ,
TP A Coefficient, , ,
TP B Coefficient, , ,
TN A Coefficient, , ,
TN B Coefficient, , ,
Sfc, , ,0.61
S*, , ,0.37
Sw, , ,0.11
Sh, , ,0.05
Emax (m/day), , ,0.008
Ew (m/day), , ,0.001
IN - Mean Annual Flow (ML/yr),0.495,0.533,1.14
IN - TSS Mean Annual Load (kg/yr),12.2,17.9,117
IN - TP Mean Annual Load (kg/yr),76.2E-3,84.1E-3,0.268
IN - TN Mean Annual Load (kg/yr),1.21,1.09,2.58
IN - Gross Pollutant Mean Annual Load (kg/yr),10.4,11.2,5.62
OUT - Mean Annual Flow (ML/yr),0.418,0.455,1.02
OUT - TSS Mean Annual Load (kg/yr),9.09,14.4,11.5
OUT - TP Mean Annual Load (kg/yr),62.3E-3,70.4E-3,84.8E-3
OUT - TN Mean Annual Load (kg/yr),0.997,0.896,1.06
OUT - Gross Pollutant Mean Annual Load (kg/yr),0.00,0.00,0.00

Flow In (ML/yr),0.494996,0.53308,1.13942
ET Loss (ML/yr),0,0,0.049882
Infiltration Loss (ML/yr),0,0,0.069875
Low Flow Bypass Out (ML/yr),0,0,0
High Flow Bypass Out (ML/yr),0,0,0
Orifice / Filter Out (ML/yr),0.410595,0.444213,0.811086
Weir Out (ML/yr),0.00698567,0.0110625,0.205658
Transfer Function Out (ML/yr),0,0,0
Reuse Supplied (ML/yr),0.0724948,0.0728997,0
Reuse Requested (ML/yr),0.0946146,0.0942338,0
% Reuse Demand Met,76.6212,77.3605,0
% Load Reduction,15.6396,14.5953,10.7661
TSS Flow In (kg/yr),12.197,17.8731,117.394
TSS ET Loss (kg/yr),0,0,0
TSS Infiltration Loss (kg/yr),0,0,0.301838
TSS Low Flow Bypass Out (kg/yr),0,0,0
TSS High Flow Bypass Out (kg/yr),0,0,0
TSS Orifice / Filter Out (kg/yr),8.93598,13.9811,2.14695
TSS Weir Out (kg/yr),0.155115,0.417523,9.39397
TSS Transfer Function Out (kg/yr),0,0,0
TSS Reuse Supplied (kg/yr),0.984761,1.02635,0
TSS Reuse Requested (kg/yr),0,0,0
TSS % Reuse Demand Met,0,0,0
TSS % Load Reduction,25.4645,19.4397,90.1691
TP Flow In (kg/yr),0.0762382,0.084092,0.268407
TP ET Loss (kg/yr),0,0,0
TP Infiltration Loss (kg/yr),0,0,0.004762
TP Low Flow Bypass Out (kg/yr),0,0,0
TP High Flow Bypass Out (kg/yr),0,0,0
TP Orifice / Filter Out (kg/yr),0.0610916,0.0686711,0.051067
TP Weir Out (kg/yr),0.00119868,0.00170449,0.033769
TP Transfer Function Out (kg/yr),0,0,0
TP Reuse Supplied (kg/yr),0.00976308,0.00976795,0
TP Reuse Requested (kg/yr),0,0,0
TP % Reuse Demand Met,0,0,0
TP % Load Reduction,18.2952,16.3112,68.3928
TN Flow In (kg/yr),1.20696,1.08823,2.58433
TN ET Loss (kg/yr),0,0,0
TN Infiltration Loss (kg/yr),0,0,0.052629
TN Low Flow Bypass Out (kg/yr),0,0,0
TN High Flow Bypass Out (kg/yr),0,0,0
TN Orifice / Filter Out (kg/yr),0.981616,0.871942,0.587025
TN Weir Out (kg/yr),0.0150293,0.024497,0.477277
TN Transfer Function Out (kg/yr),0,0,0
TN Reuse Supplied (kg/yr),0.144381,0.138873,0
TN Reuse Requested (kg/yr),0,0,0
TN % Reuse Demand Met,0,0,0
TN % Load Reduction,17.4252,17.6241,58.8171
GP Flow In (kg/yr),10.4323,11.2348,5.61742
GP ET Loss (kg/yr),0,0,0
GP Infiltration Loss (kg/yr),0,0,0
GP Low Flow Bypass Out (kg/yr),0,0,0
GP High Flow Bypass Out (kg/yr),0,0,0
GP Orifice / Filter Out (kg/yr),0,0,0
GP Weir Out (kg/yr),0,0,0
GP Transfer Function Out (kg/yr),0,0,0
GP Reuse Supplied (kg/yr),0,0,0
GP Reuse Requested (kg/yr),0,0,0
GP % Reuse Demand Met,0,0,0
GP % Load Reduction,100,100,100

PET Scaling Factor, , ,2.1

No Generic treatment nodes

Other nodes

Location,OUTLET,Junction

ID,1,9

Node Type,ReceivingNode,JunctionNode

IN - Mean Annual Flow (ML/yr),1.22,0.873

IN - TSS Mean Annual Load (kg/yr),17.0,23.5

IN - TP Mean Annual Load (kg/yr),0.113,0.133

IN - TN Mean Annual Load (kg/yr),1.57,1.89

IN - Gross Pollutant Mean Annual Load (kg/yr),4.28,0.00

OUT - Mean Annual Flow (ML/yr),1.22,0.873

OUT - TSS Mean Annual Load (kg/yr),17.0,23.5

OUT - TP Mean Annual Load (kg/yr),0.113,0.133

OUT - TN Mean Annual Load (kg/yr),1.57,1.89

OUT - Gross Pollutant Mean Annual Load (kg/yr),4.28,0.00

% Load Reduction,18.6,15.1

TSS % Load Reduction,86.9,21.9

TN % Load Reduction,55.1,17.5

TP % Load Reduction,65.1,17.3

GP % Load Reduction,86.4,100

Links

Location,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link

Source node ID,5,2,8,9,4,7,6,3

Target node ID,7,6,1,8,1,9,9,8

Muskingum-Cunge Routing,Not Routed,Not Routed,Not Routed,Not Routed,Not

Routed,Not Routed,Not Routed,Not Routed,Not Routed

Muskingum K, , , , , , , ,

Muskingum theta, , , , , , , ,

IN - Mean Annual Flow (ML/yr),0.533,0.495,1.02,0.873,0.203,0.455,0.418,0.267

IN - TSS Mean Annual Load (kg/yr),17.9,12.2,11.5,23.5,5.47,14.4,9.09,93.9

IN - TP Mean Annual Load

(kg/yr),84.1E-3,76.2E-3,84.8E-3,0.133,28.3E-3,70.4E-3,62.3E-3,0.136

IN - TN Mean Annual Load (kg/yr),1.09,1.21,1.06,1.89,0.501,0.896,0.997,0.691

IN - Gross Pollutant Mean Annual Load

(kg/yr),11.2,10.4,0.00,0.00,4.28,0.00,0.00,5.62

OUT - Mean Annual Flow

(ML/yr),0.533,0.495,1.02,0.873,0.203,0.455,0.418,0.267

OUT - TSS Mean Annual Load (kg/yr),17.9,12.2,11.5,23.5,5.47,14.4,9.09,93.9

OUT - TP Mean Annual Load

(kg/yr),84.1E-3,76.2E-3,84.8E-3,0.133,28.3E-3,70.4E-3,62.3E-3,0.136

OUT - TN Mean Annual Load

(kg/yr),1.09,1.21,1.06,1.89,0.501,0.896,0.997,0.691

OUT - Gross Pollutant Mean Annual Load

(kg/yr),11.2,10.4,0.00,0.00,4.28,0.00,0.00,5.62

Catchment Details

Catchment Name,Lowood_v1

Timestep,6 Minutes

Start Date,1/01/1990

End Date,31/12/1990 11:54:00 PM

Rainfall Station, 40223 BRISBANE

ET Station,Monthly User Defined

Mean Annual Rainfall (mm), 1380

Mean Annual ET (mm), 1537

Appendix 11

Traffic Assessment



LOWOOD STATE HIGH SCHOOL
ADDITIONAL ACCOMMODATION – 2020
TRAFFIC IMPACT ASSESSMENT

FOR

**QUEENSLAND DEPARTMENT OF
EDUCATION AND TRAINING**

BITZIOS
consulting

Gold Coast

Suite 26, 58 Riverwalk Avenue

Robina QLD 4226

P: (07) 5562 5377

W: www.bitziosconsulting.com.au

Brisbane

Level 2, 428 Upper Edward Street

Spring Hill QLD 4000

P: (07) 3831 4442

E: admin@bitziosconsulting.com.au

Sydney

Studio 203, 3 Gladstone Street

Newtown NSW 2042

P: (02) 9557 6202

DOCUMENT CONTROL SHEET

Issue History

| Report File Name | Prepared by | Reviewed by | Issued by | Date | Issued to |
|---------------------------|-------------|-------------|------------|------------|---|
| P3650.001R Lowood SHS TIA | N. Edwards | L. Darragh | N. Edwards | 12/07/2018 | Mariana Pellicciotti at RPS via email Mariana.Pellicciotti@rpsgroup.com.au |

Copyright in the information and data in this document is the property of Bitzios Consulting. This document and its information and data is for the use of the authorised recipient and this document may not be used, copied or reproduced in whole or in part for any purpose other than for which it was supplied by Bitzios Consulting. Bitzios Consulting makes no representation, undertakes no duty and accepts no responsibility to any third party who may use or rely upon this document or its information and data.

CONTENTS

| | Page |
|---|-----------|
| 1. INTRODUCTION | 1 |
| 1.1 BACKGROUND | 1 |
| 1.2 PROPOSED EXPANSION OVERVIEW | 1 |
| 1.3 SCOPE OF ASSESSMENT | 2 |
| 2. SUBJECT SITE CONTEXT | 3 |
| 2.1 TRANSPORT NETWORK OVERVIEW | 3 |
| 2.1.1 Transport Network Planning | 4 |
| 3. EXTERNAL TRANSPORT ARRANGEMENTS | 5 |
| 3.1 STUDENT TRANSPORT – PRIVATE VEHICLE | 5 |
| 3.1.1 Existing Arrangements | 5 |
| 3.1.2 Review | 6 |
| 3.2 STUDENT TRANSPORT – SCHOOL BUSES | 6 |
| 3.2.1 Existing Arrangements | 6 |
| 3.2.2 Review | 7 |
| 3.3 ACTIVE TRANSPORT | 7 |
| 3.3.1 Existing Arrangements | 7 |
| 3.3.2 Review | 8 |
| 3.4 SUMMARY | 9 |
| 4. INTERNAL TRANSPORT ARRANGEMENTS | 11 |
| 4.1 OVERVIEW | 11 |
| 4.2 SITE ACCESS | 11 |
| 4.2.1 Existing Arrangements | 11 |
| 4.2.2 Review | 11 |
| 4.3 CAR PARKING | 12 |
| 4.3.1 Existing Areas | 12 |
| 4.3.2 Review | 12 |
| 4.4 BICYCLE PARKING PROVISION REVIEW | 13 |
| 4.5 SERVICING REVIEW | 13 |
| 5. EXTERNAL TRAFFIC IMPACTS REVIEW | 14 |
| 5.1 STUDY INTERSECTION | 14 |
| 5.2 ASSESSMENT METHODOLOGY | 14 |
| 5.3 ASSESSMENT SCENARIOS | 14 |
| 5.4 BACKGROUND TRAFFIC VOLUMES | 14 |
| 5.5 PROPOSED EXPANSION TRAFFIC VOLUMES | 15 |
| 5.5.1 Generation Rates | 15 |
| 5.5.2 Directional Splits | 15 |
| 5.5.3 Traffic Generation | 15 |
| 5.5.4 External Traffic Distribution | 15 |
| 5.5.5 Assessed Traffic Volumes | 16 |
| 5.6 ANALYSIS RESULTS | 17 |
| 6. CODE RESPONSES | 18 |
| 7. SUMMARY | 19 |

Tables

| | |
|------------|---|
| Table 1.1: | Student Enrolments and Staff – Existing and Proposed |
| Table 2.1: | Key Roads |
| Table 2.2: | Key Intersections |
| Table 3.1: | Public Transport Services |
| Table 4.1: | Car Parking Requirements and Provision |
| Table 4.2: | Bicycle Parking Provision Rate – Austroads GTTM Part 11 |
| Table 5.1: | Traffic Survey Results Summary |
| Table 5.2: | Adopted Background Traffic Growth Rates |
| Table 5.3: | Adopted Trip Generation Rates |
| Table 5.4: | Adopted Directional Split |
| Table 5.5: | Estimated Peak Hour Demands |
| Table 5.6: | Adopted External Traffic Distribution |
| Table 5.7: | SIDRA Results: Intersection 1 |

Figures

| | |
|-------------|---|
| Figure 1.1: | Subject Site Location |
| Figure 2.1: | Existing Road Network |
| Figure 3.1: | Overview – Existing Private Vehicle Set-Down / Pick-Up Arrangements |
| Figure 3.2: | Overview – Existing School Bus Set-Down / Pick-Up Arrangements |
| Figure 3.3: | Overview – Existing Active Transport Considerations |
| Figure 3.4: | Recommended Modifications – Active Transport |
| Figure 4.1: | Existing Site Access Arrangements |
| Figure 4.2: | Existing Car Parking Areas |
| Figure 5.1: | Adopted Traffic Distribution – In |
| Figure 5.2: | Adopted Traffic Distribution – Out |
| Figure 5.3: | Modelled Layout: Intersection 1 |

Appendices

| | |
|-------------|----------------------------|
| Appendix A: | Proposed Development Plans |
| Appendix B: | Swept Path Analysis |
| Appendix C: | Intersection Survey Data |
| Appendix D: | Assessed Traffic Volumes |
| Appendix E: | SIDRA Analysis Outputs |
| Appendix F: | Code Responses |

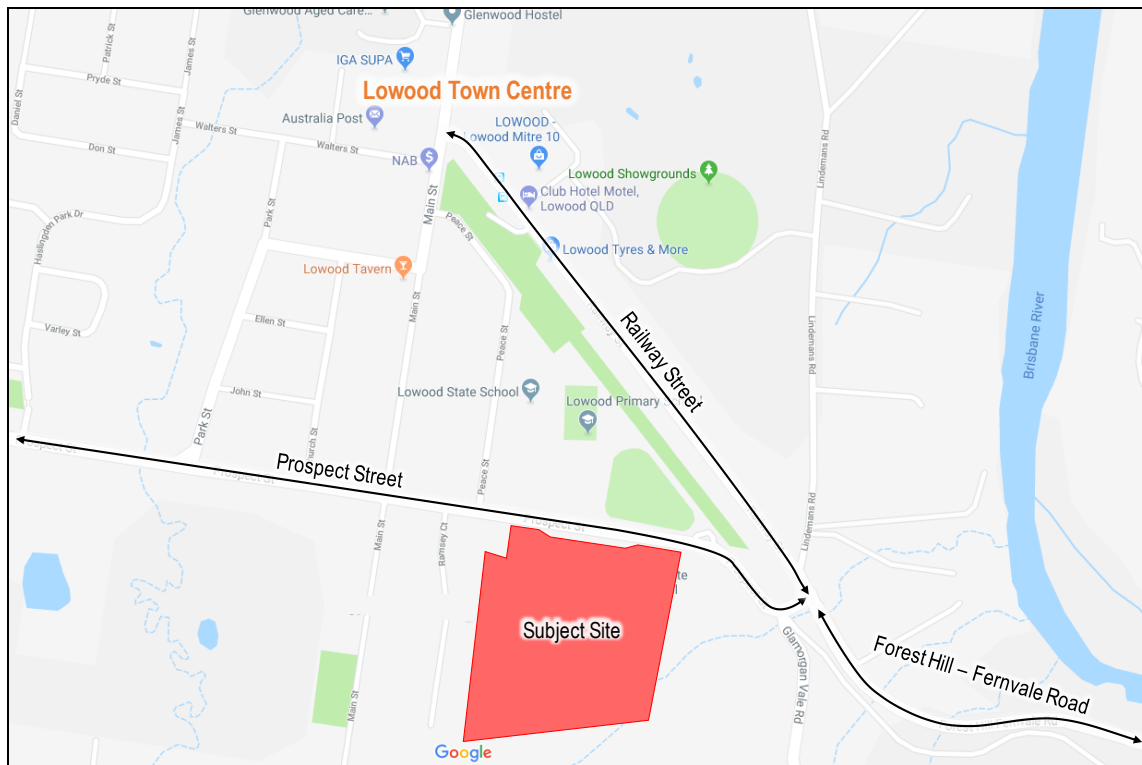
1. INTRODUCTION

1.1 BACKGROUND

Bitzios Consulting has been commissioned by Queensland’s Department of Education and Training (DET) to prepare a traffic impact assessment (TIA) for the ‘proposed expansion’ of the Lowood State High School.

The school is located within the Somerset Regional Council (Council) local government area.

As illustrated in Figure 1.1, the school is located at Prospect Street, Lowood with the subject site being formally described as Lot 89 on CC3323.



SOURCE: Google Maps

Figure 1.1: Subject Site Location

1.2 PROPOSED EXPANSION OVERVIEW

The intent of the expansion is to increase the enrolment capacity of the school to cater for anticipated growth in 2020 associated with six (6) year level cohorts attending secondary school (currently five (5) year level cohorts).

A summary of the existing and proposed number of student enrolments and staff is provided in Table 1.1.

Table 1.1: Student Enrolments and Staff – Existing and Proposed

| Persons | Existing | Proposed | |
|--------------|------------|------------|------------|
| | | Additional | Total |
| Student | 849* | 70 | 919 |
| Staff | 69* | 11 | 80 |
| Total | 918 | 81 | 999 |

*based on existing enrolment capacity

The proposed expansion will require the construction of a new manual arts building including four (4) teaching spaces.

A copy of the proposed development plans is included in **Appendix A**.

Whilst existing traffic and transport matters were considered as part of this assessment, the traffic and transport matters associated with the proposed expansion was our focus. The key tasks we undertook as part of preparing this assessment are outlined in Section 1.3.

1.3 SCOPE OF ASSESSMENT

The scope of this TIA included completing the following key tasks:

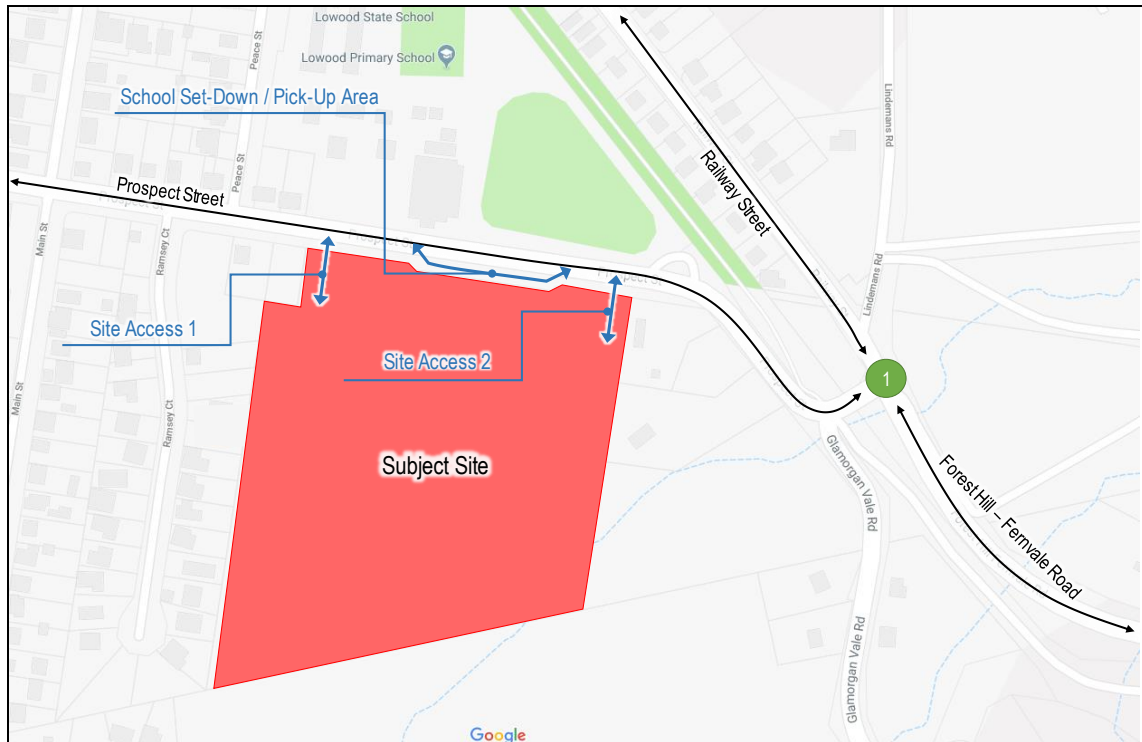
- undertaking a site inspection to gain a better understanding of the transport network surrounding the subject site, observe existing traffic and transport operations, issues etc.;
- reviewing set-down / pick-up arrangements;
- reviewing school bus arrangements;
- reviewing active transport in proximity to the subject site;
- reviewing any modified access arrangements against the requirements of the Somerset Region Planning Scheme (Planning Scheme), Part 8.3.6 Transport, Access and Parking Code (TAP Code) and/or relevant Australian Standards (AS2890);
- reviewing the additional car and bicycle parking spaces required by the TAP Code to support the proposed expansion;
- reviewing modified servicing and refuse collection arrangements including swept paths;
- estimating the proposed expansion's traffic generation and distributing traffic volumes across the external road network; and
- undertaking SIDRA analysis at the Railway Street / Forest Hill – Fernvale Road / Prospect Street intersection and quantifying potential expansion related impacts.

As mentioned above, whilst existing traffic and transport matters were considered as part of this assessment, the traffic and transport matters associated with the proposed expansion was our focus.

2. SUBJECT SITE CONTEXT

2.1 TRANSPORT NETWORK OVERVIEW

Figure 2.1 illustrates the key elements of the existing road network in proximity to the site.



SOURCE: Google Maps

Figure 2.1: Existing Road Network

Table 2.1 provides a summary of the key roads surrounding the site.

Table 2.1: Key Roads

| Road Name | Jurisdiction | Hierarchy | Cross-Section | Speed Limit |
|--|--------------|-----------------|-------------------|----------------------------------|
| Forest Hill – Fernvale Road / Railway Street | TMR* | Arterial Road | 2 lanes undivided | 60km/h |
| Prospect Street | Council | Trunk Collector | 2 lanes undivided | 50km/h (School Zone – 40km/h) |

*The Department of Transport and Main Roads (TMR)

Table 2.2 provides a summary of the key intersections surrounding the site.

Table 2.2: Key Intersections

| ID | Name | Jurisdiction | Control |
|----------------|--|----------------|----------|
| Intersection 1 | Forest Hill – Fernvale Road / Railway Street / Prospect Street | TMR* / Council | Priority |

*The Department of Transport and Main Roads (TMR)

A set-down / pick-up area for the school, predominately used by school buses is located on Prospect Street.

2.1.1 Transport Network Planning

A review of Council's Local Government Infrastructure Plan (LGIP), indicated that Council may be planning to upgrade the Forest Hill–Fernvale Road / Lindemans Road intersection which is located approximately 50m north of Intersection 1.

The Forest Hill–Fernvale Road / Lindemans Road intersection is identified in Council's LGIP, Transport Trunk Infrastructure Map 13, Rev 1.3 as a future trunk, prioritised intersection. However, no upgrades are identified in the corresponding section of the planning scheme i.e. Schedule 3.2, Schedule of works.

In any case it is not expected that upgrades at the Forest Hill–Fernvale Road / Lindemans Road intersection would have a significant, long-term impact on the proposed expansion.

It is also considered important to note that, as outlined in Section 5.6 of this report, SIDRA analysis undertaken at the adjacent intersection i.e. Intersection 1 indicated that:

- the proposed expansion would not significantly impact its operation; and
- it will likely operate with significant spare capacity for some years.

It is therefore considered reasonable to assume that the Forest Hill–Fernvale Road / Lindemans Road intersection will also not be significantly impacted by the proposed expansion and, operate with significant spare capacity for some years.

A review of the Queensland Transport and Roads Investment Program (QTRIP) 2017-18 to 2020-21, published by TMR, indicated that no upgrades are planned for the existing road, active transport or public transport networks adjacent to the site.

3. EXTERNAL TRANSPORT ARRANGEMENTS

3.1 STUDENT TRANSPORT – PRIVATE VEHICLE

3.1.1 Existing Arrangements

Key areas on Prospect Street used by drivers to set-down and pick-up students are identified on Figure 3.1.



SOURCE: Nearmap

Figure 3.1: Overview – Existing Private Vehicle Set-Down / Pick-Up Arrangements

It is again noted that we undertook an inspection of the site during the afternoon school peak period. During our site inspection it was noted that:

- students were predominately picked up from the northern side of Prospect Street (areas 'A' and 'B' illustrated in Figure 3.1). Students used the existing children's crossing located on Prospect Street to cross from the school site which is located on the southern side of Prospect Street;
- some students were picked up from area 'C' however its use was somewhat limited by vehicles that were parked in this area for the afternoon pick-up period; and
- areas 'D' and 'E' were largely used by school buses.

It is expected that areas 'D' and 'E' would be more heavily used to set-down students prior to school noting that:

- student set-down is typically more spread out than pick-up; and
- school bus arrivals are more spread out than departures. Therefore, these areas are unlikely to be fully occupied by buses. It is noted that in the afternoon, school buses queue in these areas prior to school finishing and most depart at 3:10pm, close to the end of the peak afternoon pick-up period which was observed to be around 3:15pm.

3.1.2 Review

We reviewed the additional set-down / pick-up arrangements which are required to support the proposed expansion. TMR's *Planning for Safe Transport Infrastructure at Schools* (PSTIS), 2011 guideline recommends that 20% of the short term (i.e. visitor) parking supply should be provided as set-down / pick-up area. Based on PSTIS requirements, the expansion would require one (1) additional set-down / pick-up parking space.

Noting PSTIS requirements and the issues observed during our site inspection, it is recommended that area 'C' be identified as a loading area on School Days between:

- 8:00am and 9:00am; and
- 2:30pm and 3:30pm.

Outside of these periods, no parking duration restrictions are considered necessary. Area 'C' is approximately 45m long and is therefore expected to accommodate approximately six (6) cars.

3.2 STUDENT TRANSPORT – SCHOOL BUSES

3.2.1 Existing Arrangements

Several school buses currently transport students to and from school. School buses set-down and pick-up students from a loading area on Prospect Street as identified on Figure 3.2.



SOURCE: Nearmap

Figure 3.2: Overview – Existing School Bus Set-Down / Pick-Up Arrangements

An overview of the bus routes which service these stops is provided in Table 3.1.

Table 3.1: Public Transport Services

| Route ID | Servicing | Frequency |
|----------|--|---------------------------------|
| 21 | Fernvale, Dundas | 1 morning and afternoon service |
| 9 | Patrick Estate, Willaura Drive / Gatton Esk Road | 1 morning and afternoon service |
| 17 | Fernvale, Glamorgan Vale, Marburg | 1 morning and afternoon service |
| 18 | Brisbane Valley, Honeywood Estate Fernvale | 1 morning and afternoon service |
| 3 | Blue Gum Drive, Mt Tarampa, Lockyer Waters | 1 morning and afternoon service |
| 1 | Atkinson Dam, Coominya, Clarendon | 1 morning and afternoon service |
| 2 | Eagle Rise, Rifle Range, Clarendon | 1 morning and afternoon service |
| 8 | Tarampa, Prenzlau, Minden | 1 morning and afternoon service |
| 14 | Brightview, Lockrose, Regency Downs | 1 morning and afternoon service |
| 16 | Wivenhoe Pocket, Brookside Estate Fernvale | 1 morning and afternoon service |
| 20 | Fernvale Old Estate | 1 morning and afternoon service |

3.2.2 Review

An inspection of the site and surrounding transport network was undertaken on Thursday 24th May 2018 during the afternoon school peak period.

During our site inspection we observed that many students used existing school bus services. We believe that high patronage indicates that the school is well serviced by the existing services.

It is not anticipated that the expansion will trigger the need for any modifications to existing school bus routes or trigger the need for additional services. However, it is recommended that demands be monitored and if considered warranted, additional routes and/or services be provided.

3.3 ACTIVE TRANSPORT

3.3.1 Existing Arrangements

Given the subject site is located within a semi-rural township, existing active transport provisions are considered reasonable.

Most higher order roads within 800m of the subject site (i.e. 10-minute walking distance) have a concrete footpath on at least one side. There is a children's crossing on Prospect Street in proximity to the main pedestrian access to the subject site.

Key active transport related matters noted during our inspection are summarised below and in Figure 3.3:

- some sections of Prospect Street that are used for student set-down / pick-up are not located adjacent to footpaths; and
- a crossing guard is only stationed at the Prospect Street children's crossing for short periods i.e. around the start and end of school each day. However, students cross Prospect Street throughout the day. It is noted that the school uses the hall which is located on the northern side of Prospect Street, within the Lowood State School site (Lot 92 on CP896415). Whilst it is not as heavily used as the main school site, it is understood that classes, whole of school assemblies, sports etc. are held in the hall.



Figure 3.3: Overview – Existing Active Transport Considerations

3.3.2 Review

We reviewed the existing active transport network arrangements noting the matters outlined in Section 3.3.1 and the expected impacts generated by the proposed expansion.

We also examined whether the existing children's crossing on Prospect Street is appropriate given students need to access the hall located on the northern side of Prospect Street i.e. students need to cross the street throughout the day.

As part of our examination of the existing crossing arrangements we considered factors such as school operations, our on-site observations etc. as well as the recommendations/requirements of the following documents:

- Queensland Manual of Uniform Traffic Control Devices, Part 10: Pedestrian control and protection, TMR, November 2017 (referred to herein as the 'QLD MUTCD, Part 10');
- Supplement, Traffic and Road Use Management Volume 2 – Guide to Road Safety, Part 3: Speed Limits and Speed Management, TMR, May 2017 (referred to herein as the 'TRUM Part 3 Supplement'); and
- Australian Standard, AS1742.10 – 2009, Manual of Uniform Traffic Control Devices, Part 10: Pedestrian control and protection (referred to herein as 'AS1742.10').

It is noted that the abovementioned documents are listed in order of precedent e.g. if QLD MUTCD Part 10 requirements differ to those in AS1742.10, QLD MUTCD Part 10 requirements should be followed.

Based on our review, we identified that a children's crossing is appropriate in this instance.

It is specifically noted that a 'combined children's crossing and pedestrian crossing' (combined crossing) is not recommended in this instance as Section 2.5 of the TRUM Part 3 Supplement identifies that they, 'may be installed at schools where there is substantial pedestrian use, other than school children, during and outside school hours.' In this case we understand the existing crossing is not used by a substantial number of pedestrians (who aren't school children).

Whilst a children's crossing is already provided on Prospect Street, we suggest that the existing arrangements are modified as discussed below:

- although it is not identified as a split campus school, students need to cross the street throughout the day. Therefore, we recommend CHILDREN CROSSING flags (R3-3) should be displayed for the duration of school zone operating time i.e. 9am to 4pm in this case, as required at split campus schools by the TRUM Part 3 Supplement;
- if they can be appropriately lit and, subject to review of potential impacts on vehicle manoeuvring, cyclists etc., install kerb extensions adjacent to the crossing;
- install a pedestrian fence in front of the path that connects from Prospect Street to the school's administration building to encourage pedestrians to use the children's crossing;
- replace the existing W6-3 signs on approach to the crossing with new W6-3 signs which include an orange border; and
- mark 'SCHOOL X' on the road pavement adjacent to the W6-3 and W8-22 signs that are located on the eastern side of the crossing, as the signs are blocked by school buses setting down and picking up students.

In addition, we recommend that where not already provided, 1.5m wide footpaths are constructed on Prospect Street adjacent to set-down / pick-up areas.

The above recommendations are also illustrated on Figure 3.4 overleaf for ease of reference.

It is important to note that these changes are recommended primarily to address existing issues i.e. we do not believe that the proposed expansion solely necessitates crossing modifications and the construction of additional footpaths.

3.4 SUMMARY

In summary, based on our review of transport arrangements external to the site it is recommended that:

- a loading area be provided on the southern side of Prospect Street, in proximity to the school administration pedestrian entry;
- although it is not anticipated that the expansion will trigger the need for any modifications to existing school bus routes services, demands should be monitored and if considered warranted, additional routes and/or services be investigated;
- where no footpath is currently provided, construct 1.5m wide footpaths on Prospect Street adjacent to student set-down / pick-up areas; and
- the existing children's crossing on Prospect Street is maintained however some modifications are made to existing arrangements.

It is also important to again note that the majority of the changes identified above are recommended primarily to address existing issues i.e. we do not believe that the proposed expansion solely necessitates crossing modifications and the construction of additional footpaths.



SOURCE: Nearmap

Figure 3.4: Recommended Modifications – Active Transport

4. INTERNAL TRANSPORT ARRANGEMENTS

4.1 OVERVIEW

As part of the proposed expansion, a new building is proposed to be constructed to the west of Building R.

It is important to note that whilst the construction of the new building will require the demolition of an existing tennis court; the existing vehicular accesses, car parks, servicing areas and vehicle manoeuvring areas will not be affected.

A review of the internal transport infrastructure arrangements considering the proposed development was undertaken is detailed herein.

4.2 SITE ACCESS

4.2.1 Existing Arrangements

Existing site access arrangements are illustrated on Figure 4.1.



SOURCE: Nearmap

Figure 4.1: Existing Site Access Arrangements

4.2.2 Review

As outlined in Section 4.5 below, 9m medium rigid vehicles (MRVs) are expected to service the new manual arts building proposed as part of the expansion. The vehicles will access the site via the western driveway.

A review of the existing western driveway configuration does not comply with Planning Scheme, 'Schedule 6 Planning Scheme Policies, SC6.5.10 Roadworks Design Standards' (Roadworks Design Standards Schedule) requirements for driveways supporting commercial/service vehicle access.

The Roadworks Design Standards Schedule requires that driveways providing commercial/service vehicle access be configured in accordance with Council standard drawing SRC-ROAD-013. To accommodate MRVs, the width (W) of the driveway should be 6.5m.

It recommended that the western driveway is upgraded accordingly.

4.3 CAR PARKING

4.3.1 Existing Areas

Car parking is provided on the east and west sides of the subject site as illustrated in Figure 4.2.



SOURCE: Nearmap

Figure 4.2: Existing Car Parking Areas

As illustrated above, some car parking areas are sealed whilst others are unsealed. It is recommended that consideration be given to sealing/formalising all existing car parking areas noting that:

- they are regularly used by staff;
- additional residential dwellings are likely to be constructed on land surrounding the subject site, increasing the likelihood that the use of car parking areas will impact resident amenity.

It is important to note that the proposed expansion does not affect the existing car park areas.

4.3.2 Review

The car parking provision required to support the expansion has been identified noting the requirements of Council's TAP Code.

The car parking provision rate required by the TAP Code is identified in Table 4.1.

Table 4.1: Car Parking Requirements and Provision

| Land Use | Required Provision Rate | Yield | Required Spaces |
|-------------------------|-------------------------|----------|-----------------|
| Education Establishment | 1 space per 2 staff | 11 staff | 6 spaces |

Our review suggests that six (6) car parking spaces are required by the TAP Code for the proposed expansion. It is recommended that these spaces are provided on-site to accommodate additional demand associated with the expansion.

New car parking spaces and associated car parking areas should be configured in accordance with TAP Code, AS2890.1, AS2890.2 and/or AS2890.6 requirements.

4.4 BICYCLE PARKING PROVISION REVIEW

The bicycle parking provision required to support the expansion has been identified noting the requirements of Council’s TAP Code.

The TAP Code indicates that bicycle parking is to be provided in accordance with AS2890.3 and Austroads, Guide to Traffic Management Part 11: Parking (GTTM Part 11).

The bicycle parking provision rate required by Austroads GTTM Part 11 is identified in Table 4.2.

Table 4.2: Bicycle Parking Provision Rate – Austroads GTTM Part 11

| Land Use | Required Provision Rate | Yield | Required Spaces |
|---|--------------------------|---------------|------------------|
| Education Establishment (Over Grade 4) | 1 space per 5 enrolments | 70 enrolments | 14 spaces |

Our review suggests that 14 bicycle parking spaces are required by Austroads GTTM Part 11 for the proposed expansion. It is recommended that these spaces are provided on-site to accommodate additional demand associated with the expansion.

New bicycle parking spaces should be configured in accordance with Austroads GTTM Part 11.

4.5 SERVICING REVIEW

Existing servicing arrangements will be largely unaffected by the proposed expansion.

It is expected that the only changes to servicing arrangements will be those associated with the new manual arts building (to be constructed to support the expansion). A review of the proposed manual arts building servicing arrangements was therefore undertaken.

DET indicated that the largest vehicles that service the existing manual arts building are 9m medium rigid vehicles (MRVs).

Swept path analysis based on a 9m MRV was completed and indicated that this type of vehicle should be able to acceptably access the proposed loading area. Furthermore, it is expected that MRVs will be able to enter and exit the site in forward gear. A copy of the swept path analysis completed is included in **Appendix B**.

We also undertook a preliminary review of the proposed servicing area layout noting the requirements of the relevant Australian Standard, AS2890.2. Our preliminary review indicated that:

- the layout complies with AS2890.2 requirements;
- however, at the time of our review limited site survey information was available.

We therefore recommend that the layout is reviewed once additional survey information becomes available.

Whilst our review indicated that the proposed servicing area layout is likely to be appropriate, the condition / standard of the existing driveway which leads from Prospect Street to the proposed loading area is not considered ideal. Large sections of the driveway are unsealed, and some sections are also quite narrow i.e. insufficient to allow two-way traffic flow.

Although general traffic and servicing demands are likely to be relatively low / not significantly increase as part of the expansion, it is recommended that consideration be given to sealing and / or improving the existing driveway standard.

5. EXTERNAL TRAFFIC IMPACTS REVIEW

5.1 STUDY INTERSECTION

Operational (SIDRA) analysis has been undertaken at the Forest Hill–Fernvale Road / Railway Street / Prospect Street intersection (Intersection 1) to determine the potential impact of development related traffic.

5.2 ASSESSMENT METHODOLOGY

Our traffic analysis has been undertaken generally in accordance with the Guide to Traffic Impact Assessment (GTIA), TMR 2017.

The key intersection performance threshold identified in the GTIA is intersection delay. The GTIA requires mitigation measures to be implemented if average intersection delays increase by more than 5% due to the addition of development traffic.

5.3 ASSESSMENT SCENARIOS

This report considers potential development related traffic impacts during the following years:

- 2018 base year (when traffic survey data was captured); and
- 2020 future year (assumed 'Year of Opening' for the proposed expansion).

5.4 BACKGROUND TRAFFIC VOLUMES

To establish baseline traffic volumes, surveys were undertaken at Intersection 1. The survey results are summarised in Table 5.1.

Table 5.1: Traffic Survey Results Summary

| Day & Date | AM School Peak Period | | PM School Peak Period | |
|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | Time | Total Traffic Volumes | Time | Total Traffic Volumes |
| Thursday 24 May 2018 | 8:00am to 9:00am | 523 trips | 3:00pm to 4:00pm | 565 trips |

A copy of the raw survey data is provided at **Appendix C**.

Future year background traffic volumes were estimated based on applying growth rates to surveyed traffic volumes.

The traffic growth rates applied were identified based on a review of TMR traffic census data recorded at site 32101 (600m W of Slip Gully Td 32.78) which is located on Forest Hill-Fernvale Road.

The census data indicated that Forest Hill-Fernvale Road traffic volumes grew at approximately 2.2% p.a. (linear) between 2011 and 2015. It is expected that traffic volumes are likely to grow at a similar rate through to 2020 i.e. the development year of opening.

To produce a conservative assessment, we adopted a higher growth rate than that identified based on our review of historical data.

As identified in Table 5.2, we adopted a higher background traffic growth rate than historically recorded. We believe this will likely result in our analysis being conservative.

Table 5.2: Adopted Background Traffic Growth Rates

| Road | Growth Rate |
|--|-------------|
| Forest Hill – Fernvale Road / Railway Street | 2.5% p.a. |
| Prospect Street | 2.5% p.a. |

5.5 PROPOSED EXPANSION TRAFFIC VOLUMES

5.5.1 Generation Rates

Table 5.3 provides a summary of the trip generation rates we adopted in our assessment.

Table 5.3: Adopted Trip Generation Rates

| Land Use | AM Peak | PM Peak | Unit | Source |
|-------------|---------|---------|-------------------|---|
| High School | 0.72 | 0.42 | trips / enrolment | GTA Sydney School Traffic Generation Report |

5.5.2 Directional Splits

Table 5.4 provides a summary of the adopted directional distribution splits, sourced from the GTA Sydney School Traffic Generation Report.

Table 5.4: Adopted Directional Split

| Land Use | AM Peak | | | PM Peak | | |
|-------------|---------|-----|-------|---------|-----|-------|
| | In | Out | Total | In | Out | Total |
| High School | 60% | 40% | 100% | 40% | 60% | 100% |

5.5.3 Traffic Generation

Table 5.5 provides a summary of the estimated peak hour demands for the proposed development.

Table 5.5: Estimated Peak Hour Demands

| Land Use | AM Peak (trips) | | | PM Peak (trips) | | |
|-------------|-----------------|-----|-------|-----------------|-----|-------|
| | In | Out | Total | In | Out | Total |
| High School | 30 | 20 | 50 | 12 | 18 | 29 |

5.5.4 External Traffic Distribution

The adopted external traffic distribution was identified based on a review of the traffic surveys results and on-site observations.

The external traffic distribution adopted is summarised in Table 5.6.

Table 5.6: Adopted External Traffic Distribution

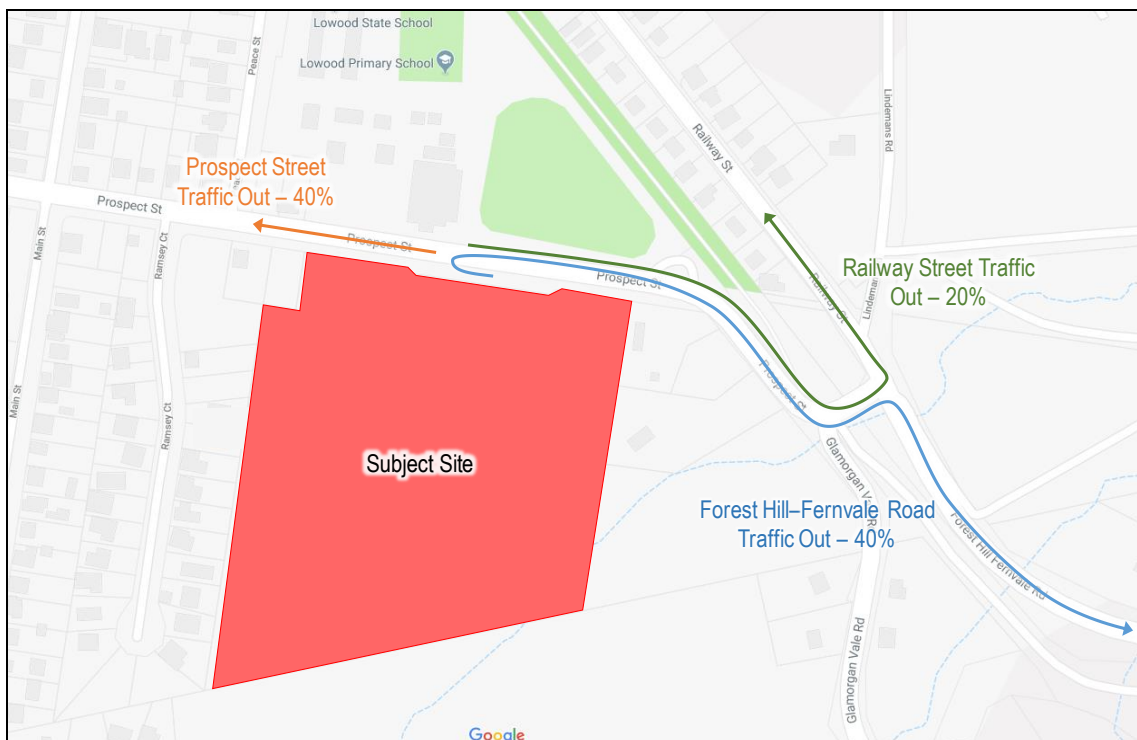
| Direction | Via | Proportion of Trips In to the Development | Proportion of Trips Out of the Development |
|--------------|-----------------------------|---|--|
| North | Railway Street | 40% | 20% |
| South | Forest Hill – Fernvale Road | 40% | 40% |
| West | Prospect Street | 20% | 40% |
| Total | - | 100% | 100% |

The distribution arrangements applied to 'in' and 'out' traffic volumes are illustrated on Figure 5.1 and Figure 5.2 respectively.



SOURCE: Google Maps | NOTE: Indicative only

Figure 5.1: Adopted Traffic Distribution – In



SOURCE: Google Maps | NOTE: Indicative only e.g. it is not expected that drivers that want to travel south on Forest Hill-Fernvale Road would necessarily perform a U-turn from the set-down / pick-up area in front of the subject site.

Figure 5.2: Adopted Traffic Distribution – Out

5.5.5 Assessed Traffic Volumes

The assessed traffic volumes are based on the above assumptions and included in **Appendix D**.

5.6 ANALYSIS RESULTS

The layout of Intersection 1 as modelled in SIDRA is illustrated in Figure 5.3.

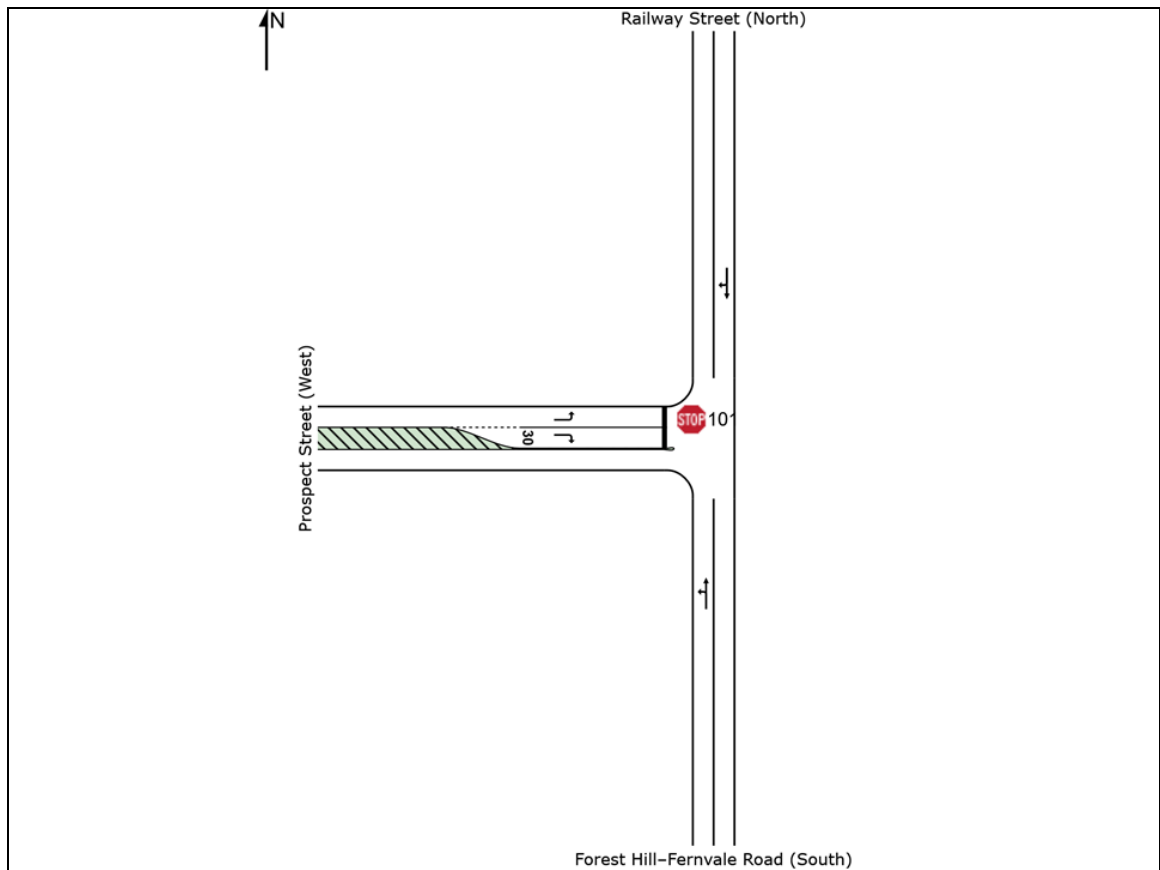


Figure 5.3: Modelled Layout: Intersection 1

The SIDRA results are summarised in Table 5.7 with detailed outputs provided at **Appendix E**.

Table 5.7: SIDRA Results: Intersection 1

| Year | Peak | Scenario | Degree of Saturation (DOS) | Average Delay (s) | Level of Service | 95 th Percentile Queue Length (m) |
|------|------|----------------|----------------------------|-------------------|------------------|--|
| 2018 | AM | Survey | 0.14 | 4.5 | A | 4 |
| | PM | | 0.14 | 4.2 | A | 3 |
| 2020 | AM | Background | 0.15 | 4.5 | A | 4 |
| | PM | | 0.15 | 4.2 | A | 3 |
| 2020 | AM | With Expansion | 0.16 | 4.7 | A | 4 |
| | PM | | 0.15 | 4.3 | A | 4 |

Green = operating below the practical operating capacity for a priority-controlled intersection (DOS < 0.80)

The above results suggest that average delays at the intersection may increase by approximately 4% due to the proposed expansion. As delays are expected to increase by less than 5% (and considering this represents less than 1 second of delay), in accordance with GTIA requirements, no intersection mitigation works are required to offset the impacts associated with the expansion.

In any case it is worth noting that the results indicate that:

- drivers traversing the intersection experience minimal delays; and
- the intersection operates well below the practical operating capacity for priority-controlled intersections (DOS < 0.80), regardless of the expansion.

6. CODE RESPONSES

The new or modified traffic arrangements proposed as part of the expansion have been reviewed against the requirements of the following codes:

- State Development Assessment Provisions (SDAP), State code 1: Development in a state-controlled road environment; and
- SDAP, State code 6: Protection of state transport networks.

A copy of our responses to each of the performance outcomes identified in the codes is included in **Appendix F**.

7. SUMMARY

Key findings of this TIA are summarised below:

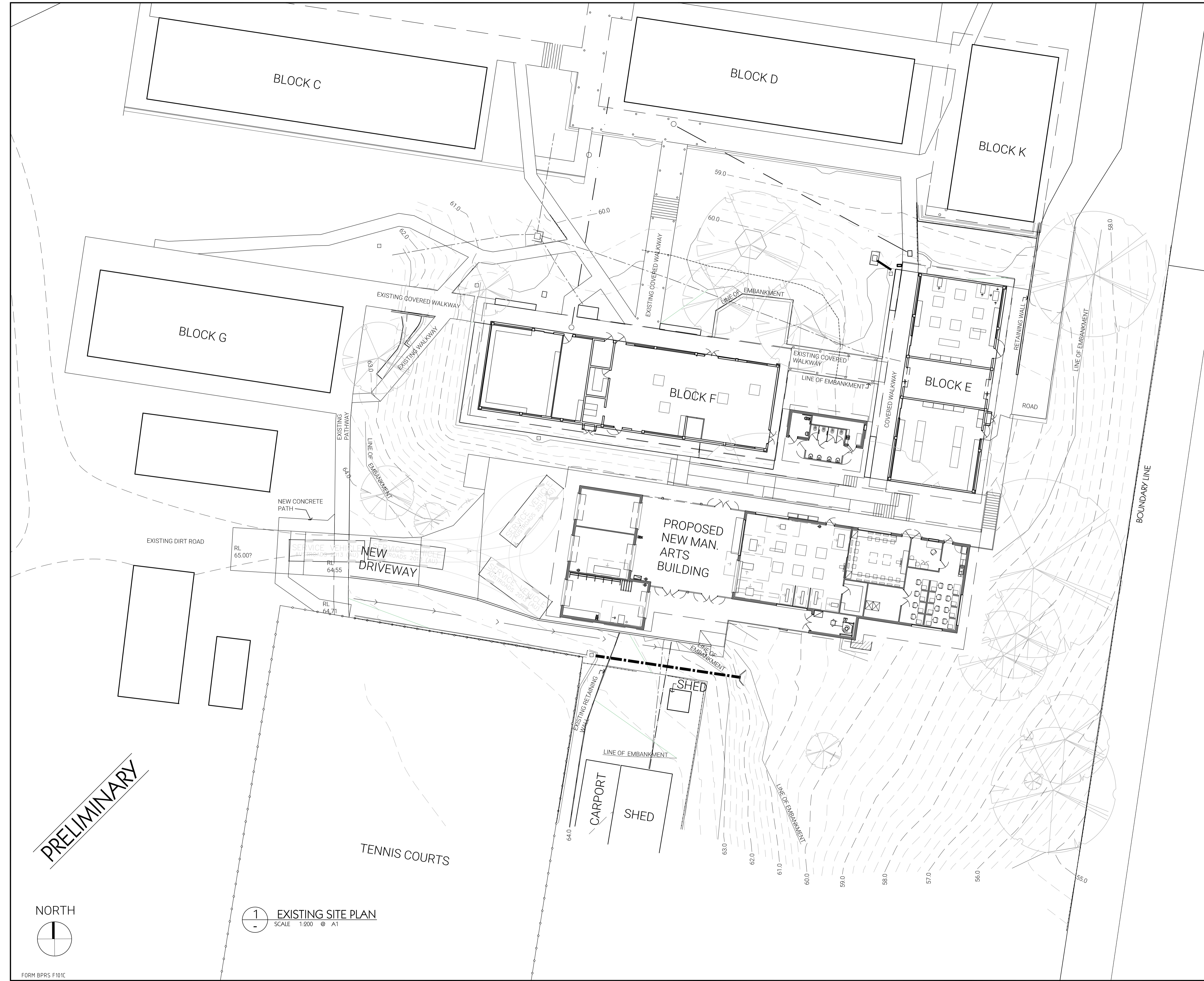
In summary, based on our review of transport arrangements external to the site it is recommended that:

- a loading area be provided on the southern side of Prospect Street, in proximity to the school administration pedestrian entry (refer Section 3.1);
- although it is not anticipated that the expansion will trigger the need for any modifications to existing school bus routes services, demands should be monitored and if considered warranted, additional routes and/or services be investigated (refer Section 3.2);
- where no footpath is currently provided, construct 1.5m wide footpaths on Prospect Street adjacent to student set-down / pick-up areas (refer Section 3.3);
- the existing children's crossing on Prospect Street is maintained however some modifications are made to existing arrangements (refer Section 3.3);
- the existing western driveway be replaced with a 6.5m wide driveway, in accordance with standard drawing SRC-ROAD-013;
- it is recommended that six (6) car parking spaces are provided to support the expansion, as required by Somerset Region Planning Scheme (Planning Scheme), Part 8.3.6 Transport, Access and Parking Code (TAP Code);
- it is recommended that 14 bicycle parking spaces are provided to support the expansion, as required by the TAP Code (AS2890.3 and Austroads, Guide to Traffic Management Part 11: Parking); and
- the development is not expected to significantly impact the operation of the surrounding road network including the Forest Hill – Fernvale Road / Railway Street / Prospect Street intersection.

Importantly, most of external active transport related changes we have recommended primarily address existing issues e.g. we do not believe that the proposed expansion solely necessitates crossing modifications and the construction of additional footpaths.

APPENDIX A

PROPOSED DEVELOPMENT PLANS



BARCODE

GENERAL NOTES

- IF IN DOUBT, JUST ASK.
- USE FIGURED DIMENSIONS, DO NOT SCALE FROM DRAWINGS.
- CONFIRM ALL RELEVANT DIMENSIONS, LEVELS AND DETAILS ON SITE PRIOR TO COMMENCEMENT OF ALL WORK. CONFIRM SETBACKS TO ALL ALIGNMENTS.
- THESE ARCHITECTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ENGINEERING AND OTHER CONSULTANT'S DRAWINGS AND SPECIFICATIONS. ANY DISCREPANCIES SHALL BE REFERRED TO THE ARCHITECT FOR DISCUSSION BEFORE PROCEEDING WITH THE WORK.
- DESIGN AND CONSTRUCTION TO COMPLY WITH CURRENT STANDARD BUILDING BY-LAWS, BUILDING ACT, BUILDING AMENDMENT ACT, BUILDING AND OTHER LEGISLATION AMENDMENT ACT, QUEENSLAND DEVELOPMENT CODE, BUILDING CODE OF AUSTRALIA, CURRENT AUSTRALIAN STANDARDS, STATUTORY REQUIREMENTS, ORDINANCES, LOCAL GOVERNMENT REQUIREMENTS, RELEVANT BUILDING AUTHORITIES AND ALL CONTRACT DOCUMENTATION.
- CARRY OUT WORK IN A SAFE MANNER IN ACCORDANCE WITH APPLICABLE STATUTORY REGULATIONS, BY-LAWS OR RULES. COMPLY WITH RELEVANT STATE OCCUPATIONAL HEALTH AND SAFETY ACTS INCLUDING ASSOCIATED REGULATIONS AND CODES OF PRACTICE. CONTRACTOR IS RESPONSIBLE FOR OCCUPATIONAL HEALTH AND SAFETY OF SITE PERSONNEL AND GENERAL PUBLIC IN ACCORDANCE WITH LEGISLATIVE REQUIREMENTS, INDUSTRIAL AGREEMENTS AND ACCEPTED INDUSTRY PRACTICE.
- THESE CONSTRUCTION TO COMPLY WITH AS1720 DOMESTIC TIMBER CONSTRUCTION IN NON-CYCLONE LOCATIONS SHALL BE IN ACCORDANCE WITH AS3684.
- ALL BRICKWORK AND BLOCKWORK SHALL BE IN ACCORDANCE WITH AS3700.
- ALL PROPRIETARY PRODUCTS AND SYSTEMS TO BE INSTALLED TO MANUFACTURER'S SPECIFICATION AND INSTRUCTIONS.
- THESE DRAWINGS ARE THE COPYRIGHT OF AN ARCHITECTURE PTY LTD AND MAY NOT BE USED, REPRODUCED OR REPRODUCED WITHOUT WRITTEN AUTHORITY.
- AS-BUILT INDICATES WORKS THAT ARE GENERALLY IN ACCORDANCE WITH THE ARCHITECTURAL DOCUMENTATION AT PROJECT COMPLETION AND EXCLUDES CONCEALED WORKS THAT WERE NOT SPECIFICALLY INSPECTED.

DIMENSIONS

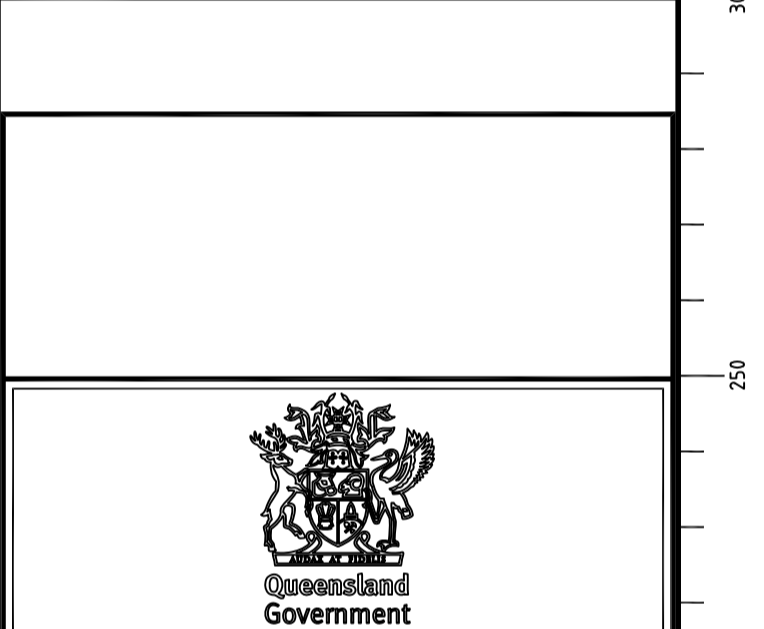
Use figured dimensions, DO NOT SCALE.

Check all dimensions & levels on site before fabrication or set out.

AMENDMENTS

| ISSUE | DATE | SUBJECT | AUTH | CHK |
|-------|----------|------------------|------|-----|
| A | 17.04.18 | PRELIMINARY | JH | |
| B | 01.05.18 | PRELIMINARY | JH | |
| C | 11.05.18 | PRELIM ARCH SDPP | JH | |
| D | 04.06.18 | AMENDMENTS | JH | |

- DRAWINGS INDEXING SYSTEM**
FOR PROJECT SERVICES, PLANS AND RECORDS USE ONLY
- CEILING PLANS
 - CONSTRUCTION DETAILS
 - ELEVATIONS
 - EXTERNAL WORKS
 - FITTINGS
 - FLOOR PLAN
 - FURNITURE & EQUIPMENT
 - HYDRAULICS
 - MASTER PLAN
 - MISCELLANEOUS DETAILS
 - OTHER
 - PLAY STRUCTURES
 - ROOF PLAN
 - SECTIONS
 - SETOUT PLAN
 - SITE PLAN
 - STANDARDS



CLIENT
Department of Education and Training
© The State of Queensland 2005

8i Architects
Suite 24, 200 Moggill Road,
Taringa, Qld, 4068
ph: (07) 3217 7100
web: www.8i.net.au
ABN 76 793 485 967

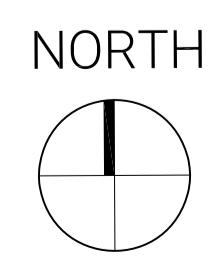
| | |
|------------------------|------------|
| SL | March 2018 |
| DRAWN | DATE |
| HN | March 2018 |
| DISCIPLINE TEAM LEADER | DATE |
| AUTHORISED FOR ISSUE | DATE |

LOWOOD STATE HIGH SCHOOL
34 PROSPECT STREET,
LOWOOD, QLD 4311

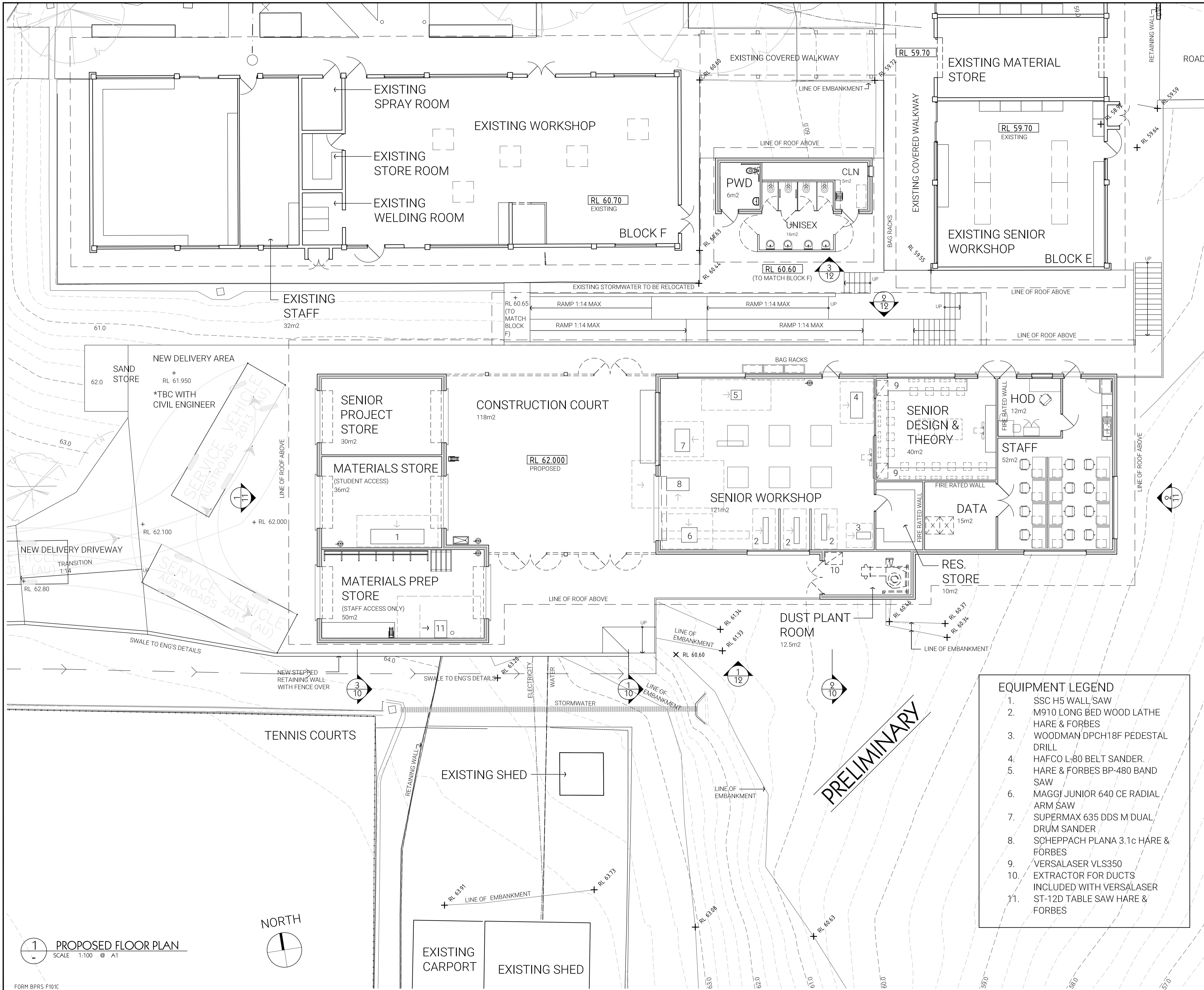
SITE PLAN
MANUAL ARTS

| | | | |
|--------------------|-------------|-------------------------|-------|
| SCALE | 1:200 | AT | A1 |
| MASTER SITE NUMBER | 00000 | CLIENT REFERENCE NUMBER | XXXXX |
| DRAWING NUMBER | 1806 / SK03 | ISSUE | D |
| | | SHEET NO | - |

PRELIMINARY



1 EXISTING SITE PLAN
SCALE 1:200 @ A1



GENERAL NOTES

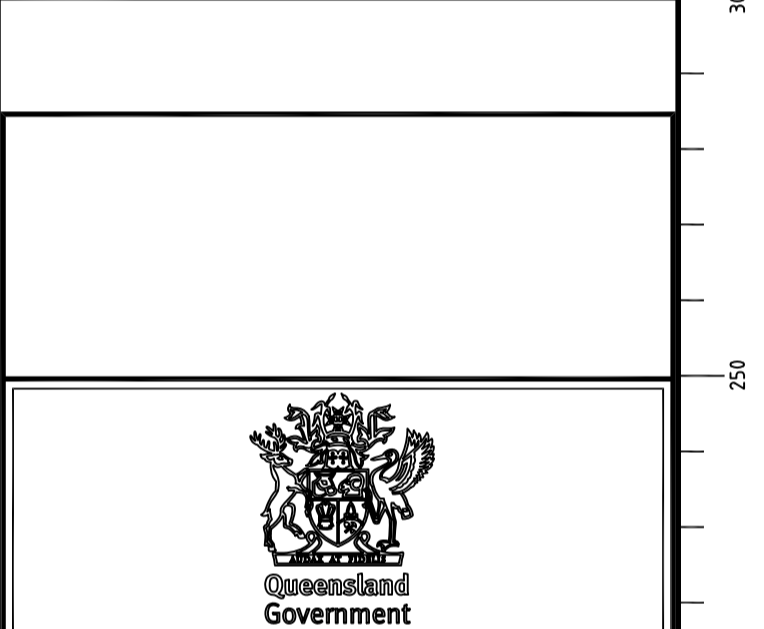
- IF IN DOUBT, JUST ASK.
- USE FIGURED DIMENSIONS, DO NOT SCALE FROM DRAWINGS.
- CONFIRM ALL RELEVANT DIMENSIONS, LEVELS AND DETAILS ON SITE PRIOR TO COMMENCEMENT OF ALL WORK. CONFIRM SETBACKS TO ALL ALIGNMENTS.
- THESE ARCHITECTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ENGINEERING AND OTHER CONSULTANT'S DRAWINGS AND SPECIFICATIONS. ANY DISCREPANCIES SHALL BE REFERRED TO THE ARCHITECT FOR DISCUSSION BEFORE PROCEEDING WITH THE WORK.
- DESIGN AND CONSTRUCTION TO COMPLY WITH CURRENT STANDARD BUILDING BY-LAWS, BUILDING ACT, BUILDING AMENDMENT ACT, BUILDING AND OTHER LEGISLATION AMENDMENT ACT, QUEENSLAND DEVELOPMENT CODE, BUILDING CODE OF AUSTRALIA, CURRENT AUSTRALIAN STANDARDS, STATUTORY REQUIREMENTS, ORDINANCES, LOCAL GOVERNMENT REQUIREMENTS, RELEVANT BUILDING AUTHORITIES AND ALL CONTRACT DOCUMENTATION.
- CARRY OUT WORK IN A SAFE MANNER IN ACCORDANCE WITH APPLICABLE STATUTORY REGULATIONS, BY-LAWS OR RULES. COMPLY WITH RELEVANT STATE OCCUPATIONAL HEALTH AND SAFETY ACTS INCLUDING ASSOCIATED REGULATIONS AND CODES OF PRACTICE. CONTRACTOR IS RESPONSIBLE FOR OCCUPATIONAL HEALTH AND SAFETY OF SITE PERSONNEL AND GENERAL PUBLIC IN ACCORDANCE WITH LEGISLATIVE REQUIREMENTS, INDUSTRIAL AGREEMENTS AND ACCEPTED INDUSTRY PRACTICE.
- TIMBER CONSTRUCTION TO COMPLY WITH AS1720 DOMESTIC TIMBER CONSTRUCTION IN NON-CYCLONIC LOCATIONS SHALL BE IN ACCORDANCE WITH AS1884.
- ALL BRICKWORK AND BLOCKWORK SHALL BE IN ACCORDANCE WITH AS3700.
- ALL PROPRIETARY PRODUCTS AND SYSTEMS TO BE INSTALLED TO MANUFACTURER'S SPECIFICATION AND INSTRUCTIONS.
- THESE DRAWINGS ARE THE COPYRIGHT OF 8i ARCHITECTURE PTY LTD AND MAY NOT BE USED, REPRODUCED OR REPRODUCED WITHOUT WRITTEN AUTHORITY.
- AS-BUILT INDICATES WORKS THAT ARE GENERALLY IN ACCORDANCE WITH THE ARCHITECTURAL DOCUMENTATION AT PROJECT COMPLETION AND EXCLUDES CONCEALED WORKS THAT WERE NOT SPECIFICALLY INSPECTED.

DIMENSIONS
Use figured dimensions, DO NOT SCALE.
Check all dimensions & levels on site before fabrication or set out.

AMENDMENTS

| ISSUE | DATE | SUBJECT | AUTH | CHK |
|-------|----------|--------------------------|------|-----|
| A | 17.04.18 | PRELIMINARY | JH | |
| B | 01.05.18 | PRELIMINARY | JH | |
| C | 11.05.18 | PRELIM ARCH SDPP | JH | |
| D | 14.05.18 | REVISED EQUIPMENT LAYOUT | HN | |
| E | 23.05.18 | REVISED EQUIPMENT LAYOUT | HN | |
| F | 25.05.18 | REVISED EQUIPMENT LAYOUT | HN | |
| G | 29.05.18 | ADDED EQUIPMENT | HN | |
| H | 04.06.18 | AMENDMENT | HN | |

- DRAWINGS INDEXING SYSTEM FOR PROJECT SERVICES, PLANS AND RECORDS USE ONLY**
- CEILING PLANS
 - CONSTRUCTION DETAILS
 - ELEVATIONS
 - EXTERNAL WORKS
 - FITTINGS
 - FLOOR PLAN
 - FURNITURE & EQUIPMENT
 - HYDRAULICS
 - MASTER PLAN
 - MISCELLANEOUS DETAILS
 - OTHER
 - PLAY STRUCTURES
 - ROOF PLAN
 - SECTIONS
 - SETOUT PLAN
 - SITE PLAN
 - STANDARDS



CLIENT
Department of Education and Training
© The State of Queensland 2005

8i Architects
Suite 24, 200 Moggill Road,
Taringa, Qld, 4068
ph: (07) 3217 7100
web: www.8i.net.au
ABN 76 793 485 967

| | | | |
|------------------------|----|------|------------|
| DRAWN | SL | DATE | March 2018 |
| DISCIPLINE TEAM LEADER | HN | DATE | March 2018 |
| AUTHORISED FOR ISSUE | | DATE | |

LOWOOD STATE HIGH SCHOOL
34 PROSPECT STREET,
LOWOOD, QLD 4311

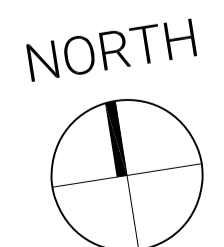
FLOOR PLAN
MANUAL ARTS EXTENSION

| | | | |
|--------------------|-------------|-------------------------|-------|
| SCALE | 1:100 | AT | A1 |
| MASTER SITE NUMBER | 00000 | CLIENT REFERENCE NUMBER | XXXXX |
| DRAWING NUMBER | 1806 / SK04 | ISSUE | H |
| | | SHEET NO | - |

- EQUIPMENT LEGEND**
- SSC H5 WALL SAW
 - M910 LONG BED WOOD LATHE HARE & FORBES
 - WOODMAN DPCH18F PEDESTAL DRILL
 - HAFCO L-80 BELT SANDER.
 - HARE & FORBES BP-480 BAND SAW
 - MAGGI JUNIOR 640 CE RADIAL ARM SAW
 - SUPERMAX 635 DDS M DUAL DRUM SANDER
 - SCHEPPACH PLANA 3.1c HARE & FORBES
 - VERSALASER VLS350
 - EXTRACTOR FOR DUCTS INCLUDED WITH VERSALASER
 - ST-12D TABLE SAW HARE & FORBES

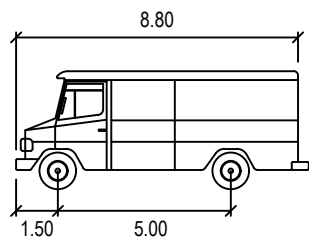
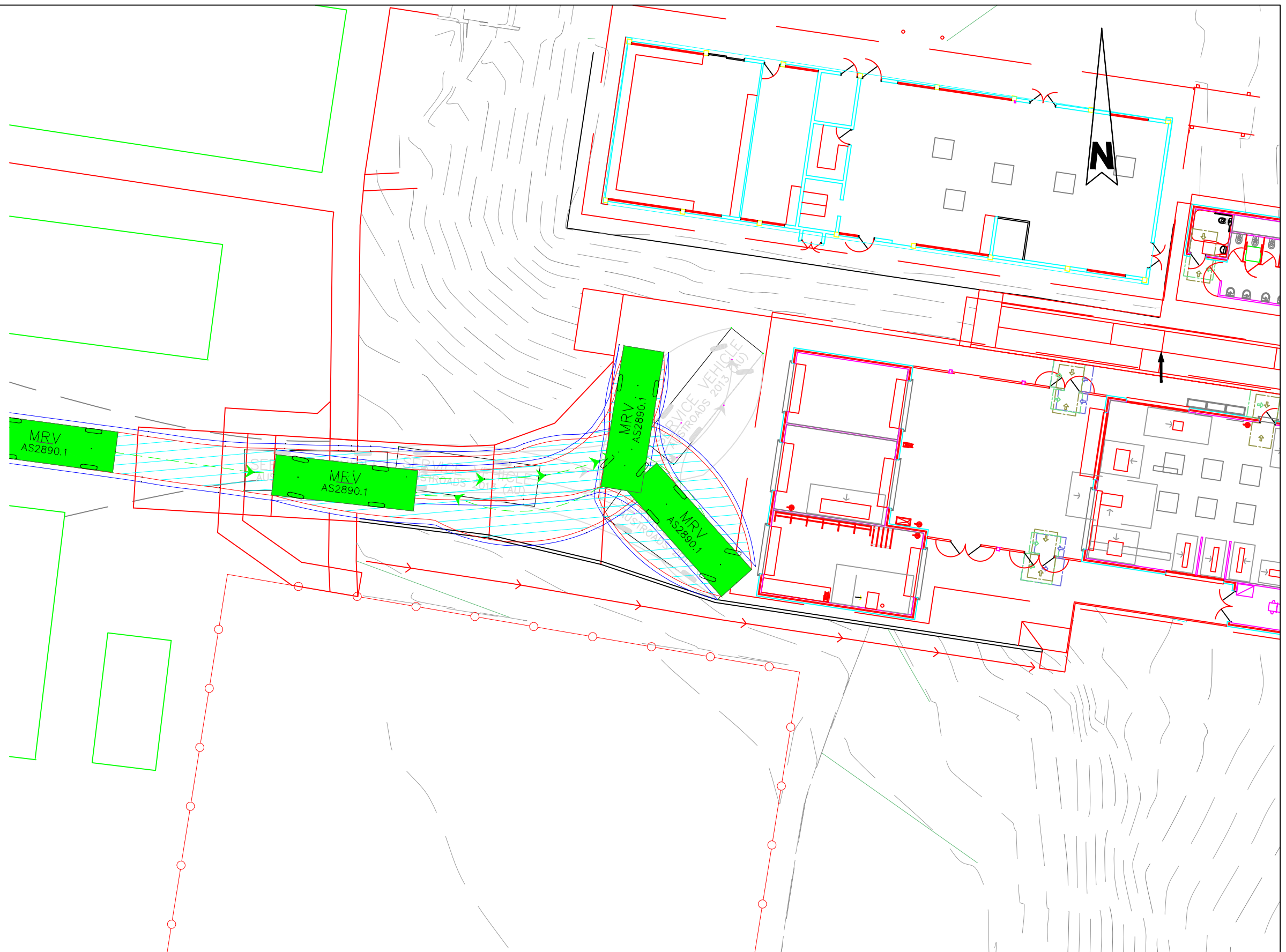
PRELIMINARY

1 PROPOSED FLOOR PLAN
SCALE 1:100 @ A1



APPENDIX B

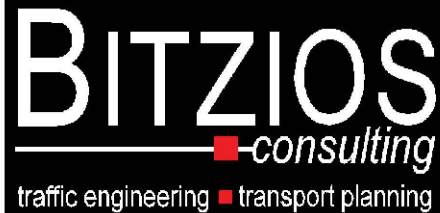
SWEPT PATH ANALYSIS



SERVICE VEHICLE meters

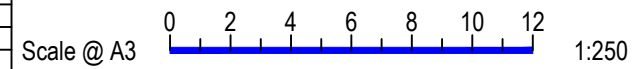
- Width : 2.50
- Track : 2.50
- Lock to Lock Time : 6.0
- Steering Angle : 38.7

DESIGN VEHICLE

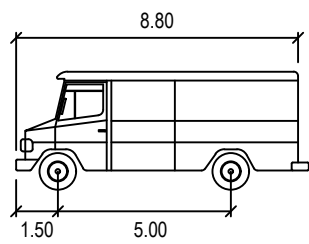
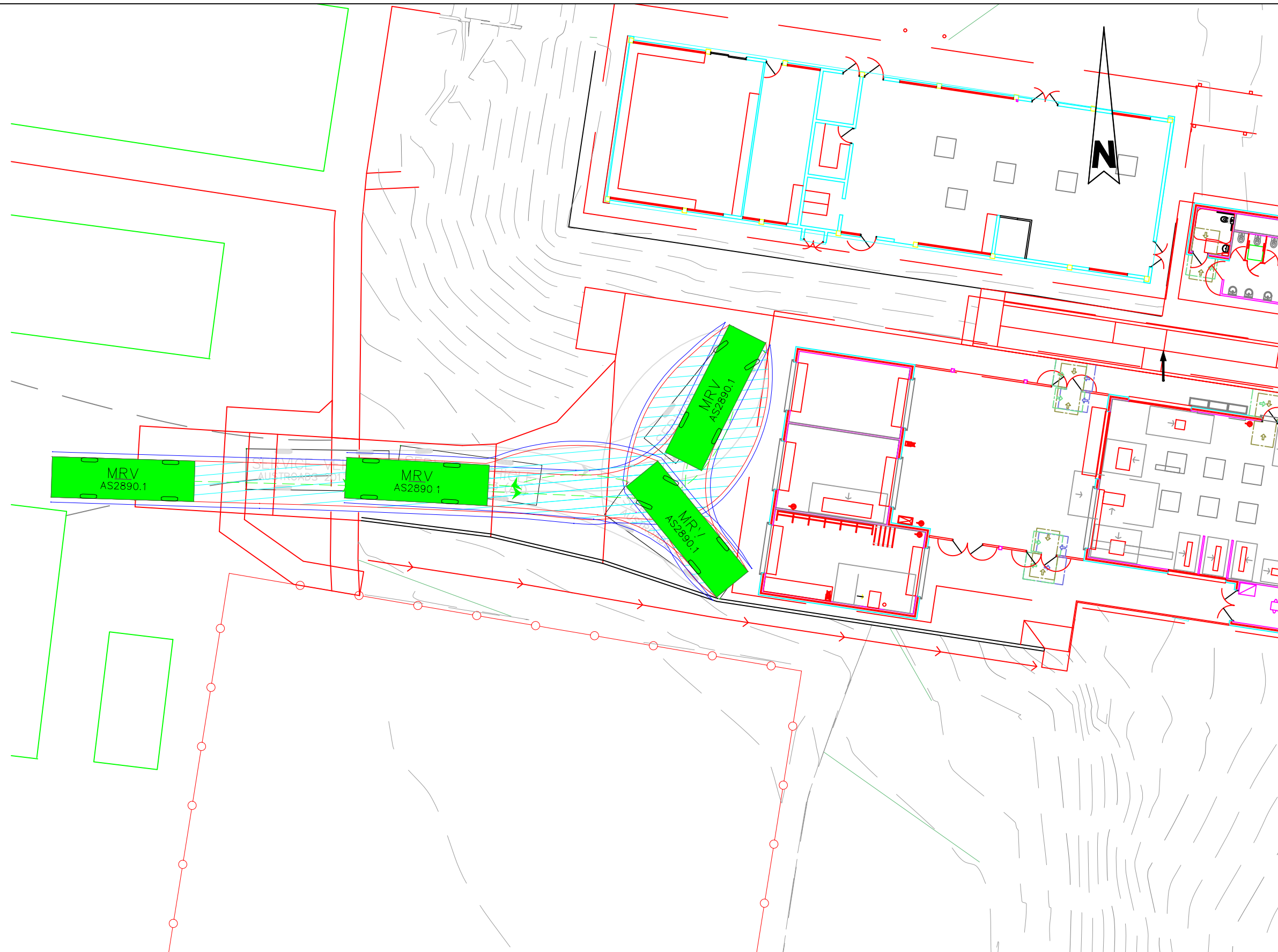


Gold Coast
 Suite 26, 58 Rivenwalk Avenue, Robina QLD 4226.
 P: (07) 5562-5377
 W: www.bitziosconsulting.com.au
Brisbane
 Level 2, 428 Upper Edward Street, Spring Hill 4000.
 P: (07) 3831-4442
 E: admin@bitziosconsulting.com.au
Sydney
 Studio 203, 3 Gladstone Street, Newtown NSW 2042.
 P: (02) 9557 6202

| REVISIONS | | Drawn | Date |
|-----------|---------------------------|-------|------------|
| Issue | Revisions/Descriptions | | |
| 001 | MRV Swept Paths For Issue | N.E | 12.07.2018 |
| | | | |
| | | | |
| | | | |
| | | | |



| | | | | | | | | |
|----------------|---|--------------|---------------------|-------|-------|------------|---------|-----|
| Project | Lowood State High School Expansion | | Design | N.E | Drawn | N.E | Checked | L.D |
| Title | Manual Arts Building Loading Area - 9m MRV Swept Path | | CONCEPT ONLY | | Date | 12.07.2018 | | |
| Project Number | P3650 | Sheet Number | 1 | Issue | 001 | | | |

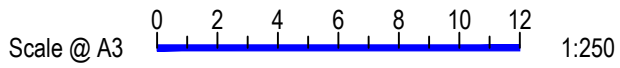


SERVICE VEHICLE meters

Width : 2.50
 Track : 2.50
 Lock to Lock Time : 6.0
 Steering Angle : 38.7

DESIGN VEHICLE

| REVISIONS | | | |
|-----------|---------------------------|-------|------------|
| Issue | Revisions/Descriptions | Drawn | Date |
| 001 | MRV Swept Paths For Issue | N.E | 12.07.2018 |
| | | | |
| | | | |
| | | | |
| | | | |



| | | | |
|---|-------------------------|-------------------|----------------|
| Project Lowood State High School Expansion | Design N.E | Drawn N.E | Checked L.D |
| | CONCEPT ONLY | | |
| Title Manual Arts Building Loading Area - 9m MRV Swept Path | Date 12.07.2018 | | Issue 001 |
| | Project Number P3650 | Sheet Number 2 | |

APPENDIX C

INTERSECTION SURVEY DATA



SURVEY INFORMATION

MAP

Site ID: 1

Location: Railway St & Prospect St, Lowood

Date: 24 / May / 2018

Time Period 1: 07:00 to 10:00

Time Period 2: 14:00 to 17:00

Primary Classes:

- 1 Light Vehicles
- 2 Light Trucks (3-5)
- 3 Heavy Trucks (6-12)
- 4 None
- 5 None

Secondary Classes:

- 1 Pedestrians
- 2 None

Weather Conditions 1: Fine Weather Conditions 2: Fine

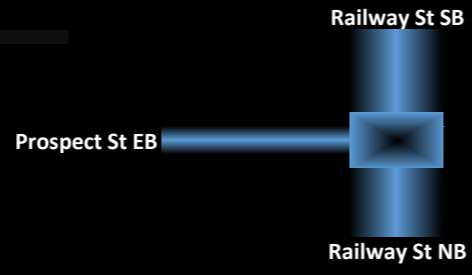
Intersection Legs:

| | | | |
|-------|-------------------------------------|----|----------------|
| North | <input checked="" type="checkbox"/> | Ch | Railway St SB |
| East | <input type="checkbox"/> | Ch | |
| South | <input checked="" type="checkbox"/> | Ch | Railway St NB |
| West | <input checked="" type="checkbox"/> | Ch | Prospect St EB |

Output time interval: 15 mins



Site ID: 1
 Location: Railway St & Prospect St, Lowood
 Date: 24-May-2018
 Period 1 Time: 7:00 AM to 10:00 AM
 Weather: Fine
 Period 1 Peak Hour: 8:00 AM to 9:00 AM



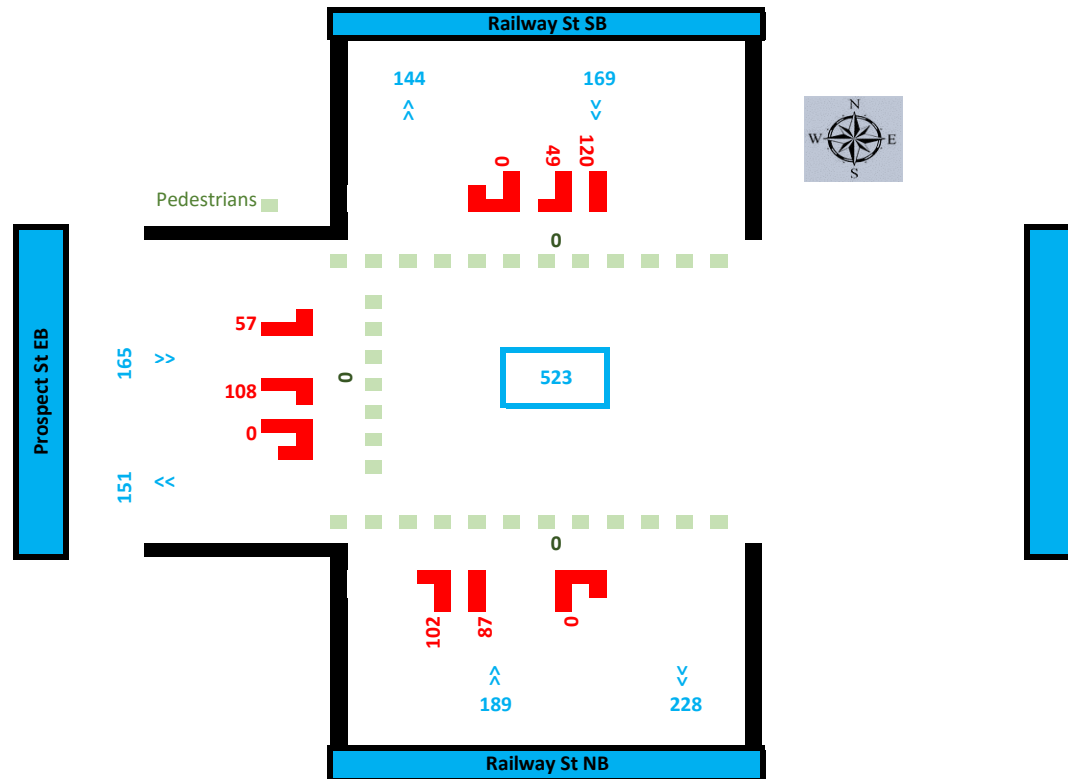
| TOTALS AND PEAKS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|-----|----|---|-----|---|---|---|---|---|---|-----|----|---|-----|---|---|---|---|---|---|-----|---|---|-----|----|---|---|---|---|---|------|-----|-----|-----|
| Period 1 Total | 310 | 24 | 5 | 109 | 6 | 0 | 1 | 0 | 0 | 0 | 209 | 17 | 1 | 212 | 8 | 5 | 0 | 0 | 0 | 0 | 101 | 6 | 1 | 243 | 11 | 1 | 0 | 0 | 0 | 0 | 1270 | 455 | 452 | 363 |
| Period 1 Peak Hr | 112 | 6 | 2 | 46 | 3 | 0 | 0 | 0 | 0 | 0 | 96 | 6 | 0 | 81 | 2 | 4 | 0 | 0 | 0 | 0 | 56 | 1 | 0 | 107 | 1 | 0 | 0 | 0 | 0 | 0 | 523 | 169 | 189 | 165 |

| Time Starting | Railway St SB | Railway St SB | Railway St SB | Railway St SB | Railway St SB | Railway St SB | Railway St SB | Railway St SB | Railway St SB | Railway St SB | Railway St NB | Railway St NB | Railway St NB | Railway St NB | Railway St NB | Railway St NB | Railway St NB | Railway St NB | Railway St NB | Railway St NB | Prospect St EB | Prospect St EB | Prospect St EB | Prospect St EB | Prospect St EB | Prospect St EB | Prospect St EB | Prospect St EB | Prospect St EB | Prospect St EB | GRAND TOTAL | Railway St SB | Railway St NB | Prospect St EB | |
|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-------------|---------------|---------------|----------------|----|
| | Through | Through | Through | Right | Right | Right | U-turn | U-turn | U-turn | Cross 1 | Left | Left | Left | Through | Through | Through | U-turn | U-turn | U-turn | Cross 1 | Left | Left | Left | Right | Right | Right | U-turn | U-turn | U-turn | Cross 1 | TOTAL | All Classes | All Classes | All Classes | |
| 07:00 | 12 | 1 | 2 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 1 | 0 | 5 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 13 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 63 | 27 | 17 | 19 |
| 07:15 | 25 | 6 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 1 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 1 | 0 | 15 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 89 | 39 | 25 | 25 |
| 07:30 | 19 | 0 | 0 | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 16 | 3 | 0 | 23 | 1 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 1 | 22 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 111 | 31 | 43 | 37 |
| 07:45 | 25 | 3 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 2 | 0 | 18 | 2 | 0 | 0 | 0 | 0 | 0 | 6 | 1 | 0 | 22 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 107 | 32 | 45 | 30 |
| 08:00 | 28 | 1 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 0 | 19 | 1 | 3 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 24 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 117 | 40 | 45 | 32 |
| 08:15 | 20 | 1 | 2 | 13 | 1 | 0 | 0 | 0 | 0 | 0 | 26 | 4 | 0 | 18 | 0 | 1 | 0 | 0 | 0 | 0 | 12 | 0 | 0 | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 130 | 37 | 49 | 44 |
| 08:30 | 33 | 3 | 0 | 13 | 2 | 0 | 0 | 0 | 0 | 0 | 24 | 2 | 0 | 19 | 1 | 0 | 0 | 0 | 0 | 0 | 18 | 1 | 0 | 28 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 145 | 51 | 46 | 48 |
| 08:45 | 31 | 1 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 131 | 41 | 49 | 41 |
| 09:00 | 17 | 3 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 0 | 1 | 21 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 16 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 87 | 31 | 36 | 20 |
| 09:15 | 35 | 2 | 0 | 6 | 0 | 0 | 1 | 0 | 0 | 0 | 16 | 2 | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 106 | 44 | 38 | 24 |
| 09:30 | 36 | 1 | 0 | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 8 | 1 | 0 | 16 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 14 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 90 | 46 | 26 | 18 |
| 09:45 | 29 | 2 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 13 | 1 | 0 | 18 | 1 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 94 | 36 | 33 | 25 |

Turning Movement Count Summary



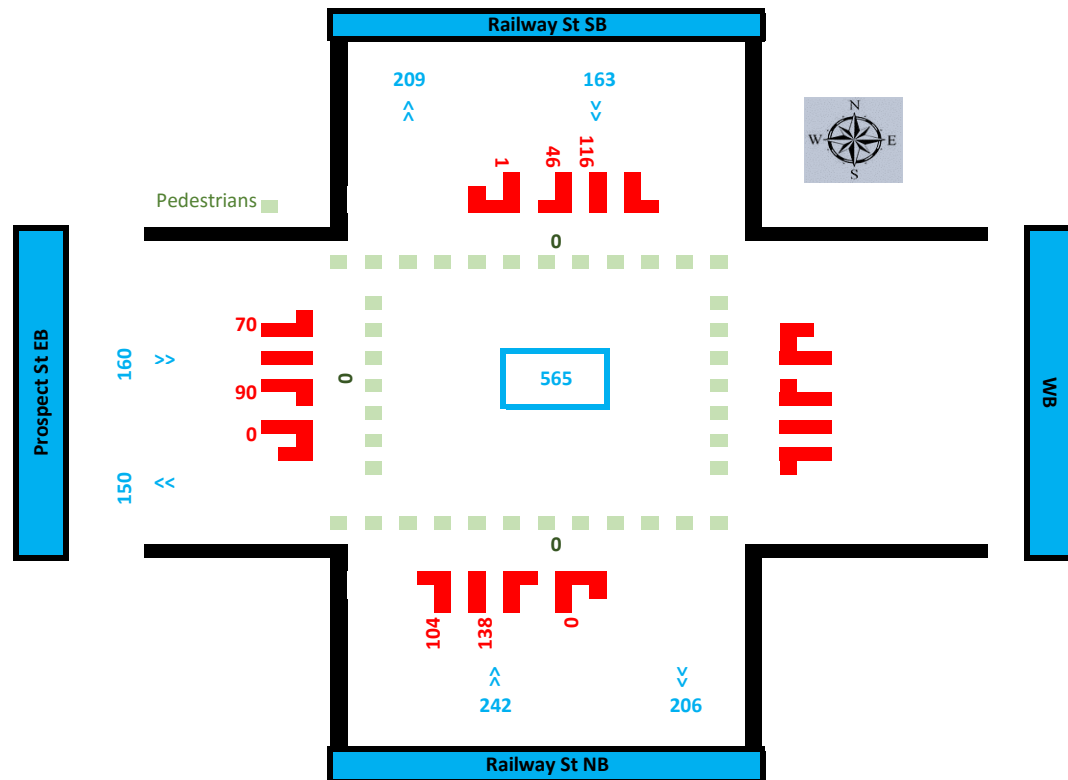
Site ID:
 Location:
 Date:
 Surveyed Time: to
 Weather:
 Data for hour starting: to
 Vehicle Class:



Turning Movement Count Summary



Site ID:
 Location:
 Date:
 Surveyed Time: to
 Weather:
 Data for hour starting: to
 Vehicle Class:



APPENDIX D

ASSESSED TRAFFIC VOLUMES

| Project Information | |
|---------------------|--|
| Project Name: | Lowood State High School |
| Project Number: | P3650 |
| Prepared By: | Aaron Lewis |
| Reviewed By: | Nathan Edwards |
| Prepared Date: | 5/06/2018 |
| Reviewed Date: | 5/06/2018 |
| File Path: | \\bitzios-srv-02\Projects\P3650 Lowood State High School TIA\Technical Work\Traffic Gen\ |

Table 1: Development Yields

| Land Use | Quantity | Unit |
|-------------|----------|------------|
| High School | 70 | enrolments |

Table 2: Peak Period Traffic Generation Rates

| Land Use | AM Peak | PM Peak | Unit | Source |
|-------------|---------|---------|---------------------|--------------------------------------|
| High School | 0.72 | 0.42 | trips per enrolment | GTA Sydney School Traffic Gen Report |

Table 3: Directional Traffic Distribution

| Land Use | AM Peak | | | PM Peak | | |
|-------------|---------|-----|-------|---------|-----|-------|
| | IN | OUT | TOTAL | IN | OUT | TOTAL |
| High School | 60% | 40% | 100% | 40% | 60% | 100% |

Table 4: Traffic Generation

| Land Use | AM Peak | | | PM Peak | | |
|--------------|-----------|-----------|-----------|-----------|-----------|-----------|
| | IN | OUT | TOTAL | IN | OUT | TOTAL |
| High School | 30 | 20 | 50 | 12 | 18 | 29 |
| Total | 30 | 20 | 50 | 12 | 18 | 29 |

Table 5: External Traffic Distribution

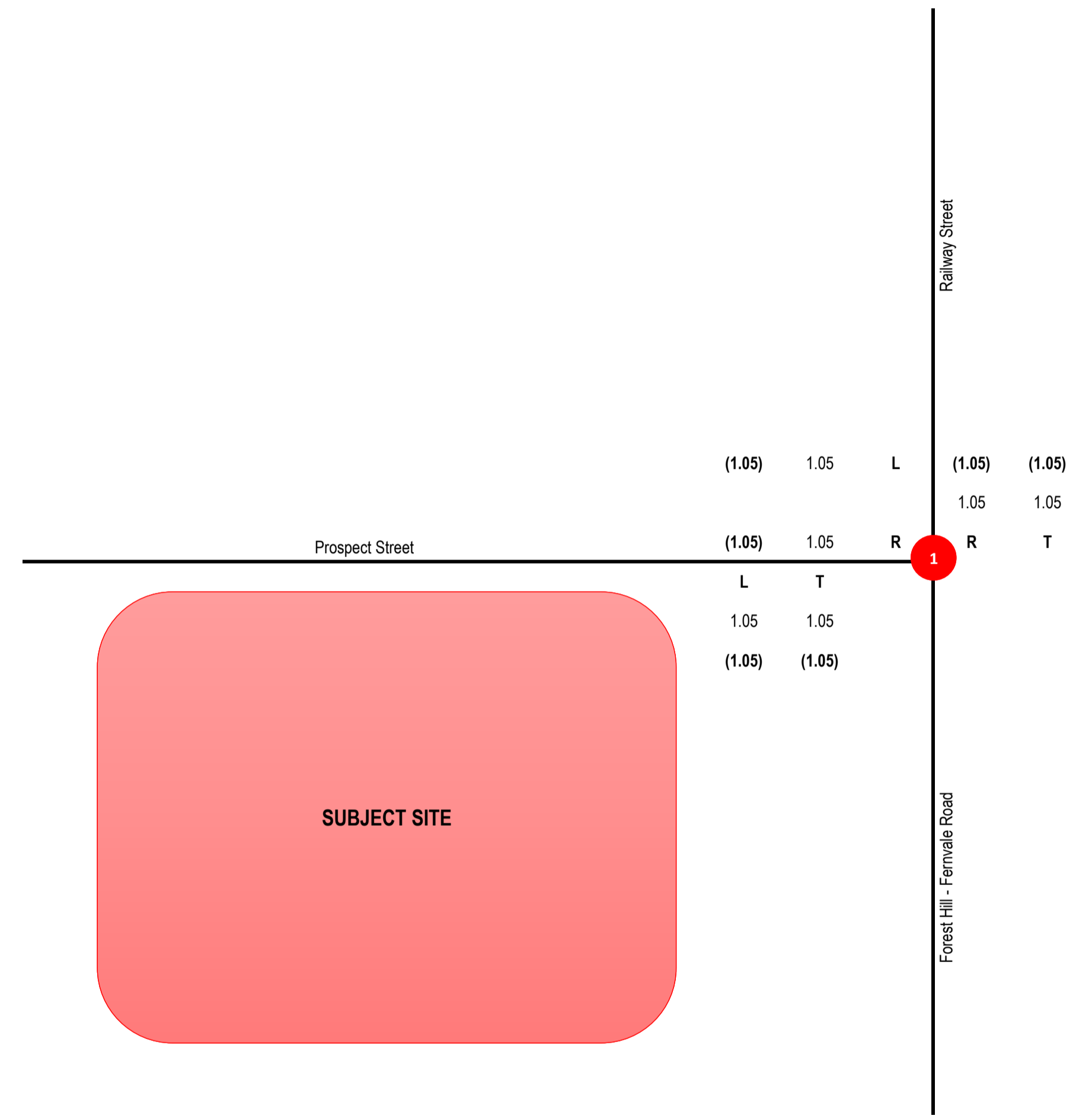
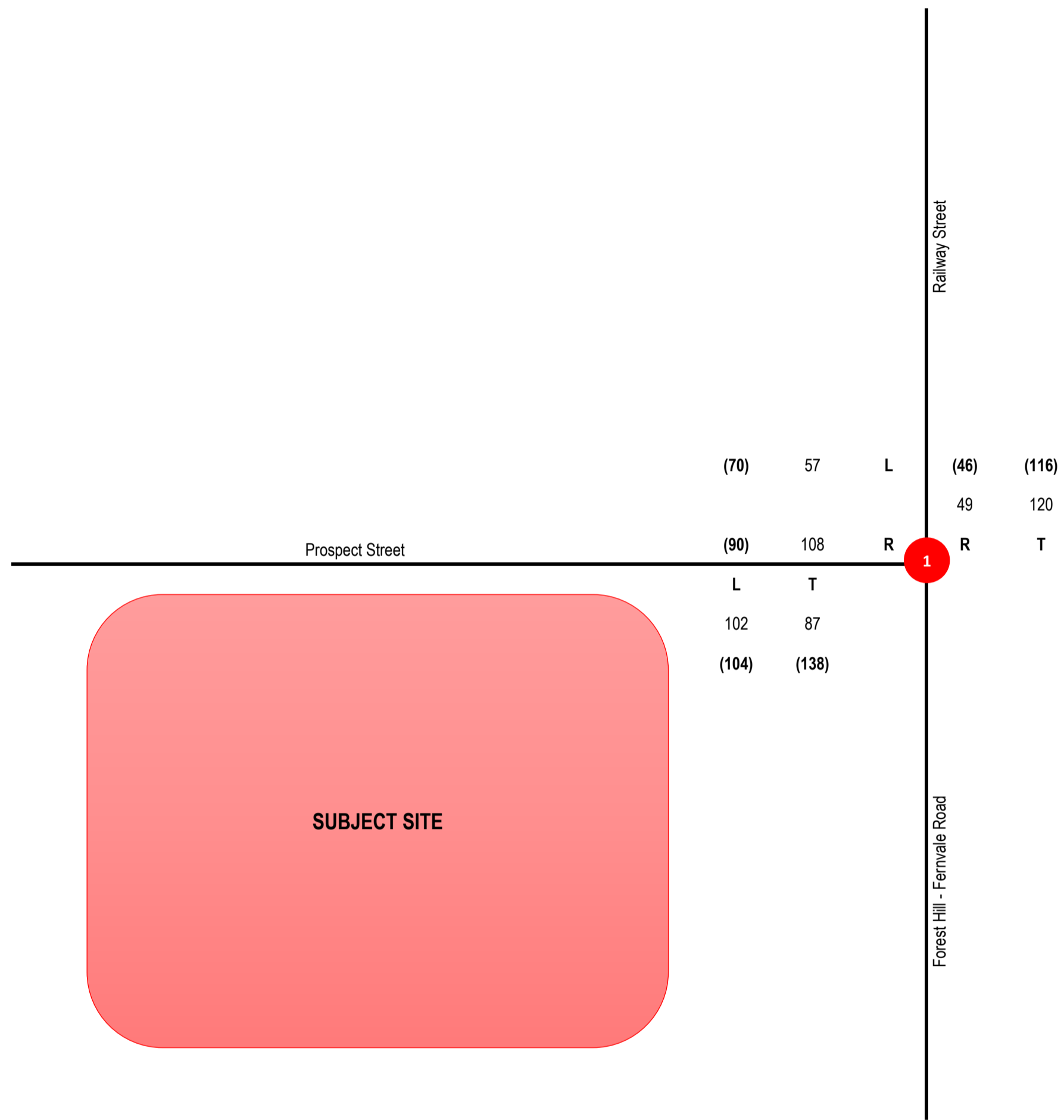
| Direction | Via | IN % | OUT % |
|--------------|-----------------------------|-------------|-------------|
| North | Railway Street | 40% | 20% |
| East | Forest Hill - Fernvale Road | 40% | 40% |
| West | Prospect Street | 20% | 40% |
| Total | - | 100% | 100% |

Table 6: Background Traffic Growth

| Road | % | Survey Year | Year of Opening | Year of Opening Growth Factor | Note |
|-----------------------------|------|-------------|-----------------|-------------------------------|---------------|
| Forest Hill - Fernvale Road | 2.5% | 2018 | 2020 | 1.05 | Linear Growth |
| Prospect Street | 2.5% | 2018 | 2020 | 1.05 | |

SURVEY

BACKGROUND GROWTH



DOCUMENT CONTROL

LEGEND

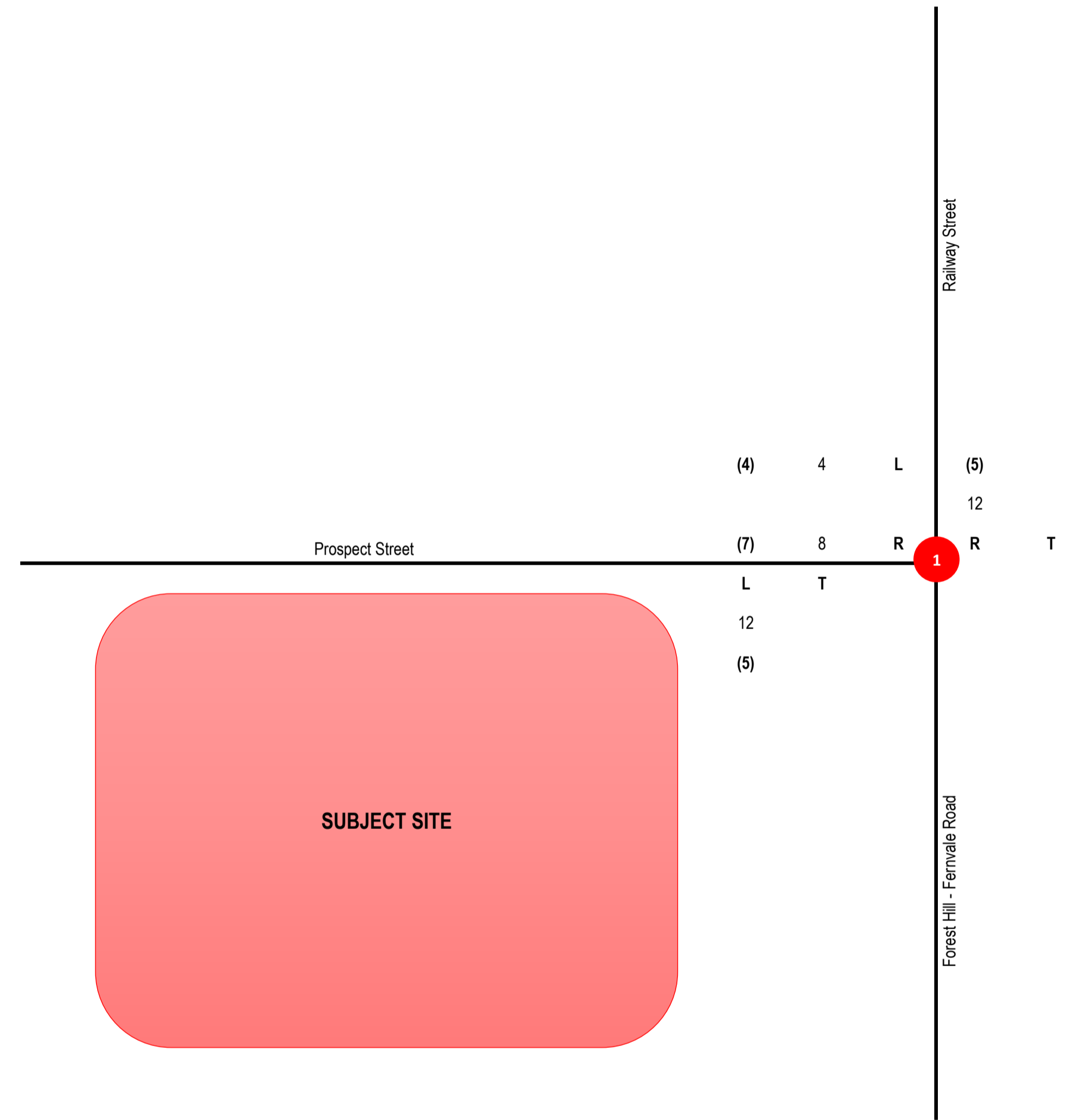
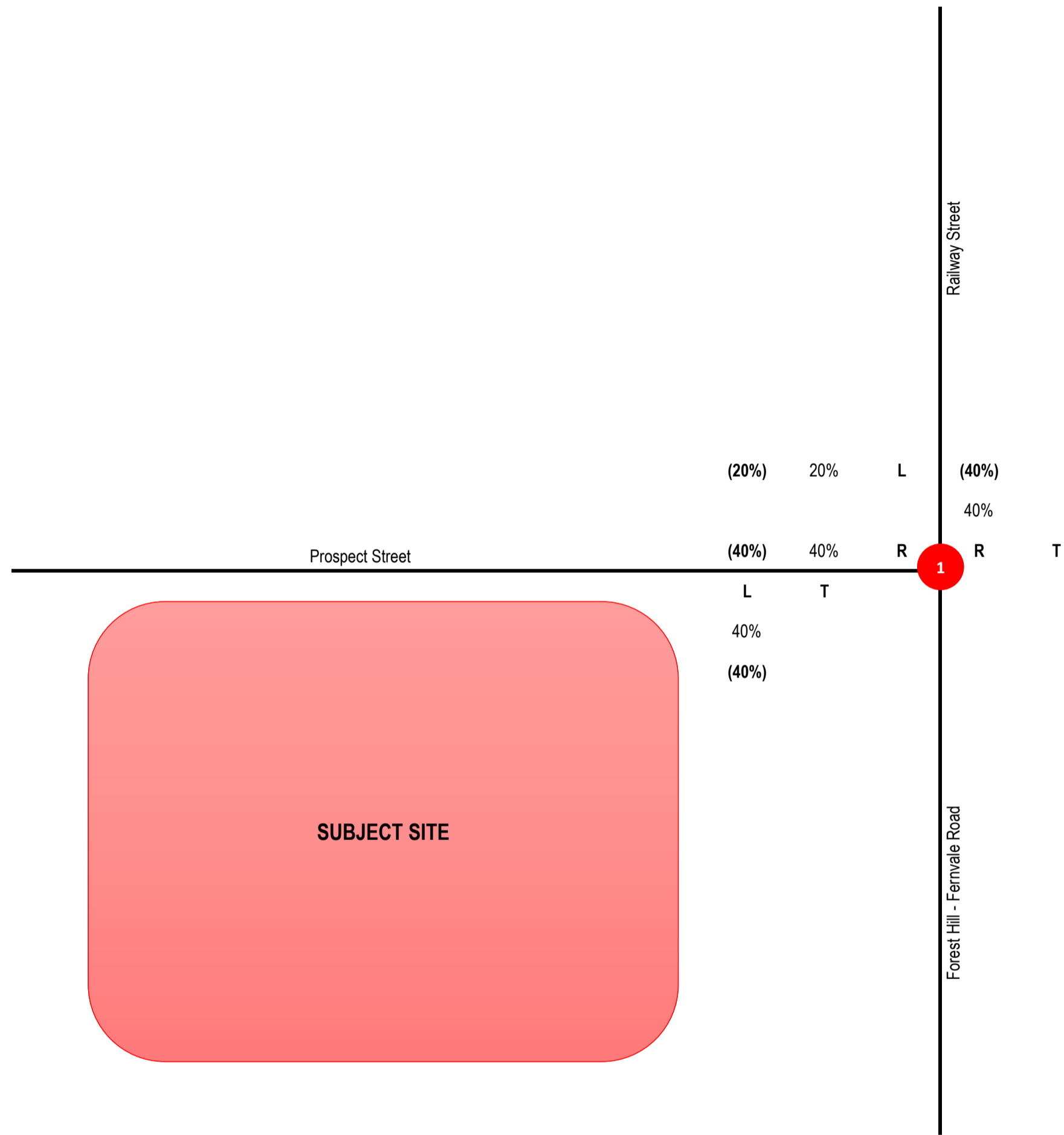
Job Number: P3650 **Prepared By:** Aaron Lewis **Prepared Date:** 5/06/2018
Job Name: Lowood State High School **Reviewed By:** Nathan Edwards **Reviewed Date:** 5/06/2018
File Path: \\bitzios-srv-02\Projects\IP3650 Lowood State High School TIA\Technical Work\Traffic Gen\

AM Peak Hour Volumes **T** Through Turn Movement **L** Left Turn Movement
(##) PM Peak Hour Volumes **R** Right Turn Movement **U** U-Turn Movement
1 Intersection ID



DEVELOPMENT TRAFFIC DISTRIBUTION

DEVELOPMENT TRAFFIC VOLUMES



DOCUMENT CONTROL

LEGEND

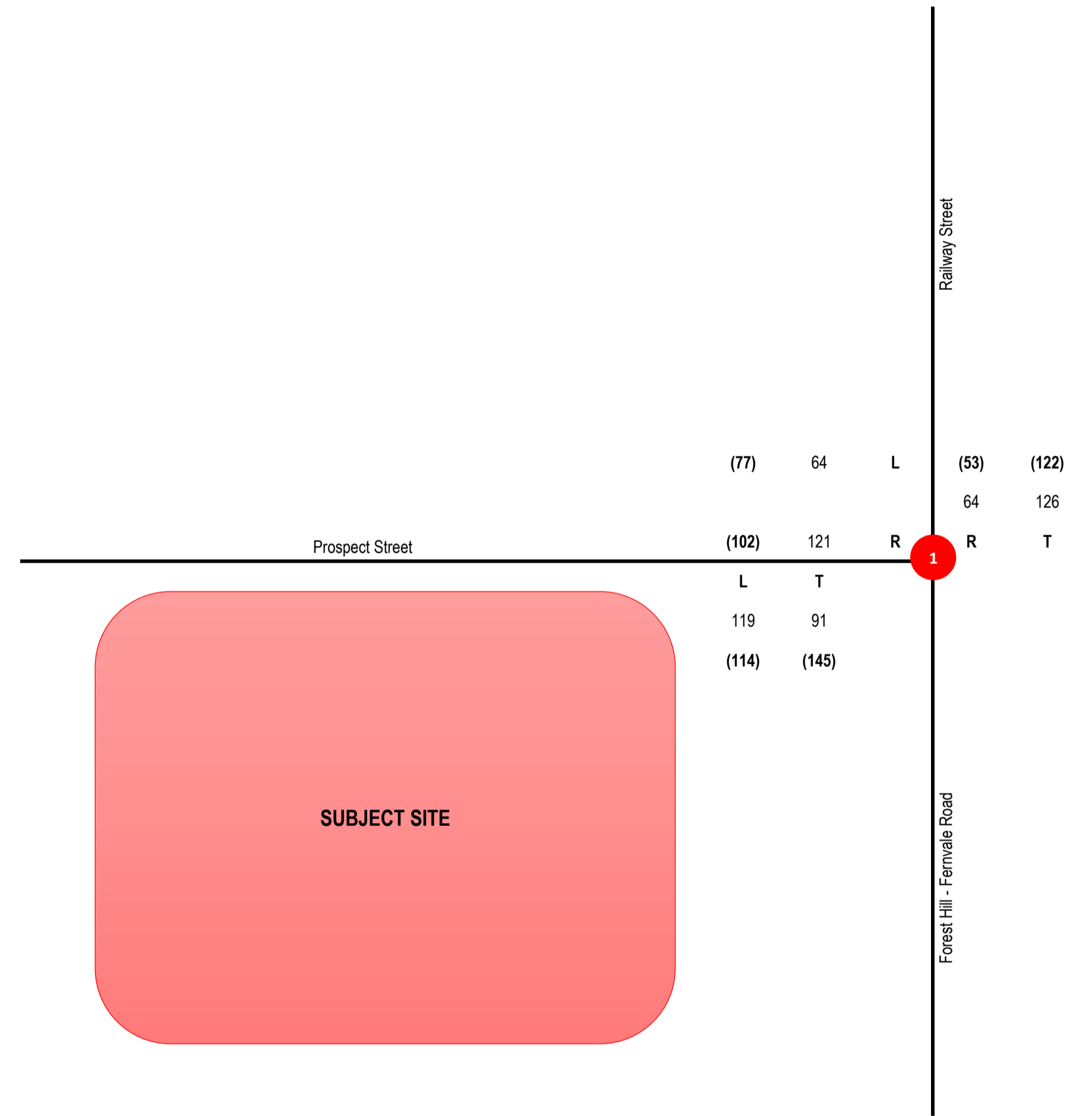
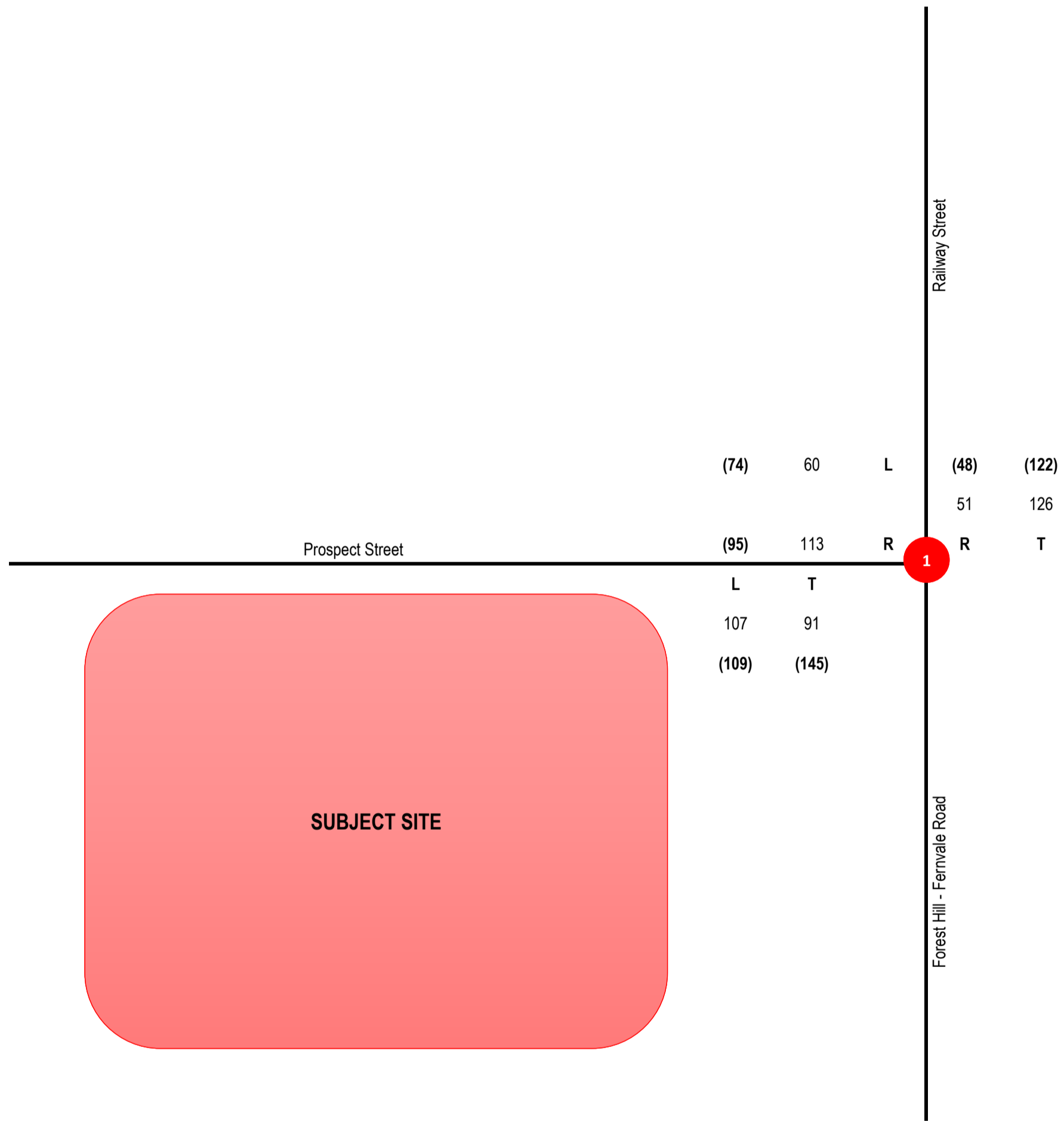
Job Number: P3650 Prepared By: Aaron Lewis Prepared Date: 5/06/2018
 Job Name: Lowood State High School Reviewed By: Nathan Edwards Reviewed Date: 5/06/2018
 File Path: \\bitzios-srv-02\Projects\IP3650 Lowood State High School TIA\Technical Work\Traffic Gen\

AM Peak Hour Volumes T Through Turn Movement L Left Turn Movement
 (##) PM Peak Hour Volumes R Right Turn Movement U U-Turn Movement
 1 Intersection ID



2020 BACKGROUND TRAFFIC VOLUMES

2020 BACKGROUND + DEVELOPMENT TRAFFIC VOLUMES



DOCUMENT CONTROL

LEGEND

Job Number: P3650 Prepared By: Aaron Lewis Prepared Date: 5/06/2018
 Job Name: Lowood State High School Reviewed By: Nathan Edwards Reviewed Date: 5/06/2018
 File Path: \\bitzios-srv-02\Projects\IP3650 Lowood State High School TIA\Technical Work\Traffic Gen\

AM Peak Hour Volumes T Through Turn Movement L Left Turn Movement
 (##) PM Peak Hour Volumes R Right Turn Movement U U-Turn Movement
 1 Intersection ID



APPENDIX E

SIDRA ANALYSIS OUTPUTS

SITE LAYOUT

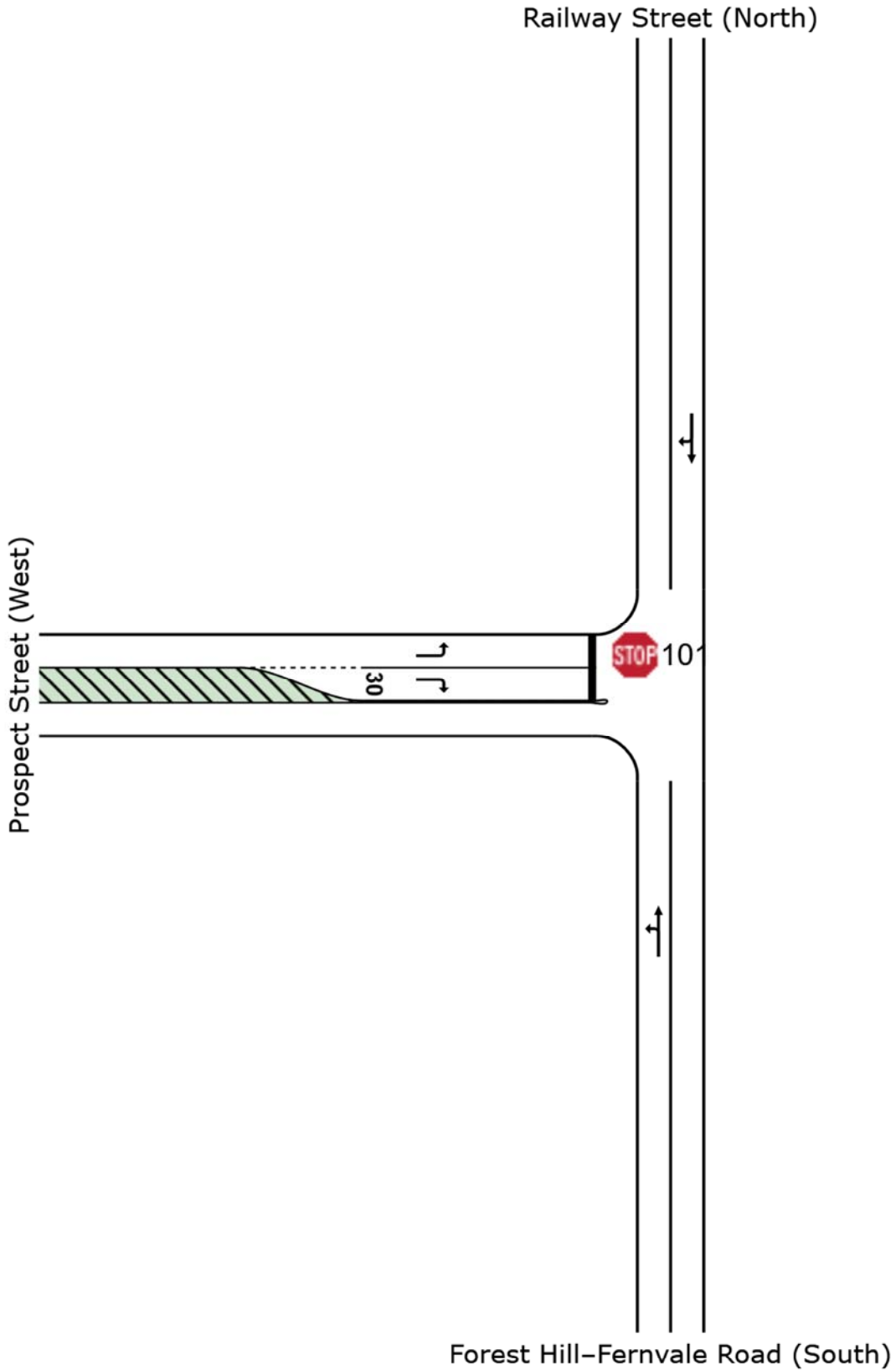
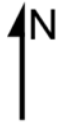
 Site: 101 [2018_AM_Survey]

Int: Forest Hill–Fernvale Road/Railway Street/Prospect Street

Project Number: P3650

Project: Lowood State High School TIA

Stop (Two-Way)



MOVEMENT SUMMARY

 Site: 101 [2018_PM_Survey]

Int: Forest Hill–Fernvale Road/Railway Street/Prospect Street
 Project Number: P3650
 Project: Lowood State High School TIA
 Stop (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | |
|--|--------|--------------|------|---------------|-------------------|------------------|-------------------|------------|--------------|-----------------------------|--------------------|
| Mov ID | OD Mov | Demand Flows | | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue | | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| | | Total veh/h | HV % | | | | Vehicles veh | Distance m | | | |
| South: Forest Hill–Fernvale Road (South) | | | | | | | | | | | |
| 1 | L2 | 109 | 5.0 | 0.138 | 5.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.25 | 56.0 |
| 2 | T1 | 145 | 5.0 | 0.138 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.25 | 57.7 |
| Approach | | 255 | 5.0 | 0.138 | 2.4 | NA | 0.0 | 0.0 | 0.00 | 0.25 | 57.0 |
| North: Railway Street (North) | | | | | | | | | | | |
| 8 | T1 | 122 | 5.0 | 0.101 | 0.4 | LOS A | 0.3 | 2.5 | 0.23 | 0.17 | 57.6 |
| 9 | R2 | 48 | 5.0 | 0.101 | 6.5 | LOS A | 0.3 | 2.5 | 0.23 | 0.17 | 51.7 |
| Approach | | 171 | 5.0 | 0.101 | 2.2 | NA | 0.3 | 2.5 | 0.23 | 0.17 | 55.8 |
| West: Prospect Street (West) | | | | | | | | | | | |
| 10 | L2 | 74 | 5.0 | 0.061 | 8.2 | LOS A | 0.2 | 1.8 | 0.26 | 0.88 | 47.7 |
| 12 | R2 | 95 | 5.0 | 0.124 | 9.3 | LOS A | 0.4 | 3.1 | 0.42 | 0.94 | 46.8 |
| Approach | | 168 | 5.0 | 0.124 | 8.8 | LOS A | 0.4 | 3.1 | 0.35 | 0.91 | 47.2 |
| All Vehicles | | 594 | 5.0 | 0.138 | 4.2 | NA | 0.4 | 3.1 | 0.17 | 0.42 | 53.5 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: 101 [2018_AM_Survey]

Int: Forest Hill–Fernvale Road/Railway Street/Prospect Street
 Project Number: P3650
 Project: Lowood State High School TIA
 Stop (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | |
|--|--------|--------------|------|---------------|-------------------|------------------|-------------------|------------|--------------|-----------------------------|--------------------|
| Mov ID | OD Mov | Demand Flows | | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue | | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| | | Total veh/h | HV % | | | | Vehicles veh | Distance m | | | |
| South: Forest Hill–Fernvale Road (South) | | | | | | | | | | | |
| 1 | L2 | 107 | 5.0 | 0.108 | 5.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.32 | 55.5 |
| 2 | T1 | 92 | 5.0 | 0.108 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.32 | 57.2 |
| Approach | | 199 | 5.0 | 0.108 | 3.0 | NA | 0.0 | 0.0 | 0.00 | 0.32 | 56.2 |
| North: Railway Street (North) | | | | | | | | | | | |
| 8 | T1 | 126 | 5.0 | 0.103 | 0.3 | LOS A | 0.3 | 2.5 | 0.20 | 0.17 | 57.7 |
| 9 | R2 | 52 | 5.0 | 0.103 | 6.3 | LOS A | 0.3 | 2.5 | 0.20 | 0.17 | 51.8 |
| Approach | | 178 | 5.0 | 0.103 | 2.1 | NA | 0.3 | 2.5 | 0.20 | 0.17 | 55.8 |
| West: Prospect Street (West) | | | | | | | | | | | |
| 10 | L2 | 60 | 5.0 | 0.047 | 8.0 | LOS A | 0.2 | 1.4 | 0.20 | 0.89 | 47.8 |
| 12 | R2 | 114 | 5.0 | 0.141 | 9.0 | LOS A | 0.5 | 3.6 | 0.40 | 0.93 | 46.9 |
| Approach | | 174 | 5.0 | 0.141 | 8.6 | LOS A | 0.5 | 3.6 | 0.33 | 0.92 | 47.2 |
| All Vehicles | | 551 | 5.0 | 0.141 | 4.5 | NA | 0.5 | 3.6 | 0.17 | 0.46 | 52.9 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 7.0 | Copyright © 2000-2016 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: BITZIOS CONSULTING | Processed: Thursday, 31 May 2018 1:48:42 PM

Project: \\bitzios-srv-02\Projects\P3650 Lowood State High School TIA\Technical Work\Models\SIDRA\Forest Hill-Fernvale Rd_Prospect St.sip7

MOVEMENT SUMMARY

 Site: 101 [2020_AM_Background]

Int: Forest Hill–Fernvale Road/Railway Street/Prospect Street
 Project Number: P3650
 Project: Lowood State High School TIA
 Stop (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | |
|--|--------|--------------|------|---------------|-------------------|------------------|-------------------|------------|--------------|-----------------------------|--------------------|
| Mov ID | OD Mov | Demand Flows | | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue | | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| | | Total veh/h | HV % | | | | Vehicles veh | Distance m | | | |
| South: Forest Hill–Fernvale Road (South) | | | | | | | | | | | |
| 1 | L2 | 113 | 5.0 | 0.113 | 5.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.32 | 55.4 |
| 2 | T1 | 95 | 5.0 | 0.113 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.32 | 57.2 |
| Approach | | 207 | 5.0 | 0.113 | 3.1 | NA | 0.0 | 0.0 | 0.00 | 0.32 | 56.2 |
| North: Railway Street (North) | | | | | | | | | | | |
| 8 | T1 | 133 | 5.0 | 0.109 | 0.3 | LOS A | 0.4 | 2.7 | 0.20 | 0.17 | 57.7 |
| 9 | R2 | 54 | 5.0 | 0.109 | 6.3 | LOS A | 0.4 | 2.7 | 0.20 | 0.17 | 51.8 |
| Approach | | 186 | 5.0 | 0.109 | 2.1 | NA | 0.4 | 2.7 | 0.20 | 0.17 | 55.8 |
| West: Prospect Street (West) | | | | | | | | | | | |
| 10 | L2 | 63 | 5.0 | 0.049 | 8.0 | LOS A | 0.2 | 1.4 | 0.20 | 0.89 | 47.8 |
| 12 | R2 | 119 | 5.0 | 0.150 | 9.1 | LOS A | 0.5 | 3.8 | 0.41 | 0.93 | 46.9 |
| Approach | | 182 | 5.0 | 0.150 | 8.7 | LOS A | 0.5 | 3.8 | 0.34 | 0.92 | 47.2 |
| All Vehicles | | 576 | 5.0 | 0.150 | 4.5 | NA | 0.5 | 3.8 | 0.17 | 0.46 | 52.9 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 7.0 | Copyright © 2000-2016 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: BITZIOS CONSULTING | Processed: Thursday, 31 May 2018 1:48:43 PM

Project: \\bitzios-srv-02\Projects\P3650 Lowood State High School TIA\Technical Work\Models\SIDRA\Forest Hill-Fernvale Rd_Prospect St.sip7

MOVEMENT SUMMARY

 Site: 101 [2020_PM_Background]

Int: Forest Hill–Fernvale Road/Railway Street/Prospect Street
 Project Number: P3650
 Project: Lowood State High School TIA
 Stop (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | |
|--|--------|--------------|------|---------------|-------------------|------------------|-------------------|------------|--------------|-----------------------------|--------------------|
| Mov ID | OD Mov | Demand Flows | | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue | | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| | | Total veh/h | HV % | | | | Vehicles veh | Distance m | | | |
| South: Forest Hill–Fernvale Road (South) | | | | | | | | | | | |
| 1 | L2 | 115 | 5.0 | 0.145 | 5.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.25 | 56.0 |
| 2 | T1 | 153 | 5.0 | 0.145 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.25 | 57.7 |
| Approach | | 267 | 5.0 | 0.145 | 2.4 | NA | 0.0 | 0.0 | 0.00 | 0.25 | 57.0 |
| North: Railway Street (North) | | | | | | | | | | | |
| 8 | T1 | 128 | 5.0 | 0.106 | 0.5 | LOS A | 0.4 | 2.7 | 0.23 | 0.17 | 57.6 |
| 9 | R2 | 51 | 5.0 | 0.106 | 6.6 | LOS A | 0.4 | 2.7 | 0.23 | 0.17 | 51.7 |
| Approach | | 179 | 5.0 | 0.106 | 2.2 | NA | 0.4 | 2.7 | 0.23 | 0.17 | 55.8 |
| West: Prospect Street (West) | | | | | | | | | | | |
| 10 | L2 | 78 | 5.0 | 0.065 | 8.3 | LOS A | 0.3 | 1.9 | 0.27 | 0.88 | 47.7 |
| 12 | R2 | 100 | 5.0 | 0.134 | 9.4 | LOS A | 0.5 | 3.3 | 0.44 | 0.94 | 46.7 |
| Approach | | 178 | 5.0 | 0.134 | 8.9 | LOS A | 0.5 | 3.3 | 0.36 | 0.92 | 47.2 |
| All Vehicles | | 624 | 5.0 | 0.145 | 4.2 | NA | 0.5 | 3.3 | 0.17 | 0.42 | 53.5 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 7.0 | Copyright © 2000-2016 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: BITZIOS CONSULTING | Processed: Thursday, 31 May 2018 1:48:44 PM

Project: \\bitzios-srv-02\Projects\P3650 Lowood State High School TIA\Technical Work\Models\SIDRA\Forest Hill-Fernvale Rd_Prospect St.sip7

MOVEMENT SUMMARY

 Site: 101 [2020_AM_Background + Development]

Int: Forest Hill–Fernvale Road/Railway Street/Prospect Street
 Project Number: P3650
 Project: Lowood State High School TIA
 Stop (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | |
|--|--------|--------------|------|---------------|-------------------|------------------|-------------------|------------|--------------|-----------------------------|--------------------|
| Mov ID | OD Mov | Demand Flows | | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue | | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| | | Total veh/h | HV % | | | | Vehicles veh | Distance m | | | |
| South: Forest Hill–Fernvale Road (South) | | | | | | | | | | | |
| 1 | L2 | 125 | 5.0 | 0.121 | 5.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.33 | 55.3 |
| 2 | T1 | 96 | 5.0 | 0.121 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.33 | 57.0 |
| Approach | | 221 | 5.0 | 0.121 | 3.2 | NA | 0.0 | 0.0 | 0.00 | 0.33 | 56.1 |
| North: Railway Street (North) | | | | | | | | | | | |
| 8 | T1 | 133 | 5.0 | 0.119 | 0.4 | LOS A | 0.5 | 3.3 | 0.24 | 0.20 | 57.3 |
| 9 | R2 | 67 | 5.0 | 0.119 | 6.4 | LOS A | 0.5 | 3.3 | 0.24 | 0.20 | 51.5 |
| Approach | | 200 | 5.0 | 0.119 | 2.4 | NA | 0.5 | 3.3 | 0.24 | 0.20 | 55.2 |
| West: Prospect Street (West) | | | | | | | | | | | |
| 10 | L2 | 67 | 5.0 | 0.053 | 8.0 | LOS A | 0.2 | 1.5 | 0.20 | 0.89 | 47.8 |
| 12 | R2 | 127 | 5.0 | 0.164 | 9.3 | LOS A | 0.6 | 4.2 | 0.43 | 0.94 | 46.8 |
| Approach | | 195 | 5.0 | 0.164 | 8.8 | LOS A | 0.6 | 4.2 | 0.35 | 0.92 | 47.1 |
| All Vehicles | | 616 | 5.0 | 0.164 | 4.7 | NA | 0.6 | 4.2 | 0.19 | 0.48 | 52.6 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 7.0 | Copyright © 2000-2016 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: BITZIOS CONSULTING | Processed: Thursday, 31 May 2018 1:48:45 PM

Project: \\bitzios-srv-02\Projects\P3650 Lowood State High School TIA\Technical Work\Models\SIDRA\Forest Hill-Fernvale Rd_Prospect St.sip7

MOVEMENT SUMMARY

 **Site: 101 [2020_PM_Background + Development]**

Int: Forest Hill–Fernvale Road/Railway Street/Prospect Street
 Project Number: P3650
 Project: Lowood State High School TIA
 Stop (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | |
|--|--------|--------------|------|---------------|-------------------|------------------|-------------------|------------|--------------|-----------------------------|--------------------|
| Mov ID | OD Mov | Demand Flows | | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue | | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| | | Total veh/h | HV % | | | | Vehicles veh | Distance m | | | |
| South: Forest Hill–Fernvale Road (South) | | | | | | | | | | | |
| 1 | L2 | 120 | 5.0 | 0.148 | 5.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.26 | 55.9 |
| 2 | T1 | 153 | 5.0 | 0.148 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.26 | 57.7 |
| Approach | | 273 | 5.0 | 0.148 | 2.5 | NA | 0.0 | 0.0 | 0.00 | 0.26 | 56.9 |
| North: Railway Street (North) | | | | | | | | | | | |
| 8 | T1 | 128 | 5.0 | 0.111 | 0.5 | LOS A | 0.4 | 3.0 | 0.25 | 0.19 | 57.4 |
| 9 | R2 | 56 | 5.0 | 0.111 | 6.6 | LOS A | 0.4 | 3.0 | 0.25 | 0.19 | 51.6 |
| Approach | | 184 | 5.0 | 0.111 | 2.4 | NA | 0.4 | 3.0 | 0.25 | 0.19 | 55.5 |
| West: Prospect Street (West) | | | | | | | | | | | |
| 10 | L2 | 81 | 5.0 | 0.067 | 8.3 | LOS A | 0.3 | 2.0 | 0.27 | 0.88 | 47.7 |
| 12 | R2 | 107 | 5.0 | 0.145 | 9.5 | LOS A | 0.5 | 3.6 | 0.44 | 0.95 | 46.7 |
| Approach | | 188 | 5.0 | 0.145 | 9.0 | LOS A | 0.5 | 3.6 | 0.37 | 0.92 | 47.1 |
| All Vehicles | | 645 | 5.0 | 0.148 | 4.3 | NA | 0.5 | 3.6 | 0.18 | 0.43 | 53.3 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX F

CODE RESPONSES

State code 1: Development in a state-controlled road environment

Table 1.2.1: Development in a state-controlled road environment

| Performance outcomes | Acceptable outcomes | |
|---|---|---|
| Buildings and structures | | |
| PO1 The location of buildings, structures, infrastructure, services and utilities does not create a safety hazard in a state-controlled road, or cause damage to, or obstruct road transport infrastructure. | AO1.1 Buildings, structures, infrastructure, services and utilities are not located in a state-controlled road. AND | Complies with AO1.1 No new buildings, structures, infrastructure, services and utilities are proposed to be located in a state-controlled road. |
| | AO1.2 Buildings, structures, infrastructure, services and utilities can be maintained without requiring access to a state-controlled road. | Complies with AO1.2 Access to a state-controlled road will not be required to maintain new buildings, structures, infrastructure, services and utilities. |
| PO2 The design and construction of buildings and structures does not create a safety hazard by distracting users of a state-controlled road. | AO2.1 Facades of buildings and structures facing a state-controlled road are made of non-reflective materials. OR | Please refer to the architectural report. |
| | AO2.2 Facades of buildings and structures do not reflect point light sources into the face of oncoming traffic on a state-controlled road. AND | Please refer to the architectural report. |
| | AO2.3 External lighting of buildings and structures is not directed into the face of oncoming traffic on a state-controlled road and does not involve flashing or laser lights. AND | Please refer to the architectural report. |
| | AO2.4 Advertising devices visible from a state-controlled road are located and designed in accordance with the Roadside Advertising Guide, Department of Transport and Main Roads, 2013. | N/A |

| Performance outcomes | Acceptable outcomes | |
|--|---|--|
| <p>PO3 Road, pedestrian and bikeway bridges over a state-controlled road are designed and constructed to prevent projectiles from being thrown onto a state-controlled road.</p> | <p>AO3.1 Road, pedestrian and bikeway bridges over a state-controlled road include throw protection screens in accordance with section 4.9.3 of the Design Criteria for Bridges and Other Structures Manual, Department of Transport and Main Roads, 2014.</p> | <p>N/A</p> |
| Filling, excavation and retaining structures | | |
| <p>PO4 Filling and excavation does not interfere with, or result in damage to, infrastructure or services in a state-controlled road.</p> <p>Note: Information on the location of services and public utility plants in a state-controlled road can be obtained from the Dial Before You Dig service.</p> <p>Where development will impact on an existing or future service or public utility plant in a state-controlled road such that the service or public utility plant will need to be relocated, the alternative alignment must comply with the standards and design specifications of the relevant service or public utility provider, and any costs of relocation are to be borne by the developer.</p> <p>Refer to the SDAP Supporting Information: Filling, excavation and retaining structures in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.</p> | <p>No acceptable outcome is prescribed.</p> | <p>Please refer to the civil engineering report.</p> |
| <p>PO5 Filling, excavation, building foundations and retaining structures do not undermine, or cause subsidence of, a state-controlled road.</p> <p>Note: To demonstrate compliance with this performance outcome, it is recommended an RPEQ certified geotechnical assessment, prepared in accordance with the Road Planning and Design Manual 2nd Edition: Volume 3, Department of Transport and Main Roads, 2016, is provided.</p> <p>Refer to the SDAP Supporting Information: Filling, excavation and retaining structures in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome and prepare a geotechnical assessment.</p> | <p>No acceptable outcome is prescribed.</p> | <p>Please refer to the civil engineering report.</p> |

| Performance outcomes | Acceptable outcomes | |
|--|---|---|
| <p>PO6 Filling, excavation, building foundations and retaining structures do not cause ground water disturbance in a state-controlled road.</p> <p>Note: To demonstrate compliance with this performance outcome, it is recommended an RPEQ certified geotechnical assessment, prepared in accordance with the Road Planning and Design manual 2nd Edition: Volume 3, Department of Transport and Main Roads, 2016, is provided.</p> <p>Refer to the SDAP Supporting Information: Filling, excavation and retaining structures in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome and prepare a geotechnical assessment.</p> | No acceptable outcome is prescribed. | Please refer to the civil engineering report. |
| <p>PO7 Excavation, boring, piling, blasting or fill compaction during construction of a development does not result in ground movement or vibration impacts that would cause damage or nuisance to a state-controlled road, road transport infrastructure or road works.</p> <p>Note: To demonstrate compliance with this performance outcome, it is recommended an RPEQ certified geotechnical assessment, prepared in accordance with Road Planning and Design Manual 2nd Edition: Volume 3, Department of Transport and Main Roads, 2016, is provided.</p> <p>Refer to the SDAP Supporting Information: Filling, excavation and retaining structures in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome and prepare a geotechnical assessment.</p> | No acceptable outcome is prescribed. | Please refer to the civil engineering report. |
| <p>PO8 Development involving the haulage of fill, extracted material or excavated spoil material exceeding 10,000 tonnes per year does not damage the pavement of a state-controlled road.</p> <p>Note: It is recommended a pavement impact assessment is provided.</p> <p>Refer to the SDAP Supporting Information: Filling, excavation and retaining structures in a state-controlled road environment, Department of Transport and Main Roads, 2017, and the Guide to Traffic Impact Assessment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome and prepare a pavement impact assessment.</p> | AO8.1 Fill, extracted material and spoil material is not transported to or from the development site on a state-controlled road. | N/A |

| Performance outcomes | Acceptable outcomes | |
|--|--|---|
| <p>PO9 Filling and excavation associated with the construction of vehicular access to a development does not compromise the operation or capacity of existing drainage infrastructure for a state-controlled road.</p> <p>Note: Refer to the SDAP Supporting Information: Filling, excavation and retaining structures in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.</p> | No acceptable outcome is prescribed. | Please refer to the civil engineering report. |
| <p>PO10 Fill material used on a development site does not result in contamination of a state-controlled road.</p> <p>Note: Refer to the SDAP Supporting Information: Filling, excavation and retaining structures in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.</p> | <p>AO10.1 Fill material is free of contaminants including acid sulfate content.</p> <p>Note: Soils and rocks should be tested in accordance with AS 1289.0 – Methods of testing soils for engineering purposes and AS 4133.0-2005 – Methods of testing rocks for engineering purposes.</p> <p>AND</p> | Please refer to the civil engineering report. |
| | <p>AO10.2 Compaction of fill is carried out in accordance with the requirements of AS 1289.0 2000 – Methods of testing soils for engineering purposes.</p> | Please refer to the civil engineering report. |
| <p>PO11 Filling and excavation does not cause wind-blown dust nuisance in a state-controlled road.</p> <p>Note: Refer to the SDAP Supporting Information: Filling, excavation and retaining structures in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.</p> | <p>AO11.1 Compaction of fill is carried out in accordance with the requirements of AS 1289.0 2000 – Methods of testing soils for engineering purposes.</p> <p>AND</p> | Please refer to the civil engineering report. |
| | <p>AO11.2 Dust suppression measures are used during filling and excavation activities such as wind breaks or barriers and dampening of ground surfaces.</p> | Please refer to the civil engineering report. |
| Stormwater and drainage | | |
| <p>PO12 Development does not result in an actionable nuisance, or worsening of, stormwater, flooding or drainage impacts in a state-controlled road.</p> <p>Note: Refer to the SDAP Supporting Information: Stormwater and drainage in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.</p> | No acceptable outcome is prescribed. | Please refer to the storm water report. |

| Performance outcomes | Acceptable outcomes | |
|---|---|---|
| <p>PO13 Run-off from the development site is not unlawfully discharged to a state-controlled road.</p> <p>Note: Refer to the SDAP Supporting Information: Stormwater and drainage in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.</p> | <p>AO13.1 Development does not create any new points of discharge to a state-controlled road.</p> <p>AND</p> | Please refer to the storm water report. |
| | <p>AO13.2 Stormwater run-off is discharged to a lawful point of discharge.</p> <p>Note: Section 3.4 of the Queensland Urban Drainage Manual, Department of Energy and Water Supply, 2013, provides further information on lawful points of discharge.</p> <p>AND</p> | Please refer to the storm water report. |
| | <p>AO13.3 Development does not worsen the condition of an existing lawful point of discharge to the state-controlled road.</p> | Please refer to the storm water report. |
| <p>PO14 Run-off from the development site during construction does not cause siltation of stormwater infrastructure affecting a state-controlled road.</p> <p>Note: Refer to the SDAP Supporting Information: Stormwater and drainage in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.</p> | <p>AO14.1 Run-off from the development site during construction is not discharged to stormwater infrastructure for a state-controlled road.</p> | Please refer to the storm water report. |
| Vehicular access to a state-controlled road | | |
| <p>PO15 Vehicular access to a state-controlled road that is a limited access road is consistent with government policy for the management of limited access roads.</p> <p>Note: Refer to the SDAP Supporting Information: Vehicular access to a state-controlled road, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.</p> | <p>AO15.1 Development does not require new or changed access to a limited access road.</p> <p>Note: Limited access roads are declared by the transport chief executive under section 54 of the <i>Transport Infrastructure Act 1994</i> and are identified in the DA mapping system.</p> <p>OR</p> | N/A – No vehicular access is proposed to a state-controlled road. |
| | <p>AO15.2 A new or changed access to a limited access road is consistent with the limited access policy for the state-controlled road.</p> <p>Note: Limited access policies for limited access roads declared under the <i>Transport Infrastructure Act 1994</i> can be obtained by contacting the relevant Department of Transport and Main Roads regional office.</p> <p>AND</p> | N/A |

| Performance outcomes | Acceptable outcomes | |
|---|---|-----|
| | <p>AO15.3 Where a new or changed access is for a service centre, access is consistent with the Service centre policy, Department of Transport and Main Roads, 2013 and the Access policy for roadside service centre facilities on limited access roads, Department of Transport and Main Roads, 2013, and the Service centre strategy for the state-controlled road.</p> <p>Note: The Service centre policy, Department of Transport and Main Roads, 2013, Access policy for roadside service centre facilities, Department of Transport and Main Roads, 2013 and the relevant Service centre strategy for a state-controlled road can be accessed by contacting the relevant Department of Transport and Main Roads regional office.</p> | N/A |
| <p>PO16 The location and design of vehicular access to a state-controlled road (including access to a limited access road) does not create a safety hazard for users of a state-controlled road or result in a worsening of operating conditions on a state-controlled road.</p> <p>Note: Where a new or changed access between the premises and a state-controlled road is proposed, the Department of Transport and Main Roads will need to assess the proposal to determine if the vehicular access for the development is safe. An assessment can be made by Department of Transport and Main Roads as part of the development assessment process and a decision under section 62 of <i>Transport Infrastructure Act 1994</i> issued.</p> <p>Refer to the SDAP Supporting Information: Vehicular access to a state-controlled road, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.</p> | <p>AO16.1 Vehicular access is provided from a local road.</p> | N/A |
| | <p>OR all of the following acceptable outcomes apply:</p> <p>AO16.2 Vehicular access for the development is consistent with the function and design of the state-controlled road.</p> <p>AND</p> | N/A |
| | <p>AO16.3 Development does not require new or changed access between the premises and the state-controlled road.</p> <p>Note: A decision under section 62 of the <i>Transport Infrastructure Act 1994</i> outlines the approved conditions for use of an existing vehicular access to a state-controlled road. Current section 62 decisions can be obtained from the relevant Department of Transport and Main Roads regional office.</p> <p>AND</p> | N/A |

| Performance outcomes | Acceptable outcomes | |
|---|---|---|
| | <p>AO16.4 Use of any existing vehicular access to the development is consistent with a decision under section 62 of the <i>Transport Infrastructure Act 1994</i>.</p> <p>Note: The development which is the subject of the application must be of an equivalent use and intensity for which the section 62 approval was issued and the section 62 approval must have been granted no more than 5 years prior to the lodgement of the application.</p> <p>AND</p> | N/A |
| | <p>AO16.5 On-site vehicle circulation is designed to give priority to entering vehicles at all times so vehicles do not queue in a road intersection or on the state-controlled road.</p> | N/A |
| Vehicular access to local roads within 100 metres of an intersection with a state-controlled road | | |
| <p>PO17 The location and design of vehicular access to a local road within 100 metres of an intersection with a state-controlled road does not create a safety hazard for users of a state-controlled road.</p> <p>Note: Refer to the SDAP Supporting Information: Vehicular access to a state-controlled road, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.</p> | <p>AO17.1 Vehicular access is located as far as possible from the state-controlled road intersection.</p> <p>AND</p> | N/A – No vehicular access is proposed within 100m of an intersection with a state-controlled road. |
| | <p>AO17.2 Vehicular access is in accordance with parts, 3, 4 and 4A of the Road Planning and Design Manual, 2nd Edition: Volume 3, Department of Transport and Main Roads, 2016.</p> <p>AND</p> | N/A |
| | <p>AO17.3 On-site vehicle circulation is designed to give priority to entering vehicles at all times so vehicles do not queue in the intersection or on the state-controlled road.</p> | N/A |
| Public passenger transport infrastructure on state-controlled roads | | |
| <p>PO18 Development does not damage or interfere with public passenger transport infrastructure, public passenger services or pedestrian or cycle access to public passenger transport infrastructure and public passenger services.</p> | <p>AO18.1 Vehicular access and associated road access works are not located within 5 metres of existing public passenger transport infrastructure.</p> <p>AND</p> | <p>Complies with AO18.1 Please refer to Section 4.2 of the Traffic Impact Assessment (TIA). Vehicular accesses are not located within 5 metres of public passenger transport infrastructure.</p> |

| Performance outcomes | Acceptable outcomes | |
|--|--|--|
| <p>Note: Refer to the SDAP Supporting Information: Vehicular access to a state-controlled road, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.</p> | <p>AO18.2 Development does not necessitate the relocation of existing public passenger transport infrastructure.</p> <p>AND</p> | <p>Complies with AO18.2 Please refer to Section 4.2 of the TIA. No significant changes to the existing access arrangements are proposed. The development does not necessitate the relocation of existing public passenger transport infrastructure.</p> |
| | <p>AO18.3 On-site vehicle circulation is designed to give priority to entering vehicles at all times so vehicles using a vehicular access do not obstruct public passenger transport infrastructure and public passenger services or obstruct pedestrian or cycle access to public passenger transport infrastructure and public passenger services.</p> <p>AND</p> | <p>Complies with AO18.3 Please refer to Section 4.2 of the TIA. No significant changes to the existing access arrangements are proposed.</p> |
| | <p>AO18.4 The normal operation of public passenger transport infrastructure or public passenger services is not interrupted during construction of the development.</p> | <p>Complies with AO18.4 It is not expected that the normal operation of public passenger transport infrastructure or public passenger services will be interrupted during construction.</p> |
| Planned upgrades | | |
| <p>PO19 Development does not impede delivery of planned upgrades of state-controlled roads.</p> | <p>AO19.1 Development is not located on land identified by the Department of Transport and Main Roads as land required for the planned upgrade of a state-controlled road.</p> <p>Note: Land required for the planned upgrade of a state-controlled road is identified in the DA mapping system.</p> <p>OR</p> | <p>Complies with AO19.1 Please refer to Section 2.1.1 of the TIA. A review of the Queensland Transport and Roads Investment Program (QTRIP) 2017-18 to 2020-21, published by TMR, indicated that no upgrades are planned for the existing road, active transport or public transport networks adjacent to the site.</p> |
| | <p>AO19.2 Development is sited and designed so that permanent buildings, structures, infrastructure, services or utilities are not located on land identified by the Department of Transport and Main Roads as land required for the planned upgrade of a state-controlled road.</p> | <p>N/A</p> |

| Performance outcomes | Acceptable outcomes | |
|--|--|--|
| | <p>OR all of the following acceptable outcomes apply:</p> <p>AO19.3 Structures and infrastructure located on land identified by the Department of Transport and Main Roads as land required for the planned upgrade of a state-controlled road are able to be readily relocated or removed without materially affecting the viability or functionality of the development.</p> <p>AND</p> | N/A |
| | <p>AO19.4 Vehicular access for the development is consistent with the function and design of the planned upgrade of the state-controlled road.</p> <p>AND</p> | N/A |
| | <p>AO19.5 Development does not involve filling and excavation of, or material changes to, land required for a planned upgrade to a state-controlled road.</p> <p>AND</p> | N/A |
| | <p>AO19.6 Land is able to be reinstated to the pre-development condition at the completion of the use.</p> | N/A |
| Network impacts | | |
| <p>PO20 Development does not result in a worsening of operating conditions on the state-controlled road network.</p> <p>Note: To demonstrate compliance with this performance outcome, it is recommended that an RPEQ certified traffic impact assessment is provided. Please refer to the Guide to Traffic Impact Assessment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.</p> | No acceptable outcome is prescribed. | <p>Complies with PO20 Please refer to Section 5.6 of the TIA.</p> <p>The traffic analysis, completed in accordance with the Guide to Traffic Impact Assessment (GTIA), Department of Transport and Main Roads, 2017 indicates that the development will not have a significant impact on the operation of the state-controlled road network i.e. average intersection delays are not expected to increase by more than 5%.</p> |
| <p>PO21 Development does not impose traffic loadings on a state-controlled road which could be accommodated on the local road network.</p> | <p>AO21.1 The layout and design of the development directs traffic generated by the development to the local road network.</p> | N/A |

| Performance outcomes | Acceptable outcomes | |
|--|---|-----|
| PO22 Upgrade works on, or associated with, a state-controlled road are built in accordance with Queensland road design standards. | AO22.1 Upgrade works required as a result of the development are designed and constructed in accordance with the <i>Road Planning and Design Manual</i> , 2 nd edition, Department of Transport and Main Roads, 2016. Note: Road works in a state-controlled road require approval under section 33 of the <i>Transport Infrastructure Act 1994</i> before the works commence. | N/A |

Table 1.2.2: Environmental emissions

Statutory note: Where a **state-controlled road** is co-located in the same transport corridor as a railway, the development should instead comply with table 2.2.2: Environmental emissions in State code 2: Development in a railway environment.

Refer to the SDAP Supporting Information: Environmental emissions in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with the performance outcomes in Table 1.2.2.

| Performance outcomes | Acceptable outcomes | |
|---|---|-----|
| Noise | | |
| Accommodation activities | | |
| PO23 Development involving an accommodation activity or land for a future accommodation activity minimises noise intrusion from a state-controlled road or type 1 multi-modal corridor in habitable rooms. | AO23.1 A noise barrier or earth mound is provided which is designed, sited and constructed: <ol style="list-style-type: none"> 1. to meet the following external noise criteria at all facades of the building envelope: <ol style="list-style-type: none"> a. ≤ 60 dB(A) L_{10} (18 hour) façade corrected (measured L_{90} (8 hour) free field between 10pm and 6am ≤ 40 dB(A)) b. ≤ 63 dB(A) L_{10} (18 hour) façade corrected (measured L_{90} (8 hour) free field between 10pm and 6am > 40 dB(A)) 2. in accordance with chapter 7 integrated noise barrier design of the Transport Noise Management Code of Practice: Volume 1 (Road Traffic Noise), Department of Transport and Main Roads, 2013. <p>Note: To demonstrate compliance with the acceptable outcome, it is recommended that a RPEQ certified noise assessment report is provided, prepared in accordance with the SDAP Supporting</p> | N/A |

| Performance outcomes | Acceptable outcomes | |
|----------------------|---|-----|
| | <p>Information: Environmental emissions in a state-controlled road environment, Department of Transport and Main Roads, 2017.</p> <p>If the building envelope is unknown, the deemed-to-comply setback distances for buildings stipulated by the local planning instrument or relevant building regulations should be used.</p> <p>In some instances, the design of noise barriers and mounds to achieve the noise criteria above the ground floor may not be reasonable or practicable. In these instances, any relaxation of the criteria is at the discretion of the Department of Transport and Main Roads.</p> | |
| | <p>OR all of the following acceptable outcomes apply:</p> <p>AO23.2 Buildings which include a habitable room are setback the maximum distance possible from a state-controlled road or type 1 multi-modal corridor.</p> <p>AND</p> | N/A |
| | <p>AO23.3 Buildings are designed and oriented so that habitable rooms are located furthest from a state-controlled road or type 1 multi-modal corridor.</p> <p>AND</p> | N/A |
| | <p>AO23.4 Buildings (other than a relevant residential building or relocated building) are designed and constructed using materials which ensure that habitable rooms meet the following internal noise criteria:</p> <ol style="list-style-type: none"> 1. ≤ 35 dB(A) L_{eq} (1 hour) (maximum hour over 24 hours). <p>Note: Noise levels from a state-controlled road or type 1 multi-modal corridor are to be measured in accordance with AS1055.1–1997 Acoustics – Description and measurement of environmental noise.</p> <p>To demonstrate compliance with the acceptable outcome, it is recommended that a RPEQ certified noise assessment report is provided, prepared in accordance with the SDAP Supporting Information: Environmental emissions in a state controlled road environment, Department of Transport and Main Roads 2017.</p> <p>Habitable rooms of relevant residential buildings located within a transport noise corridor must comply with the Queensland Development Code MP4.4 Buildings in a transport noise corridor, Queensland Government, 2015. Transport noise corridors are</p> | N/A |

| Performance outcomes | Acceptable outcomes | |
|--|--|-----|
| | mapped on the State Planning Policy interactive mapping system. | |
| <p>PO24 Development involving an accommodation activity or land for a future accommodation activity minimises noise intrusion from a state-controlled road or type 1 multi-modal corridor in outdoor spaces for passive recreation.</p> | <p>AO24.1 A noise barrier or earth mound is provided which is designed, sited and constructed:</p> <ol style="list-style-type: none"> 1. to meet the following external noise criteria in outdoor spaces for passive recreation: <ol style="list-style-type: none"> a. ≤ 57 dB(A) L_{10} (18 hour) free field (measured L_{90} (18 hour) free field between 6am and 12 midnight ≤ 45 dB(A)) b. ≤ 60 dB(A) L_{10} (18 hour) free field (measured L_{90} (18 hour) free field between 6am and 12 midnight > 45 dB(A)) 2. in accordance with chapter 7 integrated noise barrier design of the Transport Noise Management Code of Practice – Volume 1 Road Traffic Noise, Department of Transport and Main Roads, 2013. <p>Note: To demonstrate compliance with the acceptable outcome, it is recommended that a RPEQ certified noise assessment report is provided, prepared in accordance with the SDAP Supporting Information: Environmental emissions in a state controlled road environment, Department of Transport and Main Roads 2017</p> <p>OR</p> | N/A |
| | <p>AO24.2 Each dwelling has access to an outdoor space for passive recreation which is shielded from a state-controlled road or type 1 multi-modal corridor by a building, solid gap-free fence, or other solid gap-free structure.</p> <p>AND</p> | N/A |
| | <p>AO24.3 Each dwelling with a balcony directly exposed to noise from a state-controlled road or type 1 multi-modal corridor has a continuous solid gap-free balustrade (other than gaps required for drainage purposes to comply with the Building Code of Australia).</p> | N/A |

| Performance outcomes | Acceptable outcomes | |
|---|--|--|
| | | |
| Childcare centres and educational establishments | | |
| <p>PO25 Development involving a:</p> <ol style="list-style-type: none"> 1. childcare centre; or 2. educational establishment <p>minimises noise intrusion from a state-controlled road or type 1 multi-modal corridor in indoor education areas and indoor play areas.</p> | <p>AO25.1 A noise barrier or earth mound is provided which is designed, sited and constructed:</p> <ol style="list-style-type: none"> 1. to meet the following external noise criteria at all facades of the building envelope: <ol style="list-style-type: none"> a. ≤ 58 dB(A) L₁₀ (1 hour) façade corrected (maximum hour during normal opening hours) 2. in accordance with chapter 7 – Integrated noise barrier design of the Transport Noise Management Code of Practice: Volume 1 (Road Traffic Noise), Department of Transport and Main Roads, 2013. <p>Note: To demonstrate compliance with the acceptable outcome, it is recommended that a RPEQ certified noise assessment report is provided, prepared in accordance with the SDAP Supporting Information: Environmental emissions in a state controlled road environment, Department of Transport and Main Roads 2017. If the building envelope is unknown, the deemed-to-comply setback distances for buildings stipulated by the local planning instrument or relevant building regulations should be used.</p> | Please refer to the noise assessment report. |
| | <p>OR all of the following acceptable outcomes apply:</p> <p>AO25.2 Buildings which include indoor education areas and indoor play areas are setback the maximum distance possible from a state-controlled road or type 1 multi-modal corridor.</p> <p>AND</p> | Please refer to the noise assessment report. |

| Performance outcomes | Acceptable outcomes | |
|---|--|--|
| | <p>AO25.3 Buildings are designed and oriented so that indoor education areas and indoor play areas are located furthest from the state-controlled road or type 1 multi-modal corridor.</p> <p>AND</p> | Please refer to the noise assessment report. |
| | <p>AO25.4 Buildings are designed and constructed using materials which ensure indoor education areas and indoor play areas meet the following internal noise criteria:</p> <ol style="list-style-type: none"> 1. ≤ 35 dB(A) L_{eq} (1 hour) (maximum hour during opening hours). <p>Note: Noise levels from a state-controlled road or type 1 multi-modal corridor are to be measured in accordance with AS1055.1–1997 Acoustics – Description and measurement of environmental noise.</p> <p>To demonstrate compliance with the acceptable outcome, it is recommended that a RPEQ certified noise assessment report is provided, prepared in accordance with the SDAP Supporting Information: Environmental emissions in a state controlled road environment, Department of Transport and Main Roads 2017.</p> | Please refer to the noise assessment report. |
| <p>PO26 Development involving a:</p> <ol style="list-style-type: none"> 1. childcare centre; or 2. educational establishment <p>minimises noise intrusion from a state-controlled road or type 1 multi-modal corridor in outdoor education areas and outdoor play areas.</p> | <p>AO26.1 A noise barrier or earth mound is provided which is designed, sited and constructed:</p> <ol style="list-style-type: none"> 1. to meet the following external noise criteria in each outdoor education area or outdoor play area: <ol style="list-style-type: none"> a. ≤ 63 dB(A) L_{10} (12 hour) free field (between 6am and 6pm) 2. in accordance with chapter 7 – Integrated noise barrier design of the Transport Noise Management Code of Practice: Volume 1 (Road Traffic Noise), Department of Transport and Main Roads, 2013. <p>Note: To demonstrate compliance with the acceptable outcome, it is recommended that a RPEQ certified noise assessment report is provided, prepared in accordance with the SDAP Supporting Information: Environmental emissions in a state controlled road</p> | Please refer to the noise assessment report. |

| Performance outcomes | Acceptable outcomes | |
|--|--|---|
| | <p>environment, Department of Transport and Main Roads 2017. OR</p> | |
| | <p>AO26.2 Each outdoor education area and outdoor play area is shielded from noise generated from a state-controlled road or type 1 multi-modal corridor by a building, solid gap-free fence, or other solid gap-free structure.</p> | <p>Please refer to the noise assessment report.</p> |
| Hospitals | | |
| <p>PO27 Development involving a hospital minimises noise intrusion from a state-controlled road or type 1 multi-modal corridor in patient care areas.</p> | <p>AO27.1 Hospitals are designed and constructed using materials which ensure patient care areas meet the following internal noise criteria:</p> <ol style="list-style-type: none"> 1. ≤ 35 dB(A) L_{eq} (1 hour) (maximum hour during opening hours). <p>Note: Noise levels from a state-controlled road or type 1 multi-modal corridor are to be measured in accordance with AS1055.1–1997 Acoustics – Description and measurement of environmental noise.</p> <p>To demonstrate compliance with the acceptable outcome, it is recommended that a RPEQ certified noise assessment report is provided, prepared in accordance with the SDAP Supporting Information: Environmental emissions in a state controlled road environment, Department of Transport and Main Roads 2017.</p> | <p>N/A</p> |
| Vibration | | |
| Hospitals | | |

| Performance outcomes | Acceptable outcomes | |
|---|---|--|
| <p>PO28 Development involving a hospital minimises vibration impacts from vehicles using a state-controlled road or type 1 multi-modal corridor in patient care areas.</p> | <p>AO28.1 Hospitals are designed and constructed to ensure vibration in the treatment area of a patient care area does not exceed a vibration dose value of $0.1\text{m/s}^{1.75}$.</p> <p>AND</p> | N/A |
| | <p>AO28.2 Hospitals are designed and constructed to ensure vibration in the ward area of a patient care area does not exceed a vibration dose value of $0.4\text{m/s}^{1.75}$.</p> <p>Note: To demonstrate compliance with the acceptable outcome, it is recommended that a RPEQ certified vibration assessment report is provided.</p> | N/A |
| Air and light | | |
| <p>PO29 Development involving an accommodation activity minimises air quality impacts from a state-controlled road or type 1 multi-modal corridor in outdoor spaces for passive recreation.</p> | <p>AO29.1 Each dwelling has access to an outdoor space for passive recreation which is shielded from a state-controlled road or type 1 multi-modal corridor by a building, solid gap-free fence, or other solid gap-free structure.</p> | Please refer to the air quality assessment report. |
| <p>PO30 Development involving a:</p> <ol style="list-style-type: none"> 1. childcare centre; or 2. educational establishment <p>minimises air quality impacts from a state-controlled road or type 1 multi-modal corridor in outdoor education areas and outdoor play areas.</p> | <p>AO30.1 Each outdoor education area and outdoor play area is shielded from a state-controlled road or type 1 multi-modal corridor by a building, solid gap-free fence, or other solid gap-free structure.</p> | Please refer to the air quality assessment report. |
| <p>PO31 Development involving an accommodation activity or hospital minimises lighting impacts from a state-controlled road or type 1 multi-modal corridor.</p> | <p>AO31.1 Buildings for an accommodation activity or hospital are designed to minimise the number of windows or transparent/translucent panels facing a state-controlled road or type 1 multi-modal corridor.</p> <p>OR</p> | Please refer to the air quality assessment report. |

| Performance outcomes | Acceptable outcomes | |
|----------------------|--|--|
| | AO31.2 Windows facing a state-controlled road or type 1 multi-modal corridor include treatments to block light from a state-controlled road or type 1 multi-modal corridor. | Please refer to the air quality assessment report. |

Table 1.2.3: Development in a future state-controlled road environment

| Performance outcomes | Acceptable outcomes | |
|---|--|--|
| <p>PO32 Development does not impede delivery of a future state-controlled road.</p> | <p>AO32.1 Development is not located in a future state-controlled road. OR</p> | <p>Complies with AO32.1 The development is not located in a future state-controlled road.</p> |
| | <p>AO32.2 Development is sited and designed so that permanent buildings, structures, infrastructure, services or utilities are not located in a future state-controlled road.</p> | <p>N/A</p> |
| | <p>OR all of the following acceptable outcomes apply: AO32.3 Structures and infrastructure located in a future state-controlled road are able to be readily relocated or removed without materially affecting the viability or functionality of the development. AND</p> | <p>N/A</p> |
| | <p>AO32.4 Development does not involve filling and excavation of, or material changes to, a future state-controlled road. AND</p> | <p>N/A</p> |
| | <p>AO32.5 Land is able to be reinstated to the pre-development condition at the completion of the use.</p> | <p>N/A</p> |
| <p>PO33 Vehicular access to a future state-controlled road is located and designed to not create a safety hazard for users of a future state-controlled road or result in a worsening of operating conditions on a future state-controlled road.</p> <p>Note: Where a new or changed access between the premises and a future state-controlled road is proposed, the Department of Transport and Main Roads will need to assess the proposal to determine if the vehicular access for the development is safe. An assessment can be made by Department of Transport and Main Roads as part of the development assessment process and a decision under section 62 of <i>Transport Infrastructure Act 1994</i> issued.</p> | <p>AO33.1 Development does not require new or changed access between the premises and a future state-controlled road. AND</p> | <p>N/A</p> |
| | <p>AO33.2 Vehicular access for the development is consistent with the function and design of the future state-controlled road.</p> | <p>N/A</p> |

| Performance outcomes | Acceptable outcomes | |
|---|---|------------|
| <p>PO34 Filling, excavation, building foundations and retaining structures do not undermine, or cause subsidence of, a future state-controlled road.</p> <p>Note: To demonstrate compliance with this performance outcome, it is recommended that an RPEQ certified geotechnical assessment is provided, prepared in accordance with the Road Planning and Design Manual, 2nd edition: Volume 3, Department of Transport and Main Roads, 2016.</p> <p>Refer to the SDAP Supporting Information: Filling, excavation and retaining structures in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome and prepare a geotechnical assessment.</p> | <p>No acceptable outcome is prescribed.</p> | <p>N/A</p> |
| <p>PO35 Fill material from a development site does not result in contamination of land for a future state-controlled road.</p> <p>Note: Refer to the SDAP Supporting Information: Filling, excavation and retaining structures in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.</p> | <p>AO35.1 Fill material is free of contaminants including acid sulfate content. Note: Soil and rocks should be tested in accordance with AS1289 – Methods of testing soils for engineering purposes and AS4133 2005 – Methods of testing rocks for engineering purposes.</p> <p>AND</p> | <p>N/A</p> |
| <p>PO36 Development does not result in an actionable nuisance, or worsening of, stormwater, flooding or drainage impacts in a future state-controlled road.</p> <p>Note: Refer to the SDAP Supporting Information: Stormwater and drainage in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.</p> | <p>AO35.2 Compaction of fill is carried out in accordance with the requirements of AS1289.0 2000 – Methods of testing soils for engineering purposes.</p> <p>No acceptable outcome is prescribed.</p> | <p>N/A</p> |

| Performance outcomes | Acceptable outcomes | |
|--|---|-----|
| <p>PO37 Run-off from the development site is not unlawfully discharged to a future state-controlled road.</p> <p>Note: Refer to the SDAP Supporting Information: Stormwater and drainage in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.</p> | <p>AO37.1 Development does not create any new points of discharge to a future state-controlled road.</p> <p>AND</p> | N/A |
| | <p>AO37.2 Stormwater run-off is discharged to a lawful point of discharge.</p> <p>Note: Section 3.4 of the Queensland Urban Drainage Manual, Department of Energy and Water Supply, 2013, provides further information on lawful points of discharge.</p> <p>AND</p> | N/A |
| | <p>AO37.3 Development does not worsen the condition of an existing lawful point of discharge to the future state-controlled road.</p> | N/A |

State code 6: Protection of state transport networks

Table 6.2.2: All development

| Performance outcomes | Acceptable outcomes | Response |
|--|--------------------------------------|---|
| Network impacts | | |
| <p>PO1 Development does not result in a worsening of the safety of a state-controlled road.</p> <p>Note: To demonstrate compliance with this performance outcome, it is recommended that a Registered Professional Engineer of Queensland (RPEQ) certified road safety audit or road safety assessment (as applicable) is provided.</p> <p>Further information on determining whether a road safety audit or road safety assessment is required is provided in section 9 of the Guide to Traffic Impact Assessment, Department of Transport and Main Roads, 2017.</p> | No acceptable outcome is prescribed. | <p>Complies with PO1</p> <p>Please refer to Sections 4.2 and 5.6 of the Traffic Impact Assessment (TIA).</p> <p>No significant changes to the existing access arrangements are proposed.</p> <p>The traffic analysis, completed in accordance with the 'Guide to Traffic Impact Assessment, Department of Transport and Main Roads, 2017' (GTIA) indicates that the development will not have a significant impact on the operation of the state-controlled road network i.e. average intersection delays are not expected to increase by more than 5%.</p> |
| <p>PO2 Development does not result in a worsening of the infrastructure condition of a state-controlled road or road transport infrastructure.</p> <p>Note: To demonstrate compliance with this performance outcome, it is recommended that a RPEQ certified traffic impact assessment and pavement impact assessment are provided.</p> <p>Further information on how to prepare a traffic impact assessment and pavement impact assessment is provided in the Guide to Traffic Impact Assessment, Department of Transport and Main Roads, 2017.</p> | No acceptable outcome is prescribed. | <p>Complies with PO2</p> <p>Please refer to Sections 4.2 and 5.6 of the TIA.</p> <p>No significant changes to the existing access arrangements are proposed.</p> <p>The traffic analysis completed in accordance with the GTIA indicates that the development will not have a significant impact on the operation of the state-controlled road network i.e. average intersection delays are not expected to increase by more than 5%.</p> |
| <p>PO3 Development does not result in a worsening of operating conditions on a state-controlled road or the surrounding road network.</p> <p>Note: To demonstrate compliance with this performance outcome, it is recommended that an RPEQ certified traffic impact assessment is provided.</p> <p>Further information on how to prepare a traffic impact assessment is provided in the Guide to Traffic Impact Assessment, Department of Transport and Main Roads, 2017.</p> | No acceptable outcome is prescribed. | <p>Complies with PO3</p> <p>Please refer to Sections 4.2 and 5.6 of the TIA.</p> <p>No significant changes to the existing access arrangements are proposed.</p> <p>The traffic analysis completed in accordance with the GTIA indicates that the development will not have a significant impact on the operation of the state-controlled road network i.e. average intersection delays are not expected to increase by more than 5%.</p> |

| Performance outcomes | Acceptable outcomes | Response |
|--|---|----------|
| PO4 Development does not impose traffic loadings on a state-controlled road which could be accommodated on the local road network. | AO4.1 The layout and design of the development directs traffic generated by the development to the local road network. | N/A |
| PO5 Upgrade works on, or associated with, a state-controlled road are built in accordance with relevant design standards. | AO5.1 Upgrade works on a state-controlled road are designed and constructed in accordance with the Road Planning and Design Manual, 2nd edition, Department of Transport and Main Roads, 2016. | N/A |
| <p>PO6 Development involving the haulage of fill, extracted material or excavated spoil material exceeding 10,000 tonnes per year does not damage the pavement of a state-controlled road.</p> <p>Note: It is recommended that a transport infrastructure impact assessment and pavement impact assessment are provided.</p> <p>Further information on how to prepare a traffic impact assessment is provided in the Guide to Traffic Impact Assessment, Department of Transport and Main Roads, 2017.</p> | AO6.1 Fill, extracted material and spoil material is not transported to or from the development site on a state-controlled road. | N/A |
| <p>PO7 Development does not adversely impact on the safety of a railway crossing.</p> <p>Note: It is recommended that a traffic impact assessment be prepared to demonstrate compliance with this performance outcome. An impact on a level crossing may require an Australian Level Crossing Assessment Model (ALCAM) assessment to be undertaken. Section 2.2 – Railway crossing safety of the Guide to Development in a Transport Environment: Rail, Department of Transport and Main Roads, 2015, provides guidance on how to comply with this performance outcome.</p> | AO7.1 Development does not require a new railway crossing. | N/A |
| | OR | |
| | AO7.2 A new railway crossing is grade separated. | N/A |
| | <p>OR all of the following acceptable outcomes apply:</p> <p>AO7.3 Upgrades to a level crossing are designed and constructed in accordance with AS1742.7 – Manual of uniform traffic control devices, Part 7: Railway crossings and applicable rail manager standard drawings.</p> <p>Note: It is recommended a traffic impact assessment be prepared to demonstrate compliance with this acceptable outcome. An impact on a level crossing may require an Australian Level Crossing Assessment Model (ALCAM) assessment to be undertaken. Section 2.2 – Railway crossing safety of the Guide to Development in a Transport Environment: Rail, Department of Transport and Main Roads, 2015, provides guidance on how to comply with this acceptable outcome</p> | N/A |

| Performance outcomes | Acceptable outcomes | Response |
|---|--|---|
| | AND | |
| | <p>AO7.4 Access points achieve sufficient clearance from a level crossing in accordance with AS1742.7 – Manual of uniform traffic control devices, Part 7: Railway crossings by providing a minimum clearance of 5 metres from the edge running rail (outer rail) plus the length of the largest vehicle anticipated on-site.</p> <p>Note: Section 2.2 of the Guide to Development in a Transport Environment: Rail, Department of Transport and Main Roads, 2015, provides guidance on how to comply with this acceptable outcome.</p> | N/A |
| | AND | |
| | AO7.5 On-site vehicle circulation is designed to give priority to entering vehicles at all times. | N/A |
| PO8 Development does not result in a worsening of the infrastructure condition of a railway or rail transport infrastructure. | No acceptable outcome is prescribed. | N/A |
| PO9 Development does not result in a worsening of operating conditions of a railway | No acceptable outcome is prescribed. | N/A |
| Stormwater and drainage | | |
| PO10 Development does not result in an actionable nuisance, or worsening of, stormwater, flooding or drainage impacts in a state transport corridor. | No acceptable outcome is prescribed. | Please refer to the storm water report. |
| PO11 Run-off from the development site is not unlawfully discharged to a state transport corridor. | <p>AO11.1 Development does not create any new points of discharge to a state transport corridor.</p> <p>AND</p> | Please refer to the storm water report. |
| | <p>AO11.2 Stormwater run-off is discharged to a lawful point of discharge.</p> <p>Note: Section 3.4 of the Queensland Urban Drainage Manual, Department of Energy and Water Supply, 2013, provides further information on lawful points of discharge.</p> <p>AND</p> | Please refer to the storm water report. |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| | AO11.3 Development does not worsen the condition of an existing lawful point of discharge to a state transport corridor. | Please refer to the storm water report. |
| PO12 Run-off from the development site does not cause siltation of stormwater infrastructure affecting a state transport corridor. | AO12.1 Run-off from the development site is not discharged to stormwater infrastructure for a state transport corridor. | Please refer to the storm water report. |
| Planned upgrades | | |
| PO13 Development does not impede delivery of planned upgrades of state transport infrastructure. | AO13.1 Development is not located on land identified by the Department of Transport and Main Roads as land required for the planned upgrade of state transport infrastructure. Note: Land required for the planned upgrade of state transport infrastructure is identified in the DA mapping system. OR | Complies with AO13.1 Please refer to Section 2.1.1 of the TIA. A review of the Queensland Transport and Roads Investment Program (QTRIP) 2017-18 to 2020-21, published by TMR, indicated that no upgrades are planned for the existing road, active transport or public transport networks adjacent to the site. |
| | AO13.2 Development is sited and designed so that permanent buildings, structures, infrastructure, services or utilities are not located on land identified by the Department of Transport and Main Roads as land required for the planned upgrade of state transport infrastructure. OR all of the following acceptable outcomes apply: | N/A |
| | AO13.3 Structures and infrastructure located on land identified by the Department of Transport and Main Roads as land required for the planned upgrade of state transport infrastructure are able to be readily relocated or removed without materially affecting the viability or functionality of the development. AND | N/A |
| | AO13.4 Vehicular access for the development is consistent with the function and design of the planned upgrade of state transport infrastructure. | N/A |

| Performance outcomes | Acceptable outcomes | Response |
|----------------------|--|----------|
| | AND | |
| | AO13.5 Development does not involve filling and excavation of, or material changes to, land required for a planned upgrade to a state transport infrastructure. | N/A |
| | AND | |
| | AO13.6 Land is able to be reinstated to the predevelopment condition at the completion of the use. | N/A |

Table 6.2.3: Public passenger transport infrastructure

| Performance outcomes | Acceptable outcomes | Response |
|--|---|---|
| Public passenger transport infrastructure | | |
| PO14 Development does not damage or interfere with public passenger transport infrastructure, public passenger services or pedestrian or cycle access to public passenger transport infrastructure and public passenger services. | AO14.1 Vehicular access and associated road access works are not located within 5 metres of public passenger transport infrastructure. | Complies with AO15.1 Please refer to Section 4.2 of the TIA. No significant changes to the existing access arrangements are proposed. Vehicular accesses are not located within 5 metres of public passenger transport infrastructure. |
| | AND | |
| | AO14.2 Development does not necessitate the relocation of existing public passenger transport infrastructure. | Complies with AO14.2 Please refer to Section 4.2 of the TIA. No significant changes to the existing access arrangements are proposed. The development does not necessitate the relocation of existing public passenger transport infrastructure. |
| AND | | |
| AO14.3 Development does not obstruct pedestrian or cyclist access to public passenger transport infrastructure or public passenger services. | | Complies with AO14.2 Please refer to Section 4.2 of the TIA. No significant changes to the existing access arrangements are proposed. The development does not obstruct pedestrian or cyclist access to public passenger transport infrastructure or public passenger services. |
| AND | | |

| Performance outcomes | Acceptable outcomes | Response |
|--|--|--|
| | <p>AO14.4 The normal operation of public passenger transport infrastructure or public passenger services is not interrupted during construction of the development.</p> | <p>Complies with AO18.4 It is not expected that the normal operation of public passenger transport infrastructure or public passenger services will be interrupted during construction.</p> |
| <p>PO15 Upgraded or new public passenger transport infrastructure is provided to accommodate the demand for public passenger transport generated by the development.</p> <p>Note: To demonstrate compliance with this performance outcome, it is recommended a public transport impact assessment be prepared in accordance with appendix 1 of the State Development Assessment Provisions Supporting Information – Public Passenger Transport Infrastructure, Department of Transport and Main Roads, 2017.</p> <p>New or upgraded public passenger transport infrastructure provided should be in accordance with the Public Transport Infrastructure Manual, Department of Transport and Main Roads, 2015.</p> <p>Refer to the SDAP Supporting Information: Public passenger transport infrastructure, Department of Transport and Main Roads, 2017, for further guidance on how to comply with the performance outcome.</p> | <p>No acceptable outcome is prescribed.</p> | <p>Complies with PO15 Please refer to Section 3.2 of the TIA. No changes to existing public transport infrastructure are required.</p> |
| <p>PO16 Development is designed to ensure the location of public passenger transport infrastructure prioritises and enables efficient public passenger services.</p> <p>Note: Chapters 2 and 5 of the Public Transport Infrastructure Manual, Department of Transport and Main Roads, 2015 provides guidance on how to comply with this performance outcome.</p> <p>Refer to the SDAP Supporting Information: Public passenger transport infrastructure, Department of Transport and Main Roads, 2017, for further guidance on how to comply with the performance outcome.</p> | <p>No acceptable outcome is prescribed.</p> | <p>N/A</p> |

| Performance outcomes | Acceptable outcomes | Response |
|---|--|------------|
| <p>PO17 Development enables the provision or extension of public passenger services to the development and avoids creating indirect or inefficient routes for public passenger services.</p> <p>Note: Refer to the SDAP Supporting Information: Public passenger transport infrastructure, Department of Transport and Main Roads, 2017, for further guidance on how to comply with the performance outcome.</p> | <p>No acceptable outcome is prescribed.</p> | <p>N/A</p> |
| <p>PO18 New or modified road networks are designed to enable development to be serviced by public passenger services.</p> <p>Note: Refer to the SDAP Supporting Information: Public passenger transport infrastructure, Department of Transport and Main Roads, 2017, for further guidance on how to comply with the performance outcome.</p> | <p>AO18.1 Roads catering for buses are arterial or sub-arterial roads, collector or their equivalent.</p> <p>AND</p> | <p>N/A</p> |
| | <p>AO18.2 Roads intended to accommodate buses are designed and constructed in accordance with Road Planning and Design Manual 2nd edition, Volume 3: Guide to Road Design, Department of Transport and Main Roads, 2016.</p> <p>Note: Guidance on how to meet the acceptable outcome is available in the Road Planning and Design Manual 2nd edition, Volume 3: Guide to Road Design, Department of Transport and Main Roads, 2016:</p> <ol style="list-style-type: none"> 1. Part 3: <ol style="list-style-type: none"> a. 4.2 Traffic lanes b. 4.8 Bicycle lanes c. 4.9 High occupancy vehicle (HOV) lanes d. 4.12 Bus stops e. 7 Horizontal alignment f. 7.7 Super elevation g. 7.9 Curve widening 2. Part 4: <ol style="list-style-type: none"> a. 6.3 Bus Facilities b. 5.6 Design vehicle swept path 3. Part 4A: <ol style="list-style-type: none"> a. 5 Auxiliary lanes 4. Part 4B: Roundabouts: <ol style="list-style-type: none"> a. 4 Geometric design b. 4.6 Circulating carriageway. <p>AND</p> | <p>N/A</p> |
| | <p>AO18.3 Traffic calming devices are not installed on roads used for buses.</p> | <p>N/A</p> |

| Performance outcomes | Acceptable outcomes | Response |
|---|--|--|
| | <p>Note: Chapter 2 of the Public Transport Infrastructure Manual, Department of Transport and Main Roads, 2015 provides guidance on how to comply with this acceptable outcome.</p> <p>AND</p> <p>AO18.4 Where road humps are installed on roads used for buses, the road humps are designed in accordance with the Manual of Uniform Traffic Control Devices, Department of Transport and Main Roads, 2016.</p> <p>Note: Guidance on how to meet the acceptable outcome is available in the Manual of Uniform Traffic Control Devices, Part 13:</p> <ol style="list-style-type: none"> 1. Local Area Traffic Management, section 2.4 – Road humps 2. Supplement part 13: Local Area Traffic Management – 2.4.2-1 Hump profiles for bus routes. | |
| <p>PO19 Development provides safe, direct and convenient pedestrian access to existing and future public passenger transport infrastructure.</p> <p>Note: Chapter 3 of the Public Transport Infrastructure Manual, Department of Transport and Main Roads, 2015 provides guidance on how to comply with this performance outcome. In particular, it is recommended that a pedestrian demand analysis be provided to demonstrate compliance with the performance outcome.</p> <p>Refer to the SDAP Supporting Information: Public passenger transport infrastructure, Department of Transport and Main Roads, 2017, for further guidance on how to comply with the performance outcome.</p> | <p>No acceptable outcome is prescribed.</p> | <p>Can comply with PO19</p> <p>Please refer to Section 3.3 of the TIA.</p> <p>Some modification to existing pedestrian access arrangements have been recommended.</p> |
| <p>PO20 On-site vehicular circulation ensures the safety of both public passenger transport services and pedestrians.</p> <p>Note: Refer to the SDAP Supporting Information: Public passenger transport infrastructure, Department of Transport and Main Roads, 2017, for further guidance on how to comply with the performance outcome.</p> | <p>AO20.1 The location of on-site pedestrian crossings ensures safe sight distances for pedestrians and public passenger services.</p> <p>AND</p> <p>AO20.2 On-site circulation is designed and constructed so that public passenger services can enter and leave in a forward gear at all times.</p> <p>AND</p> <p>AO20.3 Development does not result in public</p> | <p>N/A</p> <p>N/A</p> <p>N/A</p> |

| Performance outcomes | Acceptable outcomes | Response |
|--|--|----------|
| | passenger services movements through car parking aisles. | |
| <p>PO21 Taxi facilities are provided to accommodate the demand generated by the development.</p> <p>Note: Guidance on how to meet the performance outcome are available in chapter 7 of the Public Transport Infrastructure Manual, Department of Transport and Main Roads, 2015.</p> <p>Refer to the SDAP Supporting Information: Public passenger transport infrastructure, Department of Transport and Main Roads, 2017, for further guidance on how to comply with the performance outcome.</p> | No acceptable outcome is prescribed. | N/A |
| <p>PO22 Taxi facilities are located and designed to provide convenient, safe and equitable access for passengers.</p> <p>Note: Refer to the SDAP Supporting Information: Public passenger transport infrastructure, Department of Transport and Main Roads, 2017, for further guidance on how to comply with the performance outcome.</p> | <p>AO22.1 A taxi facility is provided parallel to the kerb and adjacent to the main entrance.</p> <p>AND</p> | N/A |
| | <p>AO22.2 Taxi facilities are designed in accordance with:</p> <ol style="list-style-type: none"> 1. AS2890.5–1993 Parking facilities – on-street parking and AS1428.1–2009 Design for access and mobility – general requirements for access – new building work 2. AS1742.11–1999 Parking controls – manual of uniform traffic control devices 3. AS/NZS 2890.6–2009 Parking facilities – offstreet parking for people with disabilities 4. Disability standards for accessible public transport 2002 made under section 31(1) of the <i>Disability Discrimination Act 1992</i> 5. AS/NZS 1158.3.1 – Lighting for roads and public spaces, Part 3.1: Pedestrian area (category P) lighting – Performance and design requirements. | N/A |

| Performance outcomes | Acceptable outcomes | Response |
|---|--|--|
| | | |
| <p>PO23 Educational establishments are designed to ensure the safe and efficient operation of public passenger services and pedestrian access.</p> <p>Note: Refer to the SDAP Supporting Information: Public passenger transport infrastructure, Department of Transport and Main Roads, 2017, for further guidance on how to comply with the performance outcome.</p> | <p>AO23.1 Educational establishments are designed in accordance with the provisions of the Planning for Safe Transport Infrastructure at Schools, Department of Transport and Main Roads, 2011.</p> | <p>Can comply with AO23.1 Please refer to Section 3.3 of the TIA. Some modification to existing pedestrian access arrangements have been recommended.</p> |

| Performance Outcomes | Probable Solutions | Response |
|---|--|---|
| <i>For accepted development subject to requirements and assessable development</i> | | |
| <p>Parking of non-domestic vehicles associated with a dwelling house</p> <p>PO1</p> <p>The parking of non-domestic vehicles in association with a dwelling house does not:</p> <ul style="list-style-type: none"> (a) occur in urban residential areas; (b) detrimentally impact on the visual amenity of the residential street; (c) cause environmental nuisance to nearby sensitive land uses; and (d) impact on the safe operation of the road network. | <p>AO1.1</p> <p>A maximum of one (1) non-domestic vehicle is parked on the premises at any time in the following zones:</p> <ul style="list-style-type: none"> (a) Centre zone; (b) General residential zone—Park residential precinct only; (c) Rural residential zone; and (d) Township zone. <p>AO1.2</p> <p>Non-domestic vehicles must be parked on premises where:</p> <ul style="list-style-type: none"> (a) the site area is a minimum 2,000 square metres; (b) the vehicle is parked behind the rear building line of dwelling house; and (c) the vehicle can enter and leave the premises in a forward gear. | <p>Not Applicable</p> |
| <p>All weather access in the Rural zone</p> <p>PO2</p> <p>A suitable standard of access is provided to the dwelling house.</p> | <p>AO2</p> <p>All weather access is provided to each dwelling house in the Rural zone.</p> | <p>Not Applicable</p> |
| <p>Vehicle parking and servicing</p> <p>PO3</p> <p>The amount of on-site car parking and service vehicle loading/ unloading is consistent with:</p> <ul style="list-style-type: none"> (a) the nature of the use; (b) the traffic generation of the use; (c) the loading/ unloading needs of the use; (d) the availability of street parking in the Centre zone; and (e) the impact of the road network. <p>Car parks, service vehicle access, loading and manoeuvring</p> | <p>AO3.1</p> <p>The minimum number of car parking spaces complies with Table 8.3.6.3.B– Minimum car parking requirements.</p> | <p>Can Comply with AO3.1</p> <p>Refer Section 4.3 of the the Traffic Impact Assessment.</p> <p>Six (6) car parking spaces are required by Council’s Transport, Access and Parking (TAP) Code for the proposed expansion. It is recommended that these spaces are provided on-site to accommodate additional demand associated with the expansion.</p> |

| Performance Outcomes | Probable Solutions | Response |
|---|--|--|
| <p>areas are of suitable standard for the intended use.</p> | <p>AO3.2 The service vehicle complies with Table 8.3.6.3.B– Minimum loading vehicle requirements. AND AO3.3 The service vehicle is able to enter and leave the <i>site</i> in forward gear. AND AO3.4 Service vehicles stand entirely within the <i>site</i> while unloading/ loading.</p> | <p>Complies with AO3.2, AO3.3 & AO3.4 Refer Section 4.5 of the the Traffic Impact Assessment. A new, dedicated loading area is proposed to be constructed to support the proposed expansion. Swept path analysis based on a 9m Medium Rigid Vehicle (MRV) was completed and indicated that this type of vehicle should be able to acceptably access the proposed loading area. Furthermore, it is expected that MRVs will be able to enter and exit the site in forward gear.</p> |
| <i>For assessable development</i> | | |
| <p>Impacts on residential streets PO4 Non-residential activities do not impact on the amenity of land zoned or intended for residential purposes.</p> | <p>AO4.1 Non-residential activities do not use residential streets for access or haulage purposes.</p> | <p>Complies with AO4.1 Refer Section 4.2 of the Traffic Impact Assessment. No changes to the locations of existing accesses are proposed nor considered to be required. Access to the site is via Prospect Street which is identified as a Trunk Collector.</p> |

| Performance Outcomes | Probable Solutions | Response |
|---|--|--|
| <p>Site access</p> <p>PO5</p> <p>Vehicular access points are positioned along the frontage where they do not impact on the safety, capacity and operation of the existing road network having regard to:</p> <p>(a) the amount and type of vehicular traffic;</p> <p>(b) the type of use and traffic generation;</p> <p>(c) the current and future on-street parking arrangements;</p> <p>(d) proximity to intersections; and</p> <p>(e) available sight distances.</p> | <p>AO5.1</p> <p>Where the <i>site</i> has two street frontages, vehicular access is provided from the minor street.</p> <p>AO5.2</p> <p>Direct access is not provided to an arterial or higher order road.</p> | <p>Complies with AO5.1</p> <p>Refer Section 4.2 of the Traffic Impact Assessment.</p> <p>No changes to the locations of existing accesses are proposed nor considered to be required.</p> <p>The site only has frontage to one (1) road i.e. Prospect Street.</p> <p>Complies with AO5.2</p> <p>Refer Sections 2.1 and 4.2 of the Traffic Impact Assessment.</p> <p>Access to the site is via Prospect Street which is identified as a Trunk Collector.</p> |
| <p>PO6</p> <p>The number of crossovers and design standard is appropriate to the use, expected traffic volumes, vehicle types, and function of the <i>road</i>.</p> | <p>AO6.1</p> <p>The maximum number of crossovers is two for non-residential activities and one for residential activities.</p> | <p>Complies with AO6.1</p> <p>Refer Section 4.2 of the Traffic Impact Assessment.</p> <p>The existing number of accesses complies with this requirement.</p> |
| <p>Car parking locations and treatments</p> <p>PO7</p> <p>Car parking location minimises impacts on the streetscape and contributes to the intended character of the zone and locality.</p> | <p>AO7.1</p> <p>Car parking is located behind or within a building.</p> <p>AO7.2</p> <p>The location of visitor parking is discernible from the street or alternatively appropriate signage is provided.</p> | <p>Complies with AO7.1</p> <p>Refer Section 4.3 of the Traffic Impact Assessment.</p> <p>Existing car parks are not proposed to be relocated nor is relocation considered to be required.</p> <p>AO7.2 – Not Applicable</p> <p>No visitor parking is required by Council's TAP Code to support the expansion.</p> |

| Performance Outcomes | Probable Solutions | Response |
|---|--|--|
| <p>PO8</p> <p>Car parking areas are sensitively designed to minimise impacts on <i>sensitive land uses</i> and visually soften and provide shade to ground parking.</p> | <p>AO8.1</p> <p>Screen fencing is provided next to any vehicle movement or vehicle parking areas along the side or rear boundary of a <i>site</i>.</p> | <p>AO8.1 – Not Applicable</p> <p>It is noted that the proposed development involves a relatively minor expansion of the existing school.</p> <p>As part of the expansion, existing car parks are not proposed to be significantly reconfigured nor is their use expected to significantly change.</p> |
| <p>Bicycle parking</p> <p>PO9</p> <p>The provision of bicycle parking, storage and end of trip facilities is appropriate having regard to the nature and scale of the development activity.</p> | <p>AO9.1</p> <p>Bicycle parking is provided in accordance with the Australian Standards AS2890.3 and AUSTRROADS Guide to Traffic Management Part 11: Parking.</p> | <p>Can comply with AO9.1</p> <p>Refer Section 4.4 of the Traffic Impact Assessment.</p> <p>14 bicycle parking spaces are required by Austroads, Guide to Traffic Management Part 11: Parking (GTTM Part 11) for the proposed expansion. It is recommended that these spaces are provided on-site to accommodate additional demand associated with the expansion.</p> |
| <p>Vehicle standing and manoeuvring areas</p> <p>PO10</p> <p>Vehicle standing and manoeuvring areas are of suitable standard for the intended use and the areas are constructed to a standard that avoids environmental nuisance.</p> | <p>AO10.1</p> <p>Internal manoeuvring and standing areas of the site are sealed.</p> | <p>Complies with AO10.1</p> <p>Refer Section 4.5 of the Traffic Impact Assessment.</p> <p>A new loading area is proposed to be constructed to support the proposed expansion.</p> <p>The loading area is proposed to be sealed.</p> |

| Performance Outcomes | Probable Solutions | Response |
|---|--|--|
| <p>PO11 Long driveways are designed and treated to soften their visual appearance when viewed from the street frontage.</p> | <p>AO11.1 Internal driveways do not exceed 50 metres in length.</p> | <p>Complies with AO11.1 Refer Section 3.3 of the Traffic Impact Assessment. New car parking areas are proposed to be configured in accordance with the relevant Australian Standards i.e. AS2890.1, AS2890.2 and AS2890.6. We therefore believe that the proposed arrangements are appropriate from a traffic engineering perspective.</p> |
| <p>Refuse storage and collection PO12 On-site facilities are located in areas that: (a) provide reasonable standards of amenity to <i>sensitive land uses</i>; (b) maintains the amenity of <i>adjoining premises</i>; (c) are not visually obtrusive when viewed from the street; (d) are carefully sited so as to promote a cohesive streetscape in the Centre zone; and (e) can be conveniently accessed by contractors.</p> | <p>AO12.1 In the Centre zone refuse storage areas are located behind the front building line and are screened from view. AO12.2 For multiple dwellings refuse storage consists of: (a) wheelie bins for up to 10 dwellings; or (b) a suitably sized bulk refuse bin(s) where there is more than 10 dwellings. AO12.3 The refuse storage area: (a) is provided within the building and situated close to the point of collection; or (b) is an outdoor area that is: (i) no closer than 3 metres to any frontage and 1.5 metres to any other site boundary; (ii) enclosed on three sides with a screen wall extending 0.2 metres above the height of the refuse receptacles; (iii) screened by dense planting with or without mounding; and (iv) separated from sensitive land uses by a minimum of 10m so as to avoid any undesirable impact of odour or noise from refuse storage and collection services.</p> | <p>AO12.1 – Not Applicable AO12.2 – Not Applicable AO12.3 – Not Applicable Refer Section 4.5 of the Traffic Impact Assessment. Existing servicing arrangements including refuse collection arrangements will be largely unaffected by the proposed expansion. Therefore, no changes to the existing refuse storage and collection arrangements are proposed.</p> |

| Performance Outcomes | Probable Solutions | Response |
|--|---|--|
| <p>Loading and unloading PO13</p> <p>Loading and unloading activities do not impact on the amenity of the sensitive land uses.</p> | <p>AO13.1</p> <p>Where there are adjoining sensitive land uses, refuse collection and other loading and unloading activities occurs during the following period:</p> <p>(a) 7.00am and 6.00pm Monday to Friday; and (b) 8.00am to 5.00pm Saturday and Sunday.</p> | <p>Please refer to the Town Planning Report.</p> |
| <p>Pick up/ set-down areas PO14</p> <p>Car parking and pick-up/set-down areas are located in areas and designed in a way that does not detract from the amenity of streetscape and maintains the safety of users.</p> | <p>AO14.1</p> <p>Car parking and pick-up/set-down areas are located so that:</p> <p>(a) they are visible from the <i>road</i>; (b) they can be overlooked from the use's buildings or associated outdoor spaces; (c) they maintain the amenity of the street and adjacent properties; and (d) pedestrians are not required to cross the pick-up/set-down areas to gain access to the building.</p> | <p>Complies with AO14.1</p> <p>Refer Sections 3.1 and 4.3 of the Traffic Impact Assessment.</p> <p>The new pick-up/set-down areas we have recommended are located on-street, can be overlooked from the school site, are not expected to significantly impact the amenity of the street and adjacent properties and do not require pedestrians to cross the pick-up/set-down areas to gain access to the main (southern) school campus.</p> |
| <p>Vehicular and pedestrian conflict minimisation PO15</p> <p>The design and arrangement of access, car parking and vehicle movements on the site facilitates the safe and convenient use by delivery vehicles, staff and customers.</p> | <p>AO15.1</p> <p>Public access areas of the site are clearly separated from any area set aside for servicing the building.</p> | <p>Complies with AO15.1</p> <p>A new, dedicated loading area is proposed to be constructed to support the proposed expansion.</p> |
| <p>Active transport PO16</p> <p>Development contributes to an active transport movement network incorporating pedestrian pathways and cycleways.</p> | <p>AO16.1</p> <p>No acceptable outcome provided</p> | <p>Can comply with AO16.1</p> <p>Refer Section 3.3 of the Traffic Impact Assessment.</p> <p>It is recommended that the existing active transport arrangements in proximity to the school are modified.</p> <p>However, the modifications are recommended primarily to address existing issues i.e. we do not believe that the proposed expansion solely necessitates the modifications.</p> |

| Performance Outcomes | Probable Solutions | Response |
|--|---|----------------|
| Road design standards and associated works PO17 Development provides for a safe, legible and efficient road network. | AO17.1 No acceptable outcome provided. | Not Applicable |
| Service stations PO18 The layout of the service station provides for sufficient <i>on-site</i> queuing that does not impact on the safe operation of the street network. | AO18.1 Minimum <i>on-site</i> queuing space, clear of any other access or manoeuvring path, is provided for 3 vehicles on the entry of any car wash bay or fuel pump. | Not Applicable |

Appendix 12

Geotechnical Report





Douglas Partners

Geotechnics | Environment | Groundwater

Report on
Additional Geotechnical Investigation

Proposed New Manual Arts Building
Lowood State High School, Lowood

Prepared for
RPSPM Pty Ltd

Project 90505.01
June 2018

Integrated Practical Solutions





Douglas Partners

Geotechnics | Environment | Groundwater

Document History

Document details

| | | | |
|---------------------|--|--------------|------------|
| Project No. | 90505.01 | Document No. | R.001.docx |
| Document title | Report on Additional Geotechnical Investigation Proposed New Manual Arts Building | | |
| Site address | Lowood State High School, Lowood | | |
| Report prepared for | RPSPM Pty Ltd | | |
| File name | 90505.01.R.001 | | |

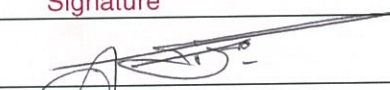
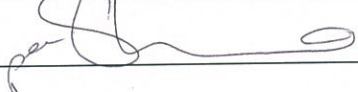
Document status and review

| Status | Prepared by | Reviewed by | Date issued |
|------------|--------------|---------------|-------------|
| Revision 0 | Matin Hesari | Bruce Stewart | 8 June 2018 |
| | | | |
| | | | |
| | | | |

Distribution of copies

| Status | Electronic | Paper | Issued to |
|------------|------------|-------|-------------------------------------|
| Revision 0 | | | Mariana Pellicciotti, RPSPM Pty Ltd |
| | | | |
| | | | |
| | | | |

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

| | Signature | Date |
|----------|---|-------------|
| Author |  | 8 June 2018 |
| Reviewer |  | 8 June 2018 |



Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au
Unit 4, 482 Scottsdale Drive
Varsity Lakes QLD 4227
Phone (07) 5568 8900
Fax (07) 5568 8999

Table of Contents

| | Page |
|---|---|
| 1. Introduction..... | 1 |
| 2. Site Description | 2 |
| 3. Regional Geology..... | 4 |
| 4. Field Work Methods | 4 |
| 5. Field Work Results | 4 |
| 6. Laboratory Testing | 5 |
| 7. Comments | 6 |
| 7.1 Proposed Development | 6 |
| 7.2 Site Classification..... | 6 |
| 7.3 Excavatability | 7 |
| 7.4 Re-use of Excavated Materials and Workability | 8 |
| 7.5 Subgrade Preparation and Fill Placement/Replacement..... | 8 |
| 7.6 Foundations | 9 |
| 7.7 Geotechnical Retaining Wall Design Parameters and Soil Properties | 10 |
| 7.8 Preliminary Subgrade and Slab-On-Ground Parameters | 11 |
| 8. Limitations | 12 |
| 9. References | 13 |
| | |
| Appendix A: | <ul style="list-style-type: none"> About This Report Sampling Methods Soil Descriptions Symbols and Abbreviations |
| Appendix B: | <ul style="list-style-type: none"> Drawing 1A - Site and Test Location Plan Previous DP Site and Test Location Plan |
| Appendix C: | <ul style="list-style-type: none"> Borehole Logs (Bores 3 to 7) Previous DP Borehole Logs (Bores 1 and 2) |
| Appendix D: | Laboratory Reports |

Report on Additional Geotechnical Investigation Proposed New Manual Arts Building Lowood State High School, Lowood

1. Introduction

This report presents the results of an additional geotechnical investigation undertaken for a proposed new manual arts building at Lowood State High School, Lowood. The investigation was undertaken at the request of RPSPM Pty Ltd (project managers) on behalf of the Department of Education and Training, in accordance with Douglas Partners Pty Ltd (DP) fee proposal GLD180053 dated 17 May 2018 and acceptance from Mariana Pellicciotti of RPSPM Pty Ltd on 17 May 2018.

Based on drawings provided by the client, it is understood that a new delivery driveway and a manual arts building (Figure 1 - yellow) will be constructed. The proposed manual arts building will likely be a single storey structure, with either concrete slab on ground or timber floor elevated on piers.



Figure 1: Proposed manual arts building and delivery driveway.

Douglas Partners Pty Ltd (DP) has recently carried out a geotechnical investigation at the site and results are presented in the report '*Geotechnical Investigation - Proposed Classroom Extension*' Project No. 90505.00 dated April 2018. The new building, situated south of Blocks E and F, and near an internal access road, was proposed after the previous investigation. The previous investigation comprised two bores (designated as Bores 1 and 2) to refusal depth of between 2.1 and 2.2 m.

The aim of the additional investigation was to assess the conditions at the site to provide comments on:

-) subsurface conditions including groundwater (if encountered);
-) site classification in accordance with AS 2870 (Ref 1);
-) earthworks and site preparation including comments on topsoil tripping, excavatability, trafficability, compaction and re-use of site soils/rock;
-) suitable foundation options and allowable bearing pressures;
-) retaining wall parameters;
-) temporary retaining options;
-) indicative temporary and permanent batter slopes; and
-) California bearing ratio (CBR) test results for pavement design.

The additional investigation comprised five bores, followed by laboratory testing, analysis and reporting. Details of the field and laboratory work are presented in this report together with comments and recommendations on the items listed above.

This report must be read in conjunction with the notes entitled 'About This Report' in Appendix A, and any other explanatory notes, and should be kept in its entirety without separation of individual pages or sections.

2. Site Description

The proposed building area is located in the central eastern portion of the Lowood State High School campus, to the south of Blocks E and F. At the time of the investigation, the building area gently sloped down towards the north, with vegetation comprising short mown grass and several mature trees.

Figures 2 and 3 below indicate typical site conditions encountered during the investigation.



Figure 2: Site looking north from Bore 5.



Figure 3: Site looking east from Bore 5.

3. Regional Geology

The Geological Survey of Queensland, Moreton Geology; 1:500,000 series sheet indicates that the site is underlain by early Jurassic aged Marburg Formation, typically comprising “Sandstone, siltstone, shale, conglomerate, coal, oolitic ironstone”. Residual soils are expected to overlie the weathered rock.

The bores encountered clays overlying weathered sandstone (refer to Section 5) which is in general agreement with the anticipated and published geology.

4. Field Work Methods

Field work was undertaken on 18 May 2018 and comprised the drilling and sampling of two bores (designated Bores 3 and 4) in the proposed building envelope to effective refusal at 2.8 m depth in Bore 3 and 5.3 m depth in Bore 4. Three bulk CBR samples (designated Bores 5, 6 and 7) were collected along the proposed new delivery driveway. The drilling was carried out using a utility mounted Christie drilling rig with solid flight augers fitted with a tungsten carbide (TC) drill bit. Strata were identified by assessing the recovered auger cuttings. On completion of drilling and after checking for groundwater, the bores were reinstated using excavated drilling spoil.

Dynamic cone penetrometer testing was carried out adjacent Bores 3 and 4 to effective refusal depths of 1.2 m and 1.1 m respectively.

UTM coordinates at the bore locations were determined using a hand held GPS unit, which is accurate to approximately 5 m and are recorded on the borehole logs. The bore locations are indicated on Drawing 1A in Appendix B. Given the absence of site survey plans, surface levels were interpreted from Nearmaps dated 19 December 2017.

All field work was undertaken by experienced geotechnical personnel who logged the bores and collated samples for tactile assessment and laboratory testing.

5. Field Work Results

Details of the subsurface conditions encountered in the bores are described in the borehole logs in Appendix C. Notes defining the sampling methods, soil descriptions, and symbols and abbreviations used are given in Appendix A.

The subsurface conditions encountered at each bore location are summarised in Table 1 below.

Table 1: Summary of Subsurface Conditions

| Bore | Strata/Depth Range (m) ⁽ⁱ⁾ | | | | |
|--------------------|--|--|---|--------------------------------|---|
| | Uncontrolled Filling (Sandy/ Gravelly Clay or Clayey Sand) | Residual Silty Sand (medium dense or stronger) | Residual Sandy Clay (stiff or stronger) | Completely weathered Sandstone | Sandstone (very low strength or stronger) |
| 3 ⁽ⁱⁱⁱ⁾ | - | 0.0 – 0.1 | 0.1 – 2.5 | 2.5 – 2.8 | 2.8 ⁽ⁱⁱ⁾ |
| 4 ⁽ⁱⁱⁱ⁾ | - | 0.0 – 0.2 | 0.2 – 4.3 | 4.3 – 5.3 | 5.3 ⁽ⁱⁱ⁾ |
| 5 ^(iv) | 0.0 - 0.25 | - | 0.25 - 0.4 | - | - |
| 6 ^(iv) | 0.0 – 1.3 | - | 1.3 – 1.5 | - | - |
| 7 ^(iv) | 0.0 – 0.2 | - | 0.2 – 1.0 | - | - |

- Notes (i) All depths were measured from existing site level at the time of the investigation.
 (ii) TC bit refusal in very low to low strength Sandstone.
 (iii) Building Area.
 (iv) Delivery Driveway.

No free groundwater was encountered during the investigation. It should be noted that groundwater depths and ground moisture conditions are affected by climatic conditions and soil permeability, and will therefore vary with time. Seepage may also occur along the fill/natural and soil/weathered rock interface during and after periods of wet weather.

6. Laboratory Testing

Given the proximity of the previous bores and similarity of materials, additional laboratory testing was not carried out, however, three bulk CBR samples were collected and tested for preliminary pavement design. Previous laboratory testing comprised Atterberg limits and particle size distribution on natural strata encountered during the investigation. The results of the previous and current laboratory tests are given in Appendix C and are summarised in Tables 2 and 3 below.

Table 2: Summary of Previous Laboratory Testing

| Bore | Depth (m) | Material | Gravel (%) | Sand (%) | Silt and Clay (%) | Liquid Limit (%) | Plastic Limit (%) | Plasticity Index (%) | Linear Shrinkage (%) |
|------|-----------|-----------------------------------|------------|----------|-------------------|------------------|-------------------|----------------------|----------------------|
| 2 | 0.5 | Sandy Silty Clay with some Gravel | 9 | 44 | 47 | 49 | 17 | 32 | 13.5 |

Table 3: Summary of Current Laboratory Testing

| Bore | Depth (m) | Material | CBR (%) | SMDD (%) | OMC (%) | Swell (%) |
|------|------------|-----------------------|---------|----------|---------|-----------|
| 5 | 0.15 – 0.4 | Gravelly Clay Filling | 8 | 2.03 | 11.0 | 1.0 |
| 6 | 0.1 – 0.4 | Sandy Clay Filling | 6 | 1.88 | 11.5 | 2.0 |
| 7 | 0.2 – 0.6 | Clayey Sand Filling | 6 | 1.76 | 12.0 | 2.5 |

Legend: OMC – optimum moisture content for Standard compaction
 CBR – California bearing ratio at 100% SMDD after four day soak
 SMDD – standard maximum dry density

7. Comments

7.1 Proposed Development

It is understood that a new manual arts building is proposed on the southern side of Blocks E and F. It is anticipated that the new building will be single storey, either slab on ground or elevated floor and timber framed structured. Details on earthworks levels and structural loads were not known at the time of preparing this report, but it is expected that cutting and filling would be to less than about 0.5 m depth and there are no concentrated structural loads.

7.2 Site Classification

Site classification of foundation soil reactivity strictly only applies to residential buildings up to two-storeys and to other buildings of similar size, loading and flexibility as defined in accordance with AS 2870 (Ref 1). Therefore, AS 2870 is not applicable to the institutional building proposed, however it may be used to assist with design of footings.

In strict accordance with AS 2870, due to the mature trees at Bores 2, 3 and 4, the site in its present state would be given a 'Class P' (problem site) classification requiring design by engineering principles.

An inferred shrink-swell index (I_{ss}) value of 2.3% per ζ pF was used to estimate the characteristic surface movement (y_s) values in general accordance with AS 2870. AS 2870 provides recommended values of change in suction (Δu) and depth of suction (H_s) for major cities and regional centres throughout Australia, but not Lowood. Based on published data by Fox (Ref. 2) relating climatic conditions to suction, a value of 1.2 pF was adopted for Δu and 2.3 m for H_s in the calculations, based on a 'temperate' climatic zone.

The results of the analysis indicate y_s values for the existing soil profile (not considering tree effects) are between 40 mm and 60 mm. This would usually be consistent with Class 'H1' (highly reactive), if it weren't for the Class 'P' noted for the reasons above. Any cutting and filling of the site will also impact on the range of surface movements, due to the need to consider changes in soil crack development. It is expected that the range of y_s values would be between 40 mm and 60 mm where site derived clays are used as controlled filling.

Tree effects on soil moisture change and potentially larger surface movements have not been considered in the above. The building designer should refer to AS 2870 in this regard, or contact DP for further assistance, once the building location and landscaping details are finalised.

'Abnormal' soil moisture conditions which would require more extensive foundation works to avoid adverse foundation performance include:

-) recent removal of buildings or structures likely to have affected soil moisture conditions (possible when existing structures are demolished);
-) unusual moisture caused by drains, channels, ponds, dams or tanks (appears unlikely);
-) recent removal of large trees (possible);
-) growth of trees too close to a structure (possible);
-) excessive or irregular watering of gardens adjacent to the structure;
-) lack of maintenance of site drainage; and
-) failure to repair plumbing leaks.

7.3 Excavatability

Excavations to depths of about 1 m will encounter soils which can be undertaken by small to medium sized excavation plant such as backhoes and 8 to 15 tonne hydraulic excavators.

Unsurcharged batter slopes cut up to 1 m vertical height within the subsurface profiles encountered in the bores may be preliminary designed at 1.5H:1V. If access for maintenance of slopes or vegetation is required (eg mowing), slopes may need to be flattened to 4H:1V or less. All fill batters should be over filled, compacted and cut back at the above batter slopes

The above temporary batter slopes are suggested with respect to slope stability only, and do not allow for lateral stress relaxation which may result in movement of nearby in-ground services or shallow footings. If such services or footings are settlement-sensitive, and are located near the crest of the cut face, then the excavation may have to be positively supported.

It is recommended that all cut and fill batters incorporate crest and toe drainage, and be covered with topsoil and vegetation to provide long term erosion protection.

Short term vertical cuts (eg trenches) of up to 1.2 m may be undertaken in any controlled filling or natural competent soils.

7.4 Re-use of Excavated Materials and Workability

Based on the results of the bores, it is expected that the material won from excavation to about 0.5 m depth will comprise medium to high plasticity clays..

It is expected that the excavated materials, with the exception of the topsoil, could be re-used as structural filling once appropriately blended and moisture conditioned as indicated in Section 8.4. Care should be taken not to over-wet the clayey soils which can lead to problems associated with trafficability and workability. Clays should not be over-compacted (i.e. not more than 102% Standard) or dry of optimum, as this can lead to future swelling and softening with moisture content increases. It may be prudent to cap and seal clay subgrades with 150 mm of select clayey granular fill (minimum CBR 15%) to reduce potential wetting and trafficability problems.

7.5 Subgrade Preparation and Fill Placement/Replacement

It is recommended that the following be carried out for subgrade preparation and filling beneath the structure (unless the structure is supported on piers or documentation can be obtained to confirm the fill is suitably compacted):

-) Remove any topsoil or deleterious soft, wet, organic or highly compressible material (noting that none of the latter was encountered in the bores).
-) Roll the exposed subgrade with eight passes with a smooth drum roller with a minimum static weight of 12 tonnes, and then test roll to detect any remaining soft or loose zones, which should be excavated and replaced with compacted select filling as appropriate.
-) Place approved filling, if required, in layers not exceeding 300 mm loose thickness and compact, each layer to a minimum dry density ratio of 98% Standard within 2% of optimum moisture content for Standard compaction (OMC).
-) Promptly cover any exposed clay at subgrade level with a minimum 150 mm of select granular fill [minimum California bearing ratio (CBR) 15%] to reduce potential trafficability problems.
-) Undertake 'Level 1' inspection and testing as detailed in AS 3798–2007 (Ref. 3) where any new filling is required to achieve design levels for support of any on-ground slabs and/or pavements.

7.6 Foundations

Depending on site preparation earthworks carried out, either high or deep level footings would be appropriate for the site. If 'controlled' filling is placed as per the recommendations in this report, the upper level footings (pads, strips or raft), could be adopted using the allowable values indicated in Table 4. . Structural footings and slab design should consider the classification following bulk earthworks and include slab stiffening. Foundations bearing on differing strata will experience differential settlements which may require extending foundations to uniform bearing strata.

Table 4: High Level Footing Design Bearing Pressures (Allowable)

| Material Description | Maximum Allowable Bearing Pressure (kPa) |
|--|---|
| Uncontrolled Filling | NR |
| Controlled Filling ⁽ⁱ⁾ / Clay (stiff or stronger) | 100 |

- Notes (i) Assuming controlled filling placement is undertaken under Level 1 inspection and testing by DP in accordance with the recommendations of this report, or documentation obtained to confirm existing filling is of suitable standard
- (ii) NR – Not recommended.

For high level pad or strip footings founded in the materials as given in the above table, it is considered that settlements under such applied loading will be less than 1% to 2% of footing width.

Should structural design loads be such that high level footing are not suitable foundations, bored piles are expected to be a suitable footing option. The allowable parameters provided in Table 5 below could be used for design of bored piles.

Table 5: Design Parameters (Allowable) for Bored Piles

| Material Description | Allowable Shaft Adhesion* (kPa) | Allowable End Bearing (kPa) |
|--|--|------------------------------------|
| Controlled Filling ⁽ⁱⁱ⁾ | 15 | NR |
| Clay (stiff or stronger) | 20 | 180 |
| Completely weathered rock (encountered as hard sandy clay) | 25 | 500 |
| Sandstone (very low strength or stronger) | 35 | 750 |

- Notes (i) * Bored piles only, ignore for steel screw piles. Ignore upper 1.5 D of soil to allow for soil shrinkage and shaft load development where D is the diameter of the pile.
- (ii) Assuming controlled filling is placed under inspection and testing by DP in accordance with the recommendations of this report.
- (iii) NR- Not Recommended

Where limit state methods are used to design the piles, the ultimate geotechnical strength ($R_{d,ug}$) can be calculated by multiplying the allowable factors by the adopted safety factor of 2.5, and then by a suitable geotechnical strength reduction factor (α_g) to obtain the design geotechnical strength ($R_{d,g}$). After assessing the overall design average risk rating in accordance with the guidelines presented in AS2159–2009 (Ref. 4), a α_g value of 0.5 is suggested for the site.

Although groundwater was not encountered during the time of investigation, inflow might be encountered during piling and piling contractors should include a provision for the use of temporary steel liners (if required) and to remove groundwater.

It is essential that foundation excavations (where applicable) be inspected by experienced geotechnical personnel to ensure the design parameters adopted are suitable for the ground conditions and to ensure that there is no soft or loose material remaining at the base of the excavations or smear on the side walls. Ground conditions can vary, and it is essential that adequate provision be made throughout the project to vary foundations to suit differing ground conditions.

Experience indicates that settlements of properly designed and constructed piles are unlikely to exceed 1% of the pile diameter.

7.7 Geotechnical Retaining Wall Design Parameters and Soil Properties

It is recommended that all retaining structures be engineer-designed and constructed to adhere to the following load patterns and procedures:

-) 'Active' conditions (K_a) should be adopted for soil lateral pressures where rotational movement or flexing of the top of the wall is permitted or possible.
-) 'At rest' conditions (K_o) should be adopted for soil lateral pressures where rotational movement or flexing of the top of the wall is not possible or not desirable, and hence 'active' conditions (K_a) cannot develop.

The parameters given in Table 6 are recommended for design of retaining walls constructed in front of batters and backfilled with controlled filling. These factors are ultimate and should be appropriately factored.

Table 6: Earth Pressure Coefficients (non sloping crest backfill) and Soil Properties

| Material | Unit Weight (kN/m^3) | K_o | K_a | K_p |
|-----------------------------------|---------------------------------|-------|-------|-------|
| Controlled Filling ⁽ⁱ⁾ | 19 | 0.60 | 0.40 | 2.0 |

Note i) Assuming controlled filling is placed under Level 1 inspection and testing by DP in accordance with the recommendations of this report.

-) Ignore passive resistance (K_p) at the toe in the zone where future disturbance (e.g. service trenches) could occur.
-) Due allowance should be made for surcharge loads (over and above the lateral earth pressure coefficients presented above) where the finished ground level above retaining walls is above horizontal and where additional loading is likely to be applied from existing or future upslope structures, or from traffic.

-) Free draining and granular drainage material behind the wall (as above) should be installed for near- full height of the wall (except for a clay surface cap to prevent surcharging by stormwater), for at least 0.3 m, and have a perforated or slotted drainage pipe at the heel of the wall. Wall design should allow for hydrostatic pressure build-up behind the wall, if full wall height drainage is not installed behind the wall.
-) No allowance should be made for passive resistance at the toe of the retaining wall where there is potential for possible excavation for services/trenches (or similar) in the future.

Wall footings may be designed using the allowable bearing pressures presented in Section 7.6 of this report reduced by one third to accommodate eccentric loading.

7.8 Preliminary Subgrade and Slab-On-Ground Parameters

The results of the four-day soaked CBR tests on the subgrade samples recovered from Bores 5, 6 and 7 indicated CBR values of 8%, 6% and 6% respectively for the gravelly/sandy clay and clayey sand subgrade samples.

If excavation at the site, or re-use of materials won from site, results in pavements being constructed on subgrade materials similar to the gravelly/sandy clay and clayey sand samples tested, then a preliminary CBR value of 5% is recommended for preliminary design.

Once earthworks have been completed, additional CBR sampling and testing should be undertaken on the subgrade to confirm design values and pavement depths. For loaded areas of different proportion or different load intensity to standard wheel loads, DP should be contacted for further advice.

The above recommended CBR values are based on the assumption that any topsoil will be stripped prior to pavement construction. It is also contingent upon adequate site preparation by test rolling (to detect any unsuitable soft or loose material) and subgrade compaction to a minimum density ratio of 98% Standard.

Where filling in excess of 1 m depth is placed under controlled conditions at the site, then a subgrade CBR value for that material could be used subject to confirmation by laboratory testing. For filling depths of less than 1 m, the Japan Road Association method of assessing a weighted subgrade strength as follows, can be used:

$$CBR_W = (D_F \times CBR_F^{0.33} + (1-D_F) \times CBR_S^{0.33})^3$$

where: CBR_W = weighted subgrade CBR (%)
 D_F = depth of filling (m)
 CBR_F = CBR of filling material
 CBR_S = CBR of subgrade material

The above recommendations are based on the provision and maintenance of adequate surface and subsurface drainage.

8. Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for the proposed new manual arts building at Lowood State High School, Lowood in accordance with DP's Proposal GLD180053 dated 17 May 2018 and acceptance received from Mariana Pellicciotti of RPSPM Pty Ltd on 17 May 2018. This report is provided for the exclusive use of Department of Education and Training or their consulting engineers for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report, DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the subsurface conditions only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Subsurface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be limited by undetected variations in ground conditions across the site and between sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP, as this report has been written as advice and opinion rather than instructions for construction.

The contents of this report do not constitute formal design components such as are required by the Health and Safety Legislation and Regulations, to be included in a safety report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in the Comments section of this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the geotechnical components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

9. References

1. Australian Standard AS 2870–2011 “Residential Slabs and Footings”, Standards Australia.
2. Fox E, “A Climate-Based Design Depth of Moisture Change Map of Queensland and the Use of Such Maps to Classify Sites Under AS 2870-1996” Australian Geomechanics, Vol 35, No 4, December 2000.
3. Australian Standard AS 3798 – 2007 “Guidelines on earthworks for residential and commercial developments”, Standards Australia.
4. Australian Standard AS 2159 – 2009 “Piling – Design and Installation”, Standards Association of Australia.

Douglas Partners Pty Ltd

Appendix A

About This Report

Sampling Methods

Soil and Rock Descriptions

Symbols and Abbreviations

About this Report

Douglas Partners



Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;

- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.



Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low

reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:
4,6,7
N=13
- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:
15, 30/40 mm

Sampling Methods

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.



Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard AS 1726, Geotechnical Site Investigations Code. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

| Type | Particle size (mm) |
|---------|--------------------|
| Boulder | >200 |
| Cobble | 63 - 200 |
| Gravel | 2.36 - 63 |
| Sand | 0.075 - 2.36 |
| Silt | 0.002 - 0.075 |
| Clay | <0.002 |

The sand and gravel sizes can be further subdivided as follows:

| Type | Particle size (mm) |
|---------------|--------------------|
| Coarse gravel | 20 - 63 |
| Medium gravel | 6 - 20 |
| Fine gravel | 2.36 - 6 |
| Coarse sand | 0.6 - 2.36 |
| Medium sand | 0.2 - 0.6 |
| Fine sand | 0.075 - 0.2 |

The proportions of secondary constituents of soils are described as:

| Term | Proportion | Example |
|-----------------|------------|---------------------------|
| And | Specify | Clay (60%) and Sand (40%) |
| Adjective | 20 - 35% | Sandy Clay |
| Slightly | 12 - 20% | Slightly Sandy Clay |
| With some | 5 - 12% | Clay with some sand |
| With a trace of | 0 - 5% | Clay with a trace of sand |

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

| Description | Abbreviation | Undrained shear strength (kPa) |
|-------------|--------------|--------------------------------|
| Very soft | vs | <12 |
| Soft | s | 12 - 25 |
| Firm | f | 25 - 50 |
| Stiff | st | 50 - 100 |
| Very stiff | vst | 100 - 200 |
| Hard | h | >200 |

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

| Relative Density | Abbreviation | SPT N value | CPT qc value (MPa) |
|------------------|--------------|-------------|--------------------|
| Very loose | vl | <4 | <2 |
| Loose | l | 4 - 10 | 2 - 5 |
| Medium dense | md | 10 - 30 | 5 - 15 |
| Dense | d | 30 - 50 | 15 - 25 |
| Very dense | vd | >50 | >25 |

Soil Descriptions

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Transported soils - formed somewhere else and transported by nature to the site; or
- Filling - moved by man.

Transported soils may be further subdivided into:

- Alluvium - river deposits
- Lacustrine - lake deposits
- Aeolian - wind deposits
- Littoral - beach deposits
- Estuarine - tidal river deposits
- Talus - scree or coarse colluvium
- Slopewash or Colluvium - transported downslope by gravity assisted by water. Often includes angular rock fragments and boulders.



Rock Strength

Rock strength is defined by the Point Load Strength Index ($Is_{(50)}$) and refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects. The test procedure is described by Australian Standard 4133.4.1 - 1993. The terms used to describe rock strength are as follows:

| Term | Abbreviation | Point Load Index $Is_{(50)}$ MPa | Approx Unconfined Compressive Strength MPa* |
|----------------|--------------|----------------------------------|---|
| Extremely low | EL | <0.03 | <0.6 |
| Very low | VL | 0.03 - 0.1 | 0.6 - 2 |
| Low | L | 0.1 - 0.3 | 2 - 6 |
| Medium | M | 0.3 - 1.0 | 6 - 20 |
| High | H | 1 - 3 | 20 - 60 |
| Very high | VH | 3 - 10 | 60 - 200 |
| Extremely high | EH | >10 | >200 |

* Assumes a ratio of 20:1 for UCS to $Is_{(50)}$

Degree of Weathering

The degree of weathering of rock is classified as follows:

| Term | Abbreviation | Description |
|----------------------|--------------|--|
| Extremely weathered | EW | Rock substance has soil properties, i.e. it can be remoulded and classified as a soil but the texture of the original rock is still evident. |
| Highly weathered | HW | Limonite staining or bleaching affects whole of rock substance and other signs of decomposition are evident. Porosity and strength may be altered as a result of iron leaching or deposition. Colour and strength of original fresh rock is not recognisable |
| Moderately weathered | MW | Staining and discolouration of rock substance has taken place |
| Slightly weathered | SW | Rock substance is slightly discoloured but shows little or no change of strength from fresh rock |
| Fresh stained | Fs | Rock substance unaffected by weathering but staining visible along defects |
| Fresh | Fr | No signs of decomposition or staining |

Degree of Fracturing

The following classification applies to the spacing of natural fractures in diamond drill cores. It includes bedding plane partings, joints and other defects, but excludes drilling breaks.

| Term | Description |
|--------------------|--|
| Fragmented | Fragments of <20 mm |
| Highly Fractured | Core lengths of 20-40 mm with some fragments |
| Fractured | Core lengths of 40-200 mm with some shorter and longer sections |
| Slightly Fractured | Core lengths of 200-1000 mm with some shorter and loner sections |
| Unbroken | Core lengths mostly > 1000 mm |

Rock Descriptions

Rock Quality Designation

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

$$\text{RQD \%} = \frac{\text{cumulative length of 'sound' core sections} \geq 100 \text{ mm long}}{\text{total drilled length of section being assessed}}$$

where 'sound' rock is assessed to be rock of low strength or better. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e. drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.

Stratification Spacing

For sedimentary rocks the following terms may be used to describe the spacing of bedding partings:

| Term | Separation of Stratification Planes |
|---------------------|-------------------------------------|
| Thinly laminated | < 6 mm |
| Laminated | 6 mm to 20 mm |
| Very thinly bedded | 20 mm to 60 mm |
| Thinly bedded | 60 mm to 0.2 m |
| Medium bedded | 0.2 m to 0.6 m |
| Thickly bedded | 0.6 m to 2 m |
| Very thickly bedded | > 2 m |

Symbols & Abbreviations

Douglas Partners



Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

| | |
|------|--------------------------|
| C | Core Drilling |
| R | Rotary drilling |
| SFA | Spiral flight augers |
| NMLC | Diamond core - 52 mm dia |
| NQ | Diamond core - 47 mm dia |
| HQ | Diamond core - 63 mm dia |
| PQ | Diamond core - 81 mm dia |

Water

| | |
|---|-------------|
| ▷ | Water seep |
| ▽ | Water level |

Sampling and Testing

| | |
|-----------------|--------------------------------|
| A | Auger sample |
| B | Bulk sample |
| D | Disturbed sample |
| E | Environmental sample |
| U ₅₀ | Undisturbed tube sample (50mm) |
| W | Water sample |
| pp | pocket penetrometer (kPa) |
| PID | Photo ionisation detector |
| PL | Point load strength Is(50) MPa |
| S | Standard Penetration Test |
| V | Shear vane (kPa) |

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

| | |
|-----|-----------------|
| B | Bedding plane |
| Cs | Clay seam |
| Cv | Cleavage |
| Cz | Crushed zone |
| Ds | Decomposed seam |
| F | Fault |
| J | Joint |
| Lam | lamination |
| Pt | Parting |
| Sz | Sheared Zone |
| V | Vein |

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

| | |
|----|----------------|
| h | horizontal |
| v | vertical |
| sh | sub-horizontal |
| sv | sub-vertical |

Coating or Infilling Term

| | |
|-----|----------|
| cln | clean |
| co | coating |
| he | healed |
| inf | infilled |
| stn | stained |
| ti | tight |
| vn | veneer |

Coating Descriptor

| | |
|-----|--------------|
| ca | calcite |
| cbs | carbonaceous |
| cly | clay |
| fe | iron oxide |
| mn | manganese |
| slt | silty |

Shape

| | |
|----|------------|
| cu | curved |
| ir | irregular |
| pl | planar |
| st | stepped |
| un | undulating |

Roughness

| | |
|----|--------------|
| po | polished |
| ro | rough |
| sl | slickensided |
| sm | smooth |
| vr | very rough |





Other

| | |
|-----|------------|
| fg | fragmented |
| bnd | band |
| qtz | quartz |



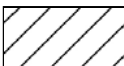
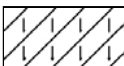
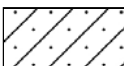

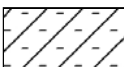

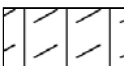


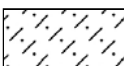


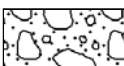
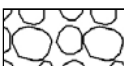

Symbols & Abbreviations

Graphic Symbols for Soil and Rock




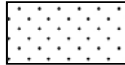
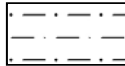
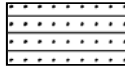
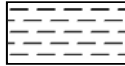

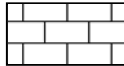
General

| | |
|---|-----------|
|  | Asphalt |
|  | Road base |
|  | Concrete |
|  | Filling |

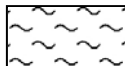
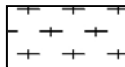
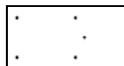
Soils

| | |
|---|-------------------|
|  | Topsoil |
|  | Peat |
|  | Clay |
|  | Silty clay |
|  | Sandy clay |
|  | Gravelly clay |
|  | Shaly clay |
|  | Silt |
|  | Clayey silt |
|  | Sandy silt |
|  | Sand |
|  | Clayey sand |
|  | Silty sand |
|  | Gravel |
|  | Sandy gravel |
|  | Cobbles, boulders |
|  | Talus |

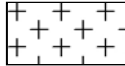
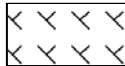
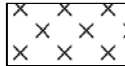
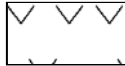

Sedimentary Rocks

| | |
|---|----------------------------|
|  | Boulder conglomerate |
|  | Conglomerate |
|  | Conglomeratic sandstone |
|  | Sandstone |
|  | Siltstone |
|  | Laminite |
|  | Mudstone, claystone, shale |
|  | Coal |
|  | Limestone |

Metamorphic Rocks

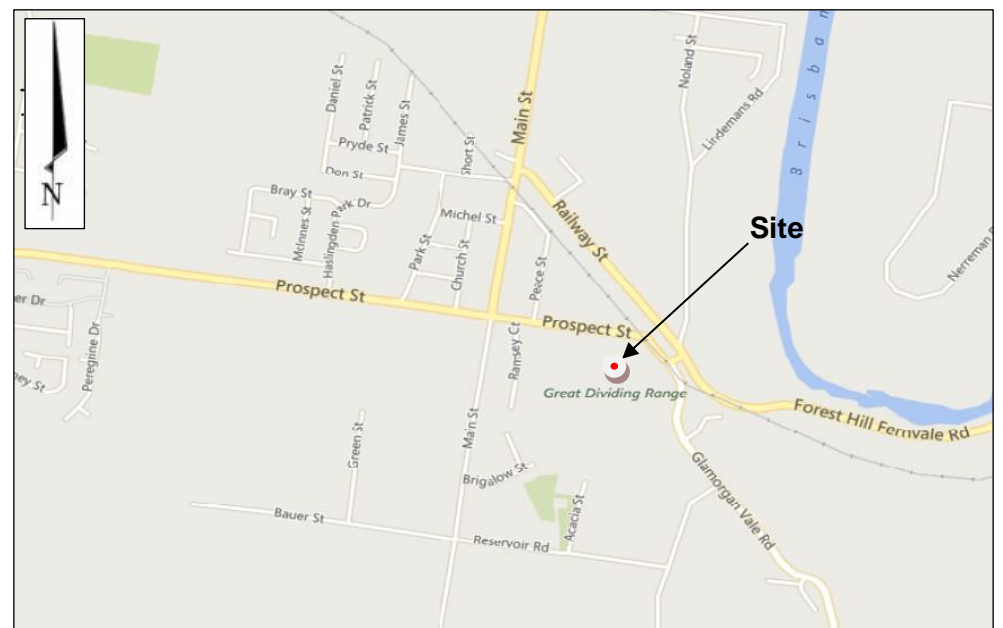
| | |
|---|-------------------------|
|  | Slate, phyllite, schist |
|  | Gneiss |
|  | Quartzite |

Igneous Rocks

| | |
|---|----------------------------|
|  | Granite |
|  | Dolerite, basalt, andesite |
|  | Dacite, epidote |
|  | Tuff, breccia |
|  | Porphyry |



Appendix B

Drawing 1A - Site and Test Location Plan
Previous DP Site and Test Location Plan



Site Locality

Legend:

-  Bore Location and Number from Current DP Investigation (May 2018)
-  Previous Test Bore Location and Number (March 2018)

Notes:

1. Test locations are approximate only and are shown with reference to existing site features.
2. Drawing adapted from nearmap.com dated 19 December 2017.

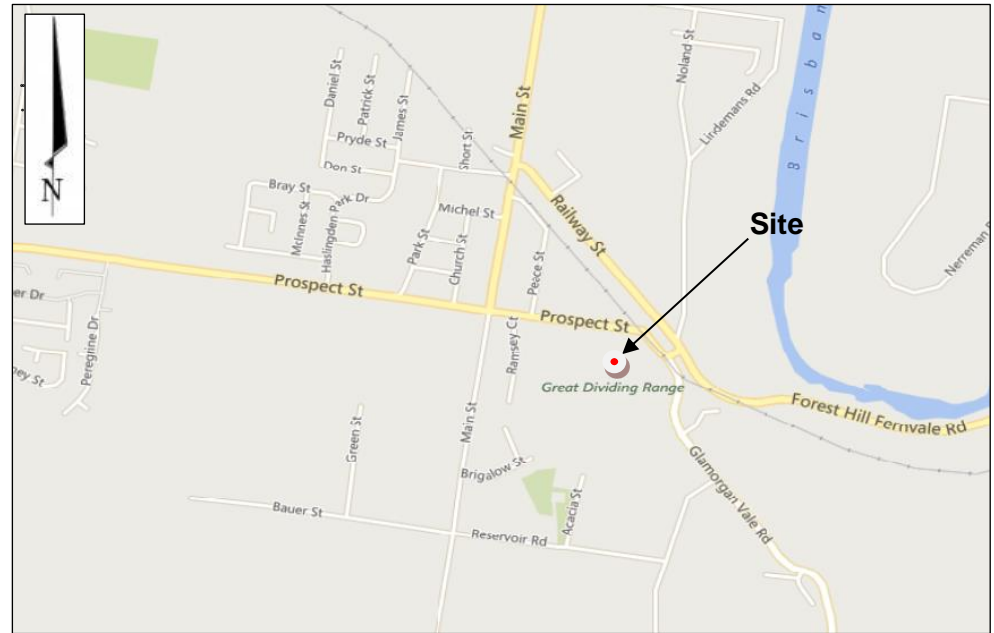


CLIENT: RPSPM Pty Ltd
 OFFICE: Gold Coast
 DATE: May 2018

Site and Test Location Plan


Proposed New Manuel Arts Building
Lowood State High School, Lowood

| | |
|-------------|----------|
| PROJECT No: | 90505.01 |
| DRAWING No: | 1A |
| REVISION: | 0 |



Site Locality

Legend:

 Bore Number and Location

Notes:

1. Test locations are approximate only and are shown with reference to existing site features.
2. Drawing adapted from nearmap.com dated 19 December 2017.



CLIENT: RPS Australia Asia Pacific
 OFFICE: Gold Coast
 DATE: March 2018

Site and Test Location Plan
Proposed Classroom Extension
Lowood State High School, Lowood

| | |
|-------------|----------|
| PROJECT No: | 90505.00 |
| DRAWING No: | 1 |
| REVISION: | 0 |

Appendix C

Borehole Logs (Bores 3 to 7)
Previous Borehole Logs (Bores 1 and 2)

BOREHOLE LOG

CLIENT: RPSPM Pty Ltd
PROJECT: Proposed New Manual Arts Building
LOCATION: Lowood State High School, Lowood

SURFACE LEVEL: 62.5 AHD
EASTING: 458871
NORTHING: 6961576
DIP/AZIMUTH: 90°/--

BORE No: 3
PROJECT No: 90505.01
DATE: 18/5/2018
SHEET 1 OF 1

| RL | Depth (m) | Description of Strata | Graphic Log | Sampling & In Situ Testing | | | Water | Dynamic Penetrometer Test (blows per 100mm) |
|----|-----------|--|---------------------|----------------------------|-------|--------|-------|---|
| | | | | Type | Depth | Sample | | |
| | 0.1 | TOPSOIL - medium dense brown grey silty sand topsoil, fine grained sands, moist | [Diagonal Hatching] | A | 0.1 | | | 5 |
| | 0.3 | SANDY CLAY (Cl) - stiff brown grey with orange sandy clay, fine grained sands with silt, dry | [Diagonal Hatching] | A | 0.3 | | | 10 |
| | 0.8 | - moist | [Diagonal Hatching] | | 0.8 | | | 15 |
| | 1.0 | - very stiff, light brown orange with grey | [Diagonal Hatching] | | 1.0 | | | 20 |
| | 1.2 | - hard to very stiff light brown-grey with orange | [Diagonal Hatching] | A | 1.2 | | | |
| | 1.5 | - hard | [Diagonal Hatching] | | | | | |
| | 2.3 | - hard clay with interbedded, very low strength sandstone | [Diagonal Hatching] | | | | | |
| | 2.5 | | [Diagonal Hatching] | | | | | |
| | 2.8 | SANDSTONE - very low strength sandstone with interbedded hard clay | [Diagonal Hatching] | | | | | |
| | 3.0 | Bore discontinued at 2.8mTC bit refusal. Limit of Investigation. | | | | | | |

RIG: Christie Soil Rig

DRILLER: BM

LOGGED: BM/MH

CASING: N/A

TYPE OF BORING: Auger

WATER OBSERVATIONS: No free groundwater was observed during auger drilling.

REMARKS: Surface levels were interpolated using nearmaps.com dated 19 December 2018.

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

| SAMPLING & IN SITU TESTING LEGEND | | | |
|-----------------------------------|----------------------|-------|--|
| A | Auger sample | G | Gas sample |
| BB | Bulk sample | P | Piston sample |
| BLK | Block sample | U | Tube sample (x mm dia.) |
| C | Core drilling | W | Water sample |
| D | Disturbed sample | > | Water seep |
| E | Environmental sample | ≡ | Water level |
| | | PID | Photo ionisation detector (ppm) |
| | | PL(A) | Point load axial test Is(50) (MPa) |
| | | PL(D) | Point load diametral test Is(50) (MPa) |
| | | pp | Pocket penetrometer (kPa) |
| | | S | Standard penetration test |
| | | V | Shear vane (kPa) |



BOREHOLE LOG

CLIENT: RPSPM Pty Ltd
PROJECT: Proposed New Manual Arts Building
LOCATION: Lowood State High School, Lowood

SURFACE LEVEL: 63.3 AHD
EASTING: 458846
NORTHING: 6961570
DIP/AZIMUTH: 90°/--

BORE No: 4
PROJECT No: 90505.01
DATE: 18/5/2018
SHEET 1 OF 1

| RL | Depth (m) | Description of Strata | Graphic Log | Sampling & In Situ Testing | | | Water | Dynamic Penetrometer Test (blows per 100mm) |
|------|-----------|---|-------------|----------------------------|-------|--------|-------|---|
| | | | | Type | Depth | Sample | | |
| 63.3 | 0.2 | SILTY SAND (SM) - medium dense to dense brown silty sand, fine grained sands, dry | | A | 0.0 | | | |
| | 0.2 | | | A | 0.2 | | | |
| | 0.3 | | | A | 0.3 | | | |
| | 0.6 | SANDY CLAY (CI) - very stiff brown grey with orange sandy clay, fine grained sands with silt, dry - orange with grey, moist | | A | 0.6 | | | |
| | 0.6 | | | A | 0.6 | | | |
| | 0.8 | | | A | 0.8 | | | |
| | 1.1 | - hard | | | | | | |
| | 1.4 | - light grey with orange | | | | | | |
| | 1.4 | | | A | 1.5 | | | |
| | 1.6 | | | A | 1.6 | | | |
| | 2.1 | | | | 2.1 | | | |
| | 2.3 | - light brown with orange and grey | | A | 2.3 | | | |
| | 2.5 | | | | 2.5 | | | |
| | 3.5 | | | A | 3.5 | | | |
| | 3.8 | | | A | 3.8 | | | |
| | 4.3 | - interbedded completely weathered sandstone | | | | | | |
| | 5.0 | SANDSTONE - very low strength sandstone light brown orange | | | | | | |
| | 5.3 | Bore discontinued at 5.3mTC bit refusal. Limit of Investigation. | | | | | | |

RIG: Christie Soil Rig

DRILLER: BM

LOGGED: BM/MH

CASING: N/A

TYPE OF BORING: Auger

WATER OBSERVATIONS: No free groundwater was observed during auger drilling.

REMARKS: Surface levels were interpolated using nearmaps.com dated 19 December 2018.

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

| SAMPLING & IN SITU TESTING LEGEND | | | |
|-----------------------------------|----------------------|-------|--|
| A | Auger sample | G | Gas sample |
| BB | Bulk sample | P | Piston sample |
| BLK | Block sample | U | Tube sample (x mm dia.) |
| C | Core drilling | W | Water sample |
| D | Disturbed sample | > | Water seep |
| E | Environmental sample | ≡ | Water level |
| | | PID | Photo ionisation detector (ppm) |
| | | PL(A) | Point load axial test Is(50) (MPa) |
| | | PL(D) | Point load diametral test Is(50) (MPa) |
| | | pp | Pocket penetrometer (kPa) |
| | | S | Standard penetration test |
| | | V | Shear vane (kPa) |

BOREHOLE LOG

CLIENT: RPSPM Pty Ltd
PROJECT: Proposed New Manual Arts Building
LOCATION: Lowood State High School, Lowood

SURFACE LEVEL: 64.2 AHD
EASTING: 458770
NORTHING: 6961617
DIP/AZIMUTH: 90°/--

BORE No: 5
PROJECT No: 90505.01
DATE: 18/5/2018
SHEET 1 OF 1

| RL | Depth (m) | Description of Strata | Graphic Log | Sampling & In Situ Testing | | | | Water | Well Construction Details | |
|-------|-----------|--|-------------|----------------------------|-------|--------|--------------------|-------|---------------------------|--|
| | | | | Type | Depth | Sample | Results & Comments | | | |
| 64.1 | 0.15 | FILLING (GM) - medium dense grey sandy gravel filling, medium gravels and fine grained sands, dry FILLING (CI) - stiff red with orange gravelly sandy clay filling, fine to medium gravels with fine to coarse sand, moist SANDY CLAY (CI) - stiff light brown with orange sandy clay, fine grained sands, moist Bore discontinued at 0.4m Limit of Investigation | | B | 0.15 | | | | | |
| 64.25 | | | | | | | | | | |
| 64.4 | | | | | | | | | | |
| 64.5 | 1 | | | | | | | | | |
| 64.6 | 2 | | | | | | | | | |
| 64.7 | 3 | | | | | | | | | |
| 64.8 | 4 | | | | | | | | | |
| 64.9 | 5 | | | | | | | | | |
| 65.0 | 6 | | | | | | | | | |
| 65.1 | 7 | | | | | | | | | |
| 65.2 | 8 | | | | | | | | | |
| 65.3 | 9 | | | | | | | | | |

RIG: Christie Soil Rig **DRILLER:** BM **LOGGED:** BM/MH **CASING:** N/A

TYPE OF BORING: Auger

WATER OBSERVATIONS: No free groundwater was observed during auger drilling.

REMARKS: Surface levels were interpolated using nearmaps.com dated 19 December 2018.

| SAMPLING & IN SITU TESTING LEGEND | | | |
|-----------------------------------|----------------------|-------|--|
| A | Auger sample | G | Gas sample |
| B | Bulk sample | P | Piston sample |
| BLK | Block sample | U | Tube sample (x mm dia.) |
| C | Core drilling | W | Water sample |
| D | Disturbed sample | > | Water seep |
| E | Environmental sample | ≡ | Water level |
| | | PID | Photo ionisation detector (ppm) |
| | | PL(A) | Point load axial test Is(50) (MPa) |
| | | PL(D) | Point load diametral test Is(50) (MPa) |
| | | pp | Pocket penetrometer (kPa) |
| | | S | Standard penetration test |
| | | V | Shear vane (kPa) |



BOREHOLE LOG

CLIENT: RPSPM Pty Ltd
PROJECT: Proposed New Manual Arts Building
LOCATION: Lowood State High School, Lowood

SURFACE LEVEL: 63 AHD
EASTING: 458670
NORTHING: 6961686
DIP/AZIMUTH: 90°/--

BORE No: 6
PROJECT No: 90505.01
DATE: 18/5/2018
SHEET 1 OF 1

| RL | Depth (m) | Description of Strata | Graphic Log | Sampling & In Situ Testing | | | Water | Dynamic Penetrometer Test (blows per 100mm) |
|----|-----------|--|-------------|----------------------------|-------|--------|-------|---|
| | | | | Type | Depth | Sample | | |
| 63 | 0.1 | FILLING (GM) - dense, brown sandy gravel filling, fine to coarse grained sands and gravels with some silt, dry | | B | 0.1 | | | |
| | 0.4 | FILLING (CI) - stiff, brown with orange sandy clay filling, fine to medium grained sands with some fine to coarse gravels, moist | | | | | | |
| 62 | 1.3 | SANDY CLAY (CI) - stiff brown sandy clay, fine grained sands, slightly silty with traces of fine gravels, moist | | | | | | |
| 61 | 1.5 | Bore discontinued at 1.5m Limit of Investigation | | | | | | |
| 60 | 2 | | | | | | | |
| 59 | 3 | | | | | | | |
| 58 | 4 | | | | | | | |
| 57 | 5 | | | | | | | |
| 56 | 6 | | | | | | | |
| 55 | 7 | | | | | | | |
| 54 | 8 | | | | | | | |
| 53 | 9 | | | | | | | |

RIG: Christie Soil Rig

DRILLER: BM

LOGGED: BM/MH

CASING: N/A

TYPE OF BORING: Auger

WATER OBSERVATIONS: No free groundwater was observed during auger drilling.

REMARKS: Surface levels were interpolated using nearmaps.com dated 19 December 2018.

- Sand Penetrometer AS1289.6.3.3
- Cone Penetrometer AS1289.6.3.2

| SAMPLING & IN SITU TESTING LEGEND | | | |
|-----------------------------------|----------------------|-------|--|
| A | Auger sample | G | Gas sample |
| B | Bulk sample | P | Piston sample |
| BLK | Block sample | U | Tube sample (x mm dia.) |
| C | Core drilling | W | Water sample |
| D | Disturbed sample | > | Water seep |
| E | Environmental sample | ≡ | Water level |
| | | PID | Photo ionisation detector (ppm) |
| | | PL(A) | Point load axial test Is(50) (MPa) |
| | | PL(D) | Point load diametral test Is(50) (MPa) |
| | | pp | Pocket penetrometer (kPa) |
| | | S | Standard penetration test |
| | | V | Shear vane (kPa) |

BOREHOLE LOG

CLIENT: RPSPM Pty Ltd
PROJECT: Proposed New Manual Arts Building
LOCATION: Lowood State High School, Lowood

SURFACE LEVEL: 60.7 AHD
EASTING: 458684
NORTHING: 6961762
DIP/AZIMUTH: 90°/--

BORE No: 7
PROJECT No: 90505.01
DATE: 18/5/2018
SHEET 1 OF 1

| RL | Depth (m) | Description of Strata | Graphic Log | Sampling & In Situ Testing | | | | Water | Dynamic Penetrometer Test (blows per 100mm) |
|----|-----------|--|--------------------------|----------------------------|-------|--------|--------------------|-------|---|
| | | | | Type | Depth | Sample | Results & Comments | | |
| | 0.2 | FILLING (CL) - stiff, grey brown sandy clay filling, fine to medium grained sands with trace fine gravels, dry | [Cross-hatched pattern] | B | 0.2 | | | | |
| | 0.4 | FILLING (SC) - medium dense brown clayey sand filling, fine grained sands, dry | [Diagonal lines pattern] | | 0.6 | | | | |
| | 0.6 | - light brown | [Diagonal lines pattern] | | | | | | |
| | 1.0 | SANDY CLAY (CI) - very stiff brown with grey sandy clay, fine to medium grained sands, dry Bore discontinued at 1.0m Limit of Investigation | [Diagonal lines pattern] | | | | | | |
| | 1.0 | | | | | | | | |
| | 2.0 | | | | | | | | |
| | 3.0 | | | | | | | | |
| | 4.0 | | | | | | | | |
| | 5.0 | | | | | | | | |
| | 6.0 | | | | | | | | |
| | 7.0 | | | | | | | | |
| | 8.0 | | | | | | | | |
| | 9.0 | | | | | | | | |

RIG: Christie Soil Rig

DRILLER: BM

LOGGED: BM/MH

CASING: N/A

TYPE OF BORING: Auger

WATER OBSERVATIONS: No free groundwater was observed during auger drilling.

REMARKS: Surface levels were interpolated using nearmaps.com dated 19 December 2018.

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

| SAMPLING & IN SITU TESTING LEGEND | | | |
|-----------------------------------|----------------------|-------|--|
| A | Auger sample | G | Gas sample |
| B | Bulk sample | P | Piston sample |
| BLK | Block sample | U | Tube sample (x mm dia.) |
| C | Core drilling | W | Water sample |
| D | Disturbed sample | > | Water seep |
| E | Environmental sample | ≡ | Water level |
| | | PID | Photo ionisation detector (ppm) |
| | | PL(A) | Point load axial test Is(50) (MPa) |
| | | PL(D) | Point load diametral test Is(50) (MPa) |
| | | pp | Pocket penetrometer (kPa) |
| | | S | Standard penetration test |
| | | V | Shear vane (kPa) |



BOREHOLE LOG

CLIENT: RPS Australia Asia Pacific
PROJECT: Proposed Classroom Extension
LOCATION: Lowood State High School, Lowood

SURFACE LEVEL: 60 mAHD
EASTING: 458890
NORTHING: 6961578
DIP/AZIMUTH: 90°/--

BORE No: 1
PROJECT No: 90505.00
DATE: 6/3/2018
SHEET 1 OF 1

| Depth (m) | Description of Strata | Graphic Log | Sampling & In Situ Testing | | | | Water | Dynamic Penetrometer Test (blows per 100mm) |
|-----------|--|-------------------------|----------------------------|-------|--------|--------------------|-------|---|
| | | | Type | Depth | Sample | Results & Comments | | |
| 0.05 | FILLING (CI) - estimated well compacted dark brown sandy clay filling, medium plasticity, fine sand, moist - light brown with grey | [Cross-hatch pattern] | D | 0.1 | | | | |
| 0.5 | - brown-grey | [Cross-hatch pattern] | A | 0.5 | | | | |
| | | [Cross-hatch pattern] | A | 0.6 | | | | |
| | | [Cross-hatch pattern] | A | 0.7 | | | | |
| 0.8 | SILTY SAND (SM) - dense brown grey silty sand, fine sand, moist to dry | [Vertical line pattern] | | 0.9 | | | | |
| 1.1 | SILTY CLAY (CH) - estimated very stiff grey brown with orange silty clay, high plasticity with some sand, moist | [Diagonal line pattern] | D | 1.2 | | | | |
| | | [Diagonal line pattern] | | 1.5 | | | | |
| 1.7 | - completely weathered siltstone/sandstone, brown with orange and grey | [Dotted pattern] | | | | | | |
| 1.9 | SILTSTONE/SANDSTONE - very low strength siltstone/sandstone, brown with orange and grey | [Diagonal line pattern] | | | | | | |
| 2.1 | Bore discontinued at 2.1m TC Bit Refusal. Limit of investigation. | | | | | | | |

RIG: Christie Soil Rig

DRILLER: BM

LOGGED: BM/GS

CASING: N/A

TYPE OF BORING: Auger

WATER OBSERVATIONS: No free groundwater level was observed during auger drilling

REMARKS: Surface level was interpolated using Google earth imagery dated 19 December 2017

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

| SAMPLING & IN SITU TESTING LEGEND | | | |
|-----------------------------------|----------------------|-------|--|
| A | Auger sample | G | Gas sample |
| B | Bulk sample | P | Piston sample |
| BLK | Block sample | U | Tube sample (x mm dia.) |
| C | Core drilling | W | Water sample |
| D | Disturbed sample | WS | Water seep |
| E | Environmental sample | WL | Water level |
| | | PID | Photo ionisation detector (ppm) |
| | | PL(A) | Point load axial test Is(50) (MPa) |
| | | PL(D) | Point load diametral test Is(50) (MPa) |
| | | pp | Pocket penetrometer (kPa) |
| | | S | Standard penetration test |
| | | V | Shear vane (kPa) |



BOREHOLE LOG

CLIENT: RPS Australia Asia Pacific
PROJECT: Proposed Classroom Extension
LOCATION: Lowood State High School, Lowood

SURFACE LEVEL: 61 mAHD
EASTING: 458878
NORTHING: 6961573
DIP/AZIMUTH: 90°/--

BORE No: 2
PROJECT No: 90505.00
DATE: 6/3/2018
SHEET 1 OF 1

| RL | Depth (m) | Description of Strata | Graphic Log | Sampling & In Situ Testing | | | Water | Dynamic Penetrometer Test (blows per 100mm) | | | | | | |
|----|-----------|---|-----------------------|----------------------------|-------|--------|-------|---|---|----|----|----|--|--|
| | | | | Type | Depth | Sample | | Results & Comments | 5 | 10 | 15 | 20 | | |
| 61 | 0.1 | FILLING (SM) - estimated poorly compacted brown silty sand filling, fine sand, moist | [Cross-hatch pattern] | A | 0.1 | | | | | | | | | |
| | 0.2 | FILLING (CI) - estimated well compacted, dark brown sandy clay filling, medium plasticity, fine sand, moist | [Diagonal lines /] | | 0.2 | | | | | | | | | |
| | 0.4 | SANDY SILTY CLAY (CI) - stiff to very stiff, brown sandy silty clay, medium plasticity, medium grained sand with some fine to medium gravels, moist | [Diagonal lines /] | D | 0.4 | | | | | | | | | |
| | 0.5 | | | | | 0.5 | | | | | | | | |
| | 0.6 | - light brown orange with grey | [Diagonal lines /] | A | 0.6 | | | | | | | | | |
| | 0.9 | | [Diagonal lines /] | A | 0.9 | | | | | | | | | |
| | 1.0 | | [Diagonal lines /] | A | 1.0 | | | | | | | | | |
| | 1.2 | - light grey brown orange | [Diagonal lines /] | D | 1.2 | | | | | | | | | |
| | 1.5 | | [Diagonal lines /] | | 1.5 | | | | | | | | | |
| | 1.6 | - completely weathered sandstone, light brown orange | [Dotted pattern] | | | | | | | | | | | |
| | 1.8 | SANDSTONE - very low strength sandstone, light brown | [Dotted pattern] | | | | | | | | | | | |
| 59 | 2 | | [Dotted pattern] | | | | | | | | | | | |
| | 2.2 | Bore discontinued at 2.2m TC Bit Refusal. Limit of investigation. | | | | | | | | | | | | |
| 57 | 3 | | [Dotted pattern] | | | | | | | | | | | |
| 57 | 4 | | [Dotted pattern] | | | | | | | | | | | |

RIG: Christie Soil Rig

DRILLER: BM

LOGGED: BM/GS

CASING: N/A

TYPE OF BORING: Auger

WATER OBSERVATIONS: No free groundwater level was observed during auger drilling

REMARKS: Surface level was interpolated using Google earth imagery dated 19 December 2017

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

| SAMPLING & IN SITU TESTING LEGEND | | | |
|-----------------------------------|----------------------|-------|--|
| A | Auger sample | G | Gas sample |
| B | Bulk sample | P | Piston sample |
| BLK | Block sample | U | Tube sample (x mm dia.) |
| C | Core drilling | W | Water sample |
| D | Disturbed sample | W | Water seep |
| E | Environmental sample | W | Water level |
| | | PID | Photo ionisation detector (ppm) |
| | | PL(A) | Point load axial test Is(50) (MPa) |
| | | PL(D) | Point load diametral test Is(50) (MPa) |
| | | pp | Pocket penetrometer (kPa) |
| | | S | Standard penetration test |
| | | V | Shear vane (kPa) |



Douglas Partners
 Geotechnics | Environment | Groundwater

Appendix D

Laboratory Report Sheets

Material Test Report



Approved Signatory: Chad Whatley

Senior Technician

NATA Accredited Laboratory Number: 828

Report Number: 90505.00-1
Issue Number: 1
Date Issued: 23/03/2018
Client: RPS Australia Asia Pacific
 PO Box 428, Hamilton NSW 2303
Contact: Michael Ware
Project Number: 90505.00
Project Name: Proposed Classroom Extension
Project Location: Lowood State High School, Lowood
Work Request: 1571
Sample Number: 18-1571A
Date Sampled: 20/03/2018
Sample Location: Borehole 2 (0.5m Below Existing Surface Level)
Material: Sandy Clay brown

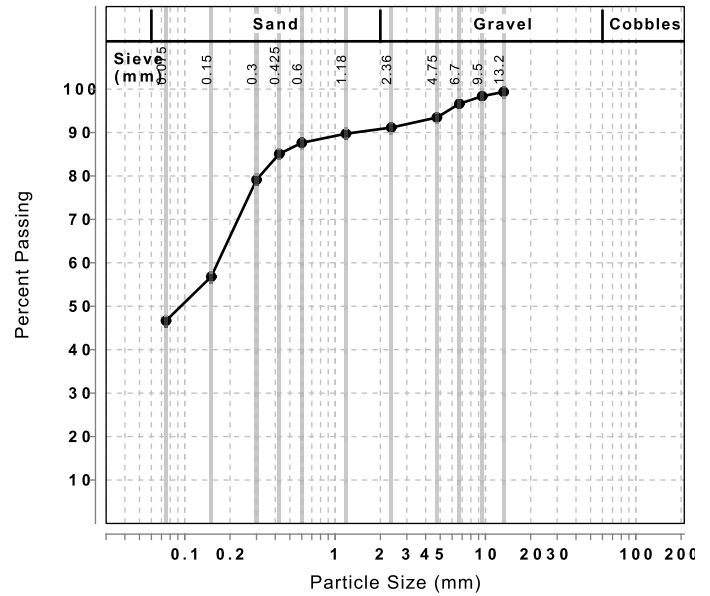
| Particle Distribution (AS1289 3.6.1) | | | | |
|--------------------------------------|----------|----------------|------------|-----------------|
| Sieve | Passed % | Passing Limits | Retained % | Retained Limits |
| 13.2 mm | 99 | | 1 | |
| 9.5 mm | 98 | | 1 | |
| 6.7 mm | 97 | | 2 | |
| 4.75 mm | 93 | | 3 | |
| 2.36 mm | 91 | | 2 | |
| 1.18 mm | 90 | | 1 | |
| 0.6 mm | 88 | | 2 | |
| 0.425 mm | 85 | | 3 | |
| 0.3 mm | 79 | | 6 | |
| 0.15 mm | 57 | | 22 | |
| 0.075 mm | 47 | | 10 | |

| Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1) | | Min | Max |
|--|------------|-----|-----|
| Sample History | Oven Dried | | |
| Preparation Method | Wet Sieve | | |
| Liquid Limit (%) | 49 | | |
| Plastic Limit (%) | 17 | | |
| Plasticity Index (%) | 32 | | |

| Linear Shrinkage (AS1289 3.4.1) | | Min | Max |
|---------------------------------|---------|-----|-----|
| Linear Shrinkage (%) | 13.5 | | |
| Cracking Crumbling Curling | Curling | | |

| Moisture Content (AS 1289 2.1.1) | |
|----------------------------------|-----|
| Moisture Content (%) | 9.6 |

Particle Size Distribution



Material Test Report



Douglas Partners Pty Ltd

Gold Coast Laboratory

Unit 7/ 482, Scottsdale Drive Varsity Lakes QLD 4227

Phone: (07) 5568 8900

Fax: (07) 5568 8999

Email: steven.whatley@douglaspartners.com.au

Accredited for compliance with ISO/IEC 17025 - Testing



Approved Signatory: Chad Whatley

Senior Technician

NATA Accredited Laboratory Number: 828

Report Number: 90505.00-1
Issue Number: 1
Date Issued: 23/03/2018
Client: RPS Australia Asia Pacific
PO Box 428, Hamilton NSW 2303
Contact: Michael Ware
Project Number: 90505.00
Project Name: Proposed Classroom Extension
Project Location: Lowood State High School, Lowood
Work Request: 1571

| Moisture Content AS 1289 2.1.1 | | | |
|--------------------------------|--|------------------|------------------|
| Sample Number | Sample Location | Moisture Content | Material |
| 18-1571A | Borehole 2 (0.5m Below Existing Surface Level) | 9.6 % | Sandy Clay brown |

Material Test Report



Signature

Approved Signatory: Chad Whatley

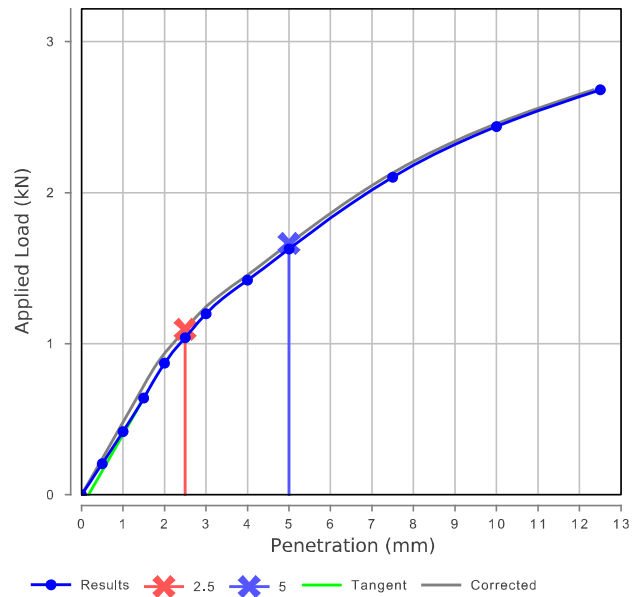
Senior Technician

NATA Accredited Laboratory Number: 828

Report Number: 90505.01-1
Issue Number: 1
Date Issued: 07/06/2018
Client: RPSPM Pty Ltd
 235 Varsity Parade, Gold Coast 4227
Contact: Mariana Pellicciotti
Project Number: 90505.01
Project Name: Proposed New Manual Arts Building
Project Location: Lowood State High School, Lowood
Work Request: 1913
Sample Number: 18-1913A
Date Sampled: 18/05/2018
Sampling Method: Sampled by Client
Sample Location: Bore 5 (0.15m - 0.4m)
Material: Gravelly Sandy Clay

| California Bearing Ratio (AS 1289 6.1.1 & 2.1.1) | | Min | Max |
|--|-----------------------|-----|-----|
| CBR taken at | 5 mm | | |
| CBR % | 8 | | |
| Method of Compactive Effort | Standard | | |
| Method used to Determine MDD | AS 1289 5.1.1 & 2.1.1 | | |
| Method used to Determine Plasticity | Visual Assessment | | |
| Maximum Dry Density (t/m ³) | 2.03 | | |
| Optimum Moisture Content (%) | 11.0 | | |
| Laboratory Density Ratio (%) | 99.5 | | |
| Laboratory Moisture Ratio (%) | 100.0 | | |
| Dry Density after Soaking (t/m ³) | 2.00 | | |
| Field Moisture Content (%) | 7.1 | | |
| Moisture Content at Placement (%) | 10.8 | | |
| Moisture Content Top 30mm (%) | 15.0 | | |
| Moisture Content Rest of Sample (%) | 12.0 | | |
| Mass Surcharge (kg) | 4.5 | | |
| Soaking Period (days) | 4 | | |
| Curing Hours | 24.0 | | |
| Swell (%) | 1.0 | | |
| Oversize Material (mm) | 19 | | |
| Oversize Material Included | Excluded | | |
| Oversize Material (%) | 0.0 | | |

California Bearing Ratio



Material Test Report



Signature

Approved Signatory: Chad Whatley

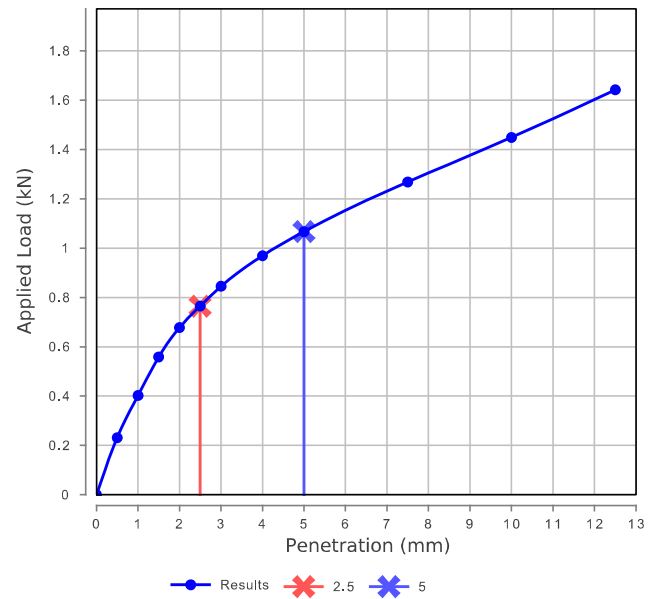
Senior Technician

NATA Accredited Laboratory Number: 828

Report Number: 90505.01-1
Issue Number: 1
Date Issued: 07/06/2018
Client: RPSPM Pty Ltd
 235 Varsity Parade, Gold Coast 4227
Contact: Mariana Pellicciotti
Project Number: 90505.01
Project Name: Proposed New Manual Arts Building
Project Location: Lowood State High School, Lowood
Work Request: 1913
Sample Number: 18-1913B
Date Sampled: 18/05/2018
Sampling Method: Sampled by Client
Sample Location: Bore 6 (0.1m - 0.4m)
Material: Sandy Clay

| California Bearing Ratio (AS 1289 6.1.1 & 2.1.1) | | Min | Max |
|--|-----------------------|-----|-----|
| CBR taken at | 2.5 mm | | |
| CBR % | 6 | | |
| Method of Compactive Effort | Standard | | |
| Method used to Determine MDD | AS 1289 5.1.1 & 2.1.1 | | |
| Method used to Determine Plasticity | Visual Assessment | | |
| Maximum Dry Density (t/m ³) | 1.88 | | |
| Optimum Moisture Content (%) | 11.5 | | |
| Laboratory Density Ratio (%) | 100.0 | | |
| Laboratory Moisture Ratio (%) | 100.0 | | |
| Dry Density after Soaking (t/m ³) | 1.84 | | |
| Field Moisture Content (%) | 10.8 | | |
| Moisture Content at Placement (%) | 11.5 | | |
| Moisture Content Top 30mm (%) | 19.6 | | |
| Moisture Content Rest of Sample (%) | 15.5 | | |
| Mass Surcharge (kg) | 4.5 | | |
| Soaking Period (days) | 4 | | |
| Curing Hours | 24.0 | | |
| Swell (%) | 2.0 | | |
| Oversize Material (mm) | 19 | | |
| Oversize Material Included | Excluded | | |
| Oversize Material (%) | 0.0 | | |

California Bearing Ratio



Material Test Report



Signature

Approved Signatory: Chad Whatley

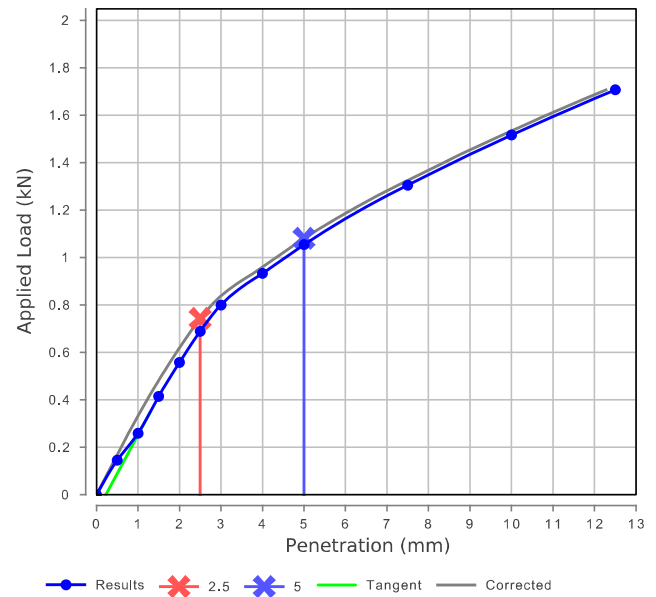
Senior Technician

NATA Accredited Laboratory Number: 828

Report Number: 90505.01-1
Issue Number: 1
Date Issued: 07/06/2018
Client: RPSPM Pty Ltd
 235 Varsity Parade, Gold Coast 4227
Contact: Mariana Pellicciotti
Project Number: 90505.01
Project Name: Proposed New Manual Arts Building
Project Location: Lowood State High School, Lowood
Work Request: 1913
Sample Number: 18-1913C
Date Sampled: 18/05/2018
Sampling Method: Sampled by Client
Sample Location: Bore 7 (0.2m - 0.6m)
Material: Clayey Sand

| California Bearing Ratio (AS 1289 6.1.1 & 2.1.1) | | Min | Max |
|--|-----------------------|-----|-----|
| CBR taken at | 2.5 mm | | |
| CBR % | 6 | | |
| Method of Compactive Effort | Standard | | |
| Method used to Determine MDD | AS 1289 5.1.1 & 2.1.1 | | |
| Method used to Determine Plasticity | Visual Assessment | | |
| Maximum Dry Density (t/m^3) | 1.76 | | |
| Optimum Moisture Content (%) | 12.0 | | |
| Laboratory Density Ratio (%) | 99.5 | | |
| Laboratory Moisture Ratio (%) | 100.0 | | |
| Dry Density after Soaking (t/m^3) | 1.71 | | |
| Field Moisture Content (%) | 7.7 | | |
| Moisture Content at Placement (%) | 12.1 | | |
| Moisture Content Top 30mm (%) | 22.3 | | |
| Moisture Content Rest of Sample (%) | 16.7 | | |
| Mass Surcharge (kg) | 4.5 | | |
| Soaking Period (days) | 4 | | |
| Curing Hours | 24.0 | | |
| Swell (%) | 2.5 | | |
| Oversize Material (mm) | 19 | | |
| Oversize Material Included | Excluded | | |
| Oversize Material (%) | 0.0 | | |

California Bearing Ratio



Appendix 13

Acoustic Assessment

Manual Arts Building

Lowood State High School, 34 Prospect Street, Lowood

Noise Impact Assessment

Report: 9538R01V01

Prepared for:


RPS Group

21 May, 2018



Document Control

| Document Ref | Date of Issue | Status | Author | Reviewer |
|------------------|---------------|--------|------------|-------------|
| 9538R01V01_draft | 18 May, 2018 | Draft | Bill Elder | Tim Osborne |
| 9538R01V01 | 21 May, 2018 | Final | Bill Elder | Tim Osborne |

| Document Approval | |
|--------------------|---|
| Approver Signature |  |
| Name | Stephen Pugh |
| Title | Director |

Disclaimer: This document and associated tasks were undertaken in accordance with the ASK Consulting Engineers Quality Assurance System, which is based on Australian Standard / NZS ISO 9001:2008. This document is issued subject to review, and authorisation by a Senior Consultant noted in the above table. If the table is incomplete, this document shall be considered as preliminary or draft only and no reliance shall be placed upon it other than for information to be verified later.

This document is prepared for our Client's particular requirements which are based on a specific brief with limitations as agreed to with the Client. It is not intended for and should not be relied upon by a third party and no responsibility is undertaken to any third party without prior consent provided by ASK Consulting Engineers. The information herein should not be reproduced, presented or reviewed except in full. Prior to passing on to a third party, the Client is to fully inform the third party of the specific brief and limitations associated with the commission.

The information contained herein is for the identified purpose of acoustics only. No claims are made and no liability is accepted in respect of design and construction issues falling outside of the specialist field of acoustics engineering including and not limited to structural integrity, fire rating, architectural buildability and fit-for-purpose, waterproofing, safety design and the like. Supplementary professional advice should be sought in respect of these issues.

Copyright: This report and the copyright thereof are the property of ASK Consulting Engineers Pty Ltd (ABN 55 622 586 522). It must not be copied in whole or in part without the written permission of ASK Consulting Engineers Pty Ltd. This report has been produced specifically for the Client and project nominated herein and must not be used or retained for any other purpose. www.askconsulting.com.au

Contents

| | | |
|-----------|--|-----------|
| 1. | Introduction | 4 |
| 2. | Study Area Description | 5 |
| 3. | Proposed Development | 6 |
| 4. | Acoustic Criteria | 7 |
| 4.1 | Overview | 7 |
| 4.2 | Environmental Protection Act | 7 |
| 4.3 | Environmental Protection (Noise) Policy | 8 |
| 4.3.1 | Overview | 8 |
| 4.3.2 | Background Creep | 8 |
| 4.3.3 | Acoustic Quality Objectives | 8 |
| 4.4 | Summary of Criteria | 9 |
| 5. | Acoustic Measurements | 10 |
| 5.1 | Overview and Locations | 10 |
| 5.2 | Attended Noise Measurements | 10 |
| 5.3 | Noise Logging | 10 |
| 6. | Workshop Noise Assessment | 13 |
| 6.1 | Noise Criteria and Limits | 13 |
| 6.2 | Building Noise Assessment | 13 |
| 7. | Mechanical Plant Noise Assessment | 15 |
| 7.1 | Noise Limits | 15 |
| 7.2 | Noise Assessment | 15 |
| 8. | Recommendations & Conclusion | 16 |

Appendices

| | | |
|-------------------|---------------------------|-----------|
| Appendix A | Glossary | 17 |
| Appendix B | Project Drawings | 18 |
| Appendix C | Noise Calculations | 19 |

1. Introduction

ASK Consulting Engineers Pty Ltd (ASK) was commissioned by RPS Group to provide a noise assessment for the proposed new manual arts building being constructed at Lowood State High School.

This noise assessment report is to accompany an Infrastructure Designation submission. The application is made over land at 34 Prospect Street QLD 4311, and described as Lot 89 on CC3323.

The purpose of this report is as follows:

- Outline the relevant project noise criteria.
- Present the results of noise monitoring.
- Predict and assess the noise emissions from the development.
- Describe noise mitigation requirements, if any.

To aid in the understanding of the terms in this report a glossary is included in **Appendix A**.

2. Study Area Description

The proposed development is to be located at 34 Prospect Street, Lowood. The site location is shown in **Figure 2.1** (source: Qld Globe Aerial Photography).



Figure 2.1 Subject Site and Monitoring Location

The site currently consists of educational buildings, play areas and sporting fields.

The proposed development is surrounded by the following uses (refer **Figure 2.1**):

- Residences and Lowood State School to the north.
- Urban Utilities depot and cleared vacant land to the east.
- Cleared vacant land to the south.
- Residences (R1) to the west and (R2) to the east.

The proposed development has the potential to create noise impacts on nearby residences (R1 and R2) due to workshop noise and mechanical plant. These potential impacts are required to be considered in the project design. If predicted noise emission levels are compliant at these receivers then it is considered that all noise emission levels are compliant.

4. Acoustic Criteria

4.1 Overview

The site is located within the Somerset Regional Council area, and therefore the Somerset Region Planning Scheme will be addressed. The current version of the planning scheme is Version 3 effective 27 April 2018.

The Somerset Region Planning Scheme does not contain specific noise criteria for noise impact assessments but does make reference to the Environmental Protection (Noise) Policy 2008 (EPP (Noise)).

For assessment of air conditioning and refrigeration plant, the Environmental Protection Act 1994 (the Act) is typically referred to.

In summary the relevant noise criteria are:

- Air-conditioning and refrigeration plant: The noise standards for regulated devices in the Act.
- Other sources: The 'background plus' (background creep) criteria and Acoustic Quality Objectives presented in the EPP (Noise).

4.2 Environmental Protection Act

In Queensland, the environment is protected under the *Environmental Protection Act 1994*. The object of the Act is to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (ecologically sustainable development).

The Act describes a number of offences relating to noise standards, including building work, regulated devices (e.g. power tools), pumps, air-conditioning equipment, refrigeration equipment, indoor venues, outdoor events, amplifier devices other than at indoor venue or open-air event, power boat sports in waterway, operating power boat engine at premises, blasting, and outdoor shooting ranges. The relevant standards are included below.

440U Air-conditioning equipment

- (1) This section applies to premises at or for which there is air-conditioning equipment.
- (2) An occupier of the premises must not use, or permit the use of, the equipment on any day—
 - (a) before 7a.m, if it makes a noise of more than 3dBA above the background level; or
 - (b) from 7a.m. to 10p.m, if it makes a noise of more than 5dBA above the background level; or
 - (c) after 10p.m, if it makes a noise of more than 3dBA above the background level.

440V Refrigeration equipment

- (3) This section applies to a person who is—
 - (a) an occupier of premises at or for which there is plant or equipment for refrigeration (*refrigeration equipment*); or
 - (b) an owner of refrigeration equipment that is on or in a vehicle, other than a vehicle used or to be used on a railway.
- (4) The person must not use, or permit the use of, the refrigeration equipment on any day—
 - (a) before 7a.m, if it makes a noise of more than 3dBA above the background level; or
 - (b) from 7a.m. to 10p.m, if it makes a noise of more than 5dBA above the background level; or

(c) after 10p.m, if it makes a noise of more than 3dBA above the background level.

(5) In this section—

vehicle includes a trailer.

4.3 Environmental Protection (Noise) Policy

4.3.1 Overview

In respect of the acoustic environment, the object of the Act is achieved by the Environmental Protection (Noise) Policy 2008 (EPP (Noise)). This policy identifies environmental values to be enhanced or protected, states acoustic quality objectives, and provides a framework for making decisions about the acoustic environment.

4.3.2 Background Creep

The EPP(Noise) contains noise criteria for controlling background creep, which are to be applied “for an activity involving noise”. The criteria are as follows:

To the extent that it is reasonable to do so, noise from an activity must not be—

- (a) for noise that is continuous noise measured by $L_{A90,T}$ —more than nil dBA greater than the existing acoustic environment measured by $L_{A90,T}$; or
- (b) for noise that varies over time measured by $L_{Aeq,adj,T}$ —more than 5dBA greater than the existing acoustic environment measured by $L_{A90,T}$.

The EPP(Noise) does not define “continuous noise”, but by definition, the “continuous noise” would be required to occur for at least 90% of a measurement period (typically 15 minutes or 60 minutes). Thus this criterion could apply for equipment such as mechanical plant.

The criterion for “noise that varies over time” is appropriate for noise sources operating for less than 90% of a measurement period, and could apply to intermittent events (e.g. vehicles) or mechanical plant that does not run continuously (e.g. air-conditioning).

4.3.3 Acoustic Quality Objectives

The EPP (Noise) contains a range of acoustic quality objectives for a range of receptors. The objectives are in the form of noise levels, and are defined for various periods of the day, and use a number of acoustic parameters.

Schedule 1 of the EPP(Noise) includes the following acoustic quality objectives to be met at residential dwellings:

- Outdoors
 - Daytime and Evening: 50 dBA $L_{Aeq,adj,1hr}$, 55 dBA $L_{A10,adj,1hr}$ and 65 dBA $L_{A1,adj,1hr}$
- Indoors
 - Daytime and Evening: 35 dBA $L_{Aeq,adj,1hr}$, 40 dBA $L_{A10,adj,1hr}$ and 45 dBA $L_{A1,adj,1hr}$
 - Night: 30 dBA $L_{Aeq,adj,1hr}$, 35 dBA $L_{A10,adj,1hr}$ and 40 dBA $L_{A1,adj,1hr}$

In the DEHP EcoAccess Guideline “Planning For Noise Control” documentation it is proposed that the noise reduction provided by a typical residential building façade is 7 dBA assuming open windows. That is, with an external noise source, a 7 dBA reduction in noise levels from outside a house to inside a house is expected when windows are fully open. Thus the indoor noise objectives noted above could be converted to the following external objectives (with windows open):

- Daytime and Evening: 42 dBA $L_{Aeq,adj,1hr}$, 47 dBA $L_{A10,adj,1hr}$ and 52 dBA $L_{A1,adj,1hr}$

- Night: 37 dBA $L_{Aeq,adj,1hr}$, 42 dBA $L_{A10,adj,1hr}$ and 47 dBA $L_{A1,adj,1hr}$

A sensitive receptor is defined as “an area or place where noise is measured”.

The EPP(Noise) states that the objectives are intended to be progressively achieved over the long term. However, as this project involves the introduction of new noise sources it would seem reasonable that the acoustic quality objectives are achieved upon commencement of operation of the project, and this may be the intent of the policy. Therefore, consideration to achieving these acoustic quality objectives will be included in the design noise limits for the project.

4.4 Summary of Criteria

The proposed criteria are from the Act and EPP(Noise) and are as follows:

- Mechanical plant:
 - Background plus 5 dBA between 7:00am to 10:00pm
 - Background plus 3 dBA between 10:00pm to 7:00am
- Workshop equipment and activities (i.e. variable noise) – a noise limit ($L_{Aeq,adj,T}$) of background ($L_{A90,T}$) plus 5 dBA

5. Acoustic Measurements

5.1 Overview and Locations

Acoustic measurements consisted of attended noise measurements and noise logging. The noise measurement locations are shown in **Figure 2.1**. Location A was located on the western boundary approximately 80 metres from the rear (southern) boundary. Location B was located within the school property at approximately 80 metres from the rear (southern) boundary and 17 metres from the side (eastern) boundary.

The noise monitoring was undertaken in general accordance with Australian Standard AS1055 Acoustics – Description and measurement of environmental noise and the EHP Noise Measurement Manual 2013.

5.2 Attended Noise Measurements

Attended noise measurements were undertaken at Locations A and B. The measurements were undertaken between 2:30pm and 3:30pm on 4/05/2018 over 15 minute periods using a field and laboratory calibrated Norsonic NOR140 sound level meter. The microphone height was approximately 1.3m above natural ground level and was located in the free field. Weather during the time of monitoring was clear and fine, approximately 27°C with a slight breeze.

The measured noise levels are summarised in **Table 5.1**.

Table 5.1 Attended Noise Measurement Results

| Location | Date & Time | Period (Minutes) | Results & Notes |
|----------|---------------------|------------------|--|
| A | 2:37pm 4/5/2018 | 15 | Statistical noise levels: L ₁₀ 50 dBA, L _{eq} 48 dBA, L ₉₀ 41 dBA Children playing on oval 49 to 61 dBA Distant traffic noise 43 to 54 dBA Nearby mower 45 to 48 dBA School bell / music 49 to 52 dBA Background estimate 38 dBA |
| B | 3:04pm 4/05/2018 | 15 | Statistical noise levels: L ₁₀ 46 dBA, L _{eq} 45 dBA, L ₉₀ 37 dBA Traffic noise 39 to 51 dBA Crows 43 to 54 dBA Background estimate 35 dBA |

Note: * The reported noise levels, excluding the statistical noise levels, are the instantaneous levels read from the sound level meter, and generally represent the range in noise levels or maximum noise levels for a particular noise source.

5.3 Noise Logging

Noise logging was undertaken at Location A. Logging was undertaken from 4/5/2018 to 5/5/2018 using a field and laboratory calibrated Larson Davis LD831 environmental noise logger. Noise logging was undertaken in the free field.

Data from the Bureau of Meteorology (Amberley) indicates that weather during the monitoring period was generally fine and warm, with no recorded rainfall. Overall, the noise monitoring data is considered acceptable for use in this report.

The measured noise levels are shown in **Figure 5.1**.

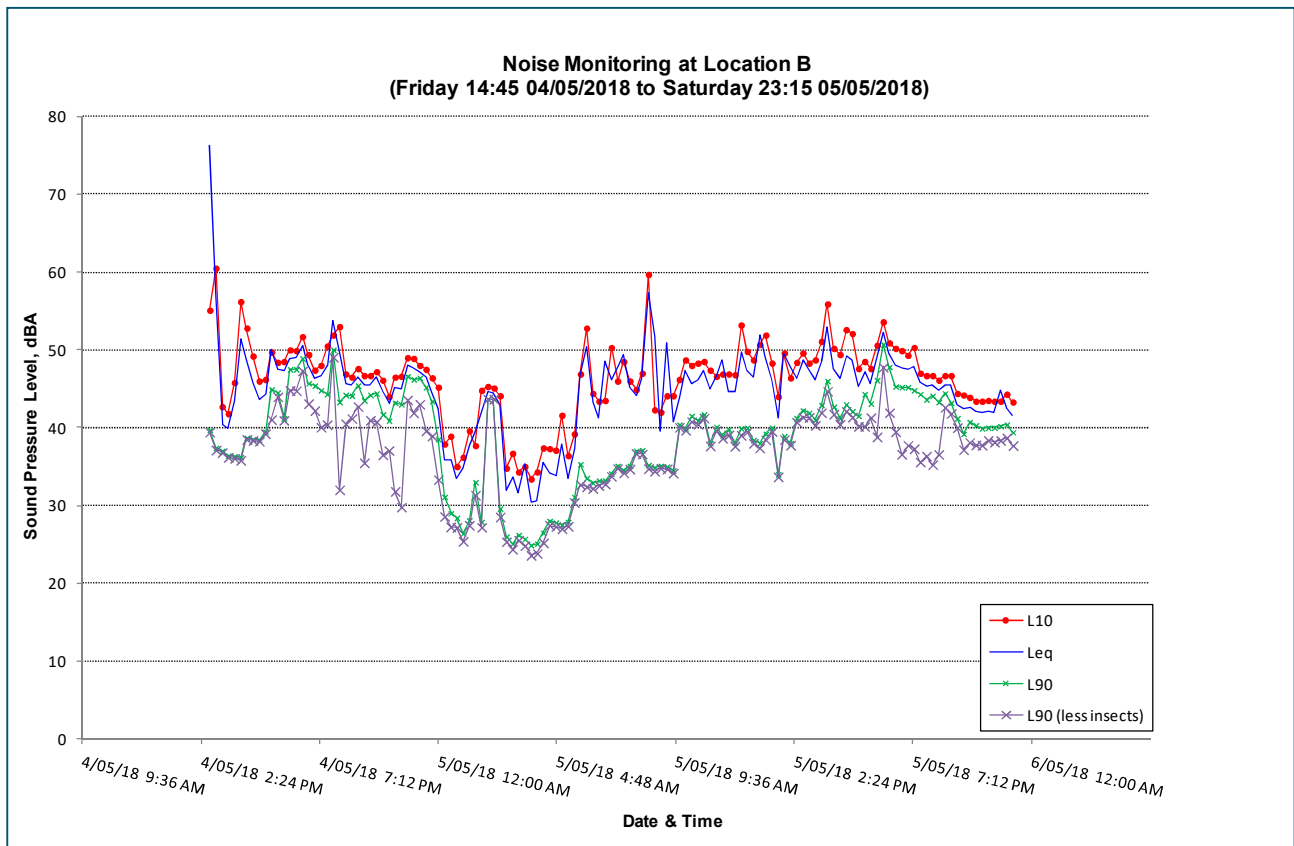


Figure 5.1 Graph of Noise Logging Results at Location B

From the noise logging the statistical results have been summarised in **Table 5.2**.

Table 5.2 Statistical Noise Levels at Location B

| Parameter | Noise Levels dBA [Maximum-Top 10%-(Average)-Bottom 10%-Minimum] | | |
|--------------------------------|--|------------------|------------------|
| | Day | Evening | Night |
| L _{max} | 111-75-(67)-57-53 | 75-63-(55)-50-46 | 75-67-(54)-47-45 |
| L ₁ | 73-62-(56)-50-47 | 66-53-(51)-47-45 | 63-53-(47)-42-38 |
| L ₁₀ | 61-53-(49)-44-42 | 54-52-(48)-45-43 | 53-47-(42)-35-33 |
| L _{eq} | 76-52-(48)-44-40 | 54-50-(47)-43-42 | 50-47-(40)-33-30 |
| L ₉₀ | 46-43-(39)-35-34 | 51-48-(45)-41-39 | 47-44-(34)-26-25 |
| L ₉₀ (less insects) | 45-41-(39)-35-34 | 49-45-(40)-36-32 | 44-42-(32)-25-24 |

The background noise levels calculated using the lowest 10th percentile method are shown in **Table 5.3**.

The background noise level was affected by insect noise. As the insect noise is likely a seasonal influence, the noise level data has been filtered to remove the insect noise. The resulting background noise levels calculated using the lowest 10th percentile method are shown in **Table 5.3**.

Table 5.3 Background Noise Levels (Measured and with Insect Noise Removed) at Location B

| Period | Measured Background Noise Level L ₉₀ dBA | Rating Background Noise Level (RBL) Filtered (Less Insect Noise) L ₉₀ dBA |
|-----------------------|--|---|
| Day (7am to 6pm) | 35 | 35 |
| Evening (6pm to 10pm) | 40 | 36 |
| Night (10pm to 7am) | 25 | 25 |

From the results above it was noted that distant road traffic noise was the dominant noise in the area and reduces during the evening and night-time, and that insect noise was significant during the evening.

6. Workshop Noise Assessment

6.1 Noise Criteria and Limits

As the workshop areas will only be used during the daytime (7am to 6pm), only daytime noise limits will be considered in this section.

It is considered that noise from workshop activities varies with time, and thus the relevant Background Creep daytime noise limit (refer **Section 4.3.2**) is 40 dBA L_{eq} (i.e. a background noise level of 35 dBA L_{90} plus 5 dBA) to be achieved at the worst-affected residences near the school.

From **Section 4.3.3** the Acoustic Quality Objective outside residences is 50 dBA $L_{eq,adj,1hour}$, though this could result in exceedance of the indoor Acoustic Quality Objective at residences of 35 dBA $L_{eq,adj,1hour}$ when residential windows and doors are open. As described in **Section 4.3.3**, the corresponding external limit to comply with an internal limit of 35 dBA $L_{eq,adj,1hour}$ with windows and doors open is 42 dBA $L_{eq,adj,1hour}$. This is higher than the Background Creep limit of 40 dBA L_{eq} , and therefore if the Background Creep limit is achieved, the Acoustic Quality Objective limits will also be achieved.

6.2 Building Noise Assessment

Noise from equipment used in the workshop and construction courtyard will be assessed onto surrounding residences. ASK understands the proposed rooms will include the following equipment:

- Wall saw
- 3 x Wood lathes
- Drop/Compound saw
- Disk sander
- Band saw
- Radial arm saw
- Dual drum sander
- Thicknesser
- Bobbin sander

ASK has previously conducted noise levels in school facilities and has the following noise data:

- In a school general workshop with students talking and undertaking wood work, the room-average noise level was approximately 78 dBA (80 dBC) L_{eq} .
- In a school general workshop with students undertaking metal work, the room-average noise level was approximately 88 dBA L_{eq} .

The new building is proposed to be used for woodworking only and a room-average of 78dBA has been used in calculations for the workshop.

The noise source sound power levels used for noise emission calculations of equipment in the construction courtyard, materials store and dust plant room are presented in **Table 6.1**.

Table 6.1 Source Noise Level Data

| Noise Source | Sound Power Levels (dBA) | | | | | | | | | |
|----------------|--------------------------|-----------------|----|-----|-----|-----|------|------|------|------|
| | Overall (dBA) | Octave Band, Hz | | | | | | | | |
| | | 32 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
| Lathe | 86 | 24 | 38 | 54 | 68 | 71 | 82 | 83 | 77 | 69 |
| Saw | 86 | 27 | 41 | 59 | 68 | 74 | 78 | 81 | 80 | 78 |
| Dust Extractor | 95 | 47 | 68 | 78 | 93 | 89 | 86 | 76 | 70 | 61 |

The existing residences to the west of the school are located approximately 229 metres from the northern opening of the construction courtyard and the existing residences to the southeast of the school are located approximately 211m from the southern wall of the dust plant room.

The general construction of the rooms is assumed as follows:

- 92mm stud frame, brick veneer with sheet metal cladding (estimated Rw 45, minimum Rw 25 required).
- Windows and doors assumed to be open.
- Metal roof, bulk insulation, and plasterboard or mineral fibre tile ceiling (workshop and stores) (Rw 38) and perforated custom orb (construction court) (Rw 25).

Noise levels from the construction courtyard, materials store, workshop and dust plant room have been calculated at the nearest residences. The summary of calculations of the predicted noise levels from each room onto the nearest receivers are presented in **Appendix C**. A summary of the calculated results is presented in **Table 6.2**.

Table 6.2 Summary of Predicted Noise Levels at Sensitive Receivers R1 and R2

| Noise Source | Predicted Noise Level, L_{eq} dBA | |
|-----------------|-------------------------------------|--------------|
| | Residence R1 | Residence R2 |
| Courtyard | 33 | 33 |
| Workshop | 35 | 36 |
| Materials Store | 26 | 25 |
| Dust Plant Room | 28 | 30 |
| TOTAL | 38 | 39 |

From **Table 6.2** it can be seen that the sum of all the noise source contributions from the subject site at sensitive receivers R1 and R2 are compliant with the criteria of 40 dBA L_{eq} .

Calculations have assumed all windows and doors are open in each of the areas except the dust plant room. It was assumed that the dust plant room would be a fully enclosed space. Any openings in the enclosure (e.g. for ventilation) may require acoustic attenuation. At this stage the specific plant room equipment is unknown. The requirement for acoustic attenuation of openings can be revised later once dust plant room equipment has been specified and noise data provided.

There may also be noisy mechanical plant associated with these rooms, and this should be located, selected and designed to achieve the noise limits proposed in **Section 7**.

7. Mechanical Plant Noise Assessment

7.1 Noise Limits

The project noise criteria were outlined in **Section 4.2** and are based on the background noise level plus 5 dBA in the daytime and evening, and the background noise level plus 3 dBA at night.

The mechanical plant noise limits are calculated as shown in **Table 7.1**. The recommended noise limits are also included in **Table 7.1**.

Table 7.1 Mechanical Plant Noise Limits

| Period | Rating Background Noise Level (RBL) Filtered (Less Insect Noise) L_{90} dBA | Mechanical Plant Overall Noise Limits $L_{eq,adj,T}$ dBA | Mechanical Plant Component (DESIGN) Noise Limits $L_{eq,adj,T}$ dBA |
|-----------------------|---|--|---|
| Day (7am to 6pm) | 35 | 40 | 38 |
| Evening (6pm to 10pm) | 36 | 41 | 39 |
| Night (10pm to 7am) | 25 | 28 | 25 |

7.2 Noise Assessment

The proposed development may include workshop extraction fans and other exhaust fans.

At this stage the mechanical design is not complete and therefore it is proposed that plant is designed and selected to achieve the above recommended noise limits in **Table 7.1**.

8. Recommendations & Conclusion

A noise assessment has been conducted for the proposed manual arts building at Lowood State High School. The results and recommendations of the assessment are as follows:

- Predicted noise emission levels at the nearest sensitive receivers from activities occurring within the manual arts building are predicted to comply with the relevant criteria with windows and doors open, based on the construction described in **Section 6.2**.
- The dust plant room is assumed to be fully enclosed. Any openings in the enclosure (e.g. for ventilation) may require acoustic attenuation. At this stage the specific plant room equipment is unknown. The requirement for acoustic attenuation of openings can be revised later once dust plant room equipment has been specified and noise data provided.
- Mechanical plant is to be designed, selected and located to achieve a daytime noise limit of 38 dBA $L_{eq,adj,T}$ outside adjoining residential dwellings. This limit and evening and night limits are discussed in **Section 7**.

Appendix A Glossary

| Parameter or Term | Description |
|---------------------------|--|
| dB | The decibel (dB) is the unit measure of sound. Most noises occur in a range of 20 dB (quiet rural area at night) to 120 dB (nightclub dance floor or concert). |
| dBA | Noise levels are most commonly expressed in terms of the 'A' weighted decibel scale, dBA. This scale closely approximates the response of the human ear, thus providing a measure of the subjective loudness of noise and enabling the intensity of noises with different frequency characteristics (e.g. pitch and tone) to be compared. |
| Day | The period between 7am and 6pm. |
| Evening | The period between 6pm and 10pm. |
| Night | The period between 10pm and 7am. |
| Free-field | The description of a noise receiver or source location which is away from any significantly reflective objects (e.g. buildings, walls). |
| L ₁ | The noise level exceeded for 1% of the measurement period. |
| L ₁₀ | The noise level exceeded for 10% of the measurement period. It is sometimes referred to as the average maximum noise level. |
| L ₉₀ | The noise level exceeded for 90% of the measurement period. This is commonly referred to as the background noise level. |
| L _{eq} | The equivalent continuous sound level, which is the constant sound level over a given time period, which is equivalent in total sound energy to the time-varying sound level, measured over the same time period. |
| L _{eq,1hour} | As for L _{eq} except the measurement intervals are defined as 1 hour duration. |
| L _{max} | Maximum A-weighted sound pressure level. |
| L _{eq} (24 hour) | The average L _{eq} noise level over the 24-hour period from midnight to midnight. |
| L ₁₀ (18 hour) | The arithmetic average of the one-hour L ₁₀ values between 6am and midnight. This parameter is used in the assessment of road traffic noise. |
| R _w | Weighted Sound Reduction Index – is a single number evaluation of the property of a partition to attenuate sounds. For the majority of partitions, the value of R _w will be similar to the value for STC. Partitions with particularly poor performance at 100 Hz may have lower values for R _w than for STC. Conversely, partitions with poor performance at 4000 Hz may have higher R _w than for STC. (As per AS1276.1-1999). |
| Habitable Rooms | According to the "Building Code of Australia" a Habitable Room is: " a room used for normal domestic activities and Includes a bedroom, living room, lounge room, music room, television room, kitchen, dining room, sewing room, study, playroom, family room, home theatre, and sunroom, but Excludes a bathroom, laundry, water closet, pantry, walk-in wardrobe, corridor, hallway, lobby, photographic darkroom, clothes drying room, and other spaces of a specialised nature occupied neither frequently nor for extended periods." |

Appendix B Project Drawings

GENERAL NOTES

1. IF IN DOUBT - JUST ASK
2. USE DIMENSIONS, DO NOT SCALE FROM DRAWINGS
3. CONFORM ALL RELATIVE DIMENSIONS, LEVELS AND DETAILS ON SITE PRIOR TO CONSTRUCTION
4. THESE ARCHITECTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DIMENSIONS AND NOTES REFERRED TO IN THESE DRAWINGS FOR DISCUSSION
5. BEFORE PROCEEDING WITH THE WORK, VERIFY WITH GOVERNMENT STATUTORY REQUIREMENTS THAT ALL BUILDING REGULATIONS, ACTS, BY-LAWS AND OTHER LEGISLATION, ORDINANCES, REGULATIONS, STANDARDS, STATUTORY REQUIREMENTS AND ALL CONCEPTS OF DOCUMENTATION, RELAYED TO THE CLIENT, ARE FULLY UNDERSTOOD AND ACCEPTED BY THE CLIENT
6. ALL WORK SHALL BE IN ACCORDANCE WITH ALL APPLICABLE GOVERNMENT STATUTORY REQUIREMENTS, ACTS, BY-LAWS AND OTHER LEGISLATION, ORDINANCES, REGULATIONS, STANDARDS, STATUTORY REQUIREMENTS AND ALL CONCEPTS OF DOCUMENTATION, RELAYED TO THE CLIENT
7. ALL WORK SHALL BE IN ACCORDANCE WITH ALL APPLICABLE GOVERNMENT STATUTORY REQUIREMENTS, ACTS, BY-LAWS AND OTHER LEGISLATION, ORDINANCES, REGULATIONS, STANDARDS, STATUTORY REQUIREMENTS AND ALL CONCEPTS OF DOCUMENTATION, RELAYED TO THE CLIENT
8. ALL WORK SHALL BE IN ACCORDANCE WITH ALL APPLICABLE GOVERNMENT STATUTORY REQUIREMENTS, ACTS, BY-LAWS AND OTHER LEGISLATION, ORDINANCES, REGULATIONS, STANDARDS, STATUTORY REQUIREMENTS AND ALL CONCEPTS OF DOCUMENTATION, RELAYED TO THE CLIENT

DIMENSIONS

Check all dimensions & levels on site before fabrication or set out


AMENDMENTS

| ISSUE | DATE | SUBJECT | APPROVAL |
|-------|----------|-----------------------|----------|
| A | 05/03/18 | SITE PLAN PRELIMINARY | SL |
| B | 04/05/18 | REVISIONS | SL |


DRAWINGS INDEXING SYSTEM

FOR PROJECT SERVICES, PLANS AND RECORDS USE ONLY

- CEILING PLANS
- CONSTRUCTION DETAILS
- ELEVATIONS
- EXTERIOR WORKS
- FLOOR PLAN
- FURNITURE & EQUIPMENT
- HYDRAULICS
- MISCELLANEOUS DETAILS
- PLAY STRUCTURES
- SECTION
- SETOUT PLAN
- SITE PLAN
- STANDARDS



CLIENT
Department of Education and Training
 © The State of Queensland 2015



8i Architects
 Suite 24, 200 Moggill Road,
 Taringa, QLD, 4068
 Ph: (07) 5217 7100
 web: www.8i.net.au
 ASN 78 793 485 897

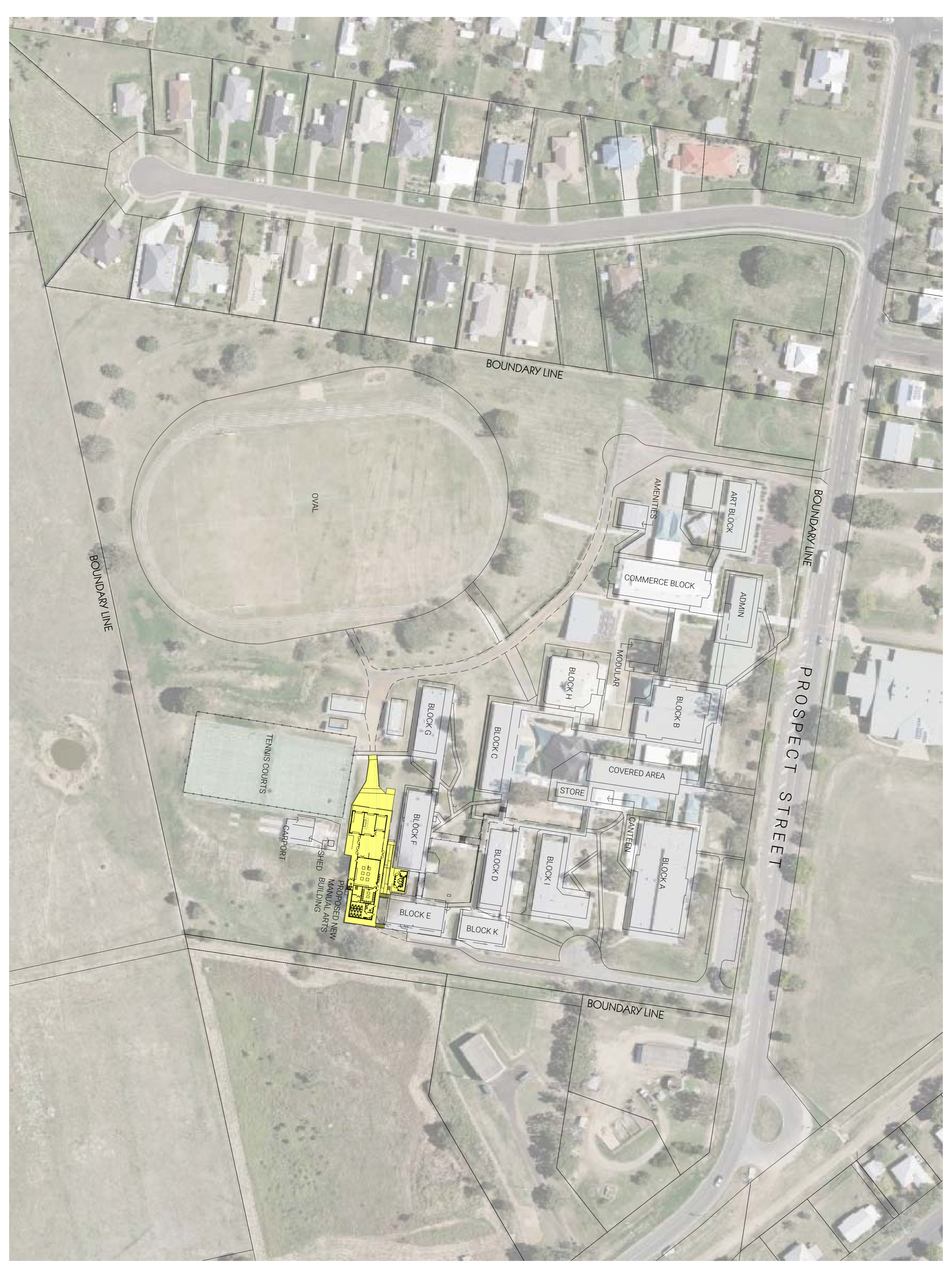
| SL | DATE |
|----|------------|
| SL | March 2018 |

DISCIPLINE TEAM LEADER DATE
 HJN March 2018
 AUTHORED FOR ISSUE DATE
 LOWOOD STATE HIGH SCHOOL
 34 PROSPECT STREET,
 LOWOOD, QLD 4311
 PROPOSED OVERALL
 SITE PLAN
 MANUAL ARTS EXTENSION

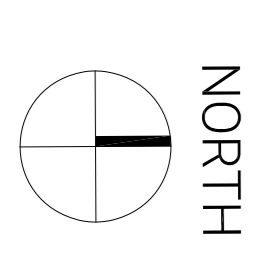
| SCALE | AT |
|--------|----|
| 1:1000 | A1 |

| MASTER SITE NUMBER | CLIENT REFERENCE NUMBER |
|--------------------|-------------------------|
| 00000 | XXXXX |

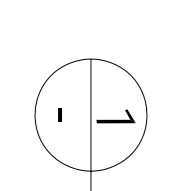
| DRAWING NUMBER | ISSUE | SHEET NO. |
|----------------|-------|-----------|
| 1806 / SK02 | B | - |



PRELIMINARY



NORTH



PROPOSED OVERALL SITE PLAN
 SCALE 1:1000 @ A1

GENERAL NOTES

1. IF IN DOUBT, JUST ASK
2. USE DIMENSIONS, DO NOT SCALE FROM DRAWINGS
3. COMPARE ALL EXISTING DIMENSIONS, LEVELS AND THE S.M. SITE FROM TO
4. THESE ARCHITECTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DISCREPANCIES SHALL BE REFERRED TO THE ARCHITECT FOR DISCUSSION
5. BEFORE PROCEEDING WITH THE WORK, VERIFY THE CURRENT STAMBO BUILDING BY-LAWS, BUILDING ACT BUILDING REGULATIONS ACT, BUILDING AND OTHER CODE OF AUSTRALIA, CURRENT AUSTRALIAN STANDARDS, STATUTORY BUILDING AUTHORITIES AND ALL CONCEPT DOCUMENTATION, SELECTIVE STATE DEVELOPMENT PLANS AND STATE ACTS TO WHICH THE STATE DEVELOPMENT ACT APPLIES
6. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL HEALTH AND SAFETY OF SITE PERSONNEL, AND GENERAL PUBLIC AND ACCEPTED INDUSTRY PRACTICE
7. ALL WORK SHALL BE IN ACCORDANCE WITH THE CURRENT GOVERNMENT PRACTICE
8. ALL WORK SHALL BE IN ACCORDANCE WITH THE CURRENT GOVERNMENT PRACTICE
9. ALL WORK SHALL BE IN ACCORDANCE WITH THE CURRENT GOVERNMENT PRACTICE
10. ALL WORK SHALL BE IN ACCORDANCE WITH THE CURRENT GOVERNMENT PRACTICE

DIMENSIONS

Check all dimensions & levels on site before fabrication or set out.

AMENDMENTS

| ISSUE | DATE | SUBJECT | AUTHOR | CHK |
|-------|----------|-------------|--------|-----|
| A | 17.03.18 | PRELIMINARY | JH | JH |
| B | 01.05.18 | PRELIMINARY | JH | JH |


DRAWINGS INDEXING SYSTEM

FOR PROJECT SERVICES, PLANS AND RECORDS USE ONLY

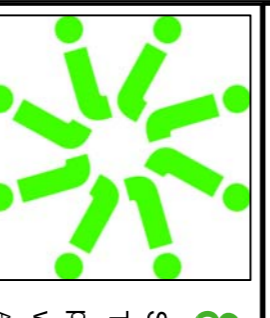
- CEILING PLANS
- CONSTRUCTION DETAILS
- ELEVATIONS
- FINISHES & WORKS
- FLOOR PLAN
- FURNITURE & EQUIPMENT
- HYDRAULICS
- MECHANICAL
- MISCELLANEOUS DETAILS
- OTHER STRUCTURES
- PLAYS
- SECTIONS
- SETOUT PLAN
- SITE PLAN
- STANDARDS

Department of Education and Training

The State of Queensland 2015



CLIENT



8i Architects

Suite 24, 200 Moggill Road,
Taringa, QLD, 4068
Ph: (07) 5217 7100
Web: www.8i.net.au
ASN 78 793 485 897

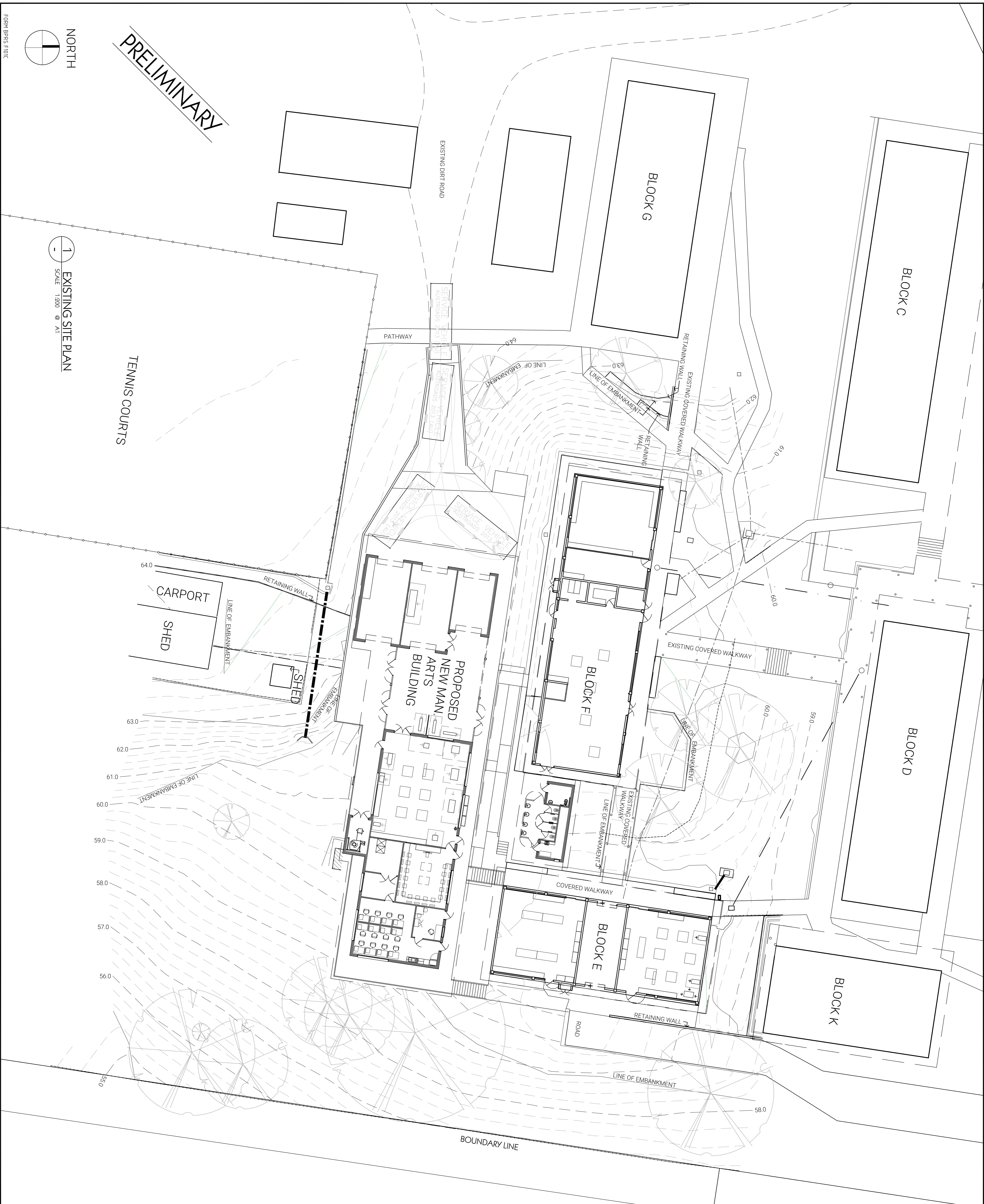
| DISCIPLINE | TEAM LEADER | DATE |
|------------------------|-------------|------------|
| SI | | March 2018 |
| DRAWN | | March 2018 |
| HN | | March 2018 |
| DISCIPLINE TEAM LEADER | | DATE |
| AUTHORED FOR ISSUE | | DATE |

LOWOOD STATE HIGH SCHOOL

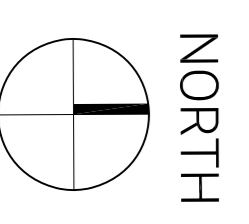
34 PROSPECT STREET, LOWOOD, QLD 4311

SITE PLAN MANUAL ARTS

| SCALE | AT |
|------------------------|-------------|
| 1:200 | A1 |
| MASTER SITE NUMBER | 00000 |
| CLEAN REFERENCE NUMBER | XXXXX |
| DRAWING NUMBER | 1806 / SK03 |
| ISSUE | B |
| SHEET NO | - |



PRELIMINARY



NORTH

FORM BPRS F101C

1 EXISTING SITE PLAN
SCALE 1:300 @ A1

BARCODE

GENERAL NOTES
1. IF IN DOUBT - JUST ASK
2. USE FIGURED DIMENSIONS, DO NOT SCALE FROM DRAWINGS
3. COMPARE ALL RELEVANT DIMENSIONS, LEVELS AND SET POINTS TO THE SITE PLAN
4. THESE ARCHITECTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DIMENSIONS AND LEVELS. DIMENSIONS SHALL BE REFERRED TO THE ARCHITECT FOR DISCUSSION
5. BEFORE PROCEEDING WITH THE WORK, VERIFY WITH GEOTECHNICAL ENGINEERING CONSULTANTS, BUILDING ACT BUILDING SURVEYORS ACT BUILDING AND OTHER RELEVANT AUTHORITIES AND ALL CONSULTANTS INVOLVED IN THE PROJECT THAT THE PROPOSED WORKS ARE FEASIBLE AND ACCORDANT WITH ALL RELEVANT REGULATIONS AND STANDARDS
6. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL HEALTH AND SAFETY OF THE PERSONNEL AND GENERAL PUBLIC ACT AND ACCEPTED INDUSTRY PRACTICE
7. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL BUILDING REGULATIONS AND STANDARDS
8. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL REGULATIONS AND STANDARDS
9. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PLUMBING AND SANITATION REGULATIONS AND STANDARDS
10. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL GAS REGULATIONS AND STANDARDS
11. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL FIRE REGULATIONS AND STANDARDS
12. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL CONSTRUCTION REGULATIONS AND STANDARDS
13. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL ENVIRONMENTAL REGULATIONS AND STANDARDS
14. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL OCCUPATIONAL HEALTH AND SAFETY REGULATIONS AND STANDARDS
15. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL INDUSTRIAL DESIGN REGULATIONS AND STANDARDS
16. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
17. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
18. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
19. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
20. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
21. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
22. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
23. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
24. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
25. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
26. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
27. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
28. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
29. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
30. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
31. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
32. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
33. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
34. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
35. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
36. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
37. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
38. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
39. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
40. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
41. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
42. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
43. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
44. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
45. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
46. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
47. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
48. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
49. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
50. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
51. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
52. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
53. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
54. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
55. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
56. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
57. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
58. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
59. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
60. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
61. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
62. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
63. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
64. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
65. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
66. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
67. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
68. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
69. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
70. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
71. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
72. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
73. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
74. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
75. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
76. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
77. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
78. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
79. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
80. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
81. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
82. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
83. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
84. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
85. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
86. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
87. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
88. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
89. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
90. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
91. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
92. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
93. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
94. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
95. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
96. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
97. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS
98. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL PATENTS REGULATIONS AND STANDARDS
99. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL COPYRIGHT REGULATIONS AND STANDARDS
100. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL TRADE MARKS REGULATIONS AND STANDARDS

AMENDMENTS

| ISSUE | DATE | SUBJECT | AUTHOR | CHK |
|-------|----------|-------------|--------|-----|
| A | 17.04.18 | PRELIMINARY | JH | |
| B | 03.05.18 | PRELIMINARY | JH | |

DIMENSIONS

Check all dimensions & levels on site before fabrication or set out.

Check all dimensions & levels on site before fabrication or set out.


DRAWINGS INDEXING SYSTEM

FOR PROJECT SERVICES, PLANS AND RECORDS USE ONLY

| | |
|--|--|
| <input type="checkbox"/> CEILING PLANS | <input type="checkbox"/> MISCELLANEOUS DETAILS |
| <input type="checkbox"/> CONSTRUCTION DETAILS | <input type="checkbox"/> OTHER STRUCTURES |
| <input type="checkbox"/> ELEVATIONS | <input type="checkbox"/> FINISHES WORKS |
| <input type="checkbox"/> FLOOR PLAN | <input type="checkbox"/> SITE PLAN |
| <input type="checkbox"/> FURNITURE & EQUIPMENT | <input type="checkbox"/> STANDARDS |
| <input type="checkbox"/> HYDRAULICS | <input type="checkbox"/> STANDARDS |
| <input type="checkbox"/> MECHANICAL | <input type="checkbox"/> STANDARDS |

Department of Education and Training

Client



8i Architects

Suite 24, 200 Moggiell Road, Tallangra, QLD, 4085
Ph: (07) 5217 7100
Web: www.8i.net.au
ASN: 78 793 483 897

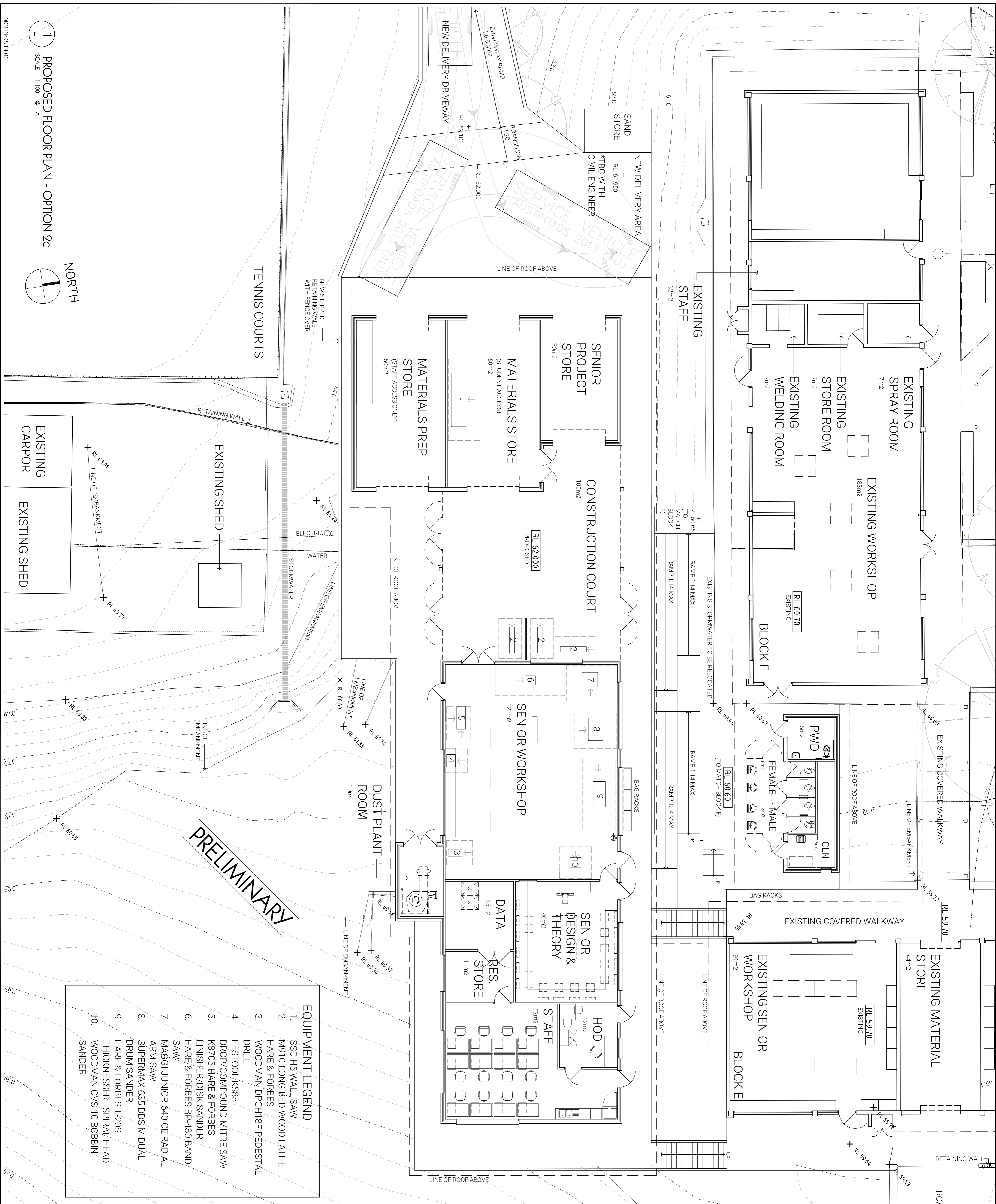
DISCIPLINE TEAM LEADER

| DISCIPLINE TEAM LEADER | DATE |
|------------------------|------------|
| HNH | March 2018 |

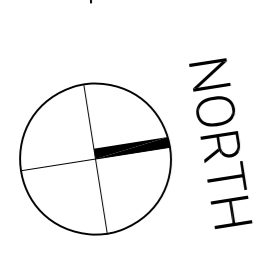
LOWOOD STATE HIGH SCHOOL
34 PROSPECT STREET,
LOWOOD, QLD 4311
FLOOR PLAN
MANUAL ARTS EXTENSION
OPTION 2c

SCALE 1:100

| | |
|-------------------------|--------------|
| MASTER SITE NUMBER | 00000 |
| CLIENT REFERENCE NUMBER | XXXXX |
| DRAWING NUMBER | 1806 / SK05c |
| ISSUE | B |
| SHEET NO | - |



PROPOSED FLOOR PLAN - OPTION 2c
SCALE 1:100 @ A1
FORM BRSR F101C



Appendix C Noise Calculations

Table C.1 Summary of Calculations of Noise Emissions from Courtyard at R1

| Element | Noise Level inside Room, dBA (dBZ) | Material Acoustic Rating, Rw dB | Area, m ² | External Sound Power Level of Element, dBA | Distance to Receiver, metres | Shielding, dBA | Directivity/ Other, dBA | Noise Level at Receiver, dBA |
|-----------------------|------------------------------------|---------------------------------|----------------------|--|------------------------------|----------------|-------------------------|------------------------------|
| Courtyard - Opening N | 85 (85) | 0 | 33 | 89 | 229 | 0 | -3 | 31 |
| Courtyard - Opening S | 85 (85) | 0 | 26 | 88 | 229 | 0 | -3 | 30 |
| Courtyard - Roof | 85 (85) | 25 | 110 | 68 | 229 | -3 | 0 | 8 |
| TOTAL | - | - | 169 | 97 | - | - | - | 33 |

Note: Noise levels at receivers are calculated using octave band data.

Table C.2 Summary of Calculations of Noise Emissions from Courtyard at R2

| Element | Noise Level inside Room, dBA (dBZ) | Material Acoustic Rating, Rw dB | Area, m ² | External Sound Power Level of Element, dBA | Distance to Receiver, metres | Shielding, dBA | Directivity/ Other, dBA | Noise Level at Receiver, dBA |
|-----------------------|------------------------------------|---------------------------------|----------------------|--|------------------------------|----------------|-------------------------|------------------------------|
| Courtyard - Opening N | 85 (85) | 0 | 33 | 89 | 228 | 0 | -3 | 31 |
| Courtyard - Opening S | 85 (85) | 0 | 26 | 88 | 228 | 0 | -3 | 30 |
| Courtyard - Roof | 85 (85) | 25 | 110 | 68 | 228 | -3 | 0 | 8 |
| TOTAL | - | - | 169 | 97 | - | - | - | 33 |

Note: Noise levels at receivers are calculated using octave band data.

Table C.3 Summary of Calculations of Noise Emissions from Workshop at R1

| Element | Noise Level inside Room, dBA (dBZ) | Material Acoustic Rating, Rw dB | Area, m ² | External Sound Power Level of Element, dBA | Distance to Receiver, metres | Shielding, dBA | Directivity/ Other, dBA | Noise Level at Receiver, dBA |
|----------------------|------------------------------------|---------------------------------|----------------------|--|------------------------------|----------------|-------------------------|------------------------------|
| Workshop - Wall N | 83 (84) | 45 | 25 | 53 | 239 | 0 | 0 | 0 |
| Workshop - Wall S | 83 (84) | 45 | 28 | 54 | 239 | 0 | 0 | 1 |
| Workshop - Wall W | 83 (84) | 45 | 24 | 53 | 239 | 0 | 0 | 0 |
| Workshop - Roof | 83 (84) | 41 | 122 | 58 | 239 | 0 | 0 | 2 |
| Workshop - Glazing N | 83 (84) | 0 | 8 | 87 | 239 | 0 | 0 | 32 |
| Workshop - Glazing S | 83 (84) | 0 | 5 | 85 | 239 | 0 | 0 | 30 |
| Workshop - Glazing W | 83 (84) | 0 | 3 | 82 | 239 | 0 | 0 | 28 |

| Element | Noise Level inside Room, dBA (dBZ) | Material Acoustic Rating, Rw dB | Area, m ² | External Sound Power Level of Element, dBA | Distance to Receiver, metres | Shielding, dBA | Directivity/ Other, dBA | Noise Level at Receiver, dBA |
|--------------|------------------------------------|---------------------------------|----------------------|--|------------------------------|----------------|-------------------------|------------------------------|
| TOTAL | - | - | 215 | 90 | - | - | - | 35 |

Note: Noise levels at receivers are calculated using octave band data.

Table C.4 Summary of Calculations of Noise Emissions from Workshop at R2

| Element | Noise Level inside Room, dBA (dBZ) | Material Acoustic Rating, Rw dB | Area, m ² | External Sound Power Level of Element, dBA | Distance to Receiver, metres | Shielding, dBA | Directivity/ Other, dBA | Noise Level at Receiver, dBA |
|----------------------|------------------------------------|---------------------------------|----------------------|--|------------------------------|----------------|-------------------------|------------------------------|
| Workshop - Wall N | 83 (84) | 45 | 25 | 53 | 216 | 0 | 0 | 1 |
| Workshop - Wall S | 83 (84) | 45 | 28 | 54 | 216 | 0 | 0 | 2 |
| Workshop - Wall W | 83 (84) | 45 | 24 | 53 | 216 | 0 | 0 | 1 |
| Workshop - Roof | 83 (84) | 41 | 122 | 58 | 216 | 0 | 0 | 3 |
| Workshop - Glazing N | 83 (84) | 0 | 8 | 87 | 216 | 0 | 0 | 33 |
| Workshop - Glazing S | 83 (84) | 0 | 5 | 85 | 216 | 0 | 0 | 31 |
| Workshop - Glazing W | 83 (84) | 0 | 3 | 82 | 216 | 0 | 0 | 29 |
| TOTAL | - | - | 215 | 90 | - | - | - | 36 |

Note: Noise levels at receivers are calculated using octave band data.

Table C.5 Summary of Calculations of Noise Emissions from Materials Store at R1

| Element | Noise Level inside Room, dBA (dBZ) | Material Acoustic Rating, Rw dB | Area, m ² | External Sound Power Level of Element, dBA | Distance to Receiver, metres | Shielding, dBA | Directivity/ Other, dBA | Noise Level at Receiver, dBA |
|--|------------------------------------|---------------------------------|----------------------|--|------------------------------|----------------|-------------------------|------------------------------|
| Materials Store - Wall E | 78 (79) | 45 | 6 | 39 | 215 | 0 | 0 | -13 |
| Materials Store - Wall E (Roller Door) | 78 (79) | 45 | 8 | 82 | 215 | 0 | 0 | 26 |
| Materials Store - Roof | 78 (79) | 45 | 50 | 47 | 215 | 0 | 0 | -9 |
| TOTAL | - | - | 64 | 82 | - | - | - | 26 |

Note: Noise levels at receivers are calculated using octave band data.

Table C.6 Summary of Calculations of Noise Emissions from Materials Store at R2

| Element | Noise Level inside Room, dBA (dBZ) | Material Acoustic Rating, Rw dB | Area, m ² | External Sound Power Level of Element, dBA | Distance to Receiver, metres | Shielding, dBA | Directivity/ Other, dBA | Noise Level at Receiver, dBA |
|--|------------------------------------|---------------------------------|----------------------|--|------------------------------|----------------|-------------------------|------------------------------|
| Materials Store - Wall E | 78 (79) | 45 | 6 | 39 | 236 | 0 | 0 | -14 |
| Materials Store - Wall E (Roller Door) | 78 (79) | 45 | 8 | 82 | 236 | 0 | 0 | 25 |
| Materials Store - Roof | 78 (79) | 45 | 50 | 47 | 236 | 0 | 0 | -10 |
| TOTAL | - | - | 64 | 82 | - | - | - | 25 |

Note: Noise levels at receivers are calculated using octave band data.

Table C.7 Summary of Calculations of Noise Emissions from Dust Plant Room at R1

| Element | Noise Level inside Room, dBA (dBZ) | Material Acoustic Rating, Rw dB | Area, m ² | External Sound Power Level of Element, dBA | Distance to Receiver, metres | Shielding, dBA | Directivity/ Other, dBA | Noise Level at Receiver, dBA |
|--------------------------|------------------------------------|---------------------------------|----------------------|--|------------------------------|----------------|-------------------------|------------------------------|
| Dust Plant Room - Wall E | 97 (105) | 45 | 7 | 73 | 244 | 0 | 0 | 20 |
| Dust Plant Room - Wall S | 97 (105) | 45 | 11 | 75 | 244 | 0 | 0 | 22 |
| Dust Plant Room - Wall W | 97 (105) | 45 | 3 | 70 | 244 | 0 | 0 | 16 |
| Dust Plant Room - Roof | 97 (105) | 45 | 10 | 70 | 244 | 0 | 0 | 14 |
| Dust Plant Room - Door | 97 (105) | 45 | 4 | 79 | 244 | 0 | 0 | 25 |
| TOTAL | - | - | 34 | 82 | - | - | - | 28 |

Note: Noise levels at receivers are calculated using octave band data.

Table C.8 Summary of Calculations of Noise Emissions from Dust Plant Room at R2

| Element | Noise Level inside Room, dBA (dBZ) | Material Acoustic Rating, Rw dB | Area, m ² | External Sound Power Level of Element, dBA | Distance to Receiver, metres | Shielding, dBA | Directivity/ Other, dBA | Noise Level at Receiver, dBA |
|--------------------------|------------------------------------|---------------------------------|----------------------|--|------------------------------|----------------|-------------------------|------------------------------|
| Dust Plant Room - Wall E | 97 (105) | 45 | 7 | 73 | 210 | 0 | 0 | 21 |
| Dust Plant Room - Wall | 97 | 45 | 11 | 75 | 210 | 0 | 0 | 23 |

| Element | Noise Level inside Room, dBA (dBZ) | Material Acoustic Rating, Rw dB | Area, m ² | External Sound Power Level of Element, dBA | Distance to Receiver, metres | Shielding, dBA | Directivity/ Other, dBA | Noise Level at Receiver, dBA |
|--------------------------|------------------------------------|---------------------------------|----------------------|--|------------------------------|----------------|-------------------------|------------------------------|
| S | (105) | | | | | | | |
| Dust Plant Room - Wall W | 97 (105) | 45 | 3 | 70 | 210 | 0 | 0 | 18 |
| Dust Plant Room - Roof | 97 (105) | 45 | 10 | 70 | 210 | 0 | 0 | 15 |
| Dust Plant Room - Door | 97 (105) | 45 | 4 | 79 | 210 | 0 | 0 | 27 |
| TOTAL | - | - | 34 | 82 | - | - | - | 30 |

Note: Noise levels at receivers are calculated using octave band data.