Metier PLANNING & DEVELOPMENT

31-35 Dowling Street, Launceston

Planning Submission

Transport Depot and Distribution, extension of buildings, construction of new buildings, signage and 3 lot subdivision, in 11 stages.

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1. Executive Summary

1.1 Proposal Overview

AJL Consulting Engineers have been engaged by Toll Holdings to make this Development Application. The application is for upgrades and extensions to the existing Toll Transport hub at Dowling Street, Launceston. The proposal substantially improves the efficiency of the site, and therefore Toll's operations in the north of the State. The proposal does not intensify the existing use.

Toll Tasmania's Dowling Street site is an existing major intermodal transport depot for the north of the State.

Toll Tasmania have operated from the site since the late 80's. Development of the site will allow Toll to relinquish the former Linfox property at Bell Bay currently utilised for storage. This would allow greater use of rail into the Launceston site and eliminate significant volumes of heavy vehicle movement in and out of Launceston via Invermay Road and Goderich Street.

In recent years, Toll Tasmania have investigated various alternative sites to establish a new transport hub in the north of the State to service its northern customer base. The analysis undertaken concludes that the current site is the optimum from a service perspective and that a substantial capital upgrade will increase the efficiency of the operation. This will also provide the benefit of reduced vehicle movements in and out of the site with a greater dependency on rail and increased service delivery to customers. The proposal represents a $20 million upgrade to the intermodal transport hub.

The subject site is zoned Light Industrial and is not within any mapped overlay areas. The subject site is contained in one title; Certificate of Title 19027 Folio 1. The use of Transport Depot and Distribution is a permitted use within the Light Industrial Zone, however the existing transport depot is within 100m of sensitive uses, and triggers a number of development related discretions. These discretions are summarised in the table below.

AJL Consulting Engineers lodged documentation with Launceston City Council in May 2016. Subsequent to lodgement an internal review of all capital projects Australia-wide was undertaken. The review has resulted in modifications to the original proposal.

This application is made pursuant to Section 57 of the *Land Use Planning and Approvals Act 1993*

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1.2 Scheme Assessment Summary

Relevant Clause	Assessment
24.2 Use	
The existing use class is Transport Depot and Distribution	Permitted Use Status
Use & Development Standards	
24.3.1 External storage of goods	Relies upon P1 storage of containers will be visible.
24.3.2 Emissions impacting sensitive uses	Relies upon P1, approximately 13 residential dwellings are within 100m of site boundary.
24.4.1 Building height, setback and siting	Relies upon P1 as three proposed buildings are above 10m in height.
24.4.4 Site landscaping	Relies upon P1 as 42 trees are proposed where 84 are required.
24.4.5 Lot size and dimensions	Meets AS – subdivision must be treated as a discretionary application
24.4.6 Frontage and access	Relies on P2. No Acceptable Solution is available.
24.4.7 Discharge of stormwater	Relies on P2. This is not a simple development or location and will require assessment by Council's infrastructure department.
Codes	
E1.0 Bushfire-Prone Areas Code	The site is identified as being within 100m of bushfire prone vegetation. The Code has application to subdivision. An exemption has been provided by an accredited person in accordance with Clause E1.4(a).
E2.0 Potentially Contaminated Land Code	The site is identified as being Potentially Contaminated Land. However, the site is deemed by a suitably qualified person to meet the exemption allowed by the Code in Clause E2.4.5
E4.0 Road and Rail Asset Code E4.6.1	Relies upon P1, buildings and works within 50m of a rail network.
E6.0 Car Parking and Sustainable Transport Code **E6.5.1 Number of Car parking spaces.** **Number of Bicycle Parking Spaces**	Relies upon P1, as Transport Depot has no set requirement for onsite vehicle parking. 22 bicycle parking spaces are provided where 26 are required.
E18.0 Signage Code **E18.5.2 – Design and siting of signage**	The proposal relies upon P3, seven signs are proposed overall.

2. Land and Locality

2.1 Site Description

The subject site has an area of approximately 8.3 ha, contained in one lot; Certificate of Title 19027 Folio 1. The site has frontages to Dowling Street to the west and Broadland Drive to the south. The railway line boarders the eastern boundary of the site. To the north is the former Becks Hardware site, this site still includes an active sawmill.

The site contains Launceston City Council stormwater assets and Tasrail infrastructure.

The registered owner of the title is Toll Logistics. A copy of the title is provided at Appendix A of this submission.

2.2 Locality Description

The subject site is located to the east of Launceston's central business district, and west of the North Esk River and associated flood plain. However, due to the raised train line the site is not subject to flooding, but may have been prior to the establishment of rail.

The immediate area is characterised by industrial uses and bulky goods sales. The wider area contains residential uses and sporting grounds.

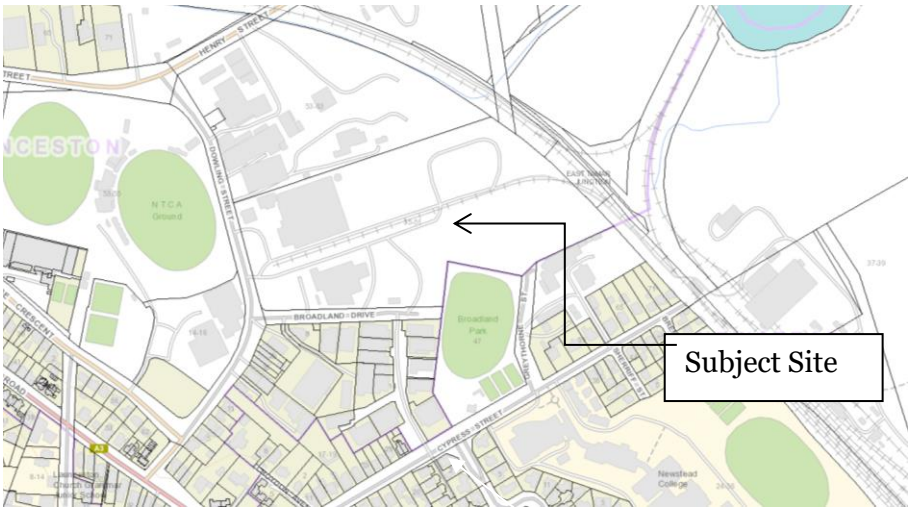

Figure 1: Locality Map

2.3 Access

Access to the site is principally from Dowling Street with secondary access points located on Broadland Drive. In total, there are five existing crossovers. The proposal will reduce this to four.

3. Proposal

The proposal consists of the following features:

- Expansion of Warehouse A, to increase the floor area by 5928m^2;
- Construction of new Warehouse B, floor area of 5569m^2;
- Construction of a Main office, floor area of 867m^2;
- Construction of a Customer 'pick up' warehouse, floor area of 44m^2;
- Truck wash & re-fuelling station, floor area of 701m^2;
- Container wash bay, with a floor area of 91.3m^2;
- Fire water tank;
- Demolition of two buildings adjacent to the Dowling Street frontage;
- Seven building fascia signs across the site;
- Site works, including sealing site to reduce dust, provisions of car parking and landscaping;
- Reduction in access points from 5 to 4 crossovers;
- Rail realignment; and
- A three lot subdivision.

The development will take place in 11 stages, as the site needs to remain operational at all times.

- Stage 1: New rail siding and heavy-duty pavements at east end of lot;
- Stage 2: Commissioning of new rail, removal of existing rail assets, infill of rail corridor with medium-duty pavement;
- Stage 3: Construction of warehouse B and surrounding medium-duty pavements. Construction of office building;
- Stage 4: Demolition of existing warehouse and office building along south boundary and conversion to temporary container park, demolition of buildings in the north-east corner of the lot, made good with pavers;
- Stage 5: Construction of office car park, truck entry and medium-duty pavements at west boundary;
- Stage 6: New awning on east wall of existing warehouse A;
- Stage 7: Construction of heavy-duty pavements as container park on the north-east corner of the lot.
- Stage 8: Construction of truck and trailer park, including customer pick-up warehouse;
- Stage 8A: Subdivision into 3 lots.
- Stage 9: Construction of truck wash and re-fuelling station;
- Stage 10: Construction of warehouse A extension, including relocation of fire and LPG systems; and
- Stage 11: Construction of enclosed truck loading area on west wall of warehouse A.

It is noted that no change is proposed to the existing Dangerous Goods Transfer Station.

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4. Planning Assessment

4.1 Launceston Interim Planning Scheme 2015 Zone Provisions

The subject site is zoned Light Industrial by the Launceston Interim Planning Scheme 2015. The site is not mapped as being subject to overlay areas.

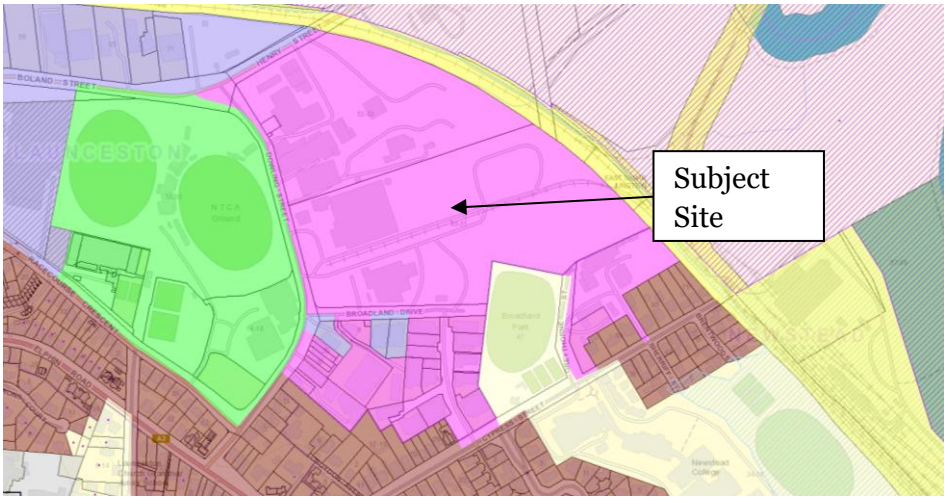

Figure 2: Zoning Map

24.0 Light Industrial Zone

24.1 Zone Purpose

24.1.1 Zone Purpose Statements

24.1.1.1

To provide for manufacturing, processing, repair, storage and distribution of goods and materials where off-site impacts are minimal or can be managed to minimize conflict or impact on the amenity of any other uses.

24.1.1.2

To provide for uses that are complementary to, and compatible with, the above purpose.

24.1.2 Local Area Objectives

There are no local area objectives.

24.1.3 Desired Future Character Statements

There are no desired future character statements.

The proposed development meets the purpose of the zone. The Zone Purpose statement clearly articulated that storage and distribution of goods and materials is the core purpose of the zone. The proposal will allow Toll to further reduce off site impacts through dust reduction, reduction in truck and car movements, and greater utilisation of the existing rail facility. This has benefits for not only the immediate area, but for the greater Launceston transport network.

24.2 Use Table

The use of Transport Depot and Distribution is permitted within the Light Industrial Zone.

24.3 Use Standards

24.3.1 External storage of goods

This standard applies to the use classes specified in Table 24.3.

Objective: To ensure that external storage of goods, materials and waste does not detract from the amenity of the area.		
Acceptable Solutions	Performance Criteria	Assessment
A1 Storage of goods and materials, other than for retail sale, or waste must not be visible from any road or public open space adjoining the site.	P1 Storage of goods and materials, other than for retail sale, or waste must be located or screened to minimise its impact on views into the site from any roads or public open space adjoining the site, having regard to: (a) the nature of the use; (b) the type of goods, materials or waste proposed to be stored; (c) the topography of the site; (d) the landscaping of the site; and (e) any screening proposed.	The development relies upon P1. External storage of goods is required. Storage of goods will take place in containers. The nature of the use means that this is unavoidable. The container storage area is largely behind the buildings. Landscaping is also proposed for the Dowling Street and Broadland Park Drive frontages.

24.3.2 Emissions impacting sensitive uses

Objective: To ensure that emissions to air, land and water are not detrimental to the amenity of sensitive uses.	
Acceptable Solution	Performance Criteria
A1 Uses must be set back from the site of a sensitive use a distance of no less than 100m.	P1 The use must not adversely impact on the amenity of nearby sensitive uses, having regard to: (a) the nature of the proposed use; (b) the nature of the emissions; (c) the proximity and number of sensitive uses in the area; (d) the topography of the site; (e) any mitigation measures proposed; and (f) the proximity and number of nearby emitting uses.

Assessment

The subject site is within 100m of residential uses, the proposal relies upon P1. There are four dwellings (2 sets of conjoined houses) to the south of the site with frontage to Dowling Street. These houses are within the Light Industrial Zone. There are approximately nine residential dwellings fronting Cyprus Street. These dwellings are separated from the site by an existing light industrial property that appears to be used by multiple tenants undertaking a range of activities.

A noise assessment and a dust management plan have been undertaken by Dr Alex McCloud of Vipac. A full copy of Dr McCloud's report is contained in Appendix C and D respectively.

Noise

The appropriate noise emissions are accepted as:

Day (0600-2000hrs) 50dBA

Night (2000-0600hrs) 40dBA

The testing and analysis undertaken by Dr McCloud indicate that the above noise emissions can be met. Where there is an operational risk that these emissions may be exceeded, Dr McCloud provides some recommendation to avoid impacts on sensitive users. These recommendations, found on Page 24 of the report, should be included in the planning permit as conditions.

Dust

Dust has been reported as an issue for surrounding users in the past, although we understand that those that reported the greatest issue are not sensitive users. This development provides an opportunity to substantially reduce dust issues for both Toll's workforce and for surrounding users. Currently, significant parts of the site are gravelled, resulting in wind and traffic movements resulting in dust generation at times. It is noted that the sealing of the site will resolve this issue, although not offsite impacts that Toll is subject to (i.e the sawdust stock pile to the north). The recommendations of Dr McCloud's report can form part of the conditions of a construction management plan.

24.4 Development Standards

24.4.1 Building height, setback and siting

Objective: To ensure that building bulk and form, and siting: (a) is compatible with the streetscape and character of the surrounding area; and (b) protects the amenity of adjoining residential zones.		
Acceptable Solutions	Performance Criteria	Assessment
A1 Building height must be no greater than: (a) 10m; or (b) 1m greater than the average of the building heights on the site or adjoining lots; whichever is higher.	P1 Building height must be compatible with the streetscape and character of the surrounding area, having regard to: (a) the topography of the site; (b) the height of buildings on the site, adjoining lots and adjacent lots; (c) the bulk and form of existing and proposed buildings; (d) the allowable building heights; (e) the apparent height when viewed from roads and public places; and	A1 – The following building heights are proposed: • Warehouse A 13.35m; • Warehouse B 13.35m; • Main office 4.3m; • Customer 'pick up' warehouse 3m; • Re-fuelling station 12.9m; and • Container wash bay 3m;

	(f) any overshadowing of adjoining lots or public places.	
A2 Setback from a frontage must be no less than: (a) 5.5m; or (b) the setback of an adjoining building.	P2 Buildings must be sited to be compatible with the streetscape and character of the surrounding area, having regard to: (a) the topography of the site; (b) the setbacks of surrounding buildings; (c) the height, bulk and form of existing and proposed buildings; (d) the appearance when viewed from roads and public places; (e) the existing or proposed landscaping; and (f) the safety of road users.	A2 – The subject site has two frontages to Dowling Street and Broadland Drive. The proposed setbacks are Dowling Street: • Main Office Western Elevation 6.07m • Existing warehouse - existing setback of approximately 39m Broadland Drive: • Main Office, Southern elevation 3.7m; • Customer Pick Up Warehouse 8m. In all, the proposed new setback arrangements are not inconsistent with the setbacks of existing buildings on the site.
A3 Buildings can be built up to the side and rear boundaries.	P3 No performance criteria.	A3 – The building setbacks are appropriate to the efficient use of the site.
A4 Where the site is located on the boundary of the General Residential, Inner Residential and Low Density Residential, Residential Rural Living, Environmental Living, Urban Mixed Use and Village zones, new buildings or alterations to existing buildings, must: (a) be set back a horizontal distance of no	P4 Buildings must be sited so that there is no unreasonable loss of amenity to the occupiers of adjoining residential zones, having regard to: (a) the topography of the site; (b) the height, bulk and form of proposed buildings; (c) the solar access of habitable room windows	A4 – The subject site is not located on the boundary of any of the residential zones.

less than 3m from the zone boundary; and (b) have a solid fence no less than 1.8m high on the zone boundary.	and private open space of adjoining dwellings; (d) the privacy of habitable room windows and private open space of adjoining dwellings; (e) the amenity of adjoining dwellings; (f) the size and proportions of the lot; (g) any existing or proposed vegetation or screening; (h) the location of building openings; and (i) any external lighting.	

24.4.2 Streetscape

Objective: To ensure that development has an acceptable impact on the streetscape.		
Acceptable Solutions	Performance Criteria	Assessment
A1 Excepting walls built to the lot boundary, new buildings or extensions to existing buildings must: (a) have external walls constructed with no less than 50% brick, concrete, masonry or glass; and (b) have external walls, unless brick or glass, painted or finished with a texture coat; and (c) have no less than 50% glazing to the external walls of the office component of the buildings.	P1 New buildings or extensions to existing buildings must be compatible with the streetscape, having regard to: (a) the topography of the site; (b) the nature of the proposed use; (c) the visibility of the building from the road; (d) the external treatment and finish of buildings; and (e) the building materials used in the surrounding area.	A1 – All walls to new buildings and extensions to existing buildings comply with the Acceptable Solutions.

A2 Car parking must not be located within 3m of the frontage.	P2 Car parking must be located to minimise visual impact on the streetscape, having regard to: (a) the topography of the site; (b) the nature of the proposed use; (c) the number of car spaces; (d) the visibility of the car parking from the road; (e) the use of measures to mitigate impacts including screening and landscaping; (f) the location of car parking on adjoining sites; and (g) the character of the streetscape.	A2- Car parking is set back a greater distance than 3m from both the Dowling Street frontage and the Broadland Drive frontage.

24.4.3 Fences

Objective: To provide for fences that are appropriate to the site and character of the area.		
Acceptable Solutions	Performance Criteria	Assessment
A1.1 Fences must be no higher than: (a) 1.8m on a frontage; or (b) 2.1m on a side or rear boundary that abuts a public reserve; or (c) 3m on a side or rear boundary otherwise. A1.2 Fences must be 50% transparent above a height of 1.2m.	P1 Boundary fences must not have an unreasonable impact on the amenity of adjoining sites and the streetscape, having regard to: (a) the topography of the site; (b) the need for security; (c) the materials and finish of the proposed fence;	No changes are proposed to the existing security fences.

A1.3 Front fences higher than 1.2m must be located no less than 1m from the frontage and the setback be landscaped between the frontage and the fence.	(d) the need and opportunity for passive surveillance, particularly where the fence adjoins a road or public reserve; (e) any overshadowing; (f) the character of the streetscape; and (g) the character of the surrounding area.	

24.4.4 Site landscaping

Objective: To ensure that new development improves the amenity of the site and the streetscape.		
Acceptable Solutions	Performance Criteria	Assessment
A1 New buildings or extensions with a gross floor area greater than 100m² or 50% of the existing gross floor area, whichever is less, must: (a) landscape an area within the front setback of not less than the 50% of that area; and	P1 Landscaping must improve the amenity and appearance of the site and the streetscape, having regard to: (a) the topography of the site; (b) the existing vegetation on the site; (c) shade for users of the site and car parking areas; (d) the location, type and growth of the proposed vegetation; (e) the area set aside for landscaping and its suitability;	A1 – (a) The required front setback is 5.5m. The subject site has approximately 392m of frontage. Therefore, an area of 1078m2 is required for landscaping. (b) The site has an area of approximately 8.37ha therefore approximately 84 trees are required. The proposal relies upon P1 as 42 Trees are proposed, in addition to this are shrubs, grasses and some hard landscaping. The design has concentrated on the street frontages of the site. This maximises the effect on the streetscape and recognises that the balance of the site is

(b)	provide a minimum of 1 tree capable of growing to a height of no less than 10m planted for every 1 000m² of site area. Trees must be located within a minimum 3m diameter landscaped area.	(f) (g)	any proposed screening; and the character of the streetscape and surrounding area.	required for the proposed use. A landscaping plan is provided at Appendix E of this submission.

24.4.5 Lot size and dimensions

Objective: To ensure: (a) the area and dimensions of lots are appropriate for the zone; and (b) adjoining land, especially residential zones, is protected from adverse impacts on amenity.		
Acceptable Solution	Performance Criteria	Assessment
A1.1 Each lot, or a lot proposed in a plan of subdivision, must: (a) have a minimum area of no less than 1 000m2; and (b) be able to contain 20m diameter circle with the centre of the circle not greater than 20m from the frontage; or A1.2 Each lot, or a lot proposed in a plan of subdivision, must: (a) be required for public use by the Crown, an agency, or a corporation all the shares of which are held by Councils or a municipality; or	P1 Each lot, or a lot proposed in a plan of subdivision, must have sufficient useable area and dimensions suitable for its intended use having regard to: (a) development of buildings on the lots; (b) the likely location of buildings on the lots; (c) the accessibility for vehicles providing for supplies, waste removal, emergency services and public transport; (d) the topography of the site; (e) the presence of any natural hazards; and (f) the existing pattern of development in the area.	A1.1 (a) the proposed lot areas are greater than 1000m2. Lot areas are proposed as: Lot 1 – 4.171ha; Lot 2 – 2.668ha; and Lot 3 – 1.452ha. A1.1 (b) Each proposed lot can contain a 20m diameter circle with the centre of the circle not greater than 20m from the frontage. A1.2 Not applicable. A1.3 Each lot contains buildings that meet the setback standards of the Light Industrial Zone. The relevant side setback standard is, 'A3 Buildings can be built up to the side and rear boundaries.' The

(b) be required for the provision of public utilities; or (c) be for the consolidation of a lot with another lot, provided each lot is within the same zone; and A1.3 Each lot, or a lot proposed in a plan of subdivision, must have new boundaries aligned from buildings that satisfy the relevant acceptable solutions for setbacks.		proposal therefore complies.
A2 Subdivision must not be located on the boundary of the General Residential, Inner residential, Low Density Residential, Environmental Living, Rural Living, Urban Mixed Use or Village zones.	P2 Each lot, or a lot proposed in a plan of subdivision, must be designed to minimise the potential for nuisance or loss of amenity for adjacent lots having regard to: (a) the lot layout and design; (b) the existing pattern of development in the area; (c) the ability for buildings to be erected in accordance with the development standards; (d) the proposed use of the lot; (e) the use of the adjoining lots; (f) the topography of the site; (g) the physical separation to surrounding sensitive land uses; (h) compatibility with the existing pattern of development in the area; (i) the orientation of the lot; (j) access considerations; and	A2 The boundary of the site is not located at the boundary of any of the residential zones.

	(k) the accessibility for vehicles providing for supplies, waste removal, emergency services and public transport.	

24.4.6 Frontage and access

Objective: To ensure that lots provide: (a) appropriate frontage to a road; (b) safe appropriate access suitable for the intended use of the new lot.		
Acceptable Solution	Performance Criteria	Assessment
A1 Each lot, or a lot proposed in a plan of subdivision, must have a frontage to a road maintained by a road authority of no less than 10m.	P1 Each lot, or a lot proposed in a plan of subdivision, must be provided with a frontage, or legal connection to a road by a right-of-carriageway, of no less than 3.6m width, having regard to: (a) the width of frontage proposed, if any; (b) whether any other land has a right-of-carriageway as its sole or principal means of access over the frontage; (c) the number of immediately adjacent rights-of-carriageway; (d) the topography of the site; (e) the proposed use of the lot; (f) the construction and maintenance of the road; (g) the existing pattern of development in the surrounding area; (h) the functionality and usability of the frontage; (i) the anticipated nature of the vehicles likely to access the site;	A1 – Each lot has a frontage greater than 10m.

	(j) the ability to manoeuvre vehicles on the site; (k) the accessibility for vehicles providing for supplies, waste removal, emergency services and public transport; and (l) the advice of the road authority.	
A2 No acceptable solution.	P2 Each lot is provided with reasonable vehicular access from a carriageway to a boundary of a lot or building area on the lot, if any, having regard to: (a) the topography of the site; (b) the distance between the lot or building area and the carriageway; (c) the nature of the road and the traffic, including pedestrians; (d) the character of the area; and (e) the advice of the road authority.	P2 – Each lot will be provided with compliant vehicular access. Please refer to GHD's traffic impact assessment for a greater detail on this. The TIA can be found at Appendix F. It is requested that the documentation is referred to Council's infrastructure department for comment.

24.4.7 Discharge of stormwater

Objective: To ensure that the subdivision layout, including roads, provides that stormwater is satisfactorily drained and discharged.		
Acceptable Solution	Performance Criteria	Assessment
A1 Each lot, or a lot proposed in a plan of subdivision, including roads, must be capable of connecting to a public stormwater system.	P1 All stormwater runoff is to be collected and discharged from the subdivision in a manner that will not cause adverse impacts, having regard to: (a) the location of the discharge point (if any);	A1 – Each lot can be connected to reticulated stormwater.

	(b) the stormwater flow paths both internal and external to the site; (c) the location of building areas within the site; (d) the topography of the site; (e) the characteristics of the site, including rainfall; (f) the development on the site and adjoining land; (g) the additional runoff from the subdivision development and likely future development of the land; and (h) any onsite storage devices, detention basins or other water sensitive urban design techniques within the subdivision.	
A2 The Council's General Manager has provided written advice that the public stormwater system has the capacity to accommodate the stormwater discharge from the subdivision.	P2 Stormwater discharge flows from the subdivision are mitigated to a level that the public stormwater system can accommodate, having regard to: (a) the location of the discharge point (if any); (b) the stormwater flow paths both internal and external to the site; (c) the topography of the site; (d) the characteristics of the site, including rainfall; (e) the development of the site; (f) the additional runoff from the subdivision development and likely future development of the land; and (g) any onsite storage devices, detention basins or	A2 – The proposal relies upon P2. The proposal will increase the impervious surfaces of the site and contains a stormwater main. It is appropriate that Infrastructure Services has time to make a detailed analysis of the issues in conjunction with AJL Consulting Engineers we therefore request in this instance that the DA be accepted on the basis of reliance on the Performance Criteria. P2 – The subdivision and development has regard to the public stormwater system. Please refer to the infrastructure report prepared by AJL Consulting Engineers located at Appendix G.

	other water sensitive urban design techniques within the subdivision.	

24.4.8 Water and sewerage services

Objective: To ensure each lot provides for appropriate water supply and wastewater disposal.		
A1 Each lot, or a lot proposed in a plan of subdivision, must be connected to a reticulated water supply.	P1 No performance criteria.	A1 – Each lot can be connected to a reticulated water supply.
A2 Each lot, or a lot proposed in a plan of subdivision, must be connected to a reticulated sewerage system.	P2 No performance criteria.	A2 - Each lot can be connected to the reticulated sewerage system. Please refer to AJL Consulting Engineers' infrastructure report located at Appendix G. We request that this report is also forwarded to Taswater.

4.2 Launceston Interim Planning Scheme 2015 Codes

E1.0 Bushfire-Prone Areas Code

The site has been identified as a bushfire-prone area. Subdivision requires assessment against the Bushfire Prone Areas Code. To that end an exemption has been granted by a accredited assessor pursuant to clause E1.4(a). A copy of this exemption is provided at Appendix H of this submission.

E2.0 Potentially Contaminated Land Code

The subject site has a history of potential contamination having been a rail storage facility for engines and wagons prior to and during its use as a transport depot. Toll bought the property from Tasrail in the 1990s having leased approximately half of it prior to that time to operate a transport depot.

Two underground fuel tanks were removed from the site in approximately 2001. At that time, it was not a requirement to gain 'signoff' from the EPA.

The site's continued operation includes uses identified by the Planning Scheme as those that may cause contamination.

A report has been prepared by a suitably qualified person, Rod Cooper of ES&D. Mr Cooper's report concludes with the statement,

"In relation to historic contamination it is deemed that there is an insufficient increase in the level of risk to warrant any specific hazard or protection measures and therefore the proposal will meet exemption condition E2.4.5. In addition, no contamination of significant levels were identified on the property."

A full copy of the report is provided at Appendix I of this submission.

E3.0 Landslip Code – Not applicable

E4.0 Road and Railway Code –

E4.5 Use Standards

E4.5.1 Existing road accesses and junctions

Objective: To ensure that the safety and efficiency of roads is not reduced by increased use of existing accesses and junctions.		
Acceptable Solutions	Performance Criteria	Assessment
A1 The annual average daily traffic (AADT) of vehicle movements, to and from a site, onto a category 1 or category 2 road, in an area subject to a speed limit of more than 60km/h , must not increase by more than 10% or 10 vehicle movements per day, whichever is the greater.	P1 Any increase in vehicle traffic to a category 1 or category 2 road in an area subject to a speed limit of more than 60km/h must be safe and minimise any adverse impact on the efficiency of the road, having regard to: (a) the increase in traffic caused by the use; (b) the nature of the traffic generated by the use; (c) the nature of the road; (d) the speed limit and traffic flow of the road; (e) any alternative access to a road; (f) the need for the use; (g) any traffic impact assessment; and (h) any written advice received from the road authority.	Not applicable
A2 The annual average daily traffic (AADT) of vehicle movements, to and from a	P2 Any increase in vehicle traffic at an existing access or junction in an area subject	Not applicable

site, using an existing access or junction, in an area subject to a speed limit of more than 60km/h, must not increase by more than 10% or 10 vehicle movements per day, whichever is the greater.	to a speed limit of more than 60km/h must be safe and not unreasonably impact on the efficiency of the road, having regard to: (a) the increase in traffic caused by the use; (b) the nature of the traffic generated by the use; (c) the nature and efficiency of the access or the junction; (d) the nature and category of the road; (e) the speed limit and traffic flow of the road; (f) any alternative access to a road; (g) the need for the use; (h) any traffic impact assessment; and (i) any written advice received from the road authority.	
A3 The annual average daily traffic (AADT) of vehicle movements, to and from a site, using an existing access or junction, in an area subject to a speed limit of 60km/h or less, must not increase by more than 20% or 40 vehicle movements per day, whichever is the greater.	P3 Any increase in vehicle traffic at an existing access or junction in an area subject to a speed limit of 60km/h or less, must be safe and not unreasonably impact on the efficiency of the road, having regard to: (a) the increase in traffic caused by the use; (b) the nature of the traffic generated by the use; (c) the nature and efficiency of the access or the junction; (d) the nature and category of the road; (e) the speed limit and traffic flow of the road; (f) any alternative access to a road;	A3 – The proposal complies with the Acceptable Solution as the proposal will not result in an increase in traffic movements and is likely to decrease traffic movements. Please refer to the Traffic Impact Assessment, contained in Appendix F, for greater analysis of this clause.

	(g) the need for the use; (h) any traffic impact assessment; and (i) any written advice received from the road authority.	

E4.5.2 Existing level crossings

Objective: To ensure that the safety and the efficiency of the rail network is not reduced by access across part of the rail network.		
Acceptable Solution	Performance Criteria	Assessment
A1 Where use has access across part of a rail network, the annual average daily traffic (AADT) at an existing level crossing must not be increased by greater than 10% or 10 vehicle movements per day, whichever is the greater.	P1 Any increase in vehicle traffic at an existing access across part of a rail network, must be safe and not unreasonably impact on the efficiency of the rail network, having regard to: (a) the increase in traffic caused by the use; (b) the nature of the traffic generated by the use; (c) the use and frequency of the rail network; (d) any alternative access; (e) the need for the use; (f) any traffic impact assessment; and (g) any written advice received from the rail authority.	A1 – The proposed development does not have access across the rail network at an existing level crossing.

E4.6 Development Standards

E4.6.1 Development adjacent to roads and railways

Objective: To ensure that development adjacent to category 1 or category 2 roads or the rail network: (a) ensures the safe and efficient operation of roads and the rail network; (b) allows for future road and rail widening, realignment and upgrading; and (c) is located to minimise adverse effects of noise, vibration, light and air emissions from roads and the rail network.		
Acceptable Solutions	Performance Criteria	Assessment

A1.1 Except as provided in A1.2, the following development must be located at least 50m from the rail network, or a category 1 road or category 2 road, in an area subject to a speed limit of more than 60km/h: (a) new buildings; (b) other road or earth works; and (c) building envelopes on new lots. A1.2 Buildings must be: (a) located within a row of existing buildings and setback no closer than the immediately adjacent building; or (b) an extension which extends no closer than: (i) the existing building; or (ii) an immediately adjacent building.	P1 The location of development, from the rail network, or a category 1 road or category 2 road in an area subject to a speed limit of more than 60km/h, must be safe and not unreasonably impact on the efficiency of the road or amenity of sensitive uses, having regard to: (a) the proposed setback; (b) the existing setback of buildings on the site; (c) the frequency of use of the rail network; (d) the speed limit and traffic volume of the road; (e) any noise, vibration, light and air emissions from the rail network or road; (f) the nature of the road; (g) the nature of the development; (h) the need for the development; (i) any traffic impact assessment; (j) any recommendations from a suitably qualified person for mitigation of noise, if for a habitable building for a sensitive use; and (k) any written advice received from the rail or road authority.	P1 – The proposal is for a transport hub that integrates rail transport. The proposal has been prepared in consultation with Tasrail.

E4.6.2 Road accesses and junctions

Objective: To ensure that the safety and efficiency of roads is not reduced by the creation of new accesses and junctions.

Acceptable Solution	Performance Criteria	Assessment
A1 No new access or junction to roads in an area subject to a speed limit of more than 60km/h.	P1 For roads in an area subject to a speed limit of more than 60km/h, accesses and junctions must be safe and not unreasonably impact on the efficiency of the road, having regard to: (a) the nature and frequency of the traffic generated by the use; (b) the nature of the road; (c) the speed limit and traffic flow of the road; (d) any alternative access; (e) the need for the access or junction; (f) any traffic impact assessment; and (g) any written advice received from the road authority.	Not applicable
A2 No more than one access providing both entry and exit, or two accesses providing separate entry and exit, to roads in an area subject to a speed limit of 60km/h or less.	P2 For roads in an area subject to a speed limit of 60km/h or less, accesses and junctions must be safe and not unreasonably impact on the efficiency of the road, having regard to: (a) the nature and frequency of the traffic generated by the use; (b) the nature of the road; (c) the speed limit and traffic flow of the road; (d) any alternative access to a road; (e) the need for the access or junction; (f) any traffic impact assessment; and	A2 – No new access points are proposed. The proposal reduces the number access points from five to four. Please refer to the Traffic Impact Assessment for greater analysis of this clause.

	(g) any written advice received from the road authority.	

E4.6.3 New level crossings

Objective: To ensure that the safety and the efficiency of the rail network is not reduced by access across part of the rail network.		
Acceptable Solution	Performance Criteria	Assessment
A1 No acceptable solution.	P1 Level crossings must be safe and not unreasonably impact on the efficiency of the rail network, having regard to: (a) the nature and frequency of the traffic generated by the use; (b) the frequency of use of the rail network; (c) the location of the level crossing; (d) any alternative access; (e) the need for the level crossing; (f) any traffic impact assessment; (g) any measures to prevent access to the rail network; and (h) any written advice received from the rail authority.	Not applicable. No new level crossing is proposed.

E4.6.4 Sight distance at accesses, junctions and level crossings

Objective: To ensure that accesses, junctions and level crossings provide sufficient sight distance between vehicles and between vehicles and trains to enable safe movement of traffic.		
Acceptable Solution	Performance Criteria	Assessment
A1 Sight distances at: (a) an access or junction must comply with the Safe Intersection Sight Distance shown in Table E4.6.4; and	P1 The design, layout and location of an access, junction or rail level crossing must provide adequate sight distances to	A1 – All proposed crossovers meet the safe intersection requirements. Please refer to GHD's traffic impact assessment which

(b) rail level crossings must comply with AS1742.7 Manual of uniform traffic control devices - Railway crossings, Standards Association of Australia.	ensure the safe movement of vehicles, having regard to: (a) the nature and frequency of the traffic generated by the use; (b) the frequency of use of the road or rail network; (c) any alternative access; (d) the need for the access, junction or level crossing; (e) any traffic impact assessment; (f) any measures to improve or maintain sight distance; and (g) any written advice received from the road or rail authority.	provides greater detail on this matter.

E5.0 Flood Prone Areas Code – Not applicable.

E6.0 Car Parking and Sustainable Transport Code

E6.0 Parking and Sustainable Transport Code

E6.5 Use Standards

E6.5.1 Car parking numbers

Objective: To ensure that an appropriate level of car parking is provided to meet the needs of the use.		
Acceptable Solutions	Performance Criteria	Assessment
A1 The number of car parking spaces must: (a) not be less than 90% of the requirements of Table E6.1 (except for dwellings in the General Residential Zone); or (b) not be less than 100% of the requirements of Table E6.1 for dwellings in	P1.1 The number of car parking spaces for other than residential uses, must be provided to meet the reasonable needs of the use, having regard to: (a) the availability of off-road public car parking spaces within reasonable walking distance;	The table to this code provides for "No Set Requirement" for the use of Transport Depot and Distribution. This has the effect of requiring the proposal to rely upon the Performance Criteria. P1 - The Traffic Impact Assessment prepared by

the General Residential Zone; or (c) not exceed the requirements of Table E6.1 by more than 2 spaces or 5% whichever is the greater, except for dwellings in the General Residential Zone; or (d) be in accordance with an acceptable solution contained within a parking precinct plan.	(b) the ability of multiple users to share spaces because of: (i) variations in car parking demand over time; or (ii) efficiencies gained by consolidation of car parking spaces; (c) the availability and frequency of public transport within reasonable walking distance of the site; (d) any site constraints such as existing buildings, slope, drainage, vegetation and landscaping; (e) the availability, accessibility and safety of on-road parking, having regard to the nature of the roads, traffic management and other uses in the vicinity; (f) an assessment of the actual car parking demand determined in light of the nature of the use and development; (g) the effect on streetscape; and (h) the recommendations of any traffic impact assessment prepared for the proposal; or P1.2 The number of car parking spaces for residential uses must be provided to meet the reasonable needs of the use, having regard to: (a) the intensity of the use and car parking required;	GHD provides an assessment of car parking requirements. It is noted that Toll provides employment for 130 staff members. It is proposed to provide the following carpark arrangement: • Lot 1 – 20 car park bays, 1 accessible car park bay; • Lot 2 – 11 car park bay, 1 accessible car park bay; • Lot 3 – 143 car park bays, 2 accessible car parks and 2 customer pick up bays; • 17 spaces will be reserved for visitors. It is considered that sufficient provision is made for onsite car parking.

	(b) the size of the dwelling and the number of bedrooms; and (c) the pattern of parking in the locality; or P1.3 The number of car parking spaces complies with any relevant parking precinct plan.	
A2 The number of accessible car parking spaces for use by persons with a disability for uses that require 6 or more parking spaces must be in accordance with Part D3 of the National Construction Code 2014, as amended from time to time.	P2 No performance criteria	A2 – Car parking provision for persons with a disability is in accordance with the National Construction Code 2014. Four spaces are proposed.

E6.5.2 Bicycle parking numbers

Objective: To ensure that an appropriate level of bicycle parking spaces are provided to meet the needs of the use.		
Acceptable Solution	Performance Criteria	Assessment
A1 The number of bicycle parking spaces must be provided on either the site or within 50m of the site in accordance with the requirements of Table E6.1.	P1 Bicycle parking spaces must be provided to meet the reasonable needs of the use, having regard to: (a) the likely number and characteristics of users of the site and their opportunities and likely need to travel by bicycle; (b) the location of the site and the likely distance a cyclist needs to travel to reach the site; and (c) the availability and accessibility of existing and planned parking facilities for bicycles in the vicinity.	P1 – 22 Bicycle parking spaces are proposed, 26 are required. This level of bicycle parking is seen as more than sufficient for the type of work and shifts undertaken by employees of the site.

E6.5.3 Taxi spaces

Objectives: To ensure that access for taxis is provided to meet the needs of the use.		
Acceptable Solution	Performance Criteria	Assessment
A1 Except for dwellings in the General Residential zone, uses that require greater than 50 car spaces by Table E6.1 must provide one parking space for a taxi on site, with one additional taxi parking space provided for each additional 50 car parking spaces required.	P1 Taxi parking spaces must be provided to meet the reasonable needs of the use, having regard to: (a) the nature of the proposed use and development; (b) the availability and accessibility of taxi spaces on the road or in the vicinity; and (c) any site constraints such as existing buildings, slope, drainage, vegetation and landscaping.	Not applicable, Clause E6.2.3.3 excludes the proposed use.

E6.5.4 Motorcycle parking

Objective: To ensure that motorcycle parking is provided to meet the needs of the use.		
Acceptable Solution	Performance Criteria	Assessment
A1 Except for dwellings in the General Residential zone, uses that require greater than 20 car parking spaces by Table E6.1 must provide one motorcycle parking space on site with one additional motorcycle parking space on site for each additional 20 car parking spaces required.	P1 Motorcycle parking spaces must be provided to meet the reasonable needs of the use, having regard to: (a) the nature of the proposed use and development; (b) the availability and accessibility of motorcycle parking spaces on the road or in the vicinity; and (c) any site constraints such as existing buildings, slope, drainage, vegetation and landscaping.	Not applicable, Clause E6.2.3.4 excludes the proposed use.

E6.5.5 Loading bays

Objective:

To ensure adequate access for goods delivery and collection, and to prevent loss of amenity and adverse impacts on traffic flows.		
Acceptable Solution	Performance Criteria	Assessment
A1 A loading bay must be provided for uses with a gross floor area greater than 1 000m² in a single occupancy.	P1 Adequate space for loading and unloading must be provided, having regard to: (a) the types of vehicles associated with the use; (b) the nature of the use; (c) the frequency of loading and unloading; (d) the location of the site; (e) the nature of traffic in the surrounding area; (f) the area and dimensions of the site; and (g) any site constraints such as existing buildings, slope, drainage, vegetation and landscaping.	Not applicable, Clause E6.2.3.5 excludes the proposed use from this clause.

E6.6 Development Standards

E6.6.1 Construction of parking areas

Objective: To ensure that parking areas are constructed to an appropriate standard.		
Acceptable Solution	Performance Criteria	Assessment
A1 All parking, access ways, manoeuvring and circulation spaces must: (a) have a gradient of 10% or less; (b) be formed and paved; (c) be drained to the public stormwater system, or contain stormwater on the site; (d) except for a single dwelling, and all uses in the Rural Resource, Environmental Management and Open Space zones, be provided	P1 All parking, access ways, manoeuvring and circulation spaces must be readily identifiable and constructed to ensure that they are useable in all weather conditions, having regard to: (a) the nature of the use; (b) the topography of the land; (c) the drainage system available; (d) the likelihood of transporting sediment or debris from the site onto a road or public place;	A1 – The proposal has been assessed to comply.

with an impervious all weather seal; and (e) except for a single dwelling, be line marked or provided with other clear physical means to delineate parking spaces.	(e) the likelihood of generating dust; and (f) the nature of the proposed surfacing and line marking.	

E6.6.2 Design and layout of parking areas

Objective: To ensure that parking areas are designed and laid out to provide convenient, safe and efficient parking.		
Acceptable Solution	Performance Criteria	Assessment
A1.1 Car parking, access ways, manoeuvring and circulation spaces must: (a) provide for vehicles to enter and exit the site in a forward direction where providing for more than 4 parking spaces; (b) have a width of vehicular access no less than the requirements in Table E6.2, and no more than 10% greater than the requirements in Table E6.2; (c) have parking space dimensions in accordance with the requirements in Table E6.3; (d) have a combined access and manoeuvring width adjacent to parking spaces not less than the requirements in Table E6.3 where there are 3 or more car parking spaces; and (e) have a vertical clearance of not less than 2.1 metres above the parking surface level. A1.2 All accessible spaces for use by persons with a disability must be located closest to	P1 Car parking, access ways, manoeuvring and circulation spaces must be convenient, safe and efficient to use, having regard to: (a) the characteristics of the site; (b) the proposed slope, dimensions and layout; (c) vehicle and pedestrian traffic safety; (d) the nature and use of the development; (e) the expected number and type of vehicles; (f) the nature of traffic in the surrounding area; and (g) the provisions of Australian Standards AS 2890.1 - Parking Facilities, Part 1: Off Road Car Parking and AS2890.2 Parking Facilities, Part 2: Parking facilities - Off-street commercial vehicle facilities.	A1.1 -1.4 – the proposed carpark has been assessed as complying with the relevant construction standards, including the provision of parking for persons with disabilities.

the main entry point to the building. A1.3 Accessible spaces for people with disability must be designated and signed as accessible spaces where there are 6 spaces or more. A1.4 Accessible car parking spaces for use by persons with disabilities must be designed and constructed in accordance with AS/NZ2890.6 – 2009 Parking facilities - Off-street parking for people with disabilities.		

E6.6.3 Pedestrian access

Objective: To ensure pedestrian access is provided in a safe and convenient manner.		
Acceptable Solution	Performance Criteria	Assessment
A1.1 Uses that require 10 or more parking spaces must: (a) have a 1m wide footpath that is separated from the access ways or parking aisles, except where crossing access ways or parking aisles, by: (i) a horizontal distance of 2.5m between the edge of the footpath and the access way or parking aisle; or (ii) protective devices such as bollards, guard rails or planters between the footpath and the access way or parking aisle; and (b) be signed and line marked at points where pedestrians cross access ways or parking aisles; and	P1 Safe pedestrian access must be provided within car parks, having regard to: (a) the characteristics of the site; (b) the nature of the use; (c) the number of parking spaces; (d) the frequency of vehicle movements; (e) the needs of persons with a disability; (f) the location and number of footpath crossings; (g) vehicle and pedestrian traffic safety; (h) the location of any access ways or parking aisles; and	A1 The proposal complies with the requirements for pedestrian accessibility. This has been assessed in greater detail by GHD.

A1.2 In parking areas containing accessible car parking spaces for use by persons with a disability, a footpath having a minimum width of 1.5m and a gradient not exceeding 1 in 14 is required from those spaces to the main entry point to the building.	(i) any protective devices proposed for pedestrian safety.	

E6.6.4 Loading bays

Objective: To ensure adequate access for goods delivery and collection and to prevent loss of amenity and adverse impacts on traffic flows.		
Acceptable Solution	Performance Criteria	Assessment
A1 The area and dimensions of loading bays and access way areas must be designed in accordance with AS2890.2 – 2002, Parking Facilities, Part 2: Parking facilities - Off-street commercial vehicle facilities, for the type of vehicles likely to use the site.	P1 Loading bays must have area and dimensions suitable for the use, having regard to: (a) the types of vehicles likely to use the site; (b) the nature of the use; (c) the frequency of loading and unloading; (d) the area and dimensions of the site; and (e) the location of the site and nature of traffic.	Not Applicable
A2 It must be demonstrated that the type of vehicles likely to use the site can enter, park and exit the site in a forward direction, without impact or conflicting with areas set aside for parking or landscaping, in accordance with AS2890.2 – 2002, Parking Facilities, Part 2: Parking facilities - Off-street commercial vehicle facilities.	P2 Access for vehicles commercial vehicles to and from the site must be safe, having regard to: (a) the types of vehicles associated with the use; (b) the nature of the use; (c) the frequency of loading and unloading; (d) the area and dimensions of the site; (e) the location of the site and nature of traffic; (f) the effectiveness or efficiency of the	Not applicable

	surrounding road network; and (g) site constraints such as existing buildings, slope, drainage, vegetation, parking and landscaping.	

E6.6.5 Bicycle facilities

Objective: To ensure that cyclists are provided with adequate facilities		
Acceptable Solution	Performance Criteria	Assessment
A1 Uses that require 5 or more bicycle spaces by Table E6.1 must provide 1 shower and change room facility on site, with one additional shower and change room on site for each 10 additional bicycles spaces required.	P1 Shower and change room facilities must be provided at adequate level to cater for the reasonable needs of cyclists, having regard to: (a) the location of the proposed use; (b) the existing network of cycle paths and bicycle lanes and other means of access to the site for cyclists; (c) the nature of the proposed use; (d) the number of employees; (e) the users of the site and the likelihood of travel by bicycle; (f) whether there are facilities on the site for other reasons that could be used by cyclists; and (g) the opportunity for sharing bicycle facilities on nearby sites.	A1 – Change room facilities are provided.

E6.6.6 Bicycle parking and storage facilities

Objective: To ensure that parking and storage facilities for bicycles are safe, secure and convenient.		
Acceptable Solution	Performance Criteria	Assessment
A1 Bicycle parking and storage facilities for uses that	P1 Bicycle parking and storage facilities must be provided in a safe, secure and	A1 - The proposal complies.

require 5 or more bicycle spaces by Table E6.1 must: (a) be accessible from a road, cycle path, bicycle lane, shared path or access way; (b) be located within 50m from the main entrance; (c) be visible from the main entrance or otherwise signed; and (d) be available and adequately lit during the times they will be used, in accordance with Table 2.3 of AS/NZS 1158.3.1: 2005 Lighting for roads and public spaces - Pedestrian area (Category P) lighting - Performance and design requirements.	convenient location, having regard to: (a) the accessibility to the site; (b) the characteristics of the site; (c) the nature of the proposed use; (d) the number of employees; (e) the users of the site and the likelihood of travel by bicycle; (f) the location and visibility of proposed parking storage facilities for bicycles; (g) the nature of the bicycle parking and storage facilities; (h) whether there are other parking and storage facilities on the site; and (i) the opportunity for sharing bicycle parking and storage facilities on nearby sites.	
A2 Bicycle parking spaces must: (a) have minimum dimensions of: (i) 1.7m in length; and (ii) 1.2m in height; and (iii) 0.7m in width at the handlebars; (b) have unobstructed access with a width of at least 2m and a gradient of no more 5% from a road, cycle path, bicycle lane, shared path or access way; and (c) include a rail or hoop to lock a bicycle to that meets AS 2890.3 1993	P2 Bicycle parking spaces and access must be convenient, safe and efficient to use, having regard to: (a) the characteristics of the site; (b) the space available; (c) the safety of cyclists; (d) the proposed measures to secure bicycles; and (e) the provisions of AS 2890.3 1993 Parking facilities - Bicycle parking facilities.	A2 - The proposal complies.

Parking facilities - Bicycle parking facilities.		

E7.0 Scenic Management Code – Not applicable.

E8.0 Biodiversity Code – Not applicable.

E9.0 Water Quality Code – Not applicable.

E10.0 Recreation and Open Space Code

This code is applicable as the site is zoned Light Industrial. There are significant areas of public open space in the locality, for example, the Hobblers Bridge to Henry Street walkway and dog park. We therefore request that the General Manager considers this specific in relation to Clause 10.4.1 (a).

E11.0 Environmental Impacts and Attenuation Code – Not applicable.

E12.0 Airports Impact Management Code – Not applicable.

E13.0 Local Historical Heritage Code – Not applicable.

E14.0 Coastal Code – Not applicable.

E15.0 Telecommunications Code – Not applicable.

E16.0 Invermay/Inveresk flood inundation area code - Not applicable.

E17.0 Cataract Gorge Management Area Code – Not applicable.

E18.0 Signs Code

The overall signage design is minimal and can be summarised as two signs for the three major buildings. No site signage such as blade a blade or pole sign is proposed. No signage will be illuminated. The signage is summarised as follows:

Office:
- One Building Fascia sign on the southern elevation, 600x2600;
- One Building Fascia sign on the western elevation, 600x2600.

Warehouse A:
- One Building Fascia sign on the southern elevation, 2000 x 5000;
- One Building Fascia sign on the western elevation, 2000 x 5000.

Warehouse B
- One Building Fascia sign on the southern elevation, 2000x5000;
- One Building Fascia sign on the western elevation, 2000x5000.

Truck Wash & Refuelling Station
- One Building Fascia sign on the southern elevation, 750x3200.

E18.5 Development Standards

E18.5.1 – Unacceptable signage – No unacceptable signage is to be applied.

E18.5.2 – Design and siting of signage

Objective: (a) provide for appropriate signage and to ensure the visual scale and impact of signage is managed; and (b) ensure that the design and siting of signs achieves the purpose of this code.		
Acceptable Solutions	Performance Criteria	Assessment
A1 A sign must: (a) be located within the applicable zone for the relevant sign type set out in Table 1 of E18.6; and (b) meet the requirements for the relevant sign type set out in Table 1 of E.18.6.	P1 A sign must: (a) be located within an applicable zone for the relevant sign type as set out in Table 1 of E18.6; and (b) be appropriate to the natural and built environment of the locality, having regard to: (i) domination of the streetscape or premises on which it is located; (ii) the size and dimensions of the sign; (iii) the amenity to surrounding properties; (iv) the repetition of messages or information; (v) the number and density of signs; and (vi) the obstruction of movement of vehicles and pedestrians.	A1 – The proposal complies.
A2 A sign must be a minimum distance of 2m from the boundary of any lot in the General Residential, Inner Residential, Low Density Residential, Rural Living, Environmental Living or Village zones.	P2 A sign must not result in the unreasonable loss of amenity to adjoining residential properties, having regard to: (a) the topography of the site and the surrounding area; (b) the relative location of buildings; (c) any overshadowing; and	A2 Not applicable

	(d) the nature and type of the sign.	
A3 A building or tenancy must have: (a) a maximum of one of each sign type per building or tenancy, unless otherwise stated in Table 1 of E18.6; and (b) no more than 3 individual signs in total.	P3 Visual clutter must be reduced where multiple signs of the same type are proposed, having regard to: (a) the number of signs; (b) replacement of existing signs with fewer, more effective signs; and (c) duplication of messages or information on the same frontage.	P3 – The signage scheme does not result in visual clutter, due to the size of the signs and the limited nature of the signage content. Seven signs across four buildings is not excessive, given that the three buildings with two signs proposed have elevations to two frontages.
A4 A sign must not be illuminated.	P4 A sign must not result in unreasonable loss of amenity to neighbouring properties or cause undue distraction to drivers of motor vehicles, having regard to: (a) the location of the sign; (b) the intensity of the lighting; (c) the hours of operation of the sign; (d) whether the sign is visible from the road; and (e) the character of the surrounding area.	A4 – The signage is not illuminated.

E19.0 Development Plan Code – Not applicable.

5. Conclusion

This submission is prepared in support of the upgrade of the Toll transport hub located at 31-35 Dowling Street, Launceston. The proposed upgrades and extension to the existing Transport Depot will result in a more efficient use of land for Toll and an increased amenity for surrounding users.

Metier PLANNING & DEVELOPMENT

Appendix A: Certificate of Title

Metier PLANNING & DEVELOPMENT

Appendix B: Plans, prepared by AJL Consulting Engineers

Metier PLANNING & DEVELOPMENT

Appendix C: Noise Assessment, prepared by Vipac

Metier PLANNING & DEVELOPMENT

Appendix D: Dust Management Plan, prepared by Vipac

Metier PLANNING & DEVELOPMENT

Appendix E: Landscape Plan, Prepared by Lange Design

Metier PLANNING & DEVELOPMENT

Appendix F: Traffic Impace Assessment, Prepared by GHD

Metier PLANNING & DEVELOPMENT

Appendix G: Infrastructure Report, Prepared by AJL Consulting Engineers

Metier PLANNING & DEVELOPMENT

Appendix H: Exemption from BAL Assessment, Prepared by Urban Design Solutions

Metier PLANNING & DEVELOPMENT

Appendix I: Site Contamination Assesment, prepared by ES&D

CLIENT:
TOLL GROUP

PROJECT:
TRANSPORT HUB REDEVELOPMENT

ADDRESS:
35-51 DOWLING STREET, LAUNCESTON

PROJECT No:
15.196

STATUS:
CONTROLLED DOCUMENT

ISSUED FOR / DESCRIPTION:
TOWN PLANNING

DRAWINGS:

ARCHITECTURAL

COV - COVER SHEET
A001 - EXISTING SITE AND DEMOLITION PLAN
A002 - SITE PLAN
A003 - EXAMPLE VEHICLE MOVEMENTS FOR INDEPENDENTLY OPERATED LOTS
A004 - PROJECT STAGING PLAN

A130 - OFFICE FLOOR PLAN
A160 - OFFICE ELEVATIONS
A161 - OFFICE ISOMETRIC VIEWS
A170 - OFFICE SECTION

A220 - WAREHOUSE A - STAGE 4 - FLOOR PLAN
A221 - WAREHOUSE A - STAGE 4 - ELEVATIONS AND SECTION
A230 - WAREHOUSE A - STAGE 10 - FLOOR PLAN - PART A
A231 - WAREHOUSE A - STAGE 10 - FLOOR PLAN - PART B
A260 - WAREHOUSE A - STAGE 10 - ELEVATIONS - 1 OF 2
A261 - WAREHOUSE A - STAGE 10 - ELEVATIONS - 2 OF 2
A270 - WAREHOUSE A - STAGE 10 - TYPICAL SECTION

A330 - WAREHOUSE B FLOOR PLAN
A360 - WAREHOUSE B ELEVATIONS
A370 - WAREHOUSE B TYPICAL SECTION

A430 - TRUCK WASH FLOOR PLAN
A460 - TRUCK WASH ELEVATIONS AND SECTION

A530 - CONTAINER WASH FLOOR PLAN ELEVATIONS AND SECTION

A630 - FIRE PUMP HOUSE FLOOR PLAN AND ELEVATIONS

A730 - CUSTOMER PICK-UP WAREHOUSE FLOOR PLAN AND ELEVATIONS

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
04	DRAWING LIST REVISED	17-10-16	C
03	TOWN PLANNING	29-04-16	B
02	CLIENT REVIEW	27-04-16	A
01	REVIEW	03-02-16	-

DRAWING REFERENCE NOTES:
1. -

STATUS:
CONTROLLED DOCUMENT

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NORTH WEST OFFICE:
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BURNIE // TAS // 7320
PO BOX 925
BURNIE // TAS // 7320
P 0418 642 550

AJL CONSULTING ENGINEERS
CIVIL // STRUCTURAL // HYDRAULIC // MANAGEMENT

DESIGNED BY:	AGS
DESIGN CHECK:	-
DRAWN BY:	AGS
DRAFT CHECK:	-
APPROVED BY:	AJL

CLIENT: **TOLL GROUP**
PROJECT: **TRANSPORT HUB REDEVELOPMENT**
ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

DRAWING: **COVER SHEET**
SCALE (AT A1 DRAWING SIZE): **-**
PROJECT No: **15.196** DWG No: **COV** REV No: **C**

PLANNING EXHIBITED DOCUMENTS

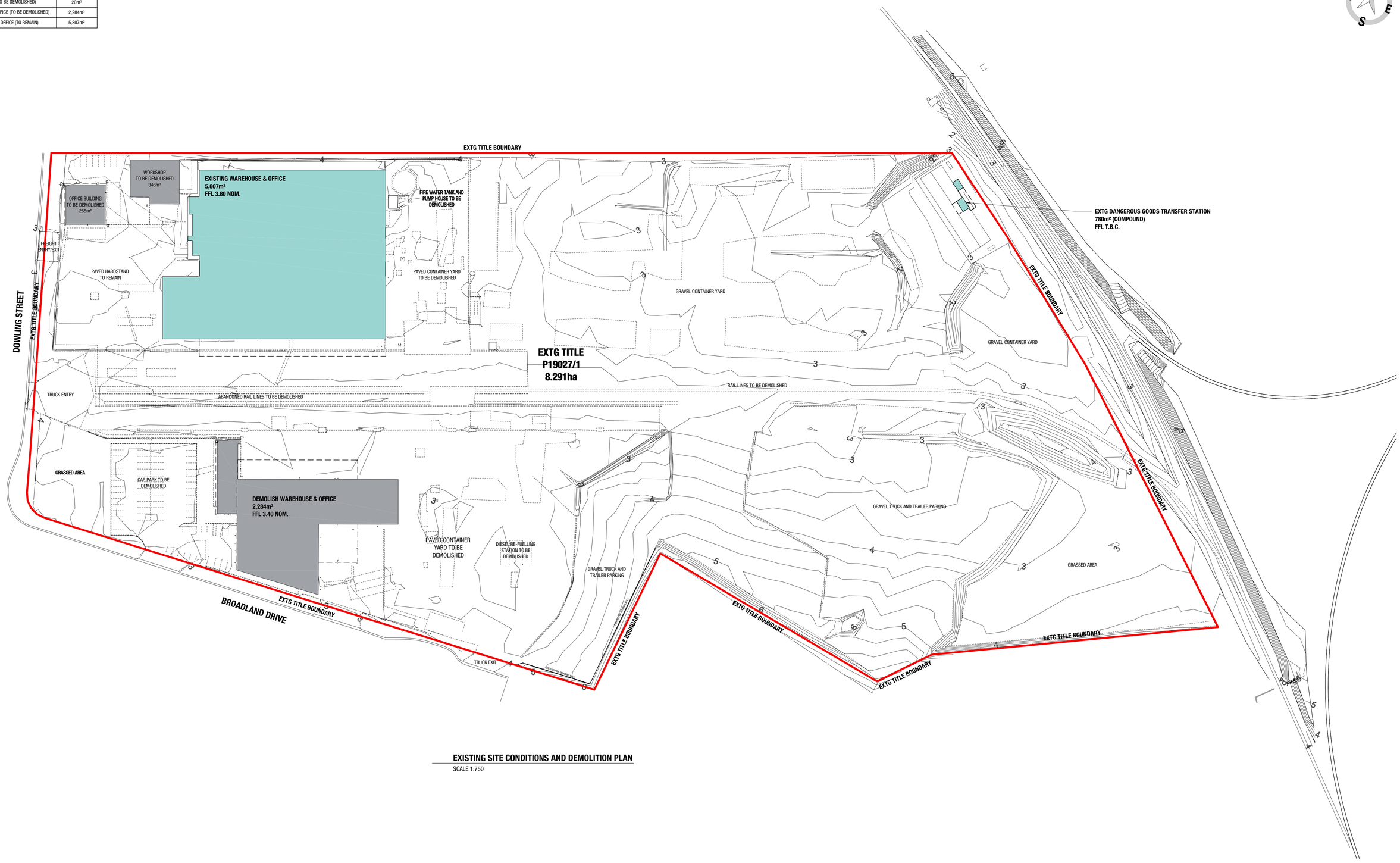
Ref. No: DA 0175/2016

Date advertised: 15/04/2017

Planning Administration

EXTG SITE AREA SCHEDULE

LOCATION	AREA
OFFICE BUILDING (TO BE DEMOLISHED)	265m²
WORKSHOP (TO BE DEMOLISHED)	346m²
FIRE PUMP HOUSE (TO BE DEMOLISHED)	20m²
WAREHOUSE AND OFFICE (TO BE DEMOLISHED)	2,284m²
EXTG WAREHOUSE & OFFICE (TO REMAIN)	5,807m²



EXISTING SITE CONDITIONS AND DEMOLITION PLAN

SCALE 1:750

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
04	TOWN PLANNING	29-04-16	A
03	CLIENT REVIEW	27-04-16	A
02	ISSUE TO SUB-CONSULTANT	18-04-16	-
01	REVIEW	03-02-16	-

DRAWING REFERENCE NOTES:

1. -

STATUS:

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DESIGNED BY:	AGS
DESIGN CHECK:	-
DRAWN BY:	AGS
DRAFT CHECK:	-
APPROVED BY:	AJL

CLIENT: **TOLL GROUP**

PROJECT: **TRANSPORT HUB REDEVELOPMENT**

ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

DRAWING: **EXISTING SITE CONDITIONS AND DEMOLITION PLAN**

SCALE (AT A1 DRAWING SIZE): **1:750**

PROJECT No: **15.196** DWG No: **A001** REV No: **A**

SITE AREA SCHEDULE

LOCATION	AREA
LIGHT DUTY HARDSTAND (CARPARK)	3,885m²
MEDIUM DUTY HARDSTAND	29,936m²
EXISTING MEDIUM DUTY HARDSTAND REPAIR AS REQUIRED	4,028m²
HEAVY DUTY HARDSTAND	19,475m²
LANDSCAPE	2,537m²
EXTG WAREHOUSE & OFFICE	5807m²
WAREHOUSE A	5928m²
WAREHOUSE A - COVERED LOADING DOCK	130m²
WAREHOUSE A - CANOPIES	1548m²
WAREHOUSE B	5,569m²
WAREHOUSE B - CANOPIES	1844m²

SITE AREA SCHEDULE - CONTINUED

LOCATION	AREA
MAIN OFFICE	867m²
MAIN OFFICE - COVERED WALKWAYS	128m²
TRUCKWASH	224m²
RE-FUELLING STATION	313m²
AXLE WEIGHBRIDGE	20m²
CONTAINER WASH	253m²
FORK TRUCK DIESEL STORAGE	66m²
FIRE PUMP HOUSE A	36m²
FIRE PUMP HOUSE B	36m²
CUSTOMER PICK-UP WAREHOUSE	44m²

SITE PLAN
SCALE 1:750

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
06	TRUCK WASH REVISED	17-10-16	E
05	TOWN PLANNING	29-04-16	D
04	CLIENT REVIEW	27-04-16	C
03	ISSUE TO SUB-CONSULTANT	18-04-16	B
02	REV'D TO CLIENT FEEDBACK	23-03-16	A
01	REVIEW	03-02-16	-

DRAWING REFERENCE NOTES:
1. REFER PROPOSED SUBDIVISION PLAN PREPARED BY SURVEY & ALIGNMENT SERVICES.

STATUS:
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AJL CONSULTING ENGINEERS
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DESIGNED BY:	AGS
DESIGN CHECK:	-
DRAWN BY:	AGS
DRAFT CHECK:	-
APPROVED BY:	AJL

CLIENT: **TOLL GROUP**
PROJECT: **TRANSPORT HUB REDEVELOPMENT**
ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

DRAWING: **SITE PLAN**
SCALE (AT A1 DRAWING SIZE): **1:750**
PROJECT No: **15.196** DWG No: **A002** REV No: **E**

SITE AREA SCHEDULE

LOCATION	AREA
LIGHT DUTY HARDSTAND (CARPARK)	3,885m²
MEDIUM DUTY HARDSTAND	29,936m²
EXISTING MEDIUM DUTY HARDSTAND REPAIR AS REQUIRED	4,028m²
HEAVY DUTY HARDSTAND	19,475m²
LANDSCAPE	2,537m²
EXTG WAREHOUSE & OFFICE	5807m²
WAREHOUSE A	5928m²
WAREHOUSE A - COVERED LOADING DOCK	130m²
WAREHOUSE A - CANOPIES	1548m²
WAREHOUSE B	5,569m²
WAREHOUSE B - CANOPIES	1844m²

SITE AREA SCHEDULE - CONTINUED

LOCATION	AREA
MAIN OFFICE	867m²
MAIN OFFICE - COVERED WALKWAYS	128m²
TRUCKWASH	224m²
RE-FUELLING STATION	313m²
AXLE WEIGHBRIDGE	20m²
CONTAINER WASH	253m²
FORK TRUCK DIESEL STORAGE	66m²
FIRE PUMP HOUSE A	36m²
FIRE PUMP HOUSE B	36m²
CUSTOMER PICK-UP WAREHOUSE	44m²

EXAMPLE VEHICLE MOVEMENTS FOR INDEPENDENTLY OPERATED LOTS

SCALE 1:750

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
02	TRUCKWASH REVISED	07-12-16	A
01	TOWN PLANNING	25-05-16	-

DRAWING REFERENCE NOTES:

1. REFER PROPOSED SUBDIVISION PLAN PREPARED BY SURVEY & ALIGNMENT SERVICES.

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DESIGNED BY:	AGS
DESIGN CHECK:	-
DRAWN BY:	AGS
DRAFT CHECK:	-
APPROVED BY:	AJL

CLIENT: **TOLL GROUP**

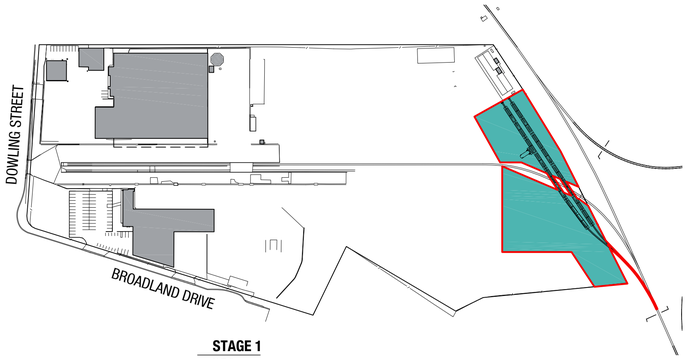
PROJECT: **TRANSPORT HUB REDEVELOPMENT**

ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

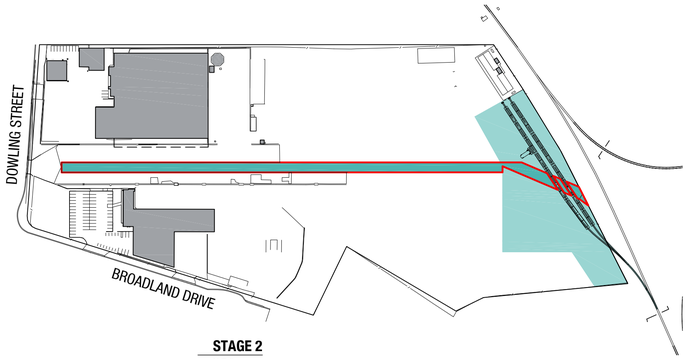
DRAWING: **EXAMPLE VEHICLE MOVEMENTS FOR INDEPENDENTLY OPERATED LOTS**

SCALE (AT A1 DRAWING SIZE): **1:750**

PROJECT No: **15.196** DWG No: **A003** REV No: **A**



STAGE 1
N.T.S.



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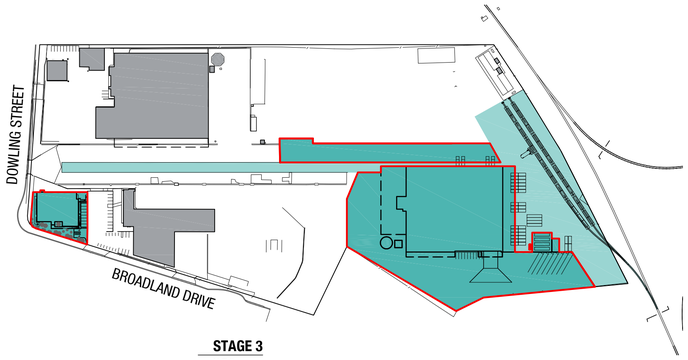

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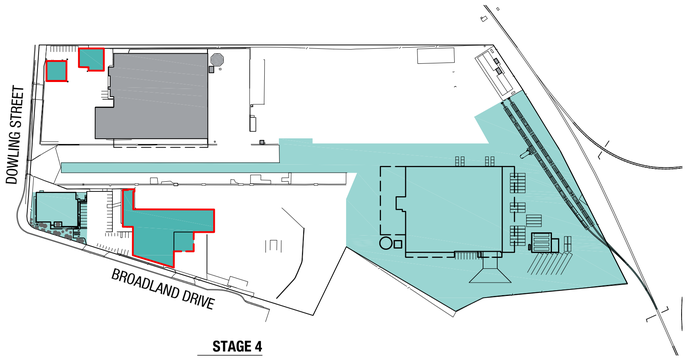

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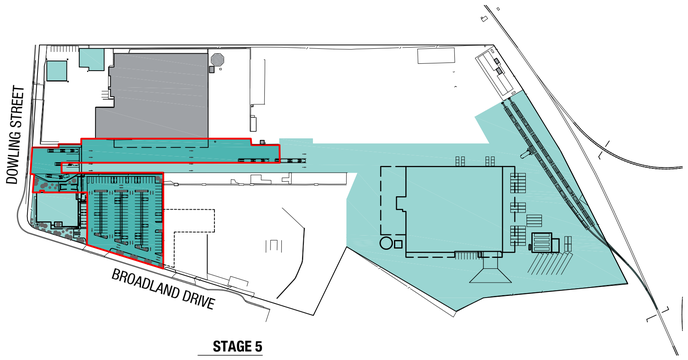

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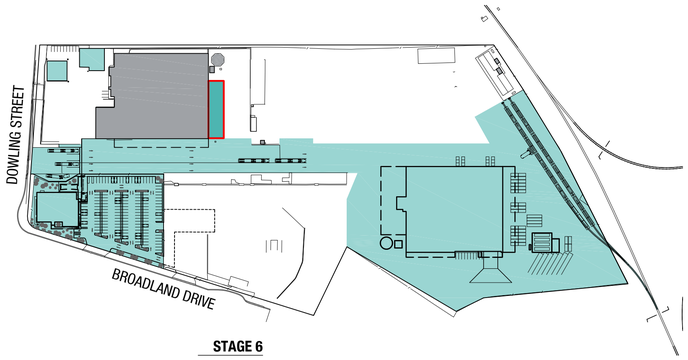

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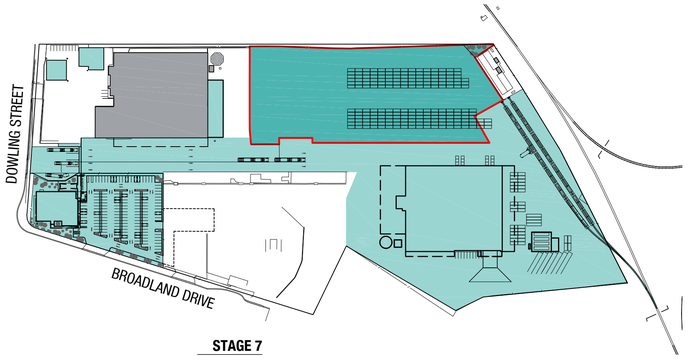

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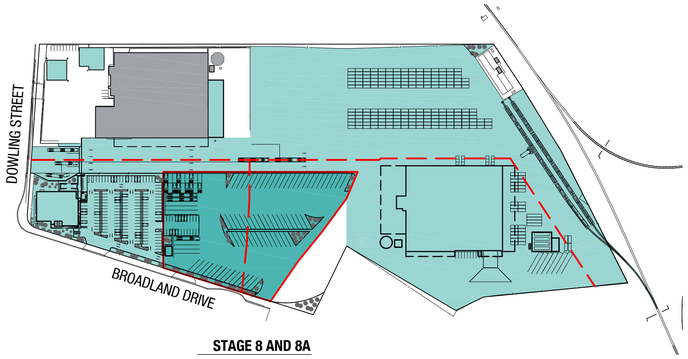

STAGE 8 AND 8A
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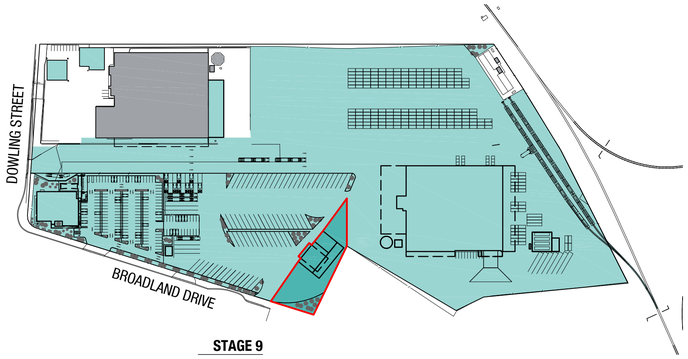

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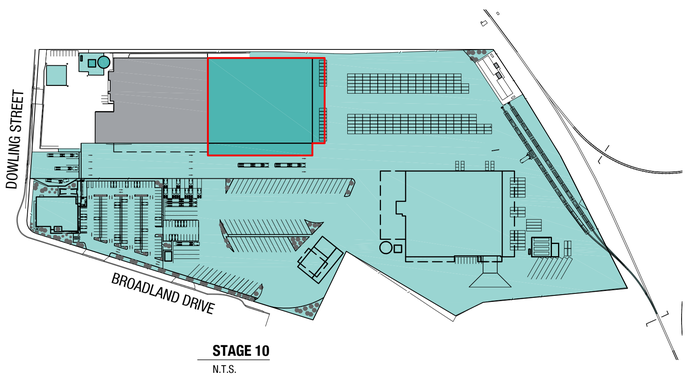

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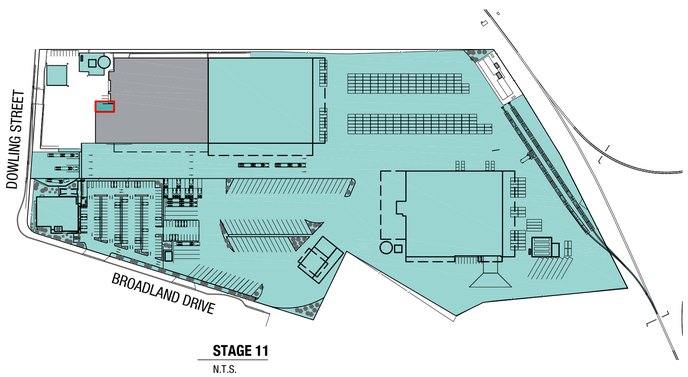

STAGE 11
N.T.S.

PROJECT STAGING

STAGE	DESCRIPTION
1	NEW RAIL SIDING AND HEAVY-DUTY PAVEMENTS AT EAST END OF LOT.
2	COMMISSIONING OF NEW RAIL, REMOVAL OF EXISTING RAIL ASSETS, INFILL OF RAIL CORRIDOR WITH MEDIUM-DUTY PAVEMENT.
3	CONSTRUCTION OF WAREHOUSE B AND SURROUNDING MEDIUM-DUTY PAVEMENTS. CONSTRUCTION OF OFFICE BUILDING.
4	DEMOLITION OF EXISTING WAREHOUSE AND OFFICE BUILDING ALONG SOUTH BOUNDARY AND CONVERSION TO TEMPORARY CONTAINER PARK. DEMOLITION OF BUILDINGS IN THE NORTH-EAST CORNER OF THE LOT, MADE GOOD WITH PAVERS.
5	CONSTRUCTION OF OFFICE CAR PARK, TRUCK ENTRY AND MEDIUM-DUTY PAVEMENTS AT WEST BOUNDARY.
6	NEW AWNING ON EAST WALL OF EXISTING WAREHOUSE A.
7	CONSTRUCTION OF HEAVY-DUTY PAVEMENTS AS CONTAINER PARK ON THE NORTH-EAST CORNER OF THE LOT.
8	CONSTRUCTION OF TRUCK AND TRAILER PARK, INCLUDING CUSTOMER PICK-UP WAREHOUSE.
8A	SUBDIVISION INTO 3 LOTS.
9	CONSTRUCTION OF TRUCK WASH AND RE-FUELLING STATION.
10	CONSTRUCTION OF WAREHOUSE A EXTENSION, INCLUDING RELOCATION OF FIRE AND LPG SYSTEMS.
11	CONSTRUCTION OF ENCLOSED TRUCK LOADING AREA ON WEST WALL OF WAREHOUSE A.

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
04	STAGE 8A ADDED	07-12-16	C
03	STAGES 4 THRU 8 REVISED	25-10-16	B
02	PREV. STG. 9 MOVED TO STG. 4	17-10-16	A
01	REVIEW	28-09-16	-

DRAWING REFERENCE NOTES:
1. -

STATUS:
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AJL CONSULTING ENGINEERS
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DESIGNED BY:	AGS
DESIGN CHECK:	-
DRAWN BY:	AGS
DRAFT CHECK:	-
APPROVED BY:	AJL

CLIENT: **TOLL GROUP**

PROJECT: **TRANSPORT HUB REDEVELOPMENT**

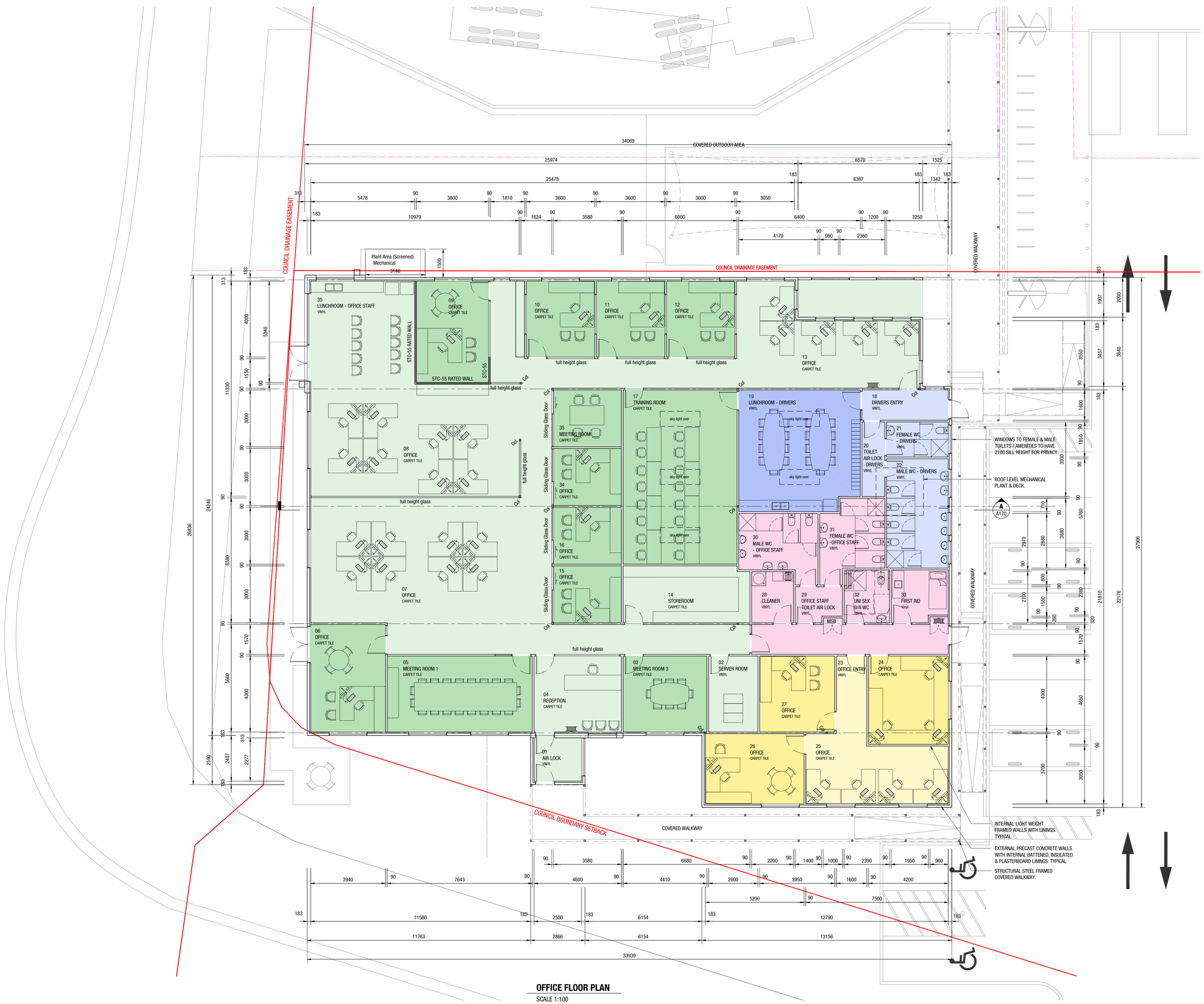
ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

DRAWING: **PROJECT STAGING PLAN**

SCALE (AT A1 DRAWING SIZE): **N.T.S.**

PROJECT No: **15.196** DWG No: **A004** REV No: **C**

Document Set ID: 3583573
Version: 2, Version Date: 31/07/2017



OFFICE FLOOR PLAN

SCALE 1:100

AREA SCHEDULE - MAIN OFFICE		
COLOUR	LOCATION	AREA
	OFFICE / MEETING / TRAINING	232m²
	COMMON AREAS	356m²
	OFFICE STAFF AMENITIES	55m²
	TRUCK DRIVERS LUNCHROOM	40m²
	TRUCK DRIVERS AMENITIES	37m²
	CONTRACTOR OFFICE	55m²
	CONTRACTOR COMMON AREA	31m²
	COVERED WALKWAYS	128m²

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
06	TOWN PLANNING	29-04-16	E
05	CLIENT REVIEW	27-04-16	D
04	ISSUE TO SUB-CONSULTANT	23-03-16	C
03	REV'D TO CLIENT FEEDBACK	18-04-16	B
02	FULL REVISION	21-03-16	A
01	REVIEW	03-02-16	-

DRAWING REFERENCE NOTES:
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AJL CONSULTING ENGINEERS
CIVIL // STRUCTURAL // HYDRAULIC // MANAGEMENT

DESIGNED BY:	AGS
DESIGN CHECK:	-
DRAWN BY:	KAH
DRAFT CHECK:	DFB
APPROVED BY:	AJL

CLIENT: **TOLL GROUP**

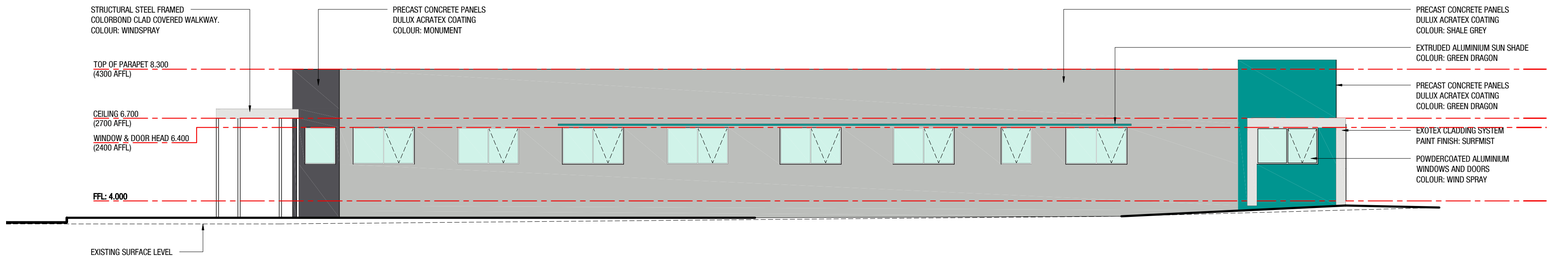
PROJECT: **TRANSPORT HUB REDEVELOPMENT**

ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

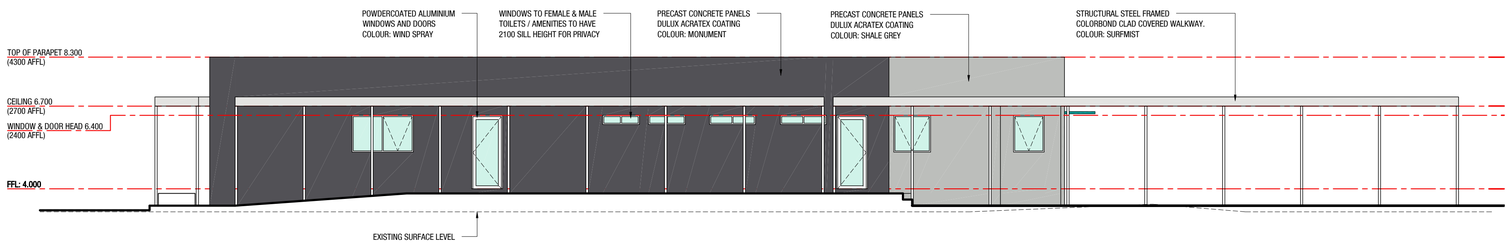
DRAWING: **OFFICE FLOOR PLAN**

SCALE (AT A1 DRAWING SIZE): **1:100**

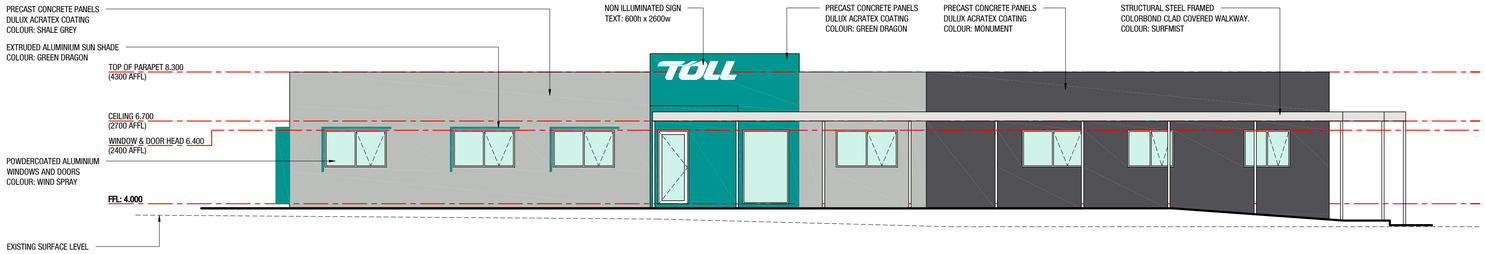
PROJECT No: **15.196** DWG No: **A130** REV No: **E**



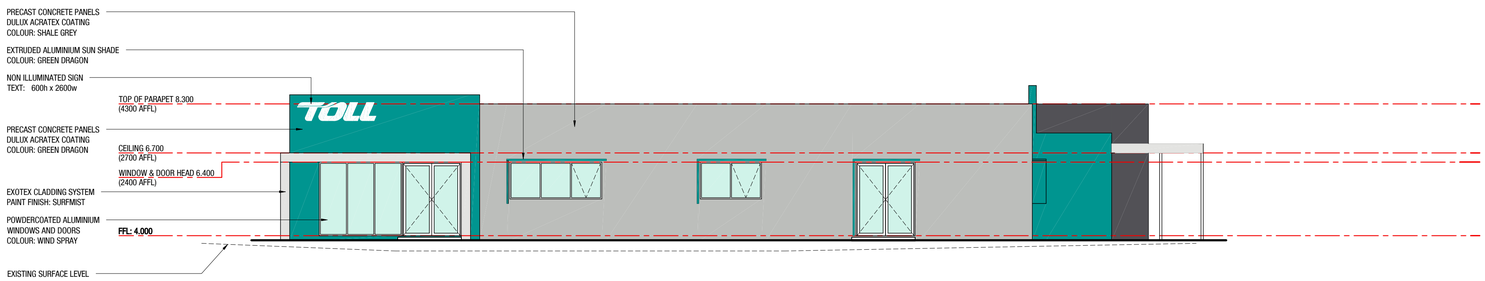
NORTH ELEVATION
SCALE 1:100



EAST ELEVATION
SCALE 1:100



SOUTH ELEVATION
SCALE 1:100



WEST ELEVATION
SCALE 1:100

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
03	TOWN PLANNING	29-04-16	B
02	CLIENT REVIEW	27-04-16	A
01	REVIEW	03-02-16	-

DRAWING REFERENCE NOTES:
1. -

STATUS:
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DESIGNED BY:	AGS
DESIGN CHECK:	-
DRAWN BY:	KAH
DRAFT CHECK:	DFB
APPROVED BY:	AJL

CLIENT: **TOLL GROUP**

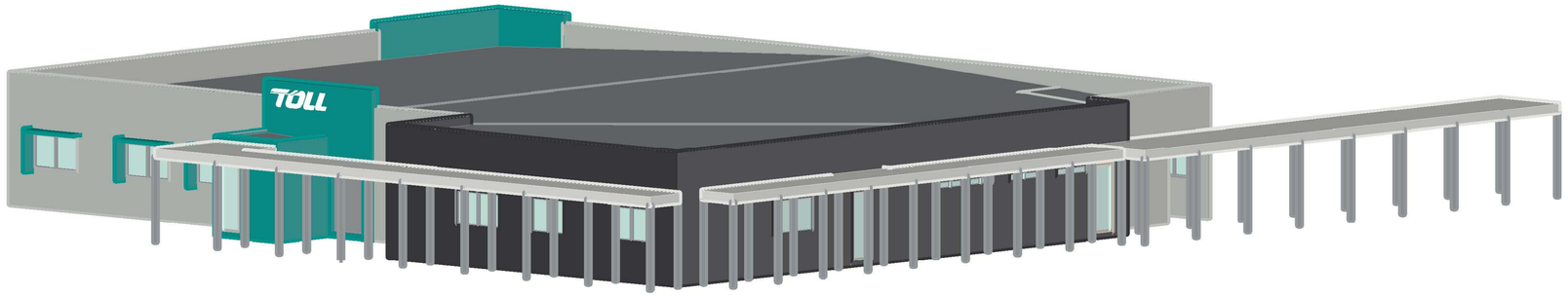
PROJECT: **TRANSPORT HUB REDEVELOPMENT**

ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

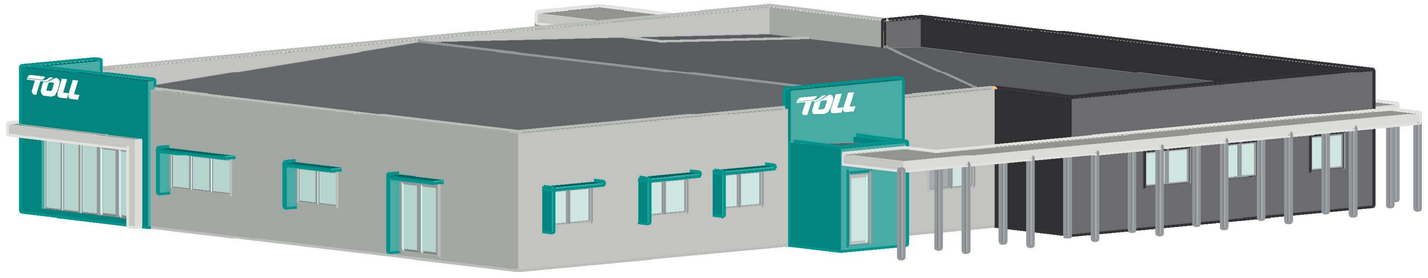
DRAWING: **OFFICE ELEVATIONS**

SCALE (AT A1 DRAWING SIZE): **1:100**

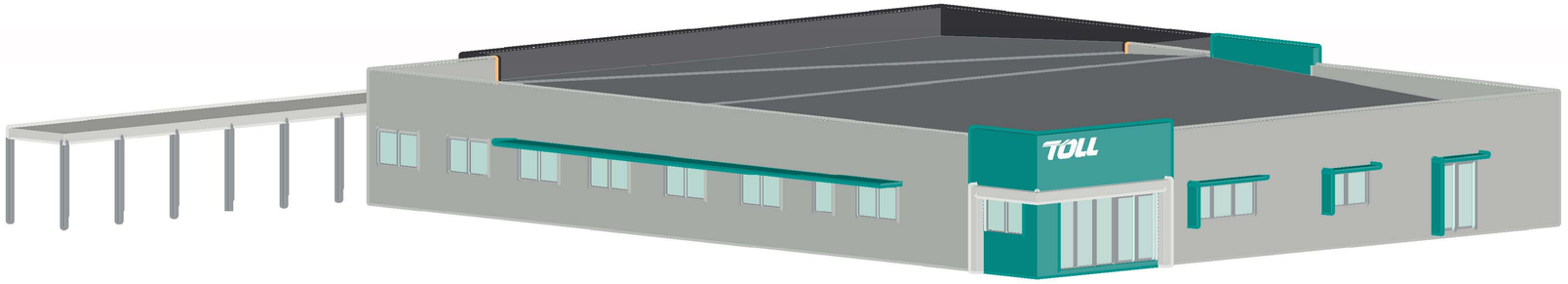
PROJECT No: **15.196** DWG No: **A160** REV No: **B**



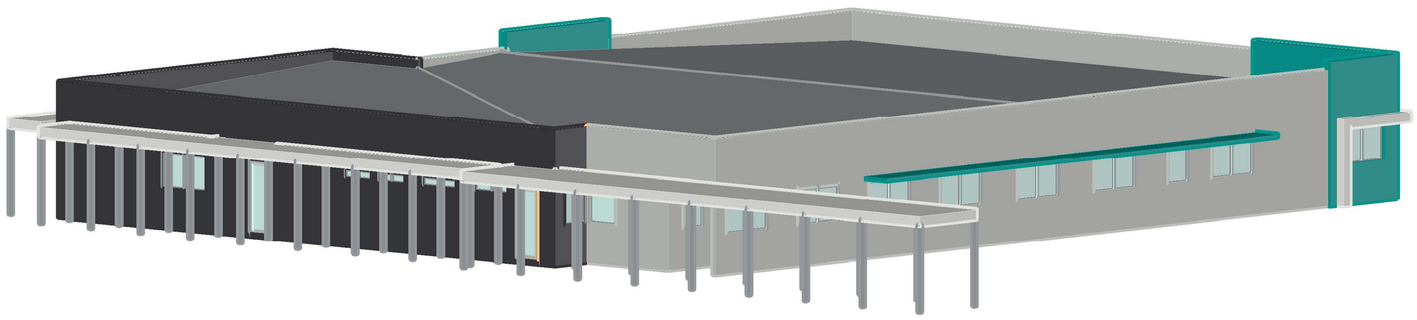
01 - **SOUTH-EAST ISOMETRIC VIEW**
SCALE N.T.S.



02 - **SOUTH-WEST ISOMETRIC VIEW**
SCALE N.T.S.



03 - **NORTH-WEST ISOMETRIC VIEW**
SCALE N.T.S.



04 - **NORTH-EAST ISOMETRIC VIEW**
SCALE N.T.S.

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
03	TOWN PLANNING	29-04-16	A
02	CLIENT REVIEW	27-04-16	A
01	REVIEW	03-02-16	-

DRAWING REFERENCE NOTES:
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NORTH WEST OFFICE:
LEVEL 1 - 83a WILSON STREET
BURNIE // TAS // 7320
PO BOX 925
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P 0418 642 550

AJL CONSULTING ENGINEERS
CIVIL // STRUCTURAL // HYDRAULIC // MANAGEMENT

DESIGNED BY:	AGS
DESIGN CHECK:	-
DRAWN BY:	KAH
DRAFT CHECK:	DFB
APPROVED BY:	AJL

CLIENT: **TOLL GROUP**

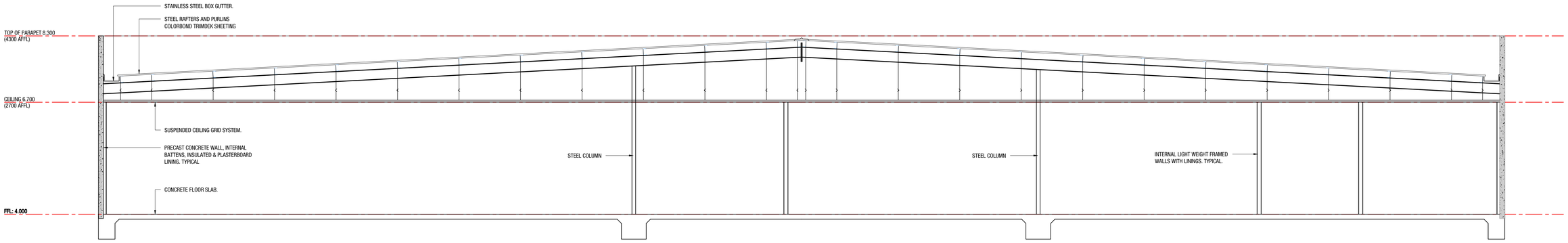
PROJECT: **TRANSPORT HUB REDEVELOPMENT**

ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

DRAWING: **OFFICE ISOMETRIC VIEWS**

SCALE (AT A1 DRAWING SIZE): **N.T.S.**

PROJECT No: **15.196** DWG No: **A161** REV No: **A**



A / A130 **SECTION**
SCALE 1:50

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
03	DRAWING TITLE CHANGED	08-12-16	A
02	TOWN PLANNING	29-04-16	-
01	CLIENT REVIEW	27-04-16	-

DRAWING REFERENCE NOTES:
1. -

STATUS:
CONTROLLED DOCUMENT

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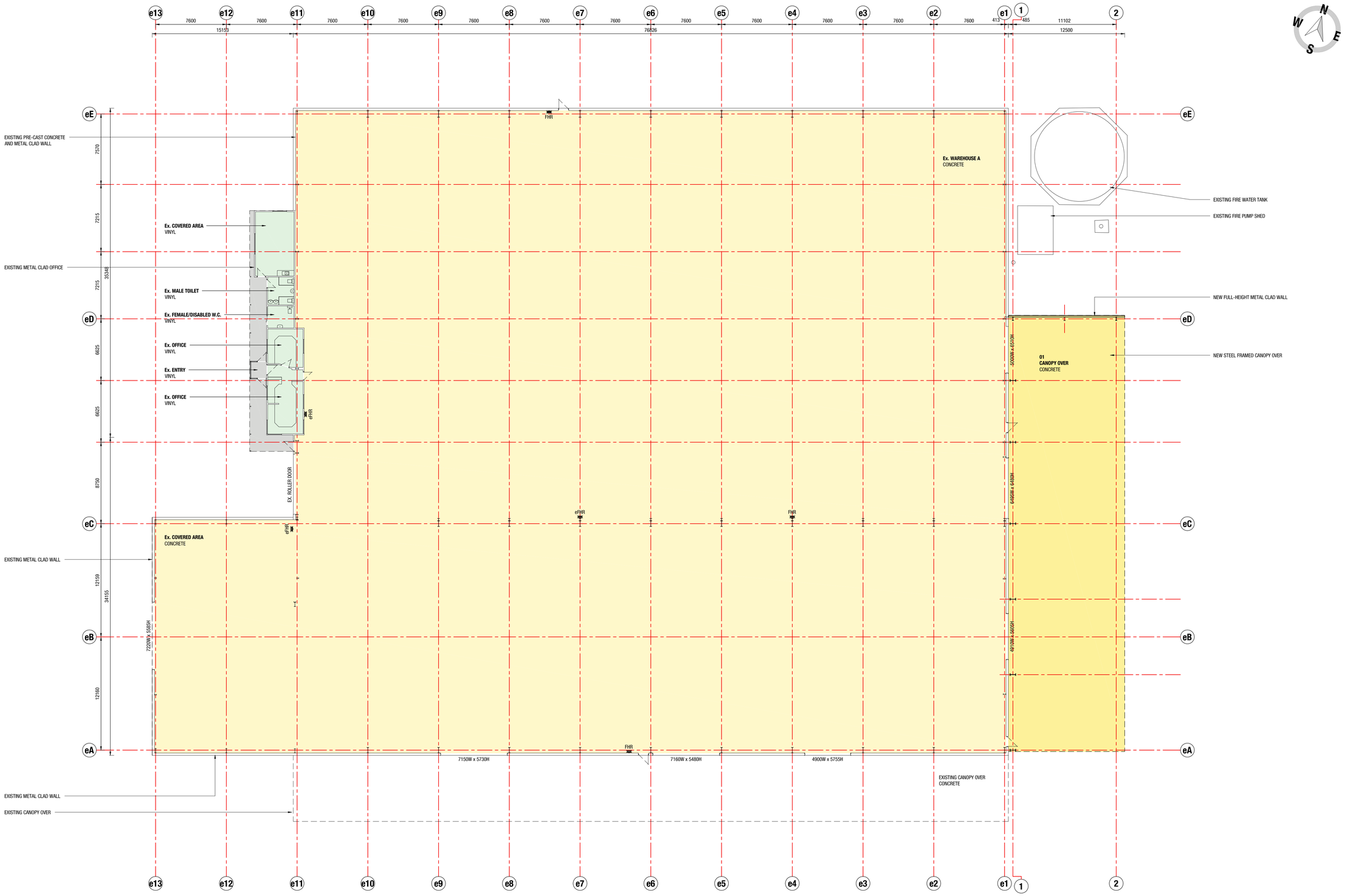
PO BOX 925
BURNIE // TAS // 7320
P 0418 642 550

AJL CONSULTING ENGINEERS
CIVIL // STRUCTURAL // HYDRAULIC // MANAGEMENT

DESIGNED BY:	**AGS**
DESIGN CHECK:	**-**
DRAWN BY:	**KAH**
DRAFT CHECK:	**DFB**
APPROVED BY:	**AJL**

CLIENT: **TOLL GROUP**
PROJECT: **TRANSPORT HUB REDEVELOPMENT**
ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

DRAWING: **OFFICE SECTION**
SCALE (AT A1 DRAWING SIZE): **1:50**
PROJECT No: **15.196** DWG No: **A170** REV No: **A**



AREA SCHEDULE - WAREHOUSE A	
LOCATION	**AREA**
EXTG WAREHOUSE & OFFICE	5939m²
WAREHOUSE A - STAGE 4 CANOPY	585m²

A

WAREHOUSE A - STAGE 4 - FLOOR PLAN

SCALE 1:200

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
02	SCHEDULE & TITLE REVISED	07-12-16	A
01	REVIEW	17-10-16	-

DRAWING REFERENCE NOTES:
1. -

STATUS:
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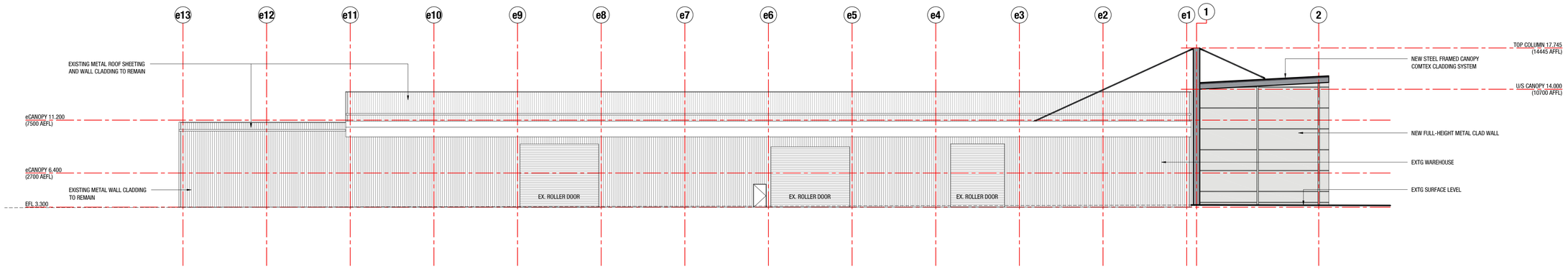
AJL CONSULTING ENGINEERS
CIVIL // STRUCTURAL // HYDRAULIC // MANAGEMENT

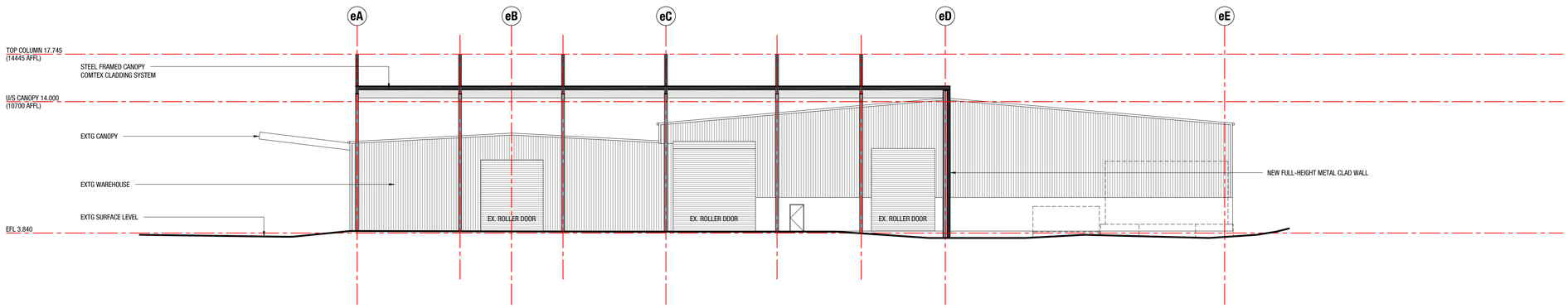
DESIGNED BY:	AGS
DESIGN CHECK:	-
DRAWN BY:	AGS
DRAFT CHECK:	DFB
APPROVED BY:	AJL

CLIENT: **TOLL GROUP**
PROJECT: **TRANSPORT HUB REDEVELOPMENT**
ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

DRAWING: **WAREHOUSE A - STAGE 4 FLOOR PLAN**
SCALE (AT A1 DRAWING SIZE): **1:200**
PROJECT No: **15.196** DWG No: **A220** REV No: **A**



SOUTH ELEVATION
SCALE 1:200



EAST ELEVATION
SCALE 1:200

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
02	**DRAWING TITLE CHANGED**	**07-12-16**	**A**
01	**REVIEW**	**17-10-16**	**-**

DRAWING REFERENCE NOTES:
1. -

STATUS:
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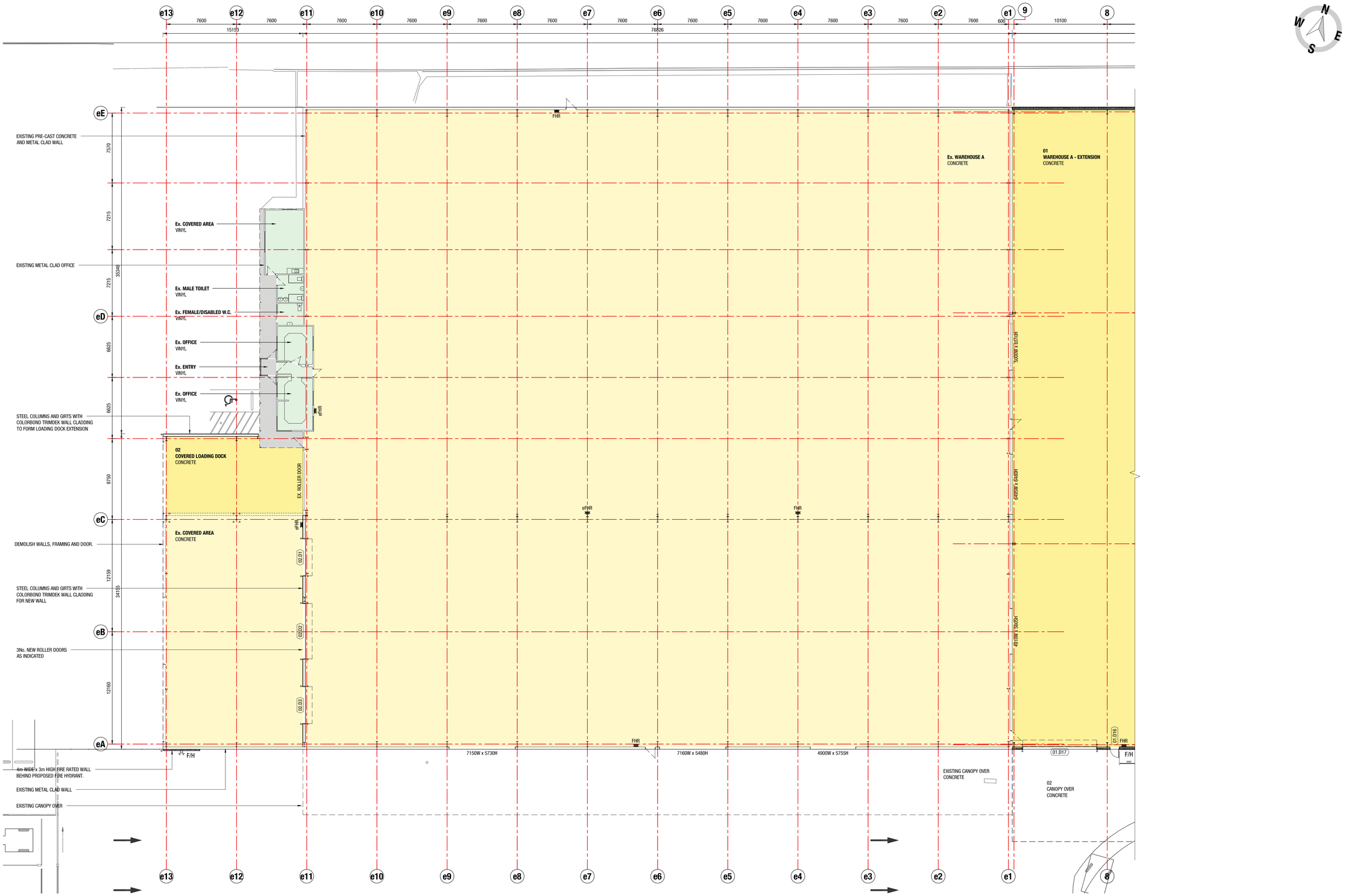
AJL CONSULTING ENGINEERS
CIVIL // STRUCTURAL // HYDRAULIC // MANAGEMENT

DESIGNED BY:	**AGS**
DESIGN CHECK:	**-**
DRAWN BY:	**AGS**
DRAFT CHECK:	**DFB**
APPROVED BY:	**AJL**

CLIENT: **TOLL GROUP**
PROJECT: **TRANSPORT HUB REDEVELOPMENT**
ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

DRAWING: **WAREHOUSE A - STAGE 4 ELEVATIONS**
SCALE (AT A1 DRAWING SIZE): **1:200**
PROJECT No: **15.196** DWG No: **A221** REV No: **A**



AREA SCHEDULE - WAREHOUSE A

LOCATION	AREA
EXTG WAREHOUSE & OFFICE	5939m²
WAREHOUSE A	5928m²
WAREHOUSE A - COVERED LOADING DOCK	130m²
WAREHOUSE A - CANOPIES	1548m²

WAREHOUSE A - STAGE 10 - FLOOR PLAN - PART A
SCALE 1:200

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
04	DRAWING TITLE REVISED	28-09-16	C
04	TOWN PLANNING	29-04-16	B
03	CLIENT REVIEW	27-04-16	B
02	ISSUE TO SUB-CONSULTANT	18-04-16	A
01	REVIEW	03-02-16	-

DRAWING REFERENCE NOTES:
1. -

STATUS:
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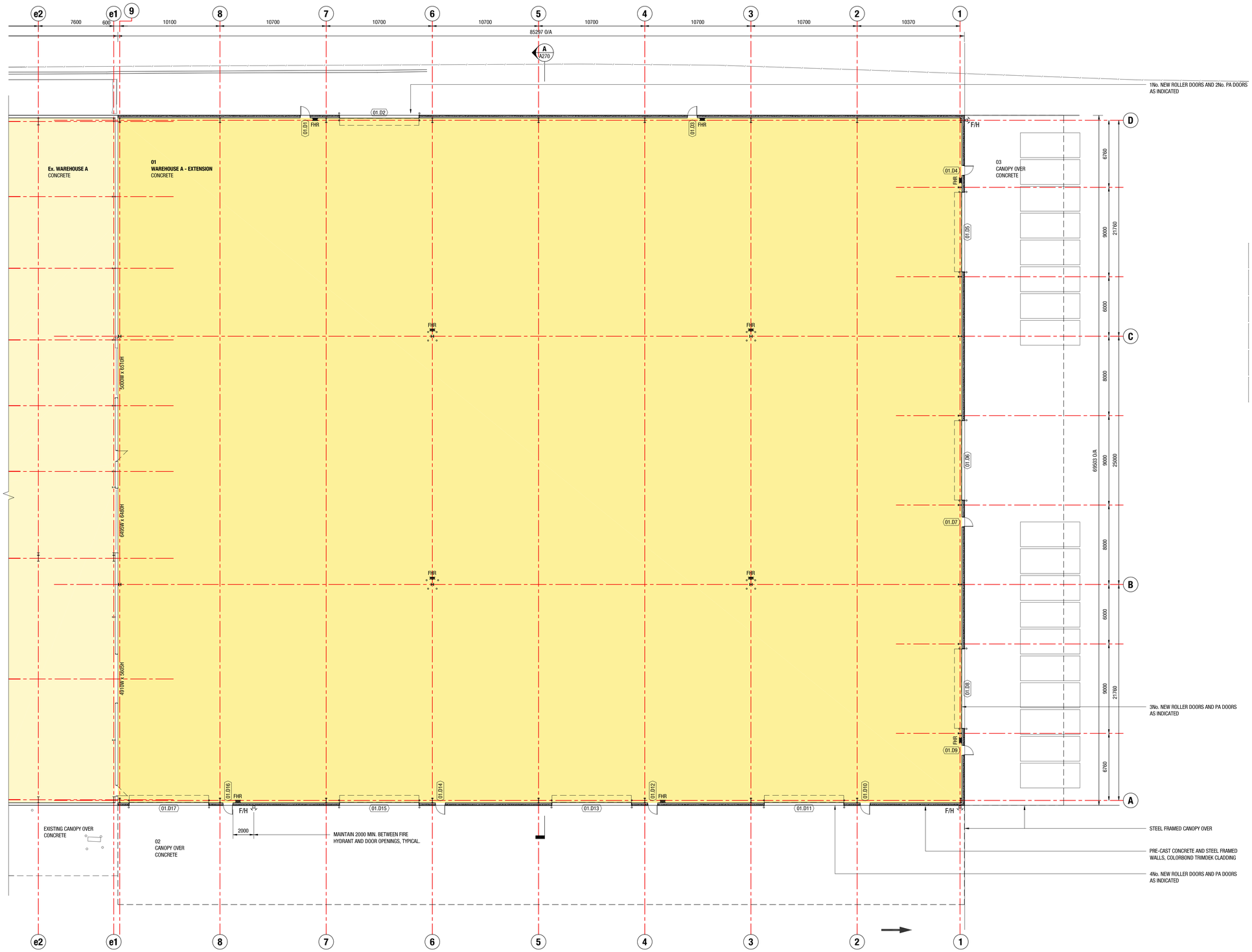
AJL CONSULTING ENGINEERS
CIVIL // STRUCTURAL // HYDRAULIC // MANAGEMENT

DESIGNED BY:	AGS
DESIGN CHECK:	-
DRAWN BY:	KAH
DRAFT CHECK:	DFB
APPROVED BY:	AJL

CLIENT: **TOLL GROUP**
PROJECT: **TRANSPORT HUB REDEVELOPMENT**
ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

DRAWING: **WAREHOUSE A - STAGE 10 FLOOR PLAN - PART A**
SCALE (AT A1 DRAWING SIZE): **1:200**
PROJECT No: **15.196** DWG No: **A230** REV No: **C**



AREA SCHEDULE - WAREHOUSE A	
LOCATION	**AREA**
EXTG WAREHOUSE & OFFICE	5939m²
WAREHOUSE A	5928m²
WAREHOUSE A - COVERED LOADING DOCK	130m²
WAREHOUSE A - CANOPIES	1548m²

WAREHOUSE A - STAGE 10 - FLOOR PLAN - PART B

SCALE 1:200

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
04	DRAWING TITLE REVISED	28-09-16	C
04	TOWN PLANNING	29-04-16	B
03	CLIENT REVIEW	27-04-16	B
02	ISSUE TO SUB-CONSULTANT	18-04-16	A
01	REVIEW	03-02-16	-

DRAWING REFERENCE NOTES:
1. -

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AJL CONSULTING ENGINEERS
CIVIL // STRUCTURAL // HYDRAULIC // MANAGEMENT

DESIGNED BY:	AGS
DESIGN CHECK:	-
DRAWN BY:	KAH
DRAFT CHECK:	DFB
APPROVED BY:	AJL

CLIENT: **TOLL GROUP**

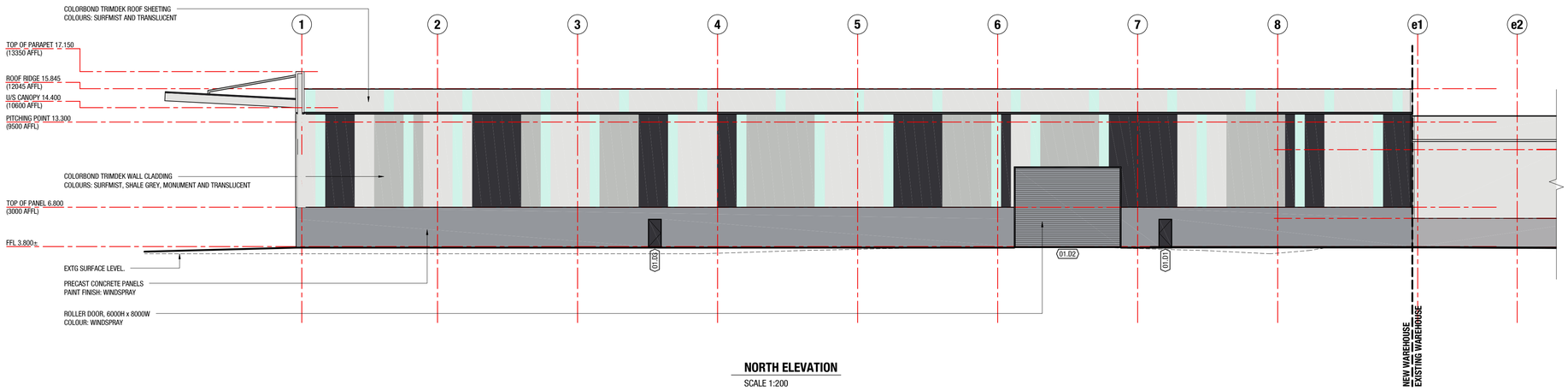
PROJECT: **TRANSPORT HUB REDEVELOPMENT**

ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

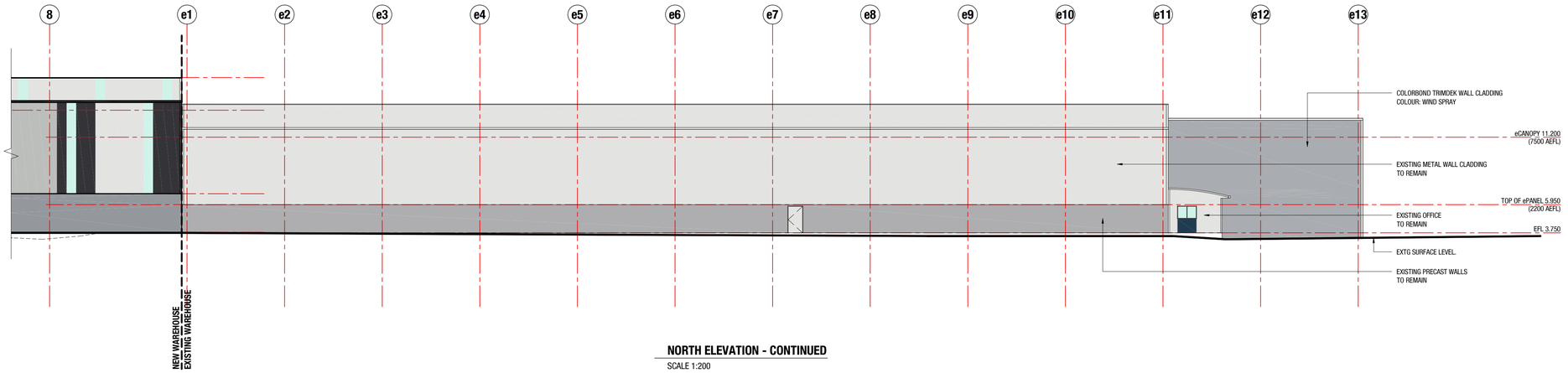
DRAWING: **WAREHOUSE A - STAGE 10 FLOOR PLAN - PART B**

SCALE (AT A1 DRAWING SIZE): **1:200**

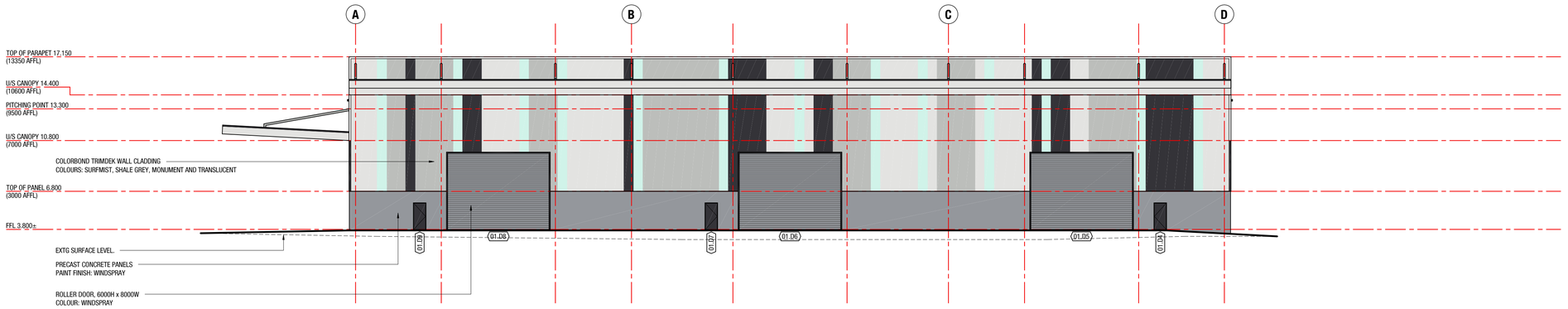
PROJECT No: **15.196** DWG No: **A231** REV No: **C**



NORTH ELEVATION
SCALE 1:200



NORTH ELEVATION - CONTINUED
SCALE 1:200



EAST ELEVATION
SCALE 1:200

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
04	DRAWING TITLE REVISED	28-09-16	D
04	TOWN PLANNING	29-04-16	C
03	CLIENT REVIEW	27-04-16	B
02	ISSUE TO SUB-CONSULTANT	18-04-16	A
01	REVIEW	03-02-16	-

DRAWING REFERENCE NOTES:
1. -

STATUS:
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AJL CONSULTING ENGINEERS
CIVIL // STRUCTURAL // HYDRAULIC // MANAGEMENT

DESIGNED BY:	AGS
DESIGN CHECK:	-
DRAWN BY:	KAH
DRAFT CHECK:	DFB
APPROVED BY:	AJL

CLIENT: **TOLL GROUP**

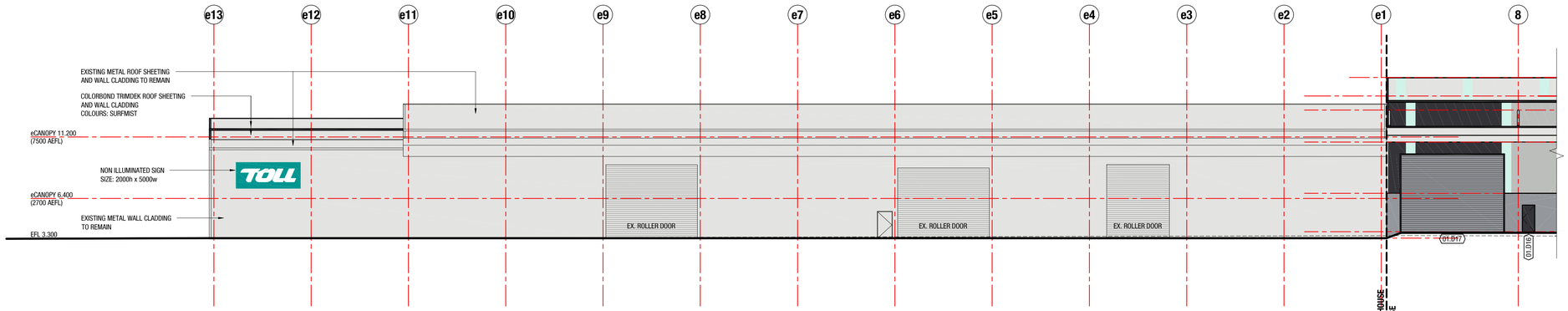
PROJECT: **TRANSPORT HUB REDEVELOPMENT**

ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

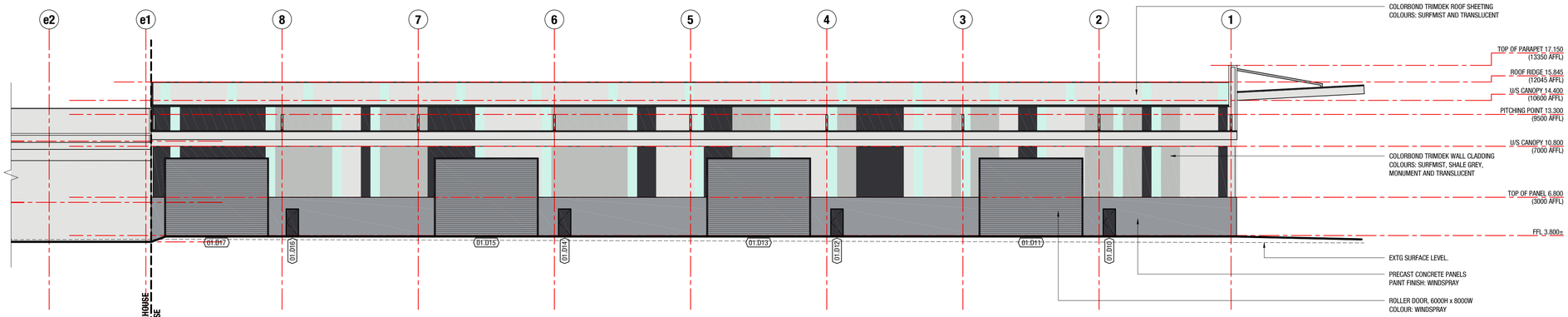
DRAWING: **WAREHOUSE A - STAGE 10 ELEVATIONS - 1 OF 2**

SCALE (AT A1 DRAWING SIZE): **1:200**

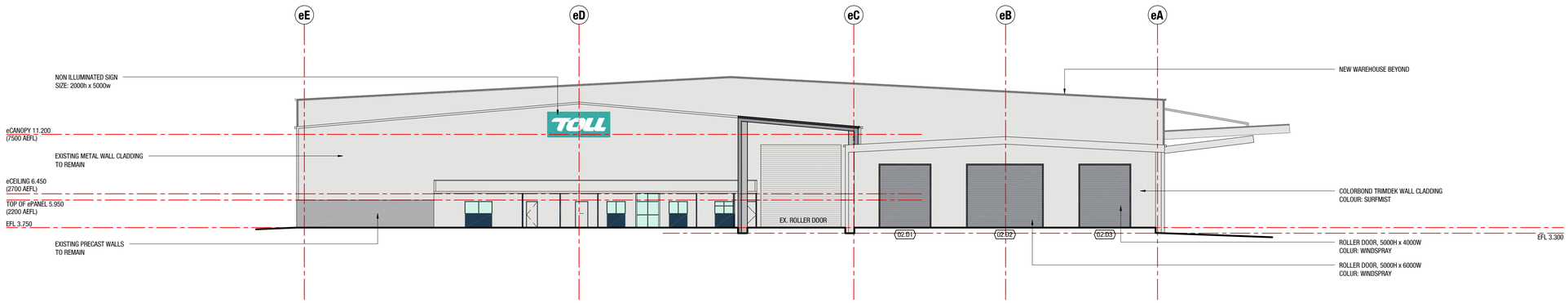
PROJECT No: **15.196** DWG No: **A260** REV No: **D**



SOUTH ELEVATION
SCALE 1:200



SOUTH ELEVATION - CONTINUED
SCALE 1:200



WEST ELEVATION
SCALE 1:200

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
04	DRAWING TITLE REVISED	28-09-16	D
04	TOWN PLANNING	29-04-16	C
03	CLIENT REVIEW	27-04-16	B
02	ISSUE TO SUB-CONSULTANT	18-04-16	A
01	REVIEW	03-02-16	-

DRAWING REFERENCE NOTES:
1. -

STATUS:
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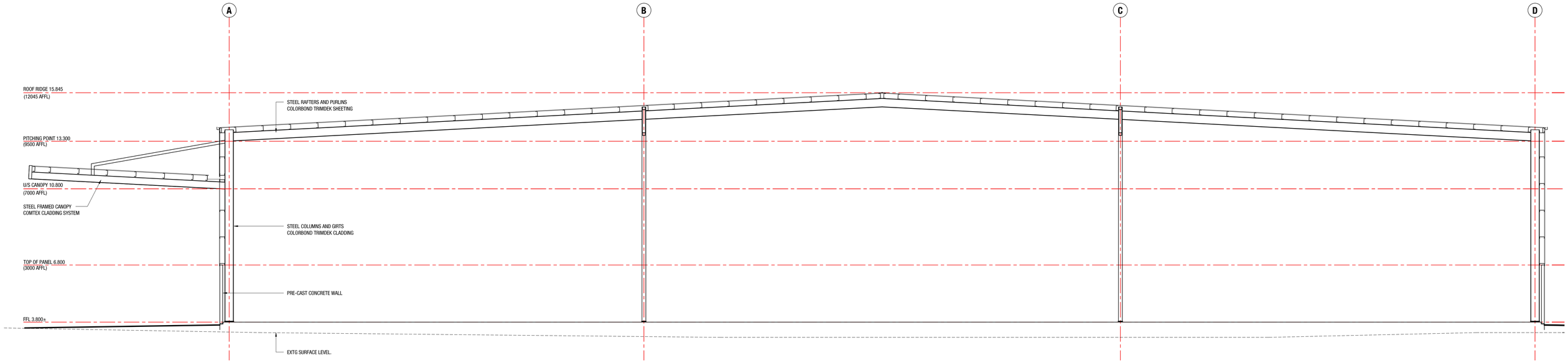
AJL CONSULTING ENGINEERS
CIVIL // STRUCTURAL // HYDRAULIC // MANAGEMENT

DESIGNED BY:	AGS
DESIGN CHECK:	-
DRAWN BY:	KAH
DRAFT CHECK:	DFB
APPROVED BY:	AJL

CLIENT: **TOLL GROUP**
PROJECT: **TRANSPORT HUB REDEVELOPMENT**
ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

DRAWING: **WAREHOUSE A - STAGE 10 ELEVATIONS - 2 OF 2**
SCALE (AT A1 DRAWING SIZE): **1:200**
PROJECT No: **15.196** DWG No: **A261** REV No: **D**



A / A231 **TYPICAL SECTION**
SCALE 1:100

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
03	DRAWING TITLE REVISED	28-09-16	D
03	TOWN PLANNING	29-04-16	C
02	CLIENT REVIEW	27-04-16	B
01	REVIEW	03-02-16	-

DRAWING REFERENCE NOTES:
1. -

STATUS:
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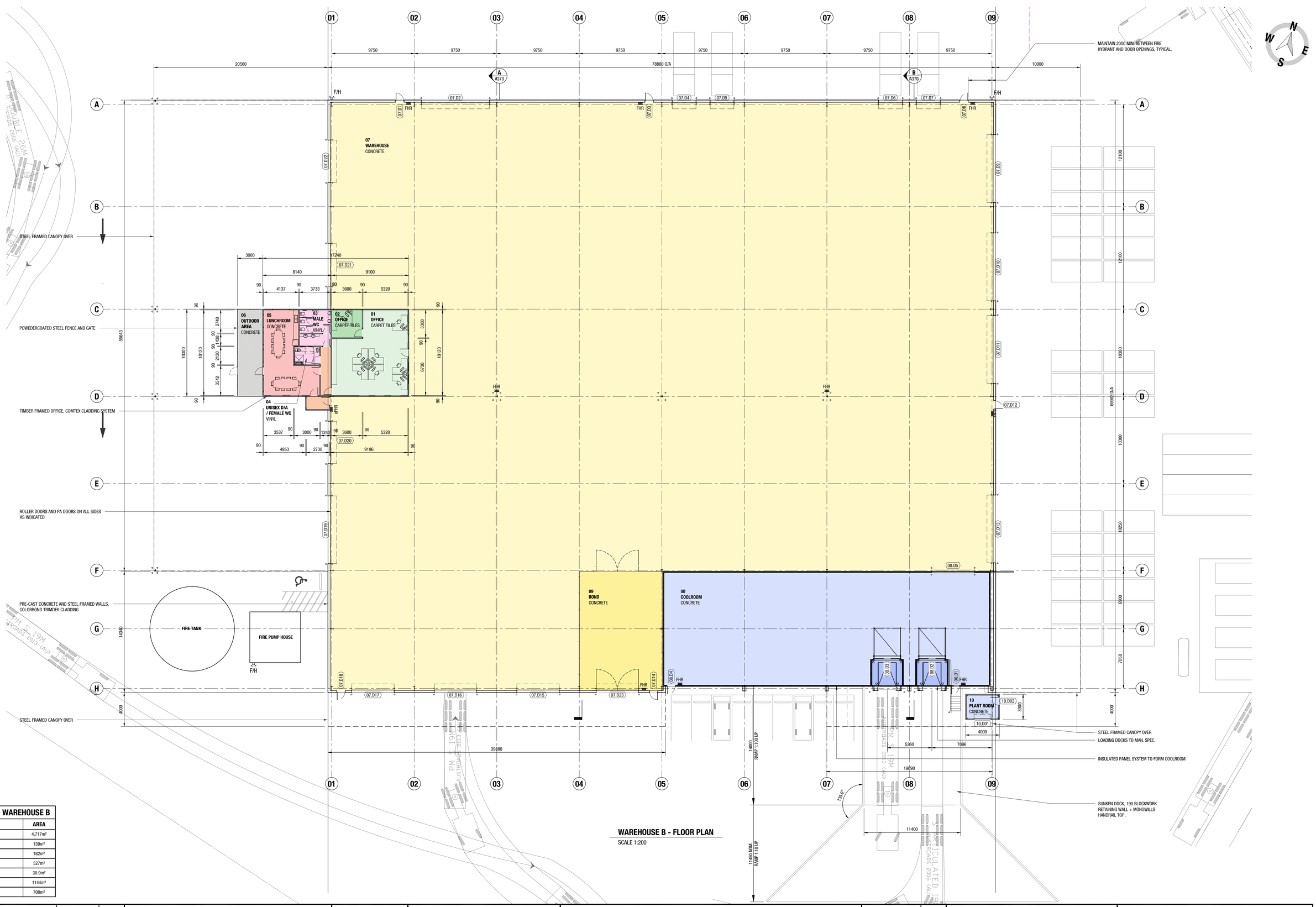
P 0418 642 550

AJL CONSULTING ENGINEERS
CIVIL // STRUCTURAL // HYDRAULIC // MANAGEMENT

DESIGNED BY:	AGS
DESIGN CHECK:	-
DRAWN BY:	KAH
DRAFT CHECK:	DFB
APPROVED BY:	AJL

CLIENT: **TOLL GROUP**
PROJECT: **TRANSPORT HUB REDEVELOPMENT**
ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

DRAWING: **WAREHOUSE A - STAGE 10 TYPICAL SECTION**
SCALE (AT A1 DRAWING SIZE): **1:100**
PROJECT No: **15.196** DWG No: **A270** REV No: **D**



AREA SCHEDULE - WAREHOUSE B

LOCATION	AREA
WAREHOUSE	4,717m²
BOND STORE	139m²
OFFICE	182m²
COOLROOM	527m²
OUTDOOR AREA	30.9m²
WESTERN CANOPY	1144m²
EASTERN CANOPY	700m²

WAREHOUSE B - FLOOR PLAN

SCALE 1:200

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
05	PLANT ROOM ADDED	09-06-16	D
04	TOWN PLANNING	29-04-16	C
03	CLIENT REVIEW	27-04-16	B
02	ISSUE TO SUB-CONSULTANT	18-04-16	A
01	REVIEW	03-02-16	-

DRAWING REFERENCE NOTES:
1. -

STATUS:
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AJL CONSULTING ENGINEERS
CIVIL // STRUCTURAL // HYDRAULIC // MANAGEMENT

DESIGNED BY:	AGS
DESIGN CHECK:	-
DRAWN BY:	KAH
DRAFT CHECK:	DFB
APPROVED BY:	AJL

CLIENT: **TOLL GROUP**

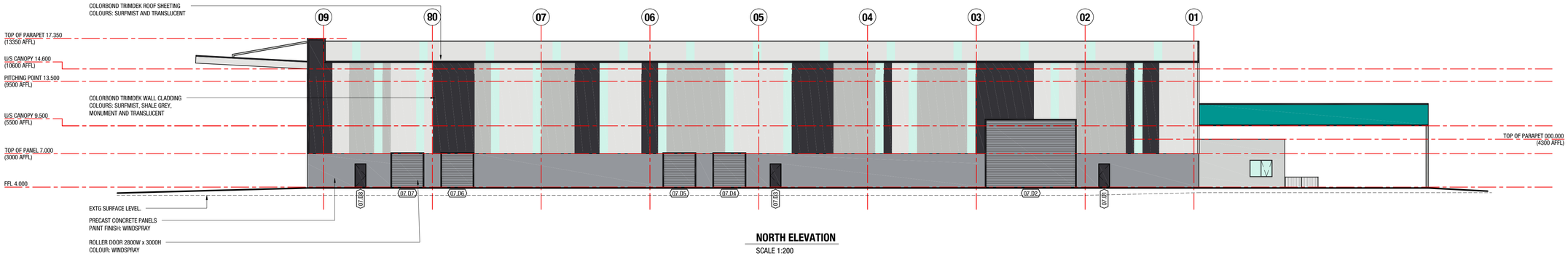
PROJECT: **TRANSPORT HUB REDEVELOPMENT**

ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

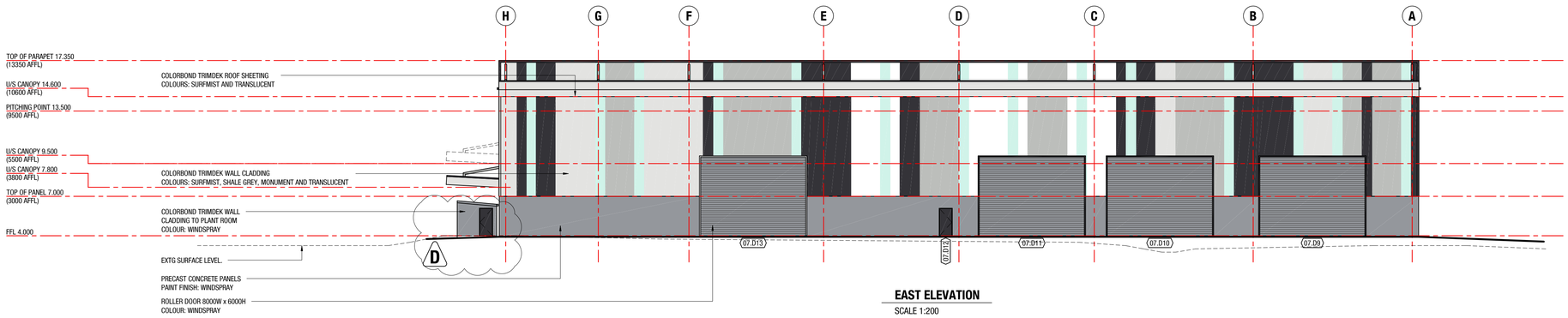
DRAWING: **WAREHOUSE B FLOOR PLAN**

SCALE (AT A1 DRAWING SIZE): **1:200**

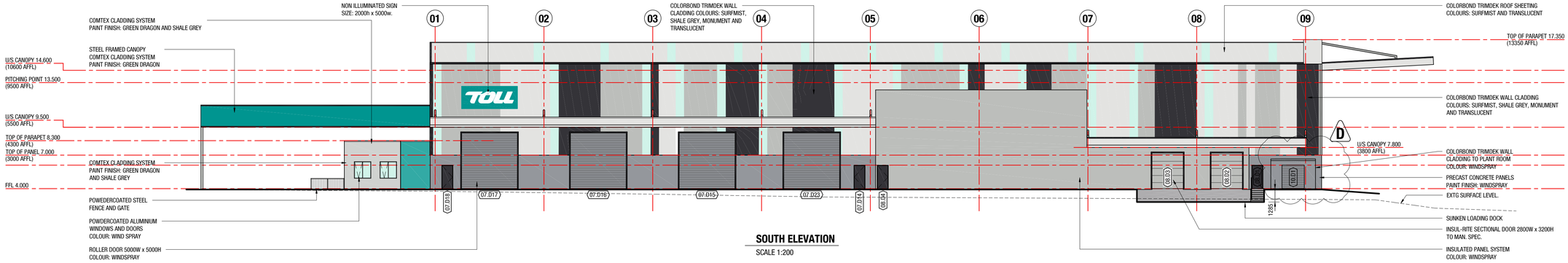
PROJECT No: **15.196** DWG No: **A330** REV No: **D**



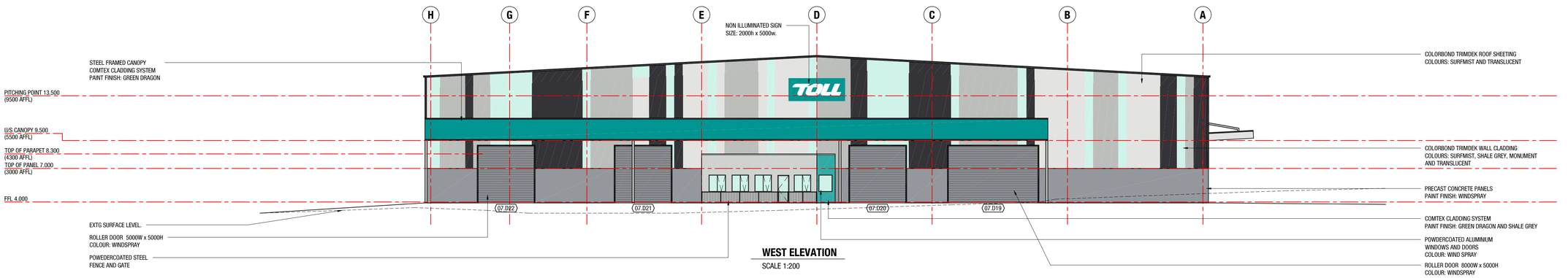
NORTH ELEVATION
SCALE 1:200



EAST ELEVATION
SCALE 1:200



SOUTH ELEVATION
SCALE 1:200



WEST ELEVATION
SCALE 1:200

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
05	PLANT ROOM ADDED	09-06-16	D
04	TOWN PLANNING	29-04-16	C
03	CLIENT REVIEW	27-04-16	B
02	ISSUE TO SUB-CONSULTANT	18-04-16	A
01	REVIEW	03-02-16	-

DRAWING REFERENCE NOTES:
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STATUS:
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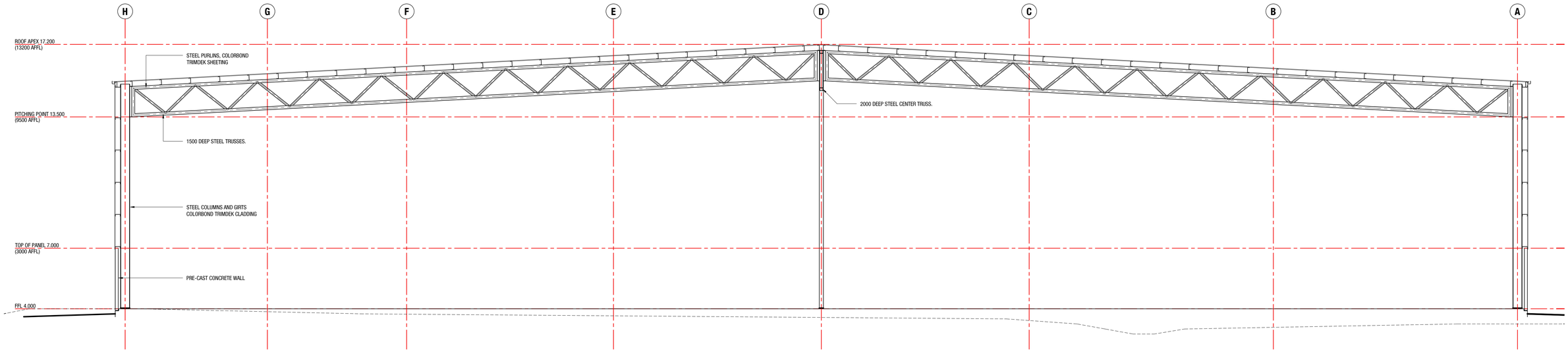
AJL CONSULTING ENGINEERS
CIVIL // STRUCTURAL // HYDRAULIC // MANAGEMENT

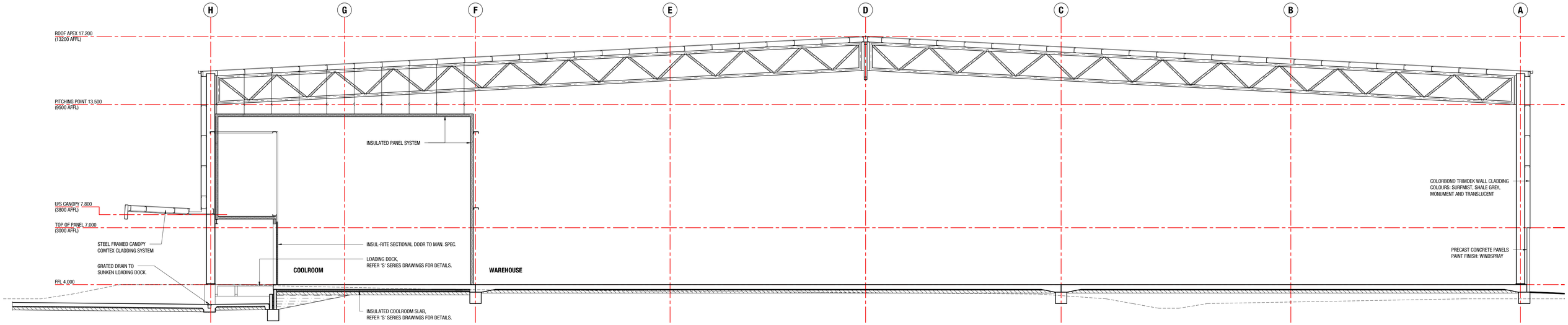
DESIGNED BY:	AGS
DESIGN CHECK:	-
DRAWN BY:	KAH
DRAFT CHECK:	DFB
APPROVED BY:	AJL

CLIENT: **TOLL GROUP**
PROJECT: **TRANSPORT HUB REDEVELOPMENT**
ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

DRAWING: **WAREHOUSE B ELEVATIONS**
SCALE (AT A1 DRAWING SIZE): **1:200**
PROJECT No: **15.196** DWG No: **A360** REV No: **D**



A A330 **TYPICAL SECTION**
SCALE 1:100



B A330 **TYPICAL SECTION**
SCALE 1:100

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
03	TOWN PLANNING	29-04-16	B
02	CLIENT REVIEW	27-04-16	A
01	REVIEW	03-02-16	-

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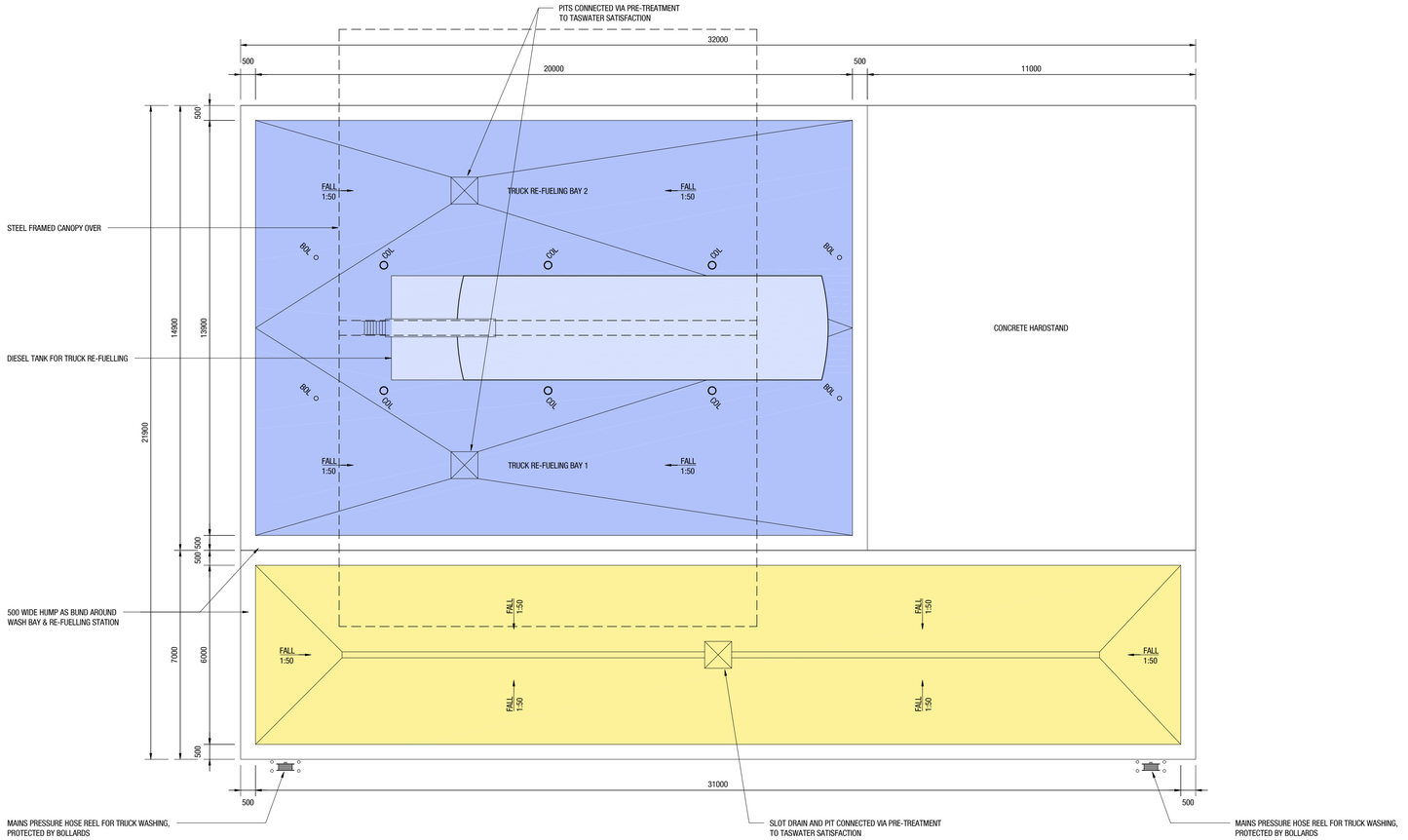
AJL CONSULTING ENGINEERS
CIVIL // STRUCTURAL // HYDRAULIC // MANAGEMENT

DESIGNED BY:	AGS
DESIGN CHECK:	-
DRAWN BY:	KAH
DRAFT CHECK:	DFB
APPROVED BY:	AJL

CLIENT: **TOLL GROUP**
PROJECT: **TRANSPORT HUB REDEVELOPMENT**
ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

DRAWING: **WAREHOUSE B TYPICAL SECTION**
SCALE (AT A1 DRAWING SIZE): **1:100**
PROJECT No: **15.196** DWG No: **A370** REV No: **B**



TRUCKWASH & RE-FUELING FACILITY - FLOOR PLAN

SCALE 1:100

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
06	NOTATION ADDED	07-12-16	E
05	REDESIGN	17-10-16	D
04	REFUELLING SLAB REVISED	20-06-16	C
03	TOWN PLANNING	29-04-16	B
02	CLIENT REVIEW	27-04-16	A
01	REVIEW	03-02-16	-

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CIVIL // STRUCTURAL // HYDRAULIC // MANAGEMENT

DESIGNED BY:	AGS
DESIGN CHECK:	-
DRAWN BY:	AGS
DRAFT CHECK:	-
APPROVED BY:	AJL

CLIENT: **TOLL GROUP**

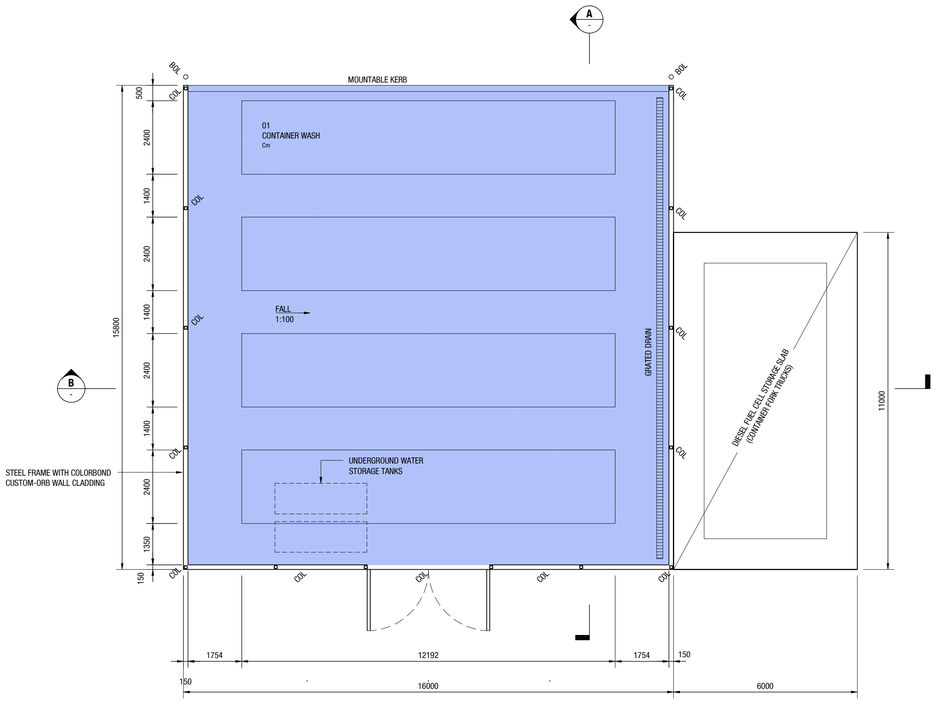
PROJECT: **TRANSPORT HUB REDEVELOPMENT**

ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

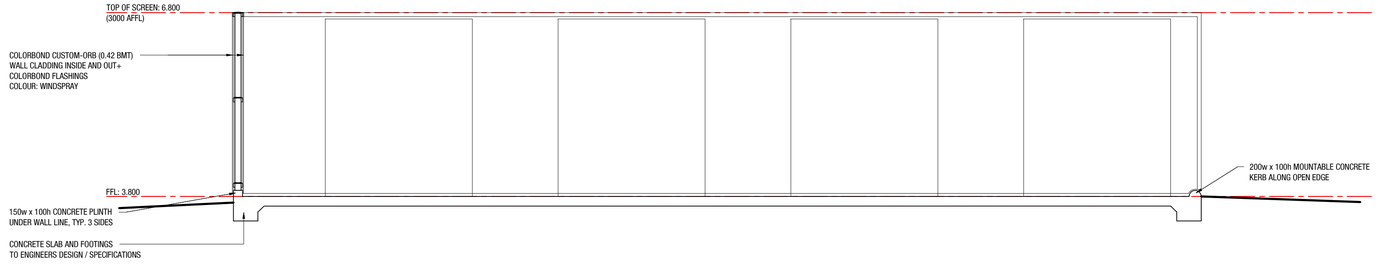
DRAWING: **TRUCK WASH & RE-FUELING STATION FLOOR PLAN**

SCALE (AT A1 DRAWING SIZE): **1:100**

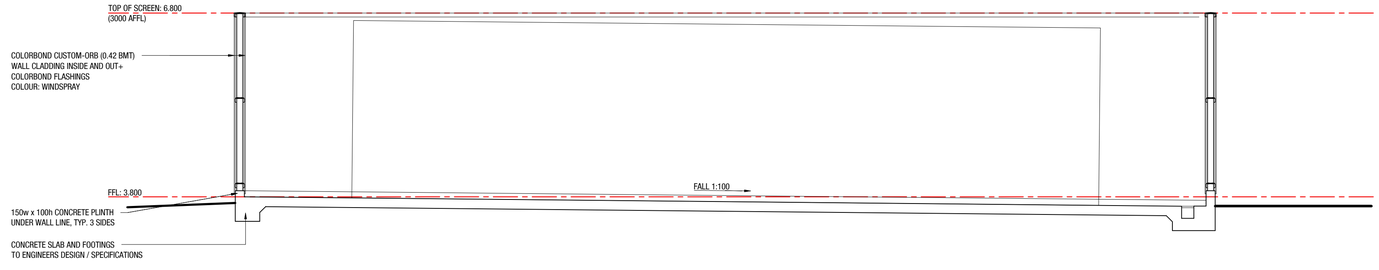
PROJECT No: **15.196** DWG No: **A430** REV No: **E**



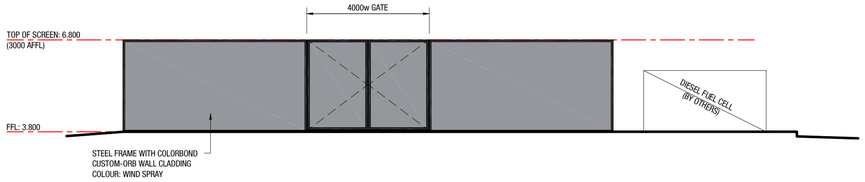
FLOOR PLAN
SCALE 1:100



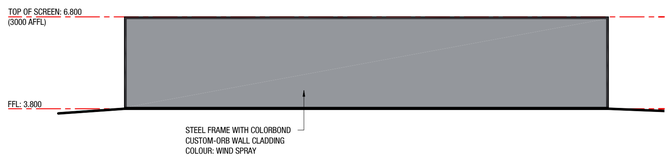
A SECTION
SCALE 1:50



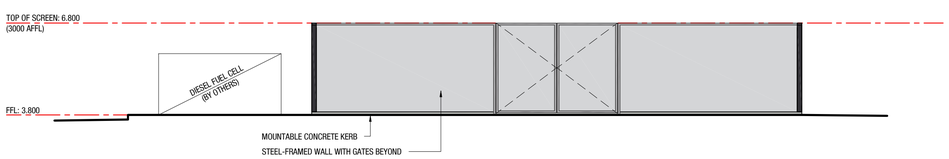
B SECTION
SCALE 1:50



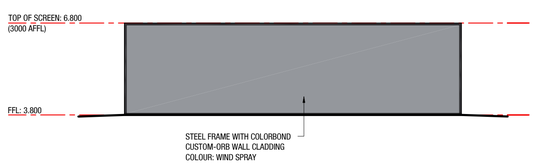
SOUTH ELEVATION
SCALE 1:100



EAST ELEVATION
SCALE 1:100



NORTH ELEVATION
SCALE 1:100



WEST ELEVATION
SCALE 1:100

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
04	TOWN PLANNING	29-04-16	C
03	CLIENT REVIEW	27-04-16	B
02	CLIENT REVIEW	03-02-16	A
01	REVIEW	03-02-16	-

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AJL CONSULTING ENGINEERS
CIVIL // STRUCTURAL // HYDRAULIC // MANAGEMENT

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DESIGN CHECK:	-
DRAWN BY:	KAH
DRAFT CHECK:	DFB
APPROVED BY:	AJL

CLIENT: **TOLL GROUP**

PROJECT: **TRANSPORT HUB REDEVELOPMENT**

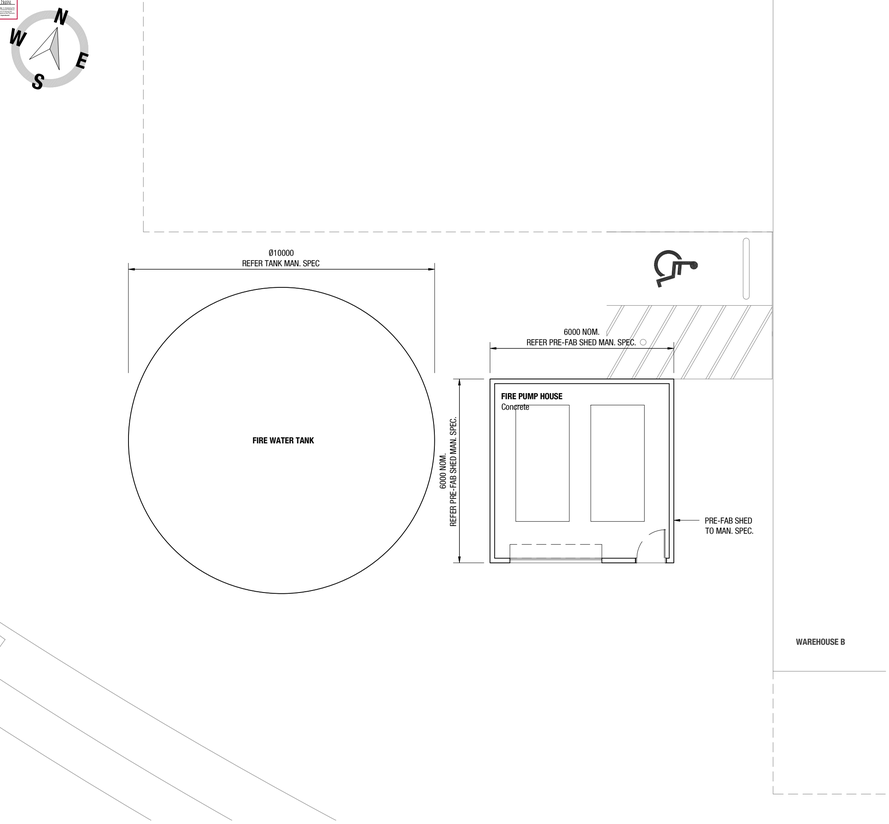
ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

DRAWING: **CONTAINER WASH FLOOR PLAN, ELEVATIONS & SECTION**

SCALE (AT A1 DRAWING SIZE): **1:100, 1:50**

PROJECT No: **15.196** DWG No: **A530** REV No: **C**

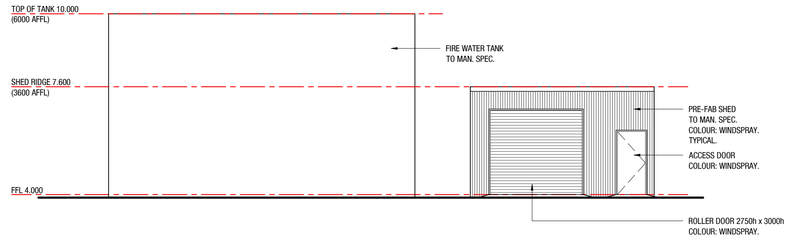
Document Set ID: 3583573
Version: 2, Version Date: 31/07/2017



FIRE PUMP HOUSE B PLAN (FIRE PUMP HOUSE A SIMILAR)

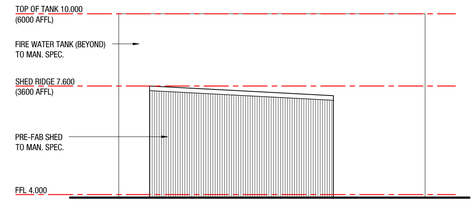
SCALE 1:100

NOTE:
1. FINAL LAYOUT OF FIRE PUMP HOUSE TO BE CO-ORDINATED WITH FIRE ENGINEER.
2. FIRE ENGINEER TO CONFIRM LOCATIONS OF SERVICES PENETRATIONS THROUGH BUILDING



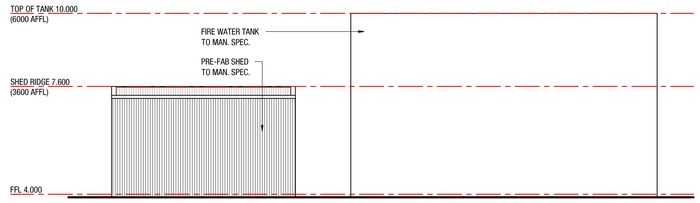
SOUTH ELEVATION

SCALE 1:100



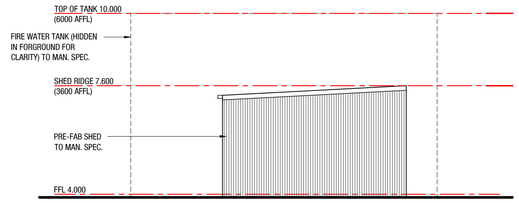
EAST ELEVATION

SCALE 1:100



NORTH ELEVATION

SCALE 1:100



WEST ELEVATION

SCALE 1:100

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
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01	CLIENT REVIEW	27-04-16	-

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AJL CONSULTING ENGINEERS
CIVIL // STRUCTURAL // HYDRAULIC // MANAGEMENT

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DESIGN CHECK:	-
DRAWN BY:	**KAH**
DRAFT CHECK:	-
APPROVED BY:	**AJL**

CLIENT: **TOLL GROUP**

PROJECT: **TRANSPORT HUB REDEVELOPMENT**

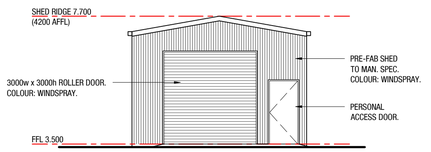
ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

DRAWING: **FIRE PUMP HOUSE FLOOR PLAN AND ELEVATIONS**

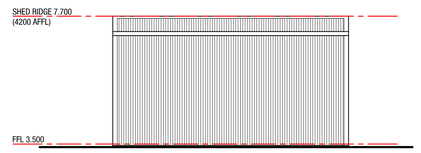
SCALE (AT A1 DRAWING SIZE): **1:100**

PROJECT No: **15.196** DWG No: **A630** REV No: **-**

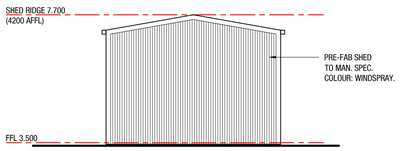
CUSTOMER PICK-UP WAREHOUSE
SCALE 1:100



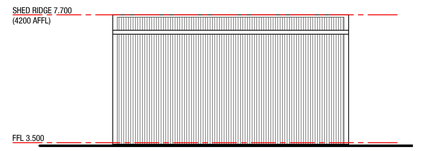
SOUTH ELEVATION
SCALE 1:100



EAST ELEVATION
SCALE 1:100



NORTH ELEVATION
SCALE 1:100



WEST ELEVATION
SCALE 1:100

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
02	TOWN PLANNING	29-04-16	-
01	CLIENT REVIEW	27-04-16	-

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DESIGNED BY:	AGS
DESIGN CHECK:	-
DRAWN BY:	KAH
DRAFT CHECK:	-
APPROVED BY:	AJL

CLIENT: **TOLL GROUP**

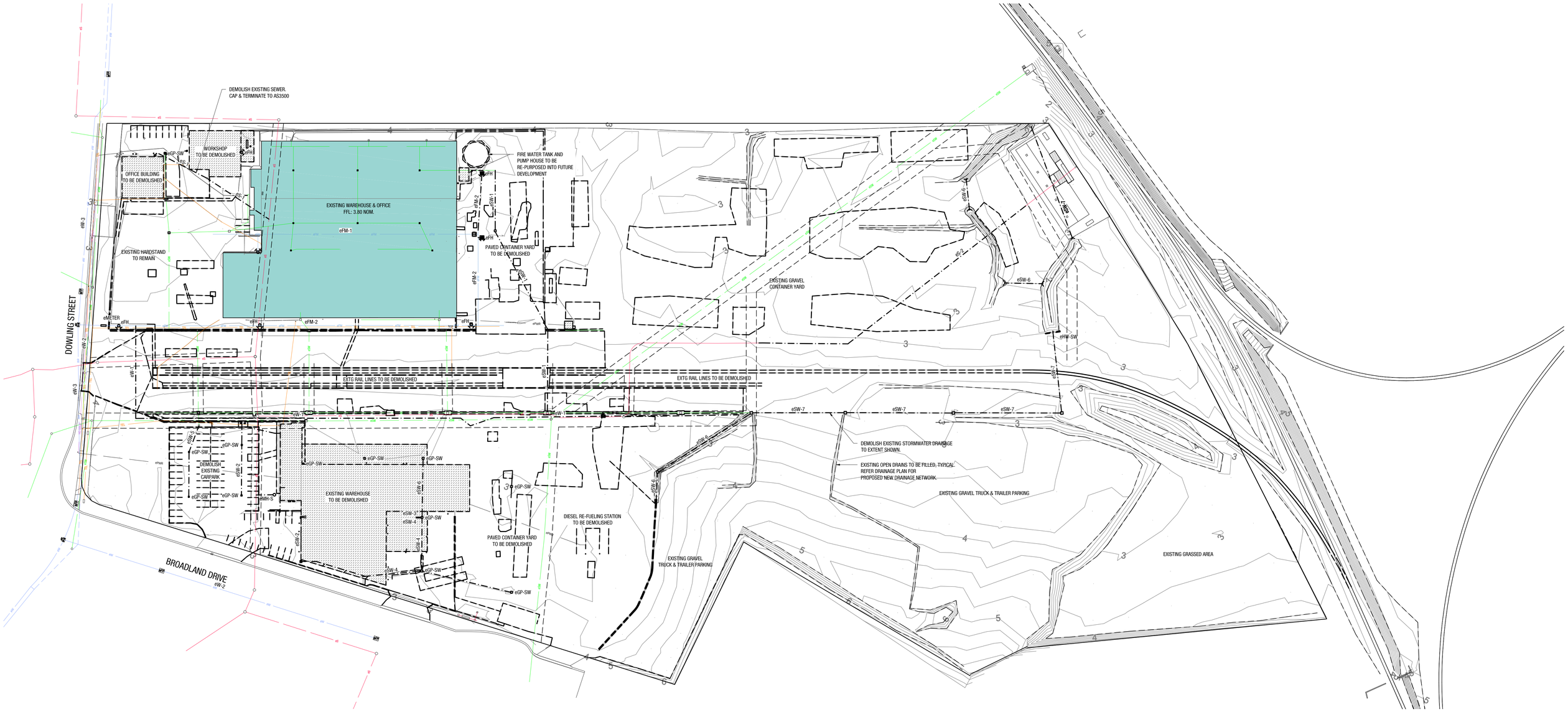
PROJECT: **TRANSPORT HUB REDEVELOPMENT**

ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

DRAWING: **CUSTOMER PICK-UP WAREHOUSE FLOOR PLAN AND ELEVATIONS**

SCALE (AT A1 DRAWING SIZE): **1:100**

PROJECT No: **15.196** DWG No: **A730** REV No: **-**



EXISTING SURVEY / DEMOLITION PLAN

SCALE 1:750

DEMOLITION NOTES

1. PRIOR TO COMMENCING DEMOLITION AND SITE WORKS, THE CONTRACTOR IS TO ARRANGE AND PAY FOR THE ON SITE MARKING AND CONFIRMATION OF DEPTH, OF SERVICE LOCATIONS FOR ALL UNDERGROUND SERVICES INCLUDING TELSTRA, AURORA, POWERCO AND COUNCIL SERVICES (ie: WATER, STORMWATER AND SEWER) IN THE AREA OF NEW WORKS. LOCATION TO BE CONFIRMED USING CABLE LOCATORS AND HAND DIGGING METHODS. PRIOR TO ANY WORKS ON SITE, ANY CLASHES WITH DESIGNED SERVICES ON FOLLOWING DRAWINGS ARE TO BE REPORTED TO DESIGN ENGINEER FOR DIRECTION.
2. REFER ARCHITECTURAL DRAWINGS FOR SET OUT DIMENSIONS & COORDINATE ALL LEVELS
3. REFER ARCHITECTURAL DRAWINGS FOR DEMOLITION PLAN
4. CAP & TERMINATE & REMOVE REDUNDANT DISUSED DRAINAGE SERVICES TO SATISFACTION OF ENGINEER & LOCAL AUTHORITIES
5. INSTALL SILT FENCES & TRAPS TO PREVENT SEDIMENTS & POLLUTANTS ENTERING STORM WATER SYSTEM OR NATURAL DRAINAGE LINES
6. STOCK PILING OF SOILS OR MATERIALS AFFECTED BY WATER TO BE STORED CLEAR OF ANY DRAINAGE PATH
7. CLEAN SITE VEHICLES BEFORE EXITING SITE
8. DISPOSE OF EXCAVATED MATERIAL TO LICENSED WASTE FACILITY OR APPROVED LAND FILL SITE
9. TRENCHES WHERE SERVICES ARE REMOVED ARE TO BE FILLED WITH AN APPROVED COMPACTED MATERIAL & TO ENGINEERS COMPACTION SPECIFICATIONS. MATCH & MAKE GOOD EXISTING SURFACES TO MATCH EXISTING SURROUNDINGS.

LEGEND

- DENOTES EXISTING STORM WATER MAIN (CONFIRM EXACT LOCATION)
- DENOTES EXISTING SEWER MAIN (CONFIRM EXACT LOCATION)
- DENOTES EXISTING WATER MAIN (CONFIRM EXACT LOCATION)
- DENOTES EXISTING TELSTRA LINE (CONFIRM EXACT LOCATION)
- DENOTES EXISTING SURFACE/STRUCTURE TO BE DEMOLISHED
- DENOTES EXISTING SERVICE LINE TO BE DEMOLISHED

EXISTING STORMWATER PIPE SCHEDULE

MARK	PIPE SIZE	TYPE	CLASS
eSW-1	T.B.C	T.B.C	T.B.C
eSW-2	100	T.B.C	T.B.C
eSW-3	150	T.B.C	T.B.C
eSW-4	225	T.B.C	T.B.C
eSW-5	250	T.B.C	T.B.C
eSW-6	300	T.B.C	T.B.C
eSW-7	600	T.B.C	T.B.C
eSW-8	750	T.B.C	T.B.C
eSW-9	1250	T.B.C	T.B.C
eSW-10	1800	T.B.C	T.B.C

EXISTING SEWER PIPE SCHEDULE

MARK	PIPE SIZE	TYPE	CLASS
eS-1	T.B.C	T.B.C	T.B.C
eS-2	100	PVC-U	T.B.C
eS-3	150	R.C.P	T.B.C
eS-4	300	T.B.C	T.B.C

EXISTING WATER MAIN SCHEDULE

MARK	PIPE SIZE	TYPE
eW-1	T.B.C.	T.B.C
eW-2	ABANDONED WATER LINE	
eW-3	150	CICL
eW-4	100	PVC-U
eFM-1	100	T.B.C
eFM-2	150	T.B.C

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
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DESIGN CHECK:	JTA
DRAWN BY:	PVD
DRAFT CHECK:	JTA
APPROVED BY:	AJL

CLIENT: **TOLL GROUP**

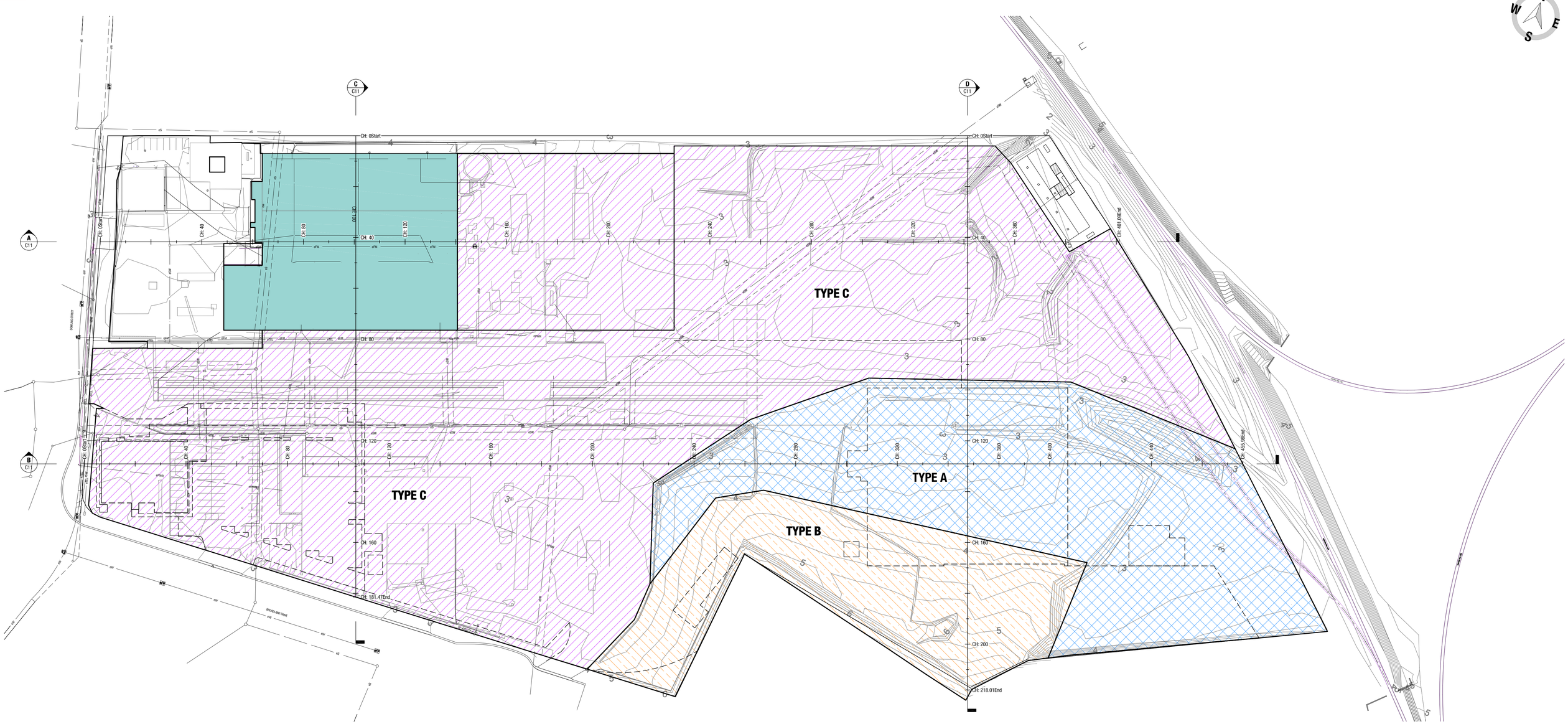
PROJECT: **TRANSPORT HUB REDEVELOPMENT**

ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

DRAWING: **EXISTING SURVEY / DEMOLITION PLAN**

SCALE (AT A1 DRAWING SIZE): **1:750**

PROJECT No: **15.196** DWG No: **C01** REV No: **-**



BULK EARTHWORKS PLAN

SCALE 1:750

BULK EARTHWORKS LEGEND

- TYPE A - NEW PAVEMENT & CONTROLLED FILL OVER UNDEVELOPED AREA
- TYPE B - NEW PAVEMENT IN CUT
- TYPE C - NEW PAVEMENT CUT AND/OR CONTROLLED FILLED OVER EXISTING PAVEMENT

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
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DESIGN CHECK:	JTA
DRAWN BY:	PVD
DRAFT CHECK:	JTA
APPROVED BY:	AJL

CLIENT: **TOLL GROUP**

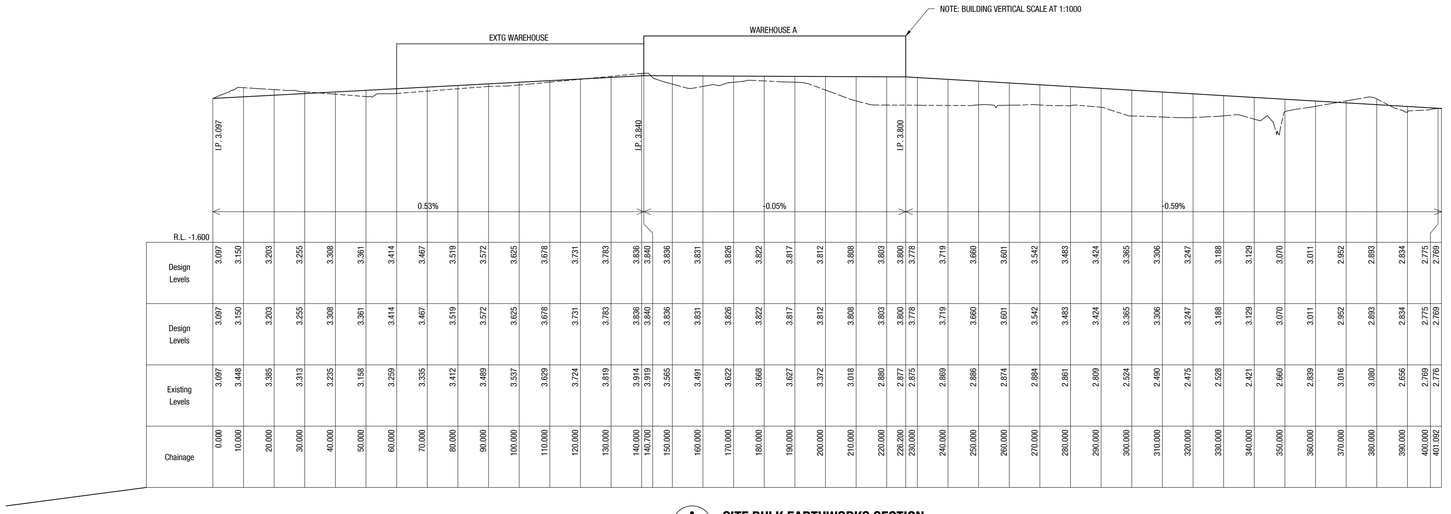
PROJECT: **TRANSPORT HUB REDEVELOPMENT**

ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

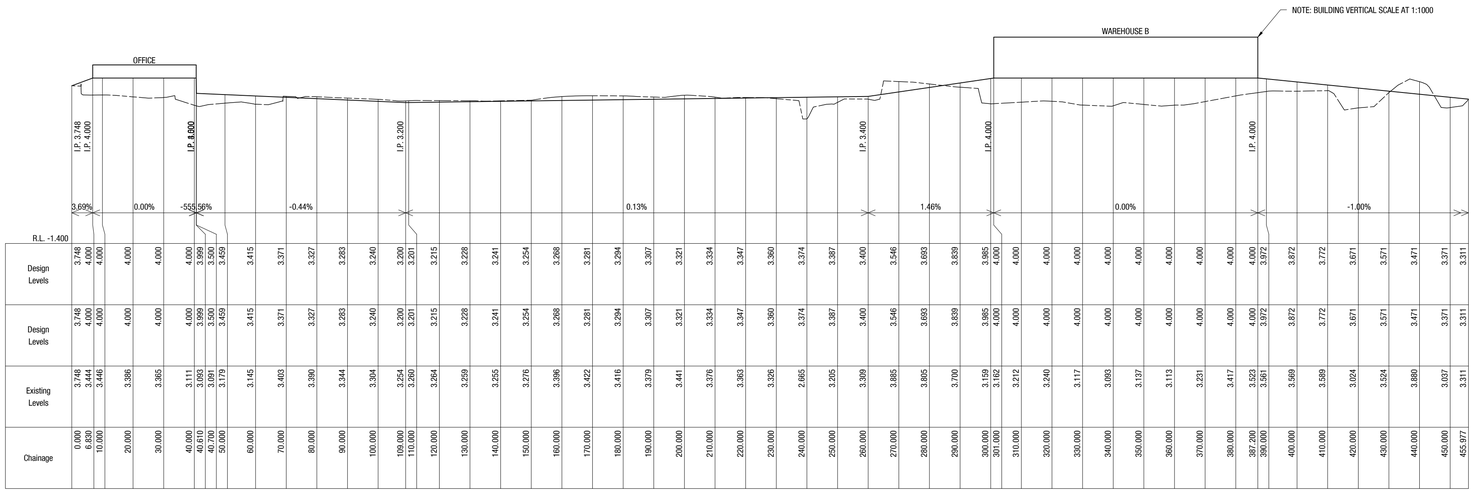
DRAWING: **BULK EARTHWORKS PLAN**

SCALE (AT A1 DRAWING SIZE): **1:750**

PROJECT No: **15.196** DWG No: **C10** REV No: **-**



A C10 **SITE BULK EARTHWORKS SECTION**
SCALE 1:100 VERT 1:1000 HOR



B C10 **SITE BULK EARTHWORKS SECTION**
SCALE 1:100 VERT 1:1000 HOR

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
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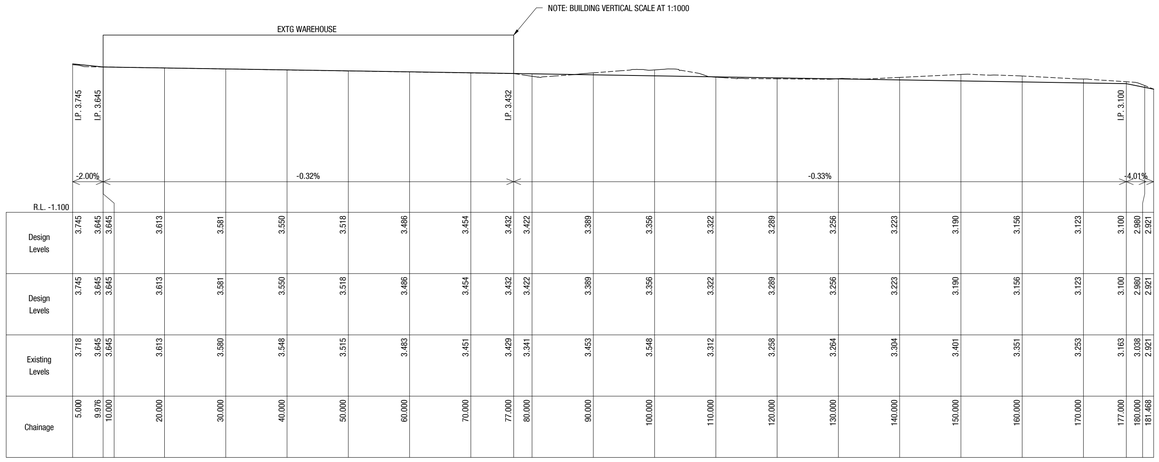
CLIENT: **TOLL GROUP**
PROJECT: **TRANSPORT HUB REDEVELOPMENT**
ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

DRAWING: **BULK EARTHWORKS SECTIONS**
SCALE (AT A1 DRAWING SIZE): **1:100 VERT 1:1000 HOR**
PROJECT No: **15.196** DWG No: **C11** REV No: **-**



C C10 **SITE BULK EARTHWORKS SECTION**
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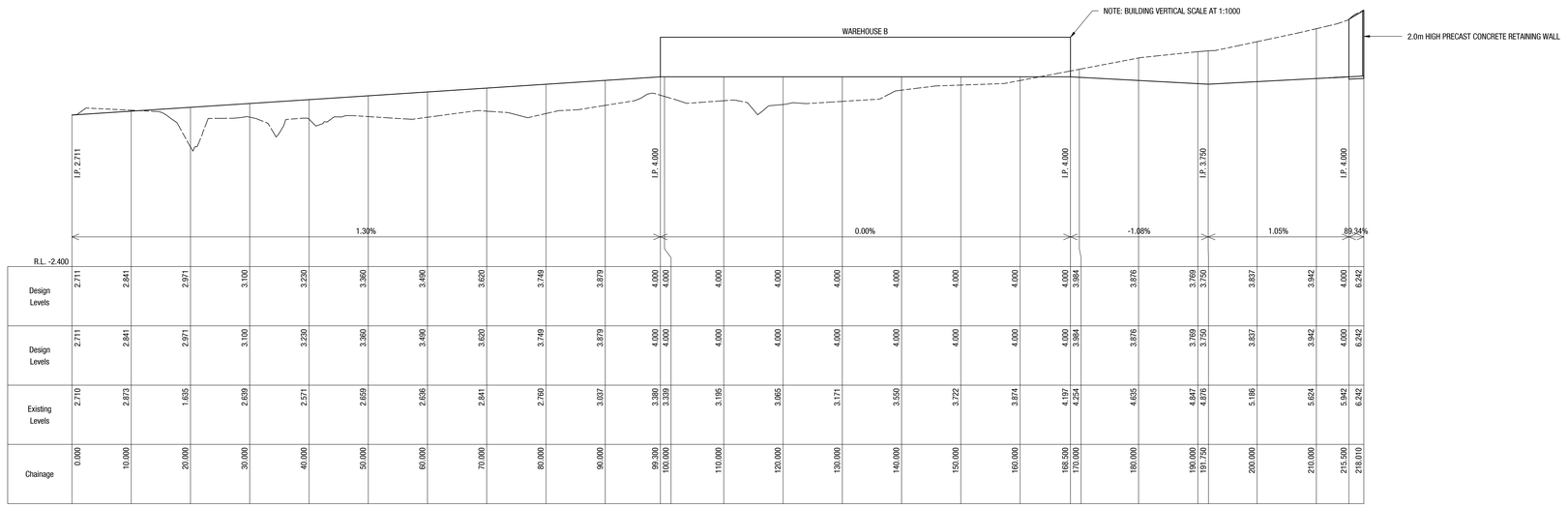

D C10 **SITE BULK EARTHWORKS SECTION**
SCALE 1:100 VERT 1:500 HOR

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
01	TOWN PLANNING	29-04-16	-

DRAWING REFERENCE NOTES:
1. -

STATUS:
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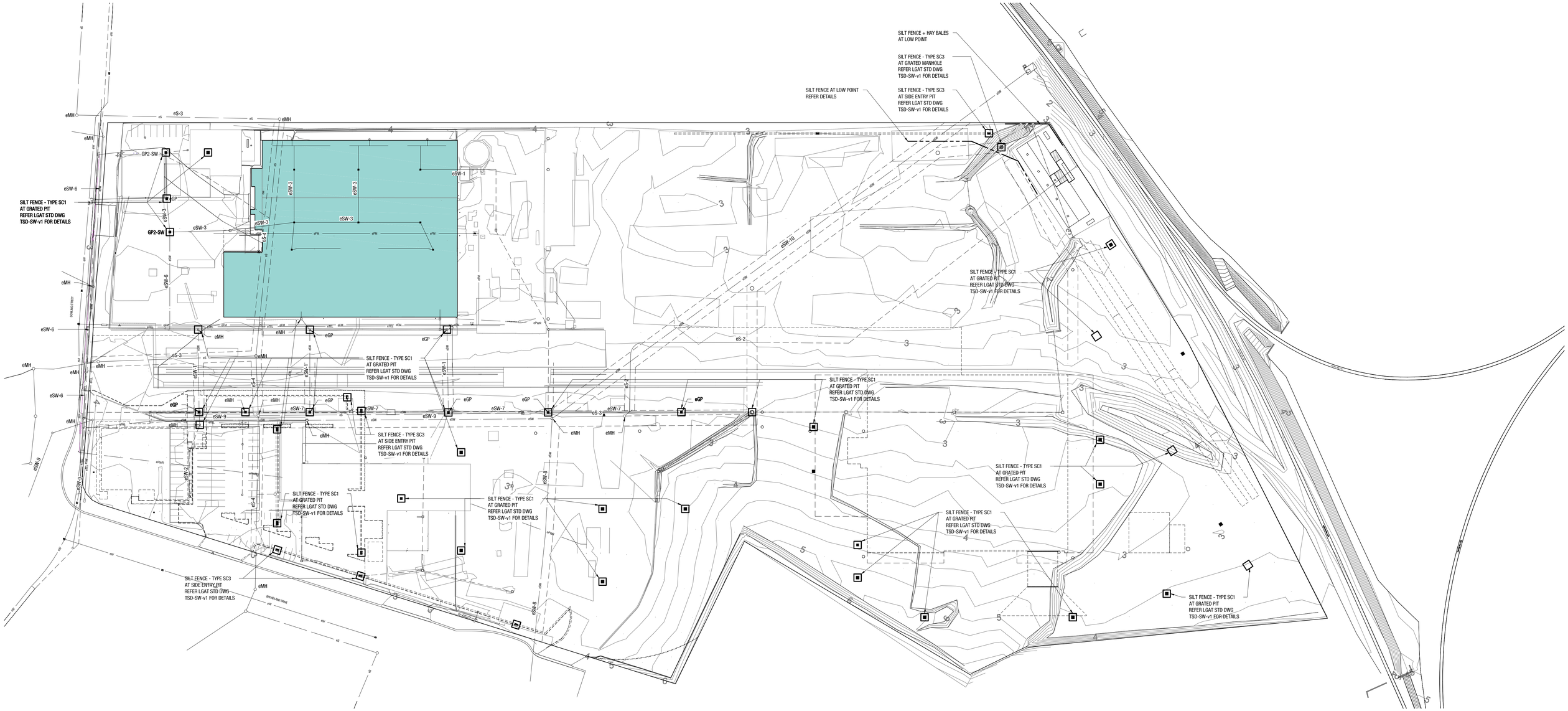
CLIENT: **TOLL GROUP**
PROJECT: **TRANSPORT HUB REDEVELOPMENT**
ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

DRAWING: **BULK EARTHWORKS SECTIONS**
SCALE (AT A1 DRAWING SIZE): **1:100 VERT 1:1000 HOR**
PROJECT No: **15.196** DWG No: **C12** REV No: **-**



EROSION CONTROL PLAN

SCALE 1:750

EROSION AND SEDIMENT CONTROL NOTES

1. ALL RUNOFF AND SEDIMENT CONTROL STRUCTURES TO BE INSPECTED EACH WORKING DAY MAINTAINED IN A FUNCTIONING CONDITION
2. ALL VEGETATION OUTSIDE OF THE BUILDING ENVELOPE TO BE RETAINED
3. REFER 'SOIL AND WATER' NOTES IN CIVIL NOTES FOR ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES
4. EROSION AND SEDIMENT CONTROL MEASURES TO BE PLACED IN ACCORDANCE WITH IPWEA STD DWG TSD-SW28-v1 & NRM GUIDELINES.

LEGEND

- eSW — DENOTES EXISTING STORM WATER MAIN (CONFIRM EXACT LOCATION)
- eS — DENOTES EXISTING SEWER MAIN (CONFIRM EXACT LOCATION)
- eW — DENOTES EXISTING WATER MAIN (CONFIRM EXACT LOCATION)
- eFM — DENOTES EXISTING FIRE MAIN (CONFIRM EXACT LOCATION)
- DENOTES EXISTING SERVICE LINE TO BE DEMOLISHED

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
01	TOWN PLANNING	29-04-16	-

DRAWING REFERENCE NOTES:
1. -

STATUS:
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CLIENT: **TOLL GROUP**
PROJECT: **TRANSPORT HUB REDEVELOPMENT**
ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

DRAWING: **EROSION CONTROL PLAN**
SCALE (AT A1 DRAWING SIZE): **1:750**
PROJECT No: **15.196** DWG No: **C15** REV No: **-**

AJL Consulting Engineers Pty Ltd

Toll Group, Dowling St, Launceston
Transport hub redevelopment
environmental noise assessment

Report No. 421424-01

Vipac Engineers & Scientists Ltd
PO Box 506
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DOCUMENT CONTROL

AJL CONSULTING ENGINEERS
TOLL GROUP, DOWLING ST, LAUNCESTON
TRANSPORT HUB REDEVELOPMENT
ENVIRONMENTAL NOISE ASSESSMENT

Report No.
421424-01
Library Code
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Approved by		Date:

Revision History

Revision No.	Date Issued	Reason/Comments
2	06/06/2016	Warehouse B refrigeration

Distribution

Copy No._____	Revision No.	Location
1	2	Project/Client File
2	2	Client
3	2	Vipac Library

Keywords environmental noise, emissions, noise management

Table of Contents

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References

[1] SoundPLAN Acoustic modelling software - Braunstein & Berndt GmbH.

Executive Summary

Vipac was commissioned by AJL Consulting Engineers on behalf of Toll Group to conduct an environmental noise assessment of a proposed redevelopment at Toll Group's Dowling St, Launceston transport hub.

Monitoring of ambient noise levels was conducted both on-site at the Dowling St site and in a nearby residential area. From analysis of the measured data nominated the following project specific noise assessment criteria developed with values apply at the boundary of any noise sensitive receptor location:-

- Day (0600 – 2000 hrs) 50 dBA.
- Night (2000 – 0600 hrs hrs) 40 dBA.

An environmental noise model of potential operations was developed and predicted results indicate the noise emissions levels are likely to at or below the assessment criteria at critical receiver locations. Some sources have the potential to elevate noise levels when operating and control the noise environment at certain locations. Additionally, some of these sources exhibit potentially intrusive noise characteristics. Given this noise controls for the site are provided in sub-section 6.1 (p. 25).

1 Introduction

Vipac was commissioned by AJL Consulting Engineers on behalf of Toll Group to conduct an environmental noise assessment of a proposed redevelopment at Toll Group's Dowling St, Launceston transport hub. The assessment is a requirement under the Launceston City Council Interim Planning Scheme 2015, the relevant section from the planning scheme is provided below:-

---

Part D Zones, 23.0 Commercial, 23.3 Use standards, 23.3.2 Emissions impacting sensitive uses

This standard applies to the use classes specified in Table 23.3.

Objective:	
To ensure that emissions to air, land and water are not detrimental to the amenity of sensitive uses.	
Acceptable Solutions	**Performance Criteria**
A1 Uses must be set back from the site of a sensitive use a distance of no less than 100m.	P1 The use must not adversely impact on the amenity of nearby sensitive uses, having regard to: **(a)** the nature of the proposed use; **(b)** the characteristics of the emissions; **(c)** the proximity and number of sensitive uses in the area; **(d)** the topography of the site; **(e)** background levels; **(f)** any mitigation measures proposed; and **(g)** the character of the surrounding area.

Vipac proposed the following approach to address the above:-

- Environmental noise measurements both on site and in the surrounding area to determine typical ambient noise conditions.
- Measurements of noise generating activities on site for the develop of source sound power (SWL) data
- Development of SWL data for new activities not currently conducted on site.
- Environmental noise modelling with prediction of noise emission levels to an appropriate standard.
- Assessment of predicted noise levels against ambient noise conditions and appropriate standards to meet planning scheme requirements.

2 Site description

The Toll Group Dowling St site is located on the corner of Dowling St and Broadland Dr. The proposed redevelopment of the site involves, but is not limited to the following:-

- Medium duty hardstand pavement.
- Heavy duty hardstand pavement.
- 5,950m² Warehouse extension.
- 5,600m² New warehouse.
- Car park.
- 970m² New office.
- Truck wash.
- Hazardous goods station.
- Rail alignment.
- Container wash.

Figure 1 provides a plan view of the site with both the current and proposed site layouts.

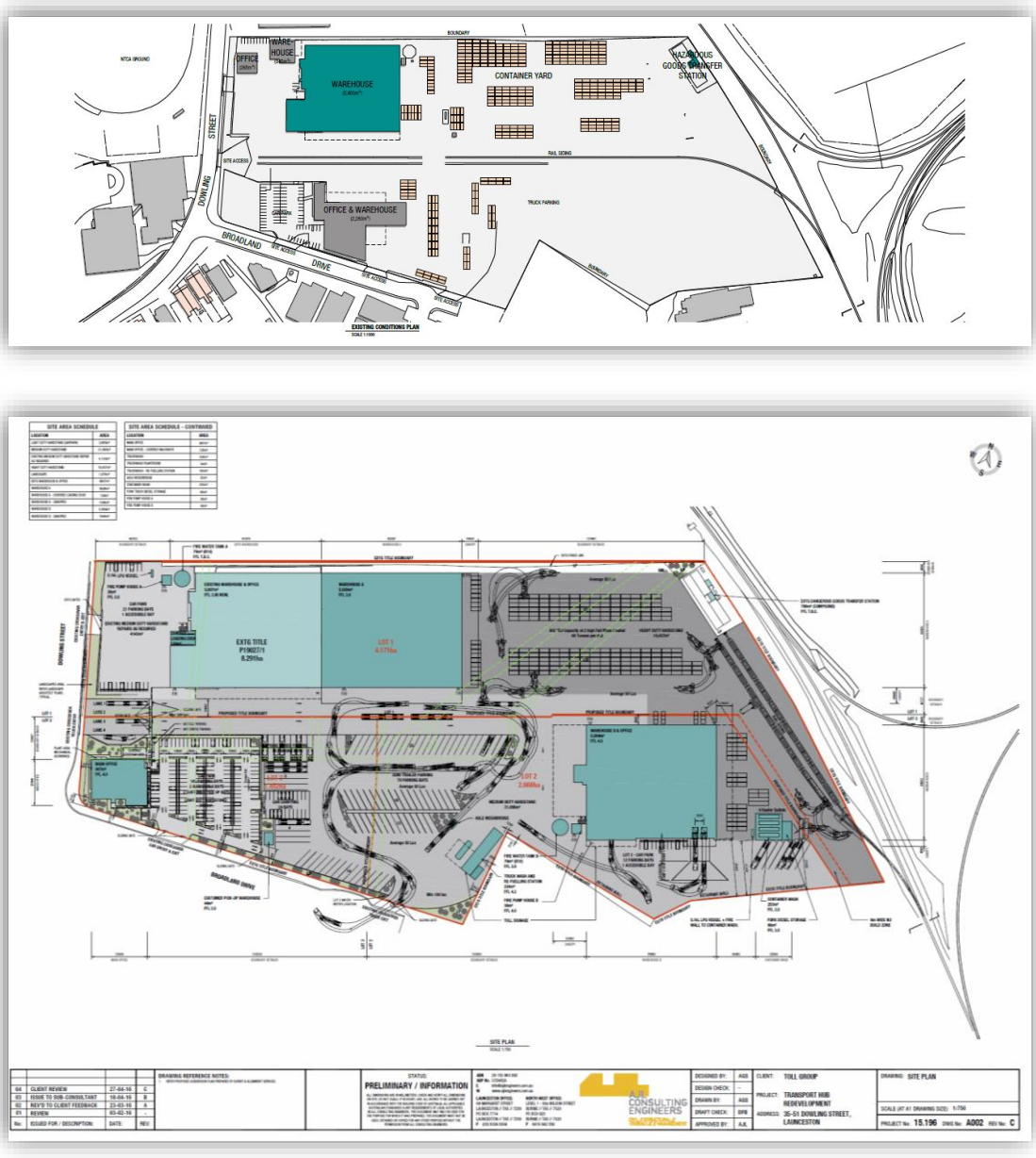


Figure 1 – Existing and proposed site plan (supplied by AJL Consulting Engineers).

The site is bounded by other light industrial / commercial premises and sports grounds to the to the south, north and west and by rail to the east. Noise sensitive premises are located to the south east and west.

Eleven environmental noise receiver locations were selected for the purposes of measurement and prediction. Location information is provided in Table 1 and figure 2 provides an aerial view with the locations marked. The SLM position was selected for the purposes of logging on-site environmental noise levels. Position 1 was used for both observed ambient noise measurements and prediction while the remaining locations were used for prediction only.

Environmental noise positions			
Position number	Location	Coordinates (MGA, Zone 55 G)	Comments
SLM	Southern boundary (near current truck parking)	513066 / 5415458	Unobserved monitoring
1	Cnr Cypress St and Greythorne St	513173 / 5413286	Observed monitoring
2	Rear facade of 73 Cypress St	513350 / 5413416	
3	Rear facade of 65 Cypress St	513289 / 5413385	
4	Rear facade of 33 Cypress St	512981 / 5413213	
5	Rear facade of 4 Croydon Ave	512840 / 5413176	
6	Front facade of 11 Dowling St	512750 / 5413267	
7	Front facade of 62 Racecourse Cres	512653 / 5413236	
8	Front facade of 42 Racecourse Cres	512506 / 5413359	
9	Front facade of 65 Henry St	514067 / 5414015	
10	Front facade of 29 Dowling St	512792 / 5413335	

Table 1 – Environmental noise measurement and model positions.

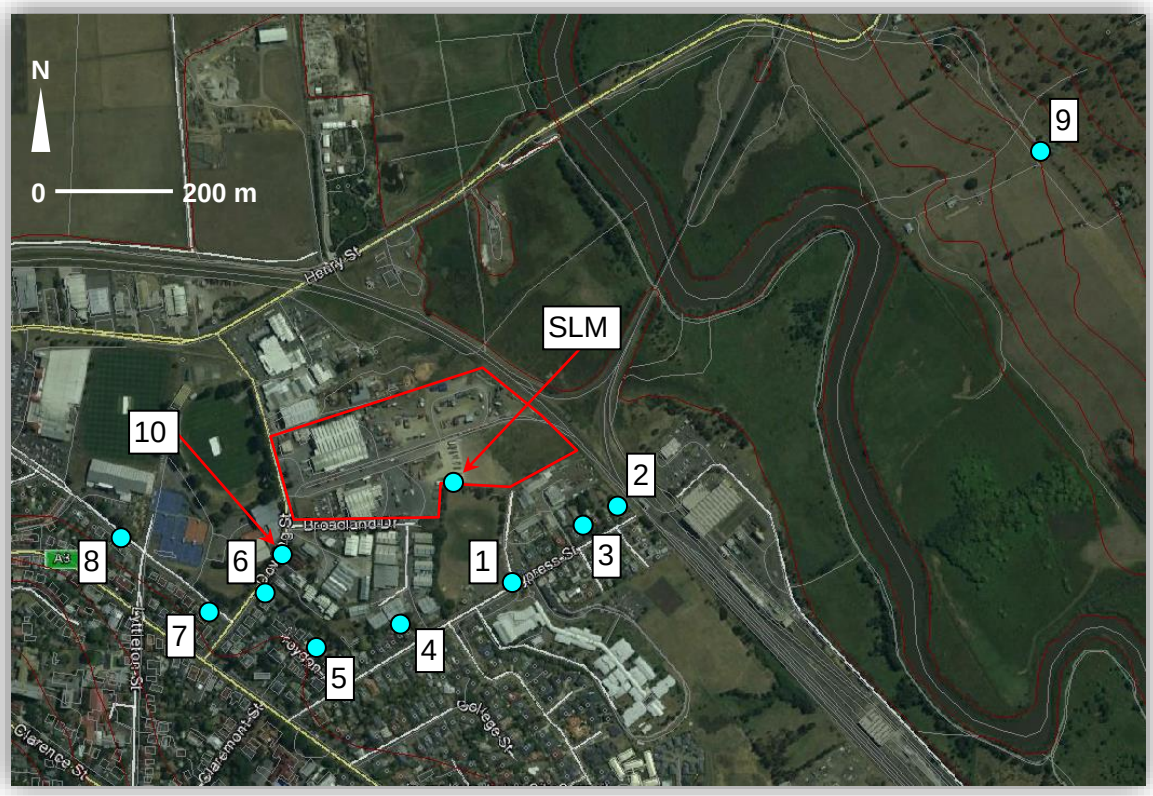


Figure 2 – Aerial view of the Toll Group, Dowling St, transport hub and surrounding area with survey and model receiver positions marked.

3 Ambient noise monitoring

Ambient noise monitoring was conducted at two locations. Figure 3 provides an aerial view with the two locations marked with the SLM location used for unobserved logging and position 1 observed measurements.

Figure 3 – Ambient noise monitoring positions.

3.1 Unobserved site measurements

A logging sound level meter (Larson Davis 824) was located on-site (see table 1 and figure 2 and 3, SLM position) for a one-week period measuring L_{eq} and L_{max}, L_{min}, L_1, L_{10}, L_{50}, L_{90} and L_{99} A-weighted sound pressure levels on a 5-minute basis.

Figure 4 provides a photograph of the sound level meter.

Figure 4 – Sound level meter at unobserved measurement position, view to the north-west.

3.2 Observed off site measurements

A logging sound level meter (Larson Davis 831) was located and observed at the coroner of Cypress St and Greythorne St (see table 1 and figure 2 and 3, position 1) for two 5-minute periods, one during the day and one during the evening, measuring L_{eq} and L_{max}, L_{min}, L_1, L_{10}, L_{50}, L_{90} and L_{99} A-weighted sound pressure levels.

Figure 5 provides a photograph of the sound level meter.

Figure 5 – Sound level meter at the observed measurement position (positon 1), view to the north north-west.

3.3 Monitoring results and discussion

3.3.1 Unobserved site measurements

Figure 4 presents a graph of the main 10-minute statistical data logged at the SLM position as follows:-

- **L_{Aeq}**: Ambient noise level
- **L_{A10}**: Represents transient noise levels
- **L_{A90}**: Considered the background noise level.

For sake of clarity the other 5 data sets are not shown in this graph.

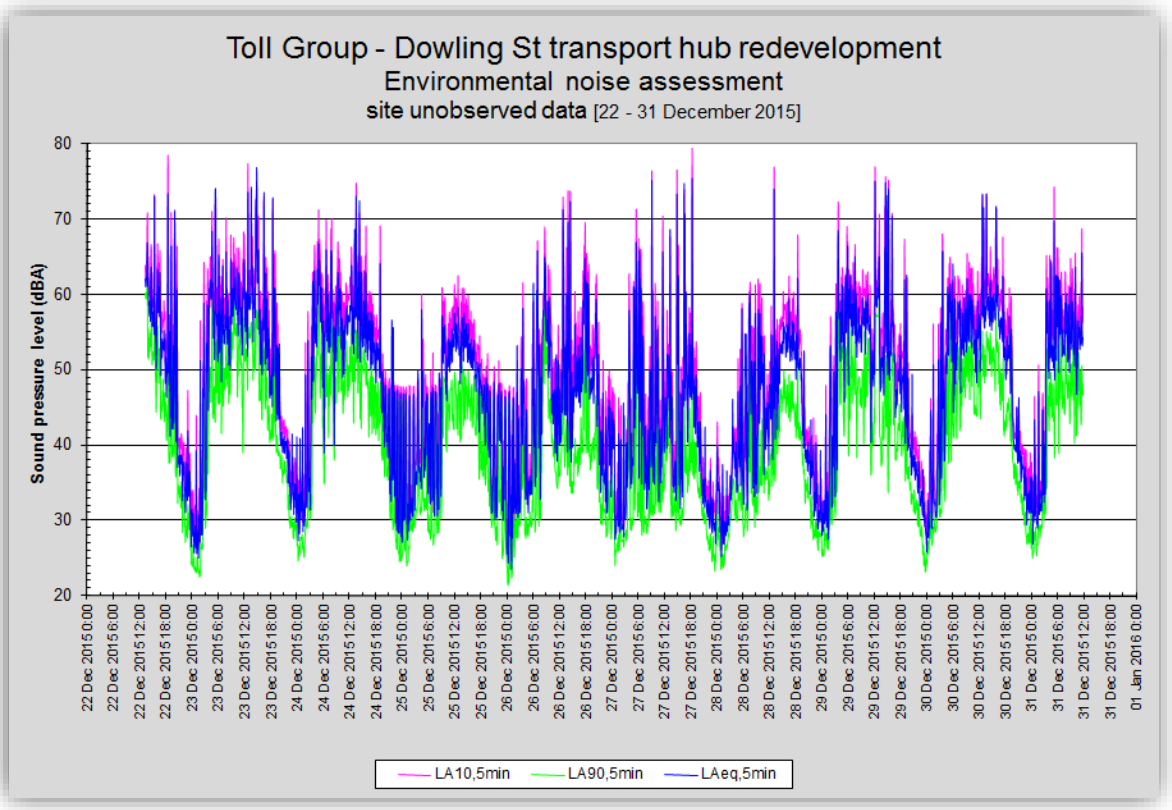


Figure 4 – Monitored Ln-statistics.

From the above:-

- Day time noise levels typically fluctuated between 50 and 60 with periods above 60 likely occurring when noise generation was near to the monitoring location.
- At night background (L_{A90}) levels drop below 30 dBA with L_{Aeq} and L_{A10} levels fluctuating between 30 and 40 dBA.
- The night periods on 25 and 26 December where L_{Aeq} and L_{A10} levels are consistently greater than 40 dBA are likely the result of the nearby refrigeration container parked in relatively close proximity to the monitoring location.

3.3.2 Observed off site measurements

Table 2 presents the results of the two 5-minute observed measurements at position 1 including measurement results, weather conditions and observed noise sources.

Observed measurements position 1 (cnr Cypress St and Greythorne St)												
Period	**Date**	**Time**	**L_{Aeq}**	**L_{Amax}**	**L_{Amin}**	**L_{A1}**	**L_{A10}**	**L_{A50}**	**L_{A90}**	**L_{A99}**	**Weather**	**Noise sources**
Day	14/12/15	1740	60.4	83.0	41.7	73.1	60.8	50.9	46.7	43.2	Fine, cloud 5 octa, mod breeze NNW	Toll: Engine (highlift, truck), Backing alarm, Impacts External to site: Distant traffic, Track pass-bys, Local traffic, Aircraft Leaf rustle, birds
Evening	14/12/15	1800	57.5	79.1	41.5	70.3	54.8	47.1	44.1	42.6		

Table 2 – observed measurements at position 1.

From the above:-

- L_{Aeq} levels during both observed measurements were dominated by local traffic noise on Cypress and Greythorne St.
- L_{A50} levels where controlled by activity in the Toll Group site with a highlift fork operating near the southern boundary the most significant source.
- Background levels (L_{A90}) were controlled by distant traffic (not from the Toll Group site).

4 Assessment criteria

From analysis of the ambient noise monitoring data detailed in section 3 above Vipac has nominated the following project specific noise assessment criteria for the transport hub redevelopment at the Toll Group Dowling St site, values apply at the boundary of any noise sensitive receptor location:-

- **Day (0600 – 2000 hrs) 50 dBA**: *Although day time noise levels are considerably higher than this level this is reflective of extending into what is typically considered the evening period (after 1800 hrs). This is also commensurate with the noise level generated by the highlift forks (the most significant noise sources currently on-site) at noise sensitive locations. Additionally, environmental indicator noise levels published in the Tasmanian Environmental Protection Policy (Noise) 2009 (EPP) suggest that moderate annoyance may occur above this noise level in outdoor living spaces (please see below from the EPP).*
- **Night (2000 – 0600 hrs hrs) 40 dBA**: *This reflects the drop in noise levels seen during the night period when traffic levels in surrounding areas decrease into the late evening and night. L_{Aeq} levels were consistently at this level during the night measurements at the SLM measurement position. Additionally, this level is conservative when considered against the environmental indicator level published in the EPP for outside bedrooms (please see below from the EPP).*

Specific environment	**Critical health effect(s)**	**L_{Aeq} [dB(A)]**	**Time base [hours]**	**L_{Amax}fast [dB]**
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime and evening	50	16	-
Dwelling, indoors	Speech intelligibility & moderate annoyance, daytime & evening	35	16	-
Inside bedrooms	Sleep disturbance, night-time	30	8	45
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60

5 Environmental noise model

SoundPLAN[1] software was used for carrying out detailed noise emission spectra and contour modelling. Parameters influencing sound propagation and attenuation include:

- Source type (point, line, plane).
- Relative source and receiver height.
- Topography and barriers.
- Industrial buildings as sources and/or barriers.
- Ground absorption.
- Distance attenuation.
- Atmospheric conditions (pasquill stability, temperature, humidity and vector wind speed).
- Reflecting surfaces.
- Source directivity.

As all propagation and attenuation parameters are frequency dependent, all input source data has been based on octave band sound power spectra. The General Prediction Method algorithm was used.

Geo-referenced topographic, transport, building and hydrologic data was obtained from Department of Primary Industry, Parks, Water and Environment. This provided contours at 10-metre intervals; residential locations; road layouts; and river and stream courses for the area.

Plant building details and equipment location details were obtained from AJL Consulting Engineers and Toll Group.

All source and geodata is referenced to the Map Grid of Australia (MGA).

5.1 Model input data

Input sound power spectra were determined from a combination of measured data at the Toll Group Dowling St site and Vipac library data. Table 3 present the overall sound power level (SWL) for each source along with information on the determination of the stated level while table 4 presents octave band sound power spectra for each source

Overall sound power Levels (dBA)		
Area	SWL	Comment
Highlift fork	**100.2**	2 off, modelled as point source, maximum SWL level 105.1 dBA.
Highlift fork backing alarm	**102.3**	2 off, modelled as point source, scaled for time of operation.
Small fork	**91.8**	2 off, modelled as point source, maximum SWL level 102.0 dBA.
Small fork backing alarm	**90.1**	2 off, modelled as point source, scaled for time of operation.
Truck	**95.6**	4 off, modelled as line source, scaled for time of operation, maximum SWL level 108.9 dBA.
Truck backing alarm	**102.7**	2 off, modelled as point source, scaled for time of operation.
Refrigeration container	**91.8**	1 off, modelled as area source.
Refrigeration condenser	**90.1**	2 off, modelled as point source, manufacturers data with SWL spectra from Vipac library data. **NB**: To be housed in building, modelled unhoused.
Refrigeration heat exchanger	**81.6**	2 off, modelled as point source, manufacturers data with SWL spectra from Vipac library data.
Truck wash pump	**79.8**	1 off, modelled in Colorbond housing. Pump SWL spectra from Vipac library data.
Container wash pump	**95.1**	1 off, modelled without a housing. Pump SWL spectra from Vipac library data.

Table 3 – Sound power levels.

Sound power spectra (dBA)										
Area	Frequency (Hz)									Total
	31	63	125	250	500	1k	2k	4k	8k	
Highlift fork	54.1	80.5	84.1	91.8	94.5	93.0	95.0	87.0	76.5	**100.2**
Highlift fork backing alarm	75.1	78.3	81.9	90.9	91.5	100.1	95.6	82.9	72.5	**102.3**
Small fork	58.9	70.6	75.6	84.6	86.7	86.3	83.0	78.4	72.3	**91.8**
Small fork backing alarm	54.3	65.0	65.9	71.2	73.3	75.0	89.7	68.9	52.9	**90.1**
Truck	49.9	76.7	78.3	81.4	88.5	90.6	91.0	83.6	76.8	**95.6**
Truck backing alarm	54.4	75.1	74.5	77.7	85.1	102.4	86.9	81.2	74.1	**102.7**
Refrigeration container	49.5	81.0	76.3	82.4	84.9	85.2	86.3	78.7	69.0	**91.8**
Refrigeration condenser	53.9	66.5	81.5	80.4	86.2	83.0	79.6	76.9	70.4	**90.1**
Refrigeration heat exchanger	45.8	62.1	67.1	70.4	76.2	76.1	75.0	70.1	64.8	**81.6**
Truck wash pump	42.9	58.7	72.3	73.3	71.7	70.0	70.6	71.8	67.9	**79.8**
Container wash pump	43.9	61.7	77.3	81.3	84.7	87.0	87.6	90.8	86.9	**95.1**

Table 4 – Sound power spectra.

5.2 Model scenarios

Four scenarios were modelled:-

Day ops: Typical daytime operations within a 5-min period. Sources include (see figure 6):-

- 2 trucks entering and 2 trucks leaving the site.
- 2 trucks entering the site and parking up, 1 in the Lot 2 and 1 in the Lot 3 truck parking areas.
- 2 highlift forks operating in the new Container Yard area.
- 2 small forks operating in the existing and new Medium Duty Stand areas.
- 1 refrigeration container located in the Lot 3 truck parking area.

Worst Case Day ops: Truck and small fork operations remain as for Day ops with the following changes (see figure 7):-

- 1 highlift fork operating near the container wash, approx. 83 m from location under Day ops.
- 1 refrigeration container parked at the Lot 2 truck parking area, approx. 245 m from location under Day ops.
- Truck wash and container wash pumps operating.
- Warehouse B refrigeration units (2X condensers and 2X heat exchangers).

Night ops: Typical night operations within a 5-min period. Sources include (see figure 8):-

- 2 trucks entering and 2 trucks leaving the site.
- 2 trucks entering the site and parking up, 1 in the Lot 2 and 1 in the Lot 3 truck parking areas.
- 2 small forks operating in the existing and new Medium Duty Stand areas.
- 1 refrigeration container located in the Lot 3 truck parking area.

NB: Highlift forks don't currently operate after 2000 hrs and this was assumed to be the same following the redevelopment.

Worst Case Night ops: Truck and small fork operations remain as for Night ops with the following changes (figure not provided, refer to figure 7 for equivalent source locations):-

- 1 refrigeration container parked at the Lot 2 truck parking area, approx. 188 m from location under Night ops.
- Truck wash and container wash pumps operating.
- Warehouse B refrigeration units (2X condensers and 2X heat exchangers).

NB: All mobile equipment was modelled with backing alarms.

Day operations

Figure 6 – Plan view of **Day ops** model.

Worst Case operations

Figure 7 – Plan view of **Worst Case Day ops** model.

Night operations

Figure 8 – Plan view of **Night ops** model.

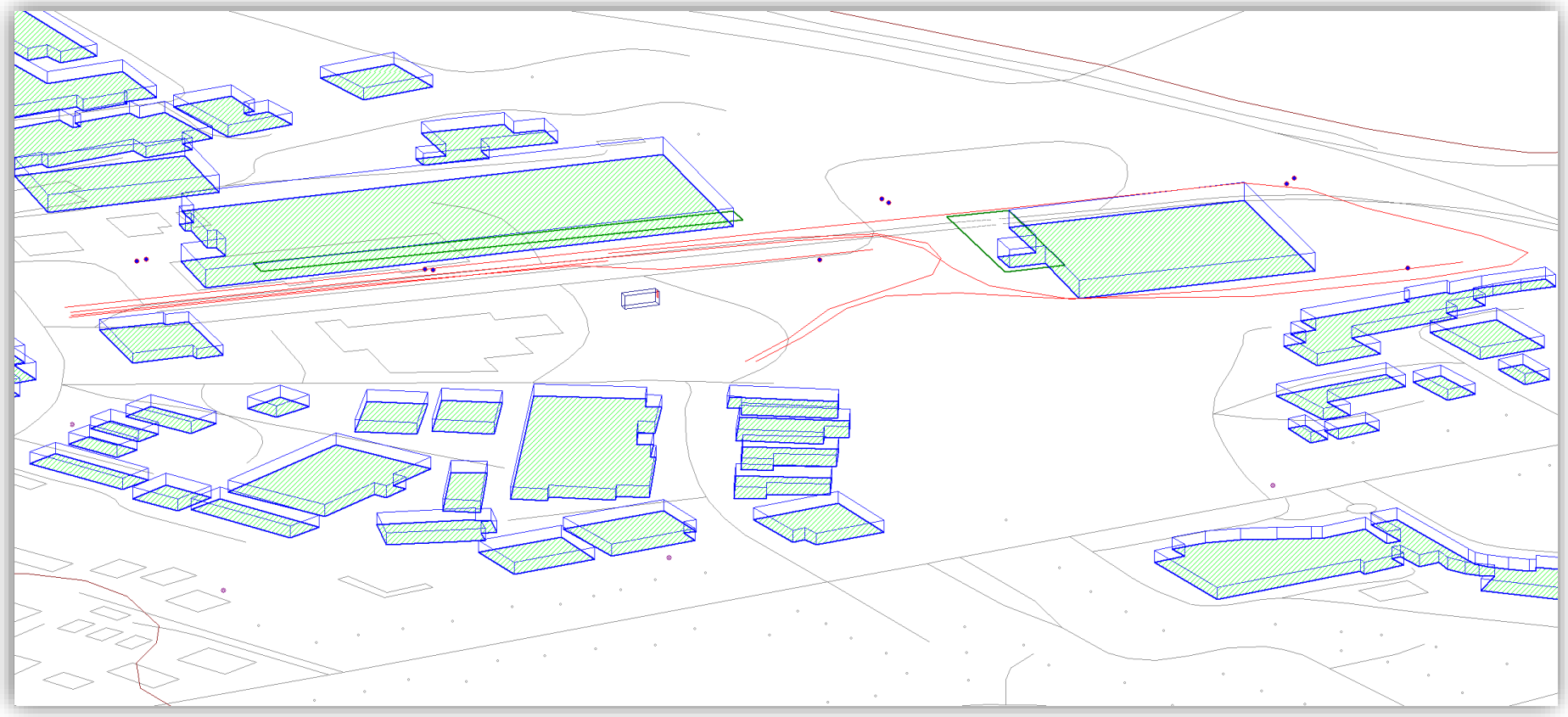


Figure 9 – Wire frame view of **Day ops** model.

5.3 Modelling results and discussion

5.3.1 Predicted noise contours

Using the environmental noise model, a series of noise contour maps were generated to assist in the visualisation of noise propagation as follows: -

- Day ops
- Worst Case Day ops
- Night ops
- Worst case night ops

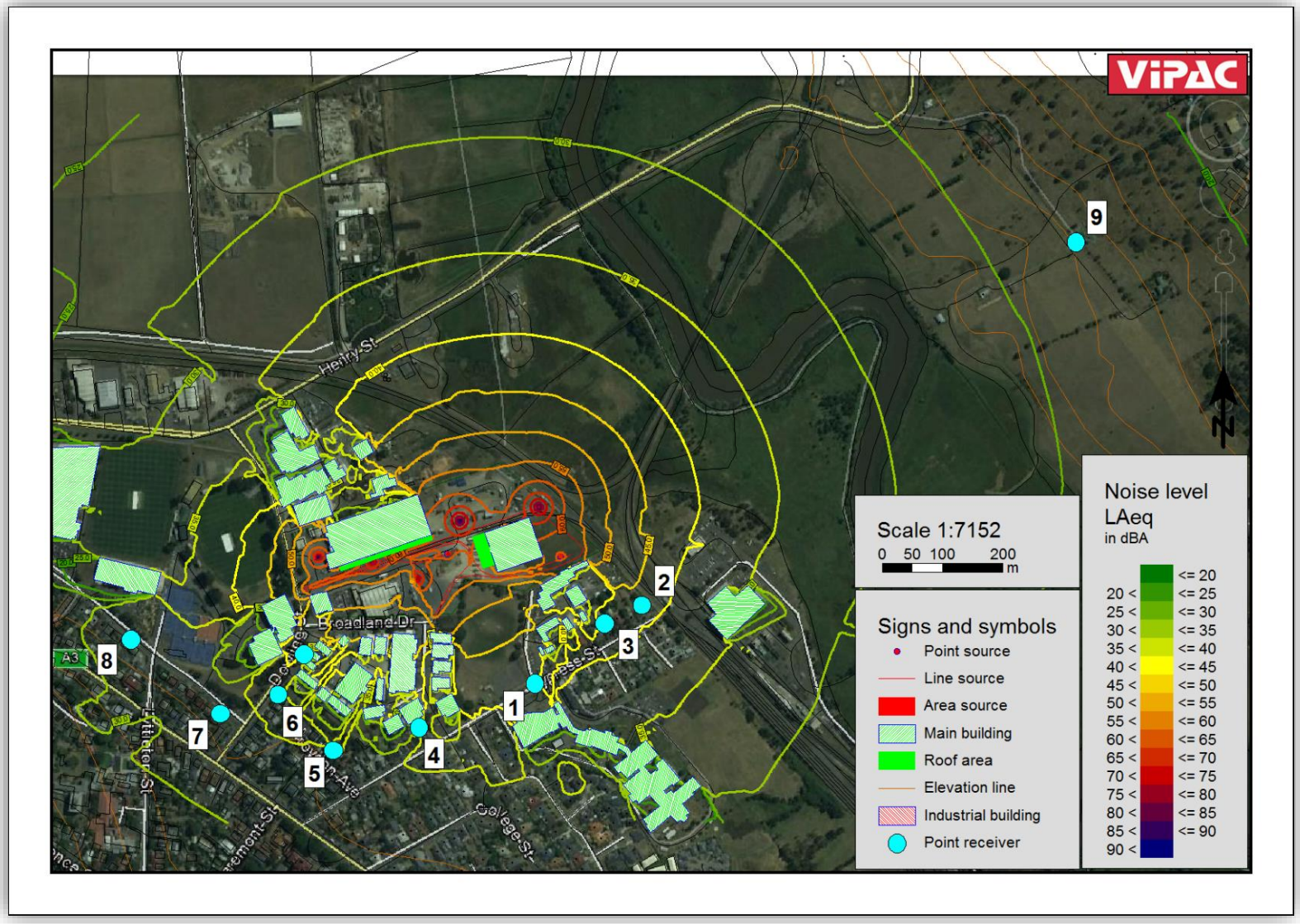


Figure 6 – Predicted noise emission contours, **Day ops**.

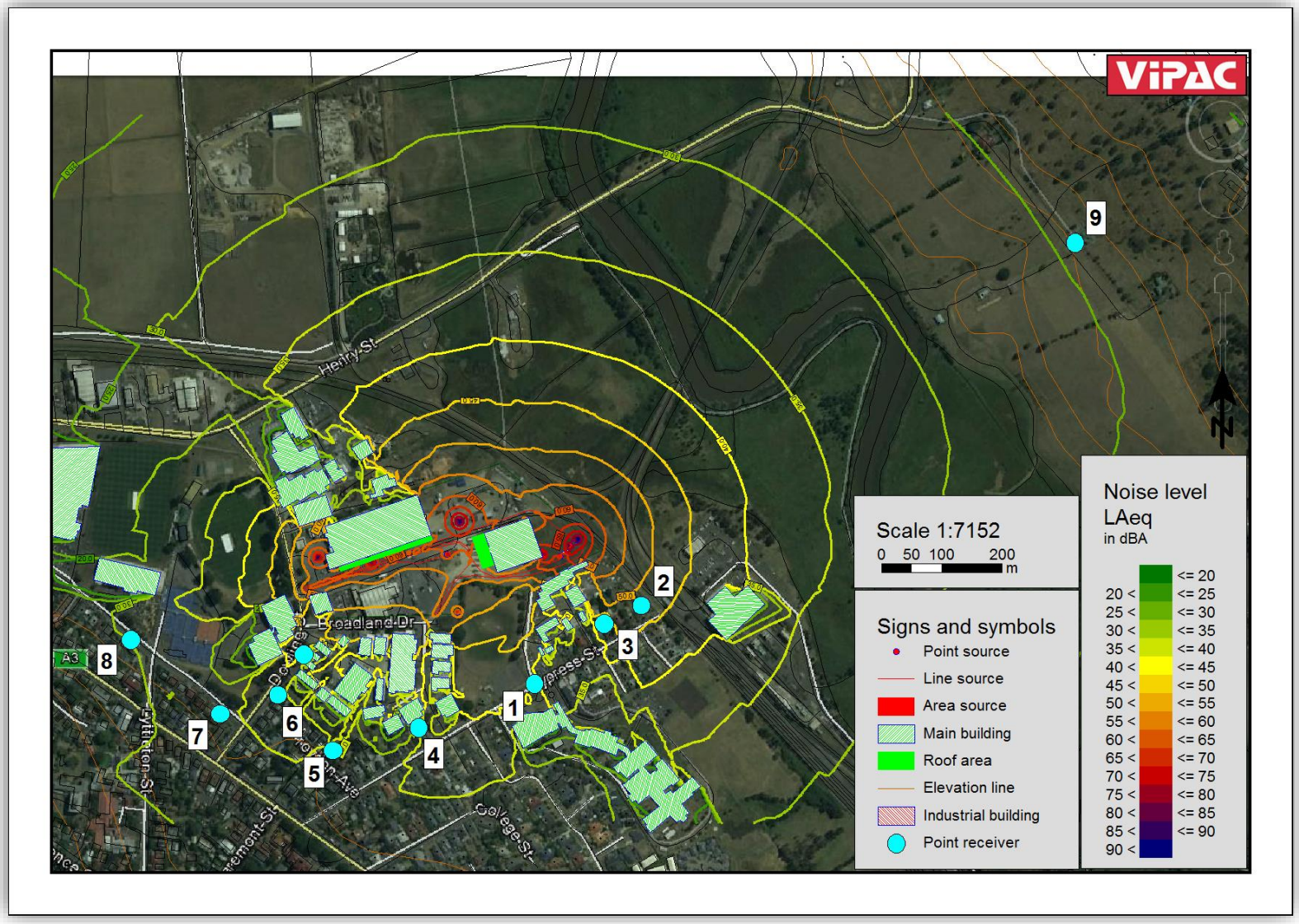


Figure 7 – Predicted noise emission contours, **Worst Case Day ops**.

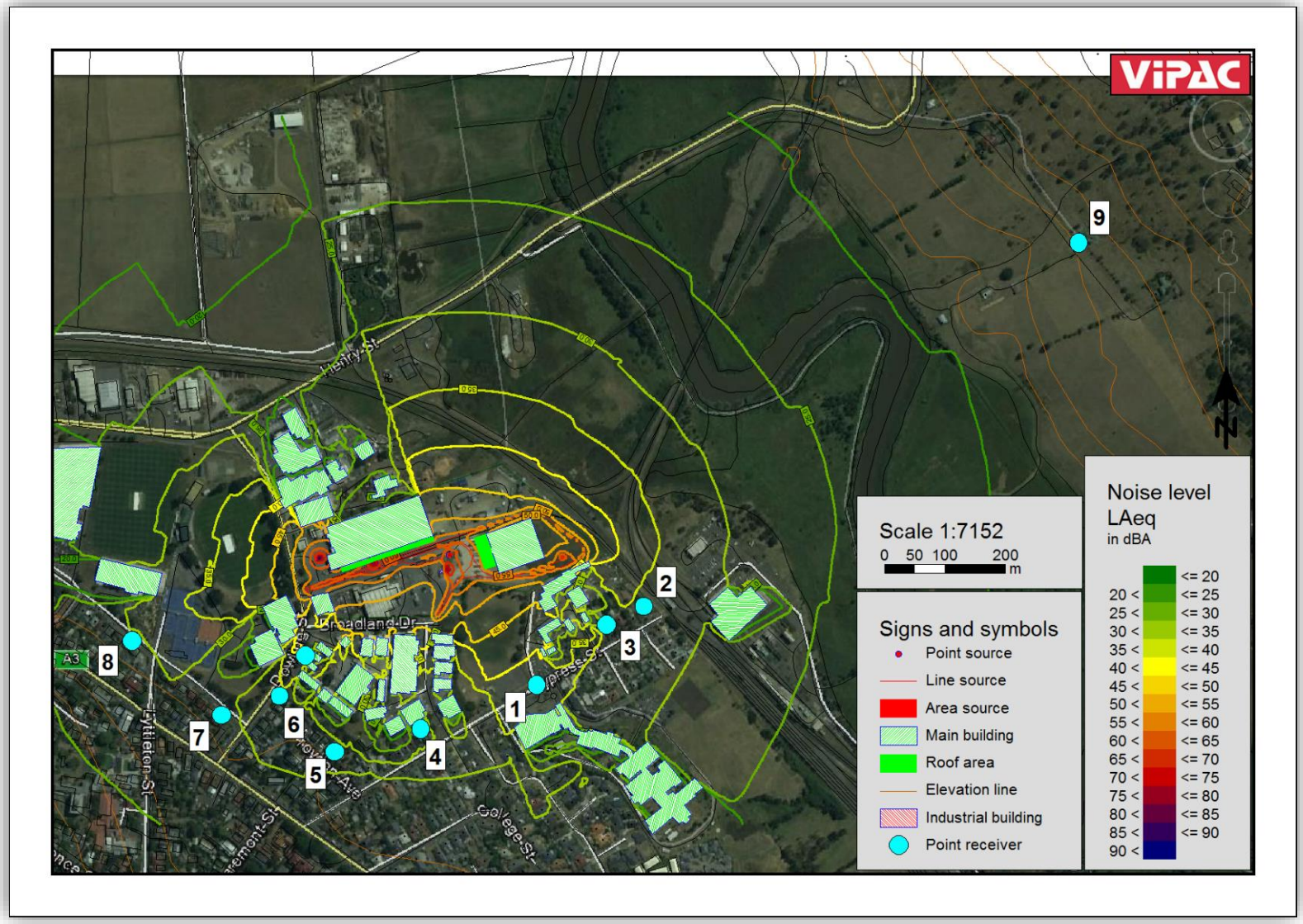


Figure 8 – Predicted noise emission contours, **Night ops**.

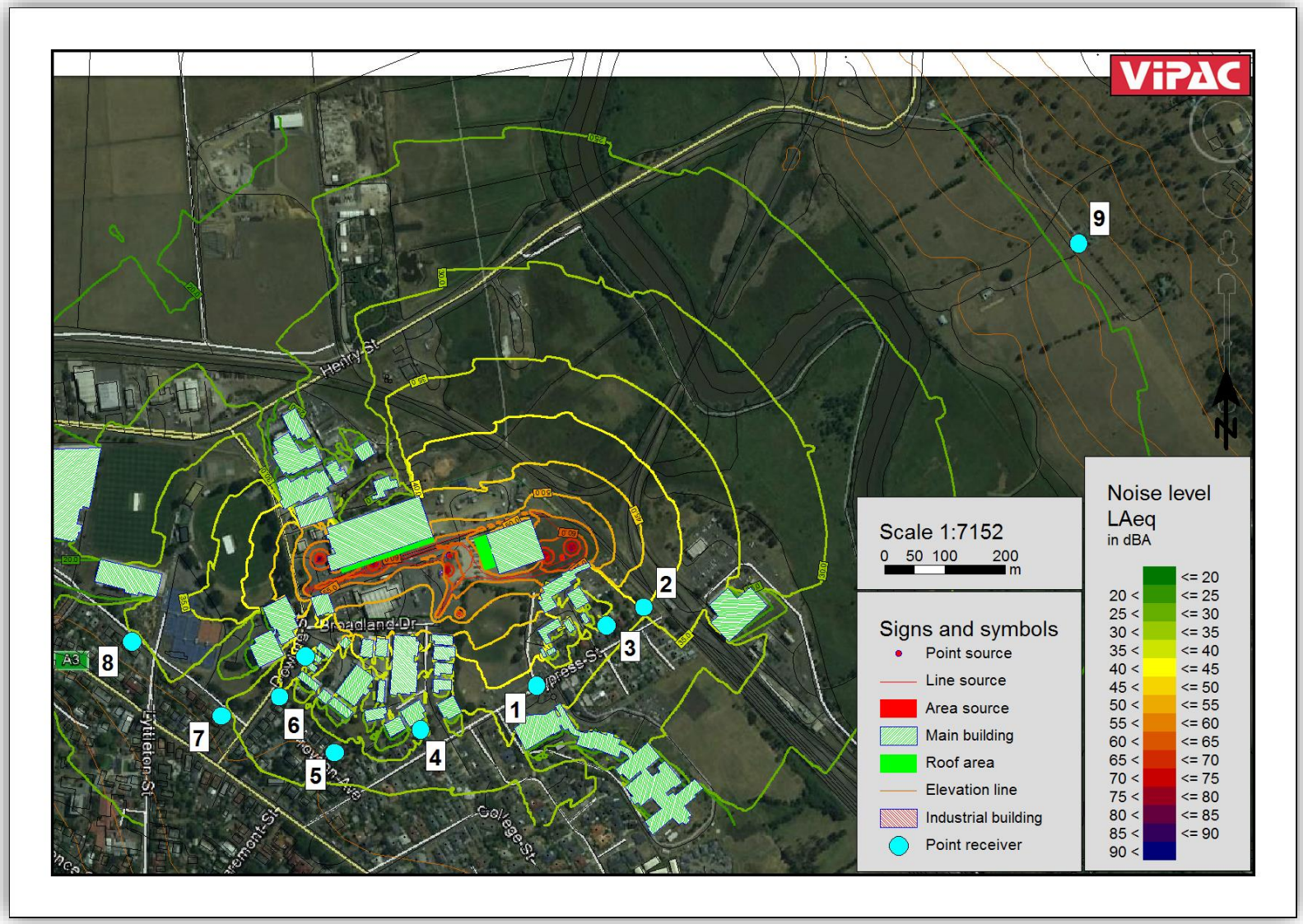


Figure 9 – Predicted noise emission contours, **Worst Case Night ops**.

5.3.2 Predicted noise emission levels

Table 5 presents the predicted noise emission levels at the ten receiver locations for the four operational scenarios.

Predicted noise emission levels (dBA)					
Receiver location	L_{Aeq}				Maximum noise level generated
	Day	Worst Case Day	Night	Worst Case Night	
1	41	41	38	38	55
2	43	48	34	40	56
3	42	44	33	34	52
4	29	29	25	27	48
5	35	35	32	32	48
6	37	37	35	35	52
7	33	34	29	29	45
8	32	30	29	29	45
9	23	24	16	20	31
10	40	40	40	40	62

Above assessment criteria

Table 5 – Predicted noise emission levels

NB: Maximum predicted noise levels were generated by truck movements at all locations.

From the above and analysis of predicted individual source contributions:-

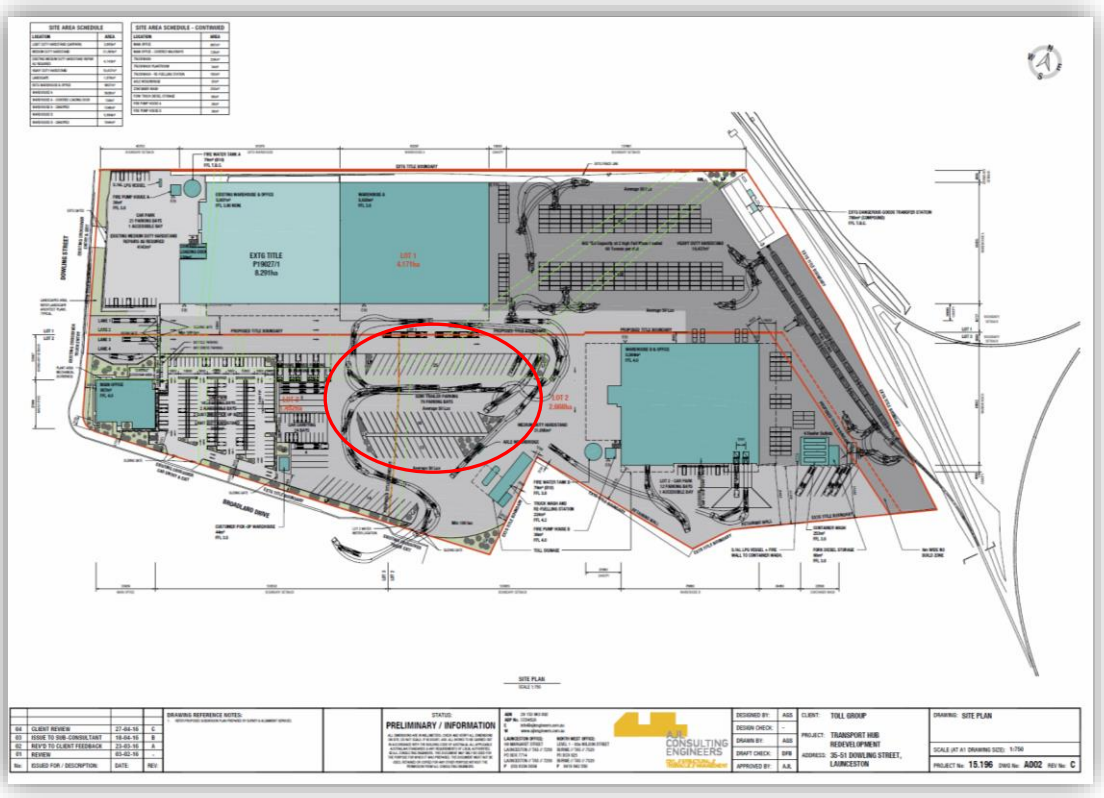
- The predicted levels are all at or below the assessment criteria for the project.
- Operation of the highlift fork near the container wash elevates noise levels significantly at position 2.
- Operation of the container wash pump elevates noise levels at position 2 significantly during the night period.
- The predicted noise levels at position 10 is controlled by small fork operations in the existing medium hardstand area.
- Operation of the refrigeration container in the proposed Lot 2 truck parking area would exceed the night criteria.

6 Conclusions and recommendations

- From environmental noise monitoring both on-site at the existing Toll Group transport hub at Dowling St and in surrounding residential areas project specific assessment criteria were developed as follows:-
    - Day (0600 – 2000 hrs) 50 dBA
    - Night (2000 – 0600 hrs hrs) 40 dBA
- Predicted results from the environmental noise modelling of potential operations at the redevelopment indicate the noise emissions levels are likely to at or below the assessment criteria at critical receiver locations.
- Some sources elevate noise levels when operating and control the noise environment at certain locations (see discussion in section 5.3.2 for further details). Additionally, some of these sources exhibit potentially intrusive noise characteristics, e.g diaphragm pumps have the potential to produce impulsive noise. Given this noise controls for the site are provided in the following sub-section.

6.1 Noise controls

1. High lift forks not to operate at night (i.e. not after 2000 hrs and before 0600 hrs).
2. Refrigeration containers parked up in Lot 2 area only, orient refrigeration unit facing the east (see the marked area in the plan view image below).

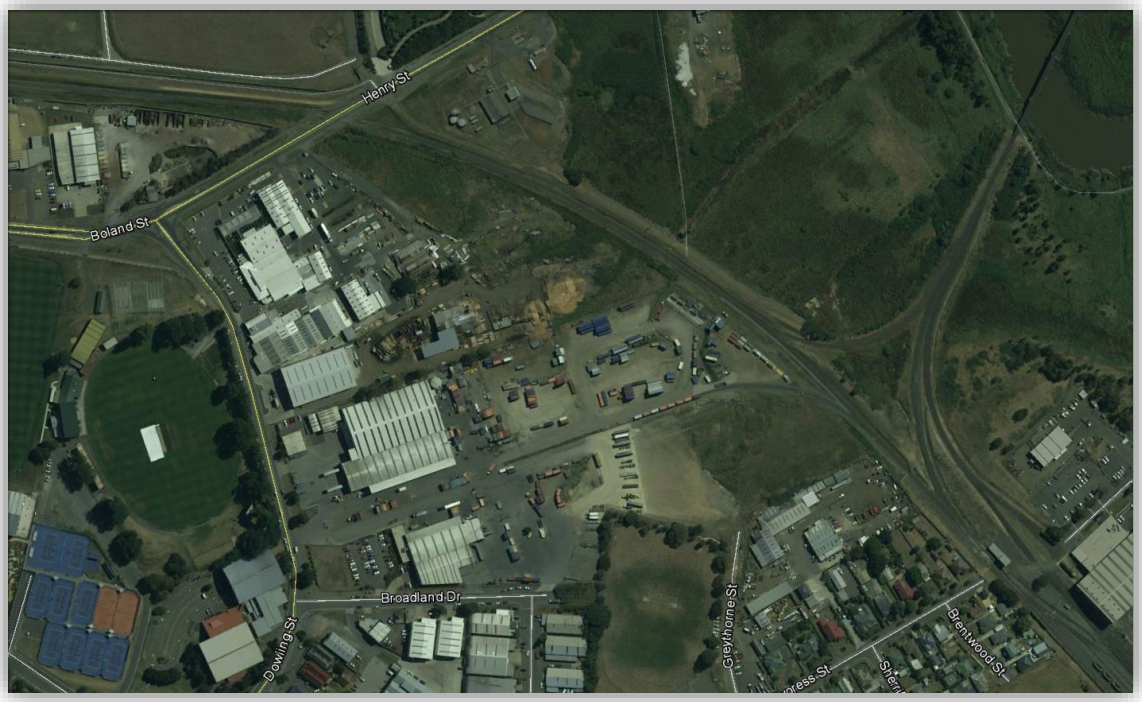


3. Minimise small fork activity in existing medium duty hardstand area at night.
4. House the container wash pump in a Colorbond housing as for the truck wash pump. Care should be taken to ensure the pumps are not vibrationally coupled to the housing structure (i.e pump or pipes supported off or hard coupled to the housing structure). Additionally, it is assumed that the housings would be fully enclosed with no openings around the base or around doors and louvres allowing air flow that face away from sensitive receiver locations.

   NB: The SWL spectrum for the wash pumps were developed from Vipac library data. Therefore, any installed pump would have to match or have a lower SWL spectrum than presented here (see section 5.1 for details).

AJL Consulting Engineers Pty Ltd

Toll Group, Dowling St, Launceston
Transport hub redevelopment
Dust management plan



Report No. 421424-02

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DOCUMENT CONTROL

AJL CONSULTING ENGINEERS
TOLL GROUP, DOWLING ST, LAUNCESTON
TRANSPORT HUB REDEVELOPMENT
DUST MANAGEMENT PLAN

Report No.
421424-02
Prepared for
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Revision History

Revision No.	Date Issued	Reason/Comments
1	27/04/2016	New site plan

Distribution

Copy No._____	Revision No.	Location
1	1	Project/Client File
2	1	Client
3	1	Vipac Library

Keywords Dust, particulate matter, TSP, PM_{10}, $PM_{2.5}$, deposited dust

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1 Introduction

Vipac was commissioned by AJL Consulting Engineers on behalf of Toll Group to provide a dust management plan for a proposed redevelopment at Toll Group's Dowling St, Launceston transport hub. The assessment is a requirement under the Launceston City Council Interim Planning Scheme 2015, the relevant section from the planning scheme is provided below:-

Part D Zones, 23.0 Commercial, 23.3 Use standards, 23.3.2 Emissions impacting sensitive uses

This standard applies to the use classes specified in Table 23.3.

Objective:
To ensure that emissions to air, land and water are not detrimental to the amenity of sensitive uses.

Acceptable Solutions	Performance Criteria
A1 Uses must be set back from the site of a sensitive use a distance of no less than 100m.	P1 The use must not adversely impact on the amenity of nearby sensitive uses, having regard to: **(a)** the nature of the proposed use; **(b)** the characteristics of the emissions; **(c)** the proximity and number of sensitive uses in the area; **(d)** the topography of the site; **(e)** background levels; **(f)** any mitigation measures proposed; and **(g)** the character of the surrounding area.

To address the above Vipac proposed a dust management plan for the site.

2 Site description

The Toll Group Dowling St site is located on the corner of Dowling St and Broadland Dr. The proposed redevelopment of the site involves, but is not limited to the following:-

- Medium duty hardstand pavement.
- Heavy duty hardstand pavement.
- 5,950m² Warehouse extension.
- 5,600m² New warehouse.
- Car park.
- 970m² New office.
- Truck wash.
- Hazardous goods station.
- Rail alignment.
- AQIS container wash.

Figure 1 provides a plan view of the site with both the current and proposed site layouts.

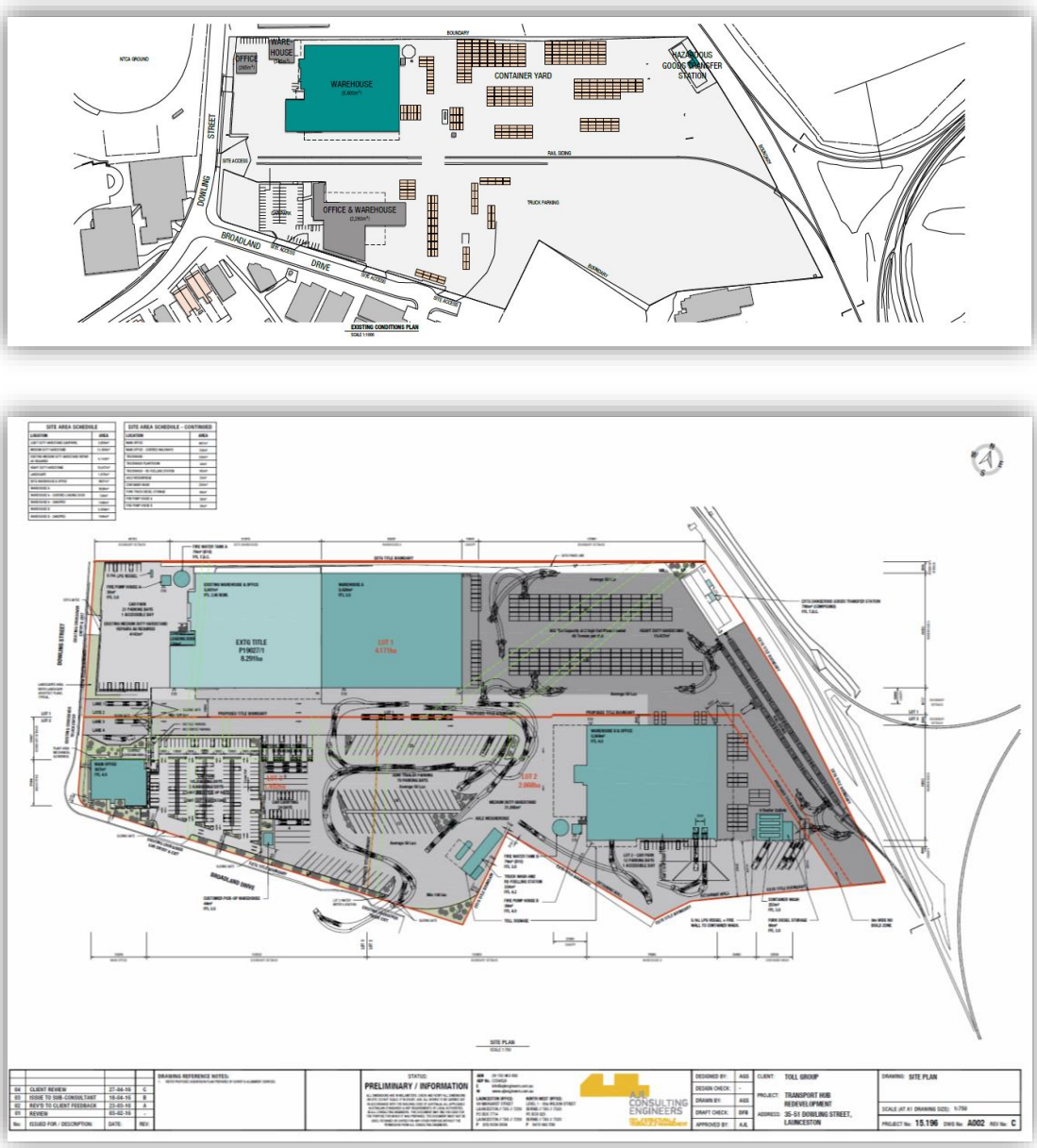


Figure 1 – Existing and proposed site plan (supplied by AJL Consulting Engineers).

The site is bounded by other light industrial / commercial premises and sports grounds to the to the south, north and west and by rail to the east. Residential premises are located to the south east and west.

The site is currently unpaved across large areas. Vehicle movements and periods of significant winds (typically speeds of > 5 m/s or approx. 18 km/h) are likely to result in dust entrainment with the potential to impact nearby residences and other sensitive uses, e.g. schools.

NB: It should be noted that following the redevelopment the site would be fully paved.

Figure 2 provides an aerial view with the site outlined in red and sensitive areas marked in red shading. Figure 3 provides an aerial view with the site with unpaved areas marked.

Figure 2 – Aerial view of Toll Group Dowling St transport hub site and surrounds.

Figure 3 – Aerial view of Toll Group Dowling St transport hub.

3 Pollutant of concern

The pollutant of concern for this project is as follows:-

- **Dust / particulate matter** - In the atmosphere, particles range in size from 0.1 to 50 µm. Particulate matter in the atmosphere can have an adverse effect on health and amenity. The impact that particles have upon health is largely related to the extent to which they can penetrate the respiratory tract. Particles with an aerodynamic diameter greater than 10 µm are generally screened out in the upper respiratory tract by adhering to mucus in the nose, mouth, pharynx and larger bronchi and from there are removed by either swallowing or expectorating. Very fine particles less than 2.5 µm can be deposited in the pulmonary region. It is these particles that are of greatest concern to health.

4 Project criteria

From a review of guidelines and regulation of dust / particulate matter both nationally and across state based jurisdictions was conducted by Vipac. From these project criteria have been selected and are presented in table 1 below. For reference the pollutant terms used in the table below are as follows:-

- TSP: total suspended particulate matter with a diameter up to 50 µm.
- PM_{10}: Particulate matter with an aerodynamic diameter less than or equal to 10 µm.
- $PM_{2.5}$: Particulate matter with an aerodynamic diameter less than or equal to 2.5 µm.
- Dust deposition: Particulate matter that settles out of the atmosphere onto surfaces.

Project criteria				
Pollutant	Basis	Criteria	Averaging Time	Exceedances allowed
TSP	Human Health	90 μg/m^3	1-year	-
PM_{10}	Human Health	50 μg/m^3	24-hour	Five days per year
$PM_{2.5}$	Human Health	25 μg/m^3	24-hour	-
	Human Health	8 μg/m^3	Annual	-
Dust deposition	Amenity	120 mg/m^2/day	Month	-

Table 1 – Project criteria.

5 Ambient data

Ambient air quality data for Launceston (Ti Tree Bend) from the Tasmanian EPA's in the form of measured PM_{10} and $PM_{2.5}$ 24-hr levels. Data for the year 2015 is provided in figure 3 below.

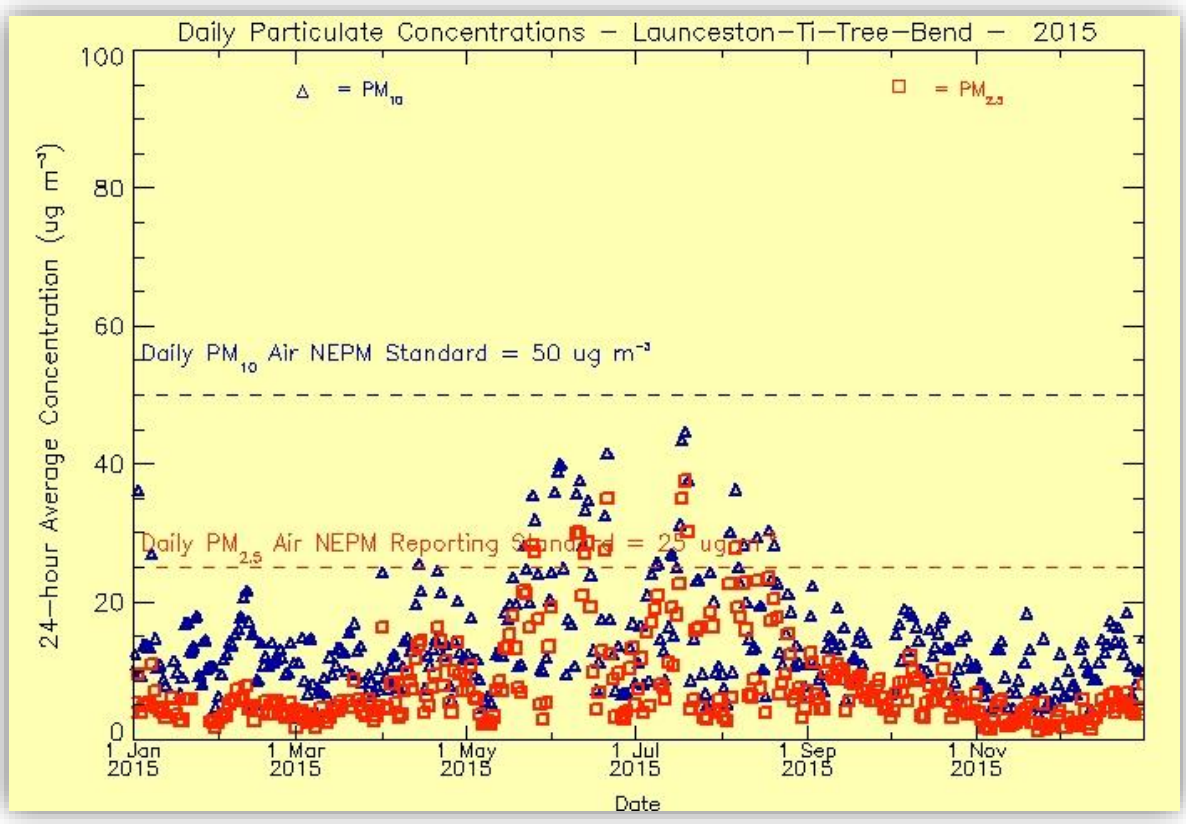


Figure 4 – Launceston (Ti Tree Bend) 24-hr particulate concentrations for 2015 (source: Tasmanian EPA, http://epa.tas.gov.au/epa/view-air-pollution-data?airid=946).

The following comments are provided on the above data by the EPA:-

- No exceedances of the PM_{10} Air NEPM Standard were recorded for this interval
- The maximum PM_{10} level was high at 44.7 μg/m^3.
- The median PM_{10} level was 12.4 μg/m^3.
- The maximum $PM_{2.5}$ level was very high at 37.5 μg/m^3.
- The median $PM_{2.5}$ level for this interval was 5.6 μg/m^3.
- Twelve $PM_{2.5}$ measurements exceeded the Air NEPM Advisory Reporting Standard in this interval.

NB: An 'advisory reporting standard' means a health-based standard to assess the results of monitoring for particles as $PM_{2.5}$.

6 Site specific data

Vipac was provided with a report on respirable crystalline silica and inhalable wood dust monitoring conducted at the Dowling St site in 2010 by Injury Prevention & Management. While the report indicates that respirable crystalline silica and inhalable dust levels were below work health and safety exposure standard levels the measurement techniques and measure durations are not appropriate to provide applicable information here.

7 Meteorology

7.1 Local long-term data

Long term weather data for the local area has been obtained from the Bureau of Meteorology (BoM) meteorological station located at Launceston, Ti Tree Bend (Site number 091237). Table 2 presents the Ti Tree Bend data.

Long term weather data, Ti Tree Bend BoM meteorological station										
Month	Mean Temperature		Mean Rainfall (mm)	Mean number of days ≥ 1 mm	9 am Conditions			3 pm Conditions		
	Max (°C)	Min (°C)			Temp (°C)	RH (%)	Wind Speed (km/h)	Temp (°C)	Mean RH (%)	Wind Speed (km/h)
Jan	24.4	12.3	47.8	5.3	16.6	69	12	22.8	48	20.8
Feb	24.6	12.3	30.7	4.1	16.1	74	9.3	23.1	49	18.5
Mar	22.5	10.2	39.1	4.6	14	77	8.3	21.3	48	17.5
Apr	18.9	7.5	52	6.7	11.8	81	8.6	17.8	56	17.2
May	15.8	5.1	62.6	7.4	8.5	89	7.4	14.9	63	14.9
Jun	13.1	2.9	66.8	8.6	5.8	92	6.2	12.2	69	13.3
Jul	12.6	2.3	77	9.9	5.2	92	6.6	11.7	69	14.3
Aug	13.8	3.7	86.9	11.1	7.1	86	9.3	12.8	63	18.7
Sep	15.7	5.2	65.6	9.7	9.9	79	12.6	14.3	59	20.5
Oct	18.1	6.9	49.4	7.9	11.8	75	12.6	16.7	54	21.2
Nov	20.5	9.1	52.4	7.1	13.9	69	12.9	19.1	52	21
Dec	22.5	10.7	46.3	6.2	15.7	66	12.9	20.9	49	20.9
Annual	**18.5**	**7.4**	**676.3**	**88.6**	**11.4**	**79**	**9.9**	**17.3**	**57**	**18.2**

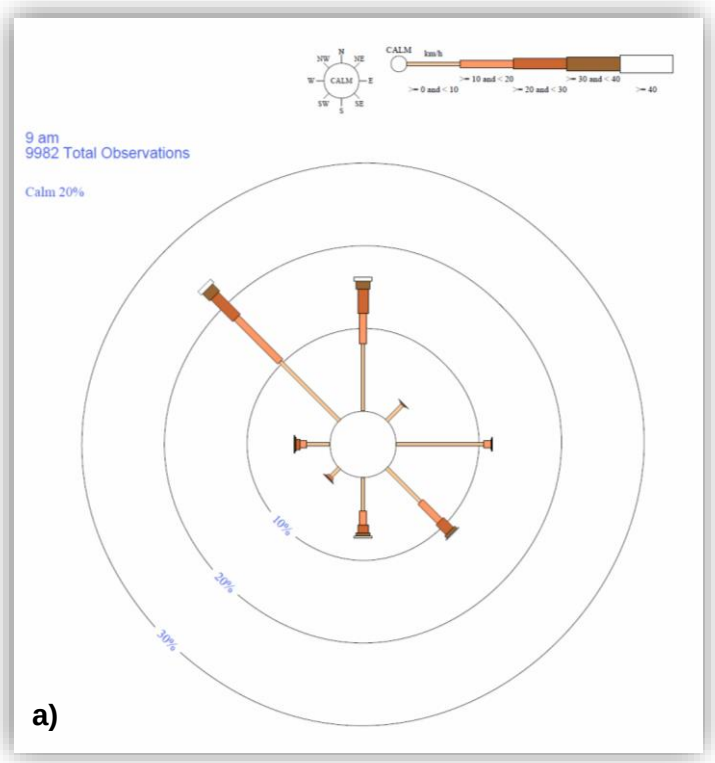
Table 2 – Long Term weather data for the BoM Ti Tree Bend meteorological station (source: BoM http://www.bom.gov.au/climate/averages/tables/cw_091237.shtml).

From the above Vipac notes the following:-

- The long term mean temperature range is between 7.4 and 18.5 ˚C with the coldest month being July and the hottest month being February.
- The rainfall in the region is relatively uniform across the year. Most rainfall and days of rain are in winter (approx. double that of the summer months) with a mean annual rainfall of 676.3 mm.
- Wind speeds tend to be higher during Spring and Summer than Autumn and Winter.

- The above suggests that the potential for dust generation and impact is most likely during the Summer months resulting from the higher temperatures, dryer conditions and higher winds speeds.

Figure 5 presents long term average annual 9 am and 3 pm windroses for the Launceston, Ti Tree Bend BoM meteorological station.



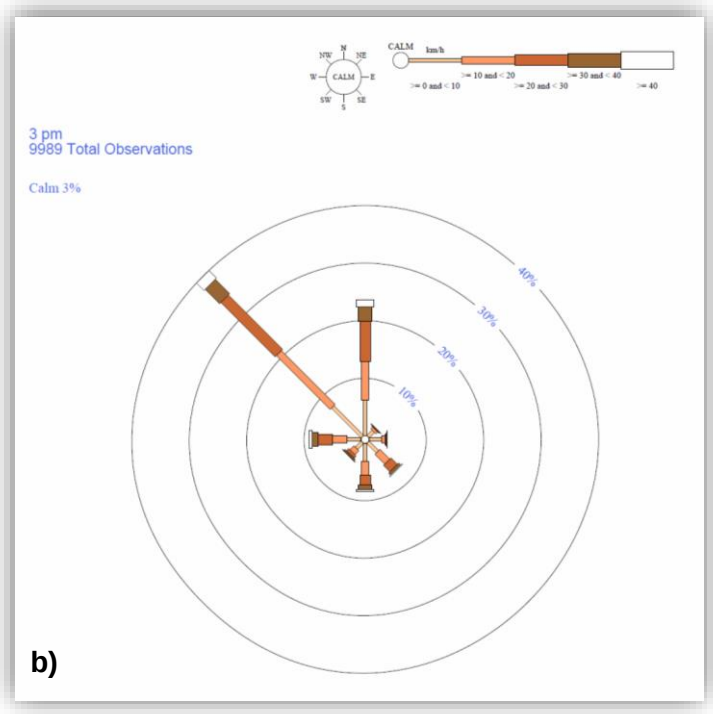


Figure 5 – BoM Ti Tree Bend long term average annual windroses, a) 9 am; and b) 3 pm.

From the above Vipac notes the following:-

- Winds are predominantly from the north-west and north.
- Afternoon winds tend to be stronger, i.e higher wind speeds.
- The above suggests that sensitive areas to the south and south-east of the site are most likely to be impacted by dust generation from the Toll Group Dowling St site, particularly in the afternoon.

8 Mitigation and management

Mitigation measures and management plans are provided in this section for both construction and operational phases of the Project.

8.1 Construction phase

8.1.1 Mitigation strategies

Damping Down

Contractors need to wash or damp down routes within the site. This is important for sites close to residential properties or other sensitive receptors. Best practice methods to limit dust accumulation include:

- Use agreed wet cleaning methods or mechanical road sweepers on all roads at least once a day (during dry weather conditions) or consider using fixed or mobile sprinkler systems; and
- Provide hard-standing areas for vehicles and regularly inspect and clean these areas.

Vehicles

The following controls should be carried out to reduce dust and particulates associated with vehicles - such as that from exhaust emissions, the contact of tyres on the road surface or dust blowing from materials carried:

- All vehicles should switch off engines - no idling;
- Ensure all non-road vehicles comply with appropriate emissions requirements;
- Clean or wash all vehicles effectively before they leave site if there is a risk of affecting nearby sensitive receptors;
- Vehicles carrying dusty materials should be securely covered before leaving the site.

Earthworks

Excavation and earthwork activities can be a potential source of dust outside the site if they are not properly controlled. Contractors need to act to minimise dust disturbance as much as possible by:

- All dusty activities should be damped down, especially during dry weather.
- Minimise drop heights to control the fall of materials;
- Re-vegetate exposed areas that are not to be paved to stabilise surfaces;
- Only remove secure covers in small areas during work and not all at once; and
- Use hessian or mulches where it is not possible to cover stockpiles.

Stockpiles and Storage

Avoid the use of long-term stockpiles on site wherever possible unless it performs the function of visual or noise screening. If necessary, the following measures should be in place:

- Do not build steep sided stockpiles or mounds or those that have sharp changes in shape;

- Whenever possible keep stockpiles or mounds away from the site boundary, sensitive receptors, watercourses and surface drains;
- Take into account the predominant wind direction when siting stockpiles to reduce the likelihood of affecting sensitive receptors.

Chutes and Skips

- Securely cover skips;
- Minimise drop heights to control the fall of materials; and
- Regularly damp down surfaces with water.

8.1.2 Management plan

It is recommended that the following measures and safeguards are implemented in order to minimise potential dust impacts during the construction phase of the Toll Group Dowling St transport hub redevelopment.

Construction phase dust management plan				
Activity	Reference	Control Measure	Frequency	Responsibility
Site Management	SM1	Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	One-off	Environmental Officer
	SM2	Display the name and contact details of person(s) accountable for dust issues on the site boundary.	One-off	Site Manager
	SM3	Record and respond to all dust emissions complaints.	When complaints arise	Environmental Officer
	SM4	Carry out regular site inspections to monitor compliance with dust control procedures, record inspection results, and update inspection log.	Daily	Environmental Officer
	SM5	Record any exceptional incidents that cause dust emissions, either on or off the site, and the action taken is recorded	When incidents occur	Environmental Officer
Site Planning and Maintenance	SM6	Plan site layout: machinery and dust causing activities should be located away from receptors	One-off	Site Manager
	SM7	Cover or fence stockpiles to prevent entrainment when close to boundary	Daily	Environmental Officer
Vehicles and Machinery	VM1	Ensure all vehicles comply with the appropriate emissions requirements.	One-off	Contractor
	VM2	Ensure all vehicles switch off engines when stationary – no idling vehicles.	Daily	All staff
	VM3	Impose and signpost a maximum-speed-limit for unpaved areas to minimise dust generation	One-off	Site Manager

General Operations	GO1	Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays	At all times	Contractors
	GO2	Ensure an adequate water supply on the site for effective dust mitigation	Weekly	Site Manager
	GO3	Use enclosed chutes, conveyors and covered skips where used	At all times	Contractors
	GO4	Minimise drop heights when loading/unloading and use water sprays on such equipment wherever appropriate	At all times	Contractors
	GO5	Ensure equipment is readily available on site to clean any dry spillages	At all times	Site Manager
Earthworks	E1	Re-vegetate earthworks and exposed areas/that are not to be paved to stabilise surfaces	At all times	Contractors
	E2	Use mulch where it is not possible to re-vegetate or cover with topsoil	At all times	Contractors
	E3	Only remove secure covers in small areas during work and not all at once.	At all times	Contractors
Construction	C1	Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place	At all times	Contractors
	C2	Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored correctly	At all times	Contractors
	C3	For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately	At all times	Contractors
Trackout	T1	Regularly use a water-assisted dust sweeper, as necessary, to remove any material tracked out of the site.	Daily	Environmental Officer
	T2	Avoid dry sweeping of large areas	Daily	Environmental Officer
	T3	Ensure vehicles entering and leaving sites are securely covered to prevent escape of materials during transport.	Daily	Contractors

Table 3 – Construction phase dust management plan.

8.2 Operational phase

8.2.1 Mitigation strategies

Internal roads and vehicles areas

Unpaved areas can account for a significant proportion of fugitive dust emissions, especially in dry or windy conditions, when the generation of dust through the movement of vehicles is exacerbated. Best practice methods to limit dust generation include:

- Impose a speed limit on site;
- Hard surface all areas through the site. (**NB**: this is to be done as a part of the development).
- For wash areas (Truck wash and AQIS container wash) inspect and clean as required to prevent build-up of potential dust sources.

Vehicles

The following controls should be carried out to reduce dust and particulates associated with vehicles - such as that from exhaust emissions, the contact of tyres on the road surface or dust blowing from materials carried:

- All vehicles should switch off engines - no idling;
- Ensure all non-road vehicles comply with appropriate emissions requirements
- Inspect all vehicles entering the site and clean or wash vehicles effectively as required to minimise the potential for dust to be brought on-site.

8.2.2 Management plan

It is recommended that the following measures and safeguards are implemented in order to minimise potential dust impacts during operation of the Toll Group Dowling St transport hub following the redevelopment.

Operational phase dust management plan				
Activity	Reference	Control Measure	Frequency	Responsibility
Site Management	SM1	Develop and implement a stakeholder communications plan that includes community engagement.	One-off	Environmental Officer
	SM2	Display the name and contact details of person(s) accountable for dust issues on the site boundary.	One-off	Site Manager
	SM3	Record and respond to all dust emissions complaints.	When complaints arise	Environmental Officer
	SM4	Carry out regular site inspections to monitor compliance with dust control procedures, record inspection results, and update inspection log.	Daily	Environmental Officer
	SM5	Record any exceptional incidents that cause dust emissions, either on or off the site, and the action taken is recorded	When incidents occur	Environmental Officer
Vehicles	VM1	Ensure all vehicles comply with the appropriate emissions requirements.	One-off	Site Manager
	VM2	Ensure all vehicles switch off engines when stationary – no idling vehicles.	Daily	All staff
	VM3	Impose and signpost a maximum-speed-limit.	One-off	Site Manager
	VM4	Inspect and clean wash areas.	Once-weekly	Site Manager and all staff

Table 4 – Operational phase dust management plan.

9 Monitoring

Monitoring is not recommended at this stage as a part of either the construction phase or operational phase dust management plans. Should significant complaints around dust impact be registered then monitoring may be justified to determine the potential extent of the impact, if any.

A monitoring program would likely involve but not be limited to the following:-

- Monitoring at sensitive boundary locations.
- Monitoring of weather conditions, in particular wind direction and speed.

- Monitoring of one or more of the following dust parameters:-
  - TSP
  - PM_{10}
  - $PM_{2.5}$
  - Deposited dust
- Assessment of measured parameters against the project criteria presented in section 4
- Measurement of parameters to an appropriate standard, see following examples:-

AS/NZS 3580.9.3:2015 Methods for sampling and analysis of ambient air - Determination of suspended particulate matter - Total suspended particulate matter (TSP) - High volume sampler gravimetric method

AS/NZS 3580.9.9:2006 Methods for sampling and analysis of ambient air - Determination of suspended particulate matter - PM(sub)10(/sub) low volume sampler - Gravimetric method

AS/NZS 3580.9.10:2006 Methods for sampling and analysis of ambient air - Determination of suspended particulate matter - PM (sub)2.5(/sub) low volume sampler - Gravimetric method

DR AS/NZS 3580.10.1:2016 Methods for sampling and analysis of ambient air. Method 10.1: Determination of particulate matter – Deposited matter – Gravimetric method.

NB: Care should be taken in the design of any monitoring program such that a degree of information regarding sources of dust from surrounding light industrial and commercial sites can be determined from the monitored data.

AJL Consulting Engineers Pty Ltd

35-51 Dowling Street, Launceston

Traffic Impact Assessment

April 2016

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Appendices

1. Introduction

1.1 Background

GHD were engaged by AJL Consulting Engineers to prepare a Traffic Impact Assessment for a proposed expansion and redevelopment of the Toll Transport Hub at 35-51 Dowling Street, Launceston.

1.2 Subject Site

The subject site is 35-51 Dowling Street, Launceston. It has frontage onto Dowling Street, Broadland Drive and Greythorne Street (unformed). The Western Rail Line passes alongside the eastern property boundary and connects to the Bell Bay Line at the East Tamar junction immediately east of the site.

The subject site and surrounds are presented in Figure 1.

Figure 1 Subject Site

Base image source: LISTMap, DPIPWE

1.3 Referenced Materials

The following documents and information sources have been referred to in this report:

- *Launceston Interim Planning Scheme 2015* (the Planning Scheme)
- *Rail Infrastructure Act 2007*
- *Guide to Traffic Generating Developments Version 2.2,* Roads and Maritime Services (RMS), October 2002 (the RMS Guide)
- *Guide to Road Design – Part 4A: Unsignalised and Signalised Intersections,* Austroads 2010
- *AS/NZS 2890.1 Parking facilities – Part 1: Off-street car parking,* 2004
- *AS 2890.2 Parking facilities – Part 2: Off-street commercial vehicle facilities,* 2002
- *AS 2890.3 Parking facilities – Part 3: Bicycle parking,* 2015

- *AS/NZS 2890.6 Parking facilities – Part 6: Off-street parking for people with disabilities,* 2009
- Crash data, Department of State Growth, January 2011 to December 2015
- Traffic count data, GHD 2013
- Preliminary Design Drawings, Transport Hub Redevelopment, 35-51 Dowling Street, AJL Consulting Engineers, issued 3 February 2016
- General project information, AJL Consulting Engineers

1.4 Planning Scheme

The project will be assessed under the *Launceston Interim Planning Scheme 2015* which is referred to as the Planning Scheme in this report.

2. Existing Conditions

2.1 Transport Network

2.1.1 Dowling Street

Dowling Street is a local access road connecting between Elphin Road, at its southern end, and Boland Street, at its northern end. It provides access primarily to light industrial land uses, with some residential development towards the southern end of the road. Racecourse Crescent connects to Dowling Street at a T-junction approximately 60 metres north of the Elphin Road intersection.

Near the subject site, Dowling Street is a two-lane, two-way road with a total road width of 12 metres. With the exception of the intersections at either end of Dowling Street, no line-marking is present. Unrestricted on-street parking is available on both sides of the road. North of the subject site, a section (approximately 70 metres) of indented, 90-degree angle parking is provided.

An asphalt footpath is provided on the eastern side of the road for the full length of Dowling Street and on the western side of the road south of the subject site only.

Photographs of Dowling Street are shown in Figure 2.

Looking north along Dowling Street from the subject site access	*Looking south along Dowling Street from the Broadland Drive junction*
	

Figure 2 Dowling Street

GHD undertook morning and afternoon peak turning movement surveys at both ends of Dowling Street in February 2013. The results suggest peak-hour traffic volumes on Dowling Street as follows:

Table 1 Dowling Street Peak Traffic Volumes [Total and CVs]

Location	Morning Peak		Afternoon Peak	
	Northbound	Southbound	Northbound	Southbound
Northern End (near Boland Street)	135 vph *19 CVs (14%)*	150 vph *14 CVs (9%)*	160 vph *5 CVs (3%)*	160 vph *12 CVs (8%)*
Southern End (near Elphin Road)	308 vph *20 CVs (6%)*	200 vph *17 CVs (9%)*	232 vph *5 CVs (2%)*	274 vph *3 CVs (1%)*

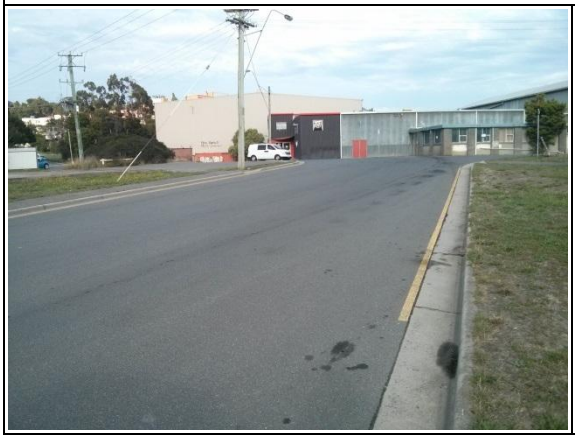
The default urban speed limit of 50 km/h applies to Dowling Street.

2.1.2 Broadland Drive

Broadland Drive is a minor access road connecting to Dowling Avenue at the south-west corner of the subject site and providing access to the existing Toll Transport Hub and other light industrial developments. It has a nominal pavement width of approximately 11 metres and unrestricted on-street parking is available on both sides of the road. An asphalt footpath is provided on the southern side of the road only. There is a grassed nature strip on the northern side of the road.

Photographs of Broadland Drive are shown in Figure 3.

Looking towards Dowling Street from the existing Toll Transport Hub car park



Looking west along Broadland Drive from the existing truck access

Figure 3 Broadland Drive

Traffic volume data was not available for Broadland Drive, however it is likely that traffic volumes are lower than Dowling Street albeit with a significant proportion of heavy vehicle movements due to the Launceston Transport Hub access.

2.1.3 Gazetted B-double Network

The existing Toll Transport Hub attracts a range of heavy vehicles including rigid trucks, semi-trailers and B-doubles. The current approved B-double route network includes Dowling Street, Racecourse Crescent, part of Boland Street and Cimitiere Street. The current network is presented in Figure 4. It is noted that Council have recently requested that the remainder of

Boland Street, the section between Innes Street and Tamar Street, be added to the approved B-double network. All approved routes meet the Tasmanian guidelines[1].

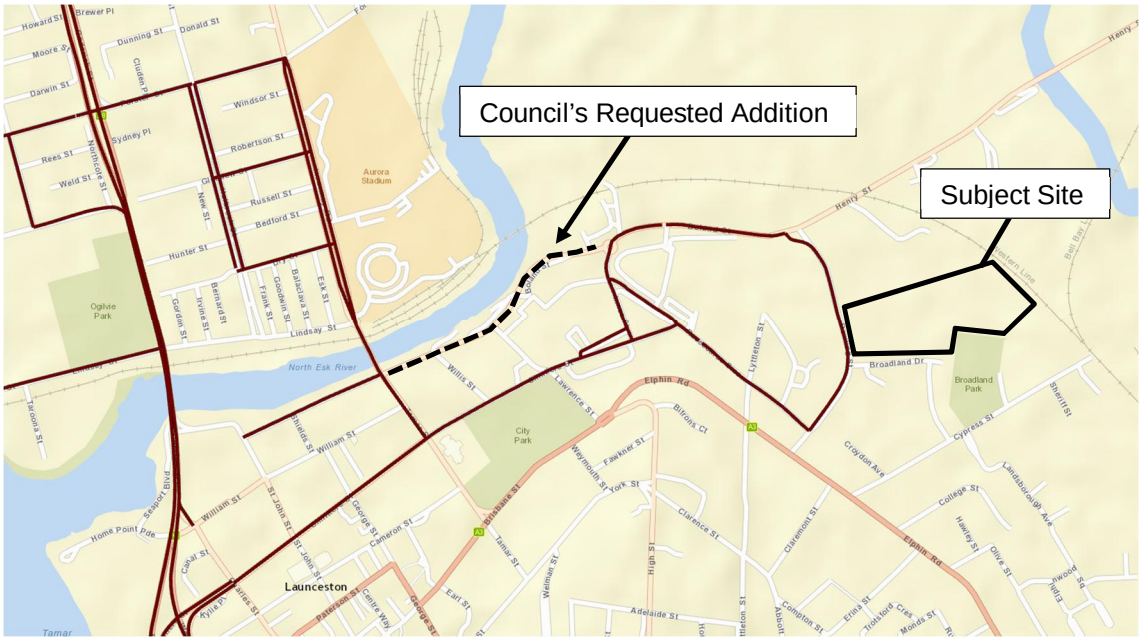


Figure 4 Gazetted B-Double Network

Base image source: National Heavy Vehicle Regulator

2.2 Road Safety Performance

Crash data was obtained from the Department of State Growth for the most recent five-year time period (January 2011 to December 2015) for the full lengths of Dowling Street and Broadland Drive. The crash history is presented in Table 2.

Table 2 Crash History (2011 – 2015)

Location	Number of crashes		Dominant crash type(s)
	Total	Casualty	
Mid-Block Sections			
Dowling St, south of Broadland Dr	2	1	Rear end (1), Loss of control (1)
Dowling St, north of Broadland Dr	3	1	Right through (1), Parked (1)
Broadland Dr	0	0	NA
Intersections			
Dowling St / Elphin Rd	6	1	Rear end (2), Right turn (2)
Dowling St / Broadland Dr	3	1	Right turning (3)
Dowling St / Boland St	4	2	Rear end (2), Pedestrian (1)
Total	***18***	***6***	

Data source: Department of State Growth

[1] Review of Gazetted High Productivity Vehicle Route Network, Department of State Growth, 2011

There were a total of 18 crashes recorded in the last 5 years with 6 of those resulting in injury. None of these crashes were serious or fatal injury crashes. The crash profile is fairly typical given the environment with "rear end" and "right-turning" crashes being more common. The only crash involving a heavy vehicle was a rear end collision between a truck and a car on Dowling Street near Elphin Road.

There were several crashes involving vulnerable road users represented in the data including:

- One bicycle crash at each of the Broadland Drive, Boland Street and Elphin Road junctions with Dowling Street, all resulting in minor injury;
- One pedestrian crash at Boland Street requiring first aid; and
- Two Motorcycle crashes mid-block on Dowling Street.

Overall, the crash history does not suggest a particular issue that might be exacerbated by the proposed development.

3. Proposed Development

3.1 Proposed Transport Hub Redevelopment

The proposed redevelopment of the Launceston Transport Hub will involve significant rework of the site including:

- Demolition of the existing warehouse and office on Broadland Drive
- Construction of a new site office and car park (867 m^2)
- Expansion of Warehouse A from 5,807 m^2 to 11,866 m^2
- Construction of a new Warehouse B (5,569 m^2)
- New container wash, customer pick-up warehouse, truck wash and refuelling station

The redevelopment will reconfigure existing vehicular accesses, truck parking areas and container storage areas. A large component of the redevelopment is the realignment of the existing rail connection to the site to create a more efficient rail terminal and to improve use of the total space on the site.

A site plan of the proposed redevelopment is provided in Figure 5.

Figure 5 Site Plan

Image source: DWG No: A002, Site Plan Rev B, AJL Consulting Engineers, issued 18 April 2016

While the transport hub will operate as a single site, the proposed redevelopment includes subdividing the property into three lots. It is therefore important that each lot is capable of providing its own access to the public road network, in accordance with the Planning Scheme, in the event part of the site is sold.

3.2 Site Access

The proposed development will reduce the total number of vehicular accesses to the site from five to four. The locations of existing accesses are presented in Figure 6.

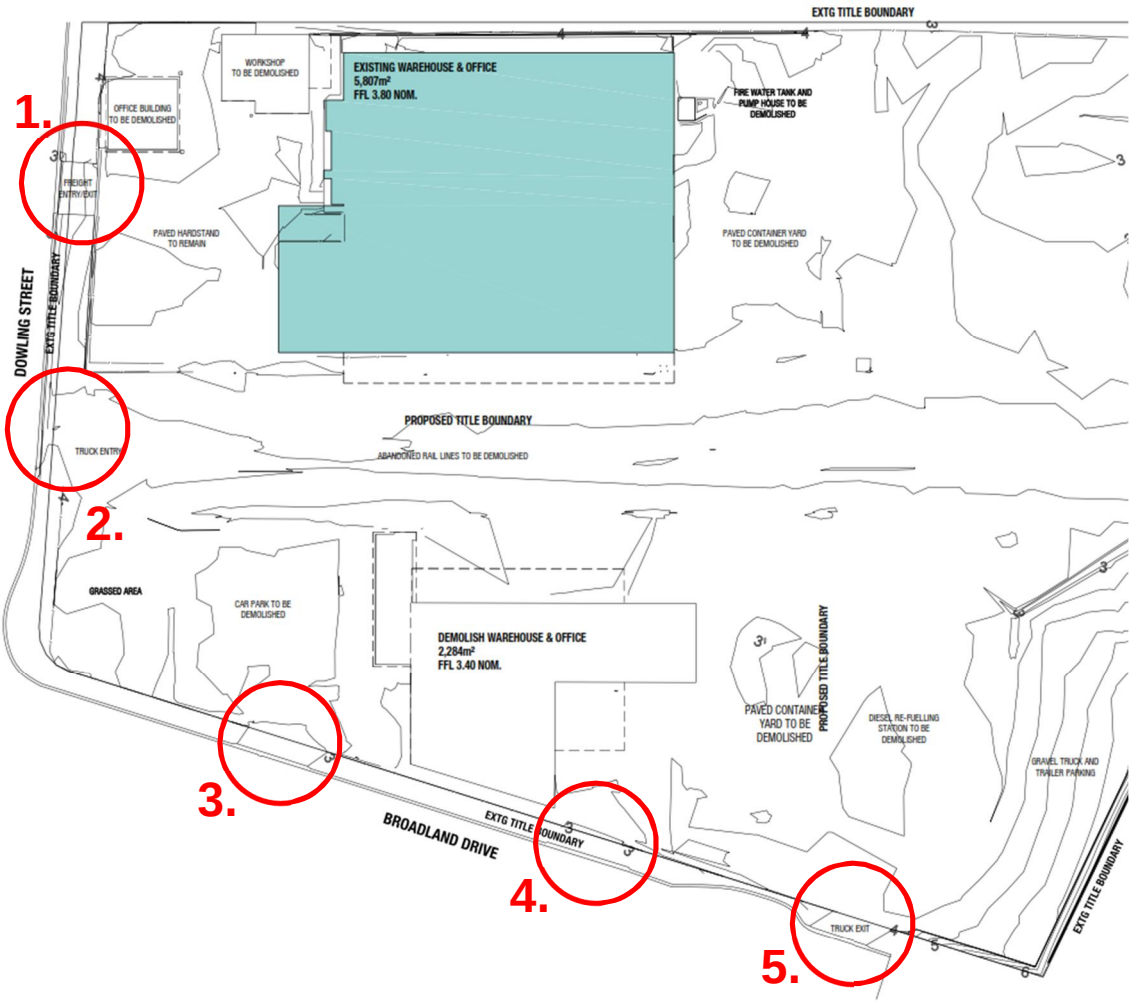


Figure 6 Existing Access Locations

Image source: DWG No: A001, Existing Site Conditions and Demolition Plan, AJL Consulting Engineers, issued 18 April 2016

Changes to accesses will be as follows:

- **Access 1**

  The purpose of this existing area will remain unchanged from current operation and the existing entry/exit will be retained. A new automatic sliding gate will be provided.

- **Access 2**

  The existing truck exit on Dowling Street will be realigned and converted to a four-lane, controlled truck entry point. The existing crossover will be widened from 10 metres to 21.6 metres, allowing for four 5.4-metre truck lanes. The access will be fully controlled with boom gates located approximately 40 metres from the property boundary.

- **Access 3**

  The existing car park will be consolidated and reconfigured and the existing access will be retained. Access gates will be open during business hours and there will be swipe card access out of hours. The existing crossover has a width of approximately 17 metres.

- **Access 4**

  The existing truck exit will be removed.

- **Access 5**

  The existing truck entry on Broadland Drive will be converted to a controlled truck exit point. Automatic sliding gates will be installed which are closed by default but open automatically when a truck approaches.

There will be strictly no pedestrian access via truck access gates. Turnstiles and locked pedestrian access gates will be provided at three locations along Broadland Drive. Pedestrian access is further discussed in Section 4.1.6 of this report.

3.3 Traffic Generation and Distribution

One of the key goals of the proposed development is to relocate the existing bottle and packaging operations from Bell Bay to Launceston and make more efficient use of rail transport. Currently, bottles are transported from Bell Bay via B-doubles, unloaded at the site and loaded onto semi-trailers before being taken to Boags Brewery in the Launceston CBD.

The existing B-double routes for Toll trucks are presented in Figure 7. Note that Toll have special dispensation from the Department of State Growth to use Boland Street in preference to Cimitiere Street for trips to and from Bell Bay despite it not being part of the Gazetted B-double Route Network.

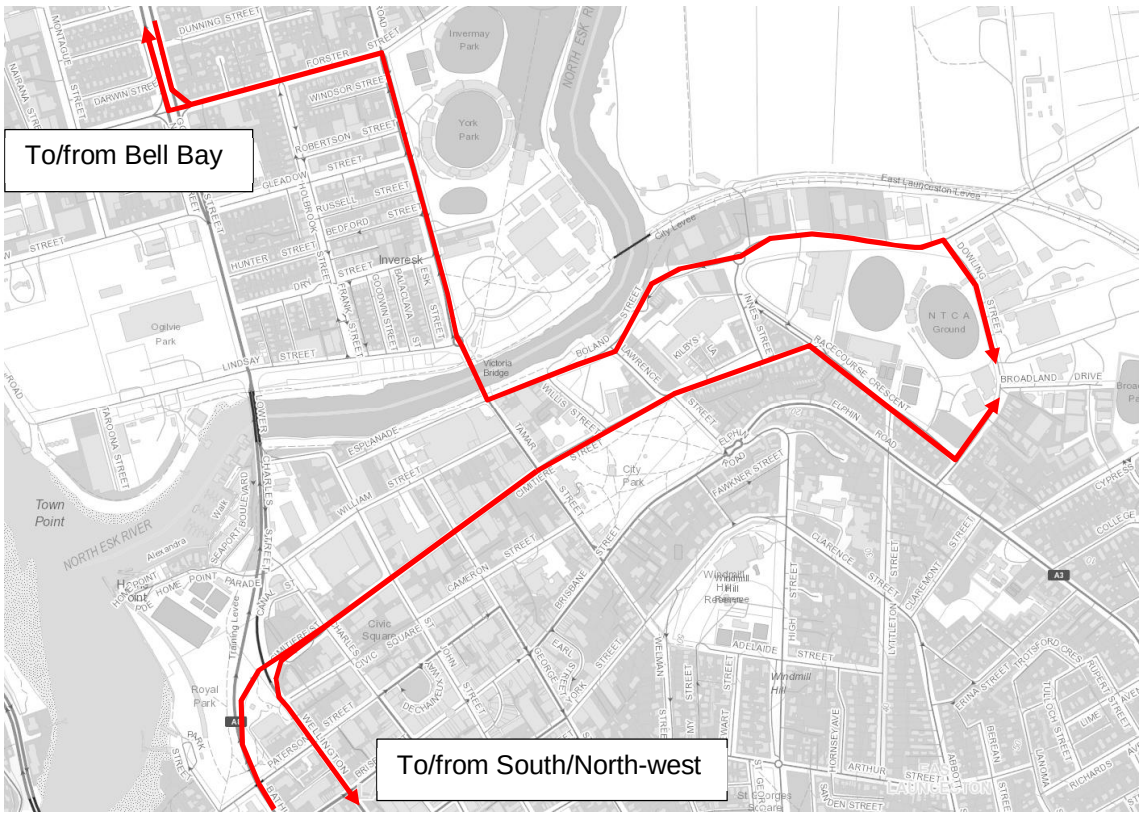


Figure 7 Toll B-Double Routes

Base image source: LISTMap, DPIPWE

As part of the redevelopment of the Transport Hub, the existing Bell Bay operations will be relocated to the site, taking up a portion of the expanded Warehouse A building. Bottles will be transported from Bell Bay via the rail corridor before being loaded onto semi-trailers and delivered to Boags Brewery.

All existing local and regional distribution operations at the site will continue as per the existing conditions, albeit with entry via Dowling Street and exit via Broadland Drive, which is switched from the current arrangement.

Therefore, there will be a general mode shift from road freight to rail and a resulting decrease in the level of traffic accessing the site. In particular, the amount of B-doubles using the local road network, including Invermay Road and Cimitiere Street, will decrease.

Toll have advised that the approximate volume of freight handled through the site is 28,000 TEU per annum. This is equivalent to an average of 52 B-double movements per day (one-way laden) or 76 semi-trailer movements per day (one-way laden) or some combination of the above. In addition, there are a number of rigid truck movements including local and regional carriers (contractors) and occasional trips by customers and visitors.

The existing Launceston Transport Hub has a total of 130 staff with arrival times between 4:00 am and 7:00 am, and departure times between 4:00 pm and 6:30 pm. There will be no change in staffing as a result of the proposed redevelopment.

In summary, the proposed redevelopment of the site will *not increase* the total level of traffic accessing the site. More efficient use of rail transport may in fact *reduce* traffic movements to and from the site.

3.3.1 Planning Scheme Assessment

Clause E4.5.1-A3 of the Planning Scheme states that: *"The annual average daily traffic (AADT) of vehicle movements, to and from a site, using an existing access or junction, in an area subject to a speed limit of 60km/h or less, must not increase by more than 20% or 40 vehicle movements per day, whichever is greater."*

Since the proposed development is unlikely to generate additional traffic, and may in fact reduce the total level of traffic accessing the site, the proposal complies with the acceptable solution.

4. Traffic Impacts

4.1 Vehicle Access

4.1.1 Access Arrangements

Clause E4.6.2-A2 of the Planning Scheme states: *"No more than one access providing both entry and exit, or two accesses providing separate entry and exit, to roads in an area subject to a speed limit of 60km/h or less."*

While the site will be separated into three titles, it will operate as a single facility and therefore the proposal relies on performance criteria which are as follows: *"For roads in an area subject to a speed limit of 60km/h or less, accesses and junctions must be safe and not unreasonably impact on the efficiency of the road, having regard to:*

(a) the nature and frequency of the traffic generated by the use;

(b) the nature of the road;

(c) the speed limit and traffic flow of the road;

(d) any alternative access to a road;

(e) the need for the access or junction;

(f) any traffic impact assessment;

(g) any written advice received from the road authority."

The Launceston Transport Hub attracts a range of traffic movements including B-Doubles, semi-trailers, medium and large rigid trucks, delivery vans and light vehicles. The proposed development will not increase the level of traffic accessing the site and is likely to reduce the number of B-Double movements due to a general mode shift to rail.

Dowling Street and Broadland Drive are located in a predominantly light industrial area and the road construction is suitable for access by heavy vehicles. Dowling Street is part of the gazetted B-Double route network. Both roads are subject to the default urban speed limit of 50 km/h.

The site is designed such that it is separated into discrete areas serving different functions as follows:

- Outside carrier pickup, existing Warehouse A and hardstand
  - Entry/exit via Access 1 on Dowling Street
- Container freight handling and truck storage, main site
  - Entry via Access 2 and exit via Access 5
- Office, staff and visitor car park
  - Entry/exit via Access 3

Given that there is no regular access between each of the above areas within the site, the proposed development would comply in principle with the acceptable solution. Furthermore, the proposed development will not create any new accesses and in fact will reduce the total number of vehicular site accesses from five to four. Therefore, it is considered to align with the objective Clause E4.6.2 which is *"to ensure that the safety and efficiency of roads is not reduced by the creation of new accesses and junctions."*

On the above basis, the proposed development complies with the performance criteria outlined in Clause E4.6.2-P2 of the Planning Scheme.

4.1.2 Access Design

Australian Standard AS2890.2, *Parking facilities – Part 2: Off-street commercial vehicle facilities,* 2002, provides the following general requirements for access driveways:

- *"For regular service from a minor road … the swept path of the maximum size design vehicle using the facility may be allowed to occupy the entire width (less specified clearances) of a two-way access driveway when the vehicle is entering or leaving the minor road.*
- *On a minor public road, vehicles shall be able to enter and leave the access driveway without infringing the boundaries of the roadway … wherever practicable, vehicles entering the access driveway should be able to turn entirely from the kerbside lane.*
- *Actual driveway design will depend on the design vehicle, the desired speed of turn and the conditions imposed on the turning manoeuvre [see above] … access driveway designs based on computer generated plots of actual vehicle manoeuvre paths may be used as alternatives provided the plots can be shown to verify the design."*

Each of the existing and proposed accesses are discussed in the following sections.

Access 1 – Outside Carrier Pickup

The existing access has a width of approximately 12 metres at the edge of the road, tapering back to 9 metres at the property boundary. The access is capable of accommodating the swept path of the heavy rigid (12.5 metre) and articulated (19 metre) design vehicles in accordance with AS2890.2 as demonstrated in Appendix A.

This area of the site will continue as per the current operation with a new automatic sliding gate installed at the property boundary. The gate will remain open during normal business hours of 6:00 am to 4:00 pm to prevent any vehicles queuing onto Dowling Street.

Access 2 – Main Site Entry

The main site entry has a proposed width of 21.6 metres, allowing for four 5.4-metre truck lanes. As demonstrated in Appendix A, the access is capable of accommodating the swept path of the 26 metre B-double design vehicle. The access will include boom gates and sliding gates approximately 40 metres from the property boundary and is shown in Figure 8.

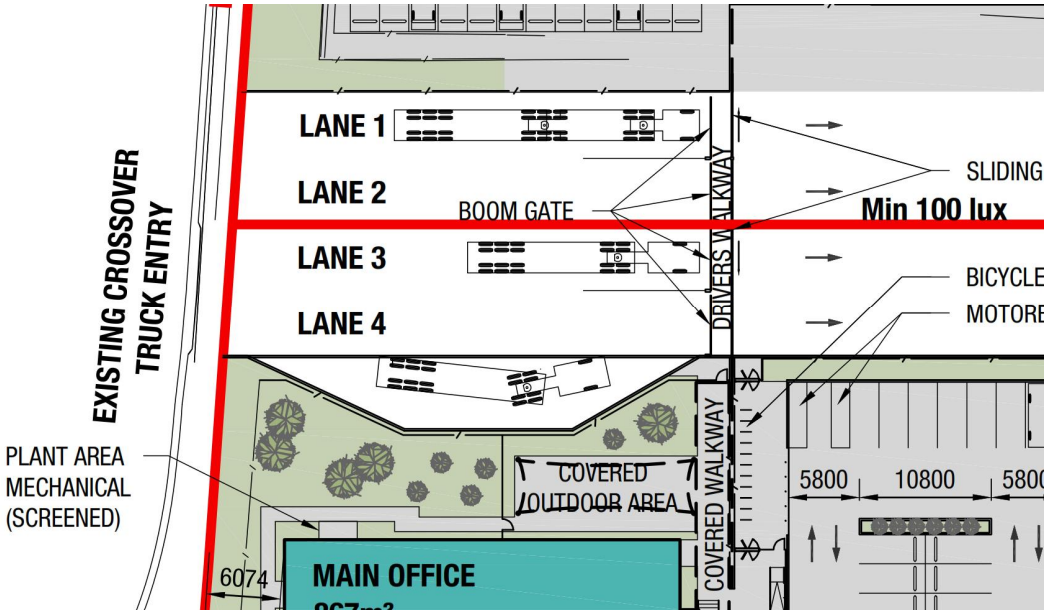


Figure 8 Access 2 – Main Site Entry

Image source: DWG No: A002, Site Plan Rev B, AJL Consulting Engineers, issued 18 April 2016

Three lanes will be for contractor trucks who will be required to stop at the boom gate and check in at the office. The remaining lane will be an express lane for Toll trucks, which will be allowed to drive straight into the site without checking in. A 1.5-metre wide pedestrian walkway is provided for this purpose between the boom gates and the sliding gates.

The 40 metre queuing space between the boom gates and the property boundary will allow for storage of up to one B-double and a rigid truck, two semi-trailers or three rigid trucks in each of the three lanes. An additional waiting bay is provided alongside Lane 4 which is capable of storing a 19 metre semi-trailer.

From Section 3.3, the site is expected to attract around 60-70 articulated vehicle (semi-trailer and B-Double) movements per day which translates to some 6-7 vehicles per hour during peak times. It is considered that sufficient storage is provided at the gates that queuing is unlikely to extend out onto Dowling Street while drivers check in to the site.

Access 3 – Staff and Visitor Carpark

See Section 4.4.3 of this report.

Access 5 – Main Site Exit

The main site exit has a width of approximately 14 metres. As demonstrated in Appendix A, it is capable of accommodating the swept path of the 26 metre B-double design vehicle. The access will include an automatic sliding gate which will remain closed by default at all times, opening automatically when a vehicle approaches.

4.1.3 Internal Access

Access between the main site and the car park may be required in the following circumstances:

- The proposed development includes a 24 space car park for the purpose of car storage. Car carriers will enter the site via Access 2 on Dowling Street and be directed to park near the car storage area. Vehicles will then be transported between the car carrier and the car park as required.
- Employee and contractor vehicles, may be required within the main site for various purposes. Access for these vehicles is located at the south-east corner of the car park and parking is provided outside Warehouse B.

Note that all access to the main site will be tightly controlled by locked gates.

4.1.4 Design Vehicle Assessment

Clause E6.6.4-A1 of the Planning Scheme states that: *"The area and dimensions of loading bays and access way areas must be designed in accordance with AS2890.2 – 2002, Parking Facilities, Part 2: Parking facilities – Off-street commercial vehicle facilities, for the type of vehicles likely to use the site."*

Similarly, Clause E6.6.4-A2 of the Planning Scheme states that: *"It must be demonstrated that the type of vehicles likely to use the site can enter, park and exit the site in a forward direction, without impact or conflicting with areas set aside for parking or landscaping, in accordance with AS2890.2 – 2002, Parking Facilities, Part 2: Parking facilities – Off-street commercial vehicle facilities."*

The swept paths for various movements to, from and within the site are demonstrated in Appendix A for the adopted design vehicles. Semi-trailer parking is provided in the form of angle parking bays. Parking bays which allow a driver-side reversing manoeuvre will be reverse entry spaces whereas spaces requiring a passenger-side reversing manoeuvre can be entered and exited in a forward direction. Appendix A demonstrates the use of these spaces.

The proposed development complies with the requirements of AS2890.2 and therefore complies with the acceptable solutions A1 and A2 of Clause E6.6.4 of the Planning Scheme.

4.1.5 Sight Distance Assessment

Clause E4.6.4-A1 of the Planning Scheme states that: *"Sight distances at … an access or junction must comply with the Safe Intersection Sight Distance shown in Table E4.6.4."* An extract from Table E4.6.4 of the Planning Scheme is provided in Table 3.

Table 3 Safe Intersection Sight Distance

Vehicle Speed km/h	Safe Intersection Sight Distance (S.I.S.D) in metres, for speed limit of:	
	60 km/h or less	Greater than 60 km/h
50	80	90
60	105	115
70	130	140

Source: Launceston Interim Planning Scheme 2015

Given a speed limit of 50 km/h, the minimum SISD which must be provided is 80 metres. The available sight distance at each exit point has been assessed as follows:

- Access 1 – Dowling Street
  - Northbound 130 metres
  - Southbound >130 metres
- Access 3 – Broadland Drive
  - Eastbound 80-90 metres to vehicles turning from Dowling Street
  - Westbound Limited due to on-street parking, can be up to 80 metres if 15 metre NO STOPPING zone provided east of access
- Access 5 – Broadland Drive
  - Eastbound 100 metres (accounting for on-street parking activity)
  - Westbound NA

Subject to the recommendation for a NO STOPPING zone east of the car park access, all accesses provide sufficient sight distance in accordance with Clause E4.6.4-A1 of the Planning Scheme.

4.1.6 Pedestrian Access

Clause E6.6.3-A1.1 of the Planning Scheme states that: *"Uses that require 10 or more parking spaces must (a) have a 1m wide footpath that is separated from the access ways or parking aisles, except where crossing access ways or parking aisles … and (b) be signed and line marked at points where pedestrians cross access ways or parking aisles."*

Similarly, Clause E6.6.3-A1.2 of the Planning Scheme states that: *"In parking areas containing accessible car parking spaces for use by persons with a disability, a footpath having a minimum width of 1.5m and a gradient not exceeding 1 in 14 is required from those spaces to the main entry point to the building."*

The proposed development site will include a network of marked pedestrian walkways inside the fence line of the site with a minimum width of 1.5 metres. The locations of walkways are presented in Figure 9.

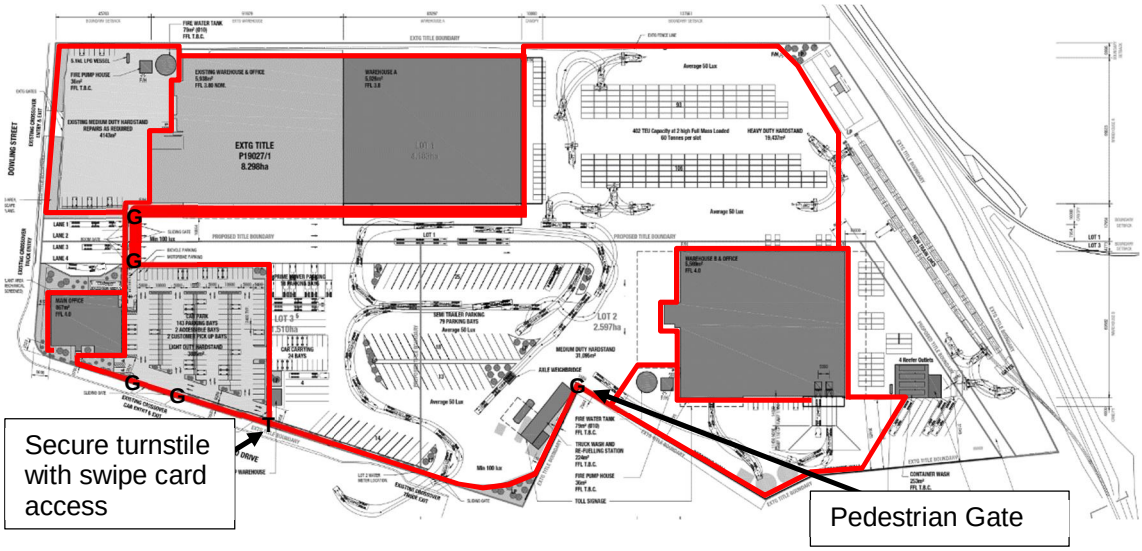


Figure 9 Pedestrian Access

Base image source: DWG No: A002, Site Plan Rev B, AJL Consulting Engineers, issued 18 April 2016

To accompany the walkways, Toll will implement a number of control measures to ensure safe access through the site for pedestrians including the following:

- Concrete, steel and relocatable barriers separating walkways from active traffic access paths where necessary;
- Secure turnstiles at entry points to the main site;
- Gate controls at pedestrian crossings;
- PPE requirements including high visibility clothing to be worn at all times while on site;

As part of the redevelopment, Toll will also develop a comprehensive pedestrian traffic safety plan for the site.

The proposed development is considered to provide safe footpaths in compliance with the acceptable solutions A1.1 and A1.2 of Clause E6.6.3 of the Planning Scheme.

4.2 Rail Network

Clause E4.6.1-A1.1 of the Planning Scheme states that: *"…the following development must be located at least 50m from the rail network, or a category 1 road or category 2 road, in an area subject to a speed limit of more than 60km/h: (a) new buildings; (b) other road or earth works; and (c) building envelopes on new lots."*

The subject site is located adjacent to the East Tamar junction and the Western Line (as defined in Schedule 1 of the *Rail Infrastructure Act 2007)* passes alongside the eastern property boundary. The proposed development includes buildings and new hardstand within 50 metres of the rail network and therefore relies on performance criteria, which are as follows:

> *"The location of development, from the rail network, or a category 1 road or category 2 road in an area subject to a speed limit of more than 60km/h, must be safe and not unreasonably impact on the efficiency of the road or amenity of sensitive uses, having regard to:*
>
> *(a) the proposed setback;*

(b) the existing setback of buildings on the site;

(c) the frequency of use of the rail network;

(d) the speed limit and traffic volume of the road;

(e) any noise, vibration, light and air emissions from the rail network or road;

(f) the nature of the road;

(g) the nature of the development;

(h) the need for the development;

(i) any traffic impact assessment;

(j) any recommendations from a suitably qualified person for mitigation of noise, if for a habitable building for a sensitive use; and

(k) any written advice received from the rail or road authority."

The existing use of the eastern area of the site was for a gravel container yard. The proposed development will include new rail infrastructure within the site and connecting to the existing railway, a new heavy-duty hardstand to the eastern property boundary, which is set back 15 metres from the railway and a new container wash building to be constructed approximately 45 metres from the railway. The existing dangerous goods transfer station will be retained with a setback of approximately 18 metres from the railway.

This section of the rail network is used infrequently. It is located west of the East Tamar junction such that the Bell Bay line bypasses the site and the only rail trip attractor west of the site is the museum at Inveresk.

One of the objectives of the proposed development is to improve the efficiency of operations at the Toll Transport Hub and to reduce road freight by making better use of the rail connection to Bell Bay. As such, the proposal will rely on, and integrate with, the existing rail network.

On the above basis, the proposed development is considered to comply with the performance criteria outlined in Clause E4.6.1-P1 of the Planning Scheme.

4.3 Surrounding Road Network Impacts

4.3.1 Traffic Efficiency

The proposed development is not expected to generate additional traffic onto the surrounding road network, and due to a mode shift of Bell Bay freight to rail, may reduce the number of B-double movements in the external road network. This would result in a reduction in road freight volumes, and therefore improved traffic performance, on Dowling Street, Boland Street and Invermay Road.

The only significant change in traffic activity as a result of the proposal will be the switching of entry and exit points so that trucks will enter the site directly via Dowling Street and exit onto Broadland Avenue. This will change traffic movements at the Broadland Drive / Dowling Street junction from predominantly right-in/left-in movements to right-out/left-out.

Given that existing peak traffic volumes on Dowling Street are less than 500 vehicles per hour, there are regular gaps in traffic and there is considered to be sufficient capacity for the changed operation with very little impact on performance.

4.3.2 Road Safety

Since the proposed development will not increase the level of traffic accessing the site, there are unlikely to be any adverse road safety impacts. There is ample sight distance at the

Broadland Drive / Dowling Street junction such that a heavier left-out and right-out flow will not cause additional risk of collision.

The existing crossover on Dowling Street which will form the main site entry is proposed to be widened from 10 metres to approximately 21 metres, increasing the distance pedestrians will have to cross on the Dowling Street footpath. While this is a much larger crossing distance, the footpath is level and there is good sight distance in both directions. The proposed widening is unlikely to cause significant safety issues for pedestrians.

4.4 Parking Assessment

4.4.1 Planning Scheme Assessment

Clause E6.5.1-A1 of the Planning Scheme states that: *"The number of car parking spaces must: (a) not be less than 90% of the requirements of Table E6.1… or (c) not exceed the requirements of Table E6.1 by more than 2 spaces or 5% whichever is the greater."* For the transport depot and distribution land use, no specific on-site parking requirement is set out in Table E6.1.

The RMS Guide provides advice on parking requirements for container depots, where a container depot is defined as:

> *"A road transport terminal where one or more of the following operations are performed:*
>
> – *Unloading of containers for the purposes of delivery to individual consignees.*
> – *Consolidation of goods from different consignors into full container loads for dispatch.*
> – *Repair, refitting and / or storage of containers."*

The following parking advice is provided:

> *"Off-street employee parking (i.e. fleet and contract operated) as well as visitor parking, must be provided to satisfy the peak demand, as determined by surveys of similar existing developments. The location of this parking must be independent of the normal operations of the depot.*
>
> *An area of 50m^2 per vehicle must be provided for vehicles held or queued on the site. Consideration must be given to providing suitable on-site parking (overnight or unattended) for trucks."*

The proposed development provides a total of 147 car parking spaces within the main car park catering for both employee and visitor parking. The car park is separated from the normal operation of the site and is accessed via an existing driveway on Broadland Drive located clear of truck manoeuvring areas. The car park will include:

- 10 signposted visitor parking spaces, and
- 12 reserved spaces for management.

The total supply of 147 car parking spaces represents an increase of 70 spaces compared to the existing situation. Given that there will be a total of 130 staff employed at the site, and assuming each staff member drives their own car to work, this leaves 17 parking spaces for visitors and customers.

It is considered that the parking supply is sufficient for the needs of the proposed development. Furthermore, the increase in car parking will reduce the level of on-street parking in the immediate surrounding area where vehicles have been observed to park on the nature strip.

There is a large area of the site (approximately 10,200 m^2 including manoeuvring aisles) dedicated to truck storage including 5 B-double parking spaces, 83 semi-trailer parking spaces and 18 spaces for prime movers (no trailer).

4.4.2 Special Parking Requirements

Accessible Car Parking

Clause E6.5.1-A2 of the Planning Scheme states that: *"The number of accessible car parking spaces for use by persons with a disability for uses that require 6 or more parking spaces must be in accordance with Part D3 of the National Construction Code 2014, as amended from time to time."*

The current document is the *National Construction Code 2015.* The proposed development has buildings falling into Class 5 (office) and Class 7b (warehouses), therefore the number of accessible car parking spaces required is 1 space for every 100 car parking spaces or part thereof.

Given a total of 147 parking spaces, the proposed supply of 2 accessible car parking spaces satisfies the requirements of the National Construction Code 2015 and therefore the proposed development complies with the acceptable solution.

Bicycle Parking

Clause E6.5.2-A1 of the Planning Scheme states that: *"The number of bicycle parking spaces must be provided on either the site or within 50m of the site in accordance with the requirements of Table E6.1."* For the transport depot and distribution land use, Table E6.1 requires 1 bicycle space per 5 employees.

Given a total of 130 employees, the Planning Scheme requires storage for 26 bicycles. There is an area of the main car park set aside for bicycle parking which contains 11 bicycle hoops (22 bicycles). This is considered sufficient for the needs of the development based on the following:

- The provision of 22 bicycle parking spaces represents a deficiency of just 15% compared to the requirements of acceptable solution.
- The use of the site as a transport hub does not generate a specific need for bicycle parking, rather bicycle parking is provided to facilitate that mode of transport for staff.
- ABS Census data suggests around 1% of Launceston residents who travel to work use a bicycle. The proposed supply of 22 parking spaces represents 17% of staff.
- The physical space constraints of the bicycle parking area limit the number of spaces which can be provided.

Clause E6.6.6-A1 of the Planning Scheme states that: *"Bicycle parking and storage facilities for uses that require 5 or more bicycle spaces by Table E6.1 must: (a) be accessible form a road, cycle path, bicycle lane, shared path or access way; (b) be located within 50m from the main entrance; (c) be visible from the main entrance or otherwise signed; and (d) be available and adequately lit during the times they will be used."*

Clause E6.6.6-A2 of the Planning Scheme states that: *"Bicycle parking spaces must: (a) have minimum dimensions of 1.7 m in length, 1.2 m in height and 0.7 m in width at the handlebars; (b) have unobstructed access with a width of at least 2m and a gradient of no more than 5% from a road, cycle path, bicycle lane, shared path or access way; and (c) include a rail or hoop to lock a bicycle to that meets AS 2890.3 1993 Parking facilities – Bicycle parking facilities."*

The proposed bicycle parking area complies with the above requirements.

4.4.3 Car Park Layout and Manoeuvring

Clause E6.6.2-A1.1 of the Planning Scheme states that:

> *"Car parking, access ways, manoeuvring and circulation spaces must:*

(a) provide for vehicles to enter and exit the site in a forward direction where providing for more than 4 parking spaces;

(b) have a width of vehicular access no less than the requirements in Table E6.2, and no more than 10% greater than the requirements in Table E6.2;

(c) have parking space dimensions in accordance with the requirements in Table E6.3;

(d) have a combined access and manoeuvring width adjacent to parking spaces not less than the requirements in Table E6.3 where there are 3 or more car parking spaces; and

(e) have a vertical clearance of not less than 2.1 metres above the parking surface level."

The proposed car park layout is presented in Figure 10.

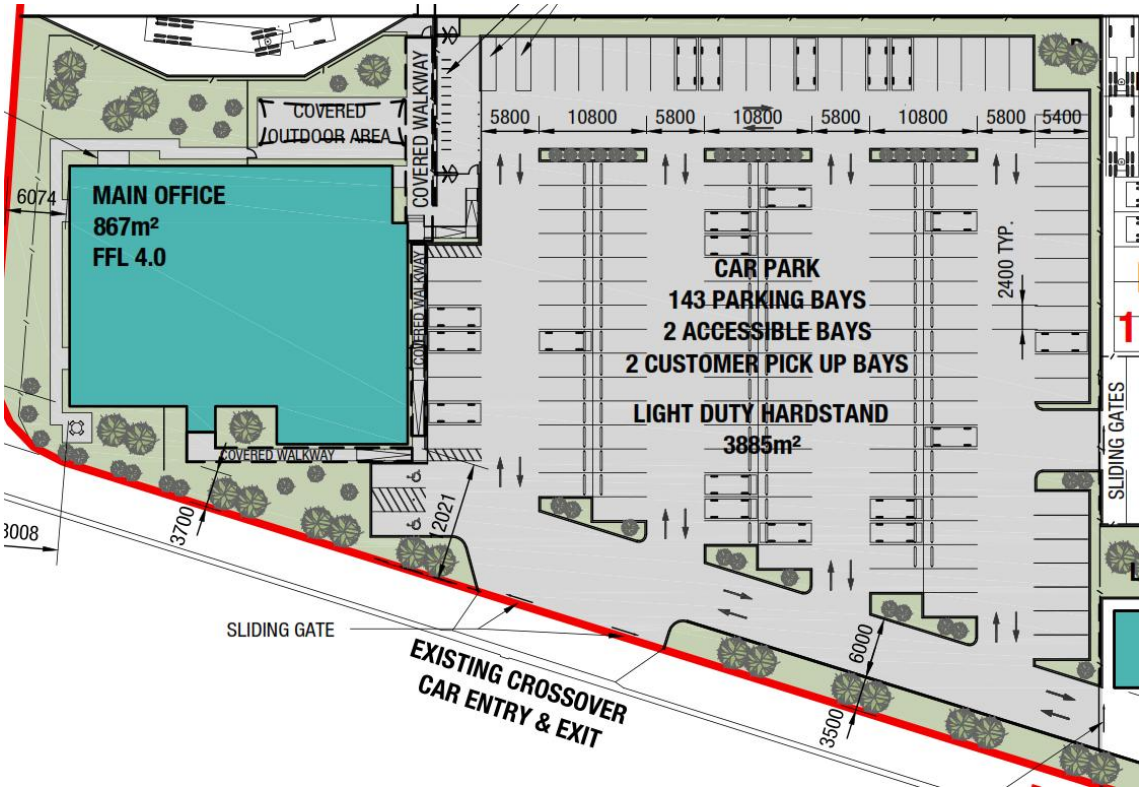


Figure 10 Proposed Car Park

Image source: DWG No: A002, Site Plan Rev B, AJL Consulting Engineers, issued 18 April 2016

The proposed car parking spaces are 5.4 metres long and 2.4 metres wide and therefore do not comply with the requirements of Table E6.3. The existing access has a width of approximately 19 metres and greatly exceeds the requirements of Table E6.2. The proposed development therefore relies on performance criteria, which refer to the provisions of the relevant Australian Standards.

AS2890.1 provides the following dimensional standards for Class 1A car parks (residential, domestic and employee parking):

- Parking space length 5.4 metres
- Parking space width 2.4 metres
- Aisle width 5.8 metres

The proposed car park complies with the above dimensions.

For a Class 1A facility on a local road, AS2890.1 recommends a combined entry/exit width of 6.0 to 9.0 metres. It is therefore recommended that the existing access be reduced significantly in width using line-marking or traffic islands to comply with the Standard.

Clause E6.6.2-A1.2, 1.3 and 1.4 state that:

> *"All accessible spaces for use by persons with a disability must be located closest to the main entry point to the building.*
>
> *Accessible spaces for people with disability must be designated and signed as accessible spaces where there are 6 spaces or more.*
>
> *Accessible car parking spaces for use by persons with disabilities must be designed and constructed in accordance with AS/NZS2890.6 – 2009 Parking facilities – Off-street parking for people with disabilities."*

Two accessible car parking spaces are provided close to the building entrance with ramp access to the proposed footpath and include a shared area in accordance with AS2890.6.

4.5 Subdivision

The Launceston Transport Hub, while it will operate as a single site, is proposed to be subdivided into three titles as shown in Figure 5 and summarised as follows:

- Lot 1 – Existing Warehouse & Office, Warehouse A, Rail Terminal and Container Storage
- Lot 2 – Warehouse B & Office
- Lot 3 – Main Office and Car Park

It is possible that at some point in the future, one or more of these lots may be sold and therefore must be capable of providing sufficient parking and access for its use independent of the remainder of the site. Each of the lots are assessed in the following sections:

Lot 1

Lanes 1 and 2 of the main site truck entry will be allocated to Lot 1 resulting in a total access width of 10.8 metres. This will allow truck entry and exit to the rear of the site where the container storage and rail terminal are located. The existing crossover on Dowling Street outside the warehouse will also provide access to Lot 1.

22 parking spaces (including 1 accessible car parking space) are proposed to be provided on Lot 1. The existing hardstand at the front of the warehouse is capable of accommodating significantly more parking spaces, which may be required depending on the potential use of these warehouses.

Lot 2

Lot 2 will be accessed via the truck exit at the end of Broadland Drive. The access has a width of approximately 14 metres and is capable of operating as a two-way entry/exit. 13 parking spaces (including 1 accessible car parking space) are proposed to be provided on Lot 2. Given the large area available, it is considered that significantly more parking spaces can be provided if required by the future use of this warehouse.

Lot 3

Lanes 3 and 4 of the main site truck entry will be allocated to Lot 3 resulting in a total access width of 10.8 metres. This will allow truck entry and exit to the rear of the site. Lot 3 contains the main site car park, containing a total of 147 car parking spaces, which is accessed by Broadland Drive.

Summary

Each of the lots on the site can be accessed independently, and could provide sufficient on-site parking, in the event one or more lots are sold off.

5. Conclusions

This report has investigated the potential traffic impacts of the proposed redevelopment of the Launceston Transport Hub at 35-51 Dowling Street, Launceston. The key findings of the report are as follows:

- The proposed development is likely to reduce the total level of traffic accessing the site due to a general mode shift to rail. This will reduce heavy vehicle (B-double) freight volumes on Dowling Street, Boland Street and Invermay Road.
- The proposed reconfiguration of site accesses will not result in detrimental impacts on the local road network including Dowling Street and Broadland Drive. Queuing at the main site entry is unlikely to extend onto the road.
- Safe pedestrian access is provided throughout the site in the form of marked pedestrian walkways and gates and secure turnstiles at key points. A comprehensive pedestrian traffic safety plan will be prepared by Toll for the site.
- The proposed development provides sufficient parking to cater for the use and will increase the existing supply by 70 parking spaces, thereby reducing reliance on on-street parking in the surrounding area.
- It is recommended that a 15 metre NO STOPPING zone be provided east of the main car park access to improve sight distance.
- Each of the lots on the site can be accessed independently, and could provide sufficient on-site parking, in the event one or more lots are sold off.

Based on the findings of this report, and subject to the recommendations above, the proposed development is supported on traffic grounds. An assessment against the Road and Railway Assets Code and the Parking and Sustainable Transport Code is provided in Table 4.

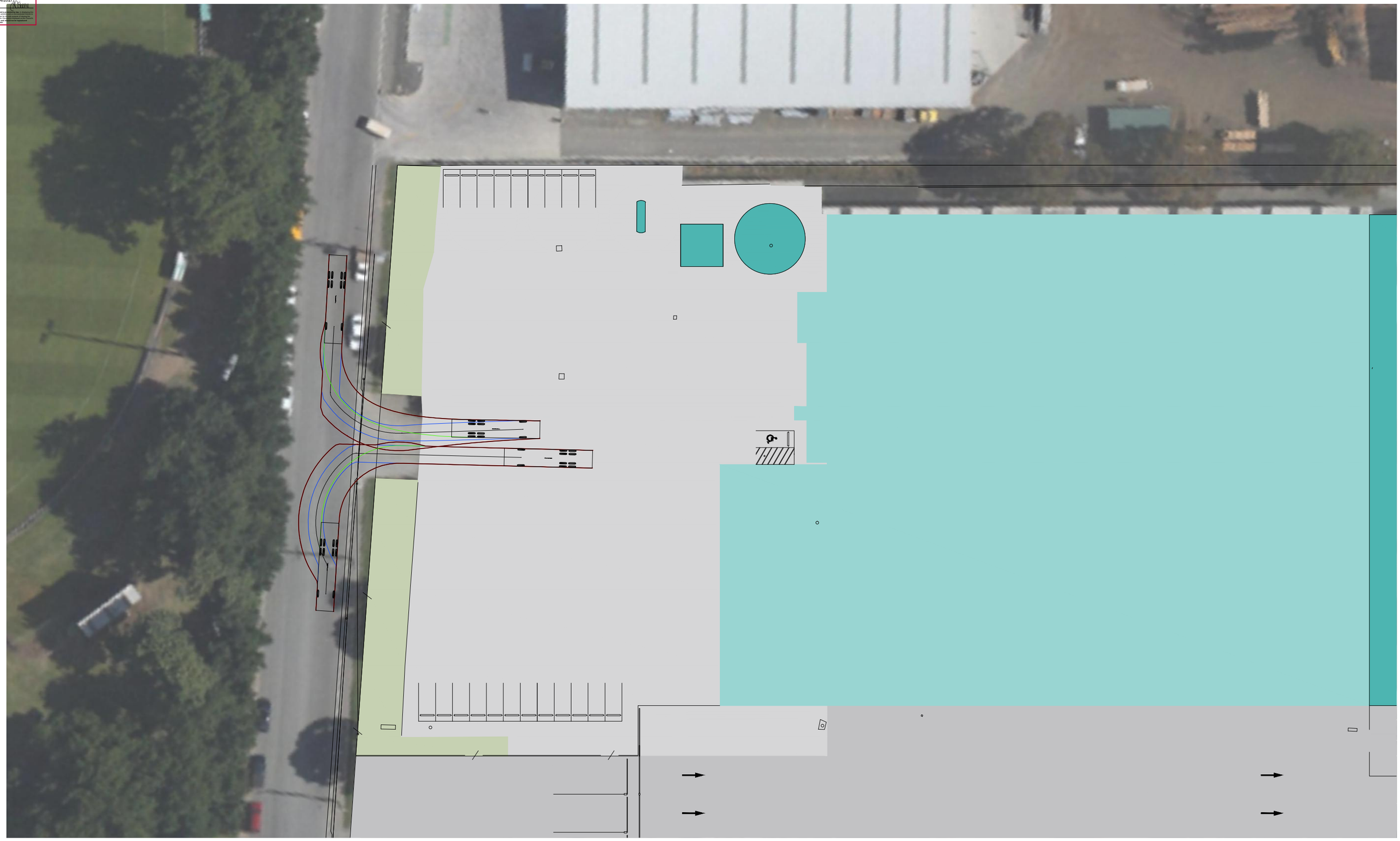
Table 4 Planning Scheme Assessment

Clause	Comment
Road and Railway Assets Code	
Clause E4.5.1 Existing road accesses and junctions	Complies with Acceptable Solution A3 **Reference:** Section 3.3.1 of this report
Clause E4.5.2 Existing level crossings	Not applicable
Clause E4.6.1 Development adjacent to roads and railways	Relies on performance criteria **Reference:** Section 4.2 of this report
Clause E4.6.2 Road accesses and junctions	Relies on performance criteria **Reference:** Section 4.1.1 of this report
Clause E4.6.3 New level crossings	Not applicable

Clause	Comment
Clause E4.6.4 Sight distance at accesses, junctions and level crossings	Complies with Acceptable Solution A1 subject to recommendations **Reference:** Section 4.1.5 of this report
Parking and Sustainable Transport Code	
Clause E6.5.1 Car parking numbers	At the discretion of the Planning Authority Complies with Acceptable Solution A2 **Reference:** Section 4.4.1 & 4.4.2 of this report
Clause E6.5.2 Bicycle parking numbers	Relies on performance criteria **Reference:** Section 4.4.2 of this report
Clause E6.5.3 Taxi spaces	Not applicable
Clause E6.5.4 Motorcycle parking	Not applicable
Clause E6.5.5 Loading bays	Not applicable
Clause E6.6.1 Construction of parking areas	Not assessed
Clause E6.6.2 Design and layout of parking areas	Complies with Acceptable Solutions A2, A3 and A4 Relies on performance criteria **Reference:** Section 4.4.3 of this report
Clause E6.6.3 Pedestrian access	Complies with Acceptable Solutions A1.1 and A1.2 **Reference:** Section 4.1.6 of this report
Clause E6.6.4 Loading bays	Complies with Acceptable Solution A1 and A2 **Reference:** Section 4.1.4 of this report
Clause E6.6.5 Bicycle facilities	Not assessed
Clause E6.6.6 Bicycle parking and storage facilities	Complies with Acceptable Solution A1 **Reference:** Section 4.4.2 of this report

Appendices

Appendix A – Swept Path Assessments



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SCALE 1:500 AT ORIGINAL SIZE

N

DESIGN VEHICLE: 12.5 m RIGID (HRV)

GHD

AJL CONSULTING ENGINEERS PTY LTD
35-51 DOWLING STREET
TRAFFIC IMPACT ASSESSMENT

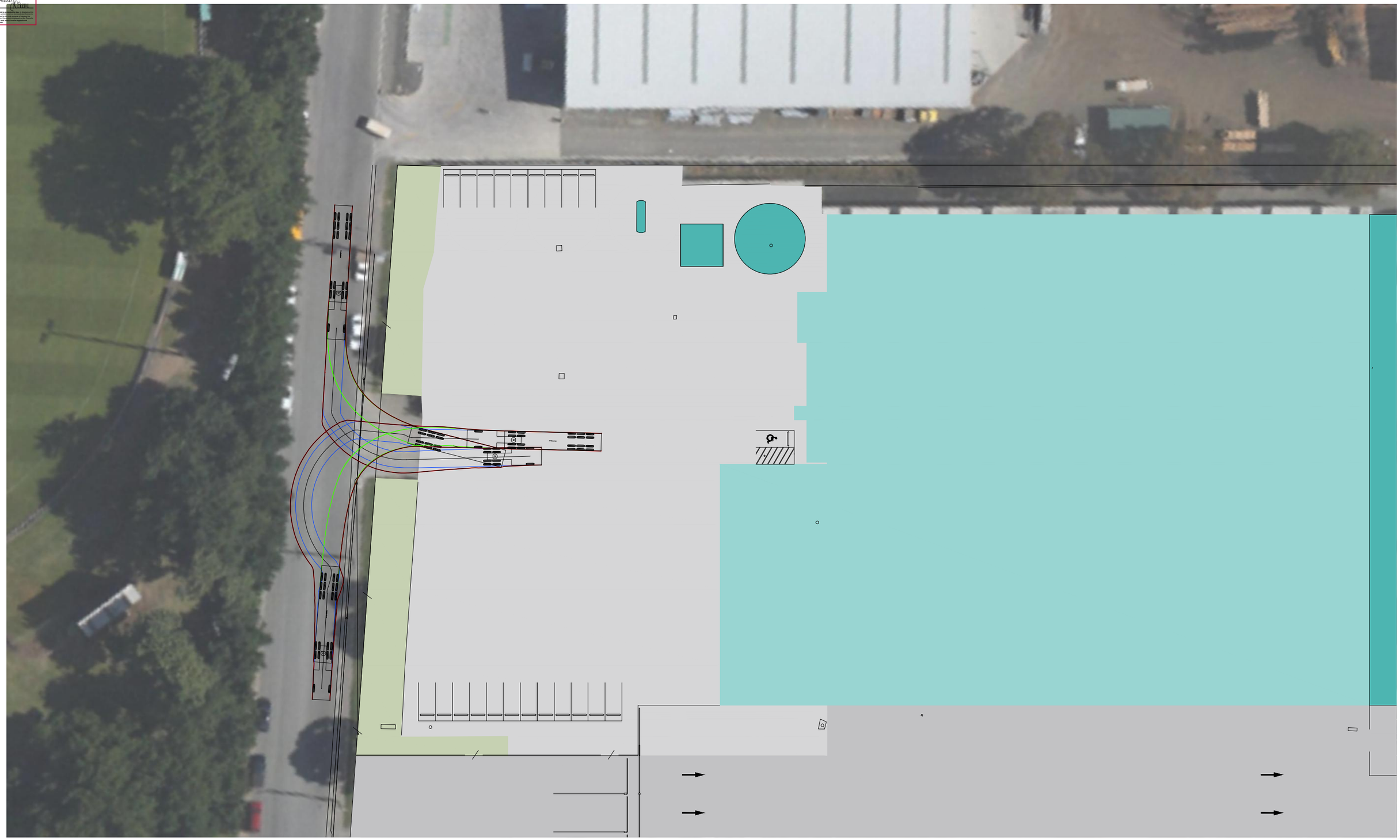
SWEPT PATH ASSESSMENT
ACCESS 1 - DOWLING STREET

Job Number 32-17861
Revision A
Date APRIL 2016

Figure A1

23 Paterson St, Launceston TAS 7250 Australia **T** 61 3 6332 5500 **F** 61 3 6332 5555 **E** lstmail@ghd.com **W** www.ghd.com

Plot Date: 22 April 2016 - 3:06 PM Plotted by: Mark Petrusma Cad File No: G:\32\17861\CADD\Drawings\32-17861-FIGURES.dwg



0 5 10 15m
SCALE 1:500 AT ORIGINAL SIZE

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DESIGN VEHICLE: 19 m SEMI-TRAILER (AV)

AJL CONSULTING ENGINEERS PTY LTD
35-51 DOWLING STREET
TRAFFIC IMPACT ASSESSMENT

SWEPT PATH ASSESSMENT ACCESS 1 - DOWLING STREET

Job Number 32-17861
Revision A
Date APRIL 2016

Figure A2

23 Paterson St, Launceston TAS 7250 Australia **T** 61 3 6332 5500 **F** 61 3 6332 5555 **E** lstmail@ghd.com **W** www.ghd.com

Plot Date: 22 April 2016 - 3:06 PM Plotted by: Mark Petrusma Cad File No: G:\32\17861\CADD\Drawings\32-17861-FIGURES.dwg

0 5 10 15m
SCALE 1:500 AT ORIGINAL SIZE

N

DESIGN VEHICLE: 26 m B-DOUBLE

AJL CONSULTING ENGINEERS PTY LTD
35-51 DOWLING STREET
TRAFFIC IMPACT ASSESSMENT
SWEPT PATH ASSESSMENT
ACCESS 2 - DOWLING STREET

Job Number 32-17861
Revision A
Date APRIL 2016

Figure A3

23 Paterson St, Launceston TAS 7250 Australia **T** 61 3 6332 5500 **F** 61 3 6332 5555 **E** lstmail@ghd.com **W** www.ghd.com

Plot Date: 22 April 2016 - 3:06 PM Plotted by: Mark Petrusma
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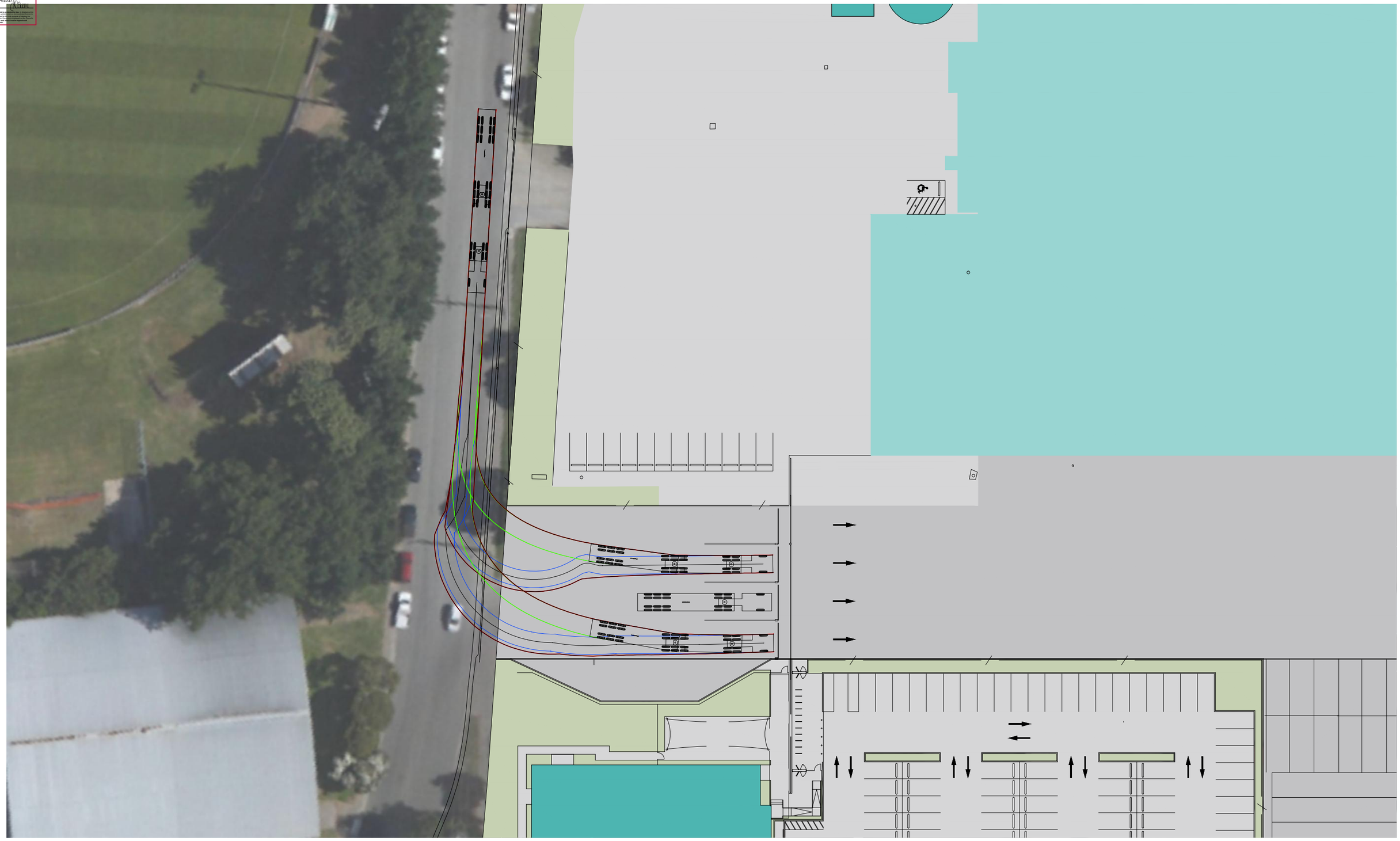
Document Set ID: 3583573
Version: 2, Version Date: 31/07/2017



0 5 10 15m
SCALE 1:500 AT ORIGINAL SIZE

N

DESIGN VEHICLE: 26 m B-DOUBLE

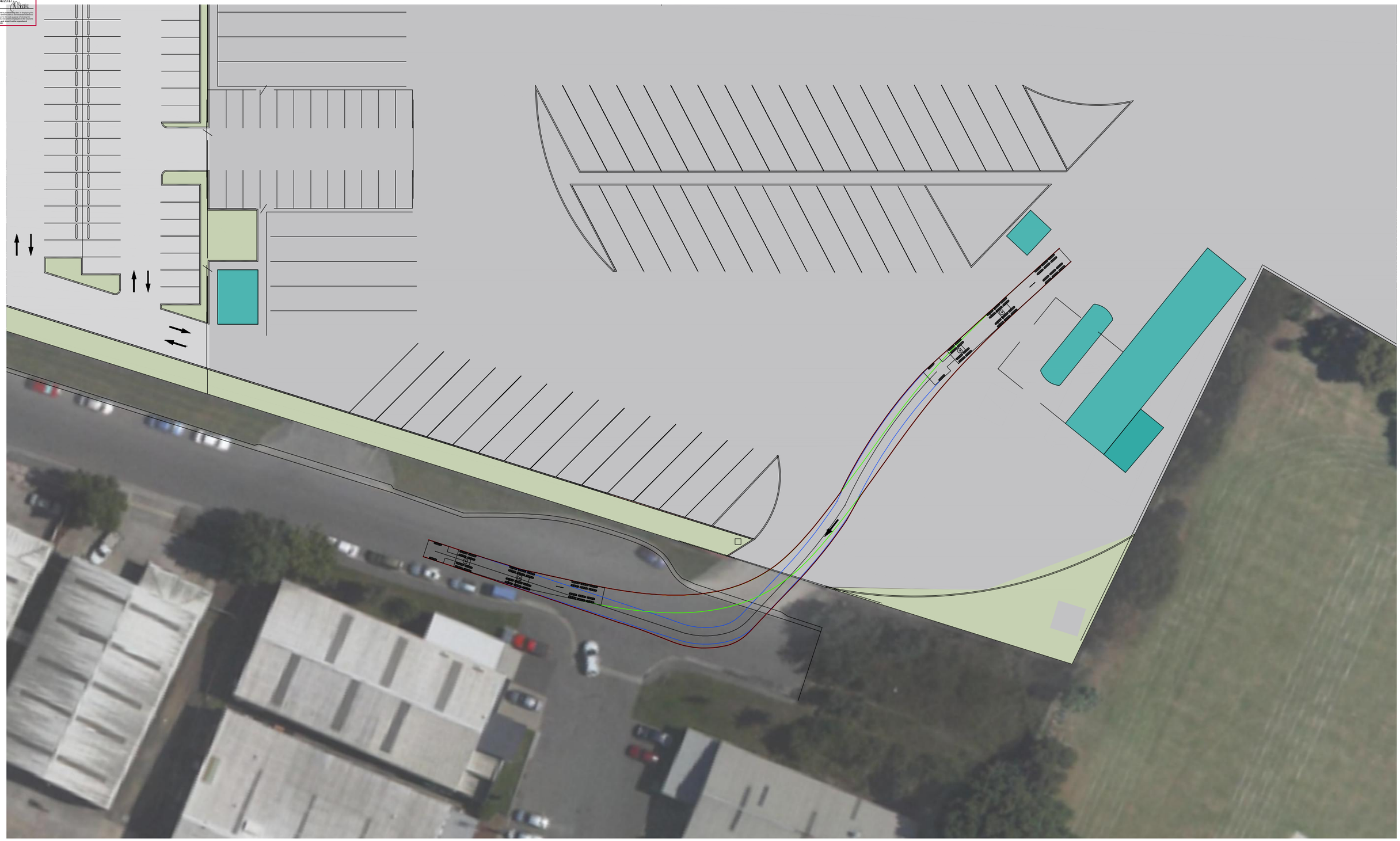
AJL CONSULTING ENGINEERS PTY LTD
35-51 DOWLING STREET
TRAFFIC IMPACT ASSESSMENT
SWEPT PATH ASSESSMENT
ACCESS 2 - DOWLING STREET

Job Number 32-17861
Revision A
Date APRIL 2016

Figure A4

23 Paterson St, Launceston TAS 7250 Australia **T** 61 3 6332 5500 **F** 61 3 6332 5555 **E** lstmail@ghd.com **W** www.ghd.com

Plot Date: 22 April 2016 - 3:06 PM Plotted by: Mark Petrusma Cad File No: G:\32\17861\CADD\Drawings\32-17861-FIGURES.dwg



0 5 10 15m
SCALE 1:500 AT ORIGINAL SIZE

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DESIGN VEHICLE: 26 m B-DOUBLE

GHD

AJL CONSULTING ENGINEERS PTY LTD
35-51 DOWLING STREET
TRAFFIC IMPACT ASSESSMENT

SWEPT PATH ASSESSMENT
ACCESS 5 - BROADLAND DRIVE

Job Number 32-17861
Revision A
Date APRIL 2016

Figure A5

23 Paterson St, Launceston TAS 7250 Australia **T** 61 3 6332 5500 **F** 61 3 6332 5555 **E** lstmail@ghd.com **W** www.ghd.com

Plot Date: 22 April 2016 - 3:06 PM Plotted by: Mark Petrusma
Cad File No: G:\32\17861\CADD\Drawings\32-17861-FIGURES.dwg

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SCALE 1:1000 AT ORIGINAL SIZE

N

DESIGN VEHICLE: 26 m B-DOUBLE

GHD

AJL CONSULTING ENGINEERS PTY LTD
35-51 DOWLING STREET
TRAFFIC IMPACT ASSESSMENT

SWEPT PATH ASSESSMENT GENERAL SITE MOVEMENTS

Job Number 32-17861
Revision A
Date APRIL 2016

Figure A6

23 Paterson St, Launceston TAS 7250 Australia **T** 61 3 6332 5500 **F** 61 3 6332 5555 **E** lstmail@ghd.com **W** www.ghd.com

Plot Date: 22 April 2016 - 3:07 PM Plotted by: Mark Petrusma Cad File No: G:\32\17861\CADD\Drawings\32-17861-FIGURES.dwg

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SCALE 1:1000 AT ORIGINAL SIZE

N

DESIGN VEHICLE: 19 m SEMI-TRAILER (AV)

GHD

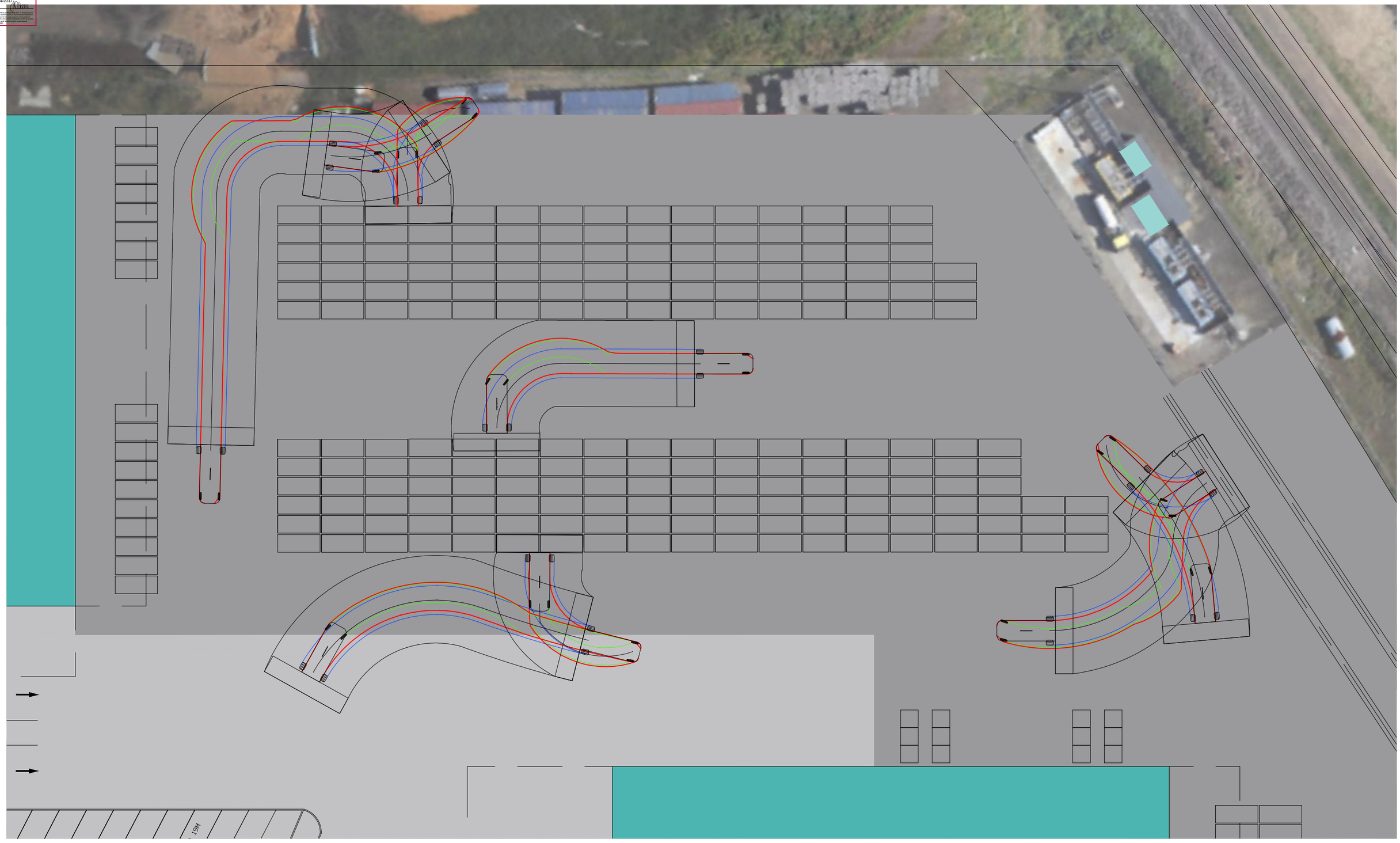
AJL CONSULTING ENGINEERS PTY LTD
35-51 DOWLING STREET
TRAFFIC IMPACT ASSESSMENT
SWEPT PATH ASSESSMENT
GENERAL SITE MOVEMENTS

Job Number 32-17861
Revision A
Date APRIL 2016

Figure A7

23 Paterson St, Launceston TAS 7250 Australia **T** 61 3 6332 5500 **F** 61 3 6332 5555 **E** lstmail@ghd.com **W** www.ghd.com

Plot Date: 22 April 2016 - 3:07 PM Plotted by: Mark Petrusma Cad File No: G:\32\17861\CADD\Drawings\32-17861-FIGURES.dwg



0 5 10 15m
SCALE 1:500 AT ORIGINAL SIZE

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DESIGN VEHICLE: REACH STACKER WITH 40 FOOT CONTAINER

GHD

AJL CONSULTING ENGINEERS PTY LTD
35-51 DOWLING STREET
TRAFFIC IMPACT ASSESSMENT
SWEPT PATH ASSESSMENT
REACH STACKER MOVEMENT

Job Number 32-17861
Revision A
Date APRIL 2016

Figure A8

23 Paterson St, Launceston TAS 7250 Australia **T** 61 3 6332 5500 **F** 61 3 6332 5555 **E** lstmail@ghd.com **W** www.ghd.com

Plot Date: 22 April 2016 - 3:07 PM Plotted by: Mark Petrusma Cad File No: G:\32\17861\CADD\Drawings\32-17861-FIGURES.dwg

0 5 10 15m
SCALE 1:500 AT ORIGINAL SIZE

N

DESIGN VEHICLE: REACH STACKER WITH 20 FOOT CONTAINER

GHD

AJL CONSULTING ENGINEERS PTY LTD
35-51 DOWLING STREET
TRAFFIC IMPACT ASSESSMENT
SWEPT PATH ASSESSMENT
REACH STACKER MOVEMENT

Job Number 32-17861
Revision A
Date APRIL 2016
Figure A9

23 Paterson St, Launceston TAS 7250 Australia **T** 61 3 6332 5500 **F** 61 3 6332 5555 **E** lstmail@ghd.com **W** www.ghd.com

Plot Date: 22 April 2016 - 3:07 PM Plotted by: Mark Petrusma Cad File No: G:\32\17861\CADD\Drawings\32-17861-FIGURES.dwg

GHD

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Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
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1	M. Petrusma	T. Bickerstaff		T. Bickerstaff		26/4/16

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Toll Group Redevelopment
35 – 51 Dowling Street
Launceston

Infrastructure Report

Prepared for: Toll Property

Project No:	15196
Document No:	15196 IR - 001
Issue No:	01
Revision No:	C

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DOCUMENT CONTROL

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Document ID	15196 – IR - 001
File Path	Projects/ 2015/15196/Correspondence Out/Authorities/Council
Client	Toll Property

Record of Report

Issue	Reason	Revision	Date	Prepared By	Approved By
01	Client Review	A	23/03/2016	AJL	AGS
02	Client Review	B	27/04/2016	AJL	AGS
03	Staging Revision	C	09/12/2016	AJL	AGS

Distribution of Report

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Toll Group	Adam Muller Branch Manager 35 – 51 Dowling Street Launceston TAS 7250	Ph: 03 6332 0200 Mob: 0419 675 673	1
Metier Planning & Development	Clair Gregg 70 Meredith Crescent Launceston TAS 7249 claire@metierplanning.com.au	Mob: 0455 556 579	1

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CONTENTS

1. INTRODUCTION

1.1 The Project

AJL Consulting Engineers Pty Ltd (AJL) have been engaged by Toll Property to carry out building design and engineering services for the redevelopment of Toll Launceston's site on Dowling Street (Title Reference 100604/1) into a modern transport hub.

The site is bounded by Dowling Street to the west, Broadland Drive to the south, industrial property to the north and the existing Launceston flood levee to the east. The redevelopment will consist of the following items:

- Demolition of existing office and warehouse
- New office
- Warehouse 'A' extension
- Warehouse 'B'
- Re-aligned rail siding
- Sealed yard and pavement upgrade
- Truck wash
- Container wash
- Truck parking

It is proposed to subdivide the existing title into three lots (Lot 1, 2 & 3), with separate site services and access points.

Metier Planning & Development have prepared a Planning Submission, which this report is to accompany.

Concept design plans for the redevelopment have been prepared by AJL Consulting Engineers Pty Ltd with associated sub-consultants and are enclosed in the appendices of this report.

The total site area is approximately 82,980m². Servicing requirements for the site have been based on preliminary discussion with servicing authorities and may be subject to change. Supply conditions are to be confirmed in writing with each relevant authority during the approval process as the development proceeds.

The redevelopment is a consolidation of Toll's existing facility to gain operational efficiencies.

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1.2 Scope of Works

To consolidate the facility it is proposed to demolish the existing office and connected warehouse to make way for a re-aligned car park and new office. The large warehouse and cross dock to the north will be extended and a new stand-alone warehouse constructed to the east. Ancillary service buildings will be located throughout the site.

Site Area	
Total site area	82,980m² (8.298ha)

Existing Building Area To Be Demolished	
Warehouse and office	2,284m²
Office	265m²
Workshop	346m²

Building Area	
Existing warehouse A (pre-extension)	5,807m²
Existing warehouse A awning	545m²
Warehouse A extension	5,928m² (combined area total 11,735m²)
Warehouse A awning	1,548m²
Warehouse B and office	5,569m²
Warehouse B awning	1,844m²
Container wash	253m²
Truck wash and re-fuelling station	701m²
Office	867m²
Fire pump house A	36m²
Fire pump house B	36m²
Axle weighbridge	20m²
Fork truck diesel storage	66m²

External Areas	
Light duty hardstand (car park)	3,885m²
Heavy duty hardstand	19,475m²
Medium duty hardstand	29,936m²
Existing medium duty hardstand / repaired as required	4,028m²

External Areas	
Heavy duty pavement for fully loaded trailer landing legs	T.B.C.
Landscaping (subject to council requirements)	2,537m²
Total crossover x 4 (subject to council requirements)	377m²

Note: For dimension areas refer to drawing AJL Consulting Engineers project in Appendix A.

1.3 References

This document is to be read in conjunction with the following documents:

- Metier Planning & Development Planning Submission.

1.4 Resource

This section of the infrastructure report outlines the parties responsible for various elements of the design and delivery of the project.

The responsibilities are consistent with industry practice.

Role	Nominated Party
Client	Toll Group and/or Toll Logistics Pty Ltd
Project Manager	Toll Property
Building Design	AJL Consulting Engineers
Mechanical Consultant	Engineering Solutions Tasmania
Electrical Consultant	Engineering Solutions Tasmania
Hydraulics Consultant	AJL Consulting Engineers
Fire Protection Consultant	T.B.C.
ESD Consultant	T.B.C.
Structural Consultant	AJL Consulting Engineers
Civil Consultant	AJL Consulting Engineers
Geotechnical Consultant	Tasman Geotechnics
Landscape Consultant	Lange Design
Town Planning Consultant	Metier Planning & Development
Environmental Consultant	VIPAC
Traffic Consultant	GHD

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1.5 Key Project Risks

We have identified the following key risks to infrastructure:

- Differential settlement between old and new structures / pavements.
- Construction below water table.
- Condition of existing services.
- Pavement failure due to high vehicle loadings and soft soils.

These issues are addressed in this report.

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2. GENERAL

2.1 Existing Site

The proposed site is located at 35 – 51 Dowling Street, Launceston.

The site is an existing transport facility with associated service buildings and hardstanding.

The site is bound by Dowling Street on its west boundary and Broadland Drive for the first portion of its south boundary.

The site is situated adjacent a flood plain to the east. The existing storm water runoff is generally directed to the North Esk and Tamar River.

Developed industrial areas exist to the north boundary. A sports field exists to the rear south boundary.

Generally the western half and north eastern corner of the yard is sealed with interlocking pavers, with the south eastern corner is undeveloped.

2.2 Built Materials

Item	Comment
Office materials	Floors – concrete Walls – pre-cast concrete panels Roof – over structural steelwork
Warehouse materials	Floors – concrete Walls – metal cladding over structural steelwork Roof – metal sheeting over structural steelwork
Setbacks	Refer plans
Height	Less than or equal to 14.445m – stage 4 canopy Less than or equal to 13.35m – completion of stage 11
External works	Pavements, concrete, asphalt, and/or concrete pavers

2.3 Zoning

The site is zoned light industrial per the Launceston City Council planning scheme. The use of the site for the proposed layout as a transport and warehousing is discretionary.

2.4 Title

A copy of the folio plan is provided in Appendix D. Refer Metier Planning & Development planning report for details.

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2.5 Staff

Current and anticipated staffing levels is 130 full time and part time staff.

Refer Metier Planning & Development report for details.

2.6 Operating Hours

Operating hours for this site are as follows:

- 24 hours, 7 days a week

Refer Metier Planning & Development report for details.

2.7 System Description

The buildings and site works will consist of the following construction types:

- Pavements – concrete, asphalt or concrete pavers.
- Piled foundations with insitu concrete pile caps.
- Insitu concrete post tensioned reinforced slab supported by piled foundation.
- Insitu concrete slab on ground.
- Blockwork retaining walls.
- Structural steel walls and roof.
- Pre-cast concrete to office.

2.8 Designing for Safety

All design work is to comply with the relevant state and commonwealth requirements for safety in design.

2.9 Environmental Sensitive Design (ESD)

2.9.1 General

Whilst no formal ESD policy has been adopted AJL recommend the principles be applied to the design and construction of this project.

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2.9.2 Prohibited Materials

The following materials are not to be used in the construction of this project:

- Any material prohibited by legislations
- Asbestos
- Lead where the metal or its corrosion products may be directly ingested, inhaled or absorbed, or any lead-based paints or primers
- Chromate paint pigment or chromate water treatment
- Urea formaldehyde foam or materials which may release formaldehyde in quantities which may be hazardous or irritant
- Synthetic mineral fibres except in accordance with Work Safe Australia National Standard and National Code of Practice.
- Materials which chlorofluorocarbons, hydro-chlorofluorocarbons or hexa-fluoroacetones have been used as a blowing agent
- Chlorofluorocarbons (CFC's)
- Polychlorinated biphenyls (PCB's)
- Other substances generally known to be deleterious to health or safety or which would adversely affect the works

2.9.3 Material Compliance

Unless otherwise specified, preference shall be given to products manufactured in Tasmania, and/or comprising materials and components manufactured in Tasmania, unless no such products satisfy the technical requirements, in which case use products manufactured in Australia or New Zealand, unless no such suitable project exits.

Engineered wood products must have acceptable levels of formaldehyde emissions as detailed in the relevant architectural specification, general engineering services specification and other trade specifications.

Concrete must have a mix design that has reduced the use of Portland Cement by 30% measure by mass across all concrete mixes in the project and contain at least 50% captured or reclaimed water. Additional to the above, all mix designs will use at least 40% of coarse aggregate in the concrete as crushed slag aggregate or another alternative material or use at least 25% of fine aggregate (sand) inputs in the concrete as manufactured sand or other alternative materials as detailed in the specification.

Steel must be produced, designed and fabricated in an environmentally responsible method that results in efficient use of steel as a building materials as detailed in the specification.

Timber must be certified by either the FSC International or the PEFC forest certification schemes, from a reused source, or a combination of both as detailed in the relevant architectural specification, general engineering services specification, the specification and other trade specifications.

Paints, sealants, adhesives, flooring and carpets must have acceptable levels of Volatile Organic Compounds (VOC's) as detailed in the relevant architectural specification, general engineering services specification and other trade specifications.

PVC must comply with the Best Practice Guidelines of PVC in the Built Environment as detailed in the relevant architectural specification, general engineering services specification and other trade specifications.

The following principles are to be used as guidance in evaluating the most appropriate material selection:

- Recycled or reused content to be maximised
- Low embodied energy material preferred
- Low formaldehyde and low volatile organic compounds (VOC) content materials
- Low maintenance requirements over the lifecycle
- Extended service life
- Reduced embodied energy

2.9.4 Design for Disassembly

By area, 100% of the structural framing, roofing and façade cladding systems are to be designed for disassembly. This requires that the building elements have connections that allow for disassembly (as detailed below) and elements to be recovered are clearly marked and/or have permanent labels attached which detail their inherent properties and date of manufacture to enable reuse (as detailed below).

- The facade building elements that are to be recycled/reused are to be recoverable – that is the extraction of them should not be prohibited by other and non-reusable elements.
- Elements to be recovered are clearly marked, or have label permanently attached, showing their inherent properties and date of manufacture to enable reuse.

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2.10 Staging

The development will be constructed in eleven stages strategically planned by Toll to enable continuous operation of the site.

Upon completion of each stage a certificate of occupancy required under the building act will be obtained.

Stage	Description
1	New rail siding and heavy-duty pavements at east end of lot.
2	Commissioning of new rail, removal of existing rail assets, infill of rail corridor with medium-duty pavement.
3	Construction of warehouse B and surrounding medium-duty pavements. Construction of office building.
4	Demolition of existing warehouse and office building along south boundary and conversion to temporary container park. Demolition of buildings in the north-east corner of the lot, made good with pavers.
5	Construction of office car park, truck entry and medium-duty pavements at west boundary.
6	New awning on east wall of existing warehouse A.
7	Construction of heavy-duty pavements as container park on the north-east corner of the lot.
8	Construction of truck and trailer park, including customer pick-up warehouse.
8A	Subdivision into 3 lots.
9	Construction of truck wash and re-fuelling station.
10	Construction of warehouse A extension, including relocation of fire and LPG systems.
11	Construction of enclosed truck loading area on west wall of warehouse A.

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3. CIVIL INFRASTRUCTURE

3.1 Site Grading

The site is located adjacent a natural flood plain for the area, and is currently protected from flooding by an earthen levee to the east.

The site is relatively flat and grades to the east and north east. The nominal floor level for existing buildings on the site is as follows:

- Existing office and attached warehouse — RL 3.39, RL 3.55 ±
- Warehouse A — RL 3.80 ±

There are a number of competing demands with regard to establishing a floor level for new buildings for the site, which are:

- Building design intent
- Match existing floor level
- Impact on cost
- Flood levels (RL 3.91 for 1:100 ARI flood)
- Ground water level
- Overland flow path
- A low level is prone to flooding
- A higher floor level results in increase fill depths and cost
- A higher floor level allows better site grades and creation of overland flow paths away from the building

After considering above, the proposed floor level for each building is as follows:

- New office — RL 4.00
- Warehouse A extension — RL 3.80
- Warehouse B — RL 4.00
- Container wash — RL 3.80
- Truck wash and re-fuelling station — RL 4.20
- Customer pick-up warehouse — RL 3.50

3.2 Stormwater Drainage

Stormwater drainage for the three newly created lots have been shown on AJL Consulting Engineers drawings in Appendix B.

The responsible authority for stormwater drainage is the Launceston City Council. The site is adjacent to the North Esk River flood plain where currently all stormwater from the site is directed to.

Site analysis confirms:

- Existence of an underground town pressure stormwater trunk drainage system owned by Launceston City Council, which runs through the site to the flood levee and on to the Tamar River via a local tributary.
- The site is protected from flooding by an earth levee.

- Existence of an underground private stormwater drainage system that collects buildings and pavements and discharges to the north east corner of the site
- In the event of flooding the building level should have a minimum of 0.2m free board from above external areas, where practical.
- The development will add approximately 6,000m² of impervious area to the site. The site will become fully developed with exception of landscaped areas. Council have not advised or have reason for concern for downstream stormwater capacity as the site is adjacent the North Esk River.
- It may be concluded on site stormwater detention is not required due to adequate downstream capacity in normal circumstances.

AJL recommend the following stormwater drainage network:

- Retain the existing town stormwater trunk main owned by Launceston City Council and leave unaffected by new works.
- Launceston City Council to install new accessible lids to town stormwater trunk main with class 'g' rating.
- Retain and adjust the existing private trunk main and re-align in part to collect local roof and hardstand run off via a network of new underground branch pipes and pits for each lot.
- Overland flow paths are to be directed to discharge through the levee and into the Tamar River via local tributary under normal circumstances.
- In the event of a 1 in 100 year flood event and continuous rain on the proposed site, it is proposed to use external areas as the sites 'storm water detention basin' with limited capacity. In the event of 1:100 ARI flooding, pumping stormwater over the levee would be required.
- A non-return valve shall be installed at the stormwater discharge point inside of the levee walls.
- For environmental containment of gross pollutants an inline ecosol gross pollutant trap is to be located at the last pit in the stormwater line before it exits site.
- Creation of a network of public and private drainage easements is required and is discussed further in Section 4 Subdivision.

All stormwater works are to be carried out in accordance with local council standards, AS3500 Plumbing Code and the PCA.

3.3 Flooding

This area is prone to flooding issues with several properties reporting flooding as a result of the larger 2013 rainfall events.

It is our understanding the site is adjacent a flood inundation area. The flood level at this site for a 1:100 ARI is a relative level of 3.91m.

A large (600mm nominal diameter pipe) has recently been installed running west to east through the site as a major flood mitigation measure. The point of discharge is the north east corner of site. This main will be incorporated into the redevelopment.

The flood risk to the site is likely to be MODERATE. A detailed flood risk assessment for the area has not been carried out by AJL and it is our understanding Launceston Flood Authority would consider this with their flood strategy.

3.4 Flood Management Plan (Draft)

A flood management plan for the three newly created lots is currently being developed and a draft copy follows below.

In the event of a 100 year flood, the site, it is expected that the flood level at the levees will be approximately 3.91 metres. This is as advised by the Launceston City Council. In the event of a levee failure there is potential for loss and damage to operations on the Toll site.

The following plan will be issued to key staff and prominently displayed at the premises. As this forms part of the company policies, it must be strictly adhered to by all staff.

In the event of a flood warning

- listen to local radio (ABC 91.7FM) and TV
- regularly check the Bureau of Meteorology website for warnings www.bom.gov.au click on TAS
- contact the Launceston City Council Customer Service on 6323 3000
- check for rising water levels at and around the premises
- listen for public address warnings
- monitoring will be the responsibility of the General Manager

When flood warnings are issued

Approximately 24 hours notice will be issued prior to premises being flooded, however only 6 to 7 hours will be available before the area will be evacuated. In this time the following must be done to minimize damage to company and customer's property as well as harm to the environment:

- remove hazardous materials or move to higher ground
- move all vehicles to higher ground
- move portable electrical and other equipment(computers, tools etc) documents and manageable furniture to higher areas
- procure sandbags which should be placed in toilet bowls and around all doors - silicon may also be used to seal all doors and windows
- weigh manhole covers down with sandbags or heavy objects
- block drains with plugs
- leave all drawers, cabinet doors and internal doors open to prevent swelling and sticking shut
- lock all windows
- turn power off at the main switchboard
- lock all external doors
- install flood mitigation pumps to pump stormwater over the levee

If evacuation is required

- follow all directions given by police and other authorities to leave the area
- do not re-enter the area or premises until advised by authorities that it is safe to do so

3.5 Sewer Drainage

Sewer drainage for the three newly created lots have been shown on AJL Consulting Engineers drawings in Appendix B.

The responsible authority for sewer drainage is Taswater.

Currently a network of Taswater owned town sewer trunk mains exist on site. Taswater have advised the sewer main is a 300mm diameter concrete pipe. The town sewer is generally located within hardstand areas for the existing site and new development. The town sewer does run under the western elevation of the existing warehouse A. After discussions with Taswater it is proposed to create sewer easements for the existing town mains as a method to define ownership and provide Taswater access to maintain.

Taswater are currently considering the condition of their assets and if any work is required to upgrade i.e. reline pipe walls and clean out. Taswater advised the cost of this work will be proportioned appropriately between Taswater and the proponent due to this project initialising this requirement to do work during construction, to avoid cutting of new pavements in the future. The method to determine proportion of cost will be based on age and condition.

AJL carried out a limited inspection of the DN 300 sewer from the manhole adjacent the pumpstation in Broadland Drive. It was found the main was half full with waste and requires cleaning.

Each of the newly created lots will connect to the existing town main. It is expected all drains will be gravity drained with exception being the dangerous goods store on Lot 1, which is currently pumped to sewer with a rising main.

It is our understanding the town sewer material is concrete, however the age is unknown at this stage.

It is envisaged that sewer mains within the development site will run with or in some case against the natural slope of the land, however a fall of 1:60 which can be easily achieved for a gravity drained sewer to the existing town sewer due to adequate depth of the main. The town sewer then heads south to the pumpstation in Broadland Drive.

Due to reactive and soft foundation conditions we recommend rubber ring jointed pipework or sewermax class SN8 be adopted for sewer mains.

All site internal sewer works and connections to existing town sewer are to be carried out in accordance with Taswater standards, AS3500 Plumbing Code and the PCA.

3.6 Trade Waste

Currently a trade waste understanding is in place with Taswater for trade waste related to the dangerous goods storage area. Toll have engaged Veolia to handle any trade waste required to be discharged off site.

The new development will require an updated trade waste agreement with Taswater for the Container wash and truck wash located on Lot 2.

Preliminary discussions with Taswater indicate, provided pre-treatment of effluent occurs, both the container wash and truck wash effluent will be able to be discharged direct into the town sewer.

To satisfy this requirement it is proposed to install a pre-treatment, oils, silt and water separator units.

3.7 Domestic Water Supply

Water reticulation pre and post-subdivsion into three lots have been shown on AJL Consulting Engineers drawings in Appendix B.

The responsible authority for water reticulation is Taswater.

Asset plans indicate a large diameter DN 150 fire main running along the southern elevation of warehouse ‘A’ on Lot 1.

Prior to subdividing at stage 8A the site will be serviced by the existing supply point on Dowling Street.

After subdividing it is proposed to service each lot as follows:

- Lot 1 – domestic water to be sourced from existing supply point with upgraded DN 150 fire main and DN 50 water meter / connector.
- Lot 2 – domestic water to be sourced from new supply point of Broadland Drive with DN 100 fire main and DN 50 water meter / connection.
- Lot 3 – domestic water to be sourced from existing water main in Broadland Drive with DN 32 water meter / connection.

All water connections and lines are to be installed in accordance with local council, Taswater, AS 3500 Plumbing Code and PCA requirements.

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3.8 Fire Protection Supply

Fire services reticulation pre and post-subdivision three lots have been shown on AJL Consulting Engineers drawings in Appendix B.

The responsible authorities for fire water reticulation is Taswater and Tasmanian Fire Services.

Asset plans indicate a large diameter DN 150 fire main running along the southern elevation of warehouse 'A' on Lot 1

A pressure and flow test was performed on the 22nd of March 2016, where two fire plugs on Broadland Drive were simultaneously tested (Plug A and Plug B). Plug A had a flow of 18 l/s and plug B had a flow of 20 l/s, the static pressure is 920 kPa required by AS2419 to operate a compliant fire hydrant system.

A third test was carried out on Dowling Street, where one fire plug was tested (Plug C). Plug C had a flow rate of 19 l/s with a static pressure of 900kPa.

The flow test results are included in Appendix F.

It is envisaged that warehouse 'A' on lot 1 and 'B' on lot 2 will be classed as a high hazard occupancy (OHI) and therefore it will require a dual water supply to feed the sprinkler system which is required by AS 2118 Automatic Fire Sprinkler Systems. In accordance with AS2118 sprinklers will be required.

Taswater have an obligation to provide adequate supply for large scale development, however it is envisaged new fire storage tanks will be required to feed the fire hydrant and sprinkler system for Lot 1 and Lot 2, (the two warehouse lots), which are classified as large isolated buildings. From the tank, a sprinkler and hydrant booster unit and connections feeds will then reduce to a DN 150 and/or DN 100 ring main to supply internal fire hydrants.

The valve and meter assemblies will be for a combined fire and domestic arrangement.

The hydrant supply is required to be at 10 litres / second tested at 200kPa with a static pressure of 700kPa and hose reels at 0.33 litres / second. These flow rates will be confirmed during detailed design.

Following are required hydrant numbers for each lot:

- Lot 1 – 4 hydrants, 3 new at 10l/s each for 4 hours.
- Lot 2 – Service by fire plugs in street.
- Lot 3 – 2 hydrants at 10 l/s each for 4 hours.

Prior to subdividing at stage 8A, warehouse 'A' will be protected by the existing fire water system. The existing DN150 fire main will be extended to serve warehouse 'B' hydrants. A new sprinkler supply line from the existing fire pump set at warehouse 'A' to warehouse 'B' will be installed.

Upon subdividing, the fire services will be separated with a dedicated fire tank and pump set installed on lot 2.

All water connections and lines are to be installed in accordance with local council, Taswater, AS 3500 Plumbing Code and PCA requirements.

3.9 Soil and Erosion Control

Soil and erosion control for the site has been shown on AJL Consulting Engineers engineering drawings in Appendix B.

Engineering specifications require works to be in accordance with 'Northern Resource Management (NRM)' soil and water management on building and construction sites.

Silt traps and fencing will be provided at:

- Perimeter of pits during construction.
- Across the existing man made open drain.
- Base of slopes and overland flow paths.

All construction vehicles are to be cleaned free of sediments prior to leaving site.

All soil removed from site is to be disposed of at a dumping facility approved by the local council.

3.10 Electricity

Tasnetworks is the responsible authority for the provision of electrical infrastructure at the proposed site.

Confirmation is required from Tasnetworks that there is sufficient capacity in the existing networks to supply the proposed development.

Refer Appendix C for pre and post-subdivision electrical services concept design.

3.11 Telecommunications

Telstra is the responsible authority for the provision of communication infrastructure at the proposed site.

There is an existing Telstra pit in Dowling Street outside the site.

Confirmation is required from Telstra that existing networks have sufficient capacity to supply the proposed development.

3.12 Gas

TasGas is the responsible authority for the provision of gas infrastructure at the proposed site.

There is no proposal to install an underground gas network with this development.

There are above ground storage vessels for liquid petroleum gas (LPG).

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3.13 Civil Infrastructure Concept Design

A concept design based on the previous mentioned criteria has been prepared and provided in Appendix B.

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4. SUBDIVISION

4.1 General

Currently the Toll site is situated on a single title registered number P19027/1. A copy of this title is shown in Appendix D.

It is proposed as part of the site consolidation to sub-divide the current title into three separate lots, with separate services and entry points.

A proposed Plan of Survey is shown in Appendix E.

To achieve this outcome a combination of public and private drainage easement will be required for stormwater, sewer and water reticulation services.

A significant portion of existing underground assets are to be re-purposed to suit the separation of services to result in each site being a stand-alone site.

It is envisaged the creation of the following easements will be required:

Easement 'A'
- Drainage and pipeline & services easement over lot 3
- In favour of lot 1; lot 2; Launceston City Council and the Tasmanian Water and Sewerage Corporation Pty Ltd

Easement 'AA'
- Drainage & pipeline & services easement over lot 2
- In favour of lot 1; lot 3; Launceston City Council and the Tasmanian Water and Sewerage Corporation Pty Ltd

Drainage easement over lot 1 and lot 2
- Easement 'B'
- In favour of Launceston City Council

Easement 'C'
- Pipeline and services easement over lot 1 and lot 3
- In favour of the Tasmanian Water and Sewerage Corporation Pty Ltd

Easement 'D'
- Drainage easement over lot 1
- In favour of lot 2 and 3

Easement 'E'
- Drainage easement over lot 3
- In favour of lot 1

Easement 'F'
- Drainage easement over lot 2
- In favour of lot 1

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Stormwater Easements

Easement width based on LGAT Standards for pipe diameter are:

Pipe Internal Diameter	Easement Width
DN up to 450mm	3m
DN 475 – 900mm	4m
DN 925 – 1200mm	5m
DN 1200mm +	6m

Easement width based on LGAT Standards for depth are:

Pipe Excavation Depth	Easement Width
1.2m	3m
1.5m	4m
1.8m	5m
2.1m	6m
2.1m +	Detail design

Sewer and Water Easements

Preliminary advice from Taswater indicates the required easements are:

- DN 150 sewer – 3.0m
- DN 300 sewer – 4.0m
- C = DN 150 water – 4.0m

General

Refer to Appendix E for proposed plan of survey including:

- Newly created lots
- Boundary length and angles
- Lot areas
- Private and public easements
- Rail easement

4.2 Subdivision Concept Design

Refer Appendix E for proposed plan of survey.

5. TRAFFIC IMPACT ASSESSMENT

5.1 Traffic

GHD have prepared a Traffic Impact Assessment. The report is appended in the Metier Planning & Development Town Planning Report.

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6. PRELIMINARY GEOTECHNICAL ENGINEERING

6.1 General

A preliminary geotechnical engineering investigation by Tasman Geotechnics into key technical and geology issues has been carried out, but not limited to, covering the following items:

- Forecast foundation conditions and recommend design parameters for built structures and pavements;
- Geology;
- Historical data and review existing foundations;
- Field testing and laboratory testing (as required);
- Site assessment and soil profile (as required);
- Pile load capacity;
- Negative skin friction downdrag on piles;
- Pile durability;
- Earthquake loading effects;
- Estimated sub-grade settlement and differential settlement between old and new;
- Underground services; and
- Proximity to levee.

6.2 Differential Settlement

AJL have identified differential settlement as a key risk that requires investigation in order to mitigate and develop design solutions for this project, therefore the expertise of a geotechnical engineer experienced in soft ground conditions has been consulted to identify engineering solutions to mitigate this risk.

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7. RAIL SIDING

7.1 General

A re-alignment of the site rail siding will be required as part of the redevelopment for safety and site continuity reasons. Currently the rail enters through the east property extending west through the centre of the site.

The rail is to be re-aligned in accordance with Opus drawing 4969-C-0001 P2 in Appendix G. The new alignment will connect to the existing Tasrail network adjacent to the flood gate on the south-east corner of the site. This re-alignment will require a new penetration and gates in the east boundary fence as well as patching of the existing fence penetration.

The western-most track will be concrete encased to allow the container fork lift to reach the eastern rail line carriages. This concrete easement detail is to be approved by Toll and Tasrail before construction.

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8. APPENDIX

8.1	APPENDIX A	BUILDING DESIGN DRAWINGS
8.2	APPENDIX B	CIVIL INFRASTRUCTURE CONCEPT DESIGN
8.3	APPENDIX C	ELECTRICAL SERVICES CONCEPT DESIGN
8.4	APPENDIX D	FOLIO PLAN
8.5	APPENDIX E	PLAN OF SURVEY
8.6	APPENDIX F	WATER MAIN FLOW TEST
8.7	APPENDIX G	RAIL SIDING
8.8	APPENDIX H	EXTERNAL SERVICES – DIAL BEFORE YOU DIG

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APPENDIX A – BUILDING DESIGN DRAWINGS

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APPENDIX B – CIVIL INFRASTRUCTURE CONCEPT DESIGN

Refer to the appended Civil Infrastructure Concept Design outlining key design assumptions for:

- Water and fire mains
- Stormwater mains
- Sewer mains
- Pump stations
- Existing services

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APPENDIX C – ELECTRICAL SERVICES CONCEPT DESIGN

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APPENDIX D – FOLIO PLAN

The title is Lot in sealed plan P19027 Folio 1. Refer to appended folio plan.

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APPENDIX E – PLAN OF SURVEY

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APPENDIX F – WATER MAIN FLOW TEST

Refer following flow test results supplied by AJ Leak Detection

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APPENDIX G – RAIL SIDING

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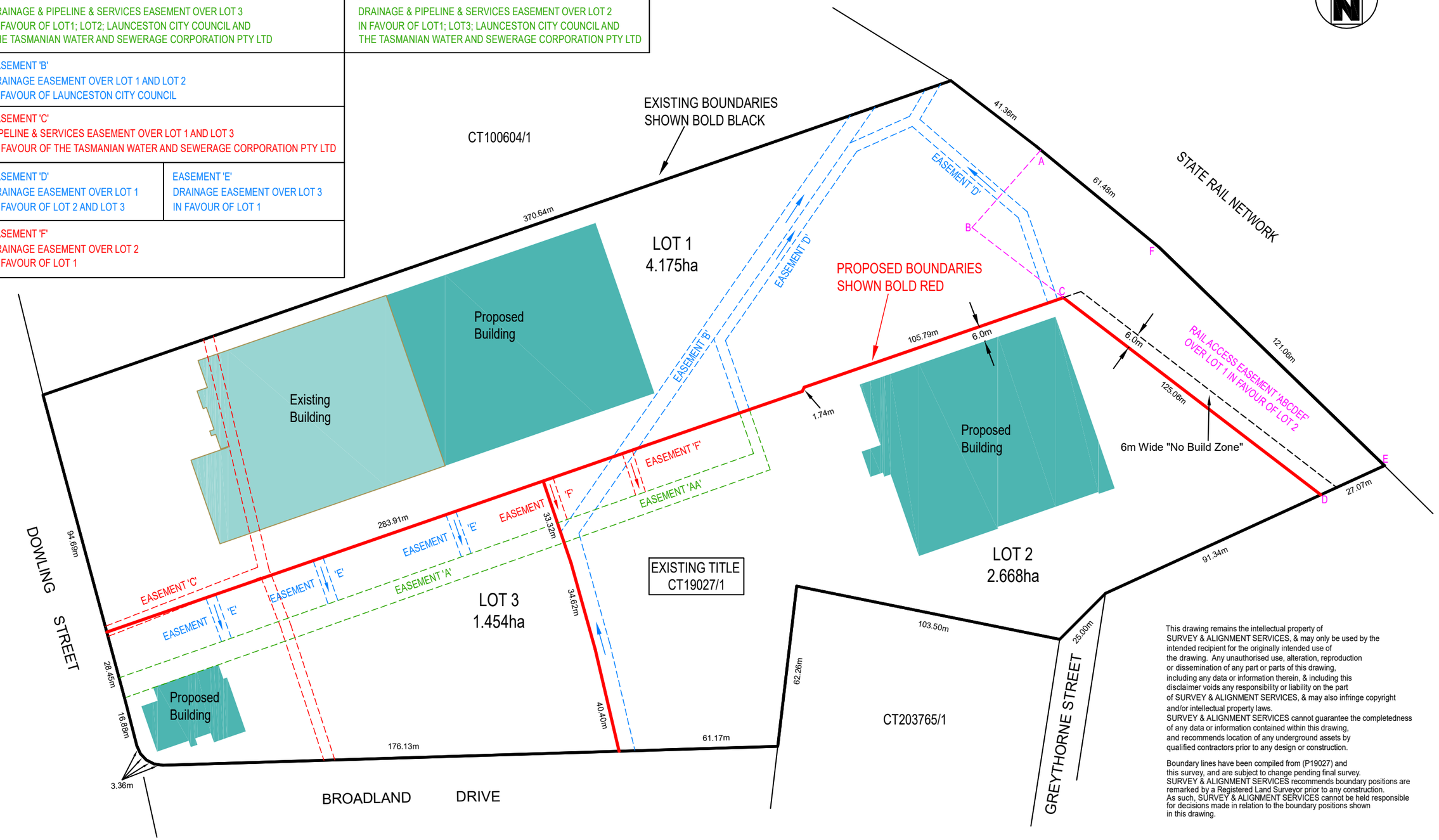
APPENDIX H – EXTERNAL SERVICES – DIAL BEORE YOU DIG

EASEMENTS	
EASEMENT 'A' DRAINAGE & PIPELINE & SERVICES EASEMENT OVER LOT 3 IN FAVOUR OF LOT1; LOT2; LAUNCESTON CITY COUNCIL AND THE TASMANIAN WATER AND SEWERAGE CORPORATION PTY LTD	EASEMENT 'AA' DRAINAGE & PIPELINE & SERVICES EASEMENT OVER LOT 2 IN FAVOUR OF LOT1; LOT3; LAUNCESTON CITY COUNCIL AND THE TASMANIAN WATER AND SEWERAGE CORPORATION PTY LTD
EASEMENT 'B' DRAINAGE EASEMENT OVER LOT 1 AND LOT 2 IN FAVOUR OF LAUNCESTON CITY COUNCIL	
EASEMENT 'C' PIPELINE & SERVICES EASEMENT OVER LOT 1 AND LOT 3 IN FAVOUR OF THE TASMANIAN WATER AND SEWERAGE CORPORATION PTY LTD	
EASEMENT 'D' DRAINAGE EASEMENT OVER LOT 1 IN FAVOUR OF LOT 2 AND LOT 3	EASEMENT 'E' DRAINAGE EASEMENT OVER LOT 3 IN FAVOUR OF LOT 1
EASEMENT 'F' DRAINAGE EASEMENT OVER LOT 2 IN FAVOUR OF LOT 1	



Boundary lines have been compiled from (P19027) and this survey, and are subject to change pending final survey. SURVEY & ALIGNMENT SERVICES recommends boundary positions are remarked by a Registered Land Surveyor prior to any construction. As such, SURVEY & ALIGNMENT SERVICES cannot be held responsible for decisions made in relation to the boundary positions shown in this drawing.

NOTE:
THIS PLAN IS FOR PRELIMINARY PLANNING PURPOSES ONLY
BOUNDARIES ARE SUBJECT TO CHANGE PENDING FINAL SURVEY.

REFERENCE:		
2014035	SCALE.	1:1500 AT A3
	DRAWN.	DT
	SURVEYED.	DT
	DATE.	29/04/2016
	SHEET #	1 of 1
	REVISION	02

TOLL GROUP
PROPOSED SUBDIVISION
35-51 DOWLING STREET
LAUNCESTON

SURVEY & ALIGNMENT SERVICES
■ INDUSTRIAL ALIGNMENT
■ ENGINEERING SURVEYING
■ LAND DEVELOPMENT
Mobile: 0429 003 584
Email: dtompkins81@gmail.com
Website: www.survalign.com.au

Flow Test Report

water & leak detection

☐ New System ☐ Addition ☐ Minor Alterations/Repairs ☑ Flow Test

Customer Name:	AJL Consulting
Customer Address:	
Site of Flow Test:	End of Boland st (Alderson Agencies)
Date of Flow Test:	22 / 3 / 16
Class of Building (please circle):	2 3 4 5 6 7a 7b 8 9a 9b 9c
Test carried out on: (please circle):	(Hydrant) Fire Plug "L" Type Hose Reel Connection
Size of Reticulation Pipework:	100mm
Reticulation pipe material:	?
Outlets tested simultaneously (please circle)	1 (2) 3 4 5
Size of Hydrant / Hose Reel: (mm):	100mm
Hydrant Stand / Hose Reel material:	Gr. I
Fire Plug type:	☐ Spring Loaded ☐ Rubber Coated Ball
General condition of item being tested:	☑ Good ☐ Average ☐ Poor
Item needs attention : (noted below)	☐ Yes ☑ No
Size of connection: (mm)	
Connection material:	
Flow at connection 100% open: (L/S)	
Static Pressure: (Kpa)	920KPA
Flow Rate at 100% open: (L/S or L/M)	18 l/s
Flow Rate at 350 KPA: (L/S for Attack)	
Flow Rate at 200 KPA: (L/S for Feed)	16 l/s
Test Result	☑ Pass ☐ Fail
Photos of site provided:	☐ Yes ☑ No
Plans of site provided:	☐ Yes ☑ No
Date of next test due	/ /

Summary

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Signed: C. M **Print Name:** Craig Bentley **Date:** 22.3.16

Flow Test Report

water & leak detection

☐ New System ☐ Addition ☐ Minor Alterations/Repairs ☑ Flow Test

Customer Name:	AJL Consulting
Customer Address:	
Site of Flow Test:	Boland st Halfway down
Date of Flow Test:	22 / 3 / 16
Class of Building (please circle):	2 3 4 5 6 7a 7b 8 9a 9b 9c
Test carried out on: (please circle):	Hydrant Fire Plug "L" Type Hose Reel Connection
Size of Reticulation Pipework:	100mm
Reticulation pipe material:	?
Outlets tested simultaneously (please circle)	1 2 3 4 5
Size of Hydrant / Hose Reel: (mm):	n/a
Hydrant Stand / Hose Reel material:	n/a
Fire Plug type:	☑ Spring Loaded ☐ Rubber Coated Ball
General condition of item being tested:	☑ Good ☐ Average ☐ Poor
Item needs attention : (noted below)	☐ Yes ☑ No
Size of connection: (mm)	n/a
Connection material:	n/a
Flow at connection 100% open: (L/S)	n/a
Static Pressure: (Kpa)	950 KPA
Flow Rate at 100% open: (L/S or L/M)	20 L/s
Flow Rate at 350 KPA: (L/S for Attack)	n/a
Flow Rate at 200 KPA: (L/S for Feed)	18 L/s
Test Result	☑ Pass ☐ Fail
Photos of site provided:	☐ Yes ☑ No
Plans of site provided:	☐ Yes ☑ No
Date of next test due	/ /

Summary

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Signed: C. [signature] **Print Name:** Craig Bentley **Date:** 22.3.16

Flow Test Report

aj water & leak detection

☐ New System ☐ Addition ☐ Minor Alterations/Repairs ☑ Flow Test

Customer Name:	AJL Consulting
Customer Address:	
Site of Flow Test:	Dowling street (old Becks Building)
Date of Flow Test:	22 / 3 / 16
Class of Building (please circle):	2 3 4 5 6 7a 7b 8 9a 9b 9c
Test carried out on: (please circle):	Hydrant (Fire Plug) "L" Type Hose Reel Connection
Size of Reticulation Pipework:	150mm
Reticulation pipe material:	?
Outlets tested simultaneously (please circle)	(1) 2 3 4 5
Size of Hydrant / Hose Reel: (mm):	n/A
Hydrant Stand / Hose Reel material:	n/A
Fire Plug type:	☐ Spring Loaded ☑ Rubber Coated Ball
General condition of item being tested:	☑ Good ☐ Average ☐ Poor
Item needs attention : (noted below)	☐ Yes ☑ No
Size of connection: (mm)	n/A
Connection material:	n/A
Flow at connection 100% open: (L/S)	n/A
Static Pressure: (Kpa)	900KPA
Flow Rate at 100% open: (L/S or L/M)	19L/S
Flow Rate at 350 KPA: (L/S for Attack)	n/A
Flow Rate at 200 KPA: (L/S for Feed)	18 L/S
Test Result	☑ Pass ☐ Fail
Photos of site provided:	☐ Yes ☑ No
Plans of site provided:	☐ Yes ☑ No
Date of next test due	/ /

Summary

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Signed: C. [illegible] **Print Name:** Craig Bentley **Date:** 22-3-16

GENERAL NOTES:

1. EXISTING TRAIN LENGTH 240m = 32 SLOTS
2. WAGON BASED ON TQAY - 29.7m LONG = 4 SLOTS (20ft)

DANGEROUS GOODS TRANSFER STATION
PROPOSED BAULKS
13.5m
9m
5m
6.5m
120m - 4 WAGONS = 16 SLOTS
120m - 4 WAGONS = 16 SLOTS
EXISTING FENCE
EXISTING TRACK TO BE REMOVED
3.325
4.000
PROPOSED GATE
100m RAD
PROPOSED 1 IN 8 L.H. TURNOUT
100m RAD
EXISTING TURNOUT TO BE RELOCATED
FLOOD GATE
TURNOUT ADJACENT FLOOD GATE
TASRAIL CORRIDOR
GRAVEL HARDSTAND
RAIL LINES

DRAFT

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

10 5 0 5 10 20 30 40 50m

NOT FOR CONSTRUCTION

PRELIMINARY DRAWING
FOR DISCUSSION PURPOSES ONLY

Rev.	Date	Description	Drawn	Drft Chk	Designed	Des Chk.	Approv.
P2	05/11/15	PRELIMINARY ISSUE	R.J.B.		R.J.B.		
P1	15/10/15	PRELIMINARY ISSUE	RJB		RJB		

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RAILWAY TRACK

TOLL TASMANIA

PROPOSED NEW TRACKS
INTO TOLL TERMINAL
CONCEPT LAYOUT OPTION 1

Client: TOLL

Drawn By: RJB	Designed By: RJB
Drafting Checked	Design Checked
Approved	Approval Date
Sheet No. of	
DMS Drg No.	
Scale 1:1000	Sheet Size A3
Drawing Number 4969-C-0001	Revision P2

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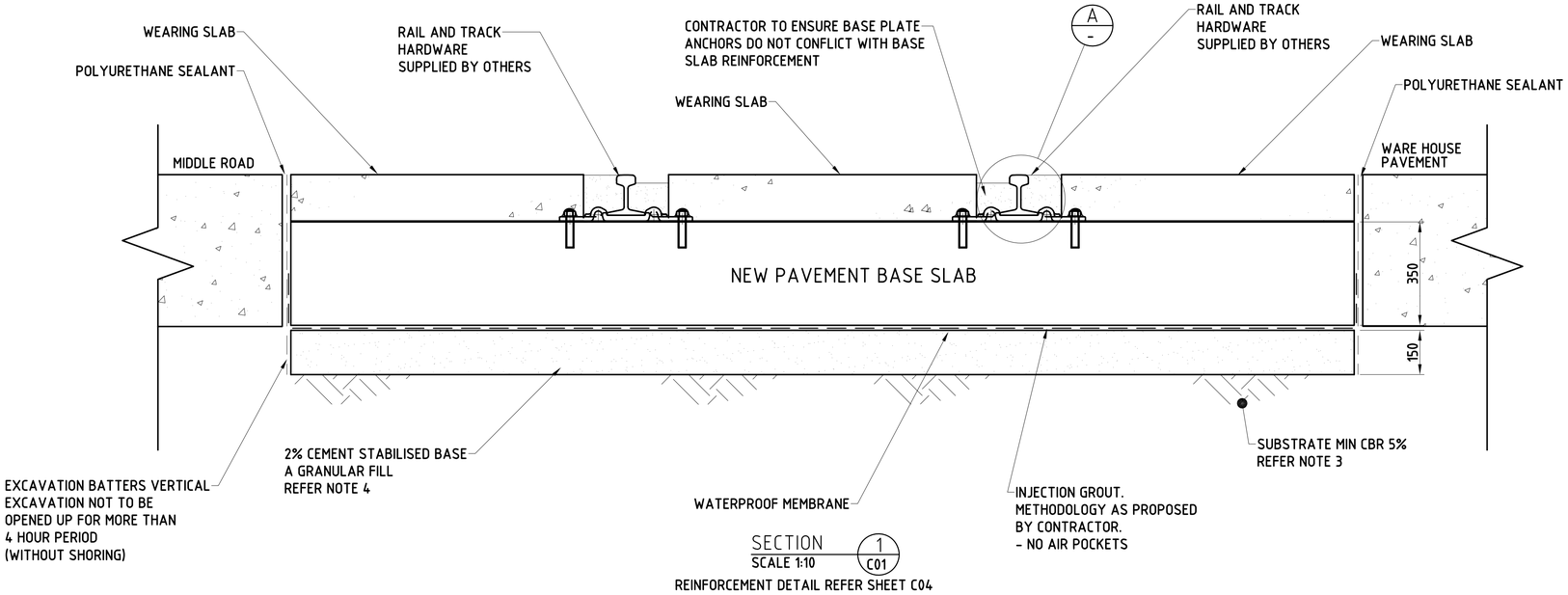
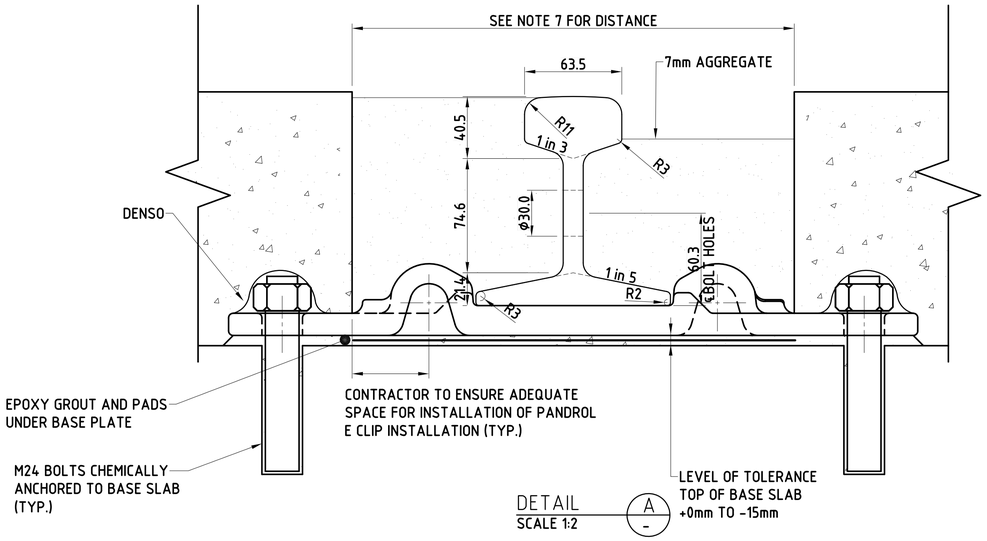


SECTION 1 / C01
SCALE 1:10

REINFORCEMENT DETAIL REFER SHEET C04

NOTE:

1. NO SURVEY HAS BEEN CARRIED OUT. SETOUT POINT HAS BEEN BASED ON ORIGINAL DESIGN DRAWINGS. ANY LEVELS AND LOCATIONS ARE THEREFORE INDICATIVE.
2. NO DIAL BEFORE YOU DIG HAS BEEN CARRIED OUT. CONTRACTOR TO CONFIRM LOCATION OF ALL UNDERGROUND SERVICES WITH NORSKE SKOG PRIOR TO CONSTRUCTION.
3. CONTRACTOR TO CONFIRM GROUND CONDITIONS WITH SUPERINTENDENT PRIOR TO BACKFILL.
4. DEPARTMENT OF STATE GROWTH R40 BASE A MATERIAL WITH 2% CEMENT STABILISED MATERIAL IS USED FOR BACKFILL.
5. THIXOTROPIC EPOXY MORTAR ADHESIVE REQUIRED AT EDGE OF PAVEMENT BASE SLABS.
6. DIMENSIONS ARE IN MILLIMETRE U.N.O.
7. DISTANCE BETWEEN WEARING SLABS TO BE CONFIRMED BY CONTRACTOR TO ENSURE PANDROL TYPE E CLIP CAN BE INSTALLED



DETAIL A / -
SCALE 1:2

SCALE 1:2 (A1) 0 40 80 120 160 200mm / 40 20

SCALE 1:10 (A1) 0 200 400 600 800 1000mm / 200 100

REV	DATE	DRAWN	REV'D	APP'D	REVISION
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DRAWING NUMBER	REFERENCE DRAWING TITLE
-	-
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CLIENT: TASRAIL
PROJECT: RAIL SIDINGS PAVEMENT

DRAWN	DRAWING CHECK	REVIEWED	APPROVED
-	-	-	-
DESIGNED	DESIGN REVIEW	DATE -	DATE -
-	-		

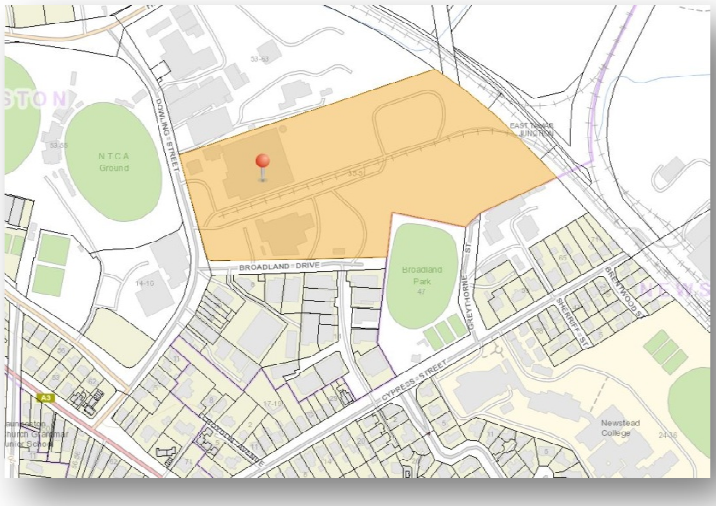
TITLE: RAIL SIDINGS PAVEMENT
PAVEMENT SECTIONS
-

SCALE	DRAWING No	REV
1:10, 1:2	-	-

URBAN design solutions
by JASON VAN ZETTEN

PO BOX 7647 Launceston
Phone **6334 4089** Email **admin@urbantas.com.au**
VZ Designs Pty Ltd ABN 50110377421

Bushfire Assessment
EXEMPTION



Report Prepared for:	**AJL Consulting Engineers.**
Property:	**35 – 51 Dowling Street, LAUNCESTON, Tasmania.** **List Map: Volume No: 19027 Folio : 1 PID : 6595324**
Report Prepared by: Accreditation:	**JASON VAN ZETTEN** **BFP - 113**
Report Reference:	**UBR 6172**
Report Date:	**02 06 2016**

Summary

This report has been prepared to be read in conjunction with the attached plan, supplied by AJL Consulting Engineers, for the proposed sub-division, construction of buildings and modifications to the existing transport hub for Toll Group.

(Class 5 & 7B Works) - by AJL Consulting Engineers prepared in April 2016.
Reference: 15196 A002 REV-D - Dated 29/04/2016.

The site, 35 – 51 Dowling Street, is located on the corner of Dowling Street and Boland Drive in a commercial/ industrial precinct.

To the north of the property are; other commercial uses, mainly with large sheds and factories and small areas of low threat vegetation.

To the east of the property is; a large area of grass/wetland, which is low threat to **AS3959/2009 2.2.3.2 e), & f).** This area is part of the North Esk River low lying wetland area.

To the south of the property is; primarily other commercial uses; with residential dwellings beyond this.

To the west of the property is; the NTCA cricket ground and sports centres, including basketball venues and the tennis centre, which are again low threat to the requirements of **AS3959/2009 2.3.3.2 f)**

This site is exempt to the requirements of planning and should be deemed BAL – LOW for the purpose of construction.

E 1.4 Use or development exempt from this Code

The following use and development is exempt from this Code:

a)Any development that the TFS or an accredited person, having regard to the objective of all applicable standards in this Code, certifies there is an insufficient increase in risk to the development from bushfire to warrant any specific bushfire protection measures;

Launceston City Council Interim Planning Scheme E1.0 Bushfire Prone Areas

E1.4 – use or development exempt from this code - This development is exempt from this code.

E1.5 – Use Standards

- E1.5.1 – Vulnerable Use - This development is exempt from this code (the development is not a vulnerable use).

- E1.5.2 – Hazardous Uses - This development is exempt from this code.

E1.6 – Development Standards - This development is exempt from this code.

ASSESSMENT TO AS3959/2009 – BAL – LOW - EXEMPT

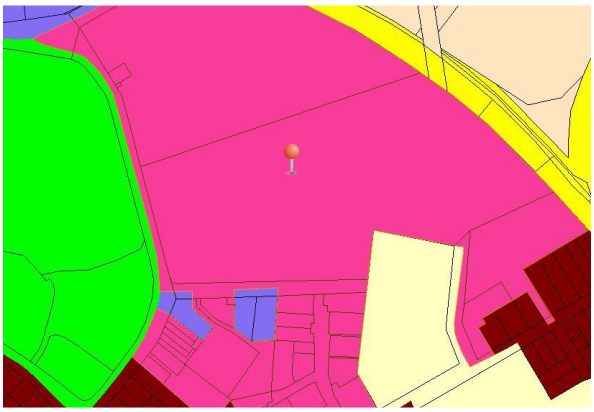


Fig.1: LIST Maps – Zoning – Light Commercial

Fig.2: LIST Maps – Satellite image of lot

SITE AREA SCHEDULE

LOCATION	AREA
LIGHT DUTY HARDSTAND (CARPARK)	3,885m²
MEDIUM DUTY HARDSTAND	31,095m²
EXISTING MEDIUM DUTY HARDSTAND REPAIR AS REQUIRED	4,143m²
HEAVY DUTY HARDSTAND	19,437m²
LANDSCAPE	1,879m²
EXTG WAREHOUSE & OFFICE	5807m²
WAREHOUSE A	5928m²
WAREHOUSE A - COVERED LOADING DOCK	130m²
WAREHOUSE A - CANOPIES	1548m²
WAREHOUSE B	5,569m²
WAREHOUSE B - CANOPIES	1844m²

SITE AREA SCHEDULE - CONTINUED

LOCATION	AREA
MAIN OFFICE	867m²
MAIN OFFICE - COVERED WALKWAYS	128m²
TRUCKWASH	224m²
TRUCKWASH PLANTROOM	34m²
TRUCKWASH - RE-FUELLING STATION	160m²
AXLE WEIGHBRIDGE	20m²
CONTAINER WASH	253m²
FORK TRUCK DIESEL STORAGE	66m²
FIRE PUMP HOUSE A	36m²
FIRE PUMP HOUSE B	36m²
CUSTOMER PICK-UP WAREHOUSE	44m²

SITE PLAN
SCALE 1:750

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
05	TOWN PLANNING	29-04-16	D
04	CLIENT REVIEW	27-04-16	C
03	ISSUE TO SUB-CONSULTANT	18-04-16	B
02	REV'D TO CLIENT FEEDBACK	23-03-16	A
01	REVIEW	03-02-16	-

DRAWING REFERENCE NOTES:
1. REFER PROPOSED SUBDIVISION PLAN PREPARED BY SURVEY & ALIGNMENT SERVICES.

STATUS:
CONTROLLED DOCUMENT

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AJL CONSULTING ENGINEERS
CIVIL // STRUCTURAL // HYDRAULIC // MANAGEMENT

DESIGNED BY:	AGS
DESIGN CHECK:	-
DRAWN BY:	AGS
DRAFT CHECK:	-
APPROVED BY:	AJL

CLIENT: **TOLL GROUP**
PROJECT: **TRANSPORT HUB REDEVELOPMENT**
ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

DRAWING: **SITE PLAN**
SCALE (AT A1 DRAWING SIZE): **1:750**
PROJECT No: **15.196** DWG No: **A002** REV No: **D**

Preliminary Contaminated Site Assessment

35-51 Dowling Street, Launceston 7250

Project No: 5482

Environmental Service & Design

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Document Control

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Version:			Date:
DRAFT	Adam Pandelis	ES&D	18/08/2016
REVIEW	Gillian Rasmussen	ES&D	23/08/2016
FINAL	Rod Cooper	ES&D	23/08/2016

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Appendices

1 Introduction

Environmental Service and Design (ES&D) have been commissioned by AJL Consulting Engineers (The Client) to carry out a Preliminary Contaminated Site Assessment (CSA) for a proposed development at a Toll trucking depot on 35-51 Dowling Street, Launceston (Title ref 19027/1, PID 6595324). The objective is to meet council planning requirements and determine whether two Decommissioned Underground Petroleum Storage System (UPSS) have caused historical contamination on the property and if so, whether there is an increased risk to the proposed new development.

1.1 Background

The Client is in the process of putting a Development Application (DA) with Launceston City Council and have been advised that the subject parcel of land needs to address Code E2 (Potentially Contaminated Land Code) of the Launceston Interim Planning Scheme 2015 (LIPS 2015) for the application to progress. The potential sources of contamination onsite that have the possibility to impact the redevelopment include two UPSS that were decommissioned in 2001. UPSS 1 held Super Fuel with a capacity of 11,900L and UPSS 2 held Diesel with a capacity of 27,000L. Other potentially contaminating sources identified included railway tracks running through the property and a large number of registered dangerous goods onsite, which are all bunded and or stored correctly to ensure no risk to the environment or human health. A full list of chemicals can be found in Appendix 3.

For the purpose of this investigation Code E2 of the LIPS 2015 needs to address the criteria set out in E2.4:1-5. In this case the focus will be on E2.4.5 which states “Any use or development that the Director, or a person approved by the Director for the purpose of this Code, having regard to the objective stated in all applicable standards in this Code, has issued a certificate stating that there is insufficient increase in risk from contamination to warrant any specific remediation and protection measures.”

2 Scope of Works

Works were carried out by ES & D Pty Ltd and Tasman Geotechnics Pty Ltd. The scope of works included;

ES & D- Environmental investigation pertaining to the Site Assessment:

- Site History and desktop assessment;
- Order/ review Dial Before You Dig (DBYD) and Worksafe Tasmania Information;
- Onsite detection of underground assets by AJ Water & Leak Detection;

- Commissioning of one groundwater monitoring well; this was subcontracted to Tasman Geotechnics Pty Ltd but the installation, including the location was supervised by ES&D; Bore logging by ES&D (Appendix 4); Collection, preparation and dispatch of soil samples for NATA laboratory analysis conducted by ES&D;

- Collection, preparation and dispatch of soil samples for NATA laboratory analysis conducted by Tasman Geotechnics.

- Collection, preparation and dispatch of groundwater samples for NATA laboratory analysis conducted by Tasman Geotechnics.

- Collation and interpretation of analytical results;

- Human health and ecological risk assessments; and

- Preparation of the preliminary assessment report; by a certified Contaminated Site Practitioner, Rod Cooper of ES&D.

3 Preliminary Investigation

3.1 Site Inspection

Environmental Services and Design conducted a site visit on the 8th of August 2016. The locations of the decommissioned UPSSs were identified with the help of the line locating equipment and the original site plan which identified the location of the UPSSs when they were in operation (Appendix 3). The locations of the decommissioned UPSS were confirmed with onsite observation and it was noted that the proposed new development is ~25m away at the closest point. Onsite walk through inspection was focused on chemical storage (Chlorine, Hydrochloric Acid, Potassium Hydroxide, Sodium Hydroxide, Sodium Hypochlorite), new refueling station, Oil storage, railway track line and drainage channels with a focus on evidence of contamination from hydrocarbons. It was noted that previous geotechnical studies were conducted onsite with 3 piezometer installed in various locations (Figure 2). BH1 is in the approximate location of the Proposed Warehouse A, BH2 is in the approximate location of Warehouse B and BH3 is in the approximate location of the new Main office (see Appendix 2 for Development Plans). This was installed on the 8/8/2016.

3.2 Site identification

Site identification and current ownership information are summarised in Table 1. A Site map is provided in Figure 2. Historic ownership and UPSS history was deduced from Worksafe Tasmania Files and are summarised in Tables 2 and 3.

Table 1 Site details

Property ID	6595324
Title Reference	19027/1
UPSS Address	35 Dowling Street Launceston
UPSS infrastructure owner	Hammond Palmer Transport
Landowner	UPSS period Hammond Palmer Transport, now Toll Transport Pty Ltd
Authority	Landowner

Table 2 Site Ownership History

Year	*Site Owner*
>1986	Unknown
1986-1992	Hammond Palmer Transport
1992-1995	Interlink Distribution Services
1995-Present	Toll Transport Pty Ltd

Table 3 UPSS Information

Element & Comment	*Year*
UPSS1: 11,900L Super and Pump decommissioned in December 2001	1986-2001
UPSS2: 27,000L Diesel and Pump decommissioned in December 2001	1986-2001

3.3 Current and Proposed Use

The current and proposed use of the property is light industrial, this will not change, the redevelopment will shift buildings to a more efficient use of the land. There will be an increase in office density in the new main office.

3.4 Site History

The site has historically been used as a transport depot, previously owned by Hammond Palmer Transport, which was then taken over by Interlink Distribution Services which was later bought out by Toll Transport Pty Ltd. Historically the site has stored underground Diesel and Super Tanks. More recently Toll has opted to only use above ground bunded tanks.

3.4.1 Site Plan and Historical Maps

Current site plan is shown in Figure 2 and a historical site plan which identifies locations of the UPSSs can be found in Appendix 3.

3.4.2 Land Use Zoning

The Site (Blue outlined) is zoned as Light Industrial (Pink) as per *Launceston City Council Interim Planning Scheme 2015* (Figure 1), with the surrounding zones consisting of Recreation (Green), Community Purpose (Light cream), Commercial (Dark grey), Inner Residential (Maroon), Utility (Yellow) and Rural Resource (Dark Cream).

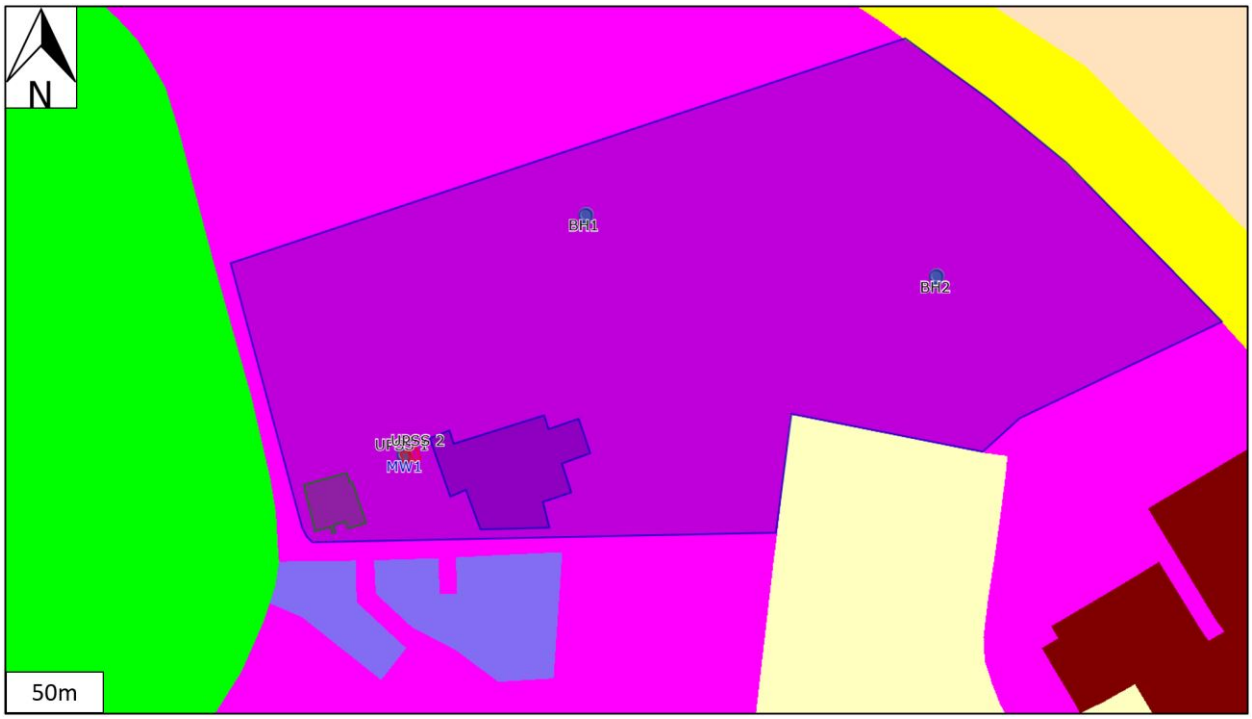


Figure 1 Zoning boundaries as per *Launceston City Council Interim Planning Scheme 2015.*

Highlighting 35-51 Dowling Drive (blue outlined), Light Industrial (Pink), Recreation (Green), Community Purpose (light cream), Commercial (dark grey), Inner residential (maroon), Utility (yellow) and Rural Resource (Dark cream). Source The List 2016.

3.4.3 Ownership and Location

The property is currently owned by Toll Transport Pty Ltd and is located at 35-51 Dowling Street 7250 (PID 6595324, Title ref 19027/1). The site is approximately 300m west of the North Esk River at its closest point and approximately 1.5km east of the Launceston CBD. The site is situated on a relatively flat flood plain of the North Esk River, there is a flood levee on the eastern boundary to protect the site from inundation.

The Site has been owned by Toll Transport Pty Ltd since 1995 whereby it was purchased off Interlink Distribution Services which was also a transport company. The UPSS were decommissioned in 2001 by BP Australia Limited.

Figure 2 Site Location.

Highlighting 35-51 Dowling St (Blue Outlined), Sampling locations (Piezometre BH1, BH2, and Groundwater well MW1), UPSS tanks, Railway track (dashed black line) Current office space (Blue) and Proposed office space (Green).

3.4.4 Previous Activities and Uses

The site since 1986 has been used as a transport depot/hub, for refueling of trucks and forklifts and the storage of freight. The time before this is unknown. At present the site is not used as a workshop, all repairs on machinery are conducted offsite. The site currently stores a number of dangerous substances onsite (Full list in Site manifest in Appendix 3) all of which are registered and are bunded and stored correctly posing no increased risks to the environment or human health. Two UPSS were commissioned in 1986, UPSS 1 being a 11,000L Super tank and UPSS 2 a 27,000L tank.

3.4.5 Site Services

Site services and underground assets were identified by AJ Leak and Water with correspondence with the historical site plans.

4 Geology, Hydrology and Hydrogeology

Review of the Tasmanian Land Information System (The List) indicated that there are 4 geological units within the site all grouped as Quaternary sediments. They are broadly described as Estuarine deposits of clayey silt, silt, sand and subordinate gravel, supra-estuarine swamp and laterally derived alluvial, deposits, unmapped man-made deposits including silt dredgings; in environments inferred to lie above frequent tidal influence. The local topography is relatively flat as it is situated in the North-Esk Flood zone. The suspected groundwater flow is to the north towards the opening of the North-Esk River to the Tamar Estuary. Detailed bore logs are included in Appendix 4.

5 Potential Receptors

The current human receptors include subsurface workers, office workers and warehouse workers. The future receptors with the redevelopment would increase to include construction workers.

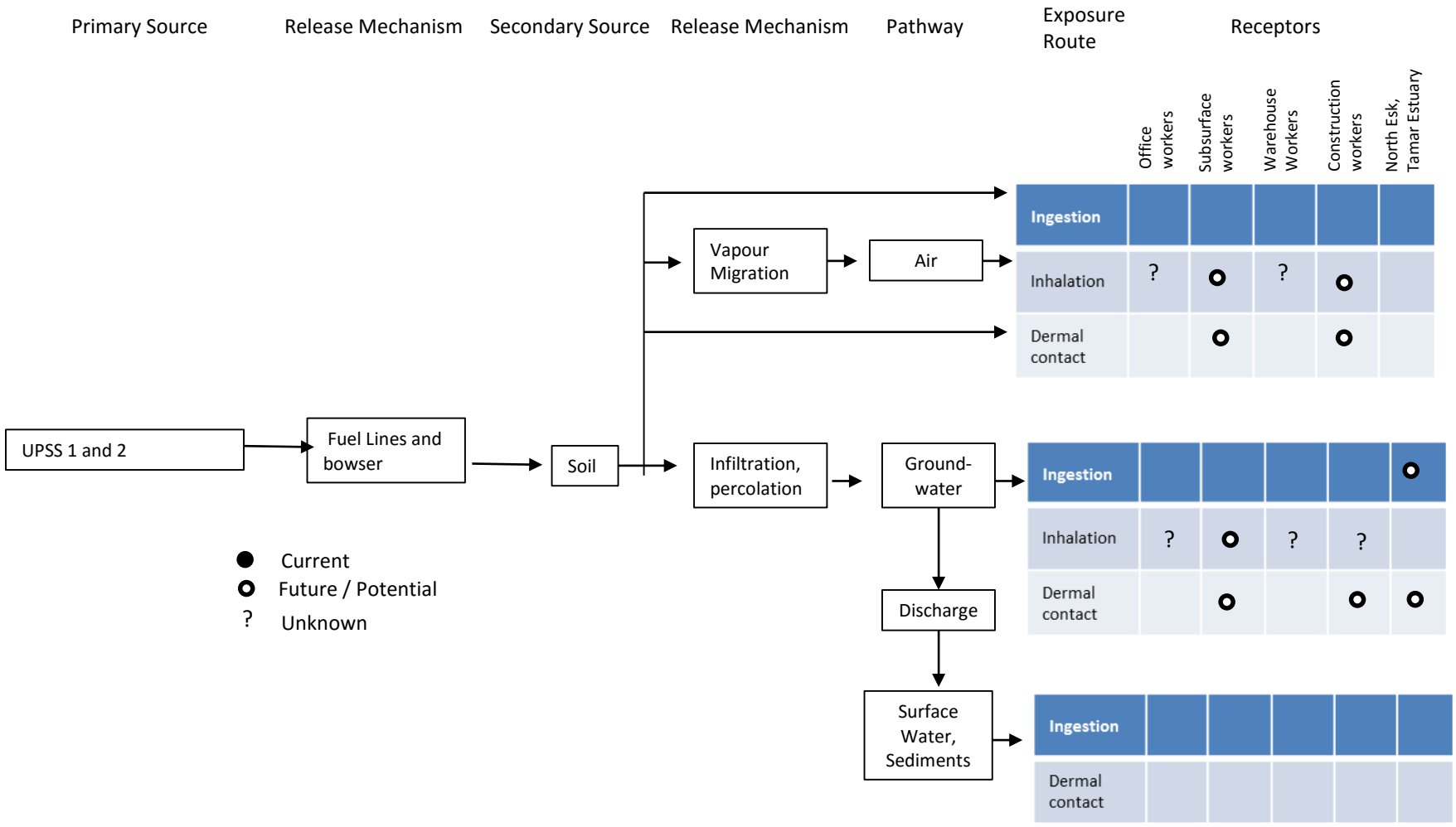
5.1 Human Receptors

Risks to human health from COC's outlined in section 8.0 can arise via the inhalation route from vapour intrusion into building spaces, or when people are in close proximity to vapours for extended periods (e.g., subsurface workers), and/or by direct contact with contaminated soil, surface water or groundwater (e.g., ingestion, dermal contact).

5.2 Ecological Receptors

North-Esk and the Tamar Estuary are the receiving surface bodies of water for groundwater discharging from the site. Therefore, contaminants within the groundwater could pose a risk to ecological receptors in this area. Soil contamination off site was not considered as soil contamination would be limited to the site. The DA does not include a change in use and so ecological impacts although assessed are not considered for management.

6 Preliminary Conceptual Site Model



7 Environmental Data Collection

7.1 Sampling, Analysis and Quality Plan (SAQP)

Laboratory Certificates of Analysis (COA) for all samples are attached in Appendix 1. Sampling QA/QC protocols and QC results are presented. A sampling plan is summarised in Table 4.

Table 4 Sampling Plan

Sample plan								
Sample Information			Analytical Plan					
Soil	Number of samples	Number of duplicates	Total	TRH Fractions	PAH	BTEX / BTEXN	Lead	TPH
MW1-2.0m	1	0	1	X	X	X	X	X
MW1-3.0m	1	0	1	X	X	X	X	X
MW1-4.0m	1	0	1	X	X	X	X	X
MW1-4.3m	1	0	1	X	X	X	X	X
MW1-5.0m	1	0	1	X	X	X	X	X
Groundwater								
MW1	1	1	2	X	X	X	X	X
BH1	1	0	1	X	X	X		X
BH2	1	0	1	X	X	X		X

7.1.1 Sample Handling, storage and transport

- NEPM Schedule B (2), *Guideline on Site Characterisation; judgmental sampling;*
- AS 4482.1 (2005) Guide to the Sampling and Investigation of Potentially Contaminated Soil – Part 1: Non- Volatile and Semi Volatile Compounds;
- AS 4482.2- Part 2: Volatile Substances; and
- AS 5667.1 (1998) Guidance on the design of sampling programs, sampling techniques and the preservation and handling of sampling.

Soil samples were taken directly from the drill auger. Groundwater bore was triple purged to condition it on the 8th of August 2016. Sampling of the bores occurred on the 9th of August 2016. Samples were immediately placed into a Laboratory supplied esky with ice bricks after collection and were dispatched by overnight airfreight to the analytical laboratory. The analytical laboratory used for all samples was NATA certified Australian Laboratory Services (ALS), Springvale, Victoria.

7.2 QA & QC

ALS Laboratory supplies a full QC report covering laboratory QA/QC activities with each COA. Field duplicates were collected as described above.

Techniques used to prevent cross contamination of samples and ensure the integrity of samples were as follows:

- Samples were collected using techniques and methods to ensure that there was no cross contamination;
- All samples were immediately collected into ALS supplied analyte appropriate bottles, individually labelled, placed in an Esky with freezer packs and dispatched for overnight delivery to the Laboratory with an accompanying chain of custody document.

AS 4482.1 (2005) suggests that typical Measurable Data Quality Indicators (MDQI) should be ≤50% Relative Percentage Difference (RPD), and this was the adopted MDQI for all samples

Table 5 RPD Calculations for Groundwater samples.

Laboratory Report No: EM1609387	Pair 1		RPD (%)
	MW1	Duplicate	
	µg/L		
Lead	25	21	-17.39
TPH			
C_6 - C_9 Fraction	<20	<20	N/A
C_{10} – C_{14} Fraction	<50	<50	N/A
C_{15} – C_{28} Fraction	460	480	4.25
C_{29} – C_{36} Fraction	<50	50	N/A
C_{10} – C_{36} Fraction (sum)	460	530	14.14
TRH			
C_6 - C_{10} Fraction	<20	<20	N/A
C_6 - C_{10} Fraction minus BTEX (F1)	<20	<20	N/A
>C_{10} – C_{16} Fraction	<100	<100	N/A
>C_{16}-C_{34} Fraction	440	470	6.59
>C_{34}-C_{40} Fraction	<100	<100	N/A
>C_{10} – C_{40} Fraction (sum)	440	470	6.59
>C10-C16 Fraction minus Naphthalene (F2)	<100	<100	N/A
BTEXN			
Benzene	<1	<1	N/A
Toluene	<2	<2	N/A
Ethylbenzene	<2	<2	N/A
Meta- & para-Xylene	<2	<2	N/A
Ortho-Xylenes	<2	<2	N/A
Total Xylenes	<2	<2	N/A
Sum of BTEX	<1	<1	N/A
Naphthalene	<5	<5	N/A

8 Chemicals of Concern

Chemicals of Concern (COC) for the focus of this study include TPH, PAHs, BTEXN and Lead. Asbestos may also be a concern in the redevelopment phase. Chemicals that are stored onsite that were inspected but not the focus of this study included; Ammonia, Aqua Ammonia, assorted flammable liquids, Caustic soda, chlorine, Dry chlorine granuler, Hydrochloric acid, LP Gas, Potassium hydroxide, sodium hydroxide solution, sodium hydroxide solid, sodium chlorite, ethanolamine, disodium trioxo silicate, corrosives – solid, corrosives – liquid, ethanol, N-propanol and aerosols (full list of quantities can be found in Appendix 3). These were not considered chemicals of concern because Toll have well established OH&S procedures in place with well documented spill control reporting and cleanup systems. It is also understood that the use is not changing and so risk is not increased with the implementation of the DA. There are no recorded spills on the site, no reports.

9 Basis for Assessment

Health Screening Levels (HSLs), Health Investigation Levels (HILs), Ecological Investigation Levels (EILs), Ecological Screening Levels (ESLs) and Groundwater Investigation Levels (GILs) provided in the *National Environmental protection (Assessment of Site Contamination) Measure* 1999, as amended April 11, 2013 (NEPM) were the designated criteria for assessing potential ecological and human health risks posed by hydrocarbon contamination of soil and groundwater as applicable. Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE) documents used in the assessment comprised CRC CARE Technical Report No. 10 *"Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater Part 2: Application Document"* (TR10), including the associated Risk Assessment Checklist.

Soil and groundwater screening / investigation levels considered are given in Tables 6, 7 and 8.

NEPM advises that a pragmatic risk-based approach should be taken in applying ESLs & EILs in commercial/industrial land use settings, and that these generally only apply to the top 2.0 metres of soil. ESLs relating to fine grained soil were considered to be appropriate because the clay was highly impermeable.

With respect to the assessment for lead, the ambient soil background concentration (ABC) is not known. The ABC is normally added to the added contaminant limit (ACL) provided by NEPM to give the EIL value, however the ABC often makes little difference to the ultimate value. For the purposes of this assessment the ACL was considered to be equivalent to the EIL.

Table 6 Soil Assessment Criteria, Health Screening Levels/ Health Investigation Levels

Land Use	*Commercial / Industrial*	
HSLs - Derived from NEPM Schedule B1, Table 1A(3)	HSL-D 1-2m, Clay	HSL-D 2-4 m, Clay **#**
Chemical		
Naphthalene	NL	NL
C_6-C_{10} (F1)	480	NL
>C_{10}-C_{16} (F2)	NL	NL
Benzene	6	9
Toluene	NL	NL
Ethylbenzene	NL	NL
Xylenes	NL	NL
HILs – Derived from NEPM Schedule B1, Table 1A(1)		
Lead	1500	
NL = Not Limiting: indicates that vapour reaches saturation point and cannot increase to a point which would result in an unacceptable health risk. **# 4 meters + assumed 2-4 meters guidelines as this is more conservative.**		

Table 7 Soil Assessment Criteria, Ecological Investigation Levels/ Ecological Screening Levels

Land Use	Commercial / Industrial	
Chemical	Soil (mg/kg)	
Soil (mg/kg)		
Lead	*ABC*	Not known
	ACL	1500
	EIL	1500
ESLs – Derived from NEPM Schedule B1, Table 1B(6)		
C_6-C_{10} (F1)	Fine substrate	215
>C_{10}-C_{16} (F2)		170
>C_{16}-C_{34} (F3)		2500
>C_{34}-C_{40} (F4)		6600
Benzene		95
Toluene		135
Ethylbenzene		185
Xylenes		95

Table 8 Groundwater Assessment Criteria, Health Screening Levels/ Groundwater Investigation Levels.

Chemical	Groundwater (µg/L)
HSLs - Derived from NEPM Schedule B1, Table 1A(4)	
	HSL-D 2-4m, clay **#**
Naphthalene	NL
C_6-C_{10} (F1)	NL
>C_{10}-C_{16} (F2)	NL
Benzene	30000
Toluene	NL
Ethylbenzene	NL
Xylenes	NL
GILs – Derived from NEPM Schedule B1, Table 1C	
	Fresh Water
Lead	3.4
Benzene	950
o-xylene	350
p-xylene	200
Naphthalene	16
NL = Not Limiting: indicates that vapour reaches saturation point and cannot increase to a point which would result in an unacceptable health risk. **# 4 meters + assumed 2-4 meters guidelines as this is more conservative.**	

10 Field Activities

10.1 Soil

For the purpose and scope of the investigation only one borehole was drilled. Following the judgmental sampling approach drilling was conducted south-west of the UPSS towards to the new main office building. Soil sample location and notes are summarised below.

MW1: Approximately located slightly south-west of the decommissioned tanks towards the new development (Figure 3). Soil samples were taken on 8/8/2016 at the depths of 2.0m, 3.0m, 4.0m, 4.3m and 5.0m, with 4.3 being the interface between soil and water. Drilling was undertaken using a 100mm auger and all samples were taken from the tip of the auger. Due to the nature of the geology (highly impermeable) depth that groundwater was encountered was hard to determine, though groundwater seeped in very slowly from the 4.0m-4.3m interface.

Figure 3 Location of MW1, highlighting the coordinates. Photo taken 8/8/2016.

10.2 Surface Water

Surface water was not investigated in this study, as the potential sources of contamination in question were underground. However, storm water drains were inspected during the site visit and no obviously signs of contaminated were noted.

10.3 Groundwater

Groundwater was investigated in MW1, BH1 and BH2. The depth at which groundwater was encountered at MW1 was not clear however, it is likely that it was between 4.0-4.3m. The sample was taken to detect any leaks in the UPSS lines or in the tank itself that would increase the risk to the new development. BH1 and BH2 were piezometers that were previously drilled by Tasman Geotechnics for a Geotechnical investigation for the new buildings. BH1 is located on the northern boundary of the site in an area where the site currently stores shipping containers, in the redevelopment phase this area will convert into a new warehouse as such the sample will identify any risks to the warehouse workers. BH2 is located in the south-eastern aspects of the site, currently the area is frequently flooded, in the redevelopment phase the area will house another warehouse and office space, which will consist of 6 employees.

10.4 Waste

No waste issues have been identified in this study, the site has well developed and managed systems in place.

11 Analytical Result

The comprehensive data is presented in Tables 9-10. The full ALS results with the Laboratory QC & QA can be found in Appendix 1.

Table 9 Soil Sample Results

Laboratory Report: EM1609318			*Sample ID*			MW1-2.0m	MW1-3.0m	MW1-4.3m	MW1-5.0m	MW1-4.0m
			Date Sampled			08-Aug-16	08-Aug-16	08-Aug-16	08-Aug-16	08-Aug-16
Analyte	Units	LOR	HIL	HSL-D 2-4m	EIL / ESL-D	Soil	Soil	Soil	Soil	Soil
Moisture Content (dried @ 103°C)	%	1				25.4	43.6	7.5	26.7	7.2
Lead	mg/kg	5	1500			40	6	14	14	22
PAHs										
Benzo(a)pyrene TEQ (half LOR)	mg/kg	0.5				0.6	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (LOR)	mg/kg	0.5				1.2	1.2	1.2	1.2	1.2
TPH										
C6-C9 Fraction	mg/kg	10				<10	<10	-	<10	-
C10-C14 Fraction	mg/kg	50				<50	<50	<50	<50	<50
C15-C28 Fraction	mg/kg	100				<100	<100	<100	<100	<100
C29-C36 Fraction	mg/kg	100				<100	<100	<100	<100	<100
C10-C36 Fraction (sum)	mg/kg	50				<50	<50	<50	<50	<50
TRH										
C6-C10 Fraction	mg/kg	10				<10	<10	-	<10	-

Laboratory Report: EM1609318			*Sample ID*			MW1-2.0m	MW1-3.0m	MW1-4.3m	MW1-5.0m	MW1-4.0m
			Date Sampled			08-Aug-16	08-Aug-16	08-Aug-16	08-Aug-16	08-Aug-16
C6-C10 Fraction minus BTEX (F1)	mg/kg	10				<10	<10	-	<10	-
>C10-C16 Fraction	mg/kg	50				<50	<50	<50	<50	<50
>C16-C34 Fraction	mg/kg	100				<100	<100	<100	<100	<100
>C34-C40 Fraction	mg/kg	100				<100	<100	<100	<100	<100
>C10-C40 Fraction (sum)	mg/kg	50				<50	<50	<50	<50	<50
>C10-C16 Fraction minus Naphthalene (F2)	mg/kg	50				<50	<50	<50	<50	<50
BTEXN										
Benzene	mg/kg	0.2		9		<0.2	<0.2	-	<0.2	-
Toluene	mg/kg	0.5				<0.5	<0.5	-	<0.5	-
Ethylbenzene	mg/kg	0.5				<0.5	<0.5	-	<0.5	-
meta- & para-Xylene	mg/kg	0.5				<0.5	<0.5	-	<0.5	-
ortho-Xylene	mg/kg	0.5				<0.5	<0.5	-	<0.5	-
Sum of BTEX	mg/kg	0.2				<0.2	<0.2	-	<0.2	-
Total Xylenes	mg/kg	0.5				<0.5	<0.5	-	<0.5	-
Naphthalene	mg/kg	1				<1	<1	-	<1	-

Laboratory Report: EM1609318			*Sample ID*			MW1-4.3m Volatiles	MW1-4.0m Volatiles
			Date Sampled			08-Aug-16	08-Aug-16
Analyte	Units	LOR	HIL	HSL-D 2-4m	EIL / ESL-D	Soil	Soil
Moisture Content (dried @ 103°C)	%	1				58.4	54.4
Lead	mg/kg	5	1500			-	-
PAHs							
Benzo(a)pyrene TEQ (half LOR)	mg/kg	0.5				-	-
Benzo(a)pyrene TEQ (LOR)	mg/kg	0.5				-	-
TPH							
C6-C9 Fraction	mg/kg	10				<20	<20
C10-C14 Fraction	mg/kg	50				-	-
C15-C28 Fraction	mg/kg	100				-	-
C29-C36 Fraction	mg/kg	100				-	-
C10-C36 Fraction (sum)	mg/kg	50				-	-
TRH							
C6-C10 Fraction	mg/kg	10				<20	<20
C6-C10 Fraction minus BTEX (F1)	mg/kg	10				<20	<20
>C10-C16 Fraction	mg/kg	50				-	-
>C16-C34 Fraction	mg/kg	100				-	-
>C34-C40 Fraction	mg/kg	100				-	-
>C10-C40 Fraction (sum)	mg/kg	50				-	-

Laboratory Report: EM1609318			Sample ID			MW1-4.3m Volatiles	MW1-4.0m Volatiles
			Date Sampled			08-Aug-16	08-Aug-16
>C10-C16 Fraction minus Naphthalene (F2)	mg/kg	50				-	-
BTEXN							
Benzene	mg/kg	0.2		9		<0.4	<0.4
Toluene	mg/kg	0.5				<1.0	<1.0
Ethylbenzene	mg/kg	0.5				<1.0	<1.0
meta- & para-Xylene	mg/kg	0.5				<1.0	<1.0
ortho-Xylene	mg/kg	0.5				<1.0	<1.0
Sum of BTEX	mg/kg	0.2				<0.4	<0.4
Total Xylenes	mg/kg	0.5				<1.0	<1.0
Naphthalene	mg/kg	1				<2	<2

Table 10 - Groundwater

Laboratory Report: EM1609318			Sample ID			BH2	MW1	FD	BH1
			Date Sampled			09-Aug-16	09-Aug-16	09-Aug-16	09-Aug-16
Analyte	Units	LOR	HIL	HSL-D 2-4m	EIL / ESL-D	Water	Water	Water	Water
Lead	mg/L	0.001				-	0.025	0.021	-
TPH									
C6-C9 Fraction	µg/L	20				<20	<20	<20	<20
C10-C14 Fraction	µg/L	50				<50	<50	<50	<50

Laboratory Report: EM1609318			*Sample ID*			BH2	MW1	FD	BH1
			Date Sampled			09-Aug-16	09-Aug-16	09-Aug-16	09-Aug-16
C15-C28 Fraction	µg/L	100				180	460	480	120
C29-C36 Fraction	µg/L	50				<50	<50	50	<50
C10-C36 Fraction (sum)	µg/L	50				180	460	530	120
TRH									
C6-C10 Fraction	µg/L	20				<20	<20	<20	<20
C6-C10 Fraction minus BTEX (F1)	µg/L	20				<20	<20	<20	<20
>C10-C16 Fraction	µg/L	100				<100	<100	<100	<100
>C16-C34 Fraction	µg/L	100				190	440	470	120
>C34-C40 Fraction	µg/L	100				<100	<100	<100	<100
>C10-C40 Fraction (sum)	µg/L	100				190	440	470	120
>C10-C16 Fraction minus Naphthalene (F2)	µg/L	100				<100	<100	<100	<100
BTEXN									
Benzene	µg/L	1		30,000		<1	<1	<1	<1
Toluene	µg/L	2				<2	<2	<2	<2
Ethylbenzene	µg/L	2				<2	<2	<2	<2
meta- & para-Xylene	µg/L	2				<2	<2	<2	<2
ortho-Xylene	µg/L	2				<2	<2	<2	<2
Sum of BTEX	µg/L	2				<2	<2	<2	<2
Total Xylenes	µg/L	1				<1	<1	<1	<1
Naphthalene	µg/L	5				<5	<5	<5	<5

12 Discussion

There were no contaminates tested that were above the Health and Ecological Investigation or Screening Levels for both soil and Groundwater.

Groundwater:

Minor traces of Lead (0.025mg/L) were found in Groundwater sample MW1, Lead was not tested for in BH1 and BH2 as there is no pathway to the human receptors. These samples were tested for indicative values only for Hydrocarbon contamination as BH 1 and BH 2 were initially commissioned for Piezometer use only. Traces of TPH factions C15-C28 and TRH fractions C16-C34 were found in all samples with the highest levels evident in MW1 (460µg/L and 440µg/L respectively). This could be explained by minor historical Diesel and or Lubricating Oils from Trucks and Forklifts onsite. No levels of BTEXN were above Laboratory Limits of Reporting (LOR).

Confirmation of groundwater flow direction was not deemed necessary for this investigation, however it is anticipated that it is likely flowing in a north-westerly direction towards the opening of the North-Esk-Tamar Estuary although the area is very flat and groundwater may circulate with tidal movement.

Soil:

Traces of Lead were found in all samples with the highest found at the MW1-2.0m (40mg/kg) interface. Samples MW1-4.0m and MW1-4.3m volatile results were reported separately due to the high moisture content within the sample. At the interface moisture content is variable particularly with clay samples, this explains why the FD sample has a different moisture content to the field sample. These samples correlate to where the groundwater interface was approximately identified. In most cases of substantial contamination, contaminates are found within this interface. In this case no traces of any contaminates tested for were above the laboratory LORs for either of these samples nor any other samples tested. As a result the LORs were raised for MW1 4.3 and FD volatiles. Due to the location of the monitoring well and the proximity to the proposed new office building this gives a strong indication that there is no increased risk by the redevelopment (relocation of the main office).

The environmental risk to the development of Warehouse A, Warehouse B & Office (Appendix 2) have been quantified using the BH1 and BH2 samples as well as historical site history that does not identify any contaminating sources in either of these areas. Warehouse A is believed to have no permanent staff offices within the building reducing possible exposure to receptors. However, Warehouse B is thought to house approximately 6 permanent staff during normal office hours. Due to the evidence (Workplace Standards Records) of no contaminating sources in the area

combined with the Site walk through and the no levels of contaminates in BH1 and BH2 samples, it was not deemed necessary to undertake further investigation in these areas. The groundwater results confirm there is no vapour risk and the concrete barrier breaks the pathway of other solid and liquid contaminants. Concluding there is no increased risk with the redevelopment.

During the redevelopment it is proposed that the old Railway lines are to be decommissioned. During the site visit an inspection of the lines was conducted and no signs of contamination were evident. However, if signs of contamination appear during the decommissioning phase, contaminated soils need to be tested and dispose of at an appropriate waste depot. EPA approval is required for transport of potentially contaminated material.

The site comprises of approximately 8.3 ha of operational areas approximately 2/3 of the site is covered with asphalt, concrete pavers or road base which are semi-impermeable. The site has spill kits onsite and all chemicals are stored and bunded to manufacturer standards. There were no other indications of contamination onsite during the site visit.

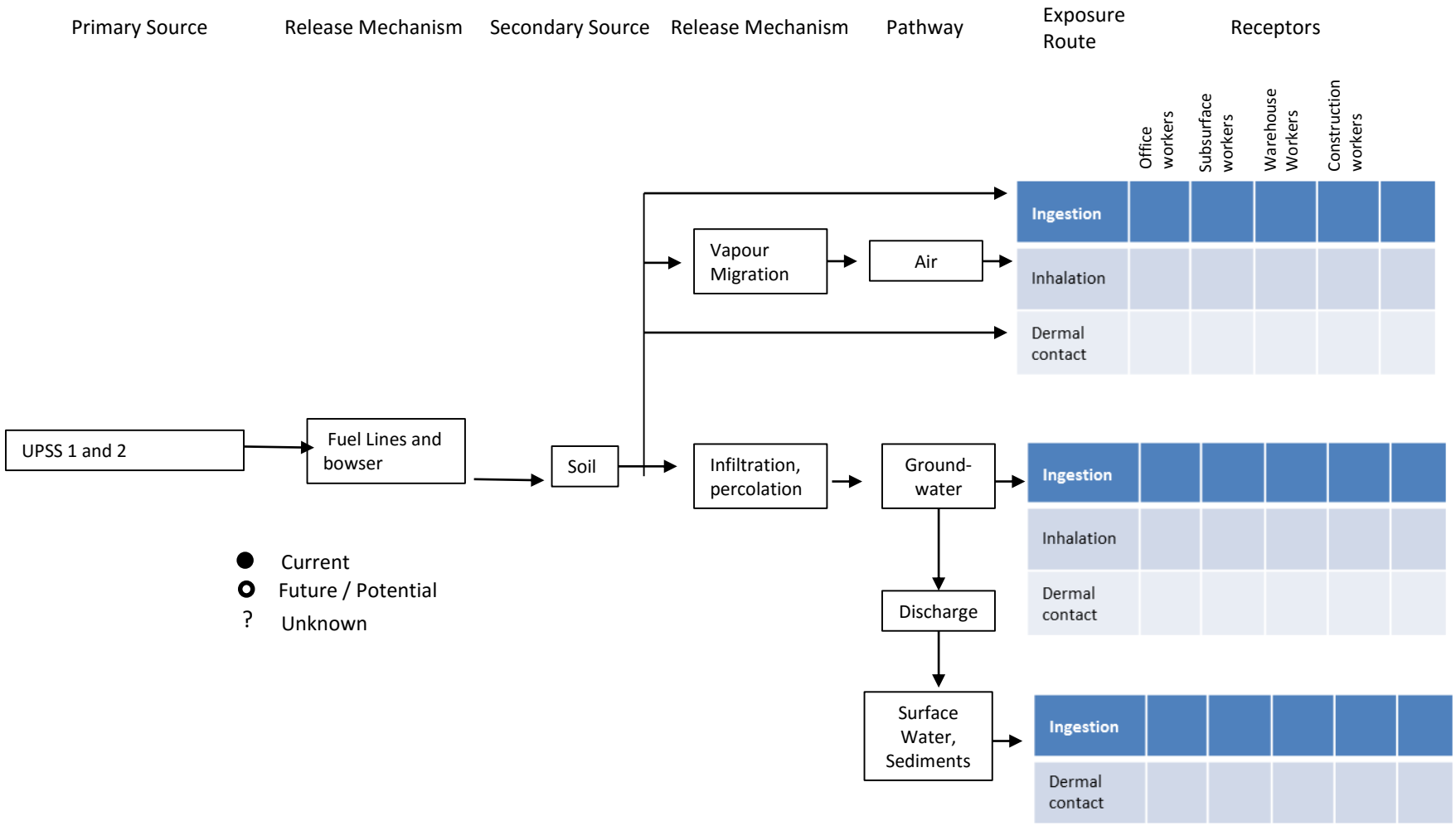


Figure 4 Final Conceptual Site Model

13 Conclusions and Recommendations

The only real risk to the human receptors on the site is via vapour migration from the decommissioned UPPS. Groundwater investigation confirmed that there is no vapour risk to any of the new facilities covered in the DA. In relation to historic contamination it is deemed that there is an insufficient increase in the level of risk to warrant any specific hazard or protection measures and therefore the proposal will meet exemption condition E2.4.5. In addition, no contamination of significant levels were identified on the property.

All exemption conditions pertaining to increased risk in relation to potential site contamination is met.

Asbestos on site is covered by WorkSafe Tasmania Legislation.

Excavation and removal of soil from the site should meet the required environmental legislation, particularly soil associated with decommissioning the rail track. This is legislated so no management requirements are made.

R. Cooper
Principal Consultant
Environmental Service & Design

14 Limitations

ES&D has prepared this report in accordance with the care and thoroughness of the consulting profession for the use of Ms Claire Gregg of AJL Consulting Engineers. It was based on accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report. It is prepared in accordance with the scope of work and for the purpose outlined.

This report was prepared in August 2016 and is based on the conditions encountered and information reviewed at the time of preparation. ES&D disclaims the responsibility for any changes that may have occurred after this time.

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

Subsurface conditions can vary across a particular site and cannot be explicitly defined by these investigations. It is unlikely therefore that the results and estimations expressed in this report will represent the extreme conditions within the site.

The information in this report is considered to be accurate at the date of issue and is in accordance with conditions at the site at the dates sampled.

This document and the information contained herein should only be regarded as validly representing the site conditions at the time of the investigation unless otherwise explicitly stated in a preceding section of the report.

No warranty or guarantee of property conditions is given or intended.

15 References

CRC CARE TR10 - CRC Care Technical Report No. 10 “Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater” (September, 2011)

National Environmental Protection (Assessment of Site Contamination) Measure, “Guideline on the Investigation Levels for Soil and Groundwater”, Schedule B (1), 1999 (as amended 2013)

National Environmental Protection (Assessment of Site Contamination) Measure, “Guideline on Data Collection, Sample Design and Reporting”, Schedule B (2), 1999 (as amended 2013)

AS 4482.1 (2005) Guide to the Sampling and Investigation of Potentially Contaminated Soil - Part 1: Non-Volatile and Semi Volatile Compounds

AS 4482.2 (1999) Guide to the Sampling and Investigation of Potentially Contaminated Soil – *Part 2: Volatile Substances*

AS 5667.1:1998, Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples

Tasmanian Government Land Information System - http:// www.thelist.tas.gov.au

Appendix 1 – Laboratory Certificates

FREIGHT

ALS Environmental

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: Environmental Services & Design	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics) ☐ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle) Custody Seal Intact? Yes No N/A
OFFICE: 42 Stanley Street, Taren Point, NSW, 2229	ALS QUOTE NO.:	Free Ice / Frozen Ice Bricks present upon receipt? Yes No N/A
PROJECT: 5482 Dowling street	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
ORDER NUMBER:	OF: 1 2 3 4 5 6 7	Other comment:
PROJECT MANAGER: R Cooper 0417421486		
SAMPLER: Rod Cooper	SAMPLER MOBILE: as above	
COC emailed to ALS? (NO)	EDD FORMAT (or default):	
Email Reports to: rcooper@esandd.com.au; admin@esandd.com.au;		
Email Invoice to: admin@esandd.com.au		

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
R Cooper			
DATE/TIME 08/08/2016	DATE/TIME:	DATE/TIME:	DATE/TIME: 9/8 13-30

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).		Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE	TOTAL CONTAINERS	TPH/TRH/BTEXN /PAH S-07 inc Napthalene	Lead	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
(1)	MW1-2.0m	8/08/2016 11:15	Soil	1Glass	1	x	x	
(2)	MW1-3.0m	8/08/2016 11:35	Soil	"	1	x	x	
(3)	MW1-4.3m (4.3m MW1-5.0)	8/08/2016 11:50	Soil	"	1	x	x	
(4)	MW1-5.0m	8/08/2016 12:15	Soil	"	1	x	x	
~~MW2-2.0m~~		~~8/08/2016~~	Soil	"		x	x	
~~MW2-3.0m~~		~~8/08/2016~~	Soil	"		x	x	
(5)	FD	8/08/2016 11:50	Soil	"	1	x	x	
					TOTAL 10			

Environmental Division
Melbourne
Work Order Reference
EM1609318

Telephone : + 61-3-8549 9600

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM1609318**	Page	: 1 of 7
Client	: **ENVIRONMENTAL SERVICE AND DESIGN PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: MR ROD COOPER	Contact	: Shirley LeCornu
Address	: 14 CATTLEY ST. PO BOX 651 BURNIE TASMANIA, AUSTRALIA 7320	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 03 6442 4037	Telephone	: +61-3-8549 9630
Project	: 5482	Date Samples Received	: 09-Aug-2016 13:30
Order number	: ----	Date Analysis Commenced	: 09-Aug-2016
C-O-C number	: ----	Issue Date	: 15-Aug-2016 16:43
Sampler	: ROD COOPER		
Site	: Dowling Street		
Quote number	: ----		
No. of samples received	: 7		
No. of samples analysed	: 7		

NATA Accredited Laboratory 825
Accredited for compliance with ISO/IEC 17025.

NATA
WORLD RECOGNISED ACCREDITATION

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Eric Chau	Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Nancy Wang	Senior Semivolatile Instrument Chemist	Melbourne Organics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP080: Particular samples (EM1609318_006, 007) has LOR raised due to the high moisture content.
- Volatile results on samples 3 & 5 to be reported separately on sample 6 & 7 due to high moisture content
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	MW1-2.0m	MW1-3.0m	MW1-4.3m	MW1-5.0m	FD
			Client sampling date / time	08-Aug-2016 11:15	08-Aug-2016 11:35	08-Aug-2016 11:50	08-Aug-2016 00:15	08-Aug-2016 11:50
Compound	CAS Number	LOR	Unit	EM1609318-001	EM1609318-002	EM1609318-003	EM1609318-004	EM1609318-005
				Result	Result	Result	Result	Result
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	25.4	43.6	7.5	26.7	7.2
EG005T: Total Metals by ICP-AES								
Lead	7439-92-1	5	mg/kg	40	6	14	14	22
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	0.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	----	<10	----
C10 - C14 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	----	<10	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	----	<10	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW1-2.0m	MW1-3.0m	MW1-4.3m	MW1-5.0m	FD
				Client sampling date / time	08-Aug-2016 11:15	08-Aug-2016 11:35	08-Aug-2016 11:50	08-Aug-2016 00:15	08-Aug-2016 11:50
Compound	CAS Number	LOR	Unit		EM1609318-001	EM1609318-002	EM1609318-003	EM1609318-004	EM1609318-005
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	<50	<50	<50	<50
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		----	----	<50	----	<50
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		<50	<50	----	<50	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	----	<0.2	----
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	<0.2	----	<0.2	----
^ **Total Xylenes**	1330-20-7	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
Naphthalene	91-20-3	1	mg/kg		<1	<1	----	<1	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**93.5**	**97.8**	**101**	**99.7**	**103**
2-Chlorophenol-D4	93951-73-6	0.5	%		**78.6**	**82.9**	**82.4**	**84.9**	**85.5**
2.4.6-Tribromophenol	118-79-6	0.5	%		**70.4**	**89.1**	**80.9**	**76.6**	**93.2**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**103**	**104**	**99.8**	**108**	**103**
Anthracene-d10	1719-06-8	0.5	%		**107**	**110**	**112**	**112**	**114**
4-Terphenyl-d14	1718-51-0	0.5	%		**98.2**	**103**	**101**	**104**	**102**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**80.7**	**84.4**	----	**93.6**	----
Toluene-D8	2037-26-5	0.2	%		**77.0**	**77.9**	----	**89.8**	----
4-Bromofluorobenzene	460-00-4	0.2	%		**91.0**	**90.0**	----	**104**	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	MW1-4.3m Volatiles	FD Volatiles	----	----	----
			Client sampling date / time	08-Aug-2016 11:50	08-Aug-2016 11:50	----	----	----
Compound	CAS Number	LOR	Unit	EM1609318-006	EM1609318-007	--------	--------	--------
				Result	Result	----	----	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	58.4	54.4	----	----	----
EG005T: Total Metals by ICP-AES								
Lead	7439-92-1	5	mg/kg	----	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	----	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg	----	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	----	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg	----	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	----	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg	----	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg	----	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<20	<20	----	----	----
C10 - C14 Fraction	----	50	mg/kg	----	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg	----	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg	----	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<20	<20	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<20	<20	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW1-4.3m Volatiles	FD Volatiles	----	----	----
				Client sampling date / time	08-Aug-2016 11:50	08-Aug-2016 11:50	----	----	----
Compound	CAS Number	LOR	Unit		EM1609318-006	EM1609318-007	--------	--------	--------
					Result	Result	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
>C10 - C16 Fraction	----	50	mg/kg		----	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		----	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		----	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		----	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		----	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		----	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.4	<0.4	----	----	----
Toluene	108-88-3	0.5	mg/kg		<1.0	<1.0	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<1.0	<1.0	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<1.0	<1.0	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<1.0	<1.0	----	----	----
^ Sum of BTEX	----	0.2	mg/kg		<0.4	<0.4	----	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg		<1.0	<1.0	----	----	----
Naphthalene	91-20-3	1	mg/kg		<2	<2	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		----	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		----	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		----	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		----	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**75.4**	**88.9**	----	----	----
Toluene-D8	2037-26-5	0.2	%		**72.0**	**80.0**	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		**83.1**	**93.0**	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	54	125
2-Chlorophenol-D4	93951-73-6	65	123
2.4.6-Tribromophenol	118-79-6	34	122
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	61	125
Anthracene-d10	1719-06-8	62	130
4-Terphenyl-d14	1718-51-0	67	133
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	51	125
Toluene-D8	2037-26-5	55	125
4-Bromofluorobenzene	460-00-4	56	124

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EM1609318**	Page	: 1 of 8
Client	: **ENVIRONMENTAL SERVICE AND DESIGN PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: MR ROD COOPER	Contact	: Shirley LeCornu
Address	: 14 CATTLEY ST. PO BOX 651 BURNIE TASMANIA, AUSTRALIA 7320	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 03 6442 4037	Telephone	: +61-3-8549 9630
Project	: 5482	Date Samples Received	: 09-Aug-2016
Order number	: ----	Date Analysis Commenced	: 09-Aug-2016
C-O-C number	: ----	Issue Date	: 15-Aug-2016
Sampler	: ROD COOPER		
Site	: Dowling Street		
Quote number	: ----		
No. of samples received	: 7		
No. of samples analysed	: 7		

NATA Accredited Laboratory 825
Accredited for compliance with ISO/IEC 17025.

NATA
WORLD RECOGNISED ACCREDITATION

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Eric Chau	Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Nancy Wang	Senior Semivolatile Instrument Chemist	Melbourne Organics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (QC Lot: 544962)									
EM1609312-001	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	28.0	29.4	4.64	0% - 20%
EM1609312-037	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	13.6	12.8	5.60	0% - 50%
EA055: Moisture Content (QC Lot: 545598)									
EM1609312-005	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	17.5	16.1	8.51	0% - 50%
EM1609313-005	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	24.1	24.9	3.45	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 545503)									
EM1609318-001	MW1-2.0m	EG005T: Lead	7439-92-1	5	mg/kg	40	32	20.2	No Limit
EM1609330-005	Anonymous	EG005T: Lead	7439-92-1	5	mg/kg	<5	9	59.6	No Limit
EG005T: Total Metals by ICP-AES (QC Lot: 546060)									
EM1609318-003	MW1-4.3m	EG005T: Lead	7439-92-1	5	mg/kg	14	12	10.4	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 545538)									
EM1609296-001	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 545538) - continued									
EM1609296-001	Anonymous	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 546056)									
EM1609318-003	MW1-4.3m	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 544952)									
EM1609312-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EM1609312-037	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 545536)									
EM1609296-001	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
		EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 546055)									
EM1609318-003	MW1-4.3m	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
		EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 544952)									
EM1609312-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EM1609312-037	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 545536)									

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 545536) - continued									
EM1609296-001	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
		EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 546055)									
EM1609318-003	MW1-4.3m	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
		EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	0.00	No Limit
EP080: BTEXN (QC Lot: 544952)									
EM1609312-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EM1609312-037	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 545503)								
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	95.2	85	107
EG005T: Total Metals by ICP-AES (QCLot: 546060)								
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	94.4	85	107
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 545538)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	3 mg/kg	101	80	121
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	3 mg/kg	95.7	70	130
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	3 mg/kg	102	80	120
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	3 mg/kg	98.8	70	124
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	3 mg/kg	99.4	80	122
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	3 mg/kg	100	80	126
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	3 mg/kg	97.7	70	128
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	3 mg/kg	98.9	80	125
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	3 mg/kg	95.2	70	130
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	3 mg/kg	103	80	126
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	3 mg/kg	84.4	70	124
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	3 mg/kg	98.2	75	125
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	3 mg/kg	84.3	65	125
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	3 mg/kg	96.6	65	128
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	3 mg/kg	96.4	65	126
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	3 mg/kg	98.0	65	127
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 546056)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	3 mg/kg	92.2	80	121
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	3 mg/kg	87.9	70	130
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	3 mg/kg	97.9	80	120
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	3 mg/kg	91.3	70	124
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	3 mg/kg	92.8	80	122
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	3 mg/kg	95.7	80	126
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	3 mg/kg	92.5	70	128
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	3 mg/kg	93.7	80	125
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	3 mg/kg	93.4	70	130
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	3 mg/kg	99.8	80	126
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	3 mg/kg	75.4	70	124

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 546056) - continued								
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	3 mg/kg	92.8	75	125
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	3 mg/kg	80.0	65	125
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	3 mg/kg	87.0	65	128
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	3 mg/kg	86.7	65	126
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	3 mg/kg	90.5	65	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 544952)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	36 mg/kg	87.8	70	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 545536)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	751 mg/kg	102	65	131
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	3103 mg/kg	97.7	70	126
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	1482 mg/kg	92.3	70	122
EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 545820)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	36 mg/kg	87.8	70	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 546055)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	751 mg/kg	105	65	131
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	3103 mg/kg	98.4	70	126
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	1482 mg/kg	113	70	122
EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 546872)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	36 mg/kg	87.8	70	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 544952)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	45 mg/kg	86.4	68	125
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 545536)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	1135 mg/kg	99.1	68	130
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	4080 mg/kg	91.6	72	116
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	162 mg/kg	84.0	38	132
EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 545820)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	45 mg/kg	86.4	68	125
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 546055)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	1135 mg/kg	110	68	130
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	4080 mg/kg	98.5	72	116
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	162 mg/kg	116	38	132
EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 546872)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	45 mg/kg	86.4	68	125

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080: BTEXN (QCLot: 544952)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	92.9	74	124
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	92.1	77	125
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	94.2	73	125
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4 mg/kg	101	77	128
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	106	81	128
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	93.8	66	130
EP080: BTEXN (QCLot: 545820)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	92.9	74	124
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	92.1	77	125
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	94.2	73	125
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4 mg/kg	101	77	128
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	106	81	128
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	93.8	66	130
EP080: BTEXN (QCLot: 546872)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	92.9	74	124
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	92.1	77	125
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	94.2	73	125
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4 mg/kg	101	77	128
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	106	81	128
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	93.8	66	130

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EG005T: Total Metals by ICP-AES (QCLot: 545503)							
EM1609323-002	Anonymous	EG005T: Lead	7439-92-1	50 mg/kg	91.5	76	124
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 545538)							
EM1609318-001	MW1-2.0m	EP075(SIM): Acenaphthene	83-32-9	3 mg/kg	105	67	117
		EP075(SIM): Pyrene	129-00-0	3 mg/kg	101	52	148
EP080/071: Total Petroleum Hydrocarbons (QCLot: 544952)							
EM1609312-002	Anonymous	EP080: C6 - C9 Fraction	----	28 mg/kg	78.7	42	131

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP080/071: Total Petroleum Hydrocarbons (QCLot: 545536)							
EM1609318-002	MW1-3.0m	EP071: C10 - C14 Fraction	----	751 mg/kg	104	53	123
		EP071: C15 - C28 Fraction	----	3103 mg/kg	98.8	70	124
		EP071: C29 - C36 Fraction	----	1482 mg/kg	92.5	64	118
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 544952)							
EM1609312-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	33 mg/kg	75.1	39	129
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 545536)							
EM1609318-002	MW1-3.0m	EP071: >C10 - C16 Fraction	----	1135 mg/kg	101	65	123
		EP071: >C16 - C34 Fraction	----	4080 mg/kg	92.4	67	121
		EP071: >C34 - C40 Fraction	----	162 mg/kg	81.7	44	126
EP080: BTEXN (QCLot: 544952)							
EM1609312-002	Anonymous	EP080: Benzene	71-43-2	2 mg/kg	96.2	50	136
		EP080: Toluene	108-88-3	2 mg/kg	95.6	56	139

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM1609318**	Page	: 1 of 5
Client	: **ENVIRONMENTAL SERVICE AND DESIGN PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: MR ROD COOPER	Telephone	: +61-3-8549 9630
Project	: 5482	Date Samples Received	: 09-Aug-2016
Site	: Dowling Street	Issue Date	: 15-Aug-2016
Sampler	: ROD COOPER	No. of samples received	: 7
Order number	: ----	No. of samples analysed	: 7

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content							
Soil Glass Jar - Unpreserved (EA055-103) MW1-2.0m, MW1-3.0m, MW1-4.3m, MW1-5.0m, MW1-4.3m - Volatiles	**08-Aug-2016**	**----**	----	----	**09-Aug-2016**	22-Aug-2016	✓
Soil Glass Jar - Unpreserved (EA055-103) FD	**08-Aug-2016**	**----**	----	----	**10-Aug-2016**	22-Aug-2016	✓
Soil Glass Jar - Unpreserved (EA055-103) FD - Volatiles	**08-Aug-2016**	**----**	----	----	**11-Aug-2016**	22-Aug-2016	✓
EG005T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T) MW1-2.0m, MW1-3.0m, MW1-5.0m, FD	**08-Aug-2016**	**10-Aug-2016**	04-Feb-2017	✓	**10-Aug-2016**	04-Feb-2017	✓
Soil Glass Jar - Unpreserved (EG005T) MW1-4.3m	**08-Aug-2016**	**15-Aug-2016**	04-Feb-2017	✓	**15-Aug-2016**	04-Feb-2017	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM)) MW1-2.0m, MW1-3.0m, MW1-5.0m, FD	**08-Aug-2016**	**10-Aug-2016**	22-Aug-2016	✓	**10-Aug-2016**	19-Sep-2016	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) MW1-4.3m	**08-Aug-2016**	**15-Aug-2016**	22-Aug-2016	✓	**15-Aug-2016**	24-Sep-2016	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080) MW1-2.0m, MW1-3.0m, MW1-5.0m, MW1-4.3m - Volatiles	**08-Aug-2016**	**09-Aug-2016**	22-Aug-2016	✓	**10-Aug-2016**	22-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) FD - Volatiles	**08-Aug-2016**	**09-Aug-2016**	22-Aug-2016	✓	**11-Aug-2016**	22-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP071) MW1-2.0m, MW1-3.0m, MW1-5.0m, FD	**08-Aug-2016**	**10-Aug-2016**	22-Aug-2016	✓	**10-Aug-2016**	19-Sep-2016	✓
Soil Glass Jar - Unpreserved (EP071) MW1-4.3m	**08-Aug-2016**	**15-Aug-2016**	22-Aug-2016	✓	**15-Aug-2016**	24-Sep-2016	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080) MW1-2.0m, MW1-3.0m, MW1-5.0m, MW1-4.3m - Volatiles	**08-Aug-2016**	**09-Aug-2016**	22-Aug-2016	✓	**10-Aug-2016**	22-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) FD - Volatiles	**08-Aug-2016**	**09-Aug-2016**	22-Aug-2016	✓	**11-Aug-2016**	22-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP071) MW1-2.0m, MW1-3.0m, MW1-5.0m, FD	**08-Aug-2016**	**10-Aug-2016**	22-Aug-2016	✓	**10-Aug-2016**	19-Sep-2016	✓
Soil Glass Jar - Unpreserved (EP071) MW1-4.3m	**08-Aug-2016**	**15-Aug-2016**	22-Aug-2016	✓	**15-Aug-2016**	24-Sep-2016	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080) MW1-2.0m, MW1-3.0m, MW1-5.0m, MW1-4.3m - Volatiles	**08-Aug-2016**	**09-Aug-2016**	22-Aug-2016	✓	**10-Aug-2016**	22-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) FD - Volatiles	**08-Aug-2016**	**09-Aug-2016**	22-Aug-2016	✓	**11-Aug-2016**	22-Aug-2016	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	4	31	**12.90**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	6	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	3	15	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	6	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	2	6	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	15	**13.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	6	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	3	16	**18.75**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	2	6	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	15	**13.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	6	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	3	16	**18.75**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260B Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve.

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

FREIGHT

CHAIN OF CUSTODY

ALS Environmental
ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: Environmental Services & Design	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics) ☐ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)	
OFFICE: [illegible]		Custody Seal Intact?	Yes / No / N/A
PROJECT: 5482 Dowling street	ALS QUOTE NO.:	COC SEQUENCE NUMBER (Circle)	Free Ice / frozen ice bricks present upon receipt? Yes / No / N/A
ORDER NUMBER:		COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: R Cooper	0417421486	OF: 1 2 3 4 5 6 7	Other comment:
SAMPLER: Wayne G	SAMPLER MOBILE: as above	RELINQUISHED BY:	RECEIVED BY:
COC emailed to ALS? (NO)	EDD FORMAT (or default):	*R Cooper*	
Email Reports to: rcooper@esandd.com.au; admin@esandd.com.au;		DATE/TIME 09/08/2016	DATE/TIME:
Email Invoice to: admin@esandd.com.au		RELINQUISHED BY:	RECEIVED BY:
		DATE/TIME:	DATE/TIME: 10/8 13

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID(S) WATER(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).				Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE	TOTAL CONTAINERS	TRH /BTEXN /PAH S-07 inc Napthalene	Silica Gel Cleanup	Lead		Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	MW1	9/08/2016	GW		4	X		X		
[redacted]	[redacted]	[redacted]	[redacted]			[redacted]		[redacted]		
2	FD	9/08/2016	GW		4	X		X		
3	BH 1	9-8-16	GW		3	X		X		
4	BH 2	9-8-16	GW		3	X		X		
				TOTAL	10					

Environmental Division
Melbourne
Work Order Reference
EM1609387

Telephone : + 61-3-8549 9600

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

B473337.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM1609387**	Page	: 1 of 7
Client	: **ENVIRONMENTAL SERVICE AND DESIGN PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: MR ROD COOPER	Contact	: Shirley LeCornu
Address	: 14 CATTLEY ST. PO BOX 651 BURNIE TASMANIA, AUSTRALIA 7320	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 03 6431 2999	Telephone	: +61-3-8549 9630
Project	: 5482	Date Samples Received	: 10-Aug-2016 13:40
Order number	: ----	Date Analysis Commenced	: 11-Aug-2016
C-O-C number	: ----	Issue Date	: 15-Aug-2016 11:53
Sampler	: ----		
Site	: ----		
Quote number	: ----		
No. of samples received	: 4		
No. of samples analysed	: 4		

NATA Accredited Laboratory 825
Accredited for compliance with ISO/IEC 17025.

NATA
WORLD RECOGNISED ACCREDITATION

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Nancy Wang	Senior Semivolatile Instrument Chemist	Melbourne Organics, Springvale, VIC

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Client sample ID	BH 2	----	----	----	----
				Client sampling date / time	[09-Aug-2016]	----	----	----	----
Compound	CAS Number	LOR	Unit		EM1609387-004	--------	--------	--------	--------
					Result	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	----	----	----	----
Acenaphthylene	208-96-8	1	µg/L		<1.0	----	----	----	----
Acenaphthene	83-32-9	1	µg/L		<1.0	----	----	----	----
Fluorene	86-73-7	1	µg/L		<1.0	----	----	----	----
Phenanthrene	85-01-8	1	µg/L		<1.0	----	----	----	----
Anthracene	120-12-7	1	µg/L		<1.0	----	----	----	----
Fluoranthene	206-44-0	1	µg/L		<1.0	----	----	----	----
Pyrene	129-00-0	1	µg/L		<1.0	----	----	----	----
Benz(a)anthracene	56-55-3	1	µg/L		<1.0	----	----	----	----
Chrysene	218-01-9	1	µg/L		<1.0	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L		<1.0	----	----	----	----
Benzo(k)fluoranthene	207-08-9	1	µg/L		<1.0	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L		<1.0	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	1	µg/L		<1.0	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	1	µg/L		<1.0	----	----	----	----
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	µg/L		<0.5	----	----	----	----
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	µg/L		<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	----	----	----	----
C10 - C14 Fraction	----	50	µg/L		<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L		**180**	----	----	----	----
C29 - C36 Fraction	----	50	µg/L		<50	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	µg/L		**180**	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		<20	----	----	----	----
>C10 - C16 Fraction	----	100	µg/L		<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L		**190**	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		**190**	----	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	100	µg/L		<100	----	----	----	----
EP080: BTEXN									

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Client sample ID	BH 2	----	----	----	----
				Client sampling date / time	[09-Aug-2016]	----	----	----	----
Compound	CAS Number	LOR	Unit		EM1609387-004	--------	--------	--------	--------
					Result	----	----	----	----
EP080: BTEXN - Continued									
Benzene	71-43-2	1	µg/L		<1	----	----	----	----
Toluene	108-88-3	2	µg/L		<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	----	----	----	----
^ **Total Xylenes**	1330-20-7	2	µg/L		<2	----	----	----	----
^ **Sum of BTEX**	----	1	µg/L		<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%		**23.0**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	1	%		**54.6**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	1	%		**95.4**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%		**77.2**	----	----	----	----
Anthracene-d10	1719-06-8	1	%		**84.8**	----	----	----	----
4-Terphenyl-d14	1718-51-0	1	%		**88.8**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**107**	----	----	----	----
Toluene-D8	2037-26-5	2	%		**114**	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		**122**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	MW1	FD	BH 1	----	----
			Client sampling date / time	[09-Aug-2016]	[09-Aug-2016]	[09-Aug-2016]	----	----
Compound	CAS Number	LOR	Unit	EM1609387-001	EM1609387-002	EM1609387-003	--------	--------
				Result	Result	Result	----	----
EG020T: Total Metals by ICP-MS								
Lead	7439-92-1	0.001	mg/L	**0.025**	**0.021**	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	<1.0	----	----
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	<1.0	----	----
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	<1.0	----	----
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	<1.0	----	----
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	<1.0	----	----
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	<1.0	----	----
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	<1.0	----	----
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	<1.0	----	----
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	<1.0	----	----
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	<1.0	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	<1.0	----	----
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	<1.0	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	<1.0	----	----
Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	<1.0	----	----
Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	<1.0	<1.0	----	----
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	µg/L	<0.5	<0.5	<0.5	----	----
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	µg/L	<0.5	<0.5	<0.5	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	----	----
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	----	----
C15 - C28 Fraction	----	100	µg/L	**460**	**480**	**120**	----	----
C29 - C36 Fraction	----	50	µg/L	<50	**50**	<50	----	----
^ **C10 - C36 Fraction (sum)**	----	50	µg/L	**460**	**530**	**120**	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L	<20	<20	<20	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	----	----
>C16 - C34 Fraction	----	100	µg/L	**440**	**470**	**120**	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	----	----
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L	**440**	**470**	**120**	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MW1	FD	BH 1	----	----
				Client sampling date / time	[09-Aug-2016]	[09-Aug-2016]	[09-Aug-2016]	----	----
Compound	CAS Number	LOR	Unit		EM1609387-001	EM1609387-002	EM1609387-003	--------	--------
					Result	Result	Result	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	----	----
Toluene	108-88-3	2	µg/L		<2	<2	<2	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	----	----
^ Total Xylenes	1330-20-7	2	µg/L		<2	<2	<2	----	----
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	----	----
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%		28.9	27.0	35.9	----	----
2-Chlorophenol-D4	93951-73-6	1	%		70.6	59.4	85.2	----	----
2.4.6-Tribromophenol	118-79-6	1	%		96.7	76.7	102	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%		87.2	71.3	103	----	----
Anthracene-d10	1719-06-8	1	%		81.2	69.9	96.2	----	----
4-Terphenyl-d14	1718-51-0	1	%		80.5	69.0	93.2	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		107	107	90.7	----	----
Toluene-D8	2037-26-5	2	%		106	108	93.2	----	----
4-Bromofluorobenzene	460-00-4	2	%		104	108	101	----	----

Surrogate Control Limits

Sub-Matrix: **GROUNDWATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	46
2-Chlorophenol-D4	93951-73-6	23	104
2.4.6-Tribromophenol	118-79-6	28	130
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	36	114
Anthracene-d10	1719-06-8	51	119
4-Terphenyl-d14	1718-51-0	49	127
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	129
Toluene-D8	2037-26-5	70	125
4-Bromofluorobenzene	460-00-4	71	129

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	46
2-Chlorophenol-D4	93951-73-6	23	104
2.4.6-Tribromophenol	118-79-6	28	130
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	36	114
Anthracene-d10	1719-06-8	51	119
4-Terphenyl-d14	1718-51-0	49	127
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	129
Toluene-D8	2037-26-5	70	125
4-Bromofluorobenzene	460-00-4	71	129

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EM1609387**	Page	: 1 of 6
Client	: **ENVIRONMENTAL SERVICE AND DESIGN PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: MR ROD COOPER	Contact	: Shirley LeCornu
Address	: 14 CATTLEY ST. PO BOX 651 BURNIE TASMANIA, AUSTRALIA 7320	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 03 6431 2999	Telephone	: +61-3-8549 9630
Project	: 5482	Date Samples Received	: 10-Aug-2016
Order number	: ----	Date Analysis Commenced	: 11-Aug-2016
C-O-C number	: ----	Issue Date	: 15-Aug-2016
Sampler	: ----		
Site	: ----		
Quote number	: ----		
No. of samples received	: 4		
No. of samples analysed	: 4		

NATA Accredited Laboratory 825
Accredited for compliance with ISO/IEC 17025.

NATA
WORLD RECOGNISED ACCREDITATION

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Nancy Wang	Senior Semivolatile Instrument Chemist	Melbourne Organics, Springvale, VIC

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Metals by ICP-MS (QC Lot: 547361)									
EM1609381-001	Anonymous	EG020A-T: Lead	7439-92-1	0.001	mg/L	0.023	0.024	0.00	0% - 20%
EM1609394-005	Anonymous	EG020A-T: Lead	7439-92-1	0.001	mg/L	0.002	0.002	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 546563)									
EM1609389-001	Anonymous	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	<1.0	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 546385)									
EM1609382-006	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EM1609382-011	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	200	200	0.00	0% - 50%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 546564)									

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 546564) - continued									
EM1609389-001	Anonymous	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 546385)									
EM1609382-006	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EM1609382-011	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	150	150	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 546564)									
EM1609389-001	Anonymous	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080: BTEXN (QC Lot: 546385)									
EM1609382-006	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EM1609382-011	Anonymous	EP080: Benzene	71-43-2	1	µg/L	85	85	0.00	0% - 20%
		EP080: Toluene	108-88-3	2	µg/L	3	2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	2	2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	2	2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 547361)								
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	106	88	113
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 546563)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	93.7	39	110
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	109	40	124
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	95.5	47	117
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	99.0	51	118
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	91.8	53	119
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	98.0	51	113
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	93.5	59	123
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	96.5	58	123
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	97.0	52	126
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	86.0	55	123
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	86.3	52	131
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	93.3	57	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	89.6	56	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	101	53	123
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	102	53	125
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	98.3	53	125
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 546573)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	81.9	39	110
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	74.6	40	124
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	82.3	47	117
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	85.0	51	118
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	84.1	53	119
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	97.5	51	113
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	85.9	59	123
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	85.0	58	123
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	88.8	52	126
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	81.7	55	123
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	82.4	52	131
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	102	57	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	89.3	56	126

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 546573) - continued								
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	94.9	53	123
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	95.7	53	125
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	92.5	53	125
EP080/071: Total Petroleum Hydrocarbons (QCLot: 546385)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	360 µg/L	112	67	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 546564)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	3368 µg/L	81.1	53	123
EP071: C15 - C28 Fraction	----	100	µg/L	<100	14735 µg/L	88.3	57	133
EP071: C29 - C36 Fraction	----	50	µg/L	<50	7856 µg/L	81.6	55	141
EP080/071: Total Petroleum Hydrocarbons (QCLot: 546574)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	3368 µg/L	79.8	53	123
EP071: C15 - C28 Fraction	----	100	µg/L	<100	14735 µg/L	95.9	57	133
EP071: C29 - C36 Fraction	----	50	µg/L	<50	7856 µg/L	86.6	55	141
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 546385)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	450 µg/L	114	65	125
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 546564)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	5225 µg/L	84.0	54	122
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	19994 µg/L	83.7	56	132
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1449 µg/L	82.8	51	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 546574)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	5225 µg/L	86.4	54	122
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	19994 µg/L	91.6	56	132
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1449 µg/L	82.4	51	137
EP080: BTEXN (QCLot: 546385)								
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	100	76	120
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	105	76	124
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	101	72	124
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	108	72	130
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	111	78	128
EP080: Naphthalene	91-20-3	5	µg/L	<5	5 µg/L	97.7	71	129

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Matrix Spike (MS) Report		
Spike	SpikeRecovery(%)	Recovery Limits (%)

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Matrix Spike (MS) Report: SpikeRecovery(%) MS	Matrix Spike (MS) Report: Recovery Limits (%) Low	Matrix Spike (MS) Report: Recovery Limits (%) High
EG020T: Total Metals by ICP-MS (QCLot: 547361)							
EM1609381-001	Anonymous	EG020A-T: Lead	7439-92-1	1 mg/L	90.7	83	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 546385)							
EM1609382-002	Anonymous	EP080: C6 - C9 Fraction	----	280 µg/L	110	43	125
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 546385)							
EM1609382-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	330 µg/L	120	44	122
EP080: BTEXN (QCLot: 546385)							
EM1609382-002	Anonymous	EP080: Benzene	71-43-2	20 µg/L	103	68	130
		EP080: Toluene	108-88-3	20 µg/L	102	72	132

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM1609387**	Page	: 1 of 5
Client	: **ENVIRONMENTAL SERVICE AND DESIGN PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: MR ROD COOPER	Telephone	: +61-3-8549 9630
Project	: 5482	Date Samples Received	: 10-Aug-2016
Site	: ----	Issue Date	: 15-Aug-2016
Sampler	: ----	No. of samples received	: 4
Order number	: ----	No. of samples analysed	: 4

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
TRH - Semivolatile Fraction	1	18	5.56	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	6	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	18	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020A-T)							
MW1, FD	**09-Aug-2016**	**12-Aug-2016**	05-Feb-2017	✓	**12-Aug-2016**	05-Feb-2017	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
MW1, FD, BH 1, BH 2	**09-Aug-2016**	**11-Aug-2016**	16-Aug-2016	✓	**11-Aug-2016**	20-Sep-2016	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
MW1, FD, BH 1, BH 2	**09-Aug-2016**	**11-Aug-2016**	16-Aug-2016	✓	**11-Aug-2016**	20-Sep-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
MW1, FD	**09-Aug-2016**	**11-Aug-2016**	23-Aug-2016	✓	**11-Aug-2016**	23-Aug-2016	✓
Clear glass VOC vial - HCl (EP080)							
BH 1, BH 2	**09-Aug-2016**	**11-Aug-2016**	23-Aug-2016	✓	**11-Aug-2016**	23-Aug-2016	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)							
MW1, FD, BH 1, BH 2	**09-Aug-2016**	**11-Aug-2016**	16-Aug-2016	✓	**11-Aug-2016**	20-Sep-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
MW1, FD	**09-Aug-2016**	**11-Aug-2016**	23-Aug-2016	✓	**11-Aug-2016**	23-Aug-2016	✓
Clear glass VOC vial - HCl (EP080)							
BH 1, BH 2	**09-Aug-2016**	**11-Aug-2016**	23-Aug-2016	✓	**11-Aug-2016**	23-Aug-2016	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
MW1,	FD	**09-Aug-2016**	**11-Aug-2016**	23-Aug-2016	✓	**11-Aug-2016**	23-Aug-2016	✓
Clear glass VOC vial - HCl (EP080)								
BH 1,	BH 2	**09-Aug-2016**	**11-Aug-2016**	23-Aug-2016	✓	**11-Aug-2016**	23-Aug-2016	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	6	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	10	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	**5.56**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	2	6	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	18	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	2	6	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	18	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	6	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	18	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

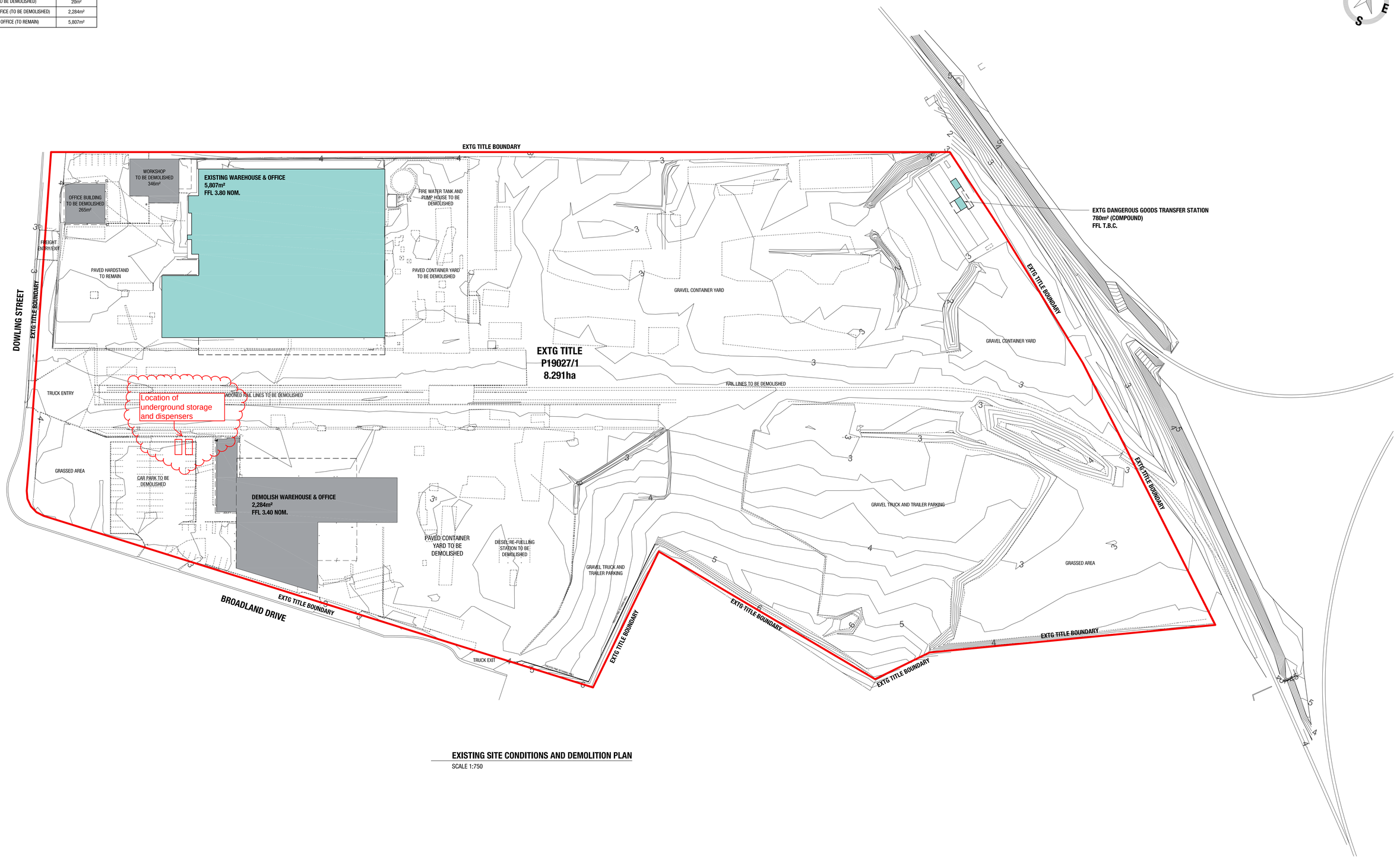
Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

EXTG SITE AREA SCHEDULE	
LOCATION	**AREA**
OFFICE BUILDING (TO BE DEMOLISHED)	265m²
WORKSHOP (TO BE DEMOLISHED)	346m²
FIRE PUMP HOUSE (TO BE DEMOLISHED)	20m²
WAREHOUSE AND OFFICE (TO BE DEMOLISHED)	2,284m²
EXTG WAREHOUSE & OFFICE (TO REMAIN)	5,807m²



EXISTING SITE CONDITIONS AND DEMOLITION PLAN
SCALE 1:750

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
04	TOWN PLANNING	29-04-16	A
03	CLIENT REVIEW	27-04-16	A
02	ISSUE TO SUB-CONSULTANT	18-04-16	-
01	REVIEW	03-02-16	-

DRAWING REFERENCE NOTES:
1. -

STATUS:
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CIVIL // STRUCTURAL // HYDRAULIC // MANAGEMENT

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DRAWN BY:	AGS
DRAFT CHECK:	-
APPROVED BY:	AJL

CLIENT: **TOLL GROUP**
PROJECT: **TRANSPORT HUB REDEVELOPMENT**
ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

DRAWING: **EXISTING SITE CONDITIONS AND DEMOLITION PLAN**
SCALE (AT A1 DRAWING SIZE): **1:750**
PROJECT No: **15.196** DWG No: **A001** REV No: **A**

SITE AREA SCHEDULE

LOCATION	AREA
LIGHT DUTY HARDSTAND (CARPARK)	3,885m²
MEDIUM DUTY HARDSTAND	31,095m²
EXISTING MEDIUM DUTY HARDSTAND REPAIR AS REQUIRED	4,143m²
HEAVY DUTY HARDSTAND	19,437m²
LANDSCAPE	1,879m²
EXTG WAREHOUSE & OFFICE	5807m²
WAREHOUSE A	5928m²
WAREHOUSE A - COVERED LOADING DOCK	130m²
WAREHOUSE A - CANOPIES	1548m²
WAREHOUSE B	5,569m²
WAREHOUSE B - CANOPIES	1844m²

SITE AREA SCHEDULE - CONTINUED

LOCATION	AREA
MAIN OFFICE	867m²
MAIN OFFICE - COVERED WALKWAYS	128m²
TRUCKWASH	224m²
TRUCKWASH PLANTROOM	34m²
TRUCKWASH - RE-FUELLING STATION	160m²
AXLE WEIGHBRIDGE	20m²
CONTAINER WASH	253m²
FORK TRUCK DIESEL STORAGE	66m²
FIRE PUMP HOUSE A	36m²
FIRE PUMP HOUSE B	36m²
CUSTOMER PICK-UP WAREHOUSE	44m²

SITE PLAN
SCALE 1:750

No:	ISSUED FOR / DESCRIPTION:	DATE:	REV:
05	TOWN PLANNING	29-04-16	D
04	CLIENT REVIEW	27-04-16	C
03	ISSUE TO SUB-CONSULTANT	18-04-16	B
02	REV'D TO CLIENT FEEDBACK	23-03-16	A
01	REVIEW	03-02-16	-

DRAWING REFERENCE NOTES:
1. REFER PROPOSED SUBDIVISION PLAN PREPARED BY SURVEY & ALIGNMENT SERVICES.

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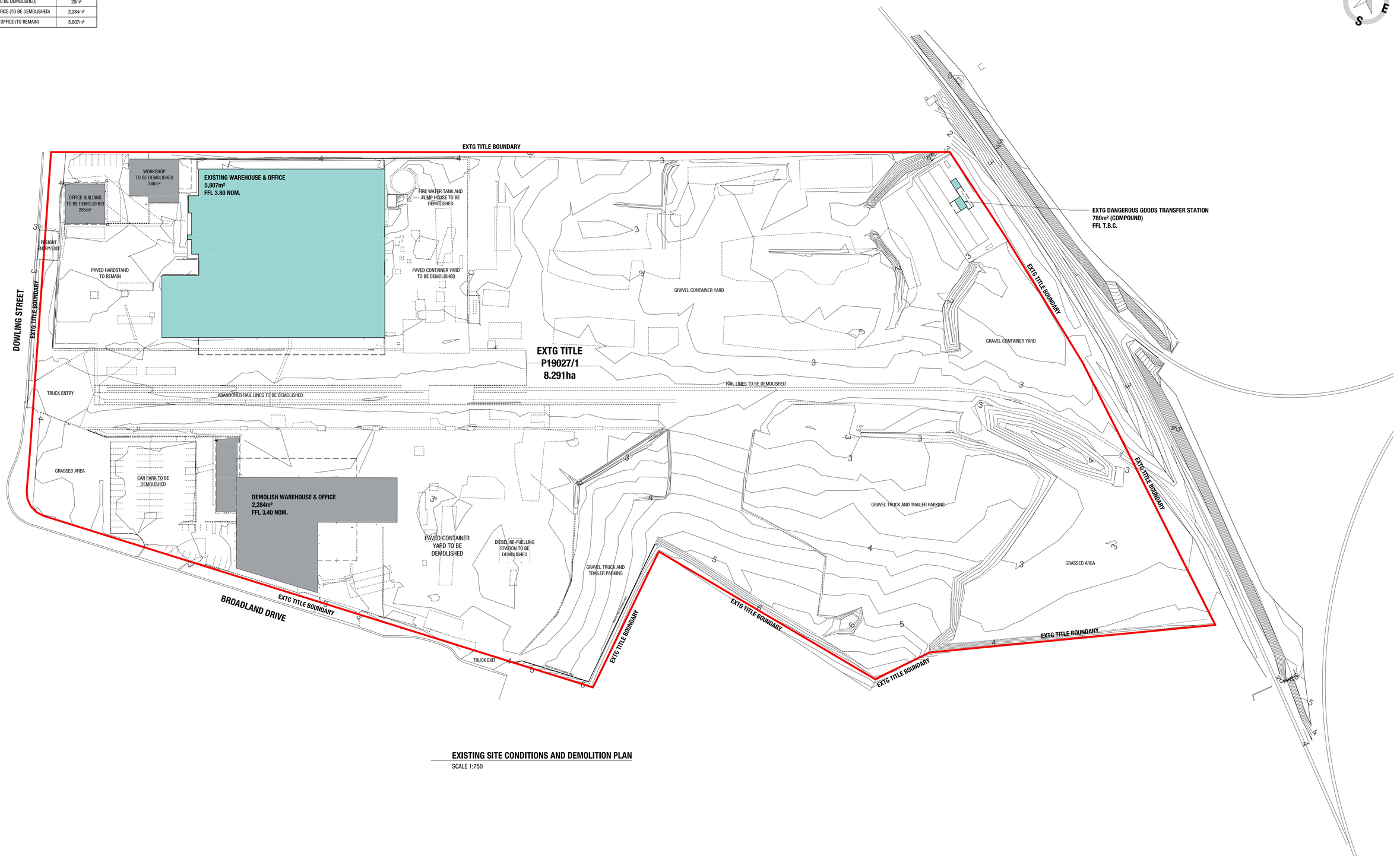
CLIENT: **TOLL GROUP**
PROJECT: **TRANSPORT HUB REDEVELOPMENT**
ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

DRAWING: **SITE PLAN**
SCALE (AT A1 DRAWING SIZE): **1:750**
PROJECT No: **15.196** DWG No: **A002** REV No: **D**

EXTG SITE AREA SCHEDULE	
LOCATION	**AREA**
OFFICE BUILDING (TO BE DEMOLISHED)	265m²
WORKSHOP (TO BE DEMOLISHED)	346m²
FIRE PUMP HOUSE (TO BE DEMOLISHED)	20m²
WAREHOUSE AND OFFICE (TO BE DEMOLISHED)	2,284m²
EXTG WAREHOUSE & OFFICE (TO REMAIN)	5,807m²



EXISTING SITE CONDITIONS AND DEMOLITION PLAN
SCALE 1:750

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APPROVED BY:	AJL

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PROJECT: **TRANSPORT HUB REDEVELOPMENT**
ADDRESS: **35-51 DOWLING STREET, LAUNCESTON**

DRAWING: **EXISTING SITE CONDITIONS AND DEMOLITION PLAN**
SCALE (AT A1 DRAWING SIZE): **1:750**
PROJECT No: **15.196** DWG No: **A001** REV No: **A**

Document Set ID: 3583573
Version: 2, Version Date: 31/07/2017

BOREHOLE LOG

Borehole No: MW1	Client: Environmental Service & Design
Logged By: RC	Project: CSA GW Sampling
Date: 8/08/2016	Locality: Toll Dowling Street Launceston
Notes: Just West of UPSS	Drill Model TASMAN GEOTECHNICS Auger
	Hole Dimensions: 150mm

Method	Support	Penetration	Water	Samples/ Tests	Depth	Classification Symbol	Material Description	Moisture	Consistency	Notes
Auger	N						Bitumen			Car Park
						SP	Fill SANDY GRAVEL- Fine Grained Subrounded. Grey, traces of silt	M	MD	
					0.5	SC	Clayey Sand - fine grained, black (quartz sand),low plasticity fines with some fine to medium grained, angular gravel	D/M	Fb	
					1.0					
					1.5					
					2.0	CH	Silty Clay, high plasticity, black, with some sand	>Wp	F	
				X	2.5					
							Orange / Grey	M	VSt	
				X	3.0					
					3.5					
				X	4.0		Orange / Grey	M	VSt	
			X		4.5					
					5.0					
							MW1 Terminated @ 4.5 m			
					5.5					
					6.0					
					6.5					