ROCKINGHAM CENTRAL

LANDSCAPE CONCEPT
DA SUBMISSION

DRAWING LIST

SK01-A LANDSCAPE CONCEPT
SK02-A PLAY AREA CONCEPT
SK03-A SMALL OPEN SPACE CONCEPT

LEGEND

1. Feature rammed earth walls help to define spaces and provide informal seating
2. Public Access Way (PAW) footpath route formalised and designed in keeping with shopping centre site landscape concept. Footpath to be coloured concrete in colours reflective of Australian landscapes
3. Native groundcover and low shrub planting used throughout site
4. Trees to provide shade as well as help create landscape identity
5. Bands of planting to be combined with bands of bound gravel to create a feature along the development frontages
6. Bonds of low planting to building facade adjacent to windows

OVERALL LANDSCAPE THEME

The landscape theme for Rockingham Central takes inspiration from a palette of Australian bushland colours and textures with a contemporary twist. A mixture of materials will be used such as coloured concrete, rammed earth walls, bound gravels which will be combined with a strong West Australian native planting palette. High quality paving materials will be used around the building frontages which will create the footprint for the built form.
Footpath routes have been carefully considered to enable safe pedestrian access throughout the site, as well as access into the site from adjacent roads and footpaths. The entire site is designed to be open and accessible with CPTED considered for all areas to ensure a safe environment for people.

7. Turf area to main road frontage keeps views open to the built form from the road
8. Footpath routes realigned to follow desire lines and to create a more open landscape area
9. Nature play area (refer to drawing SK02 for details)
10. Grass trees will be used throughout the development to help establish a strong native landscape character. The Grass Trees will be salvaged from the site and re-used where possible.
11. Existing trees in verges to be retained where possible
12. Small open space area to have a shaded space defined where people can sit in the shade and rest
13. Trafficable feature paving to entry locations help establish legibility for pedestrians
14. Entry signage to be located in prominent positions
15. Quality concrete pavers with various textures and patterns used around site to define spaces and areas
16. Existing bus stop to be relocated
17. Proposed feature tree to mark development
18. Building canopy line

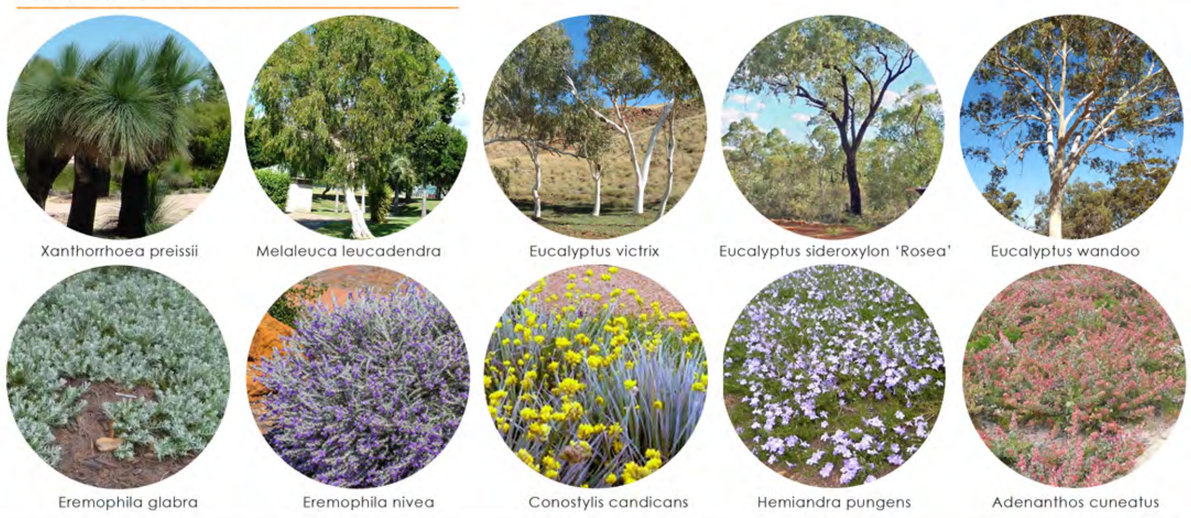
EXTENT OF PAW LOT UNDER CITY MANAGEMENT

INSPIRATIONAL IMAGERY

MATERIALS PALETTE

Bound gravel | Exposed Aggregate | Concrete Pavers | Rammed earth wall | Laterite Boulder

PLANTING PALETTE



Xanthorrhoea preissii | Melaleuca leucadendra | Eucalyptus victrix | Eucalyptus sideroxylon 'Rosea' | Eucalyptus wandoo

Eremophila glabra | Eremophila nivea | Conostylis candicans | Hemiandra pungens | Adenanthos cuneatus

TIMDAVIESLANDSCAPING

AUTHOR: AF Q.A: RB

PROJECT #: 10349 - TDL

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ROCKINGHAM CENTRAL LANDSCAPE CONCEPT

SK01-A

INSPIRATIONAL IMAGERY

LEGEND

1. Pool-type safety fence with access gate
2. Painted tunnel 'entry'
3. Rubber mounds with timber balance beams 0.3-0.6m high
4. Rubber mound with embankment slide, 1.2m high
5. Small rubber stepping humps
6. Timber balancing logs / informal seats
7. Timber steppers 0.2-0.55m high
8. Vertical timber post
9. Mulch softfall
10. Flush timber steppers
11. Coloured concrete to entry area
12. Planting pockets with native shrubs and grass trees
13. Feature rocks and rock edging
14. Salvaged grass trees
15. Bench seats for parents
16. Indicative roofline of shade structure by Architect

ILLUSTRATIVE VIEW

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ROCKINGHAM CENTRAL PLAY AREA CONCEPT

SK02-A

INSPIRATIONAL IMAGERY

Bound Gravel | Rammed Earth Wall | Laterite Boulder

LEGEND

1. Feature rammed earth walls help to define spaces and provide informal seating
2. Native groundcover and low shrub planting used throughout site
3. Trees to provide shade as well as help create landscape identity
4. Screen planting along residential boundary wall
5. External paint to residential boundary wall to tie in with landscape treatments
6. Grass trees will be used throughout the development to help establish a strong native landscape character. The Grass Trees will be salvaged from the site and re-used where possible.
7. Quality concrete pavers to provide informal access routes
8. Bound gravel in earth colour to enhance landscape theme
9. Informally placed laterite boulders

PLANTING PALETTE

Eucalyptus victrix

Eucalyptus wandoo

Xanthorrhoea preissii

Adenanthos cuneatus

Eremophila glabra

Eremophila nivea

Conostylis candicans

Hemiandra pungens

ILLUSTRATIVE VIEW

EXISTING RESIDENTIAL

TIMDAVIESLANDSCAPING

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AUTHOR: AF Q.A: RB

PROJECT #: 10349 - TDL

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ROCKINGHAM CENTRAL

SMALL OPEN SPACE CONCEPT

SK03-A

ARISE ROCKINGHAM PTY LTD

PROPOSED MIXED USE COMMERCIAL CENTRE

No 2 SEPIA COURT, ROCKINGHAM

TRAFFIC AND PARKING ASSESSMENT

July 2018

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Issued on	18 July 2018	Amendment	Date
Version	V2 for City of Rockingham comment	V1 draft to client V2 minor edits	5/7/18 18/7/18
Reference	946		

CONTENTS

1. EXECUTIVE SUMMARY

1.1. Riley Consulting has been commissioned by Arise Rockingham Pty Ltd to prepare a traffic report for a mixed-use development at 2 Sepia Court, Rockingham. The key findings of the traffic review are:

1.2. The proposed development comprises of a gym, café, convenience store with fuel and showroom tenancies. It is appropriately located adjacent to the shopping centre in Rockingham city centre.

1.3. The development is forecast to generate up to 2,139 vehicle movements per day. However, due to pass-by trade the development is forecast to increase local traffic by 1,661 movements per day.

1.4. The forecast traffic generation has a maximum increase of 2.5% to the road network capacity and under the WAPC *Transport Assessment Guidelines for Developments*, the development would be deemed to have no material traffic impact.

1.5. Peak hour traffic demands are moderate and meet the threshold for assessment of the local road network. Sidra network has been used to assess the operation of access to Council Avenue, Read Street and the traffic signals at the intersection of Read Street and Council Avenue. The analysis of the PM peak and Saturday peak shows acceptable Levels of Service are maintained.

1.6. Primary access to the development is restricted to left-in / left-out movements to both Council Avenue and Read Street. Full movement access is provided via Sepia Court. The location of access meets current planning guidelines and appropriate visibility is provided.

1.7. Parking in accordance with the City of Rockingham's Town Planning Scheme is provided.

1.8. There are no reasons to suggest the proposed development would not operate in a safe and appropriate manner.

2. CHECKLIST

Item	Comments/Proposals
Proposed development	
proposed land uses	Gym, café, convenience store (fuel), showrooms,
existing land uses	Vacant land
context with surrounds	Town centre precinct
Vehicular access and parking	
access arrangements	Direct to Council Avenue, Read Street and Sepia Court
public, private, disabled parking set down / pick up	Disabled parking to be provided
Service vehicles	
access arrangements	On site
rubbish collection and emergency vehicle access	On site
Hours of operation (non-residential only)	24 hours a day, 7 days per week.
Traffic volumes	
daily or peak traffic volumes	Forecast traffic increases 1,661vpd No material impact under WAPC guidelines
type of vehicles (eg cars, trucks)	Predominantly cars and as-of right HGV's
Traffic management on frontage streets	Not required
Public transport access	
nearest bus stops/train stations	Within 100m
pedestrian/cycle links to bus stops/train station	N/A
Pedestrian access/facilities	
existing pedestrian facilities within the development (if any)	N/A
proposed pedestrian facilities within development	Appropriate
existing pedestrian facilities on surrounding roads	Acceptable
proposals to improve pedestrian access	N/A
Cycle access/facilities	
existing cycle facilities within the development (if any)	N/A
proposed cycle facilities within development	Cycle racks being provided
existing cycle facilities on surrounding roads	Appropriate
proposals to improve cycle access	N/A
Site specific issues	None identified
Safety issues	None identified

3. THE SITE AND SURROUNDING ROAD NETWORK

3.1. The site is located at 2 Sepia Court, located on the corner of Read Street and Council Avenue in the central business area of Rockingham. The location of the site is shown in Figure 1 and Figure 2 shows an aerial image of the site and surrounding area. Roads of significance to the development site are considered below.

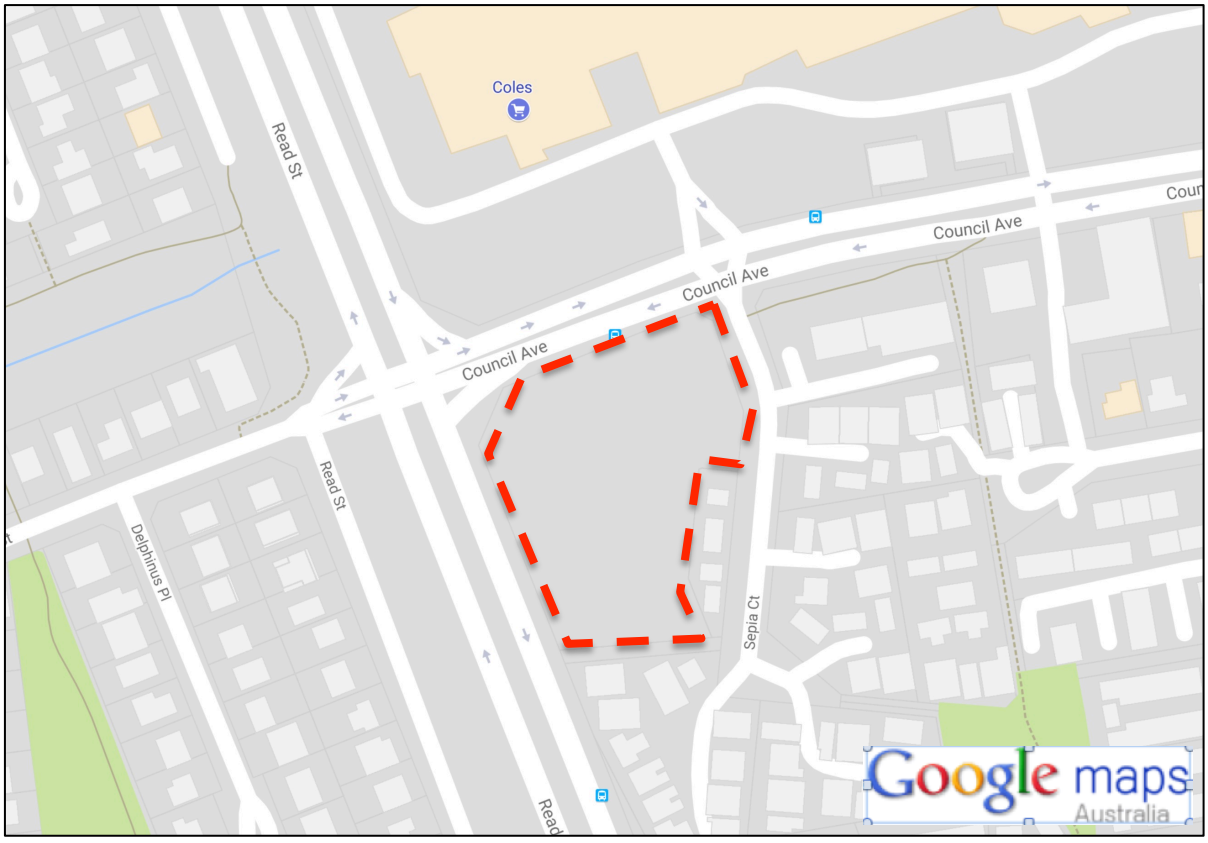


Figure 1 **Site Location** (Site area indicative)

Figure 2 **Aerial Image of the Subject Site** (site area indicative)

Council Avenue

3.2. Council Avenue is classified as a district distributor A road in the Main Roads *Functional Road Hierarchy*. It is constructed with two lanes in each direction. A 60kph speed limit applies.

3.3. Traffic data provided by the City of Rockingham indicates 10,922 vehicles per day (vpd) west of Kitson Street (2007). Traffic data provided by MRWA to the east end indicates over 15,000vpd. As the traffic data is old, reference is made to Scats data from the traffic signals at Read Street. The Scat data indicates 10,229vpd between Sepia Court and the traffic signals. It can be seen that the City of Rockingham data is still relevant.

3.4. Table 1 provides a summary of the current traffic demands taken from MRWA traffic signal data. The MRWA data is attached at Appendix A.

Table 1 Council Ave

Volume	AM Peak (8-9)	PM Peak (5-6)	Sat (12-1)	Capacity
10,229vpd (2018)	256 east 139 west	380 east 609 west	593 east 518 west	40,500vpd

Read Street

3.5. Read Street is a four lane divided road and is classified a district distributor A road in the MRWA *Functional Road Hierarchy* and an "other important" regional road (Blue road) in the Metropolitan Region Scheme. All planning proposals are required to be referred to the Western Australia Planning Commission.

3.6. Traffic data available on the MRWA website indicates 26,407vpd north of Rae Road (passing the subject site). It is considered to be operating at Level of Service A with current traffic demands. It has a posted speed limit of 70kph.

3.7. Table 2 shows the peak hour traffic demands extracted from the Scats traffic signal data.

Table 2 Read Street

Volume	AM Peak (7-8)	PM Peak (5-6)	Sat (12-1)	Capacity
26,407vpd	725 north 337 south	830 north 1,327 south	1,217 north 1,008 south	40,500vpd

Sepia Court

3.8. Sepia Court is classified an access street in the MRWA *Functional Road Hierarchy*. It has a posted speed limit of 50kph.and is predominately residential in nature. It is constructed with a 7.0 metre wide pavement with a footpath to its eastern side.

3.9. No traffic data is available. Reference to aerial images indicates that approximately 80 dwellings and a child care centre are accessed from Sepia Court. It is calculated that Sepia Court would pass about 800 to 1,000 vehicle per day.

3.10. A peak hour traffic survey undertaken of Sepia Court recorded 58 peak hour movements, suggesting a daily demand of about 600 vehicles. The peak hour survey supports the derived daily flow.

Public Transport

3.11. Reference to the Transperth web site indicates there are six bus services operating adjacent to the subject site. The bus services all service Rockingham railway station. Figure 3 shows the bus network.

3.12. The site is provided with excellent public transport access.

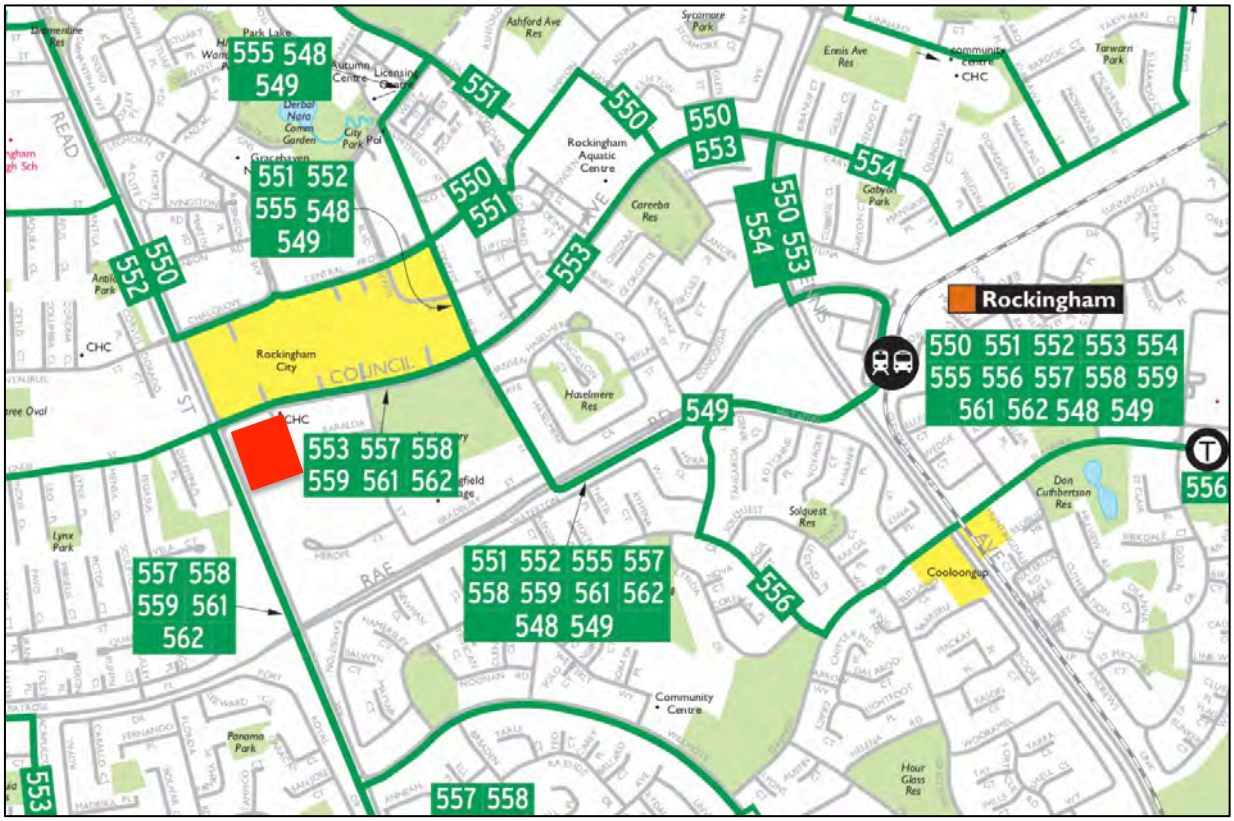


Figure 3 Local Bus Services

Cycling

3.13. A good cycling environment exists in Rockingham. The site is located adjacent to a high quality shared path making cycle access very easy.

3.14. An underpass to Council Avenue exists approximately 100 metres east of the subject site linking to Rockingham shopping centre. Shared paths are also provided to Read Street with crossing facilities provided at the Read Street / Council Avenue traffic signals.

3.15. Figure 4 shows the local cycling network.

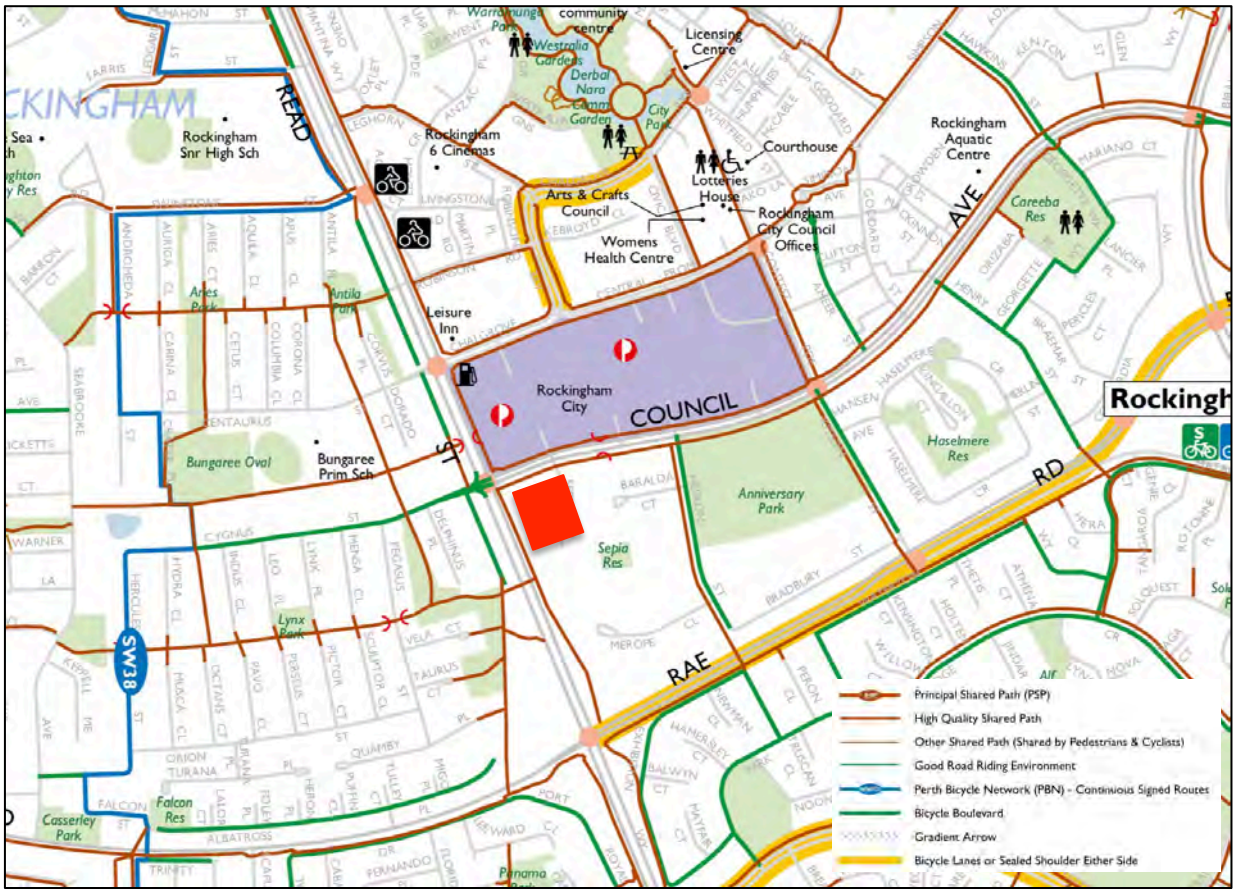


Figure 4 Local Cycling Network

4. THE PROPOSED DEVELOPMENT

4.1. It is proposed to develop the site to provide a mixed- use commercial land use. The mix of land uses proposed includes for a convenience store with fuel (6 pumps), a café of 187m^2, showroom 1 of 517m^2, showroom 2 of 948m^2, showroom 3 of 948m^2, showroom 4 of 2,200m^2 and a gym of 430m^2

4.2. A concept layout for the proposed development is shown in Figure 3.

Figure 3 Concept Development Plan (refer to DA plans)

5. TRAFFIC GENERATION AND DISTRIBUTION

5.1. To assess the potential traffic generation of the subject site, reference is made to the RTA Guide to Traffic Generating Developments and the ITE Trip Generation Manual. The traffic generation of the proposed land uses is discussed below.

Convenience Store with Fuel

5.2. There are two trip generation sources that provide trip rates for convenience stores with fuel. The RTA *Guide to Traffic Generating Developments* (NSW) provides trip rates based on the gross area of the site. The trip rate source applies the same trip generation regardless of the number of pumps. It is considered that this method is unreliable.

5.3. The ITE Trip Generation manual (USA) suggests an AM peak hour trip rate of 12.07 trips per filling position, a PM peak hour trip rate of 13.86 trips and a daily rate of 168.56 trips. Based on surveys undertaken by Riley Consulting of convenience stores with fuel in the northern suburbs of Perth, the ITE trip generation rate is considered the most reliable trip generation source for this land use.

5.4. The proposed development plan shows three bowsers providing 6 filling positions. Reference to the ITE trip rate suggests the site would generate 72 trips in the morning peak and 83 trips in the evening peak hour. The daily generation would be 1,011 trips.

5.5. The ITE trip generation source also advises that a convenience store with fuel can be expected to attract at least 45% of its traffic generation from traffic already passing the site (referred to as pass-by trips).

Cafe

5.6. Reference to the RTA *Guide to Traffic Generating Developments* suggests that Cafe land uses can be expected to generate 60 trips per $100m^2$ floor area and 5 trips per $100m^2$ during the traditional evening peak period. With a floor area of $187m^2$ plus an alfresco area of $63m^{2,}$ the café would be expected to generate 150 movements per day.

5.7. It can be expected that the café would most likely close mid afternoon, but on the basis that some evening operation could occur, the RTA evening peak trip rate is applied, or 9 peak trips.

Showrooms

5.8. Reference to the RTA *Guide to Traffic Generating Developments* (04a of 2013) identifies a trip rate of 17 trips per $100m^2$ GFA for bulky goods retail outlets

(showrooms). The peak hour trip rate is 2.7 trips per 100m^2 with a weekend peak trip rate of 3.9 trips per 100m^2.

5.9. In total there are 4 showroom tenancies with a combined floor area of 4,613m^2. The showrooms would be expected to generate 784 vehicle movements per day with a peak generation of 125 vehicle movements.

5.10. On Saturdays the RTA trip generation indicates a peak of 180 vehicle movements

Gym

5.11. The RTA guide suggests gymnasiums can be expected to generate 9 peak hour and 45 daily trips per 100m^2 of GFA in sub regional centres. In CBD centres the PM trip rate reduces by 2/3rds to 3 trips per 100m^2 of floor area. The town centre of Rockingham will lie between the two locations identified in the RTA guide. For the purpose of this assessment the higher trip rate is used.

5.12. Based on a floor area of 430m^2, the gymnasium could generate up to 194 daily vehicle movements with 39 peak hour vehicle movements.

5.13. On Saturdays during the peak of site activity, the Gym would be quiet. Other gyms in the locality have approximately 40% of the patronage indicated on a Thursday evening peak. On this basis the gym is expected to generate 15 peak movements during the Saturday site peak period.

5.14. Table 3 shows the expected traffic generation of the proposed development.

Table 3 Traffic Generation

	Pass-by	Daily	New	AM	PM	SAT
Existing land use	0	0	-	-	-	-
Convenience store (fuel)	45%	1,011	556	72	83	64
Cafe	15%	150	128	50	13	5
Showrooms	0	784	784	24	125	180
Gym	0	194	194	39	38	15
Traffic Increase		**2,139**	**+1,661**	**185**	**259**	**264**

*Peak figures ignore pass-by trips

Distribution

5.15. Traffic attracted to the proposed development will be drawn from the surrounding residential area and from traffic already passing the site using Council Avenue and Read Street. Access to Council Avenue and Read Street is restricted to left-in / left-out movements only, with full access provided at Sepia Court.

6. DAILY TRAFFIC IMPACT

6.1. Reference to the WAPC -(Volume 4) states that:

"where a traffic increase as a result of a proposed development is less than 10% of current road capacity, it would not normally have a material impact".

"For ease of assessment, an increase of 100 vehicles per hour for any lane can be considered as equating to around 10% of capacity. Therefore any section of road where traffic would increase flows by more than 100 vehicles per hour for any lane should be included in the analysis".

6.2. Based on recognised trip generation trip rates the proposed development is forecast to generate 2,139 vehicle movements per day, of which some 1,661 movements would be new to the local road network.

6.3. Figure 4 shows the expected traffic increases and the level of pass-by trips anticipated. Note that the pass-by trips are assumed from all approaches,

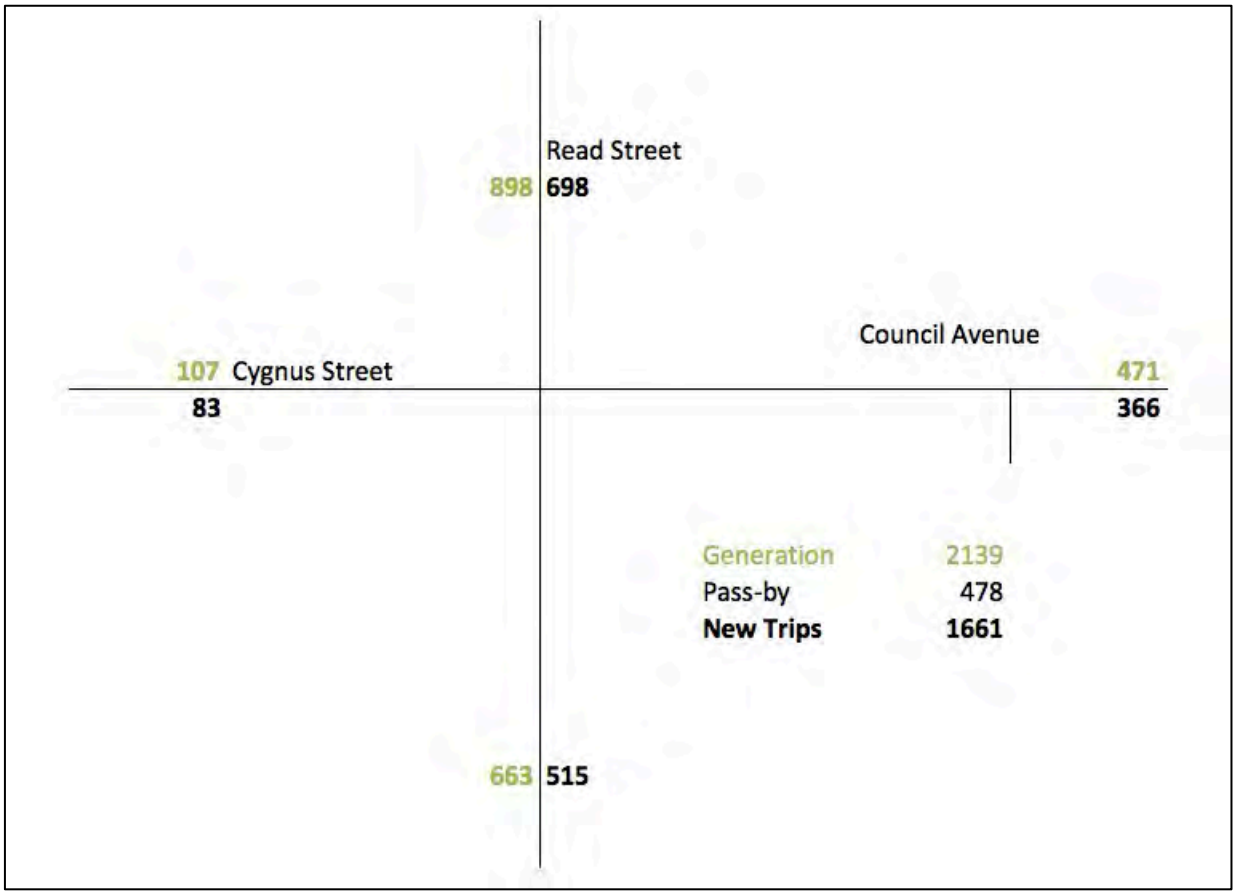


Figure 4 Forecast Daily Traffic Generation

6.4. Table 4 provides an assessment of the daily attraction that could occur to the local road network.

Table 4 Daily Increases to Local Road Network

Road	Development	New	Capacity	%
Council Avenue	471	366	40,500	1%
Read Street north	898	698	45,000	1.6%
Read Street south	663	515	45,000	1%
Cygnus Street	107	83	13,500	1%
	2,139	**1,661**		
Sepia Court	@250	All	13,500	1.8%

6.5. It can be seen from Table 4 that the increases to the surrounding road network are low and significantly less than 10% of the road capacity. It can be seen that the impact to local streets from a daily flow perspective is very low and would not be considered to have a material impact.

6.6. Excluding the traffic generation reductions to account for pass-by trips, the level of traffic increase to the surrounding road network would be less than 2.5% of the road network capacity. The development would still be considered to have no material traffic impact.

6.7. Based on the WAPC *Transport Assessment Guidelines for Developments* (Volume 4) the proposed development would be considered to have no material traffic impact in regard to daily traffic flow changes.

6.8. Table 4 also includes the possible increase to Sepia Court at approximately 250 vehicle movements per day. The demand to Sepia Court may fluctuate based on local road network operating conditions, but would not be expected to be more than 2.5% of the capacity. However, as a more residential type street a maximum demand of 3,000vpd is desirable. With approximately 1,000vpd currently using Sepia Court, It is highly improbable that the proposed development would result in Sepia Court carry more than 3,000vpd.

7. PEAK HOUR IMPACT

7.1. The assessment of the proposed development is shown to have no material traffic impact based on the change to daily traffic flows when measured against the WAPC guidelines.

7.2. During the peak periods some impacts may occur and assessment of the expected peak hour traffic demands shown in Table 3 indicates the following peak demands (no account of pass-by trips is taken).

AM Peak	185 vehicle movements
PM Peak	259 vehicle movements
Saturday Peak	264 vehicle movements

7.3. The WAPC guidelines suggest that where a peak demand of more than 100 vehicles occurs to any traffic lane an assessment of the impact should be undertaken.

7.4. Based on a typical 50/50 directional split of traffic, it can be estimated that material traffic impact to a traffic lane is unlikely to occur until 200 vehicles are generated in the peak period. On this basis it can be derived that with a generation of 180 vehicle movements, the AM peak is unlikely to result in a material traffic impact.

7.5. Appendix C shows the forecast peak period traffic demands associated with the proposed development for the PM peak and Saturday peak. It can be seen from Appendix C that traffic increases to individual lanes are low and would not generally be expected to have a material impact, noting that the peak turn into Sepia Court is high and it is considered further.

7.6. To assess the operation of the local road network, SIDRA intersection has been used for the PM peak period and the Saturday peak period. Appendices D and E show the Sidra analysis which has used the network function to assess the traffic signals, the site access points and Sepia Court.

7.7. The Sidra network analysis is summarised in Figure 5 for the PM peak hour and Figure 6 for the Saturday peak hour.

7.8. Figures 5 and 6 show that good Levels of Service are maintained for all traffic movements with the proposed development during peak periods.

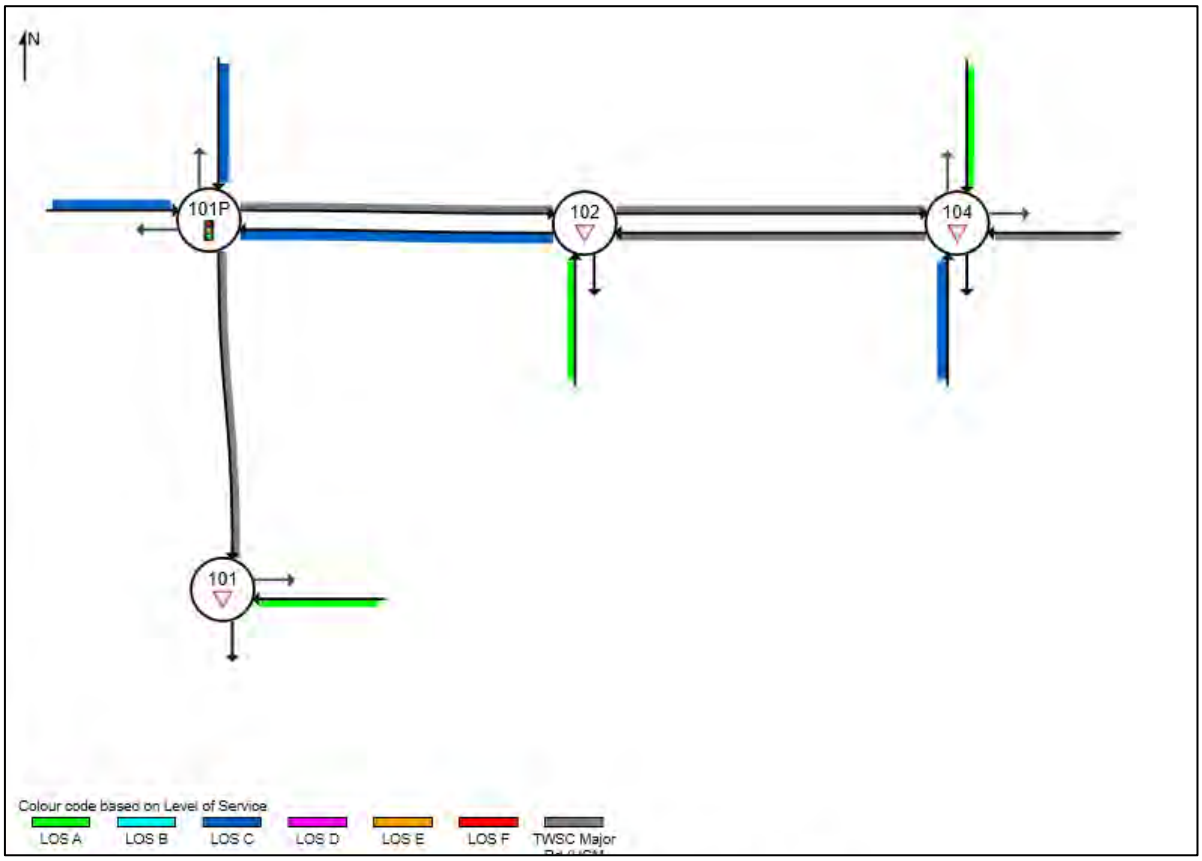


Figure 5 PM Peak Hour Sidra Levels Of Service (with development)

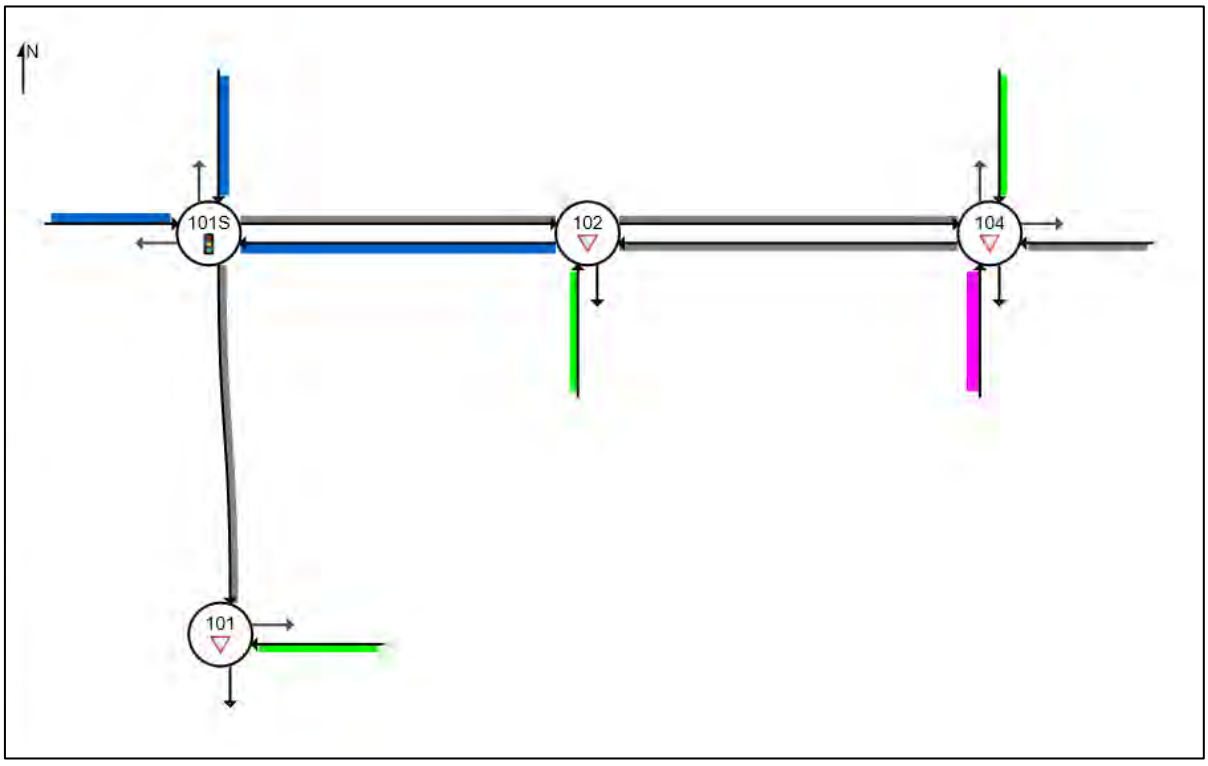


Figure 6 Saturday Peak Hour Sidra Levels Of Service (with development)

8. ACCESS

8.1. Access to the proposed development will be taken via cross overs to:

Read Street	Restricted to left-in / left-out movements only
Council Avenue	Restricted to left-in / left-out movements only
Sepia Court	Full movement permitted

8.2. An indicative plan showing the site plan superimposed to an aerial image is provided in Figure 7.

Figure 7 Access Locations (Indicative)

Access to Read Street

8.3. Access to Read Street is located to the southern end of the subject site and is located approximately 145 metres south of the traffic signals at the intersection of Read Street and Council Avenue. The location of the access accords with current guidelines.

8.4. The access is restricted to left in / left out movements only by virtue of the existing median located to the centre of Read Street. An existing embayment located to the eastern kerb line of Read Street will be converted to provide a standard 60 metre auxiliary turn lane for the site access.

8.5. Visibility is in accordance with current guidelines.

8.6. Reference to the Sidra network analysis indicates that level of Service A can be expected at this access during peak periods of operation.

Access to Council Avenue

8.7. The access to Council Avenue is located 85 metres east of the traffic signals stop line at Read Street. A separation of 60 metres is provided from Sepia Court. The access is located 60 metres from the MRS line and accords with current planning policies.

8.8. Good visibility is provided for the access to Council Avenue and in accordance with current guidelines.

8.9. Reference to the Sidra network analysis indicates that Level of Service A can be expected at this access during peak periods of operation.

8.10. It is likely that during some peak periods the queue form the traffic signals may interact with the access to Council Avenue. However, the Sidra network analysis shows that very good operation will be provided. Occasional interruption of the access is not considered to be an issue and is a common occurrence in town centre locations.

Access to Sepia Court

8.11. Access to Sepia Court is taken at two locations to provide an entry/exit for the convenience store (fuel) and an entry/exit for the showrooms and other land uses on the site. The access is located approximately 35 metres south of the Sepia Court yield line to Council Avenue and is appropriately located. A child care centre exists to the east of Sepia Court and the proposed access is located in accordance with the requirements of AS2890.1 in regard to the child care centre access.

8.12. The showroom access is located approximately 75 metres south of the Sepia Court yield line to Council Avenue. The proposed access is located in accordance with the requirements of AS2890.1 in regard to the child care centre access.

8.13. Appropriate visibility is provided for the accesses to Sepia Court.

8.14. The operation of these access points has not been included in the Sidra network assessment as traffic demands on Sepia Court are very low and uninterrupted flow conditions can be expected.

8.15. Analysis of the Sepia Court intersection with Council Avenue is included and shows Level of Service D during the PM peak.

Service Vehicle Access

8.16. Service vehicles will typically be 12.5 metre rigid vehicles delivering goods to the commercial uses.

8.17. The fuel component of the convenience store will require access by a 19 metre length petrol tanker. The tanker will enter from Sepia Court and depart to Council Avenue.

8.18. Swept path assessment of the site will be required to be undertaken to ensure appropriate access by service vehicles.

9. PARKING

9.1. The proposed development is located close to the heart of the Rockingham City Centre and falls within the primary centre in regard to the car parking requirements of the Town Planning Scheme (TPS).

9.2. A minimum and maximum level of parking is set out in Table 3 of the City's TPS as follows (maximum acceptable parking shown in brackets):

- Health Studio (gym) 1 bay per 20m^2 (15)
- Restaurant 1 bay per 8 persons accommodated (6)
- Showroom 1 Bay per 80m^2 (60m^2)
- Shop 1 bay per 22m^2 NLA (17m^2)

Table 5 Parking Requirements

Land Use	Area NLA	Min	Max
Gym	301	16	21
Showrooms	4,583	58	77
café	166	21	28
Convenience store	210	10	13
Total		**105**	**139**

9.3. Table 5 indicates that the proposed development is required to provide a minimum of 105 parking bays and a maximum of 139 parking bays to comply with the requirements of the TPS.

9.4. Reference to the concept plan show as Figure 3 indicates in total 111 parking bays are provided for the proposed development. The number of parking bays does not include the 6 bays parking adjacent to fuel bowsers.

9.5. The number of parking bays provided falls between 105 and 139 bay and is considered to meet the car parking requirements set out in the City of Rockingham's TPS.

9.6. All car parking bays are to be provided in accordance with AS2890.1 and other relevant standards.

9.7. The concept plan indicates 20 bicycle parking bays are to be provided to meet the requirements of the TPS.

10. PUBLIC TRANSPORT, PEDESTRIANS AND CYCLISTS

10.1. Bus stops are located in close proximity to the subject site and provide excellent public transport access. There are several bus routes passing the subject site that also service the shopping centre.

10.2. The concept plan indicates an awning to the convenience store that will provide shelter for bus passengers waiting on Council Avenue. This will improve passenger comfort during inclement weather.

10.3. The development is closely located adjacent to a major shopping precinct of Rockingham and may attract some walking and cycling trips.

10.4. The subject site is located on the corner of Read Street and Council Avenue where traffic signals are provided. Pedestrian crossing facilities are provided at the traffic signals to Main Roads standards.

10.5. An underpass to Council Avenue exists approximately 100 metres east of the subject site and provides a traffic free access to the shopping centre.

10.6. Site inspection indicates that pedestrians cross Council Avenue at Sepia Court to reach the bus stops adjacent to the subject site. The development would not negatively impact the ability of pedestrians to take this route. However, use of the underpass should be encouraged if well lit and designed in accordance with safe street standards.

10.7. Staff trips may occur using bicycles and facilities for cyclists are to be provided in accordance with local government requirements.

APPENDIX A TRAFFIC DATA

Read St

SITE 5301

North of Rae Rd

Traffic Volume | Hourly | Speed | Monday to Friday | Download

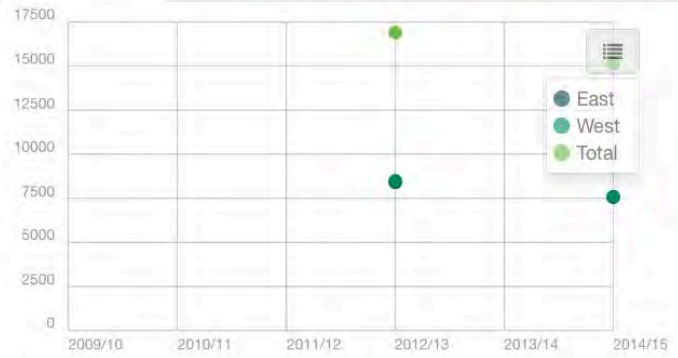
	Vehicles	
	Total	Heavy
2014/15		
2013/14		
2012/13	25825	
2011/12	27193	
2010/11		
2009/10		

Council Av

SITE 3711

West of Ennis Av

Traffic Volume | Hourly | Speed | Monday to Friday | Download



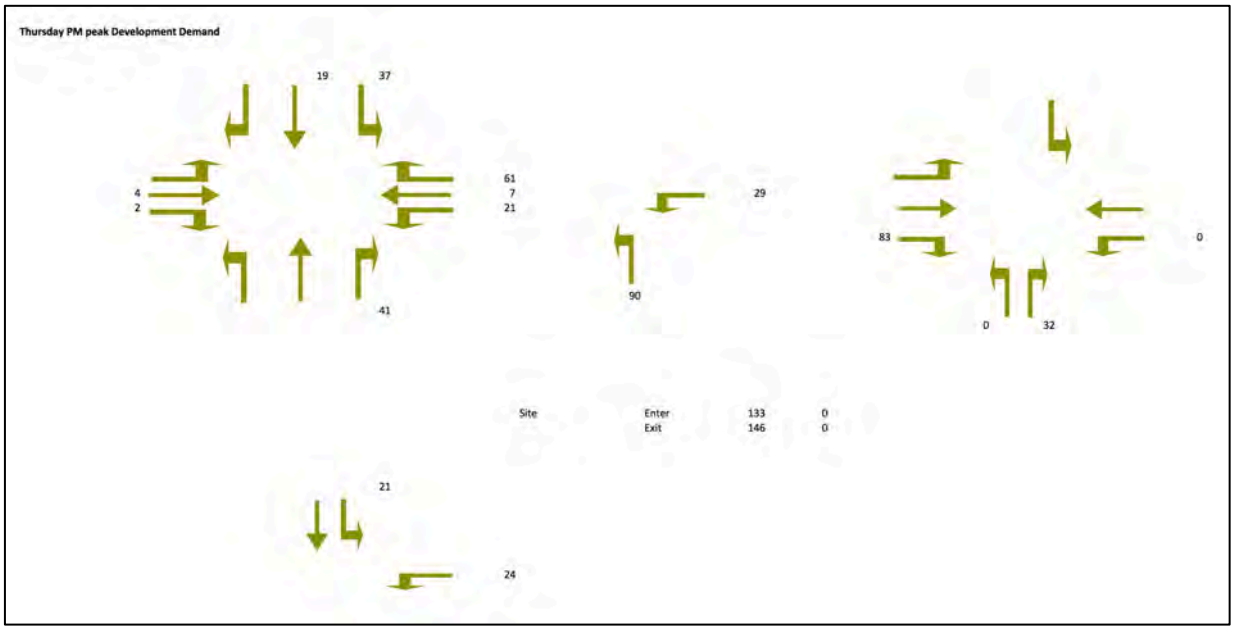
	Vehicles	
	Total	Heavy
2014/15	**15148**	**4%**
2013/14		
2012/13	16896	3%
2011/12		
2010/11		
2009/10		

APPENDIX B LEVELS OF SERVICE BY ROAD TYPE

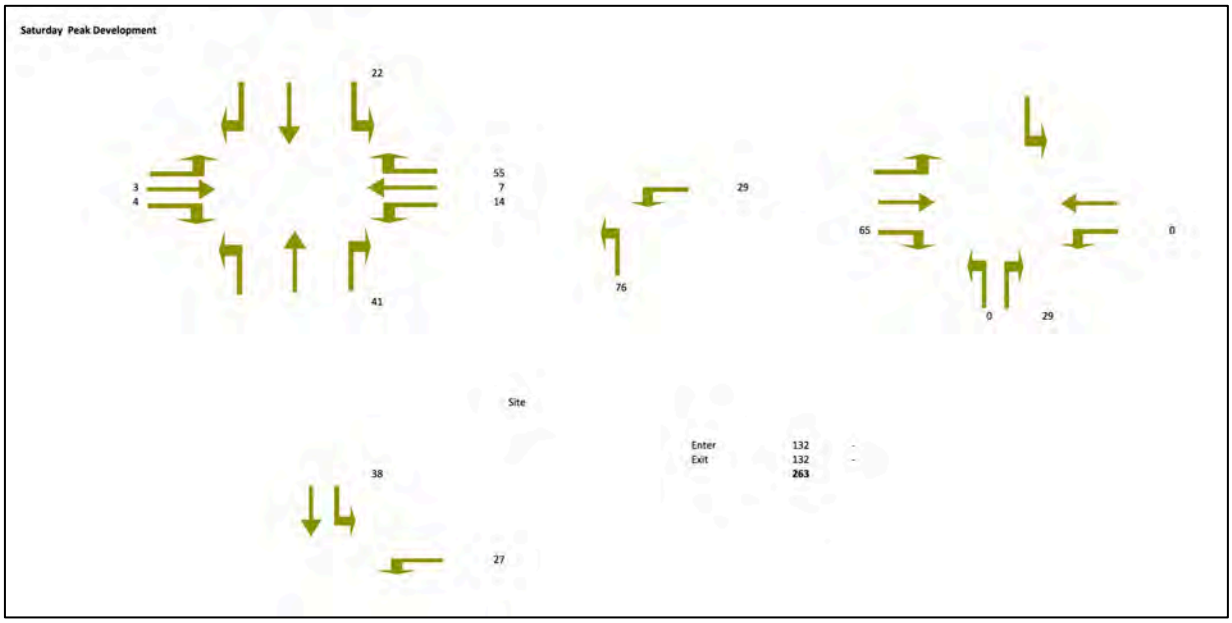
LOS	Single Carriageway[1]	2-Lane Boulevard[2]	Dual Carriageway (4-Lanes)[3]	Dual Carriageway (4-lane Clearway)[3]
A	2,400vpd	2,600vpd	24,000vpd	27,000vpd
B	4,800vpd	5,300vpd	28,000vpd	31,500vpd
C	7,900vpd	8,700vpd	32,000vpd	36,000vpd
D	13,500vpd	15,000vpd	36,000vpd	40,500vpd
E	22,900vpd	25,200vpd[4]	40,000vpd	45,000vpd
F	>22,900vpd	>25,200vpd[4]	>40,000vpd	>45,000vpd

[1] Based on Table 3.9 Austroads - Guide to Traffic Engineering Practice Part 2
[2] Based on single carriageway +10% (supported by Table 3.1 Austroads - Guide to Traffic Engineering Practice Part 3) – Boulevard or division by medians.
[3] Based on RRR Table 3.5 - mid-block service flow rates (SF.) for urban arterial roads with interrupted flow. Using 60/40 peak split.
[4] Note James Street Guildford passes 28,000vpd.

APPENDIX C DEVELOPMENT PEAK HOUR TRAFFIC DEMANDS

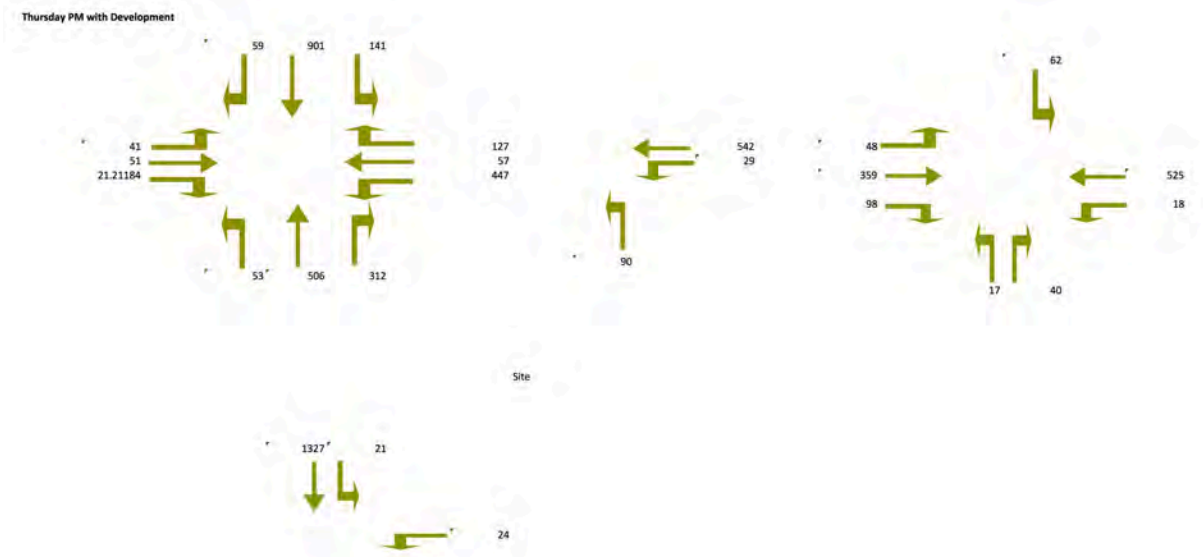


PM Peak Hour Development Traffic Demands

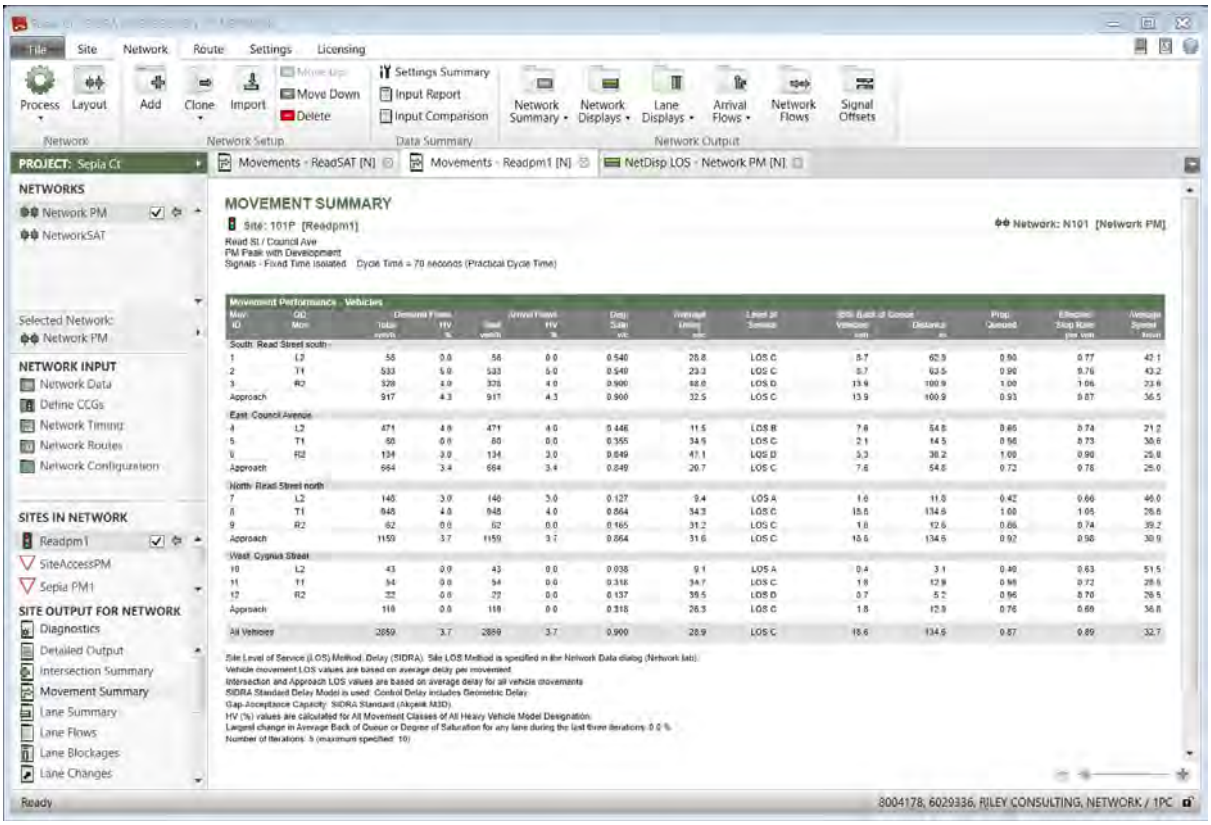


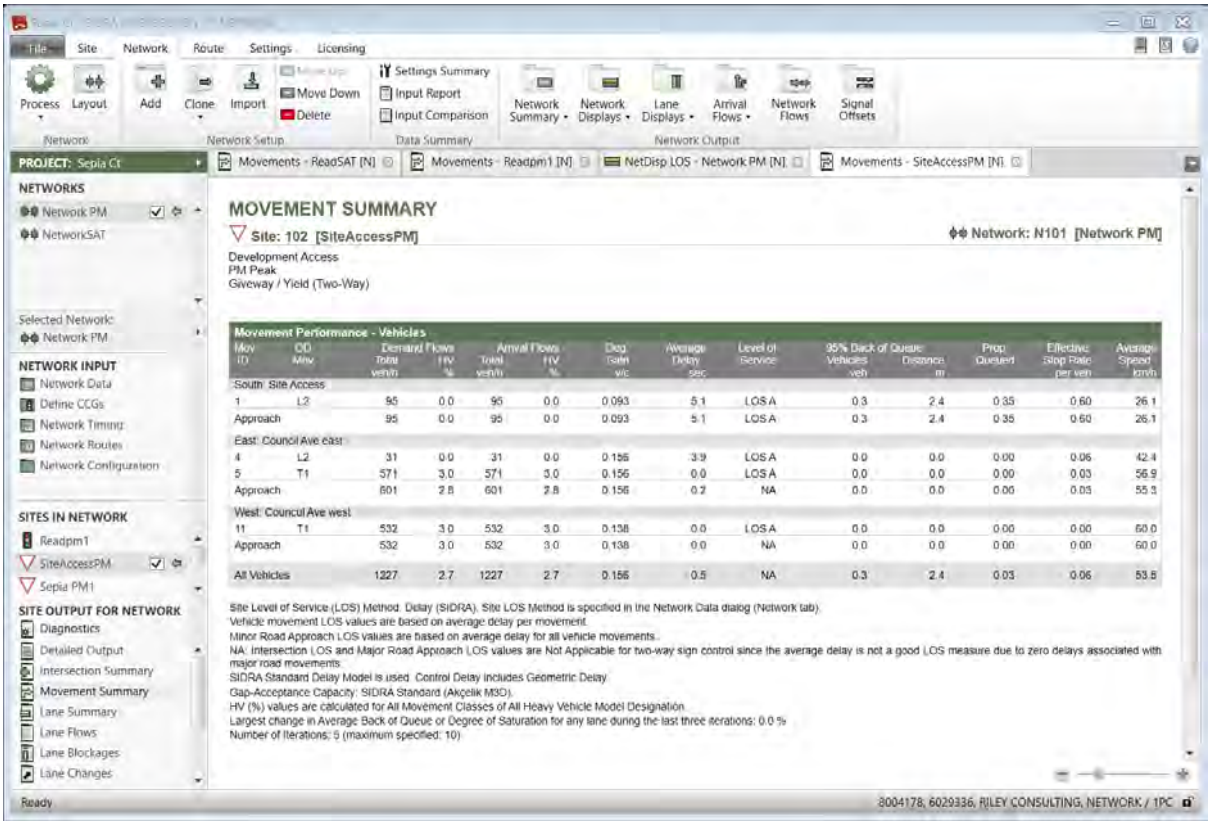
Saturday Peak Hour Development Traffic Demands

APPENDIX D PM PEAK HOUR SIDRA ANALYSIS



Traffic Demands





MOVEMENT SUMMARY

Site: 102 [SiteAccessPM]

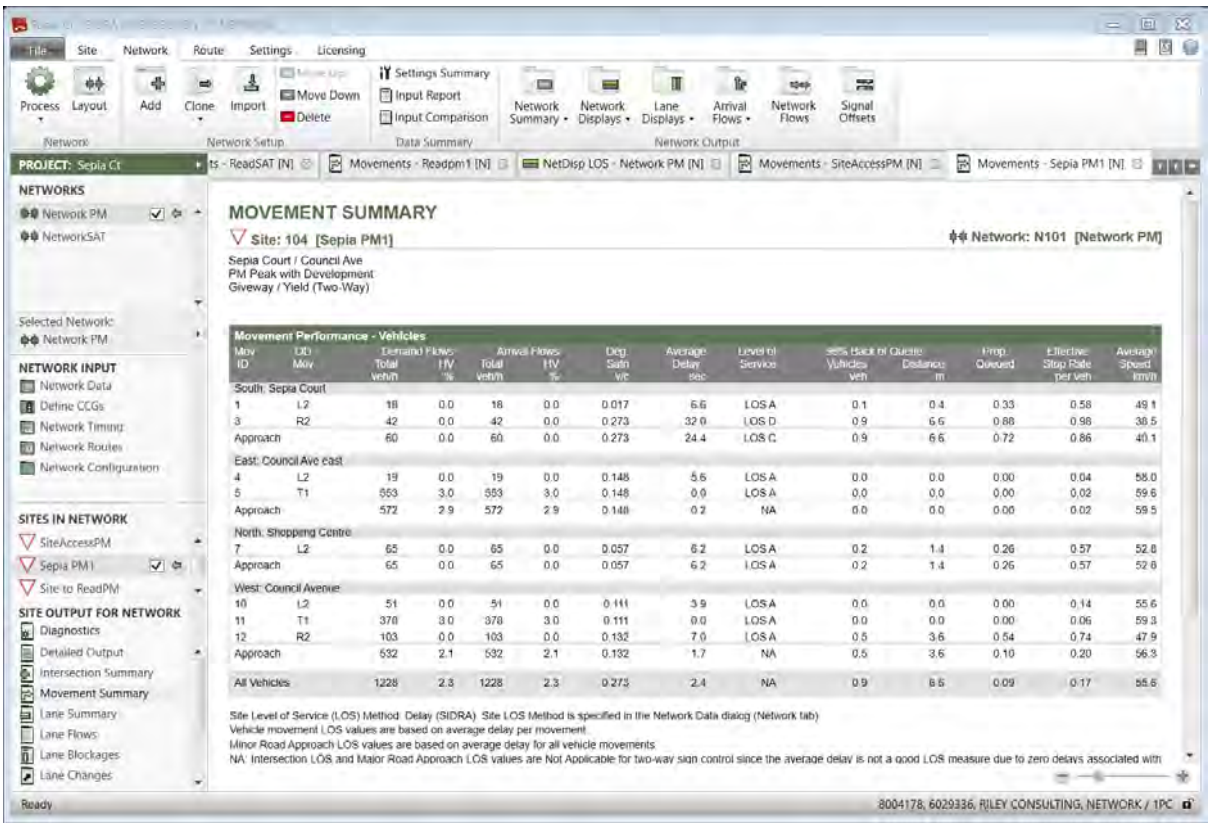
Network: N101 [Network PM]

Development Access
PM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Site Access													
1	L2	95	0.0	95	0.0	0.093	5.1	LOS A	0.3	2.4	0.35	0.60	26.1
Approach		95	0.0	95	0.0	0.093	5.1	LOS A	0.3	2.4	0.35	0.60	26.1
East: Council Ave east													
4	L2	31	0.0	31	0.0	0.156	3.9	LOS A	0.0	0.0	0.00	0.06	42.4
5	T1	571	3.0	571	3.0	0.156	0.0	LOS A	0.0	0.0	0.00	0.03	56.9
Approach		601	2.8	601	2.8	0.156	0.2	NA	0.0	0.0	0.00	0.03	55.3
West: Council Ave west													
11	T1	532	3.0	532	3.0	0.138	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		532	3.0	532	3.0	0.138	0.0	NA	0.0	0.0	0.00	0.00	60.0
All Vehicles		1227	2.7	1227	2.7	0.156	0.5	NA	0.3	2.4	0.03	0.06	53.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of iterations: 5 (maximum specified: 10)



MOVEMENT SUMMARY

Site: 104 [Sepia PM1]

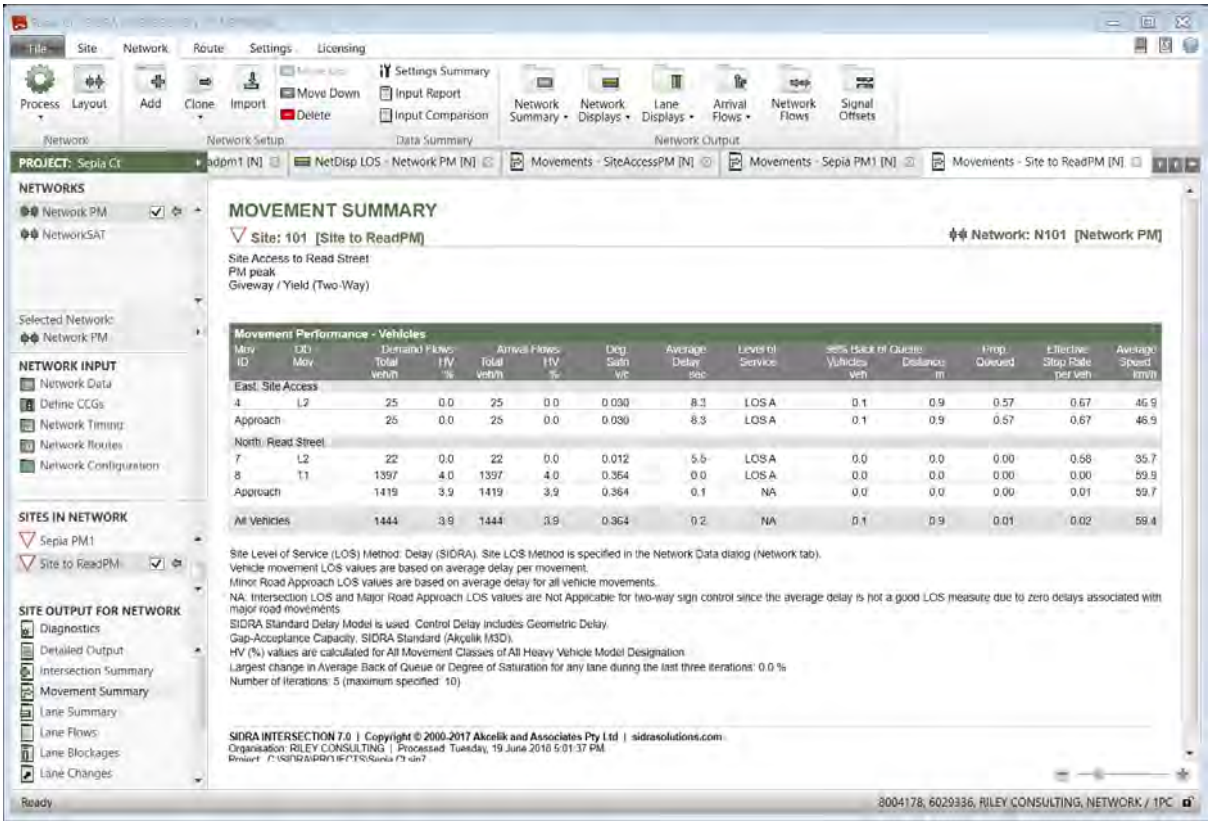
Network: N101 [Network PM]

Sepia Court / Council Ave
PM Peak with Development
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Sepia Court													
1	L2	18	0.0	18	0.0	0.017	5.6	LOS A	0.1	0.4	0.33	0.58	49.1
3	R2	42	0.0	42	0.0	0.273	32.0	LOS D	0.9	6.6	0.88	0.98	38.5
Approach		60	0.0	60	0.0	0.273	24.4	LOS C	0.9	6.6	0.72	0.86	40.1
East: Council Ave east													
4	L2	19	0.0	19	0.0	0.148	5.6	LOS A	0.0	0.0	0.00	0.04	58.0
5	T1	553	3.0	553	3.0	0.148	0.0	LOS A	0.0	0.0	0.00	0.02	59.6
Approach		572	2.9	572	2.9	0.148	0.2	NA	0.0	0.0	0.00	0.02	59.5
North: Shopping Centre													
7	L2	65	0.0	65	0.0	0.057	6.2	LOS A	0.2	1.4	0.26	0.57	52.8
Approach		65	0.0	65	0.0	0.057	6.2	LOS A	0.2	1.4	0.26	0.57	52.8
West: Council Avenue													
10	L2	51	0.0	51	0.0	0.111	3.9	LOS A	0.0	0.0	0.00	0.14	55.6
11	T1	378	3.0	378	3.0	0.111	0.0	LOS A	0.0	0.0	0.00	0.06	59.3
12	R2	103	0.0	103	0.0	0.132	7.0	LOS A	0.5	3.6	0.54	0.74	47.9
Approach		532	2.1	532	2.1	0.132	1.7	NA	0.5	3.6	0.10	0.20	56.3
All Vehicles		1228	2.3	1228	2.3	0.273	2.4	NA	0.9	6.6	0.09	0.17	55.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with



MOVEMENT SUMMARY

Site: 101 [Site to ReadPM]

Network: N101 [Network PM]

Site Access to Read Street
PM peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Site Access													
4	L2	25	0.0	25	0.0	0.030	8.3	LOS A	0.1	0.9	0.57	0.67	46.9
Approach		25	0.0	25	0.0	0.030	8.3	LOS A	0.1	0.9	0.57	0.67	46.9
North: Read Street													
7	L2	22	0.0	22	0.0	0.012	5.6	LOS A	0.0	0.0	0.00	0.58	35.7
8	T1	1397	4.0	1397	4.0	0.364	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1419	3.9	1419	3.9	0.364	0.1	NA	0.0	0.0	0.00	0.01	59.7
All Vehicles		1444	3.9	1444	3.9	0.364	0.2	NA	0.1	0.9	0.01	0.02	59.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of iterations: 5 (maximum specified: 10)

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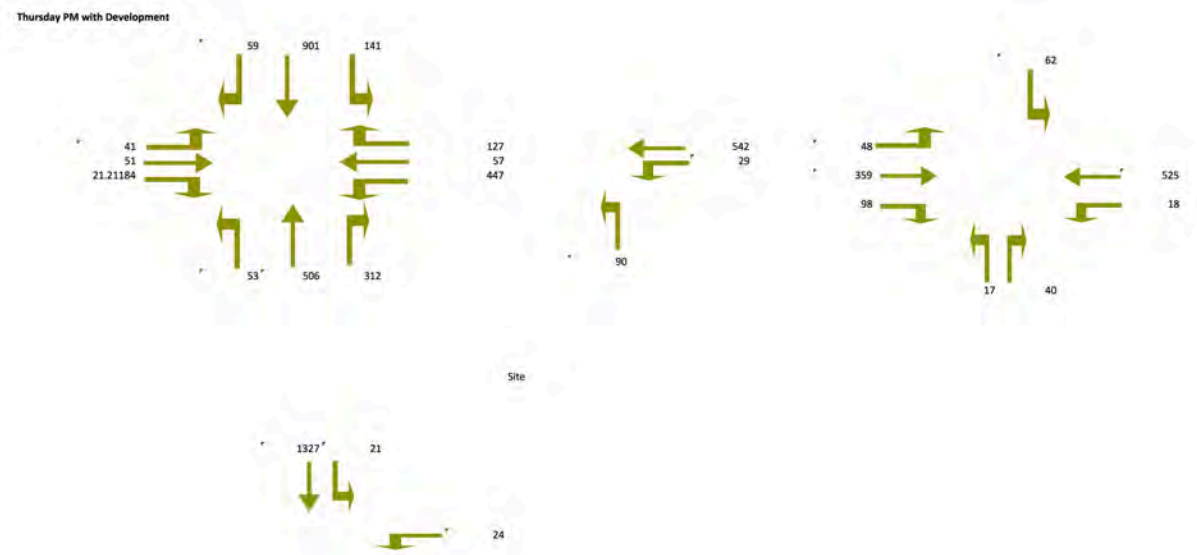
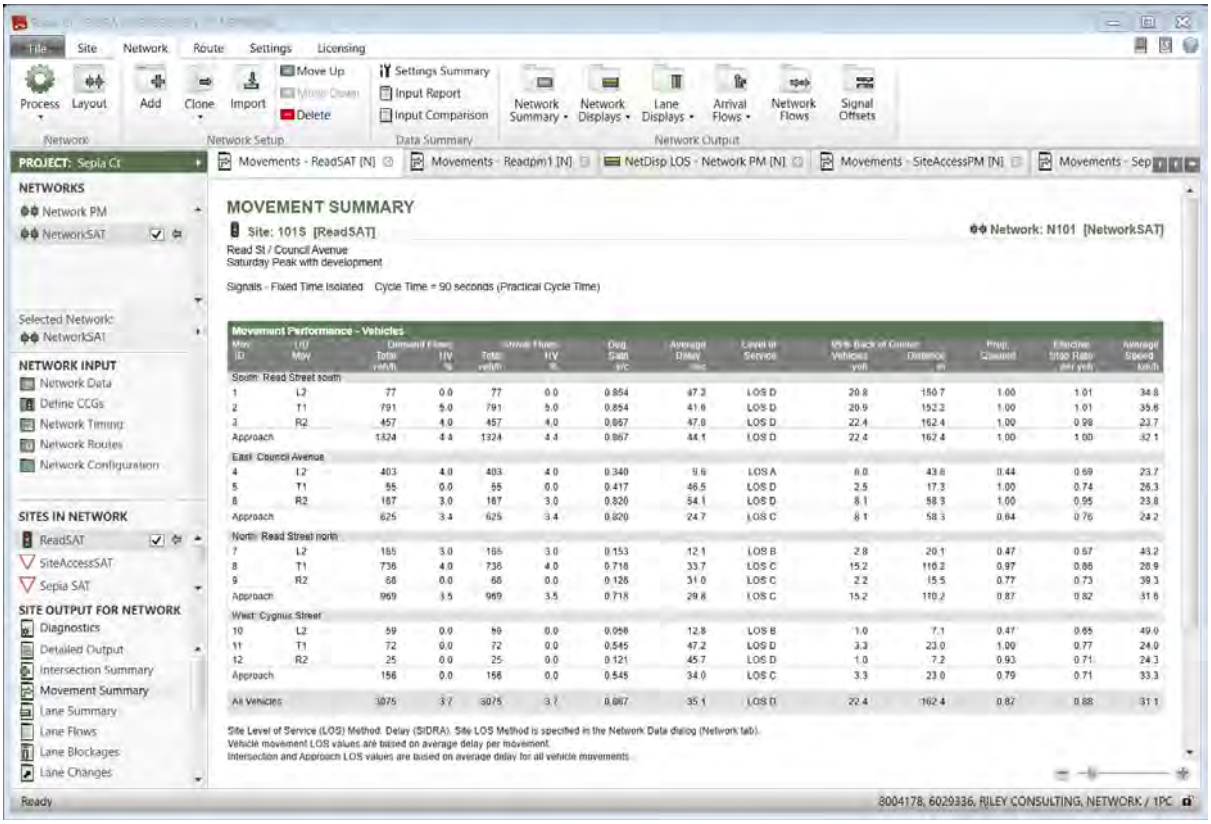
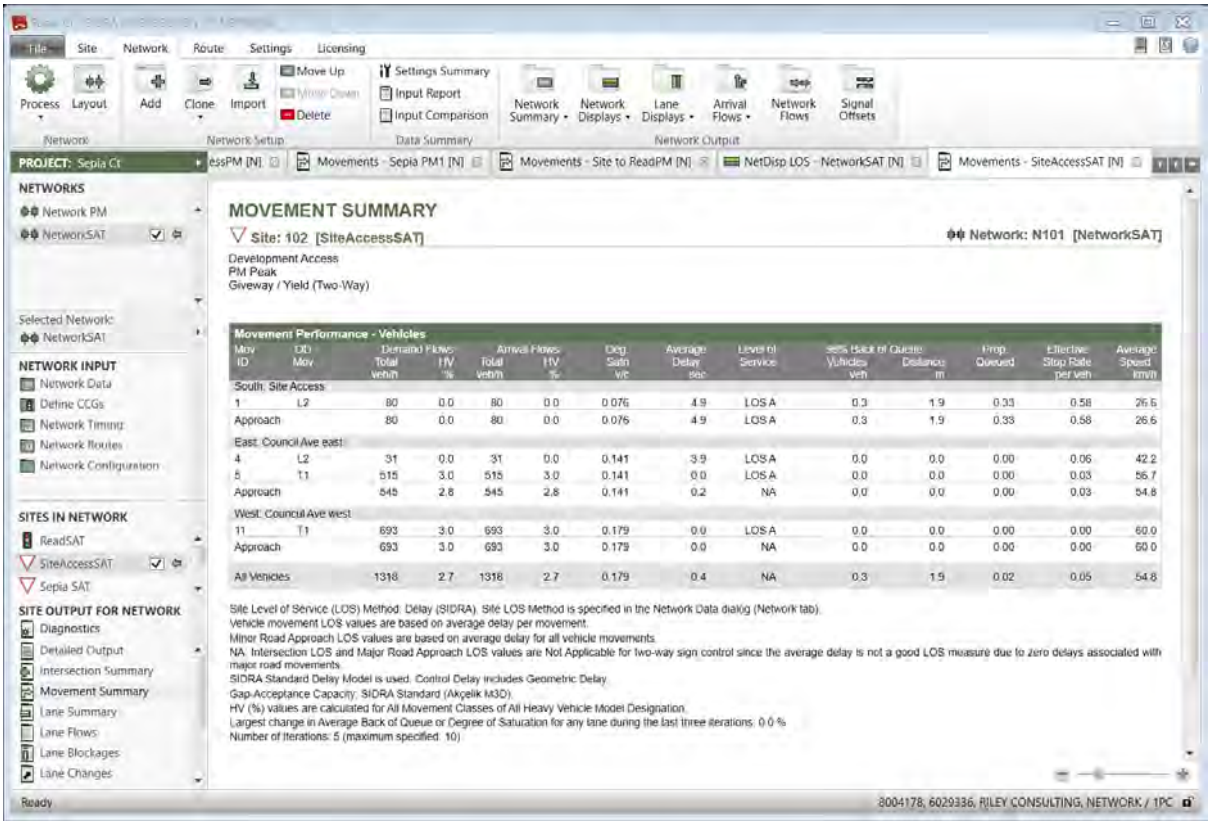
APPENDIX E SATURDAY PEAK HOUR SIDRA ANALYSIS



Traffic Demands





MOVEMENT SUMMARY

Site: 102 [SiteAccessSAT]

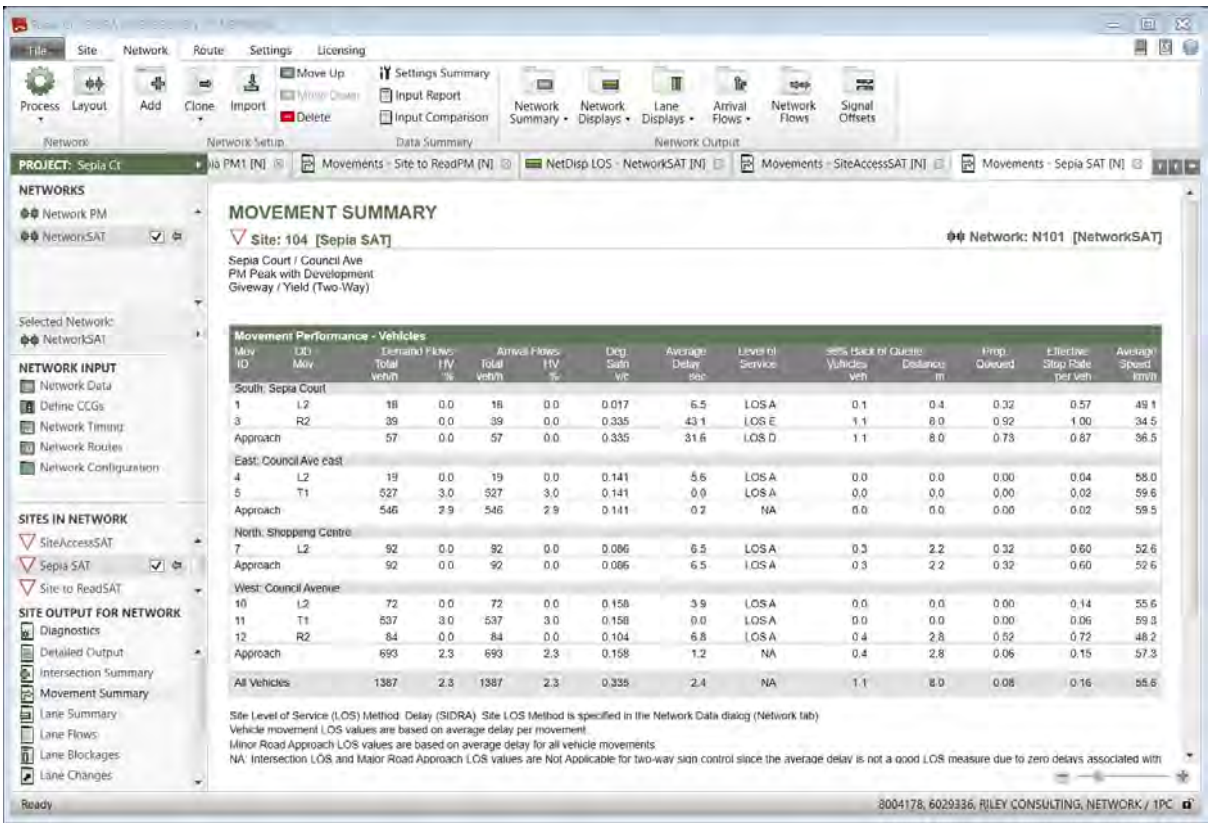
Network: N101 [NetworkSAT]

Development Access
PM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows: Total veh/h	Demand Flows: HV %	Arrival Flows: Total veh/h	Arrival Flows: HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue: Vehicles veh	95% Back of Queue: Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Site Access													
1	L2	80	0.0	80	0.0	0.076	4.9	LOS A	0.3	1.9	0.33	0.58	26.6
Approach		80	0.0	80	0.0	0.076	4.9	LOS A	0.3	1.9	0.33	0.58	26.6
East: Council Ave east													
4	L2	31	0.0	31	0.0	0.141	3.9	LOS A	0.0	0.0	0.00	0.06	42.2
5	T1	515	3.0	515	3.0	0.141	0.0	LOS A	0.0	0.0	0.00	0.03	56.7
Approach		545	2.8	545	2.8	0.141	0.2	NA	0.0	0.0	0.00	0.03	54.8
West: Council Ave west													
11	T1	693	3.0	693	3.0	0.179	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		693	3.0	693	3.0	0.179	0.0	NA	0.0	0.0	0.00	0.00	60.0
All Vehicles		1318	2.7	1318	2.7	0.179	0.4	NA	0.3	1.9	0.02	0.05	54.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of iterations: 5 (maximum specified: 10)



MOVEMENT SUMMARY

Site: 104 [Sepia SAT]

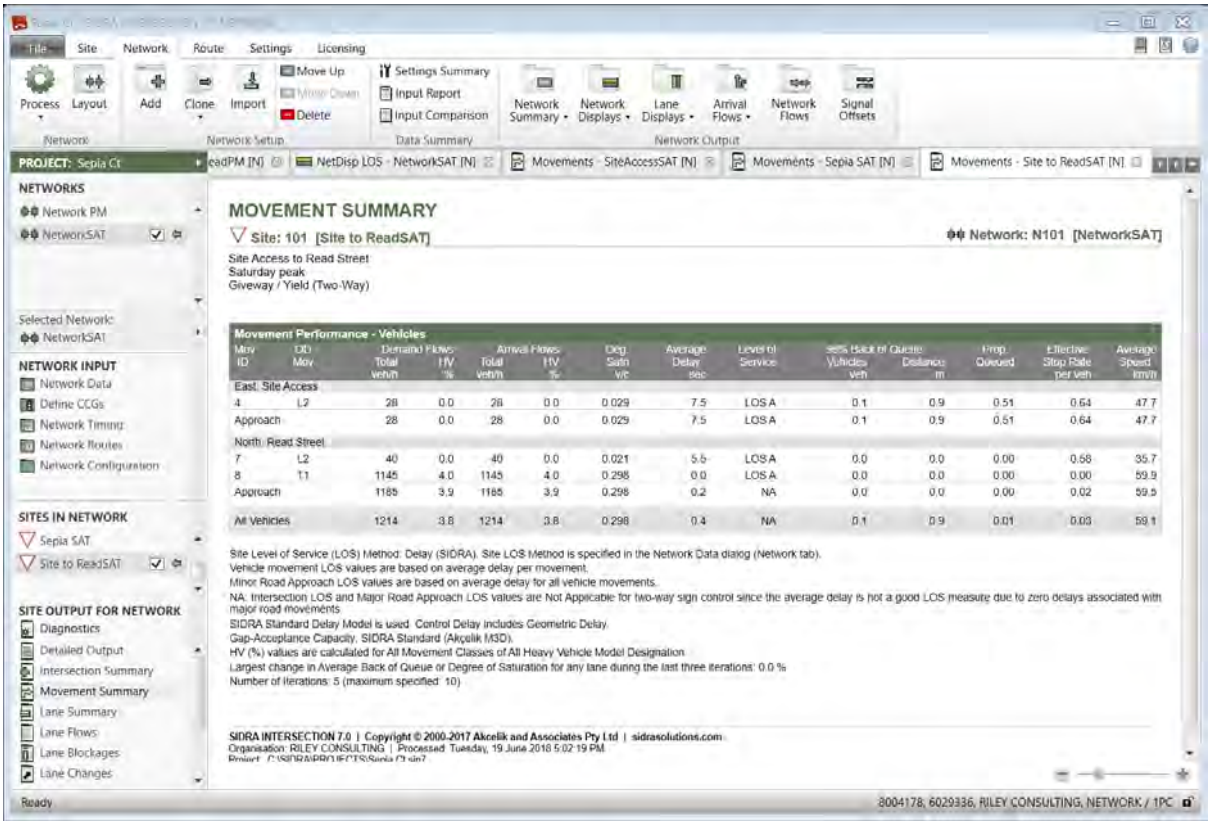
Network: N101 [NetworkSAT]

Sepia Court / Council Ave
PM Peak with Development
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows: Total veh/h	Demand Flows: HV %	Arrival Flows: Total veh/h	Arrival Flows: HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue: Vehicles veh	95% Back of Queue: Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Sepia Court													
1	L2	18	0.0	18	0.0	0.017	6.5	LOS A	0.1	0.4	0.32	0.57	49.1
3	R2	39	0.0	39	0.0	0.335	43.1	LOS E	1.1	8.0	0.92	1.00	34.5
Approach		57	0.0	57	0.0	0.335	31.6	LOS D	1.1	8.0	0.73	0.87	36.5
East: Council Ave east													
4	L2	19	0.0	19	0.0	0.141	5.6	LOS A	0.0	0.0	0.00	0.04	58.0
5	T1	527	3.0	527	3.0	0.141	0.0	LOS A	0.0	0.0	0.00	0.02	59.6
Approach		546	2.9	546	2.9	0.141	0.2	NA	0.0	0.0	0.00	0.02	59.5
North: Shopping Centre													
7	L2	92	0.0	92	0.0	0.086	6.5	LOS A	0.3	2.2	0.32	0.60	52.6
Approach		92	0.0	92	0.0	0.086	6.5	LOS A	0.3	2.2	0.32	0.60	52.6
West: Council Avenue													
10	L2	72	0.0	72	0.0	0.158	3.9	LOS A	0.0	0.0	0.00	0.14	55.6
11	T1	537	3.0	537	3.0	0.158	0.0	LOS A	0.0	0.0	0.00	0.06	59.3
12	R2	84	0.0	84	0.0	0.104	6.8	LOS A	0.4	2.8	0.52	0.72	48.2
Approach		693	2.3	693	2.3	0.158	1.2	NA	0.4	2.8	0.06	0.15	57.3
All Vehicles		1387	2.3	1387	2.3	0.335	2.4	NA	1.1	8.0	0.08	0.16	55.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with



MOVEMENT SUMMARY

Site: 101 [Site to ReadSAT]

Network: N101 [NetworkSAT]

Site Access to Read Street
Saturday peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Site Access													
4	L2	28	0.0	28	0.0	0.029	7.5	LOS A	0.1	0.9	0.51	0.64	47.7
Approach		28	0.0	28	0.0	0.029	7.5	LOS A	0.1	0.9	0.51	0.64	47.7
North: Read Street													
7	L2	40	0.0	40	0.0	0.021	5.5	LOS A	0.0	0.0	0.00	0.58	35.7
8	T1	1145	4.0	1145	4.0	0.298	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1185	3.9	1185	3.9	0.298	0.2	NA	0.0	0.0	0.00	0.02	59.5
All Vehicles		1214	3.8	1214	3.8	0.298	0.4	NA	0.1	0.9	0.01	0.03	59.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of iterations: 5 (maximum specified: 10)

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Porter
Consulting Engineers

Level 2 Kishorn Court
58 Kishorn Road
Mount Pleasant WA 6153

PO Box 1036
Canning Bridge WA 6153

Tel: (08) 9315 9955
Fax: (08) 9315 9959
Email: office@portereng.com.au
www.portereng.com.au

Our Ref: MC/JK/L0251.18
Job No: 18-07-085

19 July 2018

Arise Developments Pty Ltd
C/- Property Development Solutions
Unit 9, 69 Hay Street
SUBIACO EAST WA 6008

Attention: Geoff Loxton

Dear Geoff

ROCKINGHAM CENTRAL
DRAINAGE MANAGEMENT STRATEGY

Porter Consulting Engineers (PCE) has been engaged to prepare a drainage management strategy to support a Development Application on the above site. The development proposal includes a service station, café, fitness centre and various showroom outlets.

The site is located at the corner of Council Avenue and Read Street in Rockingham, within the City of Rockingham as shown in **Figure 1**.

Figure 1: corner of Council Avenue and Read Street, Rockingham

Landform – The site is approximately 12,320m^2 in area and is currently undeveloped. The site has a flat terrain and will require minor earthworks to shape the lot to allow suitable grades and tie-ins with the existing adjacent road network.

Ground Water and Existing Soil Condition – Based on a desktop review of the Perth Ground Water Atlas (Water and Rivers Commission 2004), we estimate ground water level to be at about RL1.6m or approximately 3m below expected finished surface levels. The Department of Mines and Petroleum Geological Series Mapping indicates the site comprises of a thin layer of topsoil overlying Calcareous Sand of good permeability.

A Geotechnical Investigation will be required prior to detailed design to confirm the soil type, permeability, depth to groundwater and site classification. It is expected the site is class A.

Drainage Management – The City of Rockingham planning policy 3.4.3 (Urban Water Management) sets out the general drainage requirements for development within the City. The requirements relevant to this development proposal are noted as follows:

- All Stormwater runoff to be managed within the lot.
- For events up to 10% AEP, stormwater management systems to be designed to provide appropriate level of serviceability, amenity and road safety.
- For major events (1% AEP) stormwater management system to protect people and property from flooding.

To achieve these requirements it is proposed to install large diameter soakwells and underground leach tanks (Tunnelwell or similar) throughout the site, sufficient to cater for the 1%AEP storm events. The soakage system will need to be shallow, with a maximum depth of 1.8m to ensure adequate separation to groundwater. Above ground storage within the carpark areas may also be utilised however will be subject to detailed design.

In extreme events, above ground storage with an overland flow path out of the site will be provided.

A Drainage Strategy Plan is included as **Appendix 1** including an approximate drainage infrastructure layout and calculations.

The location and sizing of the proposed drainage infrastructure is indicative based on the concept development layout and may be adjusted during detailed design. The proposed development layout allows for minimal verge areas and so the majority of the drainage infrastructure is shown under pavement areas. Where possible the underground leach tanks have been positioned away from tanker movements.

Service Station Site – The Service Station site will form its own drainage catchment as indicated in **Appendix 1**. All runoff from within the service station site generated from the 1%AEP will be contained onsite.
Fuel zones within the service station site will require treatment by a SPEL treatment tank or similar prior to discharge into the soakage system. The location of the SPEL unit will be confirmed during detailed design.

CONCLUSION

Based on the information available to us and the strategies set out above, we consider the site capable of meeting the City of Rockingham requirements for onsite drainage disposal.

If you have any queries regarding the above, please contact the undersigned on 9315 9955.

Yours faithfully

JAMIE KING
PROJECT ENGINEER

Appendix 1 – Drainage Strategy Plan

LEGEND

- 4.50 — PROPOSED DESIGN LEVELS
- CATCHMENT BOUNDARY
- PROPOSED DRAINAGE PIPE (Ø 225)
- PROPOSED DRAINAGE SOAKWELLS (Ø 1.8m x 1.8m DEEP)
- PROPOSED DRAINAGE STORAGE CELLS (TUNNELWELL OR SIMILAR)
- PROPOSED KERBING
- PROPOSED LINEMARKING
- EXISTING KERBING
- EXISTING BUILDING

NOTES

1. STORM VOLUME TO BE STORED AND INFILTRATED THROUGH SOAKWELLS AND UNDERGROUND STORAGE CELLS AS SHOWN.
2. PERMEABILITY RATE ESTIMATED AT 6m/DAY BASED ON SANDY SOIL.
3. ESTIMATED GROUNDWATER LEVEL RL 1.6m.

DRAINAGE CRITERIA

CATCHMENT 1

LOT AREA = 1,600 m²

COEFFICIENT OF RUNOFF = 0.9

DESIGN CRITERIA = 1% AEP STORM EVENT

DRAINAGE SYSTEM PROVIDED = 7 x Ø1.8m x 1.8m (D) SOAKWELLS + 12m x 1.8m (W) TUNNELWELL LEACH TANKS (OR SIMILAR)

CATCHMENT 2

LOT AREA = 2,600 m²

COEFFICIENT OF RUNOFF = 0.9

DESIGN CRITERIA = 1% AEP STORM EVENT

DRAINAGE SYSTEM PROVIDED = 6 x Ø1.8m x 1.8m (D) SOAKWELLS + 42m x 1.8m (W) TUNNELWELL LEACH TANKS (OR SIMILAR)

CATCHMENT 3

LOT AREA = 7,474 m²

COEFFICIENT OF RUNOFF = 0.9

DESIGN CRITERIA = 1% AEP STORM EVENT

DRAINAGE SYSTEM PROVIDED = 9 x Ø1.8m x 1.8m (D) SOAKWELLS + 78m x 1.8m (W) TUNNELWELL LEACH TANKS (OR SIMILAR)

CATCHMENT 4

LOT AREA = 650 m²

COEFFICIENT OF RUNOFF = 0.9

DESIGN CRITERIA = 1% AEP STORM EVENT

DRAINAGE SYSTEM PROVIDED = 3 x Ø1.8m x 1.8m (D) SOAKWELLS + 7m x 1.8m (W) TUNNELWELL LEACH TANKS (OR SIMILAR)

PROJECT:

ROCKINGHAM CENTRAL
ROCKINGHAM

No	DATE	REVISION	BY
A	20-7-2018	ISSUED FOR APPROVAL	DLC

Porter Consulting Engineers

Level 2 Kishorn Court
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Mt Pleasant 6153 WA

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TUONO Pty Ltd ACN 070 091 148 as trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 636 396 385

CLIENT:

ARISE DEVELOPMENTS

DRAWING:

DRAINAGE STRATEGY PLAN

STATUS: **FOR APPROVAL**

SCALE	1:300
DATE	JUL 2018
DESIGN	DLC
DRAWN	DLC
CHECK	
APP'D	
DRAWING No.	18-7-85/400
REV No.	A
ORIGINAL DRAWING SIZE	A1
FILE NAME	S:\ACTIVE PROJECTS\18-07-085\ACAD\18785-400.dwg

WASTE MANAGEMENT PLAN

Commercial Development
Rockingham Central

Council Avenue (cnr Read Street), Rockingham

July 2018

Prepared by Dallywater Consulting
For Arise Rockingham Pty Ltd

DALLYWATER CONSULTING

REPORT COMMISSIONED BY:

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Version 2: 18 July 2018

TABLE OF CONTENTS

1 EXECUTIVE SUMMARY

Arise Rockingham Pty Ltd is applying to the City of Rockingham (the "City") to develop a property on the corner of Council Avenue and Read Street in Rockingham (Central). The development is proposed to consist of 4 showrooms, a gymnasium, convenience fuel shop and cafe.

As part of the Development Approval process, the developer is required to submit a Waste Management Plan (WMP) for the development to the City. Arise Rockingham Pty Ltd employed the services of Dallywater Consulting to investigate the City's requirements in this regards and to develop this WMP.

These numbers of receptacles and the storage areas required for them would impinge significantly on available floor space within the development and raise many issues in regards to their management within the site (e.g. handling, bin stores size, collection points etc).

Various options needed to be considered to reduce the number of bins required to be stored on and serviced from the site and those selected were larger bins and increased servicing.

Proposed Arrangements

The following initiatives will be implemented for the waste and recycling servicing at the proposed development. The design of the development supports the initiatives. The initiatives will obviously be dependent on the collection options available at the time of the building being occupied and may be varied to suit the final generation rates.

Convenience Fuel Store:

Use of 660 litre receptacles for waste and recycling;

- Daily collections of the waste material; and
- Four collections per week of the recycling material; or

Use of 1100 litre bins for waste and recycling;

- Five collections per week of the waste material; and
- Three collections per week of the recycling material.

These initiatives will result in the following requirements for receptacles;

- 660s: 1 waste bin collected daily and 1 recycling bin collected 4 times per week
- 1100s: 1 waste bin collected 5 times per week and 1 recycling bin collected 3 times per week.

Showrooms, Cafe and Gymnasium:

Use of 1100 litre bins for waste and recycling;

- Daily collections of the waste material; and
- Daily collections of the recycling material.

These initiatives will result in the following requirements for receptacles;

- 3 waste bins collected daily and 1 recycling bin collected daily.

Review

All of the above-mentioned waste servicing arrangements will be reviewed as a matter of course on an ongoing basis to ensure that the most efficient arrangements to manage the waste and recycling material generated by all aspects of the facility are in place and are maintained.

DEFINITIONS

240: A 240 litre waste or recycling receptacle.

360: A 360 litre waste or recycling receptacle.

660: A 660 litre waste or recycling receptacle.

1100: An 1100 litre waste or recycling receptacle.

Building Management: For the purposes of this document, the selected legal entity charged with managing the soft services of the built structure (i.e. waste management, cleaning, landscaping, security and other similar human-sourced services) on behalf of the owners and tenants of the commercial spaces.

Recycling: Any material accepted by the local government's recycling collection contract.

Waste: Any recyclable and non-recyclable discarded solid, semi-solid, liquid or contained gaseous materials not accepted by the local government's recycling collection contract.

Waste Minimisation: A process to minimise the amount of waste requiring disposal via hierarchical activities such as behaviour and product modification, waste avoidance, reduction, reuse and recycling.

Total Waste Stream: The combined waste, recyclables and compostables.

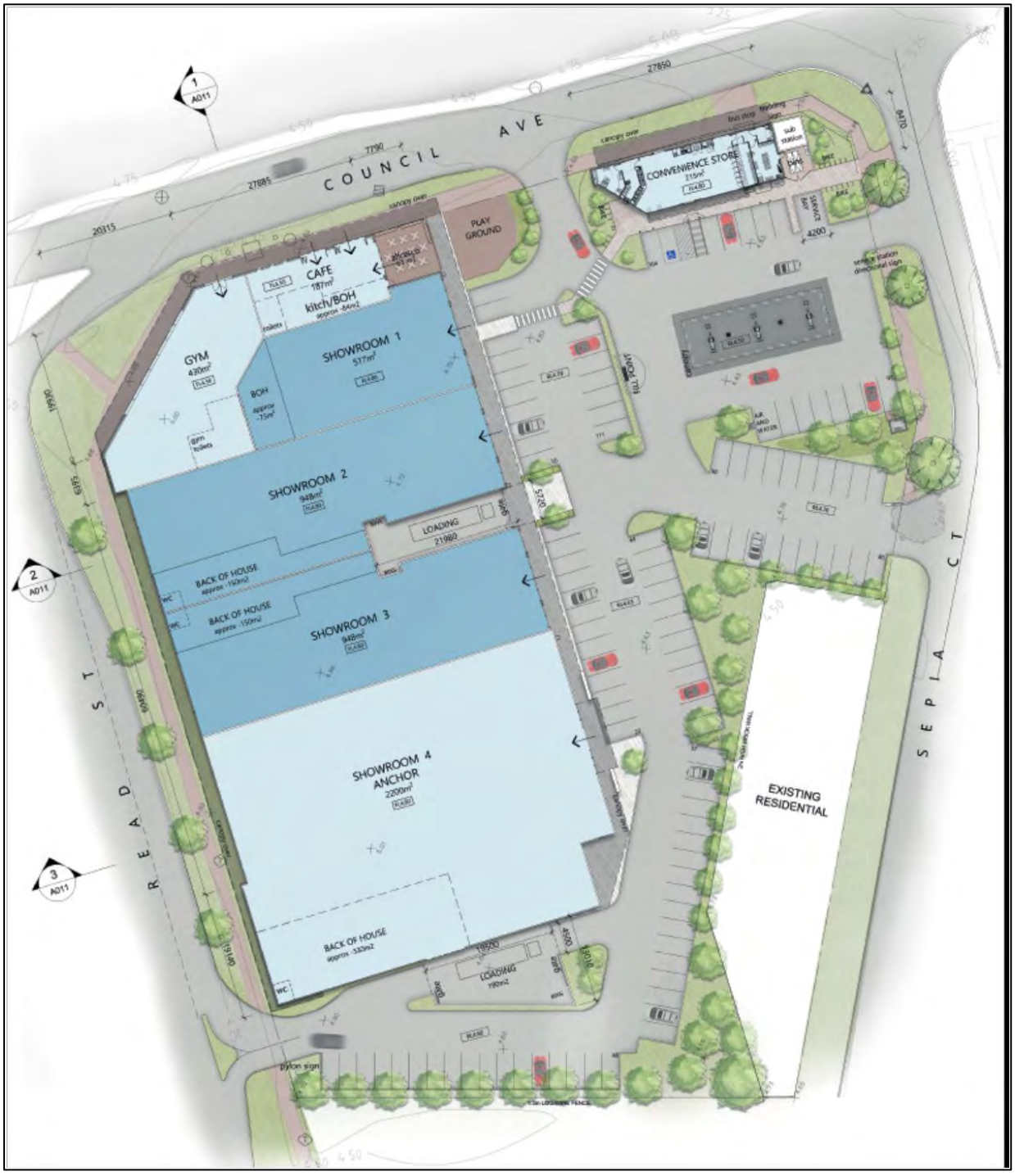
2 INTRODUCTION

2.1 The Development

Arise Rockingham Pty Ltd is applying to the City of Rockingham (the "City") to develop a property on the corner of Council Avenue and Read Street in Rockingham (Central). The development is proposed to consist of 4 showrooms, a gymnasium, convenience fuel store and cafe.

As part of the Development Approval process, the developer is required to submit a Waste Management Plan (WMP) for the development to the City. Arise Rockingham Pty Ltd employed the services of Dallywater Consulting to investigate the City's requirements in this regards and to develop this WMP.

Figure 1: Location Plan



The following table details the numbers (and types) of commercial tenancies proposed for the development.

Table 1: Number and Type of Tenancies

USE TYPE	Number	m2
Showroom 1	1	592
Showroom 2	1	1098
Showroom 3	1	1098
Showroom 4	1	2530
Gymnasium	1	430
Convenience Fuel Store	1	215
Cafe	1	304
Total Commercial Spaces	**7**	**6267**

2.2 Onsite Waste Management

The following provisions have been made for waste and recycling on the site:

- **Showroom Tenancies**
  - The tenants will take their waste and recycling material to the Loading Dock located at the rear of the units and dispose of those materials into bins located in that space.
- **Gymnasium and Cafe Tenancies**
  Subject to negotiations with the City, the Gymnasium and Cafe tenants will either;
  - take their waste and recycling material to the Loading Dock located at the rear of the showroom units and dispose of those materials into the bins located in that space; or
  - place their waste and recycling material into waste and recycling bins located within their premises and present those bins to the carpark kerb on collection days.
- **Convenience Fuel Store Tenancy**
  - take their waste and recycling material to the Bin Store area located at the rear of the building and dispose of those materials into the bins located in that space.
- **All Tenancies**
  - Each commercial tenant will be responsible for their own daily in-house storage of waste and recyclable material. At the end of each day (or more frequently as required), staff from the commercial tenancies will transport their waste and recycling material to the respective Bin Stores.
  - Any putrescible waste from the Cafe or Convenience Fuel Store is to be placed in sealed plastic bags before being placed in the waste bins.
- **Hardwaste/Bulky Items**
  - Commercial tenants will be required to organise their own immediate disposal of large or bulky items not suitable for disposal to the bins.
- **Waste Collection**
  - The City has indicated that the proponent (and subsequent tenants or building owners) are able to use privately contracted collection companies to service this development.
  - Private contractors are able to collect waste and recycling on a daily basis if required.

3 LOCAL GOVERNMENT WASTE MANAGEMENT REQUIREMENTS

3.1 Waste Management Guidelines

The following provisions have been sourced from the City's Coordinator Waste Collection Services. The City has indicated that the use of the City of Melbourne's guideline document entitled *"Waste Generation Rates"* 2015 as the basis for calculating the waste generation from the various uses in this development is acceptable.

3.2 Waste Generation

The Coordinator confirmed that the City's requirements for the provision of waste storage for this type of development are as follows:

- 240 litre to 1100 litre receptacles can be used;
- If increased collection frequencies are required, these would usually be conducted by commercial contractor under private arrangement; and
- Waste and recycling receptacles are to be provided in sufficient numbers to cater for the waste generation requirements detailed in the following table.

3.2.1 Commercial Uses

Per the City of Melbourne's guidelines, the waste generation rates for the commercial office component of the development are calculated as follows:

Table 2: Waste Generation Rats for Various Uses

Type of premises	Waste Generation	Recycling Generation
Convenience fuel store	300 litres per 100 square metres of floor area per day	150 litres per 100 square metres of floor area per day
Cafe	300 litres per 100 square metres of floor area per day	200 litres per 100 square metres of floor area per day
Gymnasium	10 litres per 100 square metres of floor area per day	10 litres per 100 square metres of floor area per day
Showroom	40 litres per 100 square metres of floor area per day	10 litres per 100 square metres of floor area per day

Note: The cafe, gymnasium and convenience fuel store waste generation has been calculated at 7 days while the showrooms are likely to be used for only 6 days per week. However, the calculations included here-under show that increasing the generation rate to seven days for the showrooms does not impact on the required bin numbers at the adopted collection frequencies.

3.3 Bin Stores

- Bin stores should be provided adequate to house all bins with sufficient area to manoeuvre the bins and with equal access to waste and recycling bins.
- Bin stores are to be provided with a permanent water supply and drainage facility for washdown.

3.4 Bin Presentation

- Unless otherwise negotiated with the City (for street presentation of bins), all bins are to be emptied from within the bin stores or within the carpark area.
- Where bins are presented to the kerb (i.e. on the street or in the carpark), bins will be returned to the stores immediately they have been emptied.

3.5 Waste Capacity

Based on the above requirements, the weekly storage capacity required by the City for waste and recycling from the proposed development is detailed in the following tables.

It is noted that the Convenience Fuel Store has its own bin store area and as such, its calculations are shown separately.

Table 3: Estimated Weekly Volumes - Commercial Building 1 (Convenience Fuel Store)

Commercial Units	Floor Area	Material Generation Rate (m3/100m2/day)		Weekly Volume (m3)	
Use	**m2**	**Waste**	**Recycling**	**Waste**	**Recycling**
Convenience Fuel Store	215	0.30	0.15	**4.52**	**2.26**

Table 4: Estimated Weekly Volumes - Commercial Building 2 (Mixed Uses)

Commercial Units	Floor Area	Material Generation Rate (m3/100m2/day)		Weekly Volume (m3)	
Use	**m2**	**Waste**	**Recycling**	**Waste**	**Recycling**
Showroom 1	592	0.04	0.01	**1.42**	**0.36**
Showroom 2	1098	0.04	0.01	**2.64**	**0.66**
Showroom 3	1098	0.04	0.01	**2.64**	**0.66**
Showroom 4	2530	0.04	0.01	**6.07**	**1.52**
Gymnasium	430	0.01	0.01	**0.30**	**0.30**
Cafe	304	0.30	0.20	**6.38**	**4.26**
Total Generation Area	**6267**	**Total Commercial Volume**		**19.45**	**7.75**

3.6 Number of Bins

Based on the above volumes, the number of 240, 360, 660 or 1100 litre receptacles required to cater for the weekly waste and recycling volumes for this development are detailed in the following tables.

Table 5: Required Number of Bins (Convenience Fuel Store)

Convenience Fuel Store								
Bin Size (litres)	**240**		**360**		**660**		**1100**	
Material	**w**	**r**	**w**	**r**	**w**	**r**	**w**	**r**
Material Volume (m3)	**4.52**	**2.26**	**4.52**	**2.26**	**4.52**	**2.26**	**4.52**	**2.26**
Number of Bins per Week (rounded up)	19	10	13	7	7	4	5	3

Table 6: Required Number of Bins (Showrooms, Gymnasium, Cafe)

Showrooms, Gymnasium, Cafe								
Bin Size (litres)	**240**		**360**		**660**		**1100**	
Material	**w**	**r**	**w**	**r**	**w**	**r**	**w**	**r**
Material Volume (m3)	**19.45**	**7.75**	**19.45**	**7.75**	**19.45**	**7.75**	**19.45**	**7.75**
Number of Bins per Week (rounded up)	82	33	55	22	30	12	18	8

3.7 Summary

Based on the above and with weekly waste and recycling collections, the number of bins required for the development would be;

- For the Convenience Fuel Store;
  - 19 waste and 10 recycling 240 litre receptacles;
  - 13 waste and 7 recycling 360 litre receptacles;
  - 7 waste and 4 recycling 660 litre receptacles;
  - 5 waste and 3 recycling 1100 litre receptacles;
- For the Showrooms, Cafe and Gymnasium;
  - 82 waste and 33 recycling 240 litre receptacles;
  - 55 waste and 22 recycling 360 litre receptacles;
  - 30 waste and 12 recycling 660 litre receptacles;
  - 18 waste and 8 recycling 1100 litre receptacles;

These numbers of receptacles and the storage areas required for them would impinge significantly on available floor space within the development and raise many issues in regards to their management within the site (e.g. handling, bin stores size, collection points etc).

Various options need to be considered to reduce the number of bins required to be stored on and serviced from the site.

4 REDUCING CAPACITY

It can be seen from the preceding tables that alternatives are required to reduce the number of waste and recycling receptacles required for the development. The initiatives selected are:

- Use of larger capacity bins; and
- Increased servicing (collections).

4.1 Larger Bins

The use of larger bins will result in less floor space being required in the bin stores.

660 and 1100 litre bins can be serviced from the site and sufficient access has been provided for a front (or rear) load collection vehicle to access the Loading Bay area to service the showrooms, cafe and gymnasium bins. A larger vehicle may also be able to directly access the Convenience Fuel Store bin area but the smaller 660 litre bins may be more practical and provide some flexibility for the collection vehicle if the forecourt is busy. The 660 bins are mobile enough to be much more easily moved to the carpark area for emptying by a smaller collection vehicle with less interference to carpark traffic.

4.2 Servicing Rates

A collection arrangement with a private collection contractor can provide significant benefit through flexible collection arrangements. That is, a private contractor could potentially service the buildings' waste and recycling material on a daily basis if required.

Therefore, the proponent will contract a private collector for both the waste and recycling material from the development. Increased collection frequencies can therefore be considered and the effect of this practice would see a significant reduction in bin numbers.

While both of the above-mentioned initiatives on their own will reduce the capacity and therefore the number of bins required, combining the net effect of both initiatives will realise significant reductions.

4.2.1 Commercial

The following table shows the number of the variously sized bins against increased collection frequencies. As discussed previously, the final bin numbers will depend on the collection service and bin size adopted.

Table 7: Number of Bins (Convenience Fuel Store) - Larger Bins & Increased Servicing

Convenience Fuel Store								
Bin Size (litres)	**240s**		**360s**		**660s**		**1100s**	
Collection Frequency	**w**	**r**	**w**	**r**	**w**	**r**	**w**	**r**
1 per week	18.81	9.41	12.54	6.27	6.84	3.42	4.10	2.05
2 x per week	9.41	4.70	6.27	3.14	3.42	1.71	2.05	1.03
3 x per week	6.27	3.14	4.18	2.09	2.28	1.14	1.37	0.68
4 x per week	4.70	2.35	3.14	1.57	1.71	0.86	1.03	0.51
5 x per week	3.76	1.88	2.51	1.25	1.37	0.68	0.82	0.41
6 x per week	3.14	1.57	2.09	1.05	1.14	0.57	0.68	0.34
7 x per week	2.69	1.34	1.79	0.90	0.98	0.49	0.59	0.29

Table 8: Number of Bins (Showrooms, Cafe a& Gymnasium) - Larger Bins & Increased Servicing

Showrooms, Cafe and Gymnasium								
Bin Size (litres)	**240s**		**360s**		**660s**		**1100s**	
Collection Frequency	**w**	**r**	**w**	**r**	**w**	**r**	**w**	**r**
1 per week	81.03	32.28	54.02	21.52	29.47	11.74	17.68	7.04
2 x per week	40.52	16.14	27.01	10.76	14.73	5.87	8.84	3.52
3 x per week	27.01	10.76	18.01	7.17	9.82	3.91	5.89	2.35
4 x per week	20.26	8.07	13.51	5.38	7.37	2.93	4.42	1.76
5 x per week	16.21	6.46	10.80	4.30	5.89	2.35	3.54	1.41
6 x per week	13.51	5.38	9.00	3.59	4.91	1.96	2.95	1.17
7 x per week	11.58	4.61	7.72	3.07	4.21	1.68	2.53	1.01

From the preceding tables, using 660 litre bins, the Convenience Fuel Store could manage its weekly waste stream with daily waste collections and four recycling collections per week. Alternatively, using 1100 litre bins, its weekly generation could be managed with five waste collections and three recycling collections per week.

Using 1100 litre bins, the material generated by the Showrooms, Cafe and Gymnasium could be managed in three waste bins and one recycling bin with daily collections.

4.3 Summation

It is proposed that the following initiatives will be implemented for the waste and recycling servicing at the proposed development. The initiatives will obviously be dependent on the collection options available at the time of the building being occupied and may be varied to suit the final generation rates.

Convenience Fuel Store:

Use of 660 litre receptacles for waste and recycling;

- Daily collections of the waste material; and
- Four collections per week of the recycling material; or

Use of 1100 litre bins for waste and recycling;

- Five collections per week of the waste material; and
- Three collections per week of the recycling material.

These initiatives will result in the following requirements for receptacles;

- 660s: 1 waste bin collected daily and 1 recycling bin collected 4 times per week
- 1100s: 1 waste bin collected 5 times per week and 1 recycling bin collected 3 times per week.

Showrooms, Cafe and Gymnasium:

Use of 1100 litre bins for waste and recycling;

- Daily collections of the waste material; and
- Daily collections of the recycling material.

These initiatives will result in the following requirements for receptacles;

- 3 waste bins collected daily and 1 recycling bin collected daily.

Review

All of the above-mentioned waste servicing arrangements will be reviewed as a matter of course on an ongoing basis to ensure that the most efficient arrangements to manage the waste and recycling material generated by all aspects of the facility are in place and are maintained.

5 BIN STORAGE AND MANAGEMENT

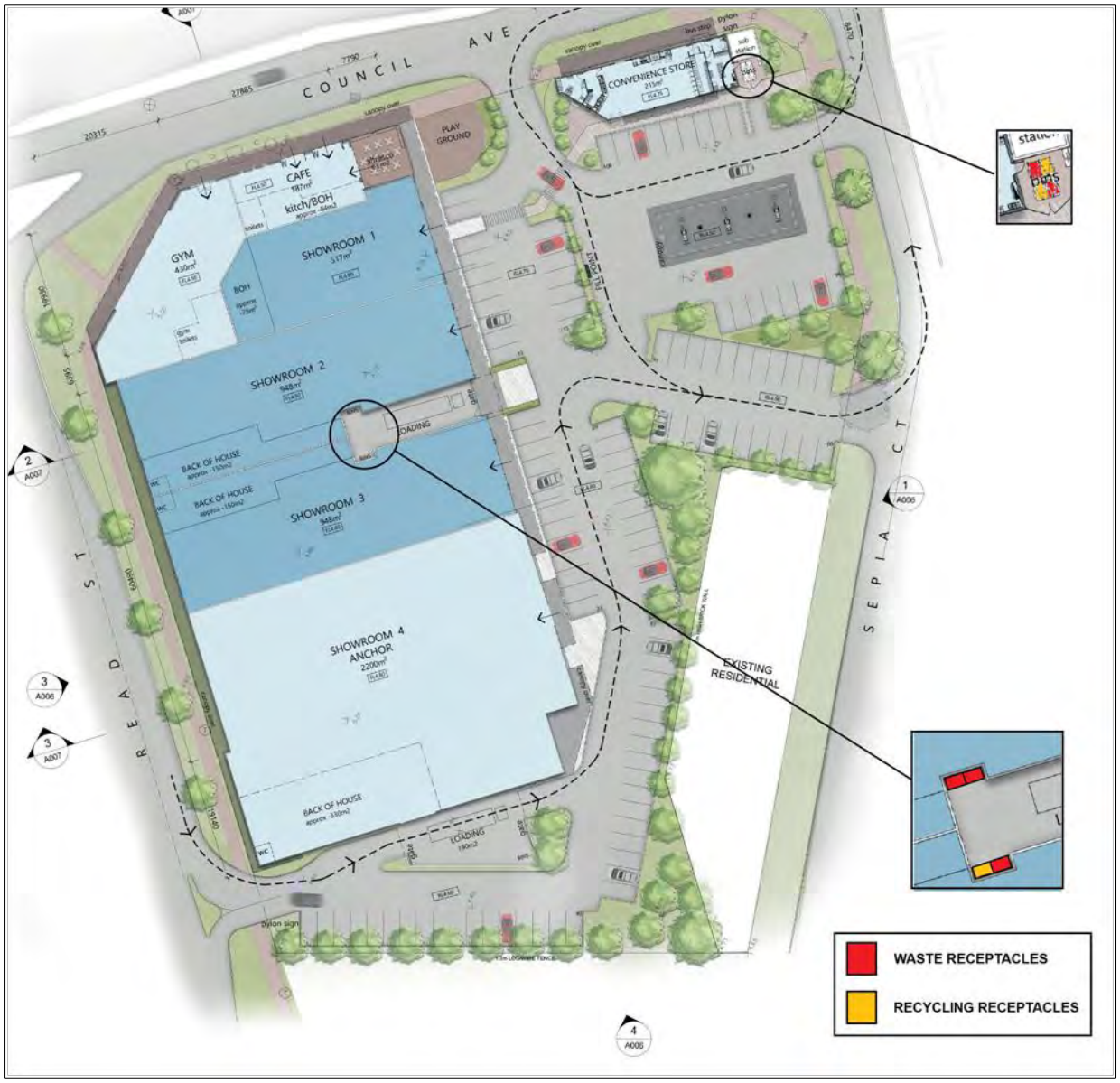
5.1 Bin Compounds/Stores

There are two bin stores within the development. They are the bin store area within the Loading Dock at the rear of the showroom building and the bin store located immediately at the rear of the Convenience Fuel Store. A plan showing the location of the stores is included below.

The access gates to both these areas will be key locked and only tenants will have access to the bins.

Both stores have sufficient space for the required number of bins.

Figure 2: Commercial Bin Stores



5.2 Bin Stores Specifications

The bin stores have been designed to meet or exceed the following specifications:

- Construction to be of brick, concrete, corrugated compressed fibre cement sheet or other suitable impervious material;
- Walls to be not less than 1.5 metres in height with an internal access way of not less than 1 metre in width;
- A tap connected to an adequate supply of water and a floor waste connected to the public sewer to be installed within each compound;
- The floors to be smooth and impervious and evenly graded to the floor waste; and
- There is to be easy access to allow for the removal of the receptacles.

5.3 Bin Stores Purpose

The purposes of the two stores are as follows.

- Storage of commercial waste and recycling;
- Storage of waste and recycling receptacles; and
- Some (minimal) potential storage of segregated recyclables (e.g. E-waste, printer cartridges, paper, fluorescent tubes etc).

5.4 Amenity

The store areas have been designed so that they;

- are well ventilated;
- can be kept thoroughly clean and disinfected;
- will prevent access to vermin and limit noise egress; and
- are consistent with the overall aesthetics of the development.

5.5 Bin Management

The management of the bins throughout the complex will be coordinated by the owners and/or Building Management and written into the strata management arrangements. Cleaners or similar personnel are likely to be either employed or contracted directly by the Building Management or owners to manage waste throughout the facility and as such, will be made aware of the expectations regarding use of the bins and stores.

Those personnel will be responsible for all bins in the bin stores and rotating full bins with empty ones as required. They will also be responsible for ensuring that the stores are accessible on collection days.

Unless other arrangements are made with the Building Management, it is anticipated that commercial tenants/occupants will bring their own waste and recycling material to the stores each day.

5.6 Bin Presentation and Collection

Collection of bins will be as per the following arrangement:

- The collection vehicle will access the bin stores and collection staff will retrieve the bins from the bin stores, empty them and return the bins back to the bin stores.
- The collection contractor will be required to operate in such a manner so as not to contravene the requirements of legislation such as the Environmental Protection (Noise) Regulations 1997, the Road Traffic Act 1974 and the Occupational Safety and Health Act 1984 and any relevant regulations.

5.7 Signage

Signage will be installed to the Store area advising of the correct usage and maintenance of the bins.

6 WASTE MANAGEMENT RESPONSIBILITIES

6.1 Building Owners/Strata Management

The owners, Building Management or strata body will have responsibility for ensuring that the commercial waste management activities are appropriately conducted and that tenants meet their waste management responsibilities. Each owner or the building management will allocate responsibility for all waste management activities to either a Building Caretaker or Cleaner (Waste Personnel). These positions will be responsible for the management of waste throughout the tenancy/and or complex and staff will be trained in all facets of the role.

6.2 Building Caretaker/Cleaner

At a minimum, the waste personnel will undertake the following bin servicing and waste management functions;

- Regular inspection and rotation of bins in the stores to ensure that a an empty or part empty bin is always available to users;
- Regular cleaning of bins and bin stores;
- Ensure access to stores for collectors on collection days;
- Ensure bins have been returned to the bin stores after collection; and
- Assistance with bin movement for operators (if required or negotiated).

In addition, the education of incoming owners and tenants will be a priority for these staff.

In the future, with the initial assistance of waste management experts, training of staff to implement Waste Minimisation Plans for the development may be explored. The plans could provide recommendations on, and include specific actions for;

- the segregation of specific recycling materials from the comingled stream; and
- implementation of waste reduction initiatives such as eWaste recycling.

6.3 Tenants

All tenants would be instructed via the owners or Building Management of the various waste requirements. This would include direction on the use of the bin facilities and expectations of the managing body with regards to any recycling or waste diversion.

In the absence of any other individual arrangement with the waste personnel, tenants (and their contractors) would be responsible for the immediate removal and disposal off-site of any waste unsuitable for placement in the bins. This would include large bulky waste and electronic items and waste from any building maintenance activities.

It is envisaged that the development of a Waste Minimisation Plan mentioned above would include the production of educational literature suitable for commercial tenants (including for inductions) and recommendations for signage relevant to the internal function of the various bin stores and waste management facilities.

7 REFERENCES

- City of Melbourne: *Waste Generation Rates (2015)*

Schedule of Submissions

Proposed Mixed-Use Development - Lot 301 (No.2-6) Council Avenue, Rockingham

PUBLIC SCHEDULE OF SUBMISSIONS		
Name	Address	Comment
1. Mrs Barbara Maslij	7/5 Sepia Court ROCKINGHAM WA 6168	I do not think we need a 24 hour Service Station or Gym. We have one on next corner (Charlgrove Ave). It already is a very busy intersection.
2. Ms Vedama Wright	5/5 Sepia Court ROCKINGHAM WA 6168	I welcome the development of the land to use it to its full potential. I make note that street lighting in that part of Council Avenue and Sepia Court may be inadequate at night.
3. Mr Raymond A Bartholmew	Unit 13/7 Sepia Court ROCKINGHAM WA 6168	I have a mobility and visit to do my shopping and most other place - on Tuesday I can't use the footpath because be bin day. Hope Sepia Court will not get congested sign at the top of Sepia Court and Cougar Avenue needs two (2) signs. 1. No right turn into centre and 2. sign to say No Entry into Council Avenue. People do it all the time.
4. Ms Decima Wilson	Unit 9, 7 Sepia Court ROCKINGHAM WA 6168	My first observation regarding this proposed development is the duplication of facilities. • Why does there need to be a petrol station in this location when there is one only a block away. • There are three gyms close-by that I know of- all within a 5-10 minute walk. • This area does not need more fast food restaurants - Siren Street houses a few as does Read Street (within a few minutes' drive. I am also concerned with the proximity of the development to the child care centre on the opposite side of Sepia Court. The smell of petrol fumes affects me when I have to refuel my car. I can only imagine how I would feel being constantly exposed to the smell all day, as would the children in the centre. In Sepia Court, there are five blocks of units totalling 99 residences. Added to that there is the traffic coming in and out of the child care centre. • Having the additional traffic (of 100+ car spaces) exiting the development will make it impossible to exit the street at certain times of the day such as 8.00- 9.30 in the morning and 3.30 - 5.30 in the afternoon. • It will also make crossing Council Avenue to get from the shopping centre to the bus stop more risky. The distance between Sepia Court and Read Street is quite short. It appears from the plan that the entrance from Council Avenue into the development is very close to the existing bus stop. There are sometimes two or three buses dropping off passengers. Therefore, it would make it difficult for the buses to pull up, AND would make it difficult for shoppers to get into the development. I (and many other Sepia Court residents) like to walk or 'gopher' to the shops. With an increase in traffic, comes an increase in risk getting to the shops safely. I bought this unit because it was a quiet location with close proximity to the shops. I believe that it would no longer be a quiet area if this development goes ahead. One of my big concerns is that this development could affect the resale value of my unit. With the addition of a fast food restaurant (and even a deli) there could be problems:-

Schedule of Submissions

Proposed Mixed-Use Development - Lot 301 (No.2-6) Council Avenue, Rockingham

PUBLIC SCHEDULE OF SUBMISSIONS		
Name	Address	Comment
No.4 - cont…		• Noise for adjoining residents late at night (when hotel patrons are looking for a snack after the Leisure Inn closes). • There could be an increase in crime with extra people wandering in the area at night, including increased graffiti. I also object to trees being removed (I presume for a driveway) when it doesn't appear to be necessary. I believe this development is ill-advised for all the reasons I have outlined above.
5. Mr Dennis & Mrs Loraine Benjamins	9 Balleroy Place PORT KENNEDY WA 6172	My concerns are: 1. Is it feasible: considering shops are closing in Rockingham City due to high rent? 2. Will attract more employment? More business? More customers? 3. Will it attract break-ins etc, in the early mornings? 4. Will it cause traffic congestion in Sepia Court for the Local traffic? 5. Will there be security?
6. Mr Bruce & Mrs Fe McRobbie	34 Lonsdale Crescent ROCKINGHAM WA 6168	We don't have any issues with the development.
7. Ms Stephanie Jackiewicz **Wanslea Ealy Learning and Development**	110 Scarborough Beach Road SCARBOROUGH WA 6019	Overall Wanslea is supportive of this development, there are just a couple of items for consideration. 1. The location of a 24 hour service station so close to a child care centre is unsupported. We are concerned about the additional pollution and traffic hazards children may be exposed to by having a service station located so close to the child care centre. The additional fumes alone are cause for concern for children's health and wellbeing. 2. What arrangements will be made to ensure continued safe and easy access to the child care centre for children and families both during construction and on completion of the development given that road accidents are the leading cause of death for children 1-14 in Australia. 3. We would appreciate being kept up to date on the progress of any development nearby to the child care centre.
8. Mr David Hudson	4/3 Sepia Court ROCKINGHAM WA 6168	I am not prepared to developing the site, but I am opposed to the addition of Sepia court. The nuisance noise of cars, air pressure hose, beeping trucks + motorbikes will surely degrade my peace at night and therefore standard of living. If this proposal goes ahead as presented, I for one will be voting against the current council and mayor.
9. Ms Charlottle Gough	6/6 Sepia Court ROCKINGHAM WA 6168	I am against the proposed mixed development at Lot 301, due to the impact Sepia Court Residents + safety of pedestrians, cyclists and children. Please see my full letter attached for further details, where I have raised all my concerns and questions including the viability of this type of business development here. I have been a resident of Sepia Court for 10 years, and worked in Rockingham for 7 years. My neighbours and I have a number of concerns about the proposed mixed-use development Lot 301- No.2-6 Council Avenue and the future impact on the residents of Sepia Court and surrounding area.

Schedule of Submissions

Proposed Mixed-Use Development - Lot 301 (No.2-6) Council Avenue, Rockingham

PUBLIC SCHEDULE OF SUBMISSIONS		
Name	Address	Comment
No.9 - cont…		Firstly, the increased traffic due to a Lot 301 slip lane will be banking up so far back that residents of Sepia Court can neither turn left nor right, as delays already occurs when a bus pulls in on that corner. Is Rockingham Council aware there are at least 100 apartments and units in Sepia Court? All of which contain a household car. This kind of congestion will turn our cul-de-sac into an undesirable area to live, reducing the value of our properties, as well as secondly, negatively impacting the safety of Sepia Court residents and parents and children using the childcare centre on the corner of Sepia Court and Council Avenue. Safety is a huge concern for the neighbours and residents, as Sepia Court is a major thoroughfare for the large number of elderly pedestrians, unit/apartment owners on foot, dog walkers, cyclists, pedestrian childcare children and pupils of the primary school, situated across on the opposite side of Read Street facing Council Avenue. All of whom walk through via the Sepia Reserve and Read Street access points around both sides of Lot 301. The traffic to and from the proposed 101 parking bays will increase risks of pedestrian accidents. Further, the Read Street & Council Avenue corner is already a dangerous corner for many accidents to date. Lot 301 with its excessive amount of 101 car-parking bays will beading to a chaotic, dangerous combination for all our pedestrians and cyclists. Especially when the Coles car-bays of Rockingham Shopping Centre opposite are never full and remain unused even at rush hour times, without a proper crossing, even today, people, children and teenagers continue to run across Council Avenue in a dangerous manner to the bus stop outside LOT 301, therefore, this Lot 301 development will again make the risks of pedestrian accidents even worse. Thirdly, 101 parking bays will be a prime target for our well-known homeless community already taking shelter during winter - up and down- Read Street over-night when buildings are vacant; these are vulnerable people, provided with extremely few options by the Rockingham Council. Not to mention, the drug dealers already dealing in the parking lots around Rockingham who now will have another car-park option for illegal behaviour. So too will the drunks, the Thursday late night shopping teenage couples and gangs that have loud, regularly violent, domestics or fights at the LOT 301 corner bus-stop and the Coles car-park directly opposite, as they are travelling on foot - to and from the bottle shop on the other side of the Coles end of Rockingham City Shopping Centre. Is Rockingham Council aware of this? How will business viability be successful - with these events continually occurring in front of the alfresco diners? Customers who would have been better located safely in Syren Street! Fourth, why is such a small space being developed so far from Syren Street? Particularly, when there are many empty, wasted land spaces and car parking spaces surrounding - and very apparent from Kmart to the Target end of Rockingham city Shopping Centre. To the current date, these large blocks are not fully utilised. Blank blocks of land, half empty shops and buildings are everywhere around Rockingham City Shopping Centre.

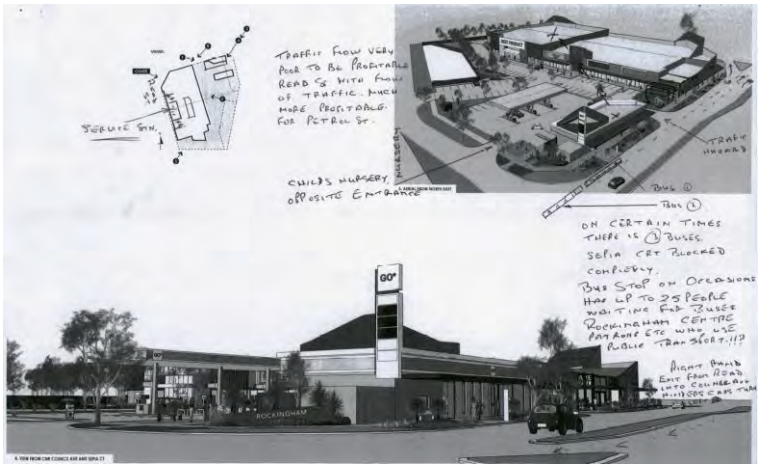
Schedule of Submissions

Proposed Mixed-Use Development - Lot 301 (No.2-6) Council Avenue, Rockingham

PUBLIC SCHEDULE OF SUBMISSIONS		
Name	Address	Comment
No.9 - cont…		Evidently, the future business viability of this Lot 301 proposal will go the same way if another gym and convenience store/service station are to be built. Why does Rockingham need another convenience/service station store and gym at Lot 301? They will struggle to compete with their BP business opposition 500 metres away - ridiculous! There are too many convenience/service station stores and gym owners already struggling with their competition in Rockingham! Businesses of this kind are not viable situated just here, future financial losses will repeat at Lot 301, especially with the external view for patrons & customers being of our extremely aesthetically, industrial-looking ugly, Rockingham Shopping Centre. We don't expect Garden City of Booragoon but even Kwinana Hub, Halls Head and Mandurah shopping centres now look better than the sad, ugly, industrial-looking aesthetics of Rockingham City Shopping Centre up to today. Yet, Rockingham Council wants to allow alfresco dining in front of the Coles Car-park and with that kind of a shopping centre view! This also includes a view across the busy Read Street/Council Avenue corner, famous for traffic accidents and the underground tunnel where so many assaults have occurred. I can only imagine the negative impact on future business viability there at Lot 301. Moreover, the council has never kept on top of the overflowing rubbish bin on the Lot 301 corner, health concerns about that bin, which contains easily observed rats and cockroaches in the evenings, can only impact on customers health and safety. And there are still no rubbish bins in the Coles car-park opposite nor anywhere else on Read Street up to Football Oval to date. It is hard to believe that this Lot 301 proposal would even be considered with the losses that the cafe-strip businesses at the Rockingham Foreshore [Weekend Courier, Friday August, 17] are currently enduring, due to the construction mess created. Why is Rockingham Council not protecting and supporting local business and landowners already established here? For the sake of Sepia Court residents, and the surrounding area of pedestrians, we suggest that the proposed playground of Lot 301 become part of a park, garden or reserve housing the native green grass trees and birdlife. And not just a small strip at our back fences! We need community & children-friendly facilities and small businesses. NOT the nightmare of 101 wasteful, concrete, parking bays, along the sides of unviable businesses with a short life span. These will bring nothing but more increased concrete, industrial-looking, empty, ugly, buildings and traffic congestion, as well as, an increased threat to public safety for Sepia Court residents/pedestrians and connecting Sepia Reserve/Read Street children, pedestrians and cyclists! Please rethink this proposal at Lot 301 before negative future impact occurs on us. We care about Rockingham, please show us that you - Rockingham Council do too, rushed bad-planning to make a quick profit will result in viability failure again. Thank you.

Schedule of Submissions

Proposed Mixed-Use Development - Lot 301 (No.2-6) Council Avenue, Rockingham

PUBLIC SCHEDULE OF SUBMISSIONS		
Name	Address	Comment
10. T S & R Calver	15/5 Sepia Court ROCKINGHAM WA 6168	Service Station (convenience store) would be more profitable and easier to enter if located in Read St. To put service station in residential street (stupid). Residents who walk to shopping centre, some are elderly (becomes mission impossible)? Sepia Court entrance to service station opposite childs nursery (dumb), would like to see how a central crossover in Council Ave would not be a traffic hazard during morning and evening rush hours. Even through the day and if service station has a cheap petrol day. How effective cross over would be (please explain). When there are 2 buses at bus stop how is Sepia Court blocked and on the occasions when 3 buses pull up this does happen? How much thought have any of these possibilities been given!!? Would have thought houses would be more profitable. 
11. Mr Derek Polinelli	1-4 Sepia Court ROCKINGHAM WA 6168	I Derek Polinelli owner and occupier of 1-4 Sepia Crt. for the past 24 years strongly object to a services station on Lot 301 (No.2-6) Council Ave. It is too close to my home and the day care centre. I am all for shops, restaurants, town houses. PS. I would like to be advised on further developments.
12. Mr Bernard Buckland	10/15 Barald Court ROCKINGHAM WA 6168	I have one main concern and that is the access of heavy vehicles to the site. Sepia Court is a narrow street with residences lining it. The noise and pollution of heavy vehicles going to and from the proposed development would be detrimental to the living of the inhabitants of these building. The pollution of the air would be a health concern and exhaust fumes would pollute and discolour at least the exteriors of the buildings. Add to this the constant vibrations would, over time, have a detrimental effect on the buildings. All this would make the area a less pleasant place to live. Also of concern is the passage of heavy vehicles in Sepia Court with the Council operated day care centre for infants on the corner of Sepia Court and Council Avenue. Add to this the issue of parking in Sepia Court. There is a strong possibility that the heavy vehicles, and customers to the business ion the new development parking in Sepia court and at least making access to the residences difficult. And then there is the strong chance of customers parking in the visitors bays within these premises. I would be glad to learn how these matters will be resolved.

Schedule of Submissions

Proposed Mixed-Use Development - Lot 301 (No.2-6) Council Avenue, Rockingham

PUBLIC SCHEDULE OF SUBMISSIONS		
Name	Address	Comment
13. A & L Shorter	1/296 Mill Point Road, SOUTH PERTH WA 6151	We agree with the proposed Mixed Development.
14. Ms Tina-Louise Toka	15-5b Sepia Court ROCKINGHAM WA 6168	The proposed development entry and exit points will have a major impact on traffic flow to Sepia Court. To date it is very difficult to turn right onto Council Avenue, the proposed entry and exits points are not sustainable in a residential street. To propose a commercial hub will pose major traffic congestion which will affect market values for anyone who owns a residents in sepia court.

City of Rockingham

Design Review Panel Meeting Notes

Notes of the Design Review Panel held on 14th August 2018

Panel Members:	Sam Klopper Emma Williamson Tom Griffiths
City Officers:	Bob Jeans - Director, Planning & Development Services Greg Delahunty - Senior Projects Officer David Banovic - Senior Planning Officer
Panel Co-Ordinator:	Sharon Peacock - Senior Planning Administration Officer
Proponent Deputation:	Peter Simpson - PTS Town Planning Derek Hays – Hames Sharley Robin Burnage – Tim Davies Landscaping Geoff Loxton – Project Manager
Declarations of Interest:	Nil
Agenda Item 5.1	
Dev/App No.	20.2018.201
Proposed Development	Proposed Health Studio, Restaurant, Showrooms and Convenience Store
Property Address	Lot 301 Read Street, Rockingham
Proposal	The proposal involves the development of buildings located on the corner of Read Street and Council Avenue comprising of four (4) showrooms, a gym (health studio), a restaurant as well as a convenience store (selling fuel) located near the corner of Council Avenue and Sepia Court. The proposed development also comprises of the following elements: • 111 car parking bays plus six (6) refuelling positions and service bays; • Vehicle access/egress from Read Street (via the existing slip lane), a central crossover on Council Avenue and two crossovers from Sepia Court; • 20 bicycle parking bays and end-of-trip (EOT) facilities; • A playground located near the restaurant alfresco area; • A landscaping theme from a palette of Australian bushland colours and textures; • Formalisation of Public Access Way (PAW) on Lot 2478 between Read Street and Sepia Court; and

	• Provision of signage including 1 pylon sign on Read Street as well as various wall panel signage, roof signage and directional signage. The proposed development also includes the following works within the road reserve: • Planting along Read Street and Council Avenue verges; • Removal of an existing tree along the frontage of Sepia Court to provide vehicle access to the site; • The existing bus stop along Council Avenue is to be incorporated as part of the overall development; and • A new footpath is to be constructed on Sepia Court and in the easement, adjacent to the site.
Background (as contained in the Agenda)	The subject site is vacant. Between 2005 and 2007, there have been proposed development applications associated with the site, however the site has remained vacant.
Assessment Summary (as contained in the Agenda)	Under Planning Policy 3.2.12 - Southern Gateway and Rockingham Station Sectors, the site is identified as a 'Gateway Location' and a 'Prominent Corner' site with a requirement for a minimum three (3) storey building height. Therefore the height, scale and density of development on this site is imperative to the realising the objectives of the applicable Policy. Although there are many aspects of the development that adhere to the planning framework, the issue of building height is considered to be a critical policy non-compliance.
Proponent deputation to the Panel	Peter Simpson, Derek Hays and Robin Burnage presented an overview of the site in terms of the history, context, development concept, design elements and landscaping.
Officer presentation to the Panel	David Banovic and Greg Delahunty provided a summary of the proposal against Policy requirements and described how the proposed development is substantially non-compliant with respect to addressing building height, activation and interaction in particular, the Read Street/Council Avenue frontages.
Key issues in relation to 'Design Quality Evaluation'	
Principle 1 **Context and Character**	• There is merit in the design and materials, however, there are fundamental Policy issues (not compliant) and a loss of opportunity to develop the site to its full potential • The proposal should set the tone for future surrounding development • The development does not respond to building height Policy requirements – essentially a single story building • Loss of opportunity by using advertising bill boards to achieve scale - vertical activation could be further resolved

	• Opportunity to further articulate and address scale to the Read Street corner elevation • Council Avenue access is a weakness and the built form needs to present as a continuous façade along Council Avenue. • Built form on Sepia Court needs to address the street corner • Concern over double crossovers to Sepia Court
Principle 2 Landscape Quality	• Landscaping is disjointed, presents as leftover spaces with no connection to built form - this compromises amenity. • Supports the use of native plants, however, reconsider design to reflect the civic nature of the location within the City Centre • Pedestrian connections within the carparking area are weak • Landscaping spaces are compromised by carparking areas – consider revising parking layout to provide for improved landscaping • Security concerns relating to the landscaping at the southern portion of the site – consider revising to provide for improved surveillance and connection • Include more mature trees and reduce the number of car bays to soften the hard stand parking areas • In addition to the café/playground, further expansion or activation should be considered to improve neighbourhood amenity
Principle 3 – Built Form and Scale	• Not a three storey activated façade which makes it difficult to reconcile against Policy requirements • Concerns over the use of a fake façade in lieu of built form and scale • An opportunity to create a better interface connection to engage with neighbourhood and street • Address the 'Prominent Corner' Read Street portion of blank wall to create visual interest to street frontage • Investigate design options to reduce appearance of being 'chopped off' on the Read Street frontage • The view at the back of the faux façade is poor • Interface with Read Street to be addressed • Remove the Council Avenue vehicle access point • Development site represents a large footprint - consider reducing the size and scale of development to provide better carparking and landscaping design options • Focus on Council Avenue building height and continuous frontage • Convenience store component presents like a different architectural language in relation to the showroom development

Principle 4 – Functionality and Build Quality	• Opportunity to improve carparking and pedestrian functionality • Reverse loading bay – conflicts with pedestrian movement • Landscaping pattern doesn't work particularly well • Vehicle circulation patterns could be better resolved over whole site • Concerns with Convenience Store signage – needs to be better controlled • The back of the building looks better than the front
Principle 5 – Sustainability	• Consideration should be given to retain the street tree on Sepia Court • Consider including more mature trees to reduce heat island effect • Consider design options to introduce natural light, skylights, reuse of storm water, PV/solar
Principle 6 - Amenity	• Activation of playground and landscape areas is good but may be better suited to a different location. Consider reconfiguration to better enhance/improve use of facilities • Consider the inclusion of seating closer to buildings • Consideration should be given to the residential interface with Sepia Court • Consider amenity provisions/relationships uses for local residents • Suggest using significant advanced trees
Principle 7 Legibility	• Attempt at legibility made through 3 storey screen, however, it should have built form behind it; needs to be a building • Address height/vertical height elements – where there is building height, there are no entrances which challenges legibility • No opportunities to access development via Read Street corner location • Legibility for Convenience Store access will be of concern if Council Avenue entrance is closed • Vehicle movement has priority over pedestrian movement • Transformer could be integrated within built form • Prominent corner used as promotional signage location which does not meet Policy requirements • Attention should be given to the pedestrian movement at the southern end of the site which dissolves at the corner of Sepia Court and Council Avenue
Principle 8 – Safety	• Concerns over the potential for social issues and lack of passive surveillance opportunities at the southern end of the site - needs to be addressed

Principle 9 - Community and	• Better integration/connection to residential development on Sepia Court is needed • Council Avenue activation, circulation and access points require resolution
Principle 10 – Aesthetics	• Development is aesthetically great but good opportunity to push further for more improved outcomes • Needs improvement to increase social activation • Showroom development appears 'flat' • Materials and colour palette are good, however, consider using a coastal palette to reflect the geographic location of Rockingham • Consider joining the two separate components of the site to achieve improved activation/integration • Mix of signage and design are good • Internal elevations are better than external elevations. Council Avenue elevation should be the strongest but is the weakest
Key matters to be addressed	The Panel considered the development to be well composed and aesthetically pleasing, however, it considered that there are two key concerns which centre on the missed opportunities for the site, these being the inclusion of the service station and the single storey built form. • Address the built form, activation and articulation to the Council Avenue frontage • Connect the two buildings on the site – Convenience Store building and Showroom component • Increase the visual connection and architectural design between buildings • Investigate opportunities to review the car park and pedestrian layout • Include more trees and combine the two separate landscape features or relocate closer to the buildings
Panel Recommendation	**That the design, as presented, cannot be supported.**
Meeting Close	1:30
Chair Signature	
Date	16th August 2018

D18/142641

GOVERNMENT OF WESTERN AUSTRALIA

Department of **Planning, Lands and Heritage**

Your ref: 20.2018.201.1
Our ref: DP/10/00551
Enquiries: Simon Luscombe (Ph: 6551 9307)

Planning Services
City of Rockingham
PO Box 2142
Rockingham DC WA 6967

27 July 2018

Attention: David Banovic

Dear David,

Re: Lot 301 (2-6) Council Avenue, Rockingham

I refer to your letter dated 23 July 2018 regarding the above application. In accordance with the Western Australian Planning Commission's (WAPC) Instrument of Delegation dated 30 May 2017, the following comments are provided. This proposal seeks approval for a mixed use development including a gymnasium, café, showrooms and a convenience store incorporating 6 fuel pumps on the vacant site.

Land Requirements

Lot 301 abuts Read Street which is reserved as an Other Regional Road (ORR) in the Metropolitan Region Scheme (MRS), also reserved as Category 1 per Plan Number SP 694/4 whereby access is strictly controlled. The subject land is not affected by the ORR reservation for Read Street, per the attached Western Australian Planning Commission (WAPC) Land Requirement Plan number 1.1102.

Access

The proposal seeks left in / left out access points to Council Avenue and Read Street. This is not in accordance with the Commission's Regional Roads (Vehicular Access) Policy D.C. 5.1, which seeks to minimise the number of new crossovers onto regional roads and rationalise existing access arrangements. The Policy states: 'Where alternative access is or could be made available from side streets, no access shall be permitted to the regional road' (refer to s 3.3.2).

Traffic and Parking Assessment

The above report, prepared by Riley Consulting dated July 2018 states that the development will generate up to 2,139 vehicle trips per day (1,661 additional trips when pass-by trade component is applied). Read Street accommodates 25,825 vehicles per day and Council Avenue accommodates 15,148 vehicles per day in the subject location. SIDRA intersection analysis shows generally satisfactory performance for the proposed crossovers (LOS A) with minimal delays. A number of right turning movements provided show moderate delays e.g. Sepia Court southern approach (LOS D) and Council Avenue eastern approach (LOS D).

Signage

The Department has no objection to the proposed signage on condition that the advertisements do not interfere with sight lines, distract drivers, or have the potential to become confused with traffic signals or road signs. This position reflects the Commission's advertising on Reserved Land Policy D.C 5.4, paragraph 5.3.1. As such the Department raises no objections on regional transport grounds to the proposed advertising signage and advises only that the type of sign, size, content and location must comply with all relevant by-laws and planning schemes made by Council.

Recommendation

The Department of Planning, Lands and Heritage has no objection to the proposal on regional transport grounds subject to the following recommendations:

- Read Street is classified as a Category 1 control of access road per Plan Number SP 694/4. As such, no access is supported from the site to Read Street;
- WAPC *Transport Impact Assessment Guidelines* states that assessment years should be undertaken 10 years after full opening of the development (not the year of full opening or *post development* as shown).

Yours sincerely

Simon Luscombe
Principal Planning Officer
Strategy and Engagement

Land Requirement Plan No. 1.1102

Mon 10/09/2018 9:56 AM

Luscombe, Simon <simon.luscombe@dplh.wa.gov.au>

Lot 301 (2-6) Council Avenue, Rockingham

To David Banovic

Hi David,

Further to the above development, we have reviewed Cardno's Review of Responsible Authority Response letter dated 31 August 2018 and provide the following comments:

In its letter dated 27 July 2018, The Department advised no objection to the proposal on regional transport grounds subject to the following recommendations:

- Read Street is classified as a Category 1 control of access road per Plan Number SP 694/4. As such, no access is supported from the site to Read Street;
- WAPC *Transport Impact Assessment Guidelines* states that assessment years should be undertaken 10 years after full opening of the development (not the year of full opening or *post development* as shown).

A recent discussion has revealed that the City seeks greater intensification of the site given its strategic importance within the Rockingham centre.

As Cardno has referenced, s 3.3.4 of Development Control Policy 5.1 WAPC Vehicular Access states that 'the types of development that would be allowed access to a regional road include large traffic generators such as major shopping, recreation or community centres. These would justify either a local distributor or access road, leading from a junction with the regional road to car parks servicing the centre.'

The proposed development includes a gymnasium, café, showrooms and a convenience store incorporating 6 fuel pumps on the vacant site. Riley Consulting's Traffic and Parking Assessment dated July 2018 states that the development will generate up to 2,139 vehicle trips per day (1,661 additional trips when pass-by trade component is applied). It is considered that this does not at present, constitute a large traffic generating development.

The Department of Planning, Lands and Heritage acknowledges Cardno's response which outlines the merits and benefit of a left in / left out access point to Read Street, including its location away from the Council Avenue / Read Street signalised intersection.

If a future development could demonstrate sufficient intensification as outlined within the City's Rockingham Strategic Metropolitan Centre Plan (Sector 10 Southern Gateway - medium and high density residential and mixed commercial and community uses), the Department would reconsider its position regarding access from the site to Read Street.

Regards

Simon Luscombe | Principal Planning Officer | Strategy and Engagement
140 William Street, Perth WA 6000
6551 9307 |
www.dplh.wa.gov.au

The department is responsible for planning and managing land and heritage for all Western Australians – **now and into the future**

The department acknowledges the Aboriginal peoples of Western Australia as the traditional custodians of this land and we pay our respects to their Elders, past and present.

This email and any attachments to it are also subject to copyright and any unauthorised reproduction, adaptation or transmission is prohibited.

Fri 3/08/2018 1:33 PM

Robinson, Richard <Richard.Robinson@pta.wa.gov.au>

FW: DAP development application - City of Rockingham

To David Banovic

Cc Cox, Simon; Holden, Brad

You replied to this message on 3/08/2018 1:42 PM.

Hi David

I have been asked to respond on behalf of the Public Transport Authority (PTA) in regard to the impact on bus stop infrastructure located on Council Avenue.

I can confirm that the affected bus stop (21234 Council Av before Sepia Ct) experiences approximately 190 passenger boardings and 40 alightings on an average weekday. Demand reflects the location of Rockingham City Shopping Centre and its pedestrian exit/egress points onto Council Avenue. It could be expected that demand would increase with the adjacent development resulting in increased patronage at this location.

The PTA would not support the proposed relocation of bus stop 21234. There are 6 Transperth bus routes that are assigned to this bus stop and given that services are designed to connect with trains at Rockingham Station this can result in multiple services arriving at bus stop 21234 simultaneously. The proposed bus stop position does not accommodate this and would result in bus services causing conflict and blocking the Council Avenue - Sepia Court intersection.

It should also be noted that although the majority of services that are assigned to bus stop 21234 turn left from Council Avenue into Read Street, Route 553 bus services travel straight ahead to Cygnus Street. The bus stop cannot therefore be relocated any further east towards Read Street as this will generate operational issues for Route 553 services that would need to safely manoeuvre from what would appear to be a dedicated left turn only lane to re-join the straight ahead traffic lane.

Taking the above into account the PTA would advocate retaining the bus stop as close to the proposed Council Avenue vehicular entry/egress as permitted under the Road Traffic Code 2000. This would maximise the ability to safely accommodate multiple services with minimal conflict. It is noted that this could have some impact on vehicles exiting left from the proposed Council Avenue entry/egress. This should be assessed in terms of driver visibility beyond multiple stationary buses. It may be necessary to restrict the left turn out.

It should also be noted that the impact on the bus stop boarding area would require it to be upgraded as part of the project scope so that it meets the requirements of the Disability Standards for Accessible Public Transport 2002. Any development of the site would require a bus stop boarding area layout being submitted to the PTA for approval. The boarding area would then also need to be constructed at the developers cost in accordance with the approved design.

Whilst it would be the City of Rockingham's responsibility to comment on the provision of discretionary infrastructure such as shelter, bins or bench seats, the PTA notes the high level of patronage at this location and suggests that any infrastructure provided should be commensurate with that use.

Any future liaison regarding the bus stop placement or bus stop boarding area design should be directed to the PTA for comment and/or approval.

Best regards

Richard Robinson
Project Officer | Transperth, Regional & School Bus Services
Public Transport Authority of Western Australia
Public Transport Centre, West Parade, Perth, 6000
PO Box 8125, Perth Business Centre, WA, 6849
Tel: (08) 9326 2922 Fax: (08) 9326 0000
Email: richard.robinson@pta.wa.gov.au | Web: www.pta.wa.gov.au

Wed 5/09/2018 4:38 PM

Robinson, Richard <Richard.Robinson@pta.wa.gov.au>

RE: DAP development application - City of Rockingham

To David Banovic

You replied to this message on 6/09/2018 7:51 AM.

Hi David

The PTA has been contacted by Cardno who provided the Traffic Peer Review and had made comments regarding engaging further with the PTA.

An alternative location has been discussed directly with Cardno on behalf of their client and the PTA agreed to assess this. A location east of Sepia Court was proposed as a suitable location.

The PTA has reviewed this proposal and deemed that it is not acceptable. This is based on the frequency of services that would stop at this location and the impact on traffic emerging from Sepia Court. This is likely to generate sight distance restrictions for drivers turning right from Sepia Court into Council Avenue, with this issue being exacerbated further by increased levels traffic utilising Sepia Court as a result of the development.

Due to safety concerns relating to the proposed alternative, the PTA supports retaining the bus stop at its current location.

Best regards
Richard

From: David Banovic [mailto:David.Banovic@rockingham.wa.gov.au]
Sent: Monday, September 03, 2018 4:02 PM
To: Robinson, Richard
Subject: RE: DAP development application - City of Rockingham

Hi Richard,

The applicant has provided additional supporting information in relation to the relocation of the bus stop.

Refer to attached letter and link to Traffic Peer Review.

I understanding that the applicant will be in contact with PTA to personally discuss their proposal. Notwithstanding this, can you please ensure I get a response from PTA by no later than Wed, 12/09.

Any questions please let me know.

Kind regards,

City of Rockingham
where the coast comes to life

David Banovic - Senior Planning Officer

PO Box 2142 Rockingham DC WA 6967
Civic Boulevard Rockingham Western Australia
telephone **+61 8 9528 0374** facsimile **+61 8 9592 1705**
email **david.banovic@rockingham.wa.gov.au**

Government of Western Australia
Department of Water and Environmental Regulation

Your ref: 20.2018.201.1
Our ref: PA22057 RF1746-03
Enquiries: Nicolene Gault, Ph (08) 9550 4237

City of Rockingham
PO BOX 2142
Rockingham WA 6168

Attention: David Banovic

Dear David,

RE: Proposed Mixed-Use Development – Lot 301 (No.2-6) Council Avenue, Rockingham

Thank you for referring the above development application received by the Department of Water and Environmental Regulation (DWER) in correspondence dated 26th July 2018. The DWER has reviewed the application and provides the following advice.

Stormwater Management
The drainage system is to be designed, constructed and managed as per *Stormwater Management Manual for Western Australia* (DWER, 2004) and best practice management provided within *Water Quality Protection Note 49 – Service Stations* (DWER, 2013). The applicant has included a Drainage Management Plan within the Development Application Report.

The department acknowledges that the planning application indicates the intent for the installation of a SPEL Puraceptor system as part of the management of stormwater and mitigation of the risk of hydrocarbons entering the stormwater system, and that the specific location won't be confirmed until the detailed design stage.

It is difficult to determine if the proposed drainage pipes indicated on the drainage strategy plan is runoff from ground level surfaces or from roofs and other infrastructure. The drainage plans for the entire development area should demonstrate how and where the small, minor and major rainfall events will be managed and consider the following:

- The fuel dispenser area and forecourt should be covered, paved and graded to contain polluted runoff. This runoff should drain via collection sumps and then to an appropriate contaminated stormwater treatment system.

Kwinana Peel Region
107 Breakwater Parade Mandurah Ocean Marina Mandurah Western Australia 6210
PO Box 332 Mandurah Western Australia 6210
Telephone: 08 9550 4222 Facsimile: 08 9581 4560
www.dwer.wa.gov.au

- Measures should be taken to prevent uncontaminated roof runoff and external surface water from entering the forecourt. These include:
  - kerbing or grade changes for paved areas
  - installing and maintaining stormwater collection systems, such as bio-retention gardens and soak wells to intercept clean roof and general runoff that would otherwise enter the forecourt.

- Runoff that may be contaminated should pass through a well-maintained litter and sediment trap, then an appropriately designed and regularly maintained fuel and oil trap. The SPEL Puraceptor system that is planned to be installed should be appropriately located to ensure the capture and effective treatment of potentially contaminated runoff.

- Only clean wastewater, that has been effectively treated should be discharged to:
  - on-site soak wells
  - on-site leach drains
  - on-site bio-retention gardens
  - a reticulated sewer where accepted by a service provider.

Hazardous Materials
The site layout plans provided have not included the location of the underground fuel storage and any associated pipelines and venting. *Water Quality Protection Note 62 – Tanks for underground chemical storage* (DWER, 2013) and *Water Quality Protection Note 65 – Toxic and Hazardous Substances* (DWER, 2006) provide best practice advice for the management and storage of hazardous materials for this development.

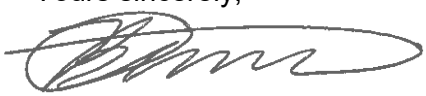
Furthermore, a contingency plan for spills and emergencies has not been described within the proposal to the DWER. The *Water Quality Protection Note 10 – Contaminant spills emergency response* (DWER, 2006) provides guidance into developing and implementing an effective emergency response plan.

Best Practice Management
The following Water Quality Protection Notes (WQPN's) have been referenced in the advice above to provide best practice management guidelines relevant to this development proposal with the intent to protect the state's water resources. These can be found on the department's website under publications search.

WQPN 10 – Contaminant Spills- emergency response
WQPN 49 – Service Stations
WQPN 62 – Tanks for underground chemical storage
WQPN 65 – Toxic and hazardous substances

If you have any queries relating to the above matter, please contact Nicolene Gault at DWER's Mandurah office on 9550 4237.

Yours sincerely,



Brett Dunn
Program Manager – Land Use Planning
Kwinana Peel Region
14 / 08 / 2018

Our Ref: J000126
Your Ref: DD020.2018.00000201.001-D18/147558
DAP Ref: DAP/18/01463

31 August 2018

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Mr David Banovic
Senior Planning Officer
City of Rockingham
PO Box 2142
ROCKINGHAM DC WA 6967

Dear David

2 (LOT 301) SEPIA COURT, ROCKINGHAM - DEVELOPMENT ASSESSMENT PANEL APPLICATION

We refer to the Design Advisory Committee (**DAC**) Meeting Notes, your letter dated 23 August 2018 and the Schedule of Submissions received on 27 August 2018. We provide the following response to the matters raised.

Design Advisory Committee

We note the Meeting Notes of the DAC and want to make the following general observations:

- We understand that the purpose of the DAC is to consider the design merits of the development, not whether the development complies with planning requirements.
- The DAC considers the development to be well composed and aesthetically pleasing.
- The DAC refers to a service station, however, a service station is not proposed by this application. The application is for a number of uses including a convenience store. A service station has a different use and outcome. The consideration of the land use is a planning consideration, which is outside the scope of the DAC, as per Planning Procedure 1.22;
- We are concerned that the DAC considered alternative development options and planning compliance, rather than considering the application before them.

We provide the following response to DAC Key Matters identified:

- The panel considered the development to be a 'missed opportunity'. This demonstrates that the DAC did not consider the design of the proposed development, but alternative development options and planning compliance;
- The application does not include a service station. The Convenience Store is a preferred use under the Council Avenue Sub Precinct by virtue of the Retail preferred land use and the definition of retail in TPS2.
- The panel considered the single storey built form to be a 'missed opportunity'. A three story development is not economically feasible at this time, whereas the proposed development is a viable development outcome for the site. In any event, the policy requires a building with 'three storey height' not a 'three storey building', which the proposed development achieves. The proposed development also clearly achieves the policy intent of establishing prominence on the corner.
- Council Avenue is activated with a convenience store, playground, café and gym, which in the context of the rest of the precinct, is diverse and extensive. The articulation is appropriate with glazing,

canopies, doors, vertical elements, and a range of materials – all of which would normally be considered as a desirable collection of elements.

- A visual connection between the two buildings has been achieved. The applicant maintains its position that the access from Council Avenue, as part of the site access strategy, is required and therefore any physical connection would impact sightlines for traffic movements and on sightlines to the showrooms signage as an integral requirement for retail exposure.
- The design provides a visual connection through the architectural expression, materials and finishes as well as building scale to ensure that the buildings are clearly identified as being of the one development. Signage and landscaping will also strengthen these visual connections between the showrooms and convenience store.
- A review of the car park and pedestrian layout has been undertaken with adjustments to the pedestrian connection between the convenience store and the showrooms to provide a more direct connection and simplification around the entry from Council Avenue.
- Additional trees have been shown on the revised plans within the car park. The proposed playground has been enlarged by the removal of 2 car bays and now includes some public bench seating along the northern boundary adjacent Council Avenue to improve the overall public/customer amenity, this approach has the essentially co-located the two features with minimal impact to parking numbers.

Noise

We have enclosed a full acoustic report which includes the noise modelling report and an evaluation of the noise from the health studio.

Waste

We have enclosed the amended Waste Management Plan. Please note that the waste consultant attempted to contact the Council's environmental officers to seek clarification of the comment raised in your letter, however, have not received a return phone call or email to clarify concerns. The waste consultant has therefore assumed the basis for the comment and addressed it in the amended WMP.

Development Engineering

We have enclosed the Geotechnical Report and the amended Drainage Management Strategy.

The amended Drainage Management Strategy cover letter addresses the comments in your letter of 23 August 2018.

Landscape

The landscape plan has been amended and is enclosed. We provide the following comments:

- The amended landscape plan has removed the original proposed landscaping to the Council Avenue and Read Street verges as per the City's advice and has simplified the landscape palette with native ground cover, grass and street trees. This includes removal of the boulders and loose gravel outside the lot boundaries.
- The application proposed the upgrade of the easement to the south of the site. It is acknowledged that the easement is owned by the City and following the commentary at the DAC meeting, the application no longer includes this as part of the application. The applicant is willing to discuss the development of this area with the City.

- The street trees along Council Avenue have been removed from the plan. The landscape plan shows one feature street tree to Read Street.
- The landscape plan has been amended to provide one (1) shade tree for every 4-6 car parking bays on-site.
- It should be noted that the boundary fence is a 2 metre high brick wall, so the residential area is already appropriately screened from the proposed development. Notwithstanding, the landscaping to the 1.3 metre wide paved pathway has been amended to include native hedge planting and trees to visually screen the development from the residential properties. In order to achieve this the trees have been included in triangular planting nibs. The preferred species (Melaleuca leucadendra and Eucalyptus sideroxylon, subject to availability) grow to 11 metres high and 5-6 metres wide, which is sufficient to screen the residential area.
- The position of the above ground 'Petrol Station Oil/Water Separation Shed' has been amended and it will now be located below ground.
- While we acknowledge the merits of the shared use footpath as part of the wider community link, there is an existing footpath along Read Street. Consequently, there needs to be a nexus between the works and the development and given that there is an existing footpath along Read Street and the shared path is part of the wider network, the nexus is not evident.

Traffic / Department of Planning / Public Transport Authority

We have enclosed an independent peer review of the traffic comments by Cardno.

Department of Water and Environmental Regulation

The amended Drainage Management Strategy cover letter addresses the comments from the Department of Water and Environmental Regulation in your letter of 23 August 2018.

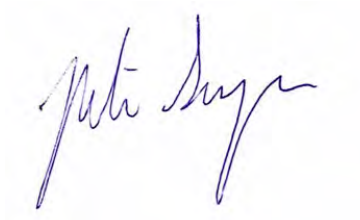
The operator of the Convenience Store (Fuel) will have an emergency response plan to deal with any spills or emergencies. We note that DWER did not request a copy of the contingency plan and, in any event, it would not be appropriate to provide one at DA stage.

Public Submissions

Please find attached the table with our response to the public submissions.

Should you have any questions or require any additional information, please do not hesitate to contact the undersigned on 0411 445 031 or peter@ptsplanning.com.au.

Yours sincerely
PTS Town Planning Pty Ltd



Peter Simpson
Director

Schedule of Submissions

Proposed Mixed-Use Development - Lot 301 (No.2-6) Council Avenue, Rockingham

PUBLIC SCHEDULE OF SUBMISSIONS		
#		Applicant Response
1	I do not think we need a 24 hour Service Station or Gym. We have one on next corner (Charlgrove Ave). It already is a very busy intersection.	The number (demand/supply) of convenience stores and health studios in the locality is not a relevant planning consideration. The uses are discretionary under TPS2 and Preferred uses (retail, commercial, leisure) under the Council Avenue Sub-Precinct.
2	I welcome the development of the land to use it to its full potential. I make note that street lighting in that part of Council Avenue and Sepia Court may be inadequate at night.	Noted. Street lighting is a City of Rockingham responsibility.
3	I have a mobility and visit to do my shopping and most other place - on Tuesday I can't use the footpath because be bin day. Hope Sepia Court will not get congested sign at the top of Sepia Court and Cougar Avenue needs two (2) signs. 1. No right turn into centre and 2. sign to say No Entry into Council Avenue. People do it all the time.	Noted. The development will use a private waste contractor who will collect bins internal to the site at the bin store locations and therefore the development will not impact the footpath on Sepia Court. Footpaths and traffic signs are a City of Rockingham responsibility.
4	My first observation regarding this proposed development is the duplication of facilities. • Why does there need to be a petrol station in this location when there is one only a block away. • There are three gyms close-by that I know of- all within a 5-10 minute walk. • This area does not need more fast food restaurants - Siren Street houses a few as does Read Street (within a few minutes' drive. I am also concerned with the proximity of the development to the child care centre on the opposite side of Sepia Court. The smell of petrol fumes affects me when I have to refuel my car. I can only imagine how I would feel being constantly exposed to the smell all day, as would the children in the centre. In Sepia Court, there are five blocks of units totalling 99 residences. Added to that there is the traffic coming in and out of the child care centre. • Having the additional traffic (of 100+ car spaces) exiting the development will make it impossible to exit the street at certain times of the day such as 8.00-9.30 in the morning and 3.30 - 5.30 in the afternoon. • It will also make crossing Council Avenue to get from the shopping centre to the bus stop more risky. The distance between Sepia Court and Read Street is quite short. It appears from the plan that the entrance from Council Avenue into the development is very close to the existing bus stop. There are sometimes two or three buses dropping off passengers. Therefore, it would make it difficult for the buses to pull up, AND would make it difficult for shoppers to get into the development. Many other Sepia Court residents like to walk or 'gopher' to the shops. With an increase in traffic, comes an increase in risk getting to the shops safely. I bought this unit because it was a quiet location with close proximity to the shops. I believe that it would no longer be a quiet area if this development goes ahead. One of my big concerns is that this development could affect the resale value of my unit. With the addition of a fast food restaurant (and even a deli) there could be problems:-	The number (demand/supply) of convenience stores and health studios in the locality is not a relevant planning consideration. The application does not propose a fast food restaurant. The convenience store and fuel forecourt will meet all of the relevant health standards. The access strategy has been designed to provide access to Sepia Court, Council Avenue and Read Street to distribute the traffic from the proposed site. The City's advice is that we should remove the access from Council Avenue and Read Street, which would require all vehicles to use Sepia Court. Based on the proposed access strategy the traffic consultant has assessed that the intersections will maintain good levels of service. We have not, however, assessed the Sepia Court intersection if Sepia Court is the only access. We note the comments regarding the location of the bus stop and the applicant will be consulting with the PTA as to the appropriate location of the bus stop on Council Avenue, which will be done outside of the development application process. We do not agree that the increase in traffic results is an unacceptable increase in risk from Sepia Court to the shopping centre. The location is within the Activity Centre and therefore the expectation of the level of amenity needs to reflect the activity centre development. The impact on property values cannot be substantiated and is therefore not a valid planning consideration. The application does not propose a fast food restaurant.
No.4 - cont	• Noise for adjoining residents late at night (when hotel patrons are looking for a snack after the Leisure Inn closes).	The proposed development cannot control the patrons of the hotel. Additionally, the site is located within an activity centre.

…	• There could be an increase in crime with extra people wandering in the area at night, including increased graffiti. I also object to trees being removed (I presume for a driveway) when it doesn't appear to be necessary. I believe this development is ill-advised for all the reasons I have outlined above.	In addition to the security that will be provided to the site, more development and a 24hr convenience store will increase the potential for passive surveillance and, hence, inhibit anti-social activity. While a tree is required to be removed for a vehicle access, there will be a significant net gain in the number of trees in the verge areas and on the site.
5.	My concerns are: 1. Is it feasible: considering shops are closing in Rockingham City due to high rent? 2. Will attract more employment? More business? More customers? 3. Will it attract break-ins etc, in the early mornings? 4. Will it cause traffic congestion in Sepia Court for the Local traffic? 5. Will there be security?	The feasibility of the proposed development is not a relevant planning consideration. The development will include additional employment opportunities from direct employment on the site and also indirect employment and economic benefit through the incidental works such as maintenance, landscape maintenance, cleaning, deliveries etc. In addition to the security that will be provided to the site, more development and a 24hr convenience store will increase the potential for passive surveillance and, hence, inhibit anti-social activity. The access strategy has been designed to provide access to Sepia Court, Council Avenue and Read Street to distribute the traffic from the proposed site. The City's advice is that we should remove the access from Council Avenue and Read Street, which would require all vehicles to use Sepia Court. Based on the proposed access strategy the traffic consultant has assessed that the intersections will maintain good levels of service. We have not, however, assessed the Sepia Court intersection if Sepia Court is the only access.
6.	We don't have any issues with the development.	Noted
7.	Overall we are supportive of this development, there are just a couple of items for consideration. 1. The location of a 24 hour service station so close to a child care centre is unsupported. We are concerned about the additional pollution and traffic hazards children may be exposed to by having a service station located so close to the child care centre. The additional fumes alone are cause for concern for children's health and wellbeing. 2. What arrangements will be made to ensure continued safe and easy access to the child care centre for children and families both during construction and on completion of the development given that road accidents are the leading cause of death for children 1-14 in Australia. 3. We would appreciate being kept up to date on the progress of any development nearby to the child care centre.	The convenience store and fuel forecourt will meet all of the relevant health standards. The traffic assessment does not raise any issues regarding safety. Sepia Court will remain open to provide access and management of construction and deliveries will be undertaken as part of a construction management plan and delivery management plan. This is the responsibility of the City of Rockingham.
8.	I am not prepared to developing the site, but I am opposed to the addition of Sepia court. The nuisance noise of cars, air pressure hose, beeping trucks + motorbikes will surely degrade my peace at night and therefore standard of living. If this proposal goes ahead as presented, I for one will be voting against the current council and mayor.	The access strategy has been designed to provide access to Sepia Court, Council Avenue and Read Street to distribute the traffic from the proposed site. There is no reason for traffic to go any further down Sepia Court than the development given that it is a dead end. However, it is the City's preference for all traffic to access the development via Sepia Court, which is not the applicant's preferred approach.
9.	I am against the proposed mixed development at Lot 301, due to the impact Sepia Court Residents + safety of pedestrians, cyclists and children. Please see my full letter attached for further details, where I have raised all my concerns and questions including the viability of this type of business development here. I have been a resident of Sepia Court for 10 years, and	The feasibility of the proposed development is not a relevant planning consideration. The access strategy has been designed to provide access to Sepia Court, Council Avenue and Read Street to distribute the traffic from the proposed site. The City's advice is that we should remove the access from Council

	worked in Rockingham for 7 years. My neighbours and I have a number of concerns about the proposed mixed-use development Lot 301- No.2-6 Council Avenue and the future impact on the residents of Sepia Court and surrounding area.	Avenue and Read Street, which would require all vehicles to use Sepia Court. Based on the proposed access strategy the traffic consultant has assessed that the intersections will maintain good levels of service. We do not agree that the increase in traffic results is an unacceptable increase in risk from Sepia Court to the shopping centre.
No.9 - cont …	Firstly, the increased traffic due to a Lot 301 slip lane will be banking up so far back that residents of Sepia Court can neither turn left nor right, as delays already occurs when a bus pulls in on that corner. Is Rockingham Council aware there are at least 100 apartments and units in Sepia Court? All of which contain a household car. This kind of congestion will turn our cul-de-sac into an undesirable area to live, reducing the value of our properties, as well as secondly, negatively impacting the safety of Sepia Court residents and parents and children using the childcare centre on the corner of Sepia Court and Council Avenue. Safety is a huge concern for the neighbours and residents, as Sepia Court is a major thoroughfare for the large number of elderly pedestrians, unit/apartment owners on foot, dog walkers, cyclists, pedestrian childcare children and pupils of the primary school, situated across on the opposite side of Read Street facing Council Avenue. All of whom walk through via the Sepia Reserve and Read Street access points around both sides of Lot 301. The traffic to and from the proposed 101 parking bays will increase risks of pedestrian accidents. Further, the Read Street & Council Avenue corner is already a dangerous corner for many accidents to date. Lot 301 with its excessive amount of 101 car-parking bays will beading to a chaotic, dangerous combination for all our pedestrians and cyclists. Especially when the Coles car-bays of Rockingham Shopping Centre opposite are never full and remain unused even at rush hour times, without a proper crossing, even today, people, children and teenagers continue to run across Council Avenue in a dangerous manner to the bus stop outside LOT 301, therefore, this Lot 301 development will again make the risks of pedestrian accidents even worse. Thirdly, 101 parking bays will be a prime target for our well-known homeless community already taking shelter during winter - up and down- Read Street over-night when buildings are vacant; these are vulnerable people, provided with extremely few options by the Rockingham Council. Not to mention, the drug dealers already dealing in the parking lots around Rockingham who now will have another car-park option for illegal behaviour. So too will the drunks, the Thursday late night shopping teenage couples and gangs that have loud, regularly violent, domestics or fights at the LOT 301 corner bus-stop and the Coles car-park directly opposite, as they are travelling on foot - to and from the bottle shop on the other side of the Coles end of Rockingham City Shopping Centre. Is Rockingham Council aware of this? How will business viability be successful - with these events continually occurring in front of the alfresco diners? Customers who would have been better located safely in Syren Street! Fourth, why is such a small space being developed so	The access strategy has been designed to provide access to Sepia Court, Council Avenue and Read Street to distribute the traffic from the proposed site. Based on the proposed access strategy the traffic consultant has assessed that the intersections will maintain good levels of service. We note the comments regarding the location of the bus stop and the applicant will be consulting with the PTA as to the appropriate location of the bus stop on Council Avenue, which will be done outside of the development application process. We do not agree that the increase in traffic results is an unacceptable increase in risk from Sepia Court to the shopping centre. In addition to the security that will be provided to the site, more development and a 24hr convenience store will increase the potential for passive surveillance and, hence, inhibit anti-social activity.

	far from Syren Street? Particularly, when there are many empty, wasted land spaces and car parking spaces surrounding - and very apparent from Kmart to the Target end of Rockingham city Shopping Centre. To the current date, these large blocks are not fully utilised. Blank blocks of land, half empty shops and buildings are everywhere around Rockingham City Shopping Centre.	Alternative locations for the proposed development are not a relevant planning considerations. The applicant, however, agrees that it would be beneficial for the economic development of the Rockingham City Centre if the Council supported development on vacant sites.
No.9 - cont …	Evidently, the future business viability of this Lot 301 proposal will go the same way if another gym and convenience store/service station are to be built. Why does Rockingham need another convenience/service station store and gym at Lot 301? They will struggle to compete with their BP business opposition 500 metres away - ridiculous! There are too many convenience/service station stores and gym owners already struggling with their competition in Rockingham! Businesses of this kind are not viable situated just here, future financial losses will repeat at Lot 301, especially with the external view for patrons & customers being of our extremely aesthetically, industrial-looking ugly, Rockingham Shopping Centre.	The number (demand/supply) of convenience stores and health studios in the locality is not a relevant planning consideration. The uses are discretionary under TPS2 and Preferred uses (retail, commercial, leisure) under the Council Avenue Sub-Precinct.
	We don't expect Garden City of Booragoon but even Kwinana Hub, Halls Head and Mandurah shopping centres now look better than the sad, ugly, industrial-looking aesthetics of Rockingham City Shopping Centre up to today. Yet, Rockingham Council wants to allow alfresco dining in front of the Coles Car-park and with that kind of a shopping centre view! This also includes a view across the busy Read Street/Council Avenue corner, famous for traffic accidents and the underground tunnel where so many assaults have occurred. I can only imagine the negative impact on future business viability there at Lot 301.	The applicant agrees with this submission and the proposed development seeks to significantly improve the building form outcome and aesthetics of the area. We agree that the site will not look at the best view of the at grade car park, however, over time development should be provided in this area to reflect the main street intent of the City of Rockingham.
	Moreover, the council has never kept on top of the overflowing rubbish bin on the Lot 301 corner, health concerns about that bin, which contains easily observed rats and cockroaches in the evenings, can only impact on customers health and safety. And there are still no rubbish bins in the Coles car-park opposite nor anywhere else on Read Street up to Football Oval to date.	Noted and the proposed development will seeks to address this on the subject site, however, the applicant cannot control what occurs on others sites.
	It is hard to believe that this Lot 301 proposal would even be considered with the losses that the cafe-strip businesses at the Rockingham Foreshore [Weekend Courier, Friday August, 17] are currently enduring, due to the construction mess created. Why is Rockingham Council not protecting and supporting local business and landowners already established here?	The number (demand/supply) of cafes in the locality is not a relevant planning consideration. The City requires development to achieve a main street outcome to Council Avenue.
	For the sake of Sepia Court residents, and the surrounding area of pedestrians, we suggest that the proposed playground of Lot 301 become part of a park, garden or reserve housing the native green grass trees and birdlife. And not just a small strip at our back fences! We need community & children-friendly facilities and small businesses. NOT the nightmare of 101 wasteful, concrete, parking bays, along the sides of unviable businesses with a short life span. These will bring nothing but more increased concrete, industrial-looking, empty, ugly, buildings and traffic congestion, as well as, an increased threat to public safety for Sepia Court residents/pedestrians and connecting Sepia Reserve/Read Street children, pedestrians and cyclists! Please rethink this proposal at Lot 301 before negative future impact occurs on us. We care about Rockingham, please show us that you - Rockingham Council do too,	The playground is provided as an amenity to the users of the subject site and the public. The provision of a park is outside the scope of the consideration of the application. The existing grass trees on site are proposed to be used in the new landscaping. The proposed car parking is a requirement for the development of the site. The car parking area has been extensively landscaped which includes the inclusion of trees adjacent to the residential fences to provide an improved amenity.

	rushed bad-planning to make a quick profit will result in viability failure again. Thank you.	
10	Service Station (convenience store) would be more profitable and easier to enter if located in Read St. To put service station in residential street (stupid). Residents who walk to shopping centre, some are elderly (becomes mission impossible)? Sepia Court entrance to service station opposite childs nursery (dumb), would like to see how a central crossover in Council Ave would not be a traffic hazard during morning and evening rush hours. Even through the day and if service station has a cheap petrol day. How effective cross over would be (please explain). When there are 2 buses at bus stop how is Sepia Crt blocked and on the occasions when 3 buses pull up this does happen? How much thought have any of these possibilities been given!!? Would have thought houses would be more profitable.	The convenience uses is discretionary under TPS2 and a preferred use (retail) under the Council Avenue Sub-Precinct. The applicant is unable to locate the convenience store on Read Street as vehicle access to a convenience store would not be supported. The access strategy has been designed to provide access to Sepia Court, Council Avenue and Read Street to distribute the traffic from the proposed site. Based on the proposed access strategy the traffic consultant has assessed that the intersections will maintain good levels of service. We note the comments regarding the location of the bus stop and the applicant will be consulting with the PTA as to the appropriate location of the bus stop on Council Avenue, which will be done outside of the development application process.
11	I strongly object to a services station on Lot 301 (No.2-6) Council Ave. It is too close to my home and the day care centre. I am all for shops, restaurants, town houses. PS. I would like to be advised on further developments.	The proposed use is a convenience store. The convenience uses is discretionary under TPS2 and a preferred use (retail) under the Council Avenue Sub-Precinct. The convenience store provides local retail services that are largely absent in the area south of Council Avenue. Whilst the development does not include townhouses, it does include a café/restaurant. This is the responsibility of the City of Rockingham.

2 Sepia Court, Rockingham

Environmental Noise Assessment

P180602RP1 Revision 1

Tuesday, 28 August 18

Resonate

Document Information

Project	2 Sepia Court, Rockingham	
Client	Arise Developments	
Report title	Environmental Noise Assessment	
Project Number	P180602	
Author	Martti Warpenius Director p+61 8 9468 7888 m+61 414 394 220 martti.warpenius@resonate-consultants.com	
Reviewed by	James Leader	

Revision Table

Report revision	Date	Comments
0	28 August, 2018	Draft issued for Comment

Glossary

A-weighting	A spectrum adaption that is applied to measured noise levels to represent human hearing. A-weighted levels are used as human hearing does not respond equally at all frequencies.
dB	Decibel—a unit of measurement used to express sound level. It is based on a logarithmic scale which means a sound that is 3 dB higher has twice as much energy. We typically perceive a 10 dB increase in sound as a doubling of the loudness of that sound.
Frequency (Hz)	The number of times a vibrating object oscillates (moves back and forth) in one second. Fast movements produce high frequency sound (high pitch/tone), but slow movements mean the frequency (pitch/tone) is low. 1 Hz is equal to 1 cycle per second.
L_{10}	Noise level exceeded for 10 % of the measurement time. The L_{10} level represents the typical upper noise level and is often used to represent traffic or industrial noise emission.
L_{A10}	A-weighted L_{10}
$L_{A10,adj}$	Adjusted L_{A10}. Adjustment based on obvious tonality, impulsive or Modulation characteristics in the audible noise at a receiver point. Based on the adjustment methodology in Environmental Protection (Noise) Regulations 1997 Regulation 9
$L_{A1,adj}$	Adjusted, A-weighted noise level exceeded for 1 % of the measurement time. The $L_{A1, adj}$ level represents mostly short duration, high level sound events.
$L_{Amax,adj}$	Adjusted, A-weighted maximum instantaneous noise level.

Table of Contents

1 Executive Summary

Resonate Acoustics has been engaged by Arise Developments to conduct an assessment of the environmental noise impact of a proposed new Retail development at 2 Sepia Court, Rockingham

This assessment, by its nature is preliminary. It nevertheless considers all the dominant noise sources on site. It was concluded that the forecast noise emissions from the site can be controlled to meet the Environmental Protection Act 1986 and subsidiary legislation such as the Environmental Protection (Noise) Regulations 1997, and to provide an acceptable degree of amenity.

This conclusion is based on the implementation of the preliminary Noise Management Plan. The main onsite physical elements required for the site to meet the acoustic requirements are:

- Installation of noise barriers 2.1m high on the boundary to the adjoining neighbours
- Installation of a noise barrier 1.8m high on the Southern side of the convenience store carpark
- Limiting the operation times of equipment and activities
- Implementation of other various controls as outlined in the Noise Management Plan.

Based on the analysis provided in this report, the noise emissions from the site are classified as acceptable and that no significant change to amenity is caused by the development.

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2 Project Description

There is a proposal to construct a retail development at 2 Sepia Court, Rockingham. This development consists of

- A convenience store with 24-hour operation
- Gymnasium with 24-hour operation
- Café operating 7am to 5.30 pm, 7 days per week
- 4 showrooms 7am to 5.30 pm, 7 days per week with late night trading on Thursday night

The development site is currently vacant. It is surrounded by several residences, specifically two-storey dwellings at 4 Sepia Court and single storey residences at 6 - 8 Sepia Court, refer the Site Plan Figure 1

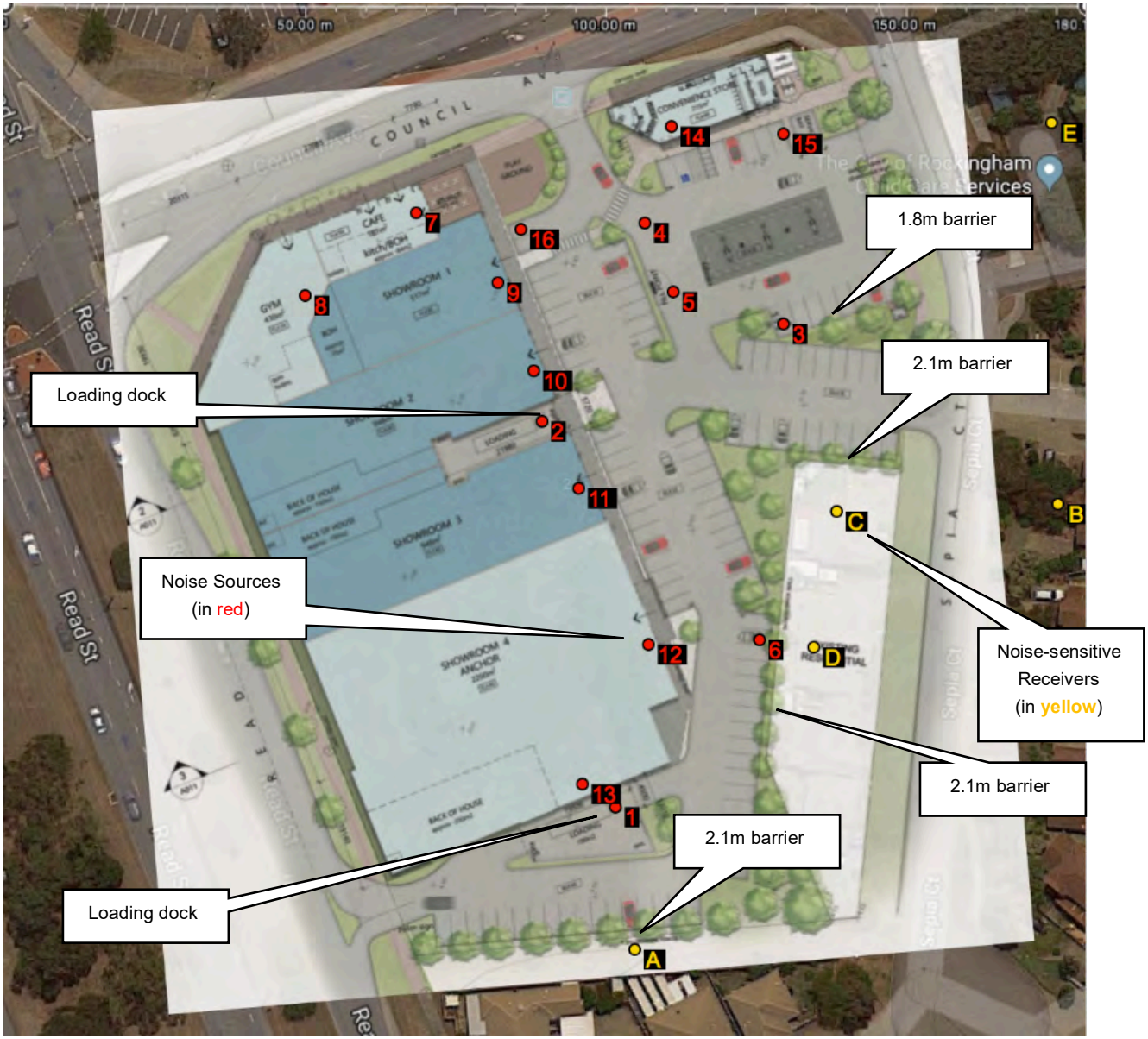

Figure 1: Site Plan - Proposed development and surrounds

3 Environmental Noise Emission Criteria

The Environmental Protection (Noise) Regulations 1997 provide limits for acceptable noise from fixed plant associated with industrial premises. The allowable noise level (called 'Assigned Noise Level') is affected by the time of day as follows:

- Lowest levels at night (10 pm to 7 am any day or to 9 am Sundays and Public Holidays);
- Higher levels during the evenings (7 pm to 10 pm) and on Sundays and Public Holidays (9 am to 7 pm); and
- Highest levels during the day (7 am to 7 pm Monday to Saturday).

These Assigned Noise Levels may also be modified (i.e. increased) in the event that there are significant influencing land uses within 100 m and 450 m radii of the sensitive receiver including:

- industrial land use zonings;
- commercial zonings; and
- the presence of major roads.

Considering these factors for the site the following noise emission criteria were developed:

Table 1 Noise assessment criteria – 4 Sepia Court (Location B, C & D)

Type of premises receiving noise	Time of day	Assigned Noise Level dB		
		L_{A10}	L_{A1}	L_{Amax}
Noise sensitive premises: highly sensitive area	0700 to 1900 hours Monday to Saturday	55	65	75
	0900 to 1900 hours Sunday and public holidays	50	60	75
	1900 to 2200 hours all days	50	60	65
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays	45	55	65

In a similar way the other criteria were developed and were established to be

- Location A - 2 dB lower
- Location E - 1 dB higher

Refer also to Table 3 and Table 5 for summaries of these criteria

4 Results

4.1 Noise Sources

The noise sources outlined below in Table 2 have been used in forecasting the environmental noise emission from site.

Table 2 – Environmental Noise Emission Sources

Location	Source	Adj** (dB)	L_{wA10} (dB)	L_{wA1} (dB)	L_{wAmax} (dB)
1	Delivery Truck: Startup*	10	-	-	91
2	Delivery Truck: Startup*	10	-	-	91
3	Car bay: Startup	10	-	84	85
4	Fuel Tanker: Idle*	5	-	94	94
5	Fuel Tanker: Park Brake*	10	-	-	101
6	Car bay: Startup*	10	-	84	85
7	AC + Refrig (Night)	5	74	77	77
8	AC + Refrig (Night)	5	74	77	77
9	AC + Refrig (Night)	5	74	77	77
10	AC + Refrig (Night)	5	74	77	77
11	AC + Refrig (Night)	5	74	77	77
12	AC + Refrig (Night)	5	74	77	77
13	AC + Refrig (Night)	5	74	77	77
14	AC + Refrig (Night)	5	74	77	77
15	Delivery Truck: Startup	10	-	-	91
16	Car bay: Startup	10	-	84	85

Note * Not operating during the night-time period
** Adjustment applied at receptor locations where noise levels are determined as having prominent characteristics

4.2 Model predictions

Noise levels were forecast at the most affected sensitive locations Identified in Figure 1, for all the noise sources in Figure 1 and Table 2. These results are presented below in Table 4 and Table 6 for night-time activity and evening activity respectively. Table 3 and Table 5 summarise the corresponding criteria applicable at each site, for each type of noise emission.

Green results in Table 4 and Table 6 indicate compliance, **Red** results indicate non-compliance with the respective criteria. All instances of non-compliance are summarised in is established we recommend the treatments outlined in Appendix A be implemented to control noise emissions.

Table 3: Receiver labels, influencing factor and night-time assigned level

Location	Zoning	Assigned level (dB)			
		Adj	L_{A10}	L_{A1}	L_{Amax}
A	Residential	8	43	53	63
B	Residential	10	45	55	65
C	Residential	10	45	55	65
D	Residential	10	45	55	65
E	Childcare	11	46	56	66

Table 4: Forecast Night-time noise from the Site

Statistic	Noise Source	L_{wA} (dB)	Adj (dB)	Forecast ($dB_{,adj}$)				
				A	B	C	D	E
L_{A10} Criterion 43/45	Delivery Truck: Startup	-	10	-	-	-	-	-
	Delivery Truck: Startup	-	10	-	-	-	-	-
	Car bay: Startup	-	10	-	-	-	-	-
	Fuel Tanker: Idle	-	5	-	-	-	-	-
	Fuel Tanker: Park Brake	-	10	-	-	-	-	-
	Car bay: Startup	-	10	-	-	-	-	-
	AC + Refrig (Night)	74	5	29	30	32	31	30
	AC + Refrig (Night)	74	5	29	29	31	31	29
	AC + Refrig (Night)	74	5	30	31	34	33	31
	AC + Refrig (Night)	74	5	31	32	36	35	31
	AC + Refrig (Night)	74	5	33	33	38	38	31
	AC + Refrig (Night)	74	5	37	34	39	42	30
	AC + Refrig (Night)	74	5	42	32	35	38	28
	AC + Refrig (Night)	74	5	28	32	34	32	35
	Delivery Truck: Startup	-	10	-	-	-	-	-
	Car bay: Startup	-	10	-	-	-	-	-
	Overall			44	41	45	46	41

Table 4 Cont

Statistic	Noise Source	L_{wA} (dB)	Adj (dB)	Forecast ($dB_{,adj}$)				
				A	B	C	D	E
	Delivery Truck: Startup	-	10	-	-	-	-	-
	Delivery Truck: Startup	-	10	-	-	-	-	-
	Car bay: Startup	84	10	45	51	56	51	51
	Fuel Tanker: Idle	-	5	-	-	-	-	-
	Fuel Tanker: Park Brake	-	10	-	-	-	-	-
	Car bay: Startup	-	10	-	-	-	-	-
L_{A1}	AC + Refrig (Night)	77	5	32	33	35	34	33
	AC + Refrig (Night)	77	5	32	32	34	34	32
Criterion	AC + Refrig (Night)	77	5	33	34	37	36	34
53/55	AC + Refrig (Night)	77	5	34	35	39	38	34
	AC + Refrig (Night)	77	5	36	36	41	41	34
	AC + Refrig (Night)	77	5	40	37	42	45	33
	AC + Refrig (Night)	77	5	45	35	38	41	31
	AC + Refrig (Night)	77	5	31	35	37	35	38
	Delivery Truck: Startup	-	10	-	-	-	-	-
	Car bay: Startup	84	10	44	46	49	47	47
	Delivery Truck: Startup	-	10	-	-	-	-	-
	Delivery Truck: Startup	-	10	-	-	-	-	-
	Car bay: Startup	85	10	46	52	57	52	52
	Fuel Tanker: Idle	-	5	-	-	-	-	-
	Fuel Tanker: Park Brake	-	10	-	-	-	-	-
	Car bay: Startup	-	10	-	-	-	-	-
L_{Amax}	AC + Refrig (Night)	77	5	32	33	35	34	33
	AC + Refrig (Night)	77	5	32	32	34	34	32
Criterion	AC + Refrig (Night)	77	5	33	34	37	36	34
63/65	AC + Refrig (Night)	77	5	34	35	39	38	34
	AC + Refrig (Night)	77	5	36	36	41	41	34
	AC + Refrig (Night)	77	5	40	37	42	45	33
	AC + Refrig (Night)	77	5	45	35	38	41	31
	AC + Refrig (Night)	77	5	31	35	37	35	38
	Delivery Truck: Startup	91	10	50	55	57	54	60
	Car bay: Startup	85	10	45	47	50	48	48

Table 5: Receiver labels, influencing factor and Evening assigned level

Location	Zoning	Assigned level (dB)			
		Adj	L_{A10}	L_{A1}	L_{Amax}
A	Residential	8	48	58	63
B	Residential	10	50	60	65
C	Residential	10	50	60	65
D	Residential	10	50	60	65
E	Childcare	11	51	61	66

Table 6: Forecast Evening noise (dB) from the Site

Statistic	Noise Source	L_{wA} (dB)	Adj (dB)	Forecast ($dB_{,adj}$)				
				A	B	C	D	E
L_{A10} Criterion 48/50	Delivery Truck: Startup	-	10	-	-	-	-	-
	Delivery Truck: Startup	-	10	-	-	-	-	-
	Car bay: Startup	-	10	-	-	-	-	-
	Fuel Tanker: Idle	-	5	-	-	-	-	-
	Fuel Tanker: Park Brake	-	10	-	-	-	-	-
	Car bay: Startup	-	10	-	-	-	-	-
	AC + Refrig (Night)	74	5	29	30	32	31	30
	AC + Refrig (Night)	74	5	29	29	31	31	29
	AC + Refrig (Night)	74	5	30	31	34	33	31
	AC + Refrig (Night)	74	5	31	32	36	35	31
	AC + Refrig (Night)	74	5	33	33	38	38	31
	AC + Refrig (Night)	74	5	37	34	39	42	30
	AC + Refrig (Night)	74	5	42	32	35	38	28
	AC + Refrig (Night)	74	5	28	32	34	32	35
	Delivery Truck: Startup	-	10	-	-	-	-	-
	Car bay: Startup	-	10	-	-	-	-	-
	Overall			44	41	45	46	41
L_{A1} Criterion 58/60	Delivery Truck: Startup	-	10	-	-	-	-	-
	Delivery Truck: Startup	-	10	-	-	-	-	-
	Car bay: Startup	84	10	45	51	56	51	51
	Fuel Tanker: Idle	94	5	49	53	56	53	54
	Fuel Tanker: Park Brake	-	10	-	-	-	-	-
	Car bay: Startup	84	10	51	51	58	67	46
	AC + Refrig (Night)	77	5	32	33	35	34	33
	AC + Refrig (Night)	77	5	32	32	34	34	32
	AC + Refrig (Night)	77	5	33	34	37	36	34
	AC + Refrig (Night)	77	5	34	35	39	38	34
	AC + Refrig (Night)	77	5	36	36	41	41	34
	AC + Refrig (Night)	77	5	40	37	42	45	33
	AC + Refrig (Night)	77	5	45	35	38	41	31
	AC + Refrig (Night)	77	5	31	35	37	35	38
	Delivery Truck: Startup	-	10	-	-	-	-	-
	Car bay: Startup	84	10	44	46	49	47	47

Table 6 Cont

Statistic	Noise Source	L_{wA} (dB)	Adj (dB)	Forecast ($dB_{,adj}$)				
				A	B	C	D	E
	Delivery Truck: Startup	91	10	65	54	57	60	50
	Delivery Truck: Startup	91	10	54	54	59	58	53
	Car bay: Startup	85	10	46	52	57	52	52
	Fuel Tanker: Idle	94	5	49	53	56	53	54
	Fuel Tanker: Park Brake	101	10	62	66	70	67	66
	Car bay: Startup	85	10	52	52	59	68	47
L_{Amax}	AC + Refrig (Night)	77	5	32	33	35	34	33
	AC + Refrig (Night)	77	5	32	32	34	34	32
Criterion	AC + Refrig (Night)	77	5	33	34	37	36	34
63/65	AC + Refrig (Night)	77	5	34	35	39	38	34
	AC + Refrig (Night)	77	5	36	36	41	41	34
	AC + Refrig (Night)	77	5	40	37	42	45	33
	AC + Refrig (Night)	77	5	45	35	38	41	31
	AC + Refrig (Night)	77	5	31	35	37	35	38
	Delivery Truck: Startup	91	10	50	55	57	54	60
	Car bay: Startup	85	10	45	47	50	48	48

5 Discussion

Table 7 below summarises the non-compliances from the Tables above.

Table 7 Summary of Non-compliances

Period	Source	Receiver	Exceedance	Comment
Night	Mechanical services (Overall)	Location A	1 dB	Requires boundary fence
Night		Location D (First Floor)	1 dB	May require localised shielding
Night	Car Start up (Location 3)	Location E	1 dB	Requires fence around carpark
Evening	Car Start up (Location 6)	Location D (First Floor)	7 dB	Requires fence around carpark
Evening	Delivery Truck Start up (Location 1)	Location A	1 dB	Requires boundary fence
Evening	Fuel Tanker Park Brake (location 5)	Location B	1 dB	Requires silencer on park brake
Evening		Location C (First Floor)	5 dB	Requires silencer on park brake
Evening		Location D (First Floor)	2 dB	Requires silencer on park brake

Mechanical Services

From the table above, it was found that the mechanical services may generate a 1 dB exceedance at receiver Locations A and D, where all outdoor units are operating at full capacity/noise level. This is unlikely to occur.

Nevertheless, compliance can be achieved by selection of units 1 dB quieter than that in Table 2 or by careful use of shielding.

Cars in Carpark

Some exceedances were generated by evening or night-time vehicle activity in the carpark. These levels can be controlled by the use of boundary noise barriers.

Delivery Vehicles in Loading dock

Noise generated by vehicles in the loading dock can exceed the nominated criteria in the evening. We recommend the construction of a boundary barrier, or limiting the operation at the Showroom loading docks between 7am and 7pm, Monday to Saturday.

Fuel tanker deliveries

Untreated park brakes activated in the evening period can generate noise that exceeds the nominated criteria. We recommend the installation of 5 dB silencers on the park brake air relief valves so that the L_{Amax} maximum permitted noise emission from the park brakes is 96 dB

6 Noise Management Plan

The elements outlined below are recommended as part of a comprehensive Noise Management Plan. They are recommended for compliance with the Environmental Protection Act 1986 and its subsidiary legislation; the Environmental Protection (Noise) Regulations 1997.

Noise Source or Activity	Requirement
Supply Trucks	• Deliveries to convenience store permitted 24/7 • Deliveries to Showrooms permitted between 7am and 10pm Mon-Sat • The total noise emission from the truck, inclusive of engine start, vehicle acceleration, park brake, operation of the roller door, door close, and all other noise sources except the refrigeration unit is a maximum Sound Power Level of 94 dB. • The total noise emission from refrigeration units (inclusive of truck idling) is to be a maximum Sound Power Level of 96 dB • The refrigeration unit to be turned off while entering the site and only switched on after leaving the site. • Reversing of trucks to be minimised to avoid the unnecessary activation of the reversing beeper. • "Broad band", or "white-noise" reversing beepers are recommended for all Delivery trucks at the site
Refuse Collection	• Refuse collection is to be carried out in the quietest reasonable and practicable manner; • Equipment used for refuse collection is the quietest reasonably available • Collection to occur between 7am and 7pm Mon-Saturday, unless the contractor has a Noise Management Plan approved by Council.
Fuel Tanker	• To operate during the daytime or evening, i.e. - 7am to 10pm Monday – Saturday - 9am to 10pm Sunday and public holidays • Silencer to the park brake limiting the noise emission to L_{wAmax} 96 dB • Vehicle manoeuvring on site to be at a maximum of 5-8 km/h, and with low engine revs. • "Broad band", or "white-noise" reversing beepers are recommended for all Tanker trucks • Reversing of trucks to be discouraged to avoid the unnecessary activation of the reversing beeper.
Barriers	• 2.1m high boundary barrier is recommended between the development and the adjoining housing to the South and the East of the site, as shown in the site plan, Figure 1. • 1.8 m high barrier is recommended along the Southern boundary of the carpark at the convenience store. • Minimum acoustic performance of the barriers is that of 0.42mm BMT colourbond or acoustic equivalent.
Grilles, Storm water grates and other metal covers	• To be installed so as to be tight fitting. Where this cannot be achieved, hard rubber or other durable materials are to be used for cushioning such grates/covers
Signage	• To be installed in the carpark to remind patrons to keep noise to a minimum due to the proximity of neighbouring areas

Outdoor Speakers at service station	No music to be played through any speaker on site. The use of the speaker is to be limited to emergency messaging and patron management only
Outdoor Building Services plant	• Refrigeration plant and air compressor to be roof mounted and located to maximise the distance to the surrounding neighbours • Maximum permitted combined Sound Power Level from the plant to not exceed 77 dB.
Other Noisy Plant	• Beepers and other alert devices on site shall be selected so as to minimise their noise emission and to orient away from the nearest neighbours at 4 Sepia Court

7 Conclusion

Resonate Acoustics was been engaged to conduct a review of the environmental noise impact of a proposed Retail development at 2 Sepia Court, Rockingham.

It was found that the forecast noise emissions from the site can be controlled to meet the legislated requirements by the implementation of the requirements of a Noise Management Plan. An example of a compliant noise management plan is shown in Section 6 of this report.

After the implementation of such a plan the noise emissions from the site would be classified as acceptable.

Porter
Consulting Engineers

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www.portereng.com.au

Our Ref: MC/JK/L0306.18
Job No: 18-07-085

28 August 2018

Arise Developments Pty Ltd
C/- Property Development Solutions
Unit 9, 69 Hay Street
SUBIACO EAST WA 6008

Attention: Geoff Loxton

Dear Geoff

LOT 301 READ STREET, ROCKINGHAM
DEVELOPMENT ASSESSMENT PANEL RESPONSE

Porter Consulting Engineers (PCE) had been engaged to prepare a drainage management strategy and assess fuel tanker turning movements to support a Development Application on the above site. PCE has received the City of Rockingham's initial comments. Refer **Attachment 1** for details. This letter responds to the 9 items (A-I).

A) The Drainage Strategy Plan (**Attachment 2**) has been updated to show the location and intended size of the proposed SPEL Puraceptor unit. Areas within fuel zones will drain through this SPEL prior to reaching the soak well network. The exact arrangement of the internal drainage pipework and SPEL parameters will be resolved during detailed design.
B) The Drainage Strategy Plan has been updated in line with the landscaping plan to show three areas where rain gardens and/ or bio-retention pockets may be used. An integrated approach at detailed design stage will be required to ensure these landscaped areas can incorporate Water Sensitive Urban Design Principles.
C) A Geotechnical Report has been provided by Galt Geotechnics (refer J1702030003 R Rev 2). The Drainage Strategy Plan has been updated based on the findings of the report.
D) See point C above – a design permeability rate of 5m/day has been used with 1.2m deep soak wells. The number of soak wells and storage cells has been updated.
E) Drainage calculations are presented as **Attachment 3**.
F) See point A above.
G) Additional swept path plans are presented in **Attachment 4.**
H) The Drainage Strategy Plan shows the buildings being connected to the drainage network. The exact arrangement of proposed downpipes and soak well connections will be resolved during detailed design. Also see points A & B above.
I) Similar to point A above, the location of the underground fuel storage and associated venting will be resolved during detailed design.

If you have any queries regarding the above, please contact the undersigned on 9315 9955.

Yours faithfully

JAMIE KING
PROJECT ENGINEER

Attachment 1 - City of Rockingham Initial Comments

Our Ref: DD020.2018.00000201.001 - D18/147558

Enquiries to: Mr David Banovic

23rd August 2018

Mr Peter Simpson
PTS Town Planning Pty Ltd
PO Box 538
INGLEWOOD WA 6052

Dear Mr Simpson

Re: Development Assessment Panel Application - Proposed Health Studio, Restaurant, Showrooms and Convenience Store at Lot 301 Read Street, Rockingham

I refer to your development application lodged on 23rd July 2018.

The applicant is advised that the subject application had been referred to relevant internal departments as well as relevant external departments for comments, which are as follows:

Noise

A full acoustics report is required to be provided. The preliminary report is lacking in information and the following is requested:

- Provide a copy of the noise modelling report, complete with source sound power levels and worst case receiver noise.
- Noise from the gym should be consider also: music noise, personal training, group fitness classes etc.

Waste

Clause 2.2 and 3.4 of WMP require further investigation to consider the use of the carpark for bin placement.

Development Engineering

A
- A Drainage Management Strategy be revised to include details on the specific SPEL treatment tank proposed and the location of the treatment tank to ensure hydrocarbons, oils and grease are appropriately treated on-site.

B
- The *Drainage Management Strategy* does not refer to WSUD measures as a key design criteria. Water Sensitive Urban Design (WSUD) best practices (rain gardens, bioretention pockets or tree pits) must therefore be integrated into the landscaped areas within the carpark and handstand areas to manage frequent events up to and including the first 15mm.

C
- The performance of the nominated infiltration devices is based on site soil condition and the groundwater level, therefore a geotechnical report is to be submitted along with the detailed Drainage Management Plan to confirm that the infiltration devices are suitable for the above site.

D
- A Geotechnical Investigation must be performed to determine onsite groundwater levels and confirm that there is sufficient separation for underground infiltration devices. The Geotechnical Investigation must also include permeability testing to confirm that the design infiltration rate of 6 m/day is appropriate.

E
- The Drainage Strategy Plan in Appendix 1 shows the catchment areas and design criteria. No calculations have however been provided to demonstrate how the drainage system storage requirements have been determined.

F
- Please provide further details on the proposed SPEL treatment system to be incorporated into the Service Station area.

Landscape

- The proposed site plan includes extensive planting, boulders and gravel on Council Ave and Read Street verge areas and the application report states that the landscape has been designed "*with the intent of complementing planting undertaken elsewhere in the city centre by the City of Rockingham*." However it should be noted that, this level of planting, gravel mulch and boulders is not a typical landscape treatment used within the City Centre. A simplified landscape palette with feature paving, grass and street trees is typical for this location.
- Proposed boulders are not supported within the street verge areas, as they present as solid, non-frangible objects in the road reserve and loose gravel is also not supported as it can be spread onto the road pavement making the surface slippery for motorists, particular motorcyclists. These landscape treatments are only supported within the development lot and the existing Reserve/PAW.
- Narrow street verge areas are not recommended to accommodate street trees, eg along Council Ave closest to the Read Street intersection, particular where existing services exist and require protection. One (1) shade tree is to be provided per every 4-6 car parking bays on-site.
- Currently there is only a 1.3metre wide paved pathway adjacent the boundary fence. Additional space/separation is required for planting to visually screen and separate the residential property from the development and reduce overlooking on to car parking areas and overhead lighting spill from the petrol station canopy etc.
- The position of the '*Petrol Station Oil/Water Separation Shed'* has the appearance of a residential garden shed and not durable materials for a commercial development. It is recommend further consideration is given to the location and the materiality of the shelter to create a robust structure that ties into the proposed built form.
- Read Street footpath is to be widened to a 2.5metre wide shared use footpath to accommodate pedestrian and bicycle movements as part of the wider community link from the mixed use development and the neighbouring shopping centre.

Traffic

- Austroads' *Guide to Road Design Part 4 – Intersections and Crossings (General)* recommends that an access driveway should not be located within the functional area of an intersection. The upstream functional area is defined as the length of which vehicles are manoeuvring to execute either a right or left-turn movement at an intersection. The proposed access driveway off Council Avenue is located within the upstream functional area of Read Street/Council Avenue intersection and **therefore is not supported**.

G
- The internal road network may not be adequate to accommodate for commercial vehicles and therefore a swept path analysis is required to be provided to demonstrate commercial vehicle manoeuvrability.

- MRWA's *Supplement to Austroads' Guide to Road Design Part 4* recommends that the location of a bus stop should be at least 30m from the Tangent Point (TP) when it is located after an intersection (i.e. from Sepia Court) and therefore the proposal location **is not supported**.
- A queue analysis is required to demonstrate that the provided queueing space within the petrol station is adequate to accommodate for the expected peak demand, otherwise the design is required to be amended.
- Define the vehicle priorities at intersections within the site by means of pavement marking and/or signage (eg. giveway sign).

The City has the following comments regarding the Transport Impact Assessment (TIA, prepared by Riley Consulting, dated 18th July 2018);

- A checklist for a TIA should be provided in Section 2 of the report instead of the currently provided checklist for "Transport Impact Statement" (TIS).
- Provide the AM weekday peak hour trip generation rate and its associated reference for "Café", "Showroom", and "Gym".
- Provide the Saturday peak hour trip generation rate and its associated reference for "Convenience store", "Café", and "Gym".
- Provide details or relevant data for the adoption of 40% patronage for the "Gym" on a Thursday evening peak.
- Provide the reference for adopting a 15% passer-by for the "Café".
- Amend the road capacity shown in Table 4 as below;
  - Council Avenue (Distributor A or Integrator Arterial A) - 25,000 vpd
  - Read Street (Distributor A or Integrator Arterial A) - 25,000 vpd
  - Cygnus Street (Local Distributor or Neighbourhood Connector B) - 3,000 vpd
  - Sepia Court (Access Road or Access Street B) - 3,000 vpd
- Figure 7 of the report suggests that the proposed site plan may not have been correctly scaled and placed onto the aerial imagery. Please amend Figure 7 accordingly.
- Austroads' *Guide to Road Design Part 4 – Intersections and Crossings (General)* recommends a minimum 70m left turn auxiliary lane for the site access instead of 60m as nominated in the report. Please amend report accordingly.
- The cycle time for the signalised intersection at Read Street/Council Avenue seems a bit low (i.e. 70 seconds for weekday PM and 90 seconds for Saturday peak). Please check and confirm that these cycle time reflects the actual operation at the intersection by comparing it to SCATS data. Different cycle time is likely to change the intersection analysis results.

<u>Department of Planning</u>

- The proposal is not in accordance with the Commission's Regional Roads (Vehicular Access) Policy D.C. 5.1, which seeks to minimise the number of new crossovers onto regional roads and rationalise existing access arrangements. The Policy states: *'Where alternative access is or could be made available from side streets, no access shall be permitted to the regional road'*. Read Street is classified as a Category 1 control of access road per Plan Number SP 694/4. As such, **no access is supported** from the site to Read Street.
- WAPC Transport Impact Assessment Guidelines states that assessment years should be undertaken 10 years after full opening of the development (not the year of full opening or post development as shown). Traffic Impact Assessment is to be updated accordingly.

Public Transport Authority

- The PTA **does not support** the proposed relocation of bus stop 21234. There are 6 Transperth bus routes that are assigned to this bus stop and given that services are designed to connect with trains at Rockingham Station this can result in multiple services arriving at bus stop 21234 simultaneously. The proposed bus stop position does not accommodate this and would result in bus services causing conflict and blocking the Council Avenue - Sepia Court intersection.
- It should also be noted that although the majority of services that are assigned to bus stop 21234 turn left from Council Avenue into Read Street, Route 553 bus services travel straight ahead to Cygnus Street. The bus stop cannot therefore be relocated any further east towards Read Street as this will generate operational issues for Route 553 services that would need to safely manoeuvre from what would appear to be a dedicated left turn only lane to re-join the straight ahead traffic lane.
- PTA advocates retention of the bus stop as close to the proposed Council Avenue vehicular entry/egress as permitted under the Road Traffic Code 2000.

Department of Water and Environmental Regulation

H

- It is difficult to determine if the proposed drainage pipes indicated on the drainage strategy plan is runoff from ground level surfaces or from roofs and other infrastructure. The drainage plans for the entire development area should demonstrate how and where the small, minor and major rainfall events will be managed and consider the following:
  - The fuel dispenser area and forecourt should be covered, paved and graded to contain polluted runoff. This runoff should drain via collection sumps and then to an appropriate contaminated stormwater treatment system.
  - Measures should be taken to prevent uncontaminated roof runoff and external surface water from entering the forecourt. These include:
    - kerbing or grade changes for paved areas.
    - installing and maintaining stormwater collection systems, such as bio-retention gardens and soak wells to intercept clean roof and general runoff that would otherwise enter the forecourt.
  - Runoff that may be contaminated should pass through a well-maintained litter and sediment trap, then an appropriately designed and regularly maintained fuel and oil trap. The SPEL Puraceptor system that is planned to be installed should be appropriately located to ensure the capture and effective treatment of potentially contaminated runoff.
  - Only clean wastewater, that has been effectively treated should be discharged to:
    - on-site soak wells
    - on-site leach drains
    - on-site bio-retention gardens
    - a reticulated sewer where accepted by a service provider

I

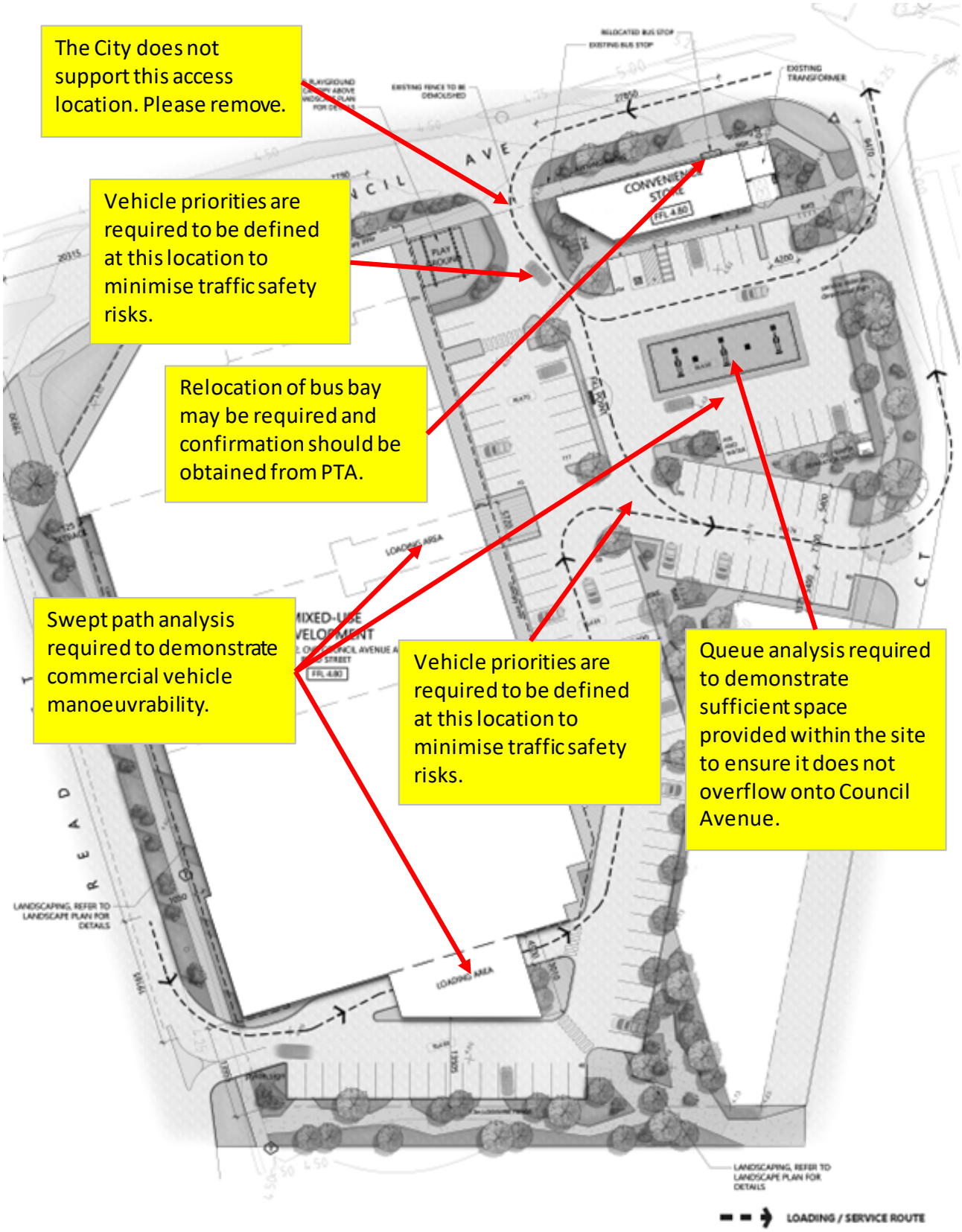
- The site layout plans provided have not included the location of the underground fuel storage and any associated pipelines and venting.
- A contingency plan for spills and emergencies has not been described within the proposal to the DWER. The Water Quality Protection Note 10 – Contaminant spills emergency response (DWER, 2006) provides guidance into developing and implementing an effective emergency response plan.

To enable streamlined processing of your application, your response together with the above mentioned information is required to be submitted within 21 days from the date of this letter (**13th September 2018**). Please note, the City will also shortly provide a schedule of submissions received during public consultation which will require a response by the applicant.

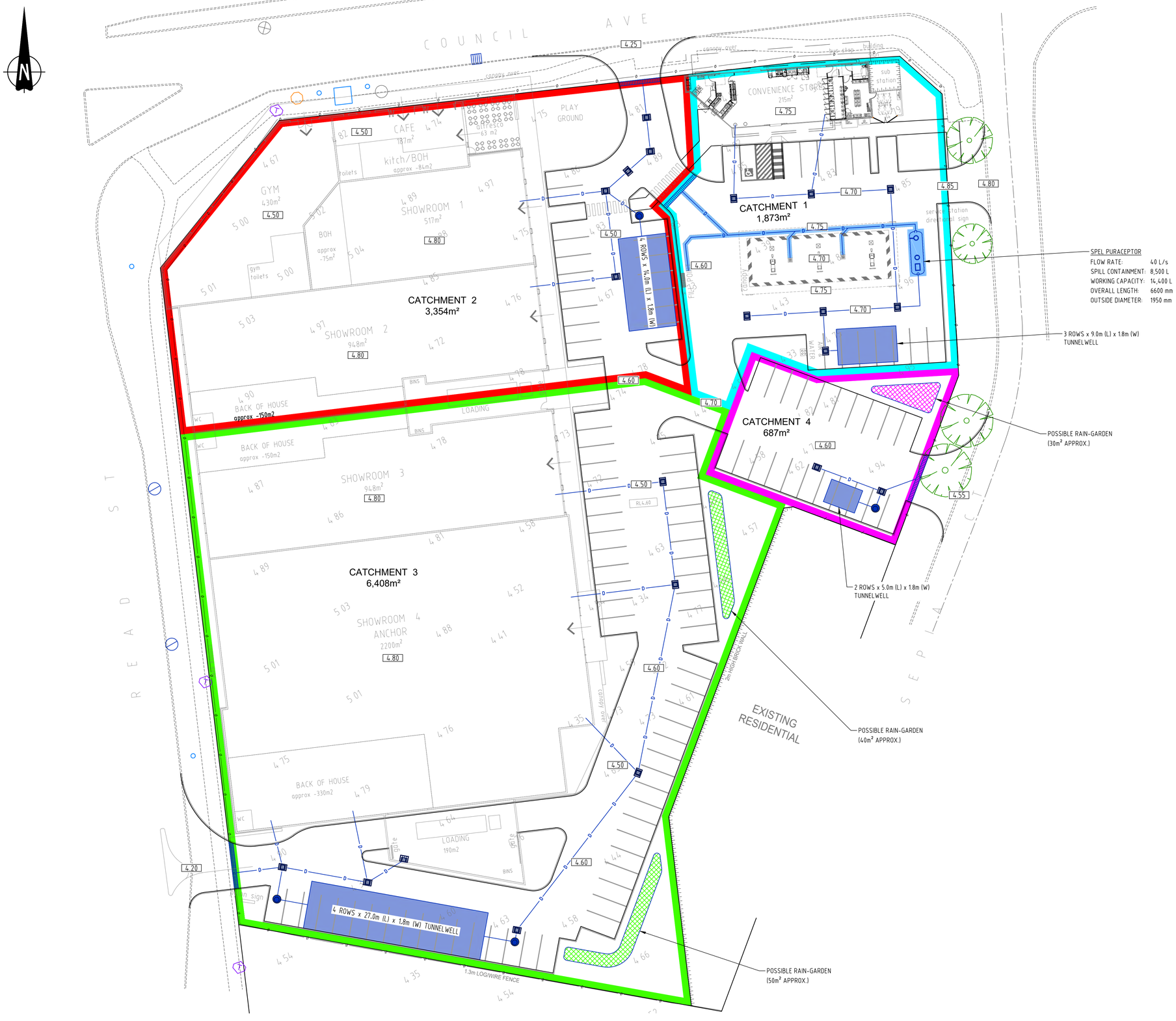
Should you have any further queries, please contact the officer on the above telephone number.

Yours faithfully

D BANOVIC
SENIOR PLANNING OFFICER


The City does not support this access location. Please remove.
Vehicle priorities are required to be defined at this location to minimise traffic safety risks.
Relocation of bus bay may be required and confirmation should be obtained from PTA.
Swept path analysis required to demonstrate commercial vehicle manoeuvrability.
Vehicle priorities are required to be defined at this location to minimise traffic safety risks.
Queue analysis required to demonstrate sufficient space provided within the site to ensure it does not overflow onto Council Avenue.
LOADING / SERVICE ROUTE

Attachment 2 - Drainage Strategy Plan



LEGEND

- 4.50 — PROPOSED DESIGN LEVELS
- CATCHMENT BOUNDARY
- PROPOSED DRAINAGE PIPE (Ø 225)
- PROPOSED DRAINAGE PIPE - FUEL ZONE (Ø 225)
- PROPOSED DRAINAGE SOAKWELLS (Ø 1.8m x 1.8m DEEP)
- PROPOSED DRAINAGE STORAGE CELLS (TUNNELWELL OR SIMILAR)
- PROPOSED KERBING
- PROPOSED LINEMARKING
- EXISTING KERBING
- EXISTING BUILDING

NOTES

1. STORM VOLUME TO BE STORED AND INFILTRATED THROUGH SOAKWELLS AND UNDERGROUND STORAGE CELLS AS SHOWN.
2. DESIGN PERMEABILITY RATE 5m/DAY.
3. MAXIMUM GROUNDWATER LEVEL RL 2.9m.

DRAINAGE CRITERIA

CATCHMENT 1

LOT AREA = 1,873 m²
COEFFICIENT OF RUNOFF = 0.9
DESIGN CRITERIA = 1% AEP STORM EVENT
DRAINAGE SYSTEM PROVIDED = 7 x Ø1.8m x 1.2m (D) SOAKWELLS + 27m x 1.8m (W) TUNNELWELL LEACH TANKS (OR SIMILAR)

CATCHMENT 2

LOT AREA = 3,354 m²
COEFFICIENT OF RUNOFF = 0.9
DESIGN CRITERIA = 1% AEP STORM EVENT
DRAINAGE SYSTEM PROVIDED = 6 x Ø1.8m x 1.2m (D) SOAKWELLS + 56m x 1.8m (W) TUNNELWELL LEACH TANKS (OR SIMILAR)

CATCHMENT 3

LOT AREA = 6,408 m²
COEFFICIENT OF RUNOFF = 0.9
DESIGN CRITERIA = 1% AEP STORM EVENT
DRAINAGE SYSTEM PROVIDED = 9 x Ø1.8m x 1.2m (D) SOAKWELLS + 108m x 1.8m (W) TUNNELWELL LEACH TANKS (OR SIMILAR)

CATCHMENT 4

LOT AREA = 687 m²
COEFFICIENT OF RUNOFF = 0.9
DESIGN CRITERIA = 1% AEP STORM EVENT
DRAINAGE SYSTEM PROVIDED = 3 x Ø1.8m x 1.2m (D) SOAKWELLS + 10m x 1.8m (W) TUNNELWELL LEACH TANKS (OR SIMILAR)

PROJECT:

LOT 301 READ STREET ROCKINGHAM

No	DATE	REVISION	BY
B	27-8-2018	DRAINAGE DETAILS AMENDED	
A	20-7-2018	ISSUED FOR APPROVAL	DLC

Porter Consulting Engineers
Level 2 Kishorn Court
58 Kishorn Road
Mt Pleasant 6153 WA
PO Box 1036
Canning Bridge 6153 WA
Tel (08) 9315 9955
Fax (08) 9315 9959
Email office@porterengineers.com.au
www.porterengineers.com.au
TUONO Pty Ltd ACN 070 091 148 as trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 636 396 385

CLIENT:

ARISE DEVELOPMENTS

DRAWING:

DRAINAGE STRATEGY PLAN

STATUS: **FOR APPROVAL**

SCALE	1:300
DATE	JUL 2018
DESIGN	DLC
DRAWN	DLC
CHECK	
APP'D	

DRAWING No. 18-7-85/400

REV No. B

ORIGINAL DRAWING SIZE A1

FILE NAME S:\ACTIVE PROJECTS\18-07-085\ACAD\18785-400.dwg

Attachment 3 - Drainage Calculations

Project	**Rockingham Central**
Job Number	**18-07-085**
Date	**27 August 2018**
Engineer	**Jamie King**
Summary	**Soakwell with Tunnelwell Leach Tank System**
Scenario	**Catchment 1 - Fuel Station**
File Name	**Drainage Calculations**
Revision	**B**
Reference Document	**Letter to client Dated 27 August 2018**
IFD Used	**Rockingham IFD used (32.300° S,115.750° E) generated from BoM website**
Ground Conditions	**High permeability due to s13 sand**
Groundwater	**High (RL 2.9m)**

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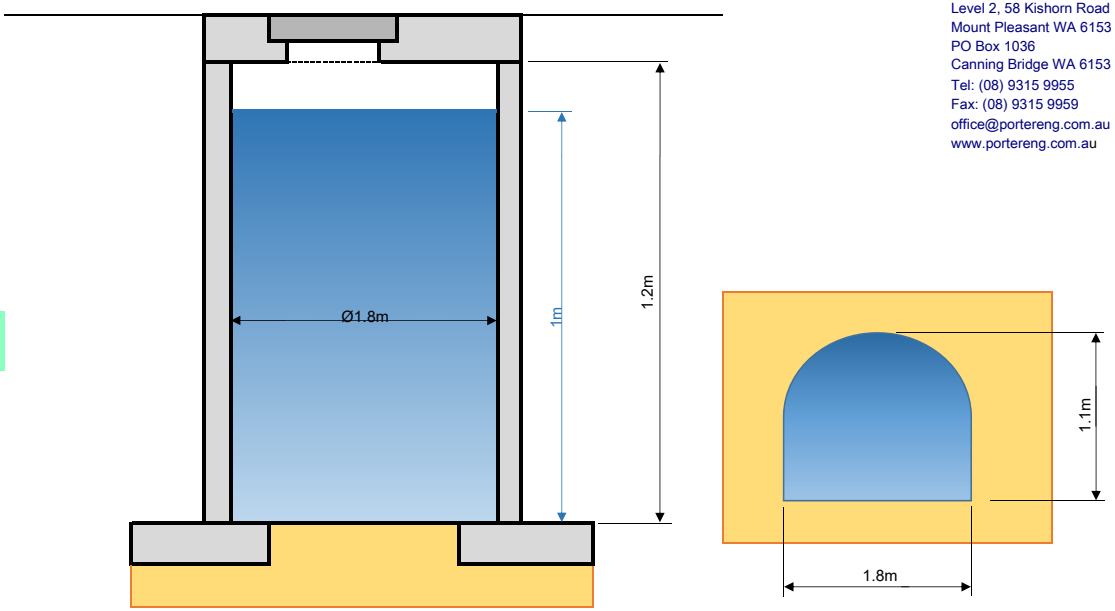

Intensities (mm/hr)			
	1 EY (1 year)	6 minute	54.5
		30 minute	24.10
		1 hour	15.80
		3 hour	7.80
		6 hour	4.99
		12 hour	3.20
	10% AEP (10 Year)	6 minute	111.00
		30 minute	44.70
		1 hour	28.30
		3 hour	13.50
		6 hour	8.48
		12 hour	5.40
	(20 Year) (10 Year)	6 minute	134.00
		30 minute	52.50
		1 hour	32.90
		3 hour	15.50
		6 hour	9.72
		12 hour	6.18
	1% AEP 100 Year	6 minute	196.00
		30 minute	73.10
		1 hour	45.10
		3 hour	20.80
		6 hour	12.90
		12 hour	8.17
		24 hour	5.31
		72 hour	2.60

Catchment Details

Area (ha) =	0.187
Co-efficient of Runoff =	0.90

Soakwell details

Soakwell Diameter (m) =	1.8
Liner Depth (m) =	1.2
Effective Depth (m) =	1
Soakwell base area (m^2) =	2.54
Soakwell Volume (m^3) =	2.54
No of Soakwells =	7

Infiltration

Rate of Soakage (m/day) =	5

Storage Cells

Length (m) =	27.000
Width (m) =	1.800
Height (m) =	1.100
Volume (m^3) =	53.46
Base Area (m^2) =	48.60

Event	1EY (1 Year)						10% AEP (10 Year)						(20 Year)						1% AEP (100 Year)							
Duration	6 min	30 min	1 hour	3 hour	6 hour	12 hour	6 min	30 min	1 hour	3 hour	6 hour	12 hour	6 min	30 min	1 hour	3 hour	6 hour	12 hour	6 min	30 min	1 hour	3 hour	6 hour	12 hour	24 hour	72 hour
Intensities	54.5	24.1	15.8	7.80	4.99	3.20	111.00	44.7	28.3	13.50	8.48	5.40	134	52.5	32.9	15.50	9.72	6.18	196	73.10	45.10	20.80	12.90	8.17	5.31	2.60
Q (m^3/s)	0.0255	0.0113	0.0074	0.0037	0.0023	0.0015	0.0520	0.0209	0.0133	0.0063	0.0040	0.0025	0.0628	0.0246	0.0154	0.0073	0.0046	0.0029	0.0919	0.0343	0.0211	0.0097	0.0060	0.0038	0.0025	0.0012
Volume	**9.19**	**20.33**	**26.66**	**39.48**	**50.51**	**64.78**	**18.73**	**37.71**	**47.74**	**68.33**	**85.84**	**109.32**	**22.61**	**44.29**	**55.50**	**78.45**	**98.39**	**125.11**	**33.07**	**61.66**	**76.09**	**105.27**	**130.58**	**165.40**	**215.00**	**315.82**
SW Vol.	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81
Soak Vol	0.37	1.86	3.71	11.13	22.27	44.53	0.37	1.86	3.71	11.13	22.27	44.53	0.37	1.86	3.71	11.13	22.27	44.53	0.37	1.86	3.71	11.13	22.27	44.53	89.06	267.19
SW Total	18.18	19.67	21.52	28.95	40.08	62.34	18.18	19.67	21.52	28.95	40.08	62.34	18.18	19.67	21.52	28.95	40.08	62.34	18.18	19.67	21.52	28.95	40.08	62.34	106.88	285.01
Cell Vol	53.46	53.46	53.46	53.46	53.46	53.46	53.46	53.46	53.46	53.46	53.46	53.46	53.46	53.46	53.46	53.46	53.46	53.46	53.46	53.46	53.46	53.46	53.46	53.46	53.46	53.46
Cell Soak	1.01	5.06	10.13	30.38	60.75	121.50	1.01	5.06	10.13	30.38	60.75	121.50	1.01	5.06	10.13	30.38	60.75	121.50	1.01	5.06	10.13	30.38	60.75	121.50	243.00	729.00
Cell Total	54.47	58.52	63.59	83.84	114.21	174.96	54.47	58.52	63.59	83.84	114.21	174.96	54.47	58.52	63.59	83.84	114.21	174.96	54.47	58.52	63.59	83.84	114.21	174.96	296.46	782.46
Total Vol	**72.66**	**78.19**	**85.11**	**112.78**	**154.29**	**237.30**	**72.66**	**78.19**	**85.11**	**112.78**	**154.29**	**237.30**	**72.66**	**78.19**	**85.11**	**112.78**	**154.29**	**237.30**	**72.66**	**78.19**	**85.11**	**112.78**	**154.29**	**237.30**	**403.34**	**1067.47**
	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

Project	**Rockingham Central**
Job Number	**18-07-085**
Date	**27 August 2018**
Engineer	**Jamie King**
Summary	**Soakwell with Tunnelwell Leach Tank System**
Scenario	**Catchment 2**
File Name	**Drainage Calculations**
Revision	**B**
Reference Document	**Letter to client Dated 27 August 2018**
IFD Used	**Rockingham IFD used (32.300° S,115.750° E) generated from BoM website**
Ground Conditions	**High permeability due to s13 sand**
Groundwater (Max)	**High (RL 2.9m)**

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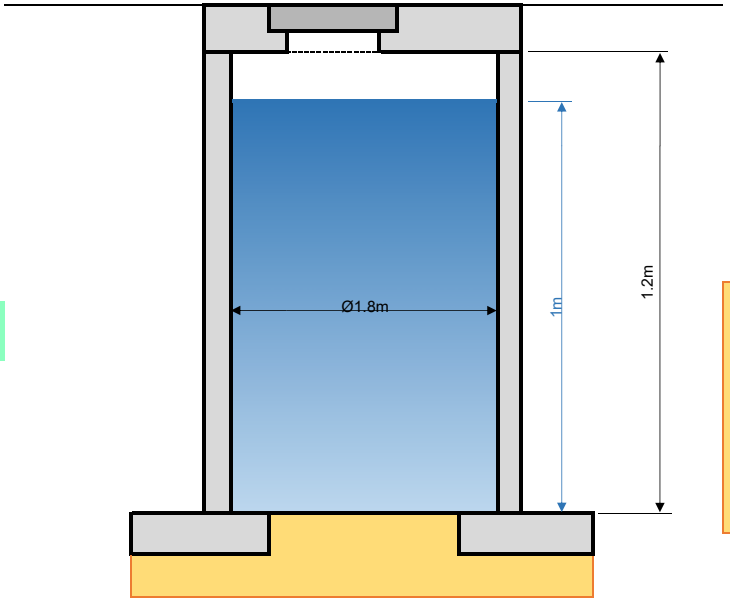

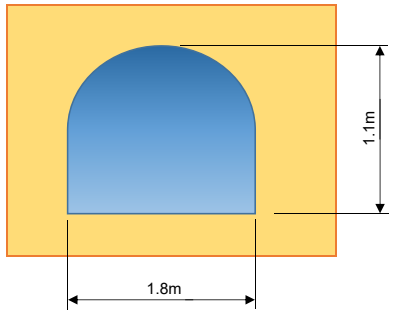

Intensities (mm/hr)		
1 EY (1 year)	6 minute	54.5
	30 minute	24.10
	1 hour	15.80
	3 hour	7.80
	6 hour	4.99
	12 hour	3.20
10% AEP (10 Year)	6 minute	111.00
	30 minute	44.70
	1 hour	28.30
	3 hour	13.50
	6 hour	8.48
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(20 Year) (10 Year)	6 minute	134.00
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	6 hour	9.72
	12 hour	6.18
1% AEP 100 Year	6 minute	196.00
	30 minute	73.10
	1 hour	45.10
	3 hour	20.80
	6 hour	12.90
	12 hour	8.17
	24 hour	5.31
	72 hour	2.60

Catchment Details

Area (ha) =	0.335
Co-efficient of Runoff =	0.90

Soakwell details

Soakwell Diameter (m) =	1.8
Liner Depth (m) =	1.2
Effective Depth (m) =	1
Soakwell base area (m^2) =	2.54
Soakwell Volume (m^3) =	2.54
No of Soakwells =	6

Infiltration

Rate of Soakage (m/day) =	5

Storage Cells

Length (m) =	56.000
Width (m) =	1.800
Height (m) =	1.100
Volume (m^3) =	110.88
Base Area (m^2) =	100.80

Event	1EY (1 Year)						10% AEP (10 Year)						(20 Year)						1% AEP (100 Year)							
Duration	6 min	30 min	1 hour	3 hour	6 hour	12 hour	6 min	30 min	1 hour	3 hour	6 hour	12 hour	6 min	30 min	1 hour	3 hour	6 hour	12 hour	6 min	30 min	1 hour	3 hour	6 hour	12 hour	24 hour	72 hour
Intensities	54.5	24.1	15.8	7.80	4.99	3.20	111.00	44.7	28.3	13.50	8.48	5.40	134	52.5	32.9	15.50	9.72	6.18	196	73.10	45.10	20.80	12.90	8.17	5.31	2.60
Q (m^3/s)	0.0457	0.0202	0.0132	0.0065	0.0042	0.0027	0.0930	0.0375	0.0237	0.0113	0.0071	0.0045	0.1123	0.0440	0.0276	0.0130	0.0081	0.0052	0.1643	0.0613	0.0378	0.0174	0.0108	0.0068	0.0045	0.0022
Volume	**16.44**	**36.36**	**47.68**	**70.61**	**90.34**	**115.87**	**33.49**	**67.44**	**85.39**	**122.21**	**153.53**	**195.53**	**40.43**	**79.21**	**99.27**	**140.31**	**175.98**	**223.77**	**59.14**	**110.29**	**136.09**	**188.29**	**233.55**	**295.83**	**384.54**	**564.86**
SW Vol.	15.27	15.27	15.27	15.27	15.27	15.27	15.27	15.27	15.27	15.27	15.27	15.27	15.27	15.27	15.27	15.27	15.27	15.27	15.27	15.27	15.27	15.27	15.27	15.27	15.27	15.27
Soak Vol	0.32	1.59	3.18	9.54	19.09	38.17	0.32	1.59	3.18	9.54	19.09	38.17	0.32	1.59	3.18	9.54	19.09	38.17	0.32	1.59	3.18	9.54	19.09	38.17	76.34	229.02
SW Total	15.59	16.86	18.45	24.81	34.35	53.44	15.59	16.86	18.45	24.81	34.35	53.44	15.59	16.86	18.45	24.81	34.35	53.44	15.59	16.86	18.45	24.81	34.35	53.44	91.61	244.29
Cell Vol	110.88	110.88	110.88	110.88	110.88	110.88	110.88	110.88	110.88	110.88	110.88	110.88	110.88	110.88	110.88	110.88	110.88	110.88	110.88	110.88	110.88	110.88	110.88	110.88	110.88	110.88
Cell Soak	2.10	10.50	21.00	63.00	126.00	252.00	2.10	10.50	21.00	63.00	126.00	252.00	2.10	10.50	21.00	63.00	126.00	252.00	2.10	10.50	21.00	63.00	126.00	252.00	504.00	1512.00
Cell Total	112.98	121.38	131.88	173.88	236.88	362.88	112.98	121.38	131.88	173.88	236.88	362.88	112.98	121.38	131.88	173.88	236.88	362.88	112.98	121.38	131.88	173.88	236.88	362.88	614.88	1622.88
Total Vol	**128.57**	**138.24**	**150.33**	**198.69**	**271.23**	**416.32**	**128.57**	**138.24**	**150.33**	**198.69**	**271.23**	**416.32**	**128.57**	**138.24**	**150.33**	**198.69**	**271.23**	**416.32**	**128.57**	**138.24**	**150.33**	**198.69**	**271.23**	**416.32**	**706.49**	**1867.17**
	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

Project	**Rockingham Central**
Job Number	**18-07-085**
Date	**27 August 2018**
Engineer	**Jamie King**
Summary	**Soakwell with Tunnelwell Leach Tank System**
Scenario	**Catchment 3**
File Name	**Drainage Calculations**
Revision	**B**
Reference Document	**Letter to client Dated 27 August 2018**
IFD Used	**Rockingham IFD used (32.300° S,115.750° E) generated from BoM website**
Ground Conditions	**High permeability due to s13 sand**
Groundwater (Max)	**High (RL 2.9m)**

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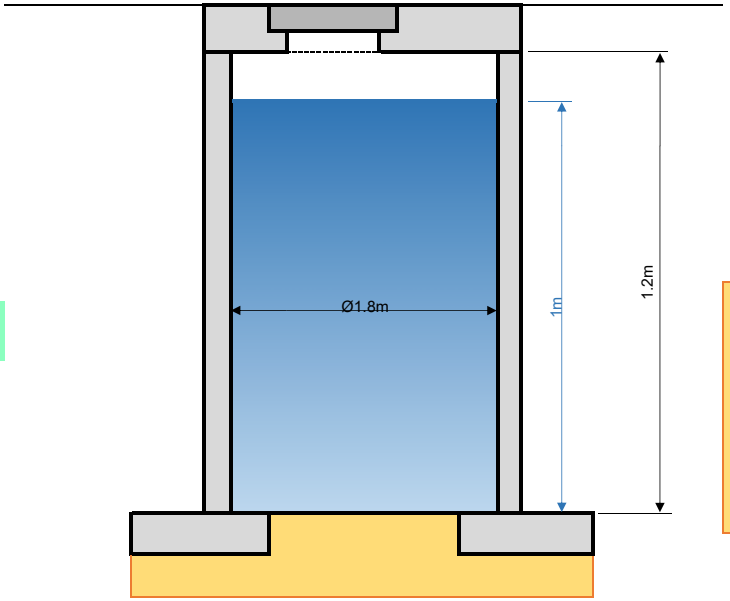

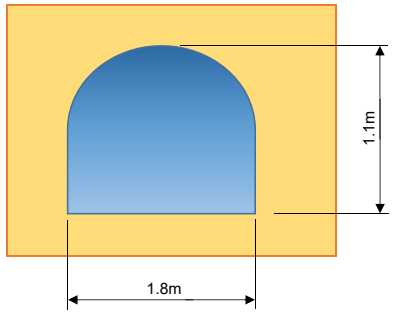

Intensities (mm/hr)		
1 EY (1 year)	6 minute	54.5
	30 minute	24.10
	1 hour	15.80
	3 hour	7.80
	6 hour	4.99
	12 hour	3.20
10% AEP (10 Year)	6 minute	111.00
	30 minute	44.70
	1 hour	28.30
	3 hour	13.50
	6 hour	8.48
	12 hour	5.40
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	3 hour	15.50
	6 hour	9.72
	12 hour	6.18
1% AEP 100 Year	6 minute	196.00
	30 minute	73.10
	1 hour	45.10
	3 hour	20.80
	6 hour	12.90
	12 hour	8.17
	24 hour	5.31
	72 hour	2.60

Catchment Details

Area (ha) =	0.641
Co-efficient of Runoff =	0.90

Soakwell details

Soakwell Diameter (m) =	1.8
Liner Depth (m) =	1.2
Effective Depth (m) =	1
Soakwell base area (m^2) =	2.54
Soakwell Volume (m^3) =	2.54
No of Soakwells =	7

Infiltration

Rate of Soakage (m/day) =	5

Storage Cells

Length (m) =	108.000
Width (m) =	1.800
Height (m) =	1.100
Volume (m^3) =	213.84
Base Area (m^2) =	194.40

Event	1EY (1 Year)						10% AEP (10 Year)						(20 Year)						1% AEP (100 Year)							
Duration	6 min	30 min	1 hour	3 hour	6 hour	12 hour	6 min	30 min	1 hour	3 hour	6 hour	12 hour	6 min	30 min	1 hour	3 hour	6 hour	12 hour	6 min	30 min	1 hour	3 hour	6 hour	12 hour	24 hour	72 hour
Intensities	54.5	24.1	15.8	7.80	4.99	3.20	111.00	44.7	28.3	13.50	8.48	5.40	134	52.5	32.9	15.50	9.72	6.18	196	73.10	45.10	20.80	12.90	8.17	5.31	2.60
Q (m^3/s)	0.0874	0.0386	0.0253	0.0125	0.0080	0.0051	0.1780	0.0717	0.0454	0.0216	0.0136	0.0087	0.2148	0.0842	0.0527	0.0249	0.0156	0.0099	0.3142	0.1172	0.0723	0.0333	0.0207	0.0131	0.0085	0.0042
Volume	**31.46**	**69.55**	**91.19**	**135.06**	**172.81**	**221.64**	**64.07**	**129.00**	**163.34**	**233.76**	**293.67**	**374.01**	**77.34**	**151.51**	**189.89**	**268.39**	**336.61**	**428.04**	**113.13**	**210.96**	**260.31**	**360.16**	**446.74**	**565.87**	**735.56**	**1080.48**
SW Vol.	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81	17.81
Soak Vol	0.37	1.86	3.71	11.13	22.27	44.53	0.37	1.86	3.71	11.13	22.27	44.53	0.37	1.86	3.71	11.13	22.27	44.53	0.37	1.86	3.71	11.13	22.27	44.53	89.06	267.19
SW Total	18.18	19.67	21.52	28.95	40.08	62.34	18.18	19.67	21.52	28.95	40.08	62.34	18.18	19.67	21.52	28.95	40.08	62.34	18.18	19.67	21.52	28.95	40.08	62.34	106.88	285.01
Cell Vol	213.84	213.84	213.84	213.84	213.84	213.84	213.84	213.84	213.84	213.84	213.84	213.84	213.84	213.84	213.84	213.84	213.84	213.84	213.84	213.84	213.84	213.84	213.84	213.84	213.84	213.84
Cell Soak	4.05	20.25	40.50	121.50	243.00	486.00	4.05	20.25	40.50	121.50	243.00	486.00	4.05	20.25	40.50	121.50	243.00	486.00	4.05	20.25	40.50	121.50	243.00	486.00	972.00	2916.00
Cell Total	217.89	234.09	254.34	335.34	456.84	699.84	217.89	234.09	254.34	335.34	456.84	699.84	217.89	234.09	254.34	335.34	456.84	699.84	217.89	234.09	254.34	335.34	456.84	699.84	1185.84	3129.84
Total Vol	**236.07**	**253.76**	**275.86**	**364.29**	**496.92**	**762.18**	**236.07**	**253.76**	**275.86**	**364.29**	**496.92**	**762.18**	**236.07**	**253.76**	**275.86**	**364.29**	**496.92**	**762.18**	**236.07**	**253.76**	**275.86**	**364.29**	**496.92**	**762.18**	**1292.72**	**3414.85**
	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

Project	**Rockingham Central**
Job Number	**18-07-085**
Date	**27 August 2018**
Engineer	**Jamie King**
Summary	**Soakwell with Tunnelwell Leach Tank System**
Scenario	**Catchment 4**
File Name	**Drainage Calculations**
Revision	**B**
Reference Document	**Letter to client Dated 27 August 2018**
IFD Used	**Rockingham IFD used (32.300° S,115.750° E) generated from BoM website**
Ground Conditions	**High permeability due to s13 sand**
Groundwater (Max)	**High (RL 2.9m)**

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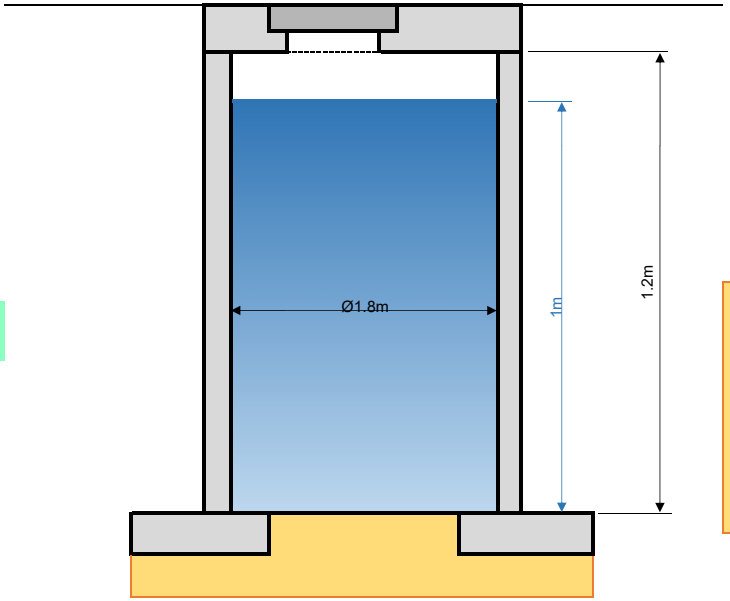
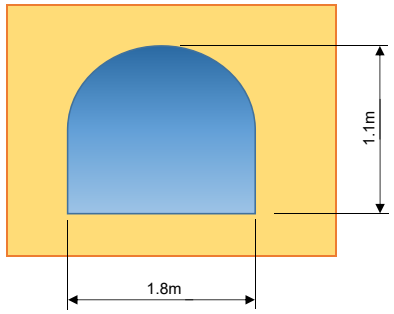




Intensities (mm/hr)

1 EY (1 year)	6 minute	54.5
	30 minute	24.10
	1 hour	15.80
	3 hour	7.80
	6 hour	4.99
	12 hour	3.20
10% AEP (10 Year)	6 minute	111.00
	30 minute	44.70
	1 hour	28.30
	3 hour	13.50
	6 hour	8.48
	12 hour	5.40
(20 Year) (10 Year)	6 minute	134.00
	30 minute	52.50
	1 hour	32.90
	3 hour	15.50
	6 hour	9.72
	12 hour	6.18
1% AEP 100 Year	6 minute	196.00
	30 minute	73.10
	1 hour	45.10
	3 hour	20.80
	6 hour	12.90
	12 hour	8.17
	24 hour	5.31
	72 hour	2.60

Catchment Details

Area (ha) =	0.069
Co-efficient of Runoff =	0.90

Soakwell details

Soakwell Diameter (m) =	1.8
Liner Depth (m) =	1.2
Effective Depth (m) =	1
Soakwell base area (m^2) =	2.54
Soakwell Volume (m^3) =	2.54
No of Soakwells =	2

Infiltration

Rate of Soakage (m/day) =	5

Storage Cells

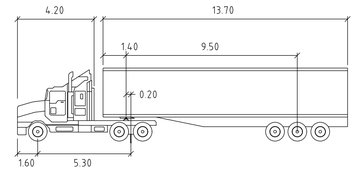
Length (m) =	10.000
Width (m) =	1.800
Height (m) =	1.100
Volume (m^3) =	19.80
Base Area (m^2) =	18.00

Event	1EY (1 Year)						10% AEP (10 Year)						(20 Year)						1% AEP (100 Year)							
Duration	6 min	30 min	1 hour	3 hour	6 hour	12 hour	6 min	30 min	1 hour	3 hour	6 hour	12 hour	6 min	30 min	1 hour	3 hour	6 hour	12 hour	6 min	30 min	1 hour	3 hour	6 hour	12 hour	24 hour	72 hour
Intensities	54.5	24.1	15.8	7.80	4.99	3.20	111.00	44.7	28.3	13.50	8.48	5.40	134	52.5	32.9	15.50	9.72	6.18	196	73.10	45.10	20.80	12.90	8.17	5.31	2.60
Q (m^3/s)	0.0094	0.0041	0.0027	0.0013	0.0009	0.0006	0.0191	0.0077	0.0049	0.0023	0.0015	0.0009	0.0230	0.0090	0.0057	0.0027	0.0017	0.0011	0.0337	0.0126	0.0078	0.0036	0.0022	0.0014	0.0009	0.0004
Volume	**3.37**	**7.46**	**9.78**	**14.48**	**18.53**	**23.76**	**6.87**	**13.83**	**17.51**	**25.06**	**31.48**	**40.10**	**8.29**	**16.24**	**20.36**	**28.77**	**36.09**	**45.89**	**12.13**	**22.62**	**27.91**	**38.61**	**47.89**	**60.67**	**78.86**	**115.84**
SW Vol.	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09
Soak Vol	0.11	0.53	1.06	3.18	6.36	12.72	0.11	0.53	1.06	3.18	6.36	12.72	0.11	0.53	1.06	3.18	6.36	12.72	0.11	0.53	1.06	3.18	6.36	12.72	25.45	76.34
SW Total	5.20	5.62	6.15	8.27	11.45	17.81	5.20	5.62	6.15	8.27	11.45	17.81	5.20	5.62	6.15	8.27	11.45	17.81	5.20	5.62	6.15	8.27	11.45	17.81	30.54	81.43
Cell Vol	19.80	19.80	19.80	19.80	19.80	19.80	19.80	19.80	19.80	19.80	19.80	19.80	19.80	19.80	19.80	19.80	19.80	19.80	19.80	19.80	19.80	19.80	19.80	19.80	19.80	19.80
Cell Soak	0.38	1.88	3.75	11.25	22.50	45.00	0.38	1.88	3.75	11.25	22.50	45.00	0.38	1.88	3.75	11.25	22.50	45.00	0.38	1.88	3.75	11.25	22.50	45.00	90.00	270.00
Cell Total	20.18	21.68	23.55	31.05	42.30	64.80	20.18	21.68	23.55	31.05	42.30	64.80	20.18	21.68	23.55	31.05	42.30	64.80	20.18	21.68	23.55	31.05	42.30	64.80	109.80	289.80
Total Vol	**25.37**	**27.29**	**29.70**	**39.32**	**53.75**	**82.61**	**25.37**	**27.29**	**29.70**	**39.32**	**53.75**	**82.61**	**25.37**	**27.29**	**29.70**	**39.32**	**53.75**	**82.61**	**25.37**	**27.29**	**29.70**	**39.32**	**53.75**	**82.61**	**140.34**	**371.23**
	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

Attachment 4 - Swept Path Analysis Plans

LEGEND

- PROPOSED KERBING
- PROPOSED LINEMARKING
- EXISTING KERBING
- EXISTING BUILDING



PM S 19M

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 27.8
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

PROJECT:

ROCKINGHAM CENTRAL
ROCKINGHAM

No	DATE	REVISION	BY
A	27-8-2018	ISSUED FOR INFORMATION	DLC

Porter Consulting Engineers

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YUGNO Pty Ltd ACN 010 691 148 as trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 636 396 385

CLIENT:

ARISE DEVELOPMENTS

DRAWING:

TURNING MOVEMENTS 19m SEMI-TRAILER

STATUS: **FOR INFORMATION**

SCALE	1:300
DATE	JUL 2018
DESIGN	DLC
DRAWN	DLC
CHECK	

DRAWING No. **18-7-85/800** REV No. **A** ORIGINAL DRAWING SIZE **A1**

FILE NAME S:\ACTIVE PROJECTS\18-07-085\ACAD\18785-800-801.dwg

APP'D

PROJECT:

ROCKINGHAM CENTRAL
ROCKINGHAM

No	DATE	REVISION	BY
B	28-8-2018	ADDITIONAL TURNING MOVEMENTS	DLC
A	27-8-2018	ISSUED FOR INFORMATION	DLC

Porter Consulting Engineers

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TIGNO Pty Ltd ACN 070 091 148 as trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 636 396 385

CLIENT:

ARISE DEVELOPMENTS

DRAWING:

TURNING MOVEMENTS 12.5m SERVICE TRUCK SHEET 1

STATUS: **FOR INFORMATION**

SCALE	1:300
DATE	JUL 2018
DESIGN	DLC
DRAWN	DLC
CHECK	

DRAWING No. **18-7-85/801**

REV No. **B**

ORIGINAL DRAWING SIZE **A1**

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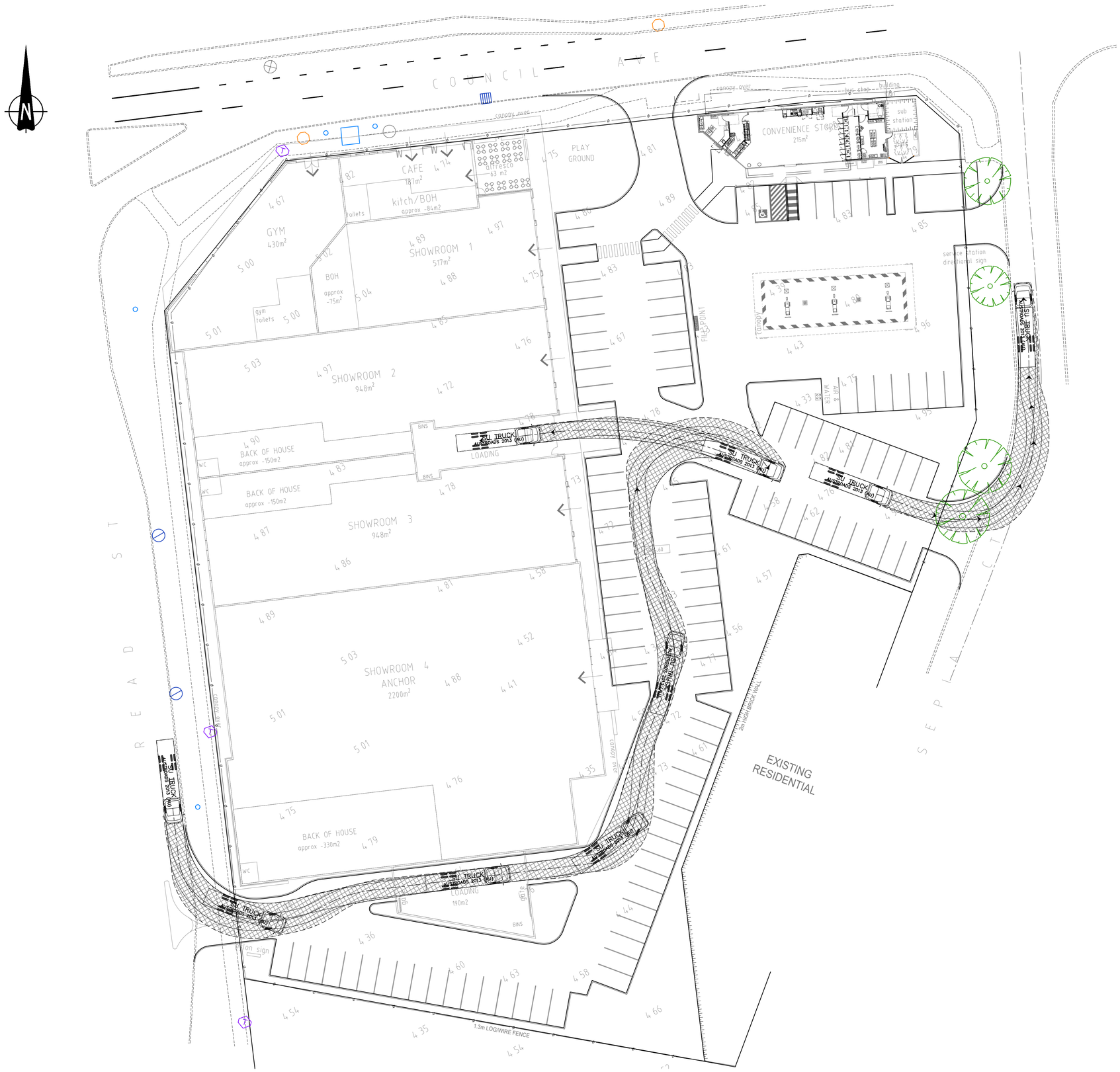
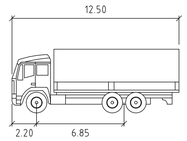
APP'D



LEGEND

- PROPOSED KERBING
- PROPOSED LINEMARKING
- EXISTING KERBING
- EXISTING BUILDING



SU TRUCK

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 36.6

PROJECT:

ROCKINGHAM CENTRAL
ROCKINGHAM

No	DATE	REVISION	BY
B	28-8-2018	ADDITIONAL TURNING MOVEMENTS	DLC
A	27-8-2018	ISSUED FOR INFORMATION	DLC

Porter Consulting Engineers

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TUGNO Pty Ltd ACN 010 691 148 as trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 636 396 385

CLIENT:

ARISE DEVELOPMENTS

DRAWING:

TURNING MOVEMENTS 12.5m SERVICE TRUCK SHEET 2

STATUS: **FOR INFORMATION**

SCALE	1:300
DATE	JUL 2018
DESIGN	DLC
DRAWN	DLC
CHECK	
APP'D	

DRAWING No. **18-7-85/802**

REV No. **B**

ORIGINAL DRAWING SIZE **A1**

FILE NAME S:\ACTIVE PROJECTS\18-07-085\ACAD\18785-800-801.dwg

ROCKINGHAM CENTRAL

LANDSCAPE CONCEPT
DA SUBMISSION

DRAWING LIST

LEGEND

1. Trees to provide shade as well as help create landscape identity
2. Bands of native groundcover and low shrub planting in verges to give identity to the development frontages
3. Bonds of low planting to building facade adjacent to windows
4. Bands of native low groundcover and shrub planting to be combined with bands of bound gravel to create a feature within lot boundaries
5. Feature rammed earth walls and boulders help to define spaces and provide informal seating within lot boundaries
6. Native hedge planting and trees to visually screen and separate residential properties from the development
7. Turf area to main road frontage keeps views open to the built form from the road

OVERALL LANDSCAPE THEME

The landscape theme for Rockingham Central takes inspiration from a palette of Australian bushland colours and textures with a contemporary twist. A mixture of materials will be used such as coloured concrete, rammed earth walls, bound gravels which will be combined with a strong West Australian native planting palette. High quality paving materials will be used around the building frontages which will create the footprint for the built form.
Footpath routes have been carefully considered to enable safe pedestrian access throughout the site, as well as access into the site from adjacent roads and footpaths. The entire site is designed to be open and accessible with CPTED considered for all areas to ensure a safe environment for people.

8. Footpath routes realigned to follow desire lines and to create a more open landscape area
9. Nature play area (refer to drawing SK02 for details)
10. Grass trees will be used throughout the development to help establish a strong native landscape character. The Grass Trees will be salvaged from the site and re-used where possible.
11. Existing trees in verges to be retained where possible
12. Small open space area to have a shaded space defined where people can sit in the shade and rest
13. Trafficable feature paving to entry locations help establish legibility for pedestrians
14. Entry signage to be located in prominent positions
15. Quality concrete pavers with various textures and patterns used around site to define spaces and areas
16. Existing bus stop to be relocated
17. Proposed feature tree to mark development
18. Building canopy line
19. Grass tree planting at increased density to cafe frontage to shield from road
20. Small scale trees under canopy structure

INSPIRATIONAL IMAGERY

Bound Gravel | Feature Paving | Concrete Pavers | Rammed Earth Wall | Laterite Boulder

PLANTING PALETTE

Xanthorrhoea preissii | Melaleuca leucadendra | Eucalyptus victrix | Eucalyptus sideroxylon 'Rosea' | Eucalyptus wandoo

Eremophila glabra | Eremophila nivea | Conostylis candicans | Hemiandra pungens | Adenanthos cuneatus

TIMDAVIESLANDSCAPING

AUTHOR: AF Q.A: RB

PROJECT #: 10349 - TDL

1:250 @ A1

ROCKINGHAM CENTRAL
LANDSCAPE CONCEPT

SK01-D

INSPIRATIONAL IMAGERY

LEGEND

1. Pool-type safety fence with access gate
2. Painted tunnel 'entry'
3. Rubber mounds with timber balance beams 0.3-0.6m high
4. Rubber mound with embankment slide, 1.2m high
5. Small rubber stepping humps
6. Timber balancing logs / informal seats
7. Timber steppers 0.2-0.55m high
8. Vertical timber post
9. Mulch softfall
10. Flush timber steppers
11. Coloured concrete to entry area
12. Planting pockets with native shrubs and grass trees
13. Feature climbing rocks and rock edging
14. Salvaged grass trees
15. Bench seat for parents
16. Indicative roofline of shade structure by Architect

ILLUSTRATIVE VIEW

TIMDAVIESLANDSCAPING

AUTHOR: AF Q.A: RB

PROJECT #: 10349 - TDL

NTS

ROCKINGHAM CENTRAL

PLAY AREA CONCEPT

SK02-D

INSPIRATIONAL IMAGERY

LEGEND

1. Feature rammed earth walls help to define spaces and provide informal seating
2. Native groundcover and low shrub planting used throughout site
3. Trees to provide shade as well as help create landscape identity
4. Screen planting along residential boundary wall
5. External paint to residential boundary wall to tie in with landscape treatments
6. Grass trees will be used throughout the development to help establish a strong native landscape character. The Grass Trees will be salvaged from the site and re-used where possible.
7. Quality concrete pavers to provide informal access routes
8. Bound gravel in earth colour to enhance landscape theme
9. Informally placed laterite boulders

PLANTING PALETTE

ILLUSTRATIVE VIEW

EXISTING RESIDENTIAL

2m HIGH BRICK WALL

TIMDAVIESLANDSCAPING

n

AUTHOR: AF Q.A: RB

PROJECT #: 10349 - TDL

1:50 @ A1

ROCKINGHAM CENTRAL

SMALL OPEN SPACE CONCEPT

SK03-D

WASTE MANAGEMENT PLAN

Commercial Development
Rockingham Central

Council Avenue (cnr Read Street), Rockingham

August 2018

Prepared by Dallywater Consulting
For Arise Rockingham Pty Ltd

DALLYWATER CONSULTING

REPORT COMMISSIONED BY:

Arise Developments
Development Manager – Alex Drake-Brockman
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Subiaco, WA 6008
Phone: (08) 9388 6702: m 0429 777 603
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REPORT PREPARED BY:

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Chittering WA 6084
Phone: 0427 137 503
Email: gordiebh@gmail.com

Version 3: 28 August 2018

TABLE OF CONTENTS

1 EXECUTIVE SUMMARY

Arise Rockingham Pty Ltd is applying to the City of Rockingham (the "City") to develop a property on the corner of Council Avenue and Read Street in Rockingham (Central). The development is proposed to consist of 4 showrooms, a gymnasium, convenience fuel shop and cafe.

As part of the Development Approval process, the developer is required to submit a Waste Management Plan (WMP) for the development to the City. Arise Rockingham Pty Ltd employed the services of Dallywater Consulting to investigate the City's requirements in this regards and to develop this WMP.

These numbers of receptacles and the storage areas required for them would impinge significantly on available floor space within the development and raise many issues in regards to their management within the site (e.g. handling, bin stores size, collection points etc).

Various options needed to be considered to reduce the number of bins required to be stored on and serviced from the site and those selected were larger bins and increased servicing.

Proposed Arrangements

The following initiatives will be implemented for the waste and recycling servicing at the proposed development. The design of the development supports the initiatives. The initiatives will obviously be dependent on the collection options available at the time of the building being occupied and may be varied to suit the final generation rates.

Convenience Fuel Store:

Use of 660 litre receptacles for waste and recycling;

- Daily collections of the waste material; and
- Four collections per week of the recycling material; or

Use of 1100 litre bins for waste and recycling;

- Five collections per week of the waste material; and
- Three collections per week of the recycling material.

These initiatives will result in the following requirements for receptacles;

- 660s: 1 waste bin collected daily and 1 recycling bin collected 4 times per week
- 1100s: 1 waste bin collected 5 times per week and 1 recycling bin collected 3 times per week.

Showrooms, Cafe and Gymnasium:

Use of 1100 litre bins for waste and recycling;

- Daily collections of the waste material; and
- Daily collections of the recycling material.

These initiatives will result in the following requirements for receptacles;

- 3 waste bins collected daily and 1 recycling bin collected daily.

Review

All of the above-mentioned waste servicing arrangements will be reviewed as a matter of course on an ongoing basis to ensure that the most efficient arrangements to manage the waste and recycling material generated by all aspects of the facility are in place and are maintained.

DEFINITIONS

240: A 240 litre waste or recycling receptacle.

360: A 360 litre waste or recycling receptacle.

660: A 660 litre waste or recycling receptacle.

1100: An 1100 litre waste or recycling receptacle.

Building Management: For the purposes of this document, the selected legal entity charged with managing the soft services of the built structure (i.e. waste management, cleaning, landscaping, security and other similar human-sourced services) on behalf of the owners and tenants of the commercial spaces.

Recycling: Any material accepted by the local government's recycling collection contract.

Waste: Any recyclable and non-recyclable discarded solid, semi-solid, liquid or contained gaseous materials not accepted by the local government's recycling collection contract.

Waste Minimisation: A process to minimise the amount of waste requiring disposal via hierarchical activities such as behaviour and product modification, waste avoidance, reduction, reuse and recycling.

Total Waste Stream: The combined waste, recyclables and compostables.

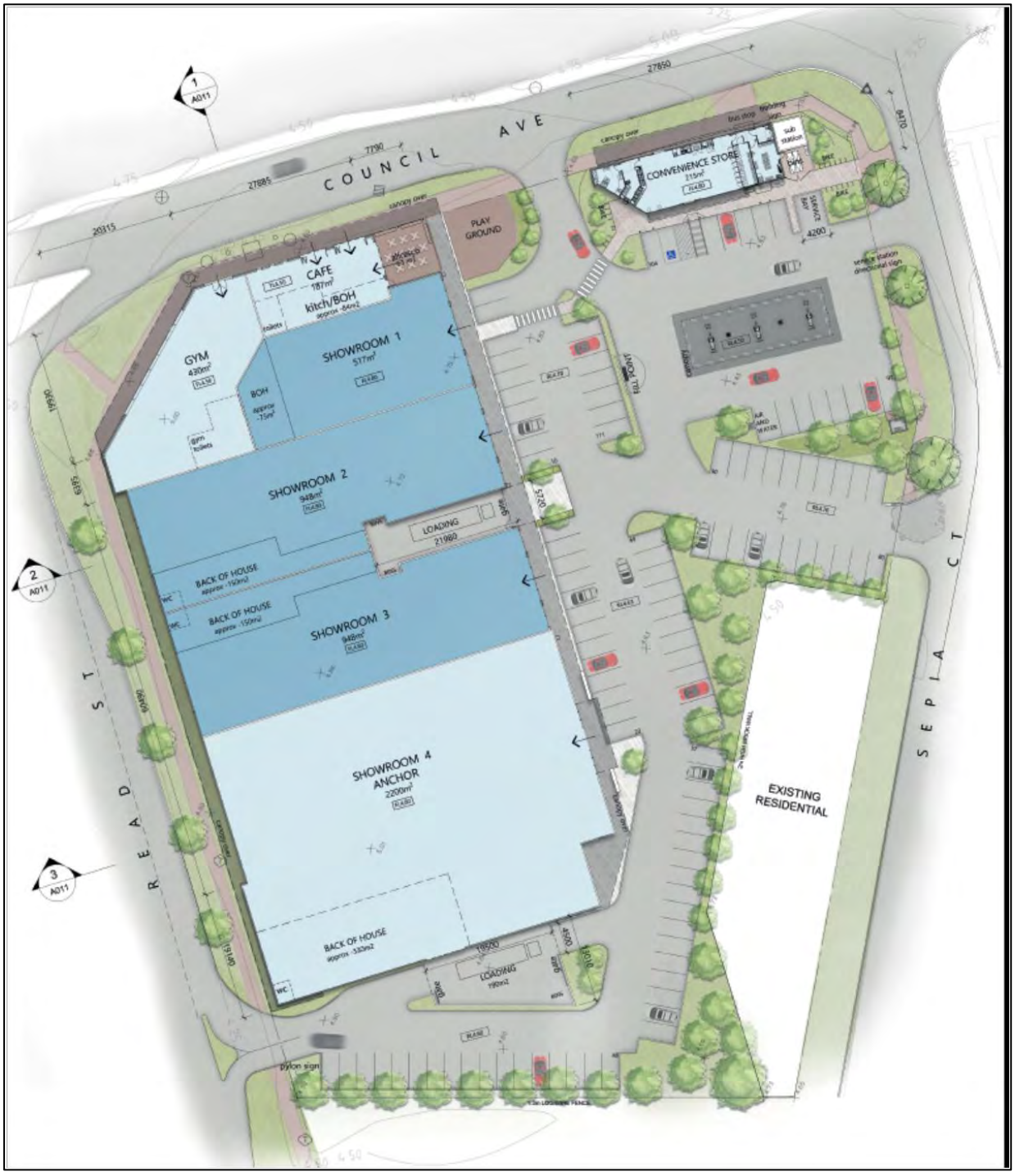
2 INTRODUCTION

2.1 The Development

Arise Rockingham Pty Ltd is applying to the City of Rockingham (the "City") to develop a property on the corner of Council Avenue and Read Street in Rockingham (Central). The development is proposed to consist of 4 showrooms, a gymnasium, convenience fuel store and cafe.

As part of the Development Approval process, the developer is required to submit a Waste Management Plan (WMP) for the development to the City. Arise Rockingham Pty Ltd employed the services of Dallywater Consulting to investigate the City's requirements in this regards and to develop this WMP.

Figure 1: Location Plan



The following table details the numbers (and types) of commercial tenancies proposed for the development.

Table 1: Number and Type of Tenancies

USE TYPE	Number	m2
Showroom 1	1	592
Showroom 2	1	1098
Showroom 3	1	1098
Showroom 4	1	2530
Gymnasium	1	430
Convenience Fuel Store	1	215
Cafe	1	304
Total Commercial Spaces	**7**	**6267**

2.2 Onsite Waste Management

The following provisions have been made for waste and recycling on the site:

- **Showroom Tenancies**
  - The tenants will take their waste and recycling material to the Loading Dock located at the rear of the units and dispose of those materials into bins located in that space.
- **Gymnasium and Cafe Tenancies**
  Subject to negotiations with the City, the Gymnasium and Cafe tenants will either;
  - take their waste and recycling material to the Loading Dock located at the rear of the showroom units and dispose of those materials into the bins located in that space; or
  - place their waste and recycling material into waste and recycling bins located within their premises and present those bins on collection days to the carpark kerb on Council Avenue or a position within the carpark agreed to by the City. It should be noted that if this option is adopted, smaller 240 or 360 litre bins would be used and serviced by a side arm vehicle for kerbside collection.
- **Convenience Fuel Store Tenancy**
  - take their waste and recycling material to the Bin Store area located at the rear of the building and dispose of those materials into the bins located in that space.
- **All Tenancies**
  - Each commercial tenant will be responsible for their own daily in-house storage of waste and recyclable material. At the end of each day (or more frequently as required), staff from the commercial tenancies will transport their waste and recycling material to the respective Bin Stores.
  - Any putrescible waste from the Cafe or Convenience Fuel Store is to be placed in sealed plastic bags before being placed in the waste bins.
- **Hardwaste/Bulky Items**
  - Commercial tenants will be required to organise their own immediate disposal of large or bulky items not suitable for disposal to the bins.
- **Waste Collection**
  - The City has indicated that the proponent (and subsequent tenants or building owners) are able to use privately contracted collection companies to service this development.
  - Private contractors are able to collect waste and recycling on a daily basis if required.

3 LOCAL GOVERNMENT WASTE MANAGEMENT REQUIREMENTS

3.1 Waste Management Guidelines

The following provisions have been sourced from the City's Coordinator Waste Collection Services. The City has indicated that the use of the City of Melbourne's guideline document entitled *"Waste Generation Rates"* 2015 as the basis for calculating the waste generation from the various uses in this development is acceptable.

3.2 Waste Generation

The Coordinator confirmed that the City's requirements for the provision of waste storage for this type of development are as follows:

- 240 litre to 1100 litre receptacles can be used;
- If increased collection frequencies are required, these would usually be conducted by commercial contractor under private arrangement; and
- Waste and recycling receptacles are to be provided in sufficient numbers to cater for the waste generation requirements detailed in the following table.

3.2.1 Commercial Uses

Per the City of Melbourne's guidelines, the waste generation rates for the commercial office component of the development are calculated as follows:

Table 2: Waste Generation Rats for Various Uses

Type of premises	Waste Generation	Recycling Generation
Convenience fuel store	300 litres per 100 square metres of floor area per day	150 litres per 100 square metres of floor area per day
Cafe	300 litres per 100 square metres of floor area per day	200 litres per 100 square metres of floor area per day
Gymnasium	10 litres per 100 square metres of floor area per day	10 litres per 100 square metres of floor area per day
Showroom	40 litres per 100 square metres of floor area per day	10 litres per 100 square metres of floor area per day

Note: The cafe, gymnasium and convenience fuel store waste generation has been calculated at 7 days while the showrooms are likely to be used for only 6 days per week. However, the calculations included here-under show that increasing the generation rate to seven days for the showrooms does not impact on the required bin numbers at the adopted collection frequencies.

3.3 Bin Stores

- Bin stores should be provided adequate to house all bins with sufficient area to manoeuvre the bins and with equal access to waste and recycling bins.
- Bin stores are to be provided with a permanent water supply and drainage facility for washdown.

3.4 Bin Presentation

- All 1100 litre bins are to be emptied from within the bin stores.
- Where smaller 240 or 360 litre bins are used (i.e. by the gymnasium) and bins are presented to the kerb (i.e. on the street or in the carpark), bins will be returned to the premises immediately they have been emptied.

3.5 Waste Capacity

Based on the above requirements, the weekly storage capacity required by the City for waste and recycling from the proposed development is detailed in the following tables.

It is noted that the Convenience Fuel Store has its own bin store area and as such, its calculations are shown separately.

Table 3: Estimated Weekly Volumes - Commercial Building 1 (Convenience Fuel Store)

Commercial Units	Floor Area	Material Generation Rate (m3/100m2/day)		Weekly Volume (m3)	
Use	**m2**	**Waste**	**Recycling**	**Waste**	**Recycling**
Convenience Fuel Store	215	0.30	0.15	**4.52**	**2.26**

Table 4: Estimated Weekly Volumes - Commercial Building 2 (Mixed Uses)

Commercial Units	Floor Area	Material Generation Rate (m3/100m2/day)		Weekly Volume (m3)	
Use	**m2**	**Waste**	**Recycling**	**Waste**	**Recycling**
Showroom 1	592	0.04	0.01	**1.42**	**0.36**
Showroom 2	1098	0.04	0.01	**2.64**	**0.66**
Showroom 3	1098	0.04	0.01	**2.64**	**0.66**
Showroom 4	2530	0.04	0.01	**6.07**	**1.52**
Gymnasium	430	0.01	0.01	**0.30**	**0.30**
Cafe	304	0.30	0.20	**6.38**	**4.26**
Total Generation Area	**6267**	**Total Commercial Volume**		**19.45**	**7.75**

3.6 Number of Bins

Based on the above volumes, the number of 240, 360, 660 or 1100 litre receptacles required to cater for the weekly waste and recycling volumes for this development are detailed in the following tables.

Table 5: Required Number of Bins (Convenience Fuel Store)

Convenience Fuel Store								
Bin Size (litres)	**240**		**360**		**660**		**1100**	
Material	**w**	**r**	**w**	**r**	**w**	**r**	**w**	**r**
Material Volume (m3)	**4.52**	**2.26**	**4.52**	**2.26**	**4.52**	**2.26**	**4.52**	**2.26**
Number of Bins per Week (rounded up)	19	10	13	7	7	4	5	3

Table 6: Required Number of Bins (Showrooms, Gymnasium, Cafe)

Showrooms, Gymnasium, Cafe								
Bin Size (litres)	**240**		**360**		**660**		**1100**	
Material	**w**	**r**	**w**	**r**	**w**	**r**	**w**	**r**
Material Volume (m3)	**19.45**	**7.75**	**19.45**	**7.75**	**19.45**	**7.75**	**19.45**	**7.75**
Number of Bins per Week (rounded up)	82	33	55	22	30	12	18	8

3.7 Summary

Based on the above and with weekly waste and recycling collections, the number of bins required for the development would be;

- For the Convenience Fuel Store;
  - 19 waste and 10 recycling 240 litre receptacles;
  - 13 waste and 7 recycling 360 litre receptacles;
  - 7 waste and 4 recycling 660 litre receptacles;
  - 5 waste and 3 recycling 1100 litre receptacles;
- For the Showrooms, Cafe and Gymnasium;
  - 82 waste and 33 recycling 240 litre receptacles;
  - 55 waste and 22 recycling 360 litre receptacles;
  - 30 waste and 12 recycling 660 litre receptacles;
  - 18 waste and 8 recycling 1100 litre receptacles;

These numbers of receptacles and the storage areas required for them would impinge significantly on available floor space within the development and raise many issues in regards to their management within the site (e.g. handling, bin stores size, collection points etc).

Various options need to be considered to reduce the number of bins required to be stored on and serviced from the site.

4 REDUCING CAPACITY

It can be seen from the preceding tables that alternatives are required to reduce the number of waste and recycling receptacles required for the development. The initiatives selected are:

- Use of larger capacity bins; and
- Increased servicing (collections).

4.1 Larger Bins

The use of larger bins will result in less floor space being required in the bin stores.

660 and 1100 litre bins can be serviced from the site and sufficient access has been provided for a front (or rear) load collection vehicle to access the Loading Bay area to service the showrooms, cafe and gymnasium bins. A larger vehicle may also be able to directly access the Convenience Fuel Store bin area but the smaller 660 litre bins may be more practical and provide some flexibility for the collection vehicle if the forecourt is busy. The 660 bins are mobile enough to be much more easily moved to the carpark area for emptying by a smaller collection vehicle with less interference to carpark traffic.

4.2 Servicing Rates

A collection arrangement with a private collection contractor can provide significant benefit through flexible collection arrangements. That is, a private contractor could potentially service the buildings' waste and recycling material on a daily basis if required.

Therefore, the proponent will contract a private collector for both the waste and recycling material from the development. Increased collection frequencies can therefore be considered and the effect of this practice would see a significant reduction in bin numbers.

While both of the above-mentioned initiatives on their own will reduce the capacity and therefore the number of bins required, combining the net effect of both initiatives will realise significant reductions.

4.2.1 Commercial

The following table shows the number of the variously sized bins against increased collection frequencies. As discussed previously, the final bin numbers will depend on the collection service and bin size adopted.

Table 7: Number of Bins (Convenience Fuel Store) - Larger Bins & Increased Servicing

Convenience Fuel Store								
Bin Size (litres)	**240s**		**360s**		**660s**		**1100s**	
Collection Frequency	**w**	**r**	**w**	**r**	**w**	**r**	**w**	**r**
1 per week	18.81	9.41	12.54	6.27	6.84	3.42	4.10	2.05
2 x per week	9.41	4.70	6.27	3.14	3.42	1.71	2.05	1.03
3 x per week	6.27	3.14	4.18	2.09	2.28	1.14	1.37	0.68
4 x per week	4.70	2.35	3.14	1.57	1.71	0.86	1.03	0.51
5 x per week	3.76	1.88	2.51	1.25	1.37	0.68	0.82	0.41
6 x per week	3.14	1.57	2.09	1.05	1.14	0.57	0.68	0.34
7 x per week	2.69	1.34	1.79	0.90	0.98	0.49	0.59	0.29

Table 8: Number of Bins (Showrooms, Cafe a& Gymnasium) - Larger Bins & Increased Servicing

Showrooms, Cafe and Gymnasium								
Bin Size (litres)	**240s**		**360s**		**660s**		**1100s**	
Collection Frequency	**w**	**r**	**w**	**r**	**w**	**r**	**w**	**r**
1 per week	81.03	32.28	54.02	21.52	29.47	11.74	17.68	7.04
2 x per week	40.52	16.14	27.01	10.76	14.73	5.87	8.84	3.52
3 x per week	27.01	10.76	18.01	7.17	9.82	3.91	5.89	2.35
4 x per week	20.26	8.07	13.51	5.38	7.37	2.93	4.42	1.76
5 x per week	16.21	6.46	10.80	4.30	5.89	2.35	3.54	1.41
6 x per week	13.51	5.38	9.00	3.59	4.91	1.96	2.95	1.17
7 x per week	11.58	4.61	7.72	3.07	4.21	1.68	2.53	1.01

From the preceding tables, using 660 litre bins, the Convenience Fuel Store could manage its weekly waste stream with daily waste collections and four recycling collections per week. Alternatively, using 1100 litre bins, its weekly generation could be managed with five waste collections and three recycling collections per week.

Using 1100 litre bins, the material generated by the Showrooms, Cafe and Gymnasium could be managed in three waste bins and one recycling bin with daily collections.

4.3 Summation

It is proposed that the following initiatives will be implemented for the waste and recycling servicing at the proposed development. The initiatives will obviously be dependent on the collection options available at the time of the building being occupied and may be varied to suit the final generation rates.

Convenience Fuel Store:

Use of 660 litre receptacles for waste and recycling;

- Daily collections of the waste material; and
- Four collections per week of the recycling material; or

Use of 1100 litre bins for waste and recycling;

- Five collections per week of the waste material; and
- Three collections per week of the recycling material.

These initiatives will result in the following requirements for receptacles;

- 660s: 1 waste bin collected daily and 1 recycling bin collected 4 times per week
- 1100s: 1 waste bin collected 5 times per week and 1 recycling bin collected 3 times per week.

Showrooms, Cafe and Gymnasium:

Use of 1100 litre bins for waste and recycling;

- Daily collections of the waste material; and
- Daily collections of the recycling material.

These initiatives will result in the following requirements for receptacles;

- 3 waste bins collected daily and 1 recycling bin collected daily.

If the gymnasium used 360 litre waste and 360 litre recycling bins, it would only need one bin for each stream collected weekly and as such, it may be able to present those bins to the kerb for side-arm collection.

Review

All of the above-mentioned waste servicing arrangements will be reviewed as a matter of course on an ongoing basis to ensure that the most efficient arrangements to manage the waste and recycling material generated by all aspects of the facility are in place and are maintained.

5 BIN STORAGE AND MANAGEMENT

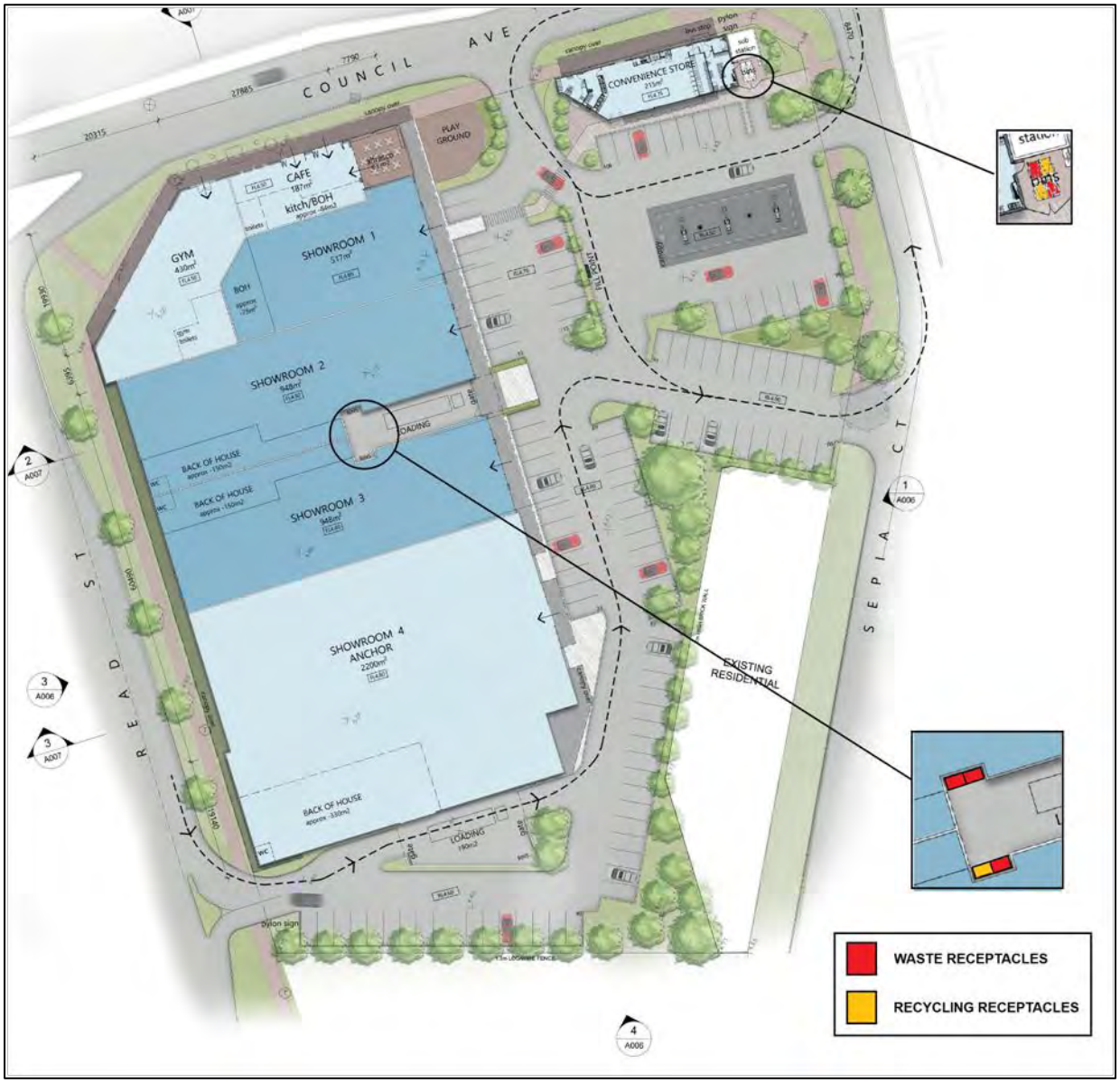
5.1 Bin Compounds/Stores

There are two bin stores within the development. They are the bin store area within the Loading Dock at the rear of the showroom building and the bin store located immediately at the rear of the Convenience Fuel Store. A plan showing the location of the stores is included below.

The access gates to both these areas will be key locked and only tenants will have access to the bins.

Both stores have sufficient space for the required number of bins.

Figure 2: Commercial Bin Stores



5.2 Bin Stores Specifications

The bin stores have been designed to meet or exceed the following specifications:

- Construction to be of brick, concrete, corrugated compressed fibre cement sheet or other suitable impervious material;
- Walls to be not less than 1.5 metres in height with an internal access way of not less than 1 metre in width;
- A tap connected to an adequate supply of water and a floor waste connected to the public sewer to be installed within each compound;
- The floors to be smooth and impervious and evenly graded to the floor waste; and
- There is to be easy access to allow for the removal of the receptacles.

5.3 Bin Stores Purpose

The purposes of the two stores are as follows.

- Storage of commercial waste and recycling;
- Storage of waste and recycling receptacles; and
- Some (minimal) potential storage of segregated recyclables (e.g. E-waste, printer cartridges, paper, fluorescent tubes etc).

5.4 Amenity

The store areas have been designed so that they;

- are well ventilated;
- can be kept thoroughly clean and disinfected;
- will prevent access to vermin and limit noise egress; and
- are consistent with the overall aesthetics of the development.

5.5 Bin Management

The management of the bins throughout the complex will be coordinated by the owners and/or Building Management and written into the strata management arrangements. Cleaners or similar personnel are likely to be either employed or contracted directly by the Building Management or owners to manage waste throughout the facility and as such, will be made aware of the expectations regarding use of the bins and stores.

Those personnel will be responsible for all bins in the bin stores and rotating full bins with empty ones as required. They will also be responsible for ensuring that the stores are accessible on collection days.

Unless other arrangements are made with the Building Management, it is anticipated that commercial tenants/occupants will bring their own waste and recycling material to the stores each day.

5.6 Bin Presentation and Collection

Collection of bins will be as per the following arrangement:

- The collection vehicle will access the bin stores and collection staff will retrieve the bins from the bin stores, empty them and return the bins back to the bin stores.
- The collection contractor will be required to operate in such a manner so as not to contravene the requirements of legislation such as the Environmental Protection (Noise) Regulations 1997, the Road Traffic Act 1974 and the Occupational Safety and Health Act 1984 and any relevant regulations.

5.7 Signage

Signage will be installed to the Store area advising of the correct usage and maintenance of the bins.

6 WASTE MANAGEMENT RESPONSIBILITIES

6.1 Building Owners/Strata Management

The owners, Building Management or strata body will have responsibility for ensuring that the commercial waste management activities are appropriately conducted and that tenants meet their waste management responsibilities. Each owner or the building management will allocate responsibility for all waste management activities to either a Building Caretaker or Cleaner (Waste Personnel). These positions will be responsible for the management of waste throughout the tenancy/and or complex and staff will be trained in all facets of the role.

6.2 Building Caretaker/Cleaner

At a minimum, the waste personnel will undertake the following bin servicing and waste management functions;

- Regular inspection and rotation of bins in the stores to ensure that a an empty or part empty bin is always available to users;
- Regular cleaning of bins and bin stores;
- Ensure access to stores for collectors on collection days;
- Ensure bins have been returned to the bin stores after collection; and
- Assistance with bin movement for operators (if required or negotiated).

In addition, the education of incoming owners and tenants will be a priority for these staff.

In the future, with the initial assistance of waste management experts, training of staff to implement Waste Minimisation Plans for the development may be explored. The plans could provide recommendations on, and include specific actions for;

- the segregation of specific recycling materials from the comingled stream; and
- implementation of waste reduction initiatives such as eWaste recycling.

6.3 Tenants

All tenants would be instructed via the owners or Building Management of the various waste requirements. This would include direction on the use of the bin facilities and expectations of the managing body with regards to any recycling or waste diversion.

In the absence of any other individual arrangement with the waste personnel, tenants (and their contractors) would be responsible for the immediate removal and disposal off-site of any waste unsuitable for placement in the bins. This would include large bulky waste and electronic items and waste from any building maintenance activities.

It is envisaged that the development of a Waste Minimisation Plan mentioned above would include the production of educational literature suitable for commercial tenants (including for inductions) and recommendations for signage relevant to the internal function of the various bin stores and waste management facilities.

7 REFERENCES

- City of Melbourne: *Waste Generation Rates (2015)*

Report on

GEOTECHNICAL STUDY
PROPOSED MIXED-USE DEVELOPMENT
CORNER READ STREET & COUNCIL AVENUE
ROCKINGHAM

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J1702030 002 R Rev2

24 August 2018

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APPENDICES

1. INTRODUCTION

This report presents the outcomes of Galt Geotechnics Pty Ltd's (Galt's) geotechnical study for the proposed mixed-use development at the corner of Read Street and Council Avenue, Rockingham (the "site"). The location of the site relative to the surrounding area is shown on Figure 1, Site and Location Plan.

The study was authorised by Alex Drake-Brockman of Arise Developments in an email dated 24 July 2018.

This revised report includes changes based on comments by the City of Rockingham, and supersedes our previous report, J702030 002 R Rev2, dated 23 August 2018.

2. SITE DESCRIPTION AND PROPOSED DEVELOPMENT

Based on the supplied information, the site is irregular in shape and approximately 1.24 hectares in size. The site is bounded by Council Avenue to the north, Read Street to the west, Sepia Court to the east and residential lots to the south.

The provided development plan indicates that the site is relatively flat with a surface elevation between RL 4.4 m and RL 5 m AHD.

There is a light to moderate coverage of vegetation, comprising of grasses, low shrubs and grass trees.

Based on the provided concept drawings, we understand the development will comprise:

- several retail-type tenancies / showrooms along the western / southern boundaries,
- a gym and café in the north west corner;
- a petrol station in the north east corner; and
- car parking and access roads over the remainder of the site (mainly the east and southern portions).

We assume that the buildings will typically be masonry or tilt-up concrete construction, founded on slab on-ground or shallow foundations.

We understand the only significant excavations are likely to be for the buried tanks at the service station, which we assume will extend to around 4 m depth.

3. PREVIOUS STUDIES

Galt Environmental carried out an environmental study for the site in January 2018 (report reference: J1702030 001 R Rev1, dated 12 February 2018).

The study included the drilling of 10 boreholes across the site to depths of between 1 m and 6 m, with boreholes logged in accordance with AS1726-2017.

The subsurface conditions were found to comprise sand to depth at all test locations (up to 6 m depth). Groundwater was encountered at depths of between 2.7m and 4.1 m across the site.

The findings of the environmental report have been used to supplement the findings of the current geotechnical study.

4. PROJECT OBJECTIVES

The objectives of the current study were to:

- assess subsurface soil and groundwater conditions across the site;
- provide recommendations on suitable footing systems for the proposed development;
- provide allowable bearing pressure and settlement estimates for shallow foundations;
- provide a site classification(s) in accordance with AS 2870-2011 "Residential Slabs and Footings";
- provide recommendations and geotechnical design parameters for earth retaining structures;
- provide recommendations on the tank installation and backfilling;
- assess the appropriate site subsoil class for the site in accordance with AS 1170.4-2007;
- recommend appropriate site preparation procedures including compaction criteria;
- assess the permeability of the soils at the site for potential on-site disposal of stormwater by infiltration; and
- provide a subgrade California bearing ratio (CBR) value for pavement thickness design by others.

5. FIELDWORK

The fieldwork was carried out on 30 July 2018 and comprised:

- a walkover and inspection of the site;
- cone penetration tests (CPTs) at 6 locations (CPT01 to CPT06), extending to depths of between 6.2 m and 8.2 m;
- drilling of hand auger boreholes at 3 locations (HA01 to HA03), extending to depths of between 1.8 m and 2.0 m;
- Perth sand penetrometer (PSP) testing adjacent to each hand auger borehole, extending to 0.9 m; and
- infiltration tests using the 'inverse auger hole' technique in each borehole, conducted at depths of between 0.75 m to 0.80 m.

General

Test locations were selected and positioned by a geotechnical engineer from Galt.

The geotechnical engineer conducted the walkover and inspection of the site, observed the CPTs, drilled the hand auger boreholes, logged the materials encountered in each borehole, and performed the penetrometer and infiltration tests.

The approximate test locations are shown on Figure 1, Site and Location Plan. Photographs of the site taken during the study are presented in Appendix A, Site Photographs.

Details of the tests are presented in Table 1: Summary of Tests.

Table 1: Summary of Tests

Test Name	Test Depth (m)	Approximate Depth to Groundwater (m)[1]	Reason for Termination	Stratigraphy[2]
CPT01	8.2	2.8	Target Depth	SAND
CPT02	8.2	2.8	Target Depth	
CPT03	6.2	2.6	Target Depth	
CPT04	8.2	2.8	Target Depth	
CPT05	6.2	2.9	Target Depth	
CPT06	6.2	2.8	Target Depth	
HA01	2.0	GNE[1]	Target Depth	
HA02	1.8	GNE	Refusal	
HA03	2.0	GNE	Target Depth	

Notes: 1. Groundwater not encountered

2. Stratigraphy below 2.0 m is inferred from CPT data using the Robertson et al. (1986) CPT interpretation method

Site Walkover

A site walkover was conducted to inspect the general condition of the site. We note that the exteriors of adjacent structures/houses and pavements appear to be in good condition with no obvious signs of settlement related damage (i.e. cracking).

A Water Corporation sewer manhole was observed in the centre of site. This is noted on DBYD information.

A Western Power substation is present in the north eastern corner of the site.

Cone Penetration Tests

Cone penetration tests (CPTs) were undertaken using a 22-tonne track-truck CPT rig supplied and operated by Probedrill Pty Ltd. The testing was undertaken in accordance with AS 1289.6.5.1. The results of the CPTs are presented in Appendix B, Cone Penetration Test Results, along with a method of interpretation proposed by Robertson et al. (1986)[1].

Hand Auger Boreholes

Summary hand auger borehole reports are presented in Appendix C, along with a list of notes, abbreviations and the method of soil description used on the reports. Photographs of the spoil recovered from the boreholes are included on each borehole report.

Perth Sand Penetrometer (PSP) Tests

Perth sand penetrometer (PSP) tests were undertaken in accordance with AS 1289.6.3.3, except to a greater depth than the 0.45 m specified by the code. Furthermore, PSP blow counts are also reported per 150 mm penetration rather than per 300 mm. PSP test results are presented in Appendix D, Perth Sand Penetrometer Test Results.

[1] Robertson, P.K., Campanella, R.G., Gillespie, D. and Grief, J. (1986) "Use of Piezometer Cone Data".

Infiltration Tests

Infiltration tests were carried out using the 'inverse auger hole' method described by Cocks[2]. The results of the infiltration testing are presented in Appendix E, Infiltration Test Results and are summarised in Table 2: Summary of Infiltration Test Results.

Table 2: Summary of Infiltration Test Results

Test Location	Description	Pipe Embedment (m)	Minimum Unsaturated Permeability, k (m/day)		
			Test 1	Test 2	Test 3
HA01	SAND	0.72	12.9	11.6	10.4
HA02		0.85	>15	>15	>15
HA03		0.80	13.8	12.2	11.3

Notes: 1. The minimum permeabilities shown are typically recorded towards the end of the test, with pressure head varying between about 0.2 m and 0.4 m.
2. Permeabilities greater than 15 m/day are not shown due to the inaccuracies of the test method in highly permeable soils.

6. SITE CONDITIONS

6.1 Geology

The Rockingham sheet of the 1:50,000 scale Environmental Geology series map indicates that the area is underlain by Safety Bay Sand described as:

- SAND - *Calcareous sand, white, fine to medium grained, sub-rounded quartz and shell debris, of eolian origin*.

The results of our investigation are in line with the geological mapping of the area.

6.2 Subsurface Conditions

The subsurface conditions across the site are generally consistent and can be summarised as:

- SAND (SP): fine to medium grained, sub-angular to sub-rounded, generally dark grey at surface becoming pale yellow to white with depth, trace organics within the top 0.2 m, trace fines, generally medium dense at surface, becoming dense to very dense below around 1.0 m depth, localised loose to medium dense zones to 2 m depth and between 4.5 m and 5.5 m depth, present from surface to maximum investigated depth (8.2 m).

Notes: 1. Soil conditions below 2.0 m depth are inferred from CPT data using the Robertson et al. (1986) CPT interpretation method.

6.3 Groundwater

The Perth Groundwater Atlas (1997) shows the maximum groundwater level to be around RL 2.9 m AHD. This is about 2 m to 3 m below the current ground surface and around 2 m above the base of the proposed fuel tanks.

Groundwater was encountered in all CPT holes after extraction of the probe at depths ranging from 2.6 m to 2.9 m below surface level. Based on the provided design drawings, this correlate to a groundwater elevation of approximately RL 2 m AHD.

[2] Cocks, G (2007), "Disposal of Stormwater Runoff by Soakage in Perth Western Australia", Journal and News of the Australian Geomechanics Society, Volume 42 No. 3, pp 101-114.

Given that installation of buried tanks will require excavation to around 4 m depth (around RL 1 m AHD), dewatering will be required to facilitate installation of the underground storage tanks.

7. GEOTECHNICAL ASSESSMENT

7.1 Site Classification

We consider that the site is geotechnically capable of supporting the proposed mixed-use development.

We have assessed the site in accordance with AS 2870-2011 "Residential Slabs and Footings". We consider that a site classification of "Class A" is appropriate for the site provided that the site preparation measures given in Section 7.3 are adopted.

Note: Footing and slab details provided in AS2870-2011 are limited to single and double storey residential buildings with a maximum bearing pressure of 100 kPa.

7.2 Site Subsoil Classification

We have assessed the site subsoil classification in accordance with AS 1170.4-2007 "Earthquake Actions in Australia". We consider that a site subsoil class of "C_e" is appropriate for the site. This is based on the expected depth to bedrock being less than 45 m.

7.3 Site Preparation

The site preparation measures outlined below are aimed at preparation of the site prior to construction of structures including on-ground slabs, shallow footings, retaining walls and pavement subgrades.

General

- Remove all vegetation and any deleterious materials encountered on site;
- Strip topsoil and stockpile for possible later treatment and re-use as fill, landscaping or disposal off-site. On average, we expect a 100 mm strip should be adequate, however all roots and organics must be removed.
- Stockpile suitable excavated material for potential re-use as fill (see Section 7.5).
- Moisture condition and compact the exposed base of the excavation to the density specified in Section 7.4 to a minimum depth of 0.9 m.
- Any areas of loose sand or unsuitable material must be removed and replaced with approved fill as outlined in Section 7.5. **Note**: There are localised areas where loose-medium sand is present to 2 m depth.
- Where fill is required to build up levels, use approved fill (see Section7.5), placed and compacted in layers of no greater than 300 mm loose thickness. Each layer must be placed and compacted to achieve the minimum density specified in Section 7.4.
- Excavate for pad and strip footings and compact the base to the minimum density specified in Section 7.4 to a depth of 0.9 m below the footings.

Underground Storage Tanks

- Dewater around the perimeter of the excavation to a minimum of 1 m below excavation levels. We consider that dewatering spears may be used to dewater the in-situ sand (see Section 7.9)
- Excavate to the required depth, battering slopes as specified in Section 7.7 and stockpile material for potential re-use (see Section 7.5). Where battering is not possible (due to proximity of other structures, buried services, etc), install temporary retaining walls / shoring (Section 7.8).

- Compact the exposed base of the excavation to the density specified in Section 7.4 to a minimum depth of 0.9 m below the excavation.
- Install tanks, including backfill to the manufacturer's specification below, to the sides and above the tanks.
- Where further fill is required to build up levels, only use approved fill outlined in Section 7.5, placed and compacted in layers of no greater than 300 mm of loose thickness.
- Any areas of loose sand or unsuitable material must be removed and replaced with approved fill as outlined in Section 7.5.

7.4 Compaction

Approved granular fill and the *in situ* sand must be compacted using suitable compaction equipment to achieve a dry density ratio of at least 95% MMDD (maximum modified dry density) as determined in accordance with AS 1289.5.2.1 at a moisture content within 2% of optimum moisture content (OMC).

Where clean sand (<5% gravel, <5% fines) is used, a Perth sand penetrometer (PSP) may be used for compaction control. We consider that the following blow counts to correspond to a dry density ratio of 95% MMDD:

- 0-150 mm: SET
- 150-450 mm: 8
- 450-750 mm: 10
- 750-1050 mm: 12 (or 750-900 mm: 6)

If difficulties are experienced recording the required blow counts, a site-specific PSP correlation should be carried out to determine the PSP blow count correlating to a DDR of 95% MMDD. The correlation must:

- be done on site;
- use the nuclear density gauge (NDG) to determine density at a minimum of 5 points with varying density to a depth of 300 mm below surface;
- use a calibrated PSP to determine the PSP blow count from 150 mm to 450 mm at each of the NDG test points; and
- be plotted on a chart of PSP blow count vs DDR.

Over-excavation and replacement of loose materials may be required where the minimum dry density ratio cannot be achieved.

Fill must be placed in horizontal layers of not greater than 300 mm loose thickness. Each layer must be compacted by suitable compaction equipment, and carefully controlled to ensure even compaction over the full area and depth of each layer.

Compaction Testing

After compaction, verify that the required level of compaction has been achieved by testing at the base of excavation and through the full depth of any fill and to a minimum depth of 0.9 m. The frequency of testing should be as follows:

- on each lift of fill at the rate of 1 test per 500 m3 or at least 2 tests per layer (4 tests per layer below the building footprint), whichever is greater;
- at each spread footing location;
- at 5 m centres along strip footings and retaining wall footings (where present); and
- at 10 m centres below on-ground slabs and pavements.

Compaction Vibrations

Care will need to be taken when compacting in the vicinity of existing services and structures. This is particularly important if vibratory compaction is being carried out. Tynan (1973)[3] provides assistance with the selection of compaction equipment for use adjacent to services. Of particular concern are the adjacent residential properties along the eastern and southern boundaries.

Large compaction equipment (self-propelled vibrating rollers, etc.) must not be used within 2 m behind retaining walls. Hand compaction plant must be used.

7.5 Approved Fill

Imported granular fill must comply with the material requirements as stated in AS 3798-2007, "Guidelines on Earthworks for Commercial and Residential Developments".

Generally, the *in situ* sand present at the site is suitable for re-use as inert structural fill.

Topsoil sand can potentially be re-used as structural fill provided it is screened of any coarse organics and blended with clean sand fill to meet the organic and permeability requirements. The proportion of clean sand required would depend on the outcomes of field permeability trials to assess a suitable blend ratio. We can provide further assistance with this process if required.

Any organic-rich sand (greater than 2% organics by weight), sand containing significant proportions of fines (greater than 5% of material less than 0.075 mm in size by weight), or rock particles greater than 100 mm diameter must not be used.

Where doubt exists, a geotechnical engineer must be engaged to inspect and approve the use of potential fill materials.

7.6 Shallow Footings

We consider that the proposed building may be founded on shallow footings founded within the *in situ* sand. Table 3 and Table 4 provide allowable bearing pressure and estimated settlements for pad footings and strip footings at embedment depths of 0.5 m and 1.0 m, respectively. These values are based on the assumption that the site preparation procedures in Section 7.3 are followed.

Table 3: Pad Footing Allowable Bearing Pressures and Estimated Settlements

Minimum Footing Embedment (m)	Minimum Footing Dimension (m)	Allowable Bearing Pressure (kPa)	Estimated Settlement (mm)
0.5	0.5	200	<5
	1.0	220	<5
	2.0	250	5-10
	3.0	250	10-15
1.0	1.0	200	<5
	2.0	240	<5
	3.0	250	10-15
	4.0	250	10-15

[3] Tynan (1973) Ground Vibration and Damage Effects on Buildings, Australia Road Research Board, Special Report No. 11.

Table 4: Strip Footing Allowable Bearing Pressures and Estimated Settlements

Minimum Footing Embedment (m)	Footing Width (m)	Allowable Bearing Pressure (kPa)	Estimated Settlement (mm)
0.5	0.5	180	<5
	1.0	200	5-10
	2.0	220	10-15
	3.0	230	15-20
1.0	1.0	200	<5
	2.0	220	5-10
	2.0	230	15-20
	4.0	240	20-25

Allowable bearing pressures for footings of intermediate plan dimensions to those tabulated can be interpolated. Footings that have a plan dimension either smaller or larger than those covered by tables above will need to be considered individually along with other embedment depths. Footings carrying significant eccentric loading, such as below retaining walls, must be assessed separately.

An allowable working bearing pressure of 250 kPa is considered to be an upper limit for footings to limit total and differential settlements as well as the risk of long-term creep settlement which may occur under high bearing pressures.

The settlement of the proposed structure will depend upon a number of factors including the applied pressures, footings size and base preparation. The estimates of settlement provided above assume that the site preparation measures in Section 7.3 have been completed. The estimated settlements are for the working bearing pressure values shown. Differential settlements of up to half of the total estimated settlement values are likely between footings of similar sizes, loads and elevations. About 70% of the settlement is expected to occur during construction.

The estimated settlements indicated in the above tables do not include interaction effects from footings founded near other footings (i.e. groups of footings). Interaction effects will need to be considered if the spacing between adjacent footings is smaller than the dimension of the footings (i.e. the centre-to-centre spacing between footings is less than twice the width of the footings). This could act to double the nominated settlements, dependent on the footing configuration. Where an assessment of footing groups is required, a more detailed numerical analysis would need to be undertaken (we can complete this, if required).

All prepared footing excavations must be carefully assessed by a competent person prior to blinding.

7.7 Excavations and Slopes

Based on the soil profile encountered, we consider that excavation of the sandy material will be readily achieved to a depth of at least 5 m using conventional earthmoving equipment (i.e. with a 15 tonne or larger excavator with a toothed bucket). The possible presence of obstructions such as buried services and moderately cemented sand layers must be taken into account when selecting excavation equipment.

Excavations in sand are prone to instability, particularly at or below the groundwater level.

Where groundwater is at least 1 m below the toe of the slope, excavations must be battered at slopes no steeper than 1V:2H for temporary slopes where no external restraint is provided to the slope (suitable for slope heights up to 2 m with no surcharge at the crest of the slope). Even at these slope angles erosion and rilling may occur. Where steeper slopes are required, temporary or permanent slope retention must be employed.

Temporary slopes of 1V:2H require the following:

- The groundwater is at least 1.0 m below the base of the excavation.
- The maximum slope height is 2 m without specific advice and slope stability analysis
- Surcharges (such as structures, plant and soil stockpiles) must not be placed at or close to the crest of unsupported excavations.

Excavations extending below groundwater will require the groundwater to be drawn down at least 1 m below the maximum depth of excavation prior to excavation commencing (see Section 7.9).

The stability of open excavations must be carefully assessed by the contractor during construction. A geotechnical engineer must be consulted where there is any doubt regarding the stability or safety of unsupported excavations.

7.8 Retaining Structures

Retaining structures above the groundwater level may be designed in accordance with AS 4678-2002 "Earth-Retaining Structures". For the design of retaining structures, the parameters in Table 5 are considered appropriate.

Table 5: Retaining Structures Design Parameters

Soil Type	Bulk Density (t/m^3)	Angle of Internal Friction (deg.)	Wall Friction = 0°		Wall Friction = 0.5Φ	
			Coefficient of Active Earth Pressure, K_a	Coefficient of Passive Earth Pressure, K_p	Coefficient of Active Earth Pressure, K_a	Coefficient of Passive Earth Pressure, K_p
Medium dense SAND (0.0 m to 1.0m depth)	17	34	0.28	3.5	0.25	5.7
Dense or well compacted SAND (1.0 m to 4,0 m depth)	18	36	0.26	3.9	0.22	6.5

Notes:
1. Earth pressure coefficients are provided in this table for conditions of zero friction between the wall and the soil and with wall friction of 0.5Φ'.
2. A horizontal ground surface behind the wall has been assumed.
3. The retaining wall designer should make an independent assessment of the parameters appropriate to the construction method to be used, including alternative values of wall friction.

Compaction plant can augment the lateral earth pressure acting on retaining walls. Hand operated compaction equipment is recommended within 2 m of any retaining walls to minimise compaction pressures.

7.9 Dewatering

We note that where excavations extend below about RL 3.0 m AHD, groundwater seepage into excavations may be expected depending on the time of the year. Based on the current groundwater levels recorded (~RL 2.0 m AHD) and the proposed tank levels (~RL 1.0 m AHD) dewatering will be necessary to enable excavation and placement of the tanks.

We consider that dewatering should be possible using groundwater spears as are conventionally used in the Perth metropolitan area. We note the following:

- A dewatering licence may be required depending on the duration and rate of dewatering.
- A dewatering licence may require a dewatering study and dewatering management plan to be done to characterise the dewatering effluent.

- Disposal of dewatering effluent will be required. Usually, an infiltration basin is used, however this relies on having adequate open area of the site (or nearby) to form the infiltration basin.

We can provide further advice and carry out the dewatering study if required.

7.10 Buoyancy

The structural designers must take into account potential buoyancy on the fuel tanks. A design groundwater level of at least RL 3.0 m AHD (historical maximum groundwater elevation) must be allowed by the designer for the tank installation. Dewatering may need to continue to at least partway through construction until sufficient load is in place to resist buoyancy. We can provide further advice if required.

7.11 Stormwater Disposal

Groundwater was encountered during the investigation at depths of between about 2.6 m and 2.9 m. The Perth Groundwater Atlas (1997) shows the historical maximum groundwater level to be around RL 2.9 m AHD. This is around 2.0 m below the current ground surface.

We consider that the site is suitable for the disposal of stormwater by infiltration (i.e soak wells, storm water cells, etc), provided that the infiltration system is founded a minimum of 0.3 m above the maximum groundwater level (i.e. founded at or above RL 3.2 m AHD).

We recommend a design permeability (k) not greater than 6 m/day. This is to allow for the variability in materials and reduced permeability as a consequence of:

- densification of sand during site preparation works;
- natural variation in sands; and
- clogging of the sand around soak wells and soakage basins over time with fines.

Soak wells should be placed outside a line of 1V:2H extending below the edge of the nearest footing, subject to local council regulations. Discharge from soak wells has been known to promote densification of loose sandy soils, leading to settlements of footings and slabs. Soak wells should be carefully wrapped with geotextile to prevent migration of sand and fines into the soak well.

Where soakwells are founded close to (within 0.3 m) or below the maximum groundwater level a reduced design permeability will be applicable during wetter times of the year. This must be taken into consideration by the civil designer.

7.12 Pavement Design

A subgrade California bearing ratio (CBR) of 12% may be assumed for pavement thickness design constructed on top of at least 0.5 m of compacted *in situ* sand or imported sand fill. This CBR value assumes that the site preparation requirements outlined in Section 7.3 have been carried out on the pavement subgrade.

8. CLOSURE

We draw your attention to Appendix F of this report, "Understanding your Report". The information provided within is intended to inform you as to what your realistic expectations of this report should be. This information is provided not to reduce the level of responsibility accepted by Galt, but to ensure that all parties who rely on this report are aware of the responsibilities each assumes in so doing.

GALT GEOTECHNICS PTY LTD

Paul Woodroof CPEng

Geotechnical Engineer

Kieran Harris

Geotechnical Engineer

\\galtgeo.local\OsbornePark\Data\Jobs\2017\J1702030 - Arise SI Rockingham\03 Correspondence\J1702030 002 R Rev0.docx

Figures

www.galtgeo.com.au
50 Edward Street OSBORNE PARK WA 6017
ABN: 64 625 054 729

Legend

- Site Boundary
- Cone Penetration Test
- Hand Auger Borehole / Permeability Test

N

0 10 20 30 40 50
Meters

SCALE	1:750	(A3)
DRAWN	CED	
DATE DRAWN	24/07/2018	
CHECKED	KH	
DATE CHECKED	02/08/2018	
PROJECTION	GDA 1994 MGA Zone 50	

Galt Environmental Pty Ltd
ACN : 161 708 998
Tel : +61 (0)8 6272-0200
Address : 50 Edward Street
Osborne Park WA 6017

CLIENT	**ARISE DEVELOPMENTS**
PROJECT	ROCKINGHAM COMMERCIAL CENTRE
LOCATION	COUNCIL AVENUE 2 SEPIA COURT
TITLE	SITE & LOCATION PLAN
Job No	J1702030
Fig No	FIGURE 1
Rev	**A**

O:\Jobs\2017\J1702030 - Arise SI Rockingham\09 GIS\04 MXD\J1702030-DS-001.mxd (claire.doyle) 24/07/2018 1:28:16 PM

Appendix A: Site Photographs

www.galtgeo.com.au
50 Edward Street OSBORNE PARK WA 6017
ABN: 64 625 054 729

Photograph 1: CPT01 in progress

Photograph 2: Water Corporation sewer manhole in the centre of the site

Photograph 3: South along Read Street

Photograph 4: View south east showing vegetation and existing residences

Appendix B: Cone Penetration Test Results

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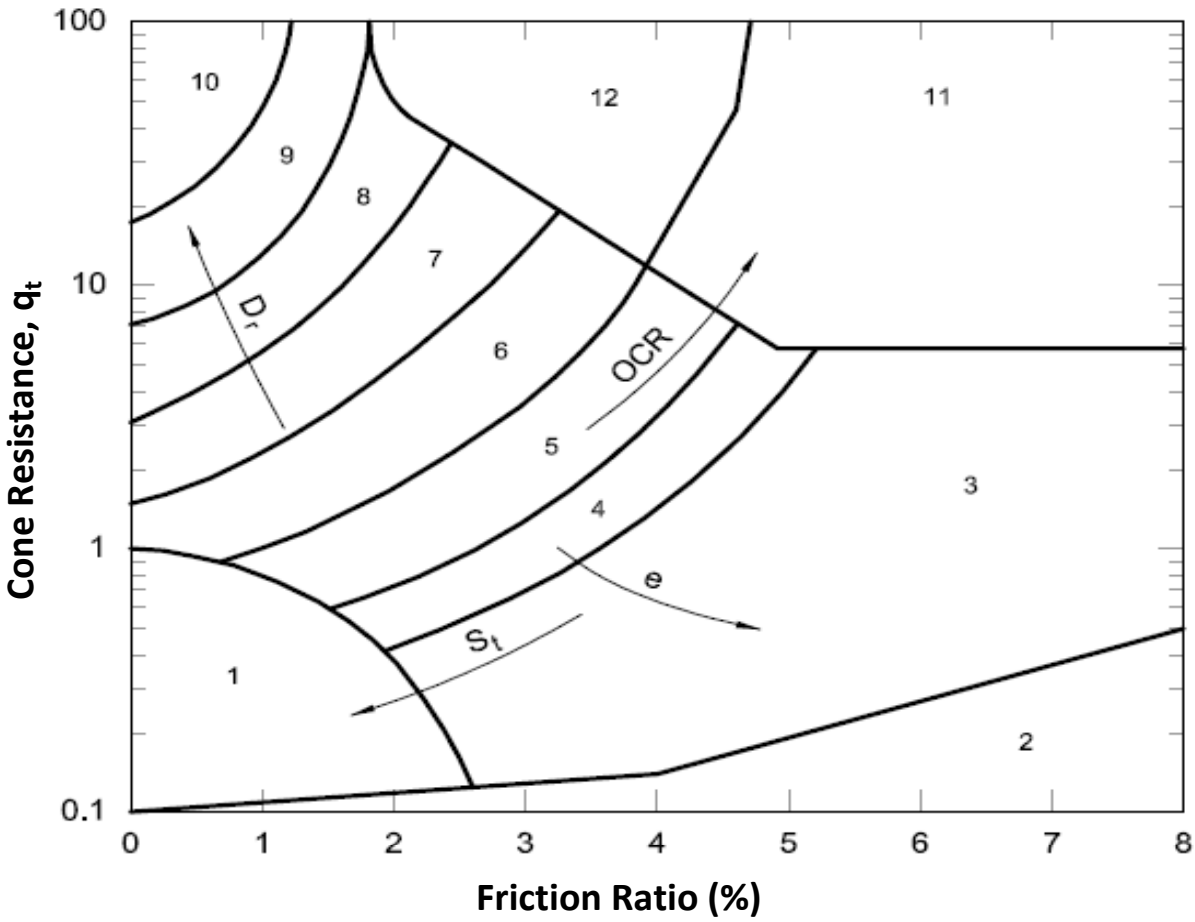
50 Edward Street OSBORNE PARK WA 6017
ABN: 64 625 054 729



DEFINITIONS

q_t : Cone tip resistance corrected for pore water pressure
S_t : Sensitivity
e : Void ratio
D_r : Relative density
OCR : Overconsolidation ratio
OC : Overconsolidated

SOIL BEHAVIOUR TYPE ZONES

1. Sensitive fine grained
2. Organic material
3. Clay
4. Silty clay to clay
5. Clayey silt to silty clay
6. Sandy silt to clayey silt
7. Silty sand to sandy silt
8. Sand to silty sand
9. Sand
10. Gravelly sand to sand
11. Very stiff fine grained material (OC/cemented)
12. Sand to clayey sand (OC/cemented)

NOTES

A. Some overlap in type zones is expected
B. Local correlations are preferred and may indicate soil type boundaries that are different from those shown above

Reference: Robertson, P.K., Campanella, R.G., Gillespie, D. and Grieg, J. (1986) "Use of Piezometer Cone Data". Proceedings of the ASCE Speciality Conference In Situ '86: Use of In Situ Tests in Geotechnical Engineering, Blacksburg, pp 1263-80, American Society of Civil Engineers (ASCE)

Galt GEOTECHNICS

CONE PENETRATION TESTING (CPT) SOIL TYPE INTERPRETATION

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: Arise Developments

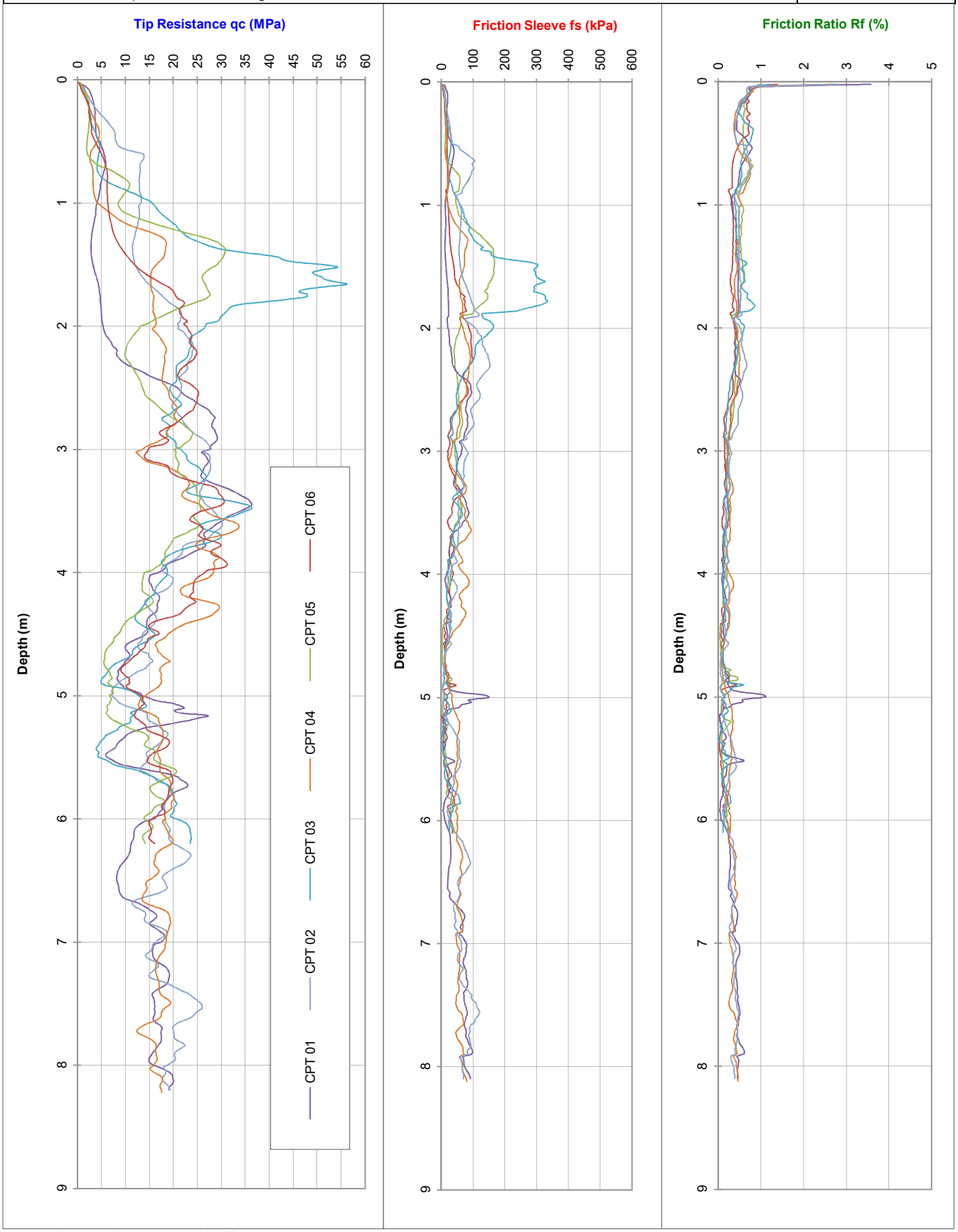
Job No.: J1702030

PROJECT: Proposed Mixed Use Development

Date/s: 30/07/2018

LOCATION: 2 Sepia Court, Rockingham

ALL DATA



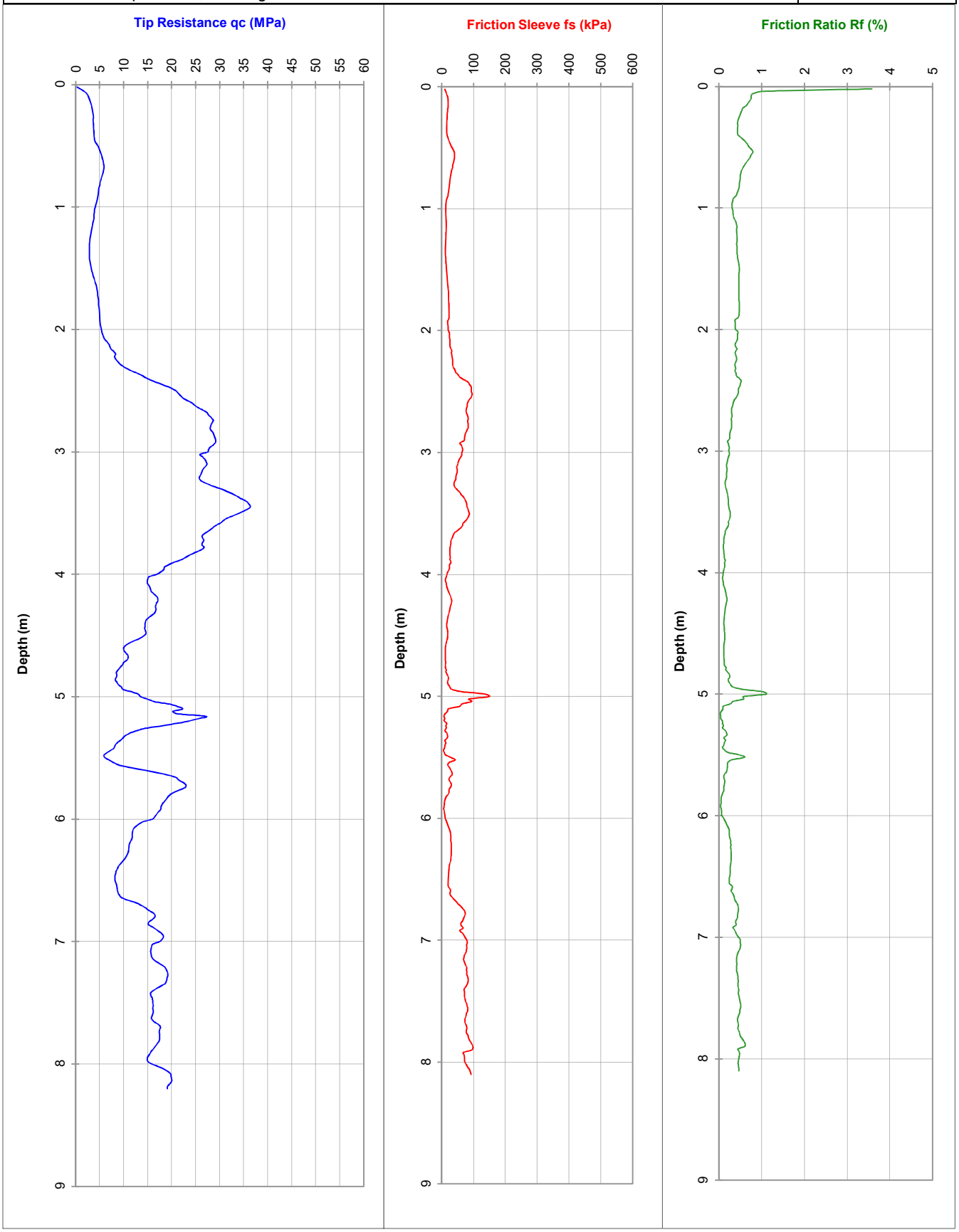
PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999
and IRTP 2001 for friction reducer

Rig: 22 tonne Truck (Track-Truck)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: Arise Developments	Job No.: J1702030	Probe I.D
PROJECT: Proposed Mixed Use Development	RL (m):	**CPT 01**
LOCATION: 2 Sepia Court, Rockingham	Co-ords:	30-Jul-18



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. Water (m): 2.8

Dummy probe to (m):

Refusal:

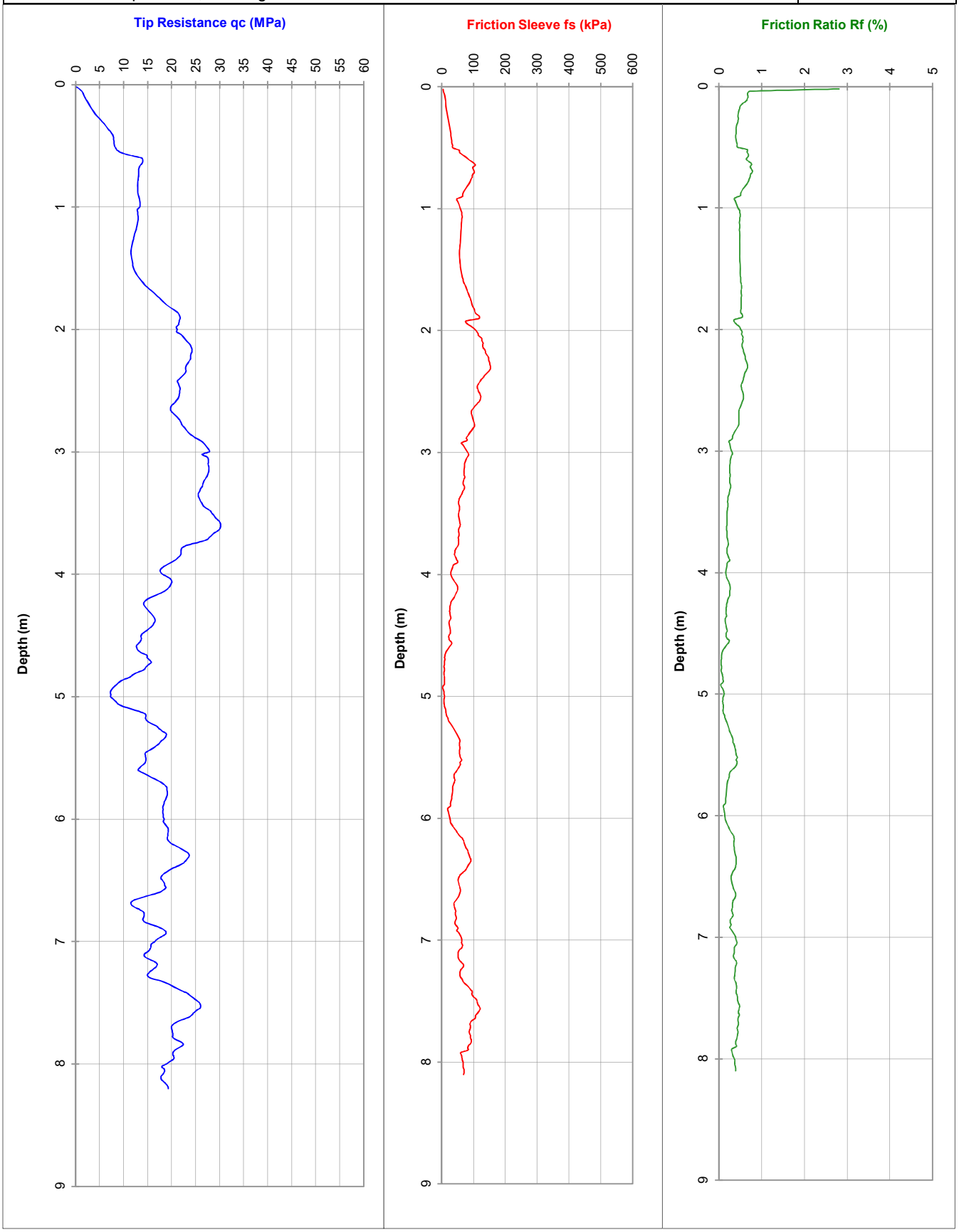
Cone I.D.: ECF68GM

File: GL0925TT

Rig: 22 tonne Truck (Track-Truck)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: Arise Developments	Job No.: J1702030	Probe I.D
PROJECT: Proposed Mixed Use Development	RL (m):	**CPT 02**
LOCATION: 2 Sepia Court, Rockingham	Co-ords:	30-Jul-18



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. Water (m): 2.8

Dummy probe to (m):

Refusal:

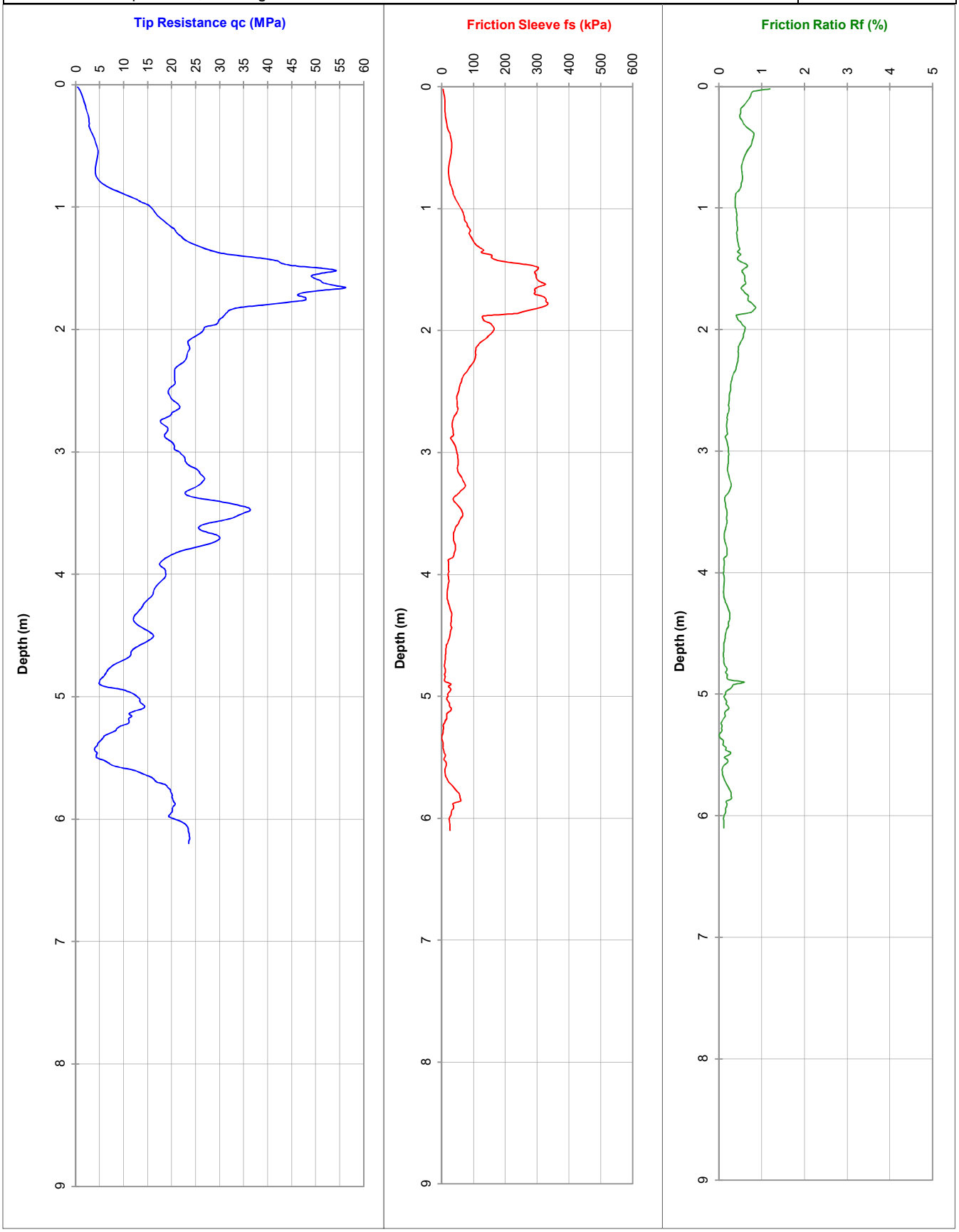
Cone I.D.: ECF68GM

File: GL0928TT

Rig: 22 tonne Truck (Track-Truck)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: Arise Developments	Job No.: J1702030	Probe I.D
PROJECT: Proposed Mixed Use Development	RL (m):	**CPT 03**
LOCATION: 2 Sepia Court, Rockingham	Co-ords:	30-Jul-18



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. Water (m): 2.6

Dummy probe to (m):

Refusal:

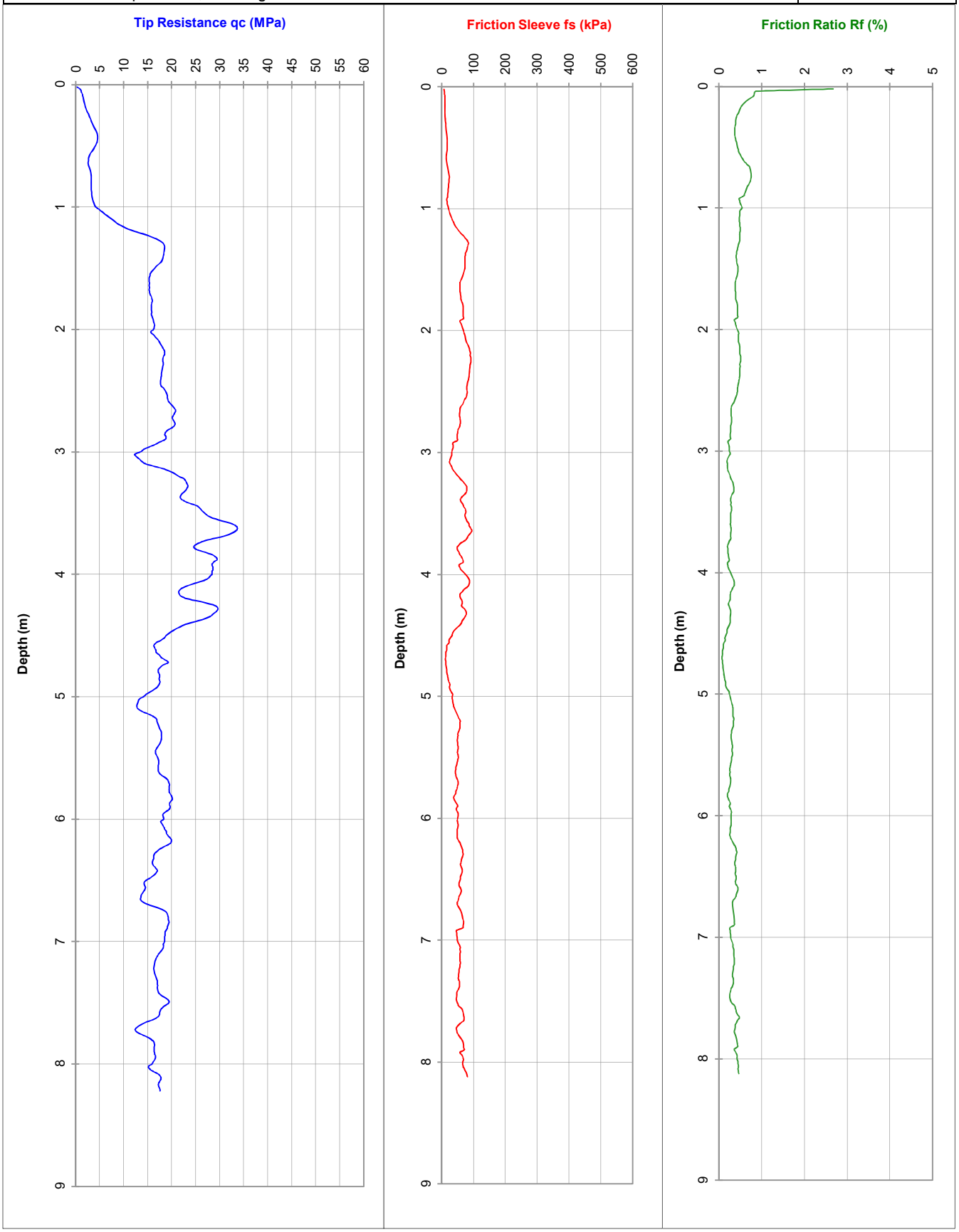
Cone I.D.: ECF68GM

File: GL0926TT

Rig: 22 tonne Truck (Track-Truck)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: Arise Developments	Job No.: J1702030	Probe I.D
PROJECT: Proposed Mixed Use Development	RL (m):	**CPT 04**
LOCATION: 2 Sepia Court, Rockingham	Co-ords:	30-Jul-18



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. Water (m): 2.8

Dummy probe to (m):

Refusal:

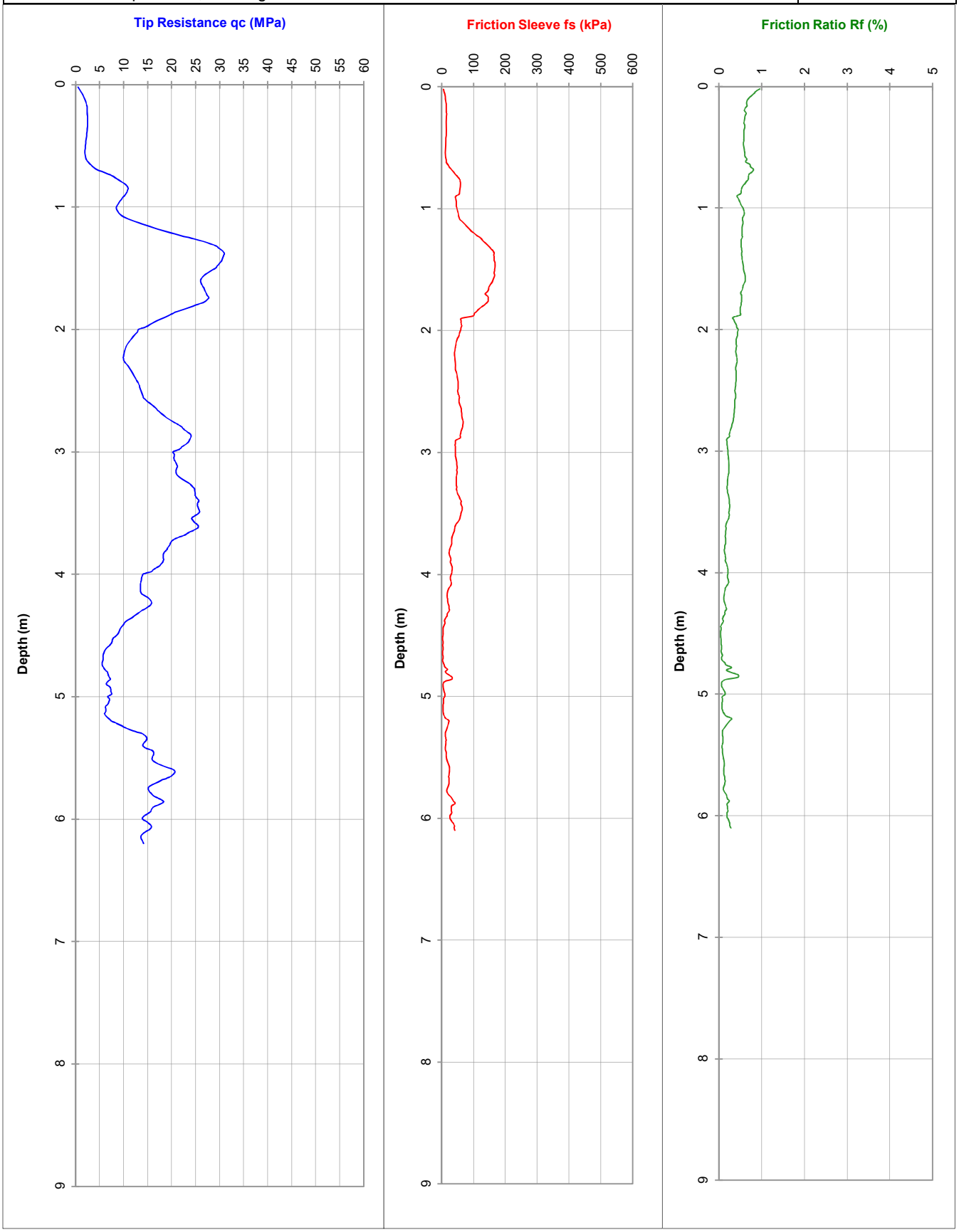
Cone I.D.: ECF68GM

File: GL0927TT

Rig: 22 tonne Truck (Track-Truck)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: Arise Developments	Job No.: J1702030	Probe I.D
PROJECT: Proposed Mixed Use Development	RL (m):	**CPT 05**
LOCATION: 2 Sepia Court, Rockingham	Co-ords:	30-Jul-18



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. Water (m): 2.9

Dummy probe to (m):

Refusal:

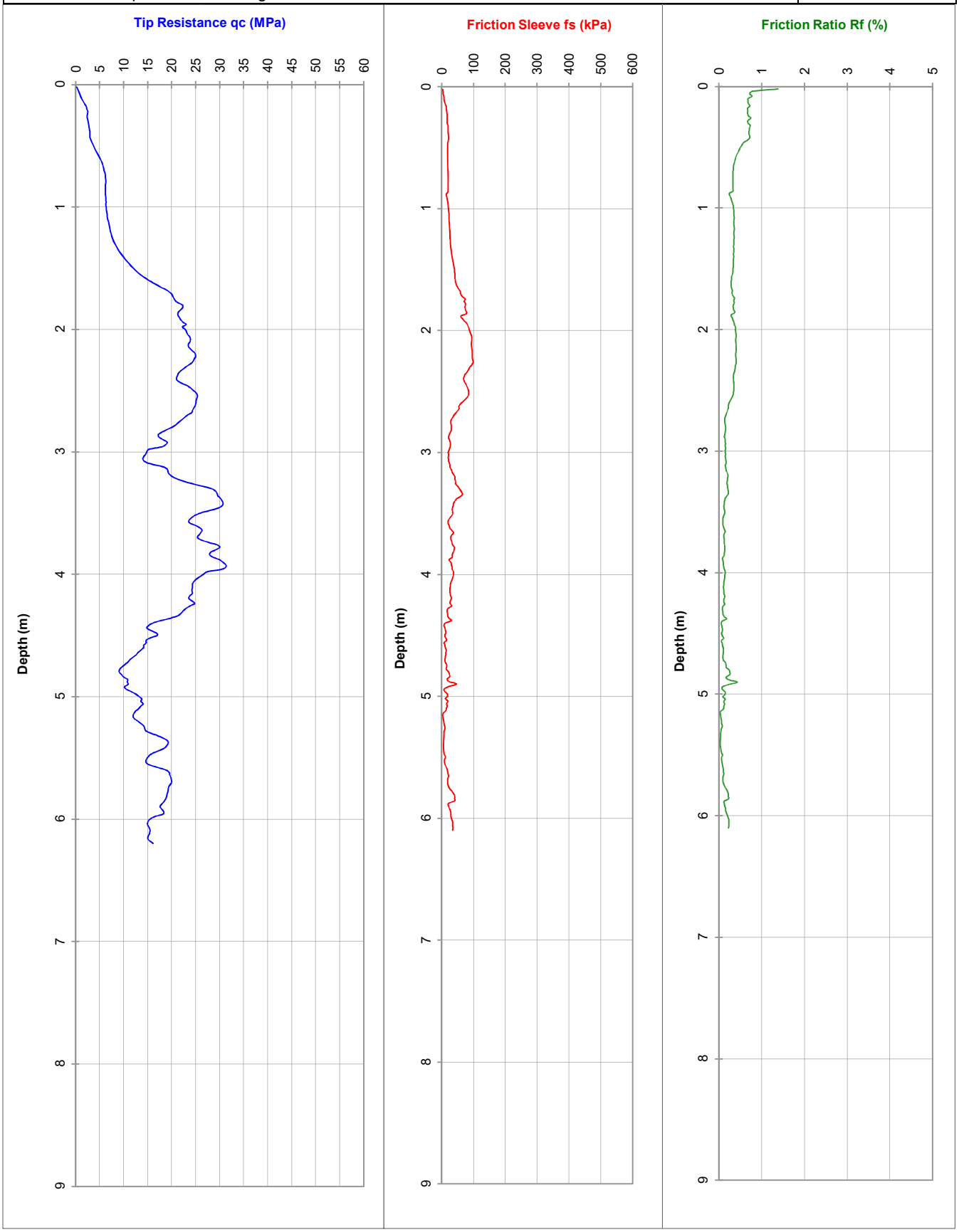
Cone I.D.: ECF68GM

File: GL0924TT

Rig: 22 tonne Truck (Track-Truck)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: Arise Developments	Job No.: J1702030	Probe I.D
PROJECT: Proposed Mixed Use Development	RL (m):	**CPT 06**
LOCATION: 2 Sepia Court, Rockingham	Co-ords:	30-Jul-18



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. Water (m): 2.8

Dummy probe to (m):

Refusal:

Cone I.D.: ECF68GM

File: GL0923TT

Rig: 22 tonne Truck (Track-Truck)

Appendix C: Summary Hand Auger Borehole Reports

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50 Edward Street OSBORNE PARK WA 6017
ABN: 64 625 054 729

METHOD OF SOIL DESCRIPTION
BOREHOLE AND TEST PIT REPORTS

GRAPHIC LOG & UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) SYMBOLS

Graphic	USCS	Soil Name
		FILL (various types)
		COBBLES / BOULDERS
	GP	GRAVEL (poorly graded)
	GW	GRAVEL (well graded)
	GC	Clayey GRAVEL
	GM	Silty GRAVEL
	SP	SAND (poorly graded)
	SW	SAND (well graded)
	SC	Clayey SAND

Graphic	USCS	Soil Name
	SM	Silty SAND
	ML	SILT (low liquid limit)
	MH	SILT (high liquid limit)
	CL	CLAY (low plasticity)
	CI	CLAY (medium plasticity)
	CH	CLAY (high plasticity)
	OL	Organic SILT (low liquid limit)
	OH	Organic SILT (high liquid limit)
	Pt	PEAT

NOTE: Dual classification given for soils with a fines content between 5% and 12%.

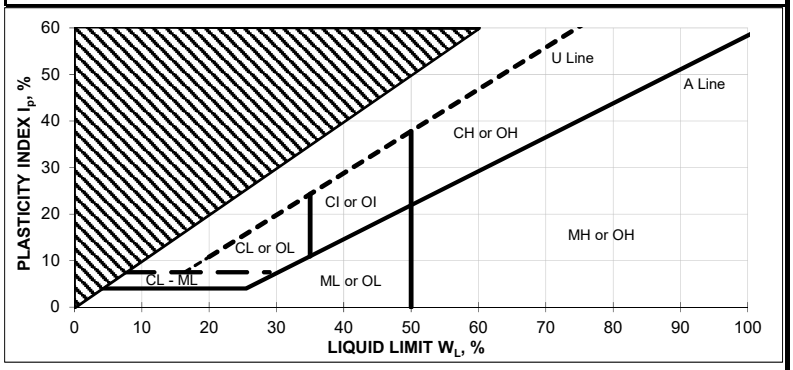
SOIL CLASSIFICATION AND INFERRED STRATIGRAPHY

Soil descriptions are based on AS1726-2017. Material properties are assessed in the field by visual/tactile methods in combination with field and laboratory testing techniques (where used).

NOTE: AS 1726-2017 defines a fine grained soil where the total dry mass of fine fractions (<0.075 mm particle size) exceeds 35%.

PARTICLE SIZE		
Soil Name		**Particle Size (mm)**
BOULDERS		>200
COBBLES		63 to 200
GRAVEL	Coarse	19 to 63
	Medium	6.7 to 19
	Fine	2.3 to 6.7
SAND	Coarse	0.6 to 2.36
	Medium	0.21 to 0.6
	Fine	0.075 to 0.21
FINES	SILT	0.002 to 0.075
	CLAY	<0.002

PLASTICITY - MODIFIED CASAGRANDE CHART - AS1726-2017



RESISTANCE TO EXCAVATION		
Symbol	**Term**	**Description**
VE	Very easy	All resistances are relative to the selected method of excavation
E	Easy	
F	Firm	
H	Hard	
VH	Very hard	

MOISTURE CONDITION	
Symbol	**Term**
D	Dry
M	Moist
W	Wet

CEMENTATION	
Cementation	**Description**
Weakly cemented	Soil may be easily disaggregated by hand in air or water
Moderately cemented	Effort is required to disaggregate the soil by hand in air or water

CONSISTENCY		
Symbol	**Term**	**Undrained Shear Strength (kPa)**
VS	Very Soft	0 to 12
S	Soft	12 to 25
F	Firm	25 to 50
St	Stiff	50 to 100
VSt	Very Stiff	100 to 200
H	Hard	>200

ORGANIC SOILS	
Material	**Organic Content % of dry mass**
Inorganic soil	<2%
Organic soil	2% to 25%
Peat	>25%

DENSITY		
Symbol	**Term**	**Density Index (%)**
VL	Very Loose	<15
L	Loose	15 to 35
MD	Medium Dense	35 to 65
D	Dense	65 to 85
VD	Very Dense	>85

SUMMARY BOREHOLE REPORT

Job Number:	J1702030	**Date Performed:**	30/07/2018
Client:	Arise Developments	**Excavated using:**	80mm Hand Auger
Project:	Proposed Mixed-use Commercial Development	**Logged By:**	KH
Location:	Cnr Read St & Council Ave Rockingham		

HA01

Test Depth (m)	Stratigraphy
0.0 – 2.0	SAND (SP): fine to medium grained, sub-angular to sub-rounded, dark grey at surface becoming pale yellow to white below 0.6 m, trace organics top 0.2 m, trace fines, moist, medium dense to dense.

End of borehole at 2.0 m
Target Depth
Groundwater not encountered

HA01 spoil

HA02

Test Depth (m)	Stratigraphy
0.0 – 1.8	SAND (SP): fine to medium grained, sub-angular to sub-rounded, grey at surface becoming pale yellow to white below 0.3 m, trace organics top 0.2 m, trace fines, moist, dense.
End of borehole at 1.8 m Refusal on inferred tree root Groundwater not encountered	

HA02 spoil

HA03

Test Depth (m)	Stratigraphy
0.0 – 2.0	SAND (SP): fine to medium grained, sub-angular to sub-rounded, dark grey at surface becoming pale yellow to white below 0.3 m, trace organics top 0.2 m, trace fines, moist, medium dense.
End of borehole at 2.0 m Target depth Groundwater not encountered	

HA03 spoil

Appendix D: Perth Sand Penetrometer Test Results

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ABN: 64 625 054 729

PERTH SAND PENETROMETER FIELD TEST DATA
(AS 1289.6.3.3)

Client:	Arise Development	**Job No:**	J1702030
Project:	Proposed Multi-Use Commercial	**Date:**	30/07/2018
Location:	Cnr Read St and Council Ave	**Engineer:**	KH

Location:	HA01	HA02	HA03			
Depth (mm)	**N° of Penetrometer Blows per 150 mm Depth Interval**					
0-150	SET	SET	SET			
150-300	4	5	2			
300-450	5	6	2			
450-600	5	3	2			
600-750	6	6	3			
750-900	5	7	5			

Perth Sand Penetrometer tests done in accordance with AS 1289.6.3.3 (except blow counts are reported per 150 mm, rather than 300 mm)
HB: Hammer bounce (refusal)
0 = Penetration due to hammer weight only
R: Refusal

Appendix E: Infiltration Test Results

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50 Edward Street OSBORNE PARK WA 6017
ABN: 64 625 054 729

Permeability Calculation - Inverse Auger Hole Method

Galt Geotechnics

Job No:	J1702030
Client:	Arise Developments
Location:	Cnr Read St & Council Ave, Rockingham
Calc by:	KH
BH Name:	HA01
Test Depth:	0.78 m

Spreadsheet author:	ORW	17-Oct-09

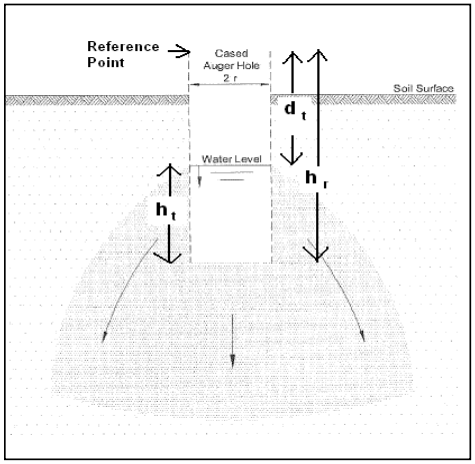
$$K = 1.15r\frac{\log_{10}(h_0 + \frac{1}{2}r) - \log_{10}(h_t + \frac{1}{2}r)}{t - t_0}$$

REFERENCE: Cocks, G. *Disposal of Stormwater Runoff by Soakage in Perth Western Australia*, Journal and News of the Australian Geomechanics Society, Volume 42 No 3 September 2007, pp101-114

Spreadsheet Legend

	Required input
	Calculated field
	Comment field
X	Field not used
	Fixed field

Parameter	Description	Value	Units
K	Permeability	X	m/s
r	radius of test hole	0.045	m
t	time since start of measurement	X	s
h_r	reference point height above base	0.78	m
d_t	depth from reference point to water at time t	X	m
h_t	Water column height at time t	X	m
h_0	h_t at t=0	X	m



Test 1

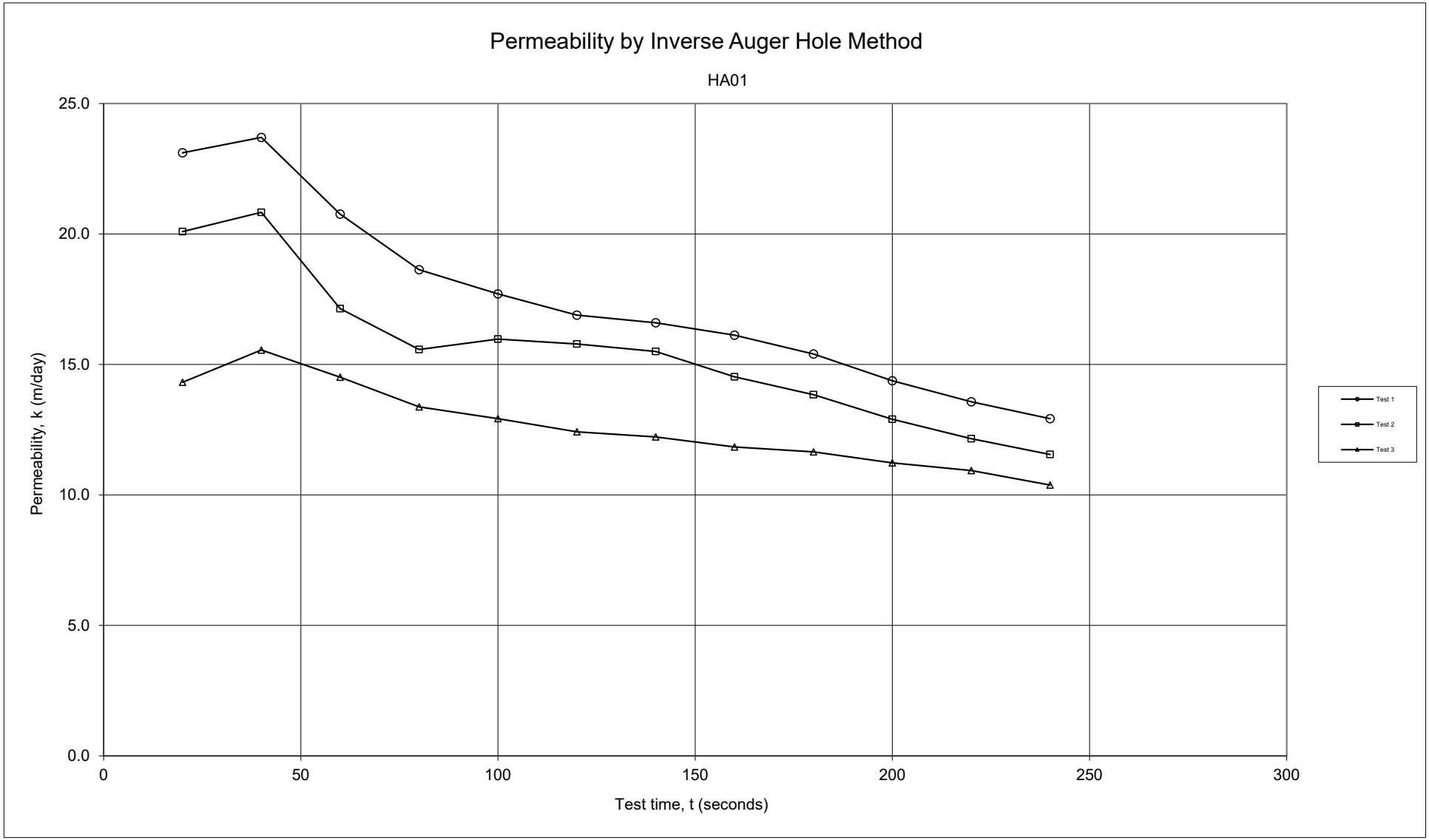
t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0	0.78	X	X
20	0.17	0.61	2.7E-04	23.1
40	0.31	0.47	2.7E-04	23.7
60	0.38	0.4	2.4E-04	20.8
80	0.43	0.35	2.2E-04	18.6
100	0.48	0.3	2.0E-04	17.7
120	0.52	0.26	2.0E-04	16.9
140	0.56	0.22	1.9E-04	16.6
160	0.59	0.19	1.9E-04	16.1
180	0.61	0.17	1.8E-04	15.4
200	0.62	0.16	1.7E-04	14.4
220	0.63	0.15	1.6E-04	13.6
240	0.64	0.14	1.5E-04	12.9
		AVERAGE	2.0E-04	17.5

Test 2

t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0	0.78	X	X
20	0.15	0.63	2.3E-04	20.1
40	0.28	0.5	2.4E-04	20.8
60	0.33	0.45	2.0E-04	17.1
80	0.38	0.4	1.8E-04	15.6
100	0.45	0.33	1.8E-04	16.0
120	0.5	0.28	1.8E-04	15.8
140	0.54	0.24	1.8E-04	15.5
160	0.56	0.22	1.7E-04	14.5
180	0.58	0.2	1.6E-04	13.8
200	0.59	0.19	1.5E-04	12.9
220	0.6	0.18	1.4E-04	12.2
240	0.61	0.17	1.3E-04	11.6
		AVERAGE	1.8E-04	15.5

Test 3

t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0	0.78	X	X
20	0.11	0.67	1.7E-04	14.3
40	0.22	0.56	1.8E-04	15.6
60	0.29	0.49	1.7E-04	14.5
80	0.34	0.44	1.5E-04	13.4
100	0.39	0.39	1.5E-04	12.9
120	0.43	0.35	1.4E-04	12.4
140	0.47	0.31	1.4E-04	12.2
160	0.5	0.28	1.4E-04	11.8
180	0.53	0.25	1.3E-04	11.7
200	0.55	0.23	1.3E-04	11.2
220	0.57	0.21	1.3E-04	10.9
240	0.58	0.2	1.2E-04	10.4
		AVERAGE	1.5E-04	1.3E+01


Permeability by Inverse Auger Hole Method
HA01
Permeability, k (m/day)
25.0
20.0
15.0
10.0
5.0
0.0
0
50
100
150
200
250
300
Test time, t (seconds)
Test 1
Test 2
Test 3

Permeability Calculation - Inverse Auger Hole Method

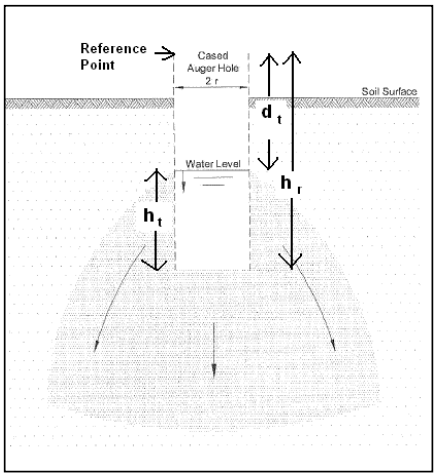
Galt Geotechnics

Job No:	J1702030
Client:	Arise Developments
Location:	Cnr Read St & Council Ave, Rockingham
Calc by:	KH
BH Name:	HA02
Test Depth:	0.81 m

Spreadsheet author:	ORW	17-Oct-09

$$K = 1.15r \frac{\log_{10}(h_0 + \frac{1}{2}r) - \log_{10}(h_t + \frac{1}{2}r)}{t - t_0}$$

REFERENCE: Cocks, G. *Disposal of Stormwater Runoff by Soakage in Perth Western Australia*, Journal and News of the Australian Geomechanics Society, Volume 42 No 3 September 2007, pp101-114



Spreadsheet Legend

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	Comment field
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	Fixed field

Parameter	Description	Value	Units
K	Permeability		m/s
r	radius of test hole	0.045	m
t	time since start of measurement		s
h_r	reference point height above base	0.81	m
d_t	depth from reference point to water at time t		m
h_t	Water column height at time t		m
h_0	h_t at t=0		m

Test 1

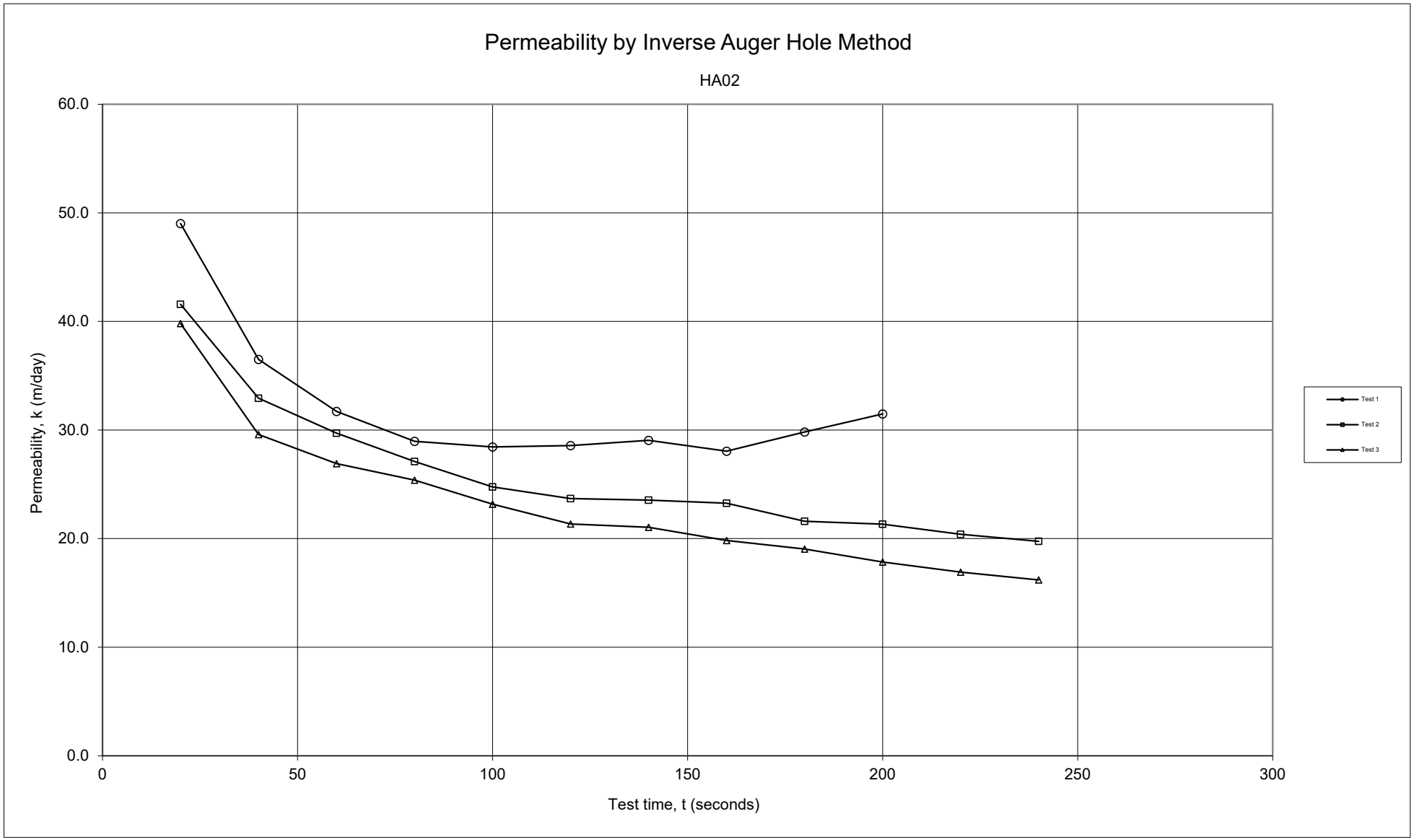
t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0	0.81		
20	0.33	0.48	5.7E-04	49.0
40	0.44	0.37	4.2E-04	36.5
60	0.52	0.29	3.7E-04	31.7
80	0.58	0.23	3.4E-04	29.0
100	0.64	0.17	3.3E-04	28.4
120	0.69	0.12	3.3E-04	28.6
140	0.73	0.08	3.4E-04	29.1
160	0.75	0.06	3.2E-04	28.1
180	0.78	0.03	3.5E-04	29.8
200	0.8	0.01	3.6E-04	31.5
220	Dry			
240				
		AVERAGE	3.7E-04	32.2

Test 2

t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0	0.81		
20	0.29	0.52	4.8E-04	41.6
40	0.41	0.4	3.8E-04	32.9
60	0.5	0.31	3.4E-04	29.7
80	0.56	0.25	3.1E-04	27.1
100	0.6	0.21	2.9E-04	24.8
120	0.64	0.17	2.7E-04	23.7
140	0.68	0.13	2.7E-04	23.5
160	0.71	0.1	2.7E-04	23.3
180	0.72	0.09	2.5E-04	21.6
200	0.74	0.07	2.5E-04	21.3
220	0.75	0.06	2.4E-04	20.4
240	0.76	0.05	2.3E-04	19.7
		AVERAGE	3.0E-04	25.8

Test 3

t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0	0.81		
20	0.28	0.53	4.6E-04	39.8
40	0.38	0.43	3.4E-04	29.6
60	0.47	0.34	3.1E-04	26.9
80	0.54	0.27	2.9E-04	25.4
100	0.58	0.23	2.7E-04	23.2
120	0.61	0.2	2.5E-04	21.4
140	0.65	0.16	2.4E-04	21.1
160	0.67	0.14	2.3E-04	19.8
180	0.69	0.12	2.2E-04	19.0
200	0.7	0.11	2.1E-04	17.8
220	0.71	0.1	2.0E-04	16.9
240	0.72	0.09	1.9E-04	16.2
		AVERAGE	2.7E-04	23.1


Permeability by Inverse Auger Hole Method
HA02
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Permeability, k (m/day)
0
50
100
150
200
250
300
Test time, t (seconds)
Test 1
Test 2
Test 3

Permeability Calculation - Inverse Auger Hole Method

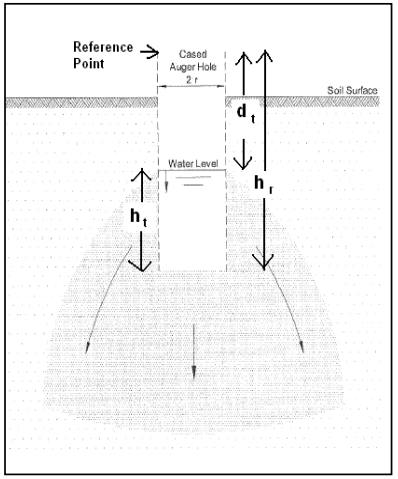
Galt Geotechnics

Job No:	J1702030
Client:	Arise Developments
Location:	Cnr Read St & Council Ave, Rockingham
Calc by:	KH
BH Name:	HA03
Test Depth:	0.76 m

Spreadsheet author:	ORW	17-Oct-09

$$K = 1.15r \frac{\log_{10}(h_0 + \frac{1}{2}r) - \log_{10}(h_t + \frac{1}{2}r)}{t - t_0}$$

REFERENCE: Cocks, G. *Disposal of Stormwater Runoff by Soakage in Perth Western Australia*, Journal and News of the Australian Geomechanics Society, Volume 42 No 3 September 2007, pp101-114



Spreadsheet Legend

	Required input
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	Field not used
	Fixed field

Parameter	Description	Value	Units
K	Permeability		m/s
r	radius of test hole	0.045	m
t	time since start of measurement		s
h_r	reference point height above base	0.76	m
d_t	depth from reference point to water at time t		m
h_t	Water column height at time t		m
h_0	h_t at t=0		m

Test 1

t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0	0.76		
20	0.25	0.51	4.3E-04	37.4
40	0.35	0.41	3.3E-04	28.8
60	0.41	0.35	2.8E-04	24.0
80	0.47	0.29	2.6E-04	22.3
100	0.5	0.26	2.3E-04	19.8
120	0.53	0.23	2.1E-04	18.3
140	0.56	0.2	2.0E-04	17.4
160	0.58	0.18	1.9E-04	16.4
180	0.6	0.16	1.8E-04	15.7
200	0.62	0.14	1.8E-04	15.3
220	0.63	0.13	1.7E-04	14.4
240	0.64	0.12	1.6E-04	13.8
		AVERAGE	2.3E-04	20.3

Test 2

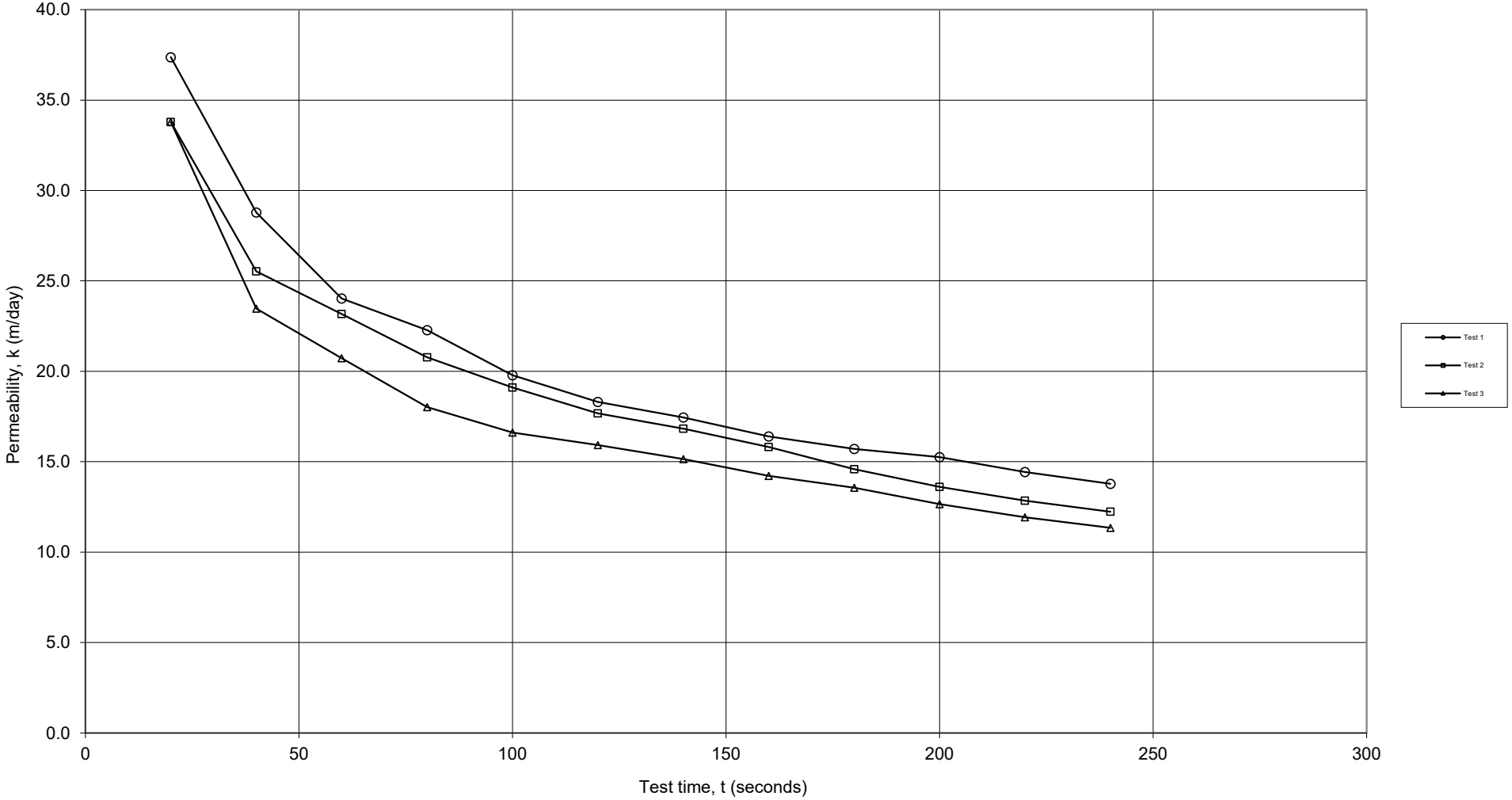
t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0	0.76		
20	0.23	0.53	3.9E-04	33.8
40	0.32	0.44	3.0E-04	25.5
60	0.4	0.36	2.7E-04	23.2
80	0.45	0.31	2.4E-04	20.8
100	0.49	0.27	2.2E-04	19.1
120	0.52	0.24	2.0E-04	17.7
140	0.55	0.21	1.9E-04	16.8
160	0.57	0.19	1.8E-04	15.8
180	0.58	0.18	1.7E-04	14.6
200	0.59	0.17	1.6E-04	13.6
220	0.6	0.16	1.5E-04	12.8
240	0.61	0.15	1.4E-04	12.2
		AVERAGE	2.2E-04	18.8

Test 3

t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0	0.76		
20	0.23	0.53	3.9E-04	33.8
40	0.3	0.46	2.7E-04	23.5
60	0.37	0.39	2.4E-04	20.7
80	0.41	0.35	2.1E-04	18.0
100	0.45	0.31	1.9E-04	16.6
120	0.49	0.27	1.8E-04	15.9
140	0.52	0.24	1.8E-04	15.1
160	0.54	0.22	1.6E-04	14.2
180	0.56	0.2	1.6E-04	13.6
200	0.57	0.19	1.5E-04	12.7
220	0.58	0.18	1.4E-04	11.9
240	0.59	0.17	1.3E-04	11.3
		AVERAGE	2.0E-04	17.3

Permeability by Inverse Auger Hole Method

HA03



Appendix F: Understanding Your Report

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50 Edward Street OSBORNE PARK WA 6017
ABN: 64 625 054 729

UNDERSTANDING YOUR REPORT

GALT FORM PMP11 Rev3

1. EXPECTATIONS OF THE REPORT

This document has been prepared to clarify what is and is not provided in your report. It is intended to inform you of what your realistic expectations of this report should be and how to manage your risks associated with the conditions on site.

Geotechnical engineering and environmental science are less exact than other engineering and scientific disciplines. We include this information to help you understand where our responsibilities begin and end. You should read and understand this information. Please contact us if you do not understand the report or this explanation. We have extensive experience in a wide variety of projects and we can help you to manage your risk.

2. THIS REPORT RELATES TO PROJECT-SPECIFIC CONDITIONS

This report was developed for a unique set of project-specific conditions to meet the needs of the nominated client. It took into account the following:

- the project objectives as we understood them and as described in this report;
- the specific site mentioned in this report; and
- the current and proposed development at the site.

It should not be used for any purpose other than that indicated in the report. You should not rely on this report if any of the following conditions apply:

- the report was not written for you;
- the report was not written for the site specific to your development;
- the report was not written for your project (including a development at the correct site but other than that listed in the report); or
- the report was written before significant changes occurred at the site (such as a development or a change in ground conditions).

You should always inform us of changes in the proposed project (including minor changes) and request an assessment of their impact.

Where we are not informed of developments relevant to your report, we cannot be held responsible or liable for problems that may arise as a consequence.

Where design is to be carried out by others using information provided by us, we recommend that we be involved in the design process by being engaged for consultation with other members of the project team. Furthermore, we recommend that we be able to review work produced by other members of the project team that relies on information provided in our report.

3. SOIL LOGS

Our reports often include logs of intrusive and non-intrusive investigation techniques. These logs are based on our interpretation of field data and laboratory results. The logs should only be read in conjunction with the report they were issued with and should not be re-drawn for inclusion in other documents not prepared by us.

4. THIRD PARTY RELIANCE

We have prepared this report for use by the client. This report must be regarded as confidential to the client and the client's professional advisors. We do not accept any responsibility for contents of this document from any party other than the nominated client. We take no responsibility for any damages suffered by a third party because of any decisions or actions they may make based on this report. Any reliance or decisions made by a third party based on this report are the responsibility of the third party and not of us.

5. CHANGE IN SUBSURFACE CONDITIONS

The recommendations in this report are based on the ground conditions that existed at the time when the study was undertaken. Changes in ground conditions can occur in numerous ways including anthropogenic events (such as construction or contaminating activities on or adjacent to the site) or natural events (such as floods, groundwater fluctuations or earthquakes). We should be consulted prior to use of this report so that we can comment on its reliability. It is important to note that where ground conditions have changed, additional sampling, testing or analysis may be required to fully assess the changed conditions.

6. SUBSURFACE CONDITIONS DURING CONSTRUCTION

Practical constraints mean that we cannot know every minute detail about the subsurface conditions at a particular site. We use professional judgement to form an opinion about the subsurface conditions at the site. Some variation to our evaluated conditions is likely and significant variation is possible. Accordingly, our report should not be considered as final as it is developed from professional judgement and opinion.

The most effective means of dealing with unanticipated ground conditions is to engage us for construction support. We can only finalise our recommendations by observing actual subsurface conditions encountered during construction. We cannot accept liability for a report's recommendations if we cannot observe construction.

7. ENVIRONMENTAL AND GEOTECHNICAL ISSUES

Unless specifically mentioned otherwise in our report, environmental considerations are not addressed in geotechnical reports. Similarly, geotechnical issues are not addressed in environmental reports. The investigation techniques used for geotechnical investigations can differ from those used for environmental investigations. It is the client's responsibility to satisfy themselves that geotechnical and environmental considerations have been taken into account for the site.

Geotechnical advice presented in a Galt Environmental report has been provided by Galt Geotechnics under a sub-contract agreement. Similarly, environmental advice presented in a Galt Geotechnics report has been provided by Galt Environmental under a sub-contract agreement.

Unless specifically noted otherwise, no parties shall draw any inferences about the applicability of the Western Australian state government landfill levy from the contents of this document.

Our Ref: CW1039400:SJL
Contact: Scott Lambie

31 August 2018

Cardno (WA) Pty Ltd
ABN 77 009 119 000

11 Harvest Terrace
West Perth WA 6005
Australia

Phone +61 8 9273 3888
Fax +61 8 9486 8664

www.cardno.com

Property Development Solutions
Unit 9, 69 Hay Street
SUBIACO EAST WA 6008

Attention: Geoff Loxton

Dear Geoff

REVIEW OF RESPONSIBLE AUTHORITY RESPONSE
PROPOSED HEALTH STUDIO, RESTAURANT, SHOWROOMS & CONVENIENCE STORE
LOT 301 READ STREET, ROCKINGHAM

As instructed, Cardno's Traffic and Transport Planning team has undertaken a review of the responsible authority responses for the proposed development of a Health Studio, Restaurant, Showrooms and Convenience Store located at Lot 301 Read Street Rockingham, in the context of current best-practice and statutory guidelines. Our responses are presented below.

CITY OF ROCKINGHAM

1. ***Austroads' Guide to Road Design Part 4 – Intersections and Crossings (General) recommends that an access driveway should not be located within the functional area of an intersection. The upstream functional area is defined as the length of which vehicles are manoeuvring to execute either a right or left-turn movement at an intersection. The proposed access driveway off Council Avenue is located within the upstream functional area of Read Street/Council Avenue intersection and therefore is not supported.***

   Cardno has undertaken an assessment of the access location against AustRoads guidelines and believes that the proposed access point is acceptable in its proposed location. The planned access is a "left in left out" configuration that intersects with Council Avenue within the left turn lane exiting onto Read Street. This access will be predominately used by drivers wishing to head south onto Read Street and by heavy vehicles / service vehicles leaving the site after deliveries (which would be undertaken well outside of peak traffic hours). While the configuration is less than ideal and is by AustRoads definition, within the functional area for right turning vehicles within Council Avenue, the lane in which the planned access intersects will not contain any traffic undertaking a through or right turn movement. This is a situation created by the design of the of the Council Avenue / Read Street intersection, with the left westbound lane within Council Avenue being a trapped lane over its entire length.

   While AustRoads guidelines suggest access points in this location should be avoided where possible, it does not state that they can't be located within this zone when appropriate. This planned access is critical to the operation of the convenience store / service station. These types of service sites are typically located on prominent intersection corners and as a consequence, inevitably have their development accesses located within the functional area of the adjacent intersection. Numerous examples of such can be seen within the wider metropolitan area. Based on these numerous precedents, it is felt that it would not be unreasonable to allow the planned access at its proposed location.

2. ***The internal road network may not be adequate to accommodate for commercial vehicles and therefore a swept path analysis is required to be provided to demonstrate commercial vehicle manoeuvrability.***

   Swept path drawings have been prepared for the City's assessment.

3. ***MRWA's Supplement to Austroads' Guide to Road Design Part 4 recommends that the location of a bus stop should be at least 30m from the Tangent Point (TP) when it is located after an intersection (i.e. from Sepia Court) and therefore the proposal location is not supported.*** –

   Cardno understands that the proponent is prepared to negotiate with the Public Transport Authority (PTA) to relocate the bus stop east of Sepia court. Should the PTA support the proposal, the concerns raised with regard to the current bus stop location will no longer be relevant. It is therefore suggested by Cardno that any issues in relation to the existing bus stop and its location be conditioned within the approval, that the developer liaise with the PTA to relocate the bus stop to the satisfaction of the Public Transport Authority.

4. ***A queue analysis is required to demonstrate that the provided queueing space within the petrol station is adequate to accommodate for the expected peak demand, otherwise the design is required to be amended.***

   It is Cardno's view that the City has not provided sufficient evidence of potential queuing / congestion of traffic on Council Avenue as a result of the convenience store / fuel service station's location within the development. There is no suggestion within the Riley Traffic Impact Assessment report or the design of the site in Cardno's view that creates the nexus for a queue analysis to be undertaken. When referring to the WAPC guidelines for individual developments, there is certainly no specific requirement for this type of analysis to be undertaken.

5. ***Define the vehicle priorities at intersections within the site by means of pavement marking and/or signage (eg. give way sign).***

   Cardno considers that this level of detail could be appropriately conditioned at this approval stage, however Cardno has been requested to provide recommendations for line marking and signage suitable for the control of traffic within the site and will provide a sketch in due course.

6. ***The City has the following comments regarding the Transport Impact Assessment (TIA, prepared by Riley Consulting, dated 18th July 2018)***

   Cardno recommends that appropriate amendments to the Riley TIA be undertaken to correct a number of minor errors / omissions. It is however Cardno's view that the minor errors and omissions are themselves, of no material importance to the findings / recommendations contained within the traffic report or the operation of the proposed site.

7. ***Austroads' Guide to Road Design Part 4 – Intersections and Crossings (General) recommends a minimum 70m left turn auxiliary lane for the site access instead of 60m as nominated in the report. Please amend report accordingly.***

   Cardno has undertaken an assessment of the required design criteria for auxiliary left turn indented pockets within AustRoads Part 4A. AustRoads typically uses a design speed criteria of either 10km per hour above the posted speed limit or the 85 percentile speed for an existing road. As Read Street is speed zoned at 70km/h, when using a design speed of 80km/h, a diverge / deceleration length of 45m is required, with an additional 30m entry tapper – totalling 75m. However, when considering the 85 percentile speed for Read Street (around 74km/h) an auxiliary left turn indented pocket length of 70m would be considered appropriate. The existing unused bus bay that exists within Read Street, which the development will utilise, is able to accommodate a 70m long auxiliary lane without significant modification and therefore the proposal should be considered compliant.

8. ***The cycle time for the signalised intersection at Read Street/Council Avenue seems a bit low (i.e. 70 seconds for weekday PM and 90 seconds for Saturday peak). Please check and confirm that these cycle time reflects the actual operation at the intersection by comparing it to SCATS data. Different cycle time is likely to change the intersection analysis results.***

   Cardno have requested appropriate SCATS data from Main Roads WA to allow checking of the existing cycle times and will confirm this as soon as practicable.

DEPARTMENT OF PLANNING

1. ***The proposal is not in accordance with the Commission's Regional Roads (Vehicular Access) Policy D.C. 5.1, which seeks to minimise the number of new crossovers onto regional roads and rationalise existing access arrangements. The Policy states: 'Where alternative access is or could be made available from side streets, no access shall be permitted to the regional road'. Read Street is classified as a Category 1 control of access road per Plan Number SP 694/4. As such, no access is supported from the site to Read Street.***

   While it is noted that Policy D.C 5.1 s 3.3.2 does state that no access from regional roads shall be permitted unless under special circumstances, s 3.3.4 of the same policy does allow for the provision of regional road access for large traffic generating developments such as shopping centres and recreation centres. Given that the proposed development has a primary focus of both commercial retail and recreation (gymnasium and café), it would be reasonable to suggest that the proposal meets the criteria for approval on these grounds.

   The access off Read Street is critical to allow the entry of vehicles originating from the north of the site. The only full access intersection that could cater for these vehicles is that of Council Avenue and Sepia Court. Sepia Court is a local access street ending in a cul-de-sac and that currently services mainly residential developments and a child care centre. Forcing the majority of the development traffic, including the heavy servicing vehicles, would lead to a deterioration of safety within Sepia Court and impact the streets current users. By allowing the prosed access off Read Street into the development, There will be a negligible effect on traffic flow due to the provision of the proposed left turn pocket, the planned access is consistent with other nearby developments fronting Read Street which have been provided direct access, results in no change in the character or operation of Read Street and no significant alterations to the configuration of Read Street will be required. Given this, it is Cardno's view that the proposed access meets the criteria within Policy D.C 5.1 to allow for discretionary approval of the Read Street access.

2. ***WAPC Transport Impact Assessment Guidelines states that assessment years should be undertaken 10 years after full opening of the development (not the year of full opening or post development as shown). Traffic Impact Assessment is to be updated accordingly.***

   Cardno is of the view that the traffic impact for the development can be assessed for the required 10 year horizon, using appropriately factored traffic growth figures and that this can be conditioned within the approval process to the satisfaction of the Department of Planning.

PUBLIC TRANSPORT AUTHORITY

1. ***The PTA does not support the proposed relocation of bus stop 21234. There are 6 Transperth bus routes that are assigned to this bus stop and given that services are designed to connect with trains at Rockingham Station this can result in multiple services arriving at bus stop 21234 simultaneously. The proposed bus stop position does not accommodate this and would result in bus services causing conflict and blocking the Council Avenue - Sepia Court intersection.***

   Cardno has undertaken an assessment of the existing bus stop location and have found that it is currently creating safety and congestion issues due to its close proximity to the Council Avenue and Read Street intersection. It is Cardno's view that there would be community benefit if the PTA was agreeable to a relocation of the bus stop to a point east of the Sepia Court intersection. This alternative location would result in moving the stop closer to the Council Avenue underpass that links directly to Rockingham City Shopping Centre and therefore would provide significant safety improvements for the public wishing to access the bus stop.

   It is noted that the elevation of the Council Avenue carriageway, designed to accommodate the underpass, results in a noteworthy height difference between the carriageway and parts of the adjacent verge and existing Council Avenue shared path, however these issues can be overcome with suitable retaining of the bus stop pad area and accessible path links to the Council Avenue shared path being provided. As the proponent is willing to work with the Public Transport Authority on relocating the bus stop to this possible location, Cardno considers it appropriate that any concerns relating to the bus stop location be appropriately conditioned requiring the developer to liaise with the Public Transport Authority in order to relocate the bus stop, to the satisfaction of the Public Transport Authority.

Should you wish to discuss any of the above please contact the undersigned or Jacob Martin.

Yours sincerely

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