

22 December 2022

Our Ref: 4733212
File Ref: MC20/01
Enquiries: Paul Want

Chevron Australia Downstream Fuels Pty Ltd
c/- TFA Project Group
PO Box 2339
FORTITUDE VALLEY QLD 4006

Sent via email: johnrowell@tfa.com.au

Dear Mr Rowell

Decision Notice – Approval
(Given under Section 63 of the *Planning Act 2016*)

The assessment manager wishes to advise that the change application (minor change) decided under delegated authority on 16 December 2022. The approval is subject to reasonable and relevant conditions and supported by a notice of reasons as detailed below.

Applicant details

Applicant name: Chevron Australia Downstream Fuels Pty Ltd

Location details

Street address: 71-93 Thompson Street, Mosman Park QLD 4820
Real property description: Lot 2 on MPH20732 and Lot 142 on DV425
Current lawful use: Service Station

Application details

Application number: MC20/01
Approval type: Development Permit
Development type: Material Change of Use
Category of assessment: Code Assessment
Description of development: Service Station
Definition of use: The use of premises for— (a) selling fuel, including, for example, petrol, liquid petroleum gas, automotive distillate or alternative fuels or (b) a Food and drink outlet, Shop, trailer hire, or maintaining, repairing, servicing or washing vehicles, if the use is ancillary to the use in paragraph (a).
Categorising instrument: Charters Towers Regional Town Plan V2

PO Box 189 Charters Towers Qld 4820

ADMINISTRATION: 12 Mosman Street Charters Towers Qld 4820 Australia

PH. (07) 4761 5300 | **F.** (07) 4761 5344 | **E.** mail@charters Towers.qld.gov.au | **ABN.** 67 731 313 583

www.charters Towers.qld.gov.au

1. Details of the approval

Details of the approval are listed below in accordance with the *Planning Regulation 2017*.

	Planning Regulation 2017 reference	Development Permit	Preliminary Approval
Development assessable under the planning scheme, a temporary local planning instrument, a master plan or a preliminary approval which includes a variation approval		<input checked="" type="checkbox"/>	<input type="checkbox"/>

2. Conditions of approval

Condition Number	Condition	Timing																														
Approved Plans/Documents																																
1.	<p>Development is to be carried out generally in accordance with the submitted application including the following plans and supporting documentation except where amendments are required to satisfy the conditions of this approval:</p> <table border="1"> <thead> <tr> <th>Drawing Title:</th> <th>Prepared by:</th> <th>Date:</th> <th>Ref No:</th> <th>Rev:</th> </tr> </thead> <tbody> <tr> <td>Demolition Plan & Site Locality & Views</td> <td>TFA Project Group</td> <td>6 May 2020 <u>3 May 2022</u></td> <td>19013 DA01</td> <td>C <u>E</u></td> </tr> <tr> <td>Proposed Overall Site Plan</td> <td>TFA Project Group</td> <td>06 May 2020 <u>21 October 2022</u></td> <td>19013 DA02</td> <td>C <u>H</u></td> </tr> <tr> <td>Proposed Site Layout</td> <td>TFA Project Group</td> <td>06 May 2020 <u>21 October 2022</u></td> <td>19013 DA03</td> <td>C <u>H</u></td> </tr> <tr> <td>Proposed Puma Building Floor Plan and Elevations <u>Proposed C-Store Building Floor Plan & Elevations</u></td> <td>TFA Project Group</td> <td>12 March 2020 <u>21 October 2022</u></td> <td>19013 DA04</td> <td>B <u>G</u></td> </tr> <tr> <td>Proposed Car and Truck Canopy Elevations</td> <td>TFA Project Group</td> <td>22 November 2019 <u>21 October 2022</u></td> <td>19013 DA05</td> <td>A <u>E</u></td> </tr> </tbody> </table>	Drawing Title:	Prepared by:	Date:	Ref No:	Rev:	Demolition Plan & Site Locality & Views	TFA Project Group	6 May 2020 <u>3 May 2022</u>	19013 DA01	C <u>E</u>	Proposed Overall Site Plan	TFA Project Group	06 May 2020 <u>21 October 2022</u>	19013 DA02	C <u>H</u>	Proposed Site Layout	TFA Project Group	06 May 2020 <u>21 October 2022</u>	19013 DA03	C <u>H</u>	Proposed Puma Building Floor Plan and Elevations <u>Proposed C-Store Building Floor Plan & Elevations</u>	TFA Project Group	12 March 2020 <u>21 October 2022</u>	19013 DA04	B <u>G</u>	Proposed Car and Truck Canopy Elevations	TFA Project Group	22 November 2019 <u>21 October 2022</u>	19013 DA05	A <u>E</u>	At all times
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Condition Number	Condition					Timing
	Proposed Food and Drink Drive Thru Building Floor Plan and Elevations	TFA Project Group	12 March 2020	19013 DA06	B	
	Site Perspectives	TFA Project Group	06 May 2020 21 October 2022	19013 DA07	B G	
	Landscaping Concept Plan Layout	TFA Project Group	21 October 2022	19013 DA08	G H	
	Proposed Site Signage	TFA Project Group	06 May 2020 21 October 2022	19013 DA09	G H	
	HRV Turning Path	TFA Project Group	21 October 2022	19013 DA10	H	
	Site queuing, Tanker Delivery and Mine Worker Parking Plan	TFA Project Group	06 May 2020 21 October 2022	19013 DA11	G H	
	Conceptual Stormwater Management Plan	TFA Project Group	5 May 2020 21 October 2022	19013 DA12	B F	
	Conceptual Erosion and Sediment Control Plan	TFA Project Group	5 May 2020 21 October 2022	19013 DA13	B E	
And supporting documents:						
	Document Title:	Prepared by:	Date:	Ref No:	Rev:	
	Traffic Impact Assessment	Cardno	20 December 2019	QTT19118	01	
	Site Based Stormwater Management Plan	TFA Project Group	06 May 2020 26 October 2022	19013	A D	
	Cardno Technical Memorandum – Thompson Street Service Station	Cardno	25 May 2020	QTT19118	-	



Condition Number	Condition	Timing
	<p>Traffic Response to SARA Information Request</p> <p>a) Provide amended Swept Path Diagrams that demonstrate internal manoeuvrability of large combination/triple road trains (55 metres). The Swept Path Diagram must demonstrate how the large combination vehicles can manoeuvre within the site inclusive of queuing distances and movements out of the designated parking areas to access the fuel bowsers.</p>	
Special		
2.	<p>Design for approval by Council an entry statement art piece that:</p> <p>a) Is located at the ingress and egress access point of Thompson Street and the development site</p> <p>b) Is clearly visible for motorists travelling both east and west</p> <p>c) Has a minimum height of 2m and a width of 3m,</p> <p>d) Provides an attractive design which celebrates the Region of Charters Towers, for example the beef/cattle industry or the gold rush, and</p> <p>e) Upon approval, construct the entry statement art piece.</p>	Prior to the lodgement of any subsequent Development Applications and as part of construction
3.	Advertising devices are to be wholly contained within the premises and not Council's controlled road reserve.	At all times
4.	The premises is to be surveyed by a registered cadastral surveyor to determine the lawful boundaries of between Lot 1 on MPH20732 of Lot 142 on DV425 (or as retitled). An acoustic fence is to be erected for the total length of 60 metres from the Clara Road road reserve along the boundary between Lot 1 on MPH20732 of Lot 142 on DV425 (or as retitled). The details of the acoustic fence are to be provided to Council for approval.	As part of construction works
5.	A minimum of one waste bin is to be constructed within the designated car parking of the Puma C – Store Truck Stop.	As part of construction works
General		
6.	<p>a) Comply with all conditions within this Development Permit with conditions prevailing over the approved plan(s) and document(s) in all instances</p> <p>b) Meet the cost of all works associated with the development including any alterations, relocations or repairs to damaged Council infrastructure, and</p> <p>a) All repairs, alterations and relocations of Council infrastructure are to be in accordance with the relevant Council policy and/or Australian Standard.</p>	At all times
Environmental		
7.	The construction of the development (not operation) must be limited to 0630—1830 Monday to Saturday and not at all on Sunday and public holidays. Noise generated from construction must be within the limits set	At all times



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Condition Number	Condition	Timing
	by the <i>Environmental Protection Act 1994</i> and the <i>Environmental Protection (Noise) Policy 20019</i> .	
8.	Ensure that: a) Works occur so they do not cause unreasonable interference with the amenity of adjoining premises because of noise, air or other chemical pollutants b) The premises including the adjoining Council controlled road reserve are kept in a safe, clean and tidy state, and c) All construction materials are contained wholly within the premises.	As part of construction works
9.	Where contaminated soils are evident, remedial works must be undertaken in accordance with <i>Environmental Protection Act 1994</i> . Where contaminated soils are identified, Council must be notified and provided with an appropriate Contaminated Soil Remedial Plan.	As part of operational and/or building works
Building, Plumbing and Drainage Works		
10.	Obtain a Development Permit and Building Final for Building Works in accordance with the <i>Planning Act 2016</i> for the removal of the existing structures. The removal of the structure is to occur prior to any Building Works for the approved Development.	Prior to construction
11.	Obtain a Development Permit and Building Final for Building Works in accordance with the <i>Planning Act 2016</i> . Construction is to comply with the <i>Building Act 1975</i> , the <i>National Construction Code</i> and the requirements of other relevant authorities.	Prior to construction
12.	Obtain a Permit for Plumbing and Drainage Works and Final Inspection Certificate in accordance with the <i>Plumbing and Drainage Act 2018</i> and the <i>Plumbing and Drainage Regulation 2019</i> . Construction is to comply with the <i>National Construction Code: Volume Three – Plumbing Code of Australia 2019</i> , the <i>Queensland Plumbing and Waste Water Code 1: 2019</i> and the requirements of other relevant authorities.	Prior to construction
13.	Lodge, have approved and construct a Trade Waste System on site in accordance with: a) S0069/CCS - Trade Waste Environmental Management Policy b) STRAT0071/CCS - Charters Towers Trade Waste Environmental Management Plan, and c) <i>Water Supply (Safety and Reliability) Act 2008</i> .	Prior to construction
14.	All plant and equipment (including air conditioners, exhaust fans and the like) are to be housed, screened and located so that these do not cause environmental nuisance or harm to residential uses in the surrounding area.	As part of construction
15.	The development is to incorporate a variety of at least four different textures, colours and designs within the external façade of the building. Details of the proposed colour scheme, materials and finishes for all external areas of the building are to be submitted to Council for approval.	As part of construction
16.	Outdoor lighting is to comply with <i>Australian Standard AS4282 – Control of the Obtrusive Effects of Outdoor Lighting</i> . All lighting at ground level and	As part of construction



Condition Number	Condition	Timing
	associated with illuminating ground level areas must be focused downwards and be provided with hoods, shades or other permanent devices to direct illumination downwards and not allow upward lighting to adversely affect the residential uses on this site and the adjoining the sites.	
Transport		
17.	A total of 46 31 car parking spaces (excluding the designated Mine Worker Car Park) are to be constructed on site generally in accordance with the approved plans, including designated disabled car parking spaces. These spaces and all vehicle movement areas are to be constructed, sealed, line marked, provided with wheel stops and maintained in accordance with and <i>AS2890.1 Off-Street Car Parking</i> and the <i>Manual of Design Vehicles and Turning Path Templates SAA HB 72 (AUSTRROADS 1995)</i> .	As part of construction
18.	A total of 7 Class 2 Triple Road Train and 6 Class 2 B Double (as per the AUSTRROADS Vehicle Classification System) parking spaces are to be constructed on site generally in accordance with the approved plans. These parking spaces are to be constructed, sealed, line marked and maintained.	As part of construction
19.	A single bus parking space is to be constructed onsite having a minimum width of 4m, minimum length of 20m and minimum height of 4m. The bus parking space is to be constructed, sealed, line marked, provided with a wheel stop and maintained in accordance with and <i>AS2890.1 Off-Street Car Parking</i> and the <i>Manual of Design Vehicles and Turning Path Templates SAA HB 72 (AUSTRROADS 1995)</i> .	As part of construction
20.	A total of 80 park and ride car parks are to be constructed on site generally in accordance with the approved plans, including designated disabled car parking spaces. These spaces and all vehicle movement areas are to be constructed, sealed, line marked, provided with wheel stops and maintained in accordance with and <i>AS2890.1 Off-Street Car Parking</i> and the <i>Manual of Design Vehicles and Turning Path Templates</i>.	As part of construction
21.	Lodge and obtain approval for an application to carry out public access on Clara Road as part of works within the Council controlled road reserve.	Prior to works within Council's road reserve
22.	Construct a driveway crossover at the frontage of Clara Road in accordance with Council's standard drawing <i>CTRC-004 Roads commercial and/or truck layout</i> .	As part of construction
23.	Under Part 1 Clause 1.10 of the Manual of Uniform Traffic Control Devices Queensland (MUTCDQ), Council delegates the responsibility for the installation of all official traffic signs and markers, as detailed in the approved plans, are installed in accordance with the methods, standards and procedures prescribed in the MUTCDQ, or other duly approved documents.	As part of construction
Water and Sewer		



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Condition Number	Condition	Timing
24.	Where changes are required to water service connections and water meters, lodge and have approved, an application for connection to water supply. Upon approval, construct the changes to water services and meters.	Prior to works on Council's water infrastructure
25.	Where changes are required to sewer supply connections, lodge and have approved an application for sewer main cut-in. Upon approval, construct the changes to sewer supply connections.	Prior to works on Council's sewer infrastructure
Stormwater		
26.	All stormwater runoff must be piped from roofed areas and discharged to the drainage system within Council controlled road (Clara Road), or as per the approved Site Based Stormwater Management Plan dated 6 January 2020 <u>18 May 2022</u> Reference Number 19013. All stormwater management must be undertaken in accordance with <i>Queensland Urban Drainage Manual 2016</i> and <i>AS3500.3:2018 Plumbing and Drainage - Stormwater Drainage</i> .	At all times
27.	Provide an amended Conceptual Stormwater Management Plan that incorporates at the end of the stormwater drains an inline Gross Pollutant Trap (GPT). The GPT must be installed prior to the discharge point into the swale detention basins in addition to the SPEL Stormsacks.	Prior to the lodgment of any subsequent Development Applications and as part of construction
Waste Management		
28.	Waste storage area/s are to be sufficient in size to house all waste collection containers including recycling waste containers. The waste storage area/s must be suitably enclosed and imperviously paved, with a hose cock and hose fitted near the enclosure to ensure the area can be easily and effectively cleaned.	As part of construction
29.	Waste storage areas shall be; a) Situated in locations not visible from the street front, and b) Provided with a 1.8m solid screen fence located around storage areas.	As part of construction
30.	Sealed and raised bunding is to be constructed around all holding tanks and forecourt areas on which a vehicle can stand while being fueled or transferring petroleum products.	As part of construction
31.	Drainage from paved forecourt areas and areas on which a vehicle can stand while being fueled or transferring petroleum products, shall be directed by appropriate surface grading into grated sumps, where it is treated in an approved manner or held and removed by an approved contractor.	As part of construction
Environmental Health		
32.	A Food Business Application is to be submitted to Council for approval in accordance with the <i>Food Act 2006</i>.	Prior to serving food on premises
Food and Drink Outlet		
33.	The Food and Drink Outlet is to be operated/occupied by one tenant.	At all times



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Condition Number	Condition	Timing
Landscaping		
34.	Construct all landscaping including species in accordance the approved plans within Condition 1. All landscaping is to be provided with an onsite irrigation system.	Prior to the lodgement of any subsequent Development Applications
35.	Provide a minimum one metre wide landscaped vegetative buffer parallel to the acoustic fence for the total length of 60 metres from the Clara Road road reserve along the boundary between Lot 1 on MPH20732 of Lot 142 on DV425 (or as retitled).	As part of construction
Survey Plan Endorsement and Easements		
36.	Amalgamate Lot 2 on MPH20732 (or as retitled) and Lot 142 on DV425 (or as retitled) into a single parcel.	Prior to the commencement of the use
Lawful Commencement		
37.	Request a Compliance Inspection be undertaken by Council to confirm that all conditions of this Development Permit are considered compliant.	Prior to the commencement of the use
38.	Notify Council within 20 business days that this approved use has lawfully commenced.	Prior to the commencement of the use

Advisory Notes	
Scale or Intensity of Use	
A.	Any proposal to increase the scale or intensity of the use/new use on the subject land, that is assessable development under the Planning Scheme, would be subject to a separate application for assessment in accordance with the <i>Planning Act 2016</i> and would have to comply with the requirements of the relevant provisions.
On-site Sewer Pump Station	
B.	Due to the development being located outside the defined sewerage area all generated waste must be discharged into Council's reticulated sewer system due to the absence of an onsite wastewater treatment plant. It is noted that the size and location of the Pump Station will be assessed as a component of the Plumbing and Drainage Application.
Staging of Development	
C.	The development as approved is not staged. Where staging is sought, a Change Application under Section 78 of the <i>Planning Act 2016</i> .
Landscaping	
D.	In accordance with the State Assessment and Referral Agency Response (Reference: 2002-15436 SRA), the Applicant must submit as part of the Road Access Works Application, a detailed landscaping plan. As part of this landscaping plan note the inclusion of the entry art statement. Where significant landscaping changes are sought, a Change Application under Section 78 of the <i>Planning Act 2016</i> will likely be required.
Local and State Heritage	
E.	The Charters Towers Regional Council local government area contains significant Local and State heritage features including stone pitch kerbing and channels and footbridges. Persons damaging or removing Local

PO Box 189 Charters Towers Qld 4820

ADMINISTRATION: 12 Mosman Street Charters Towers Qld 4820 Australia

PH. (07) 4761 5300 | **F.** (07) 4761 5344 | **E.** mail@charterstowers.qld.gov.au | **ABN.** 67 731 313 583

www.charterstowers.qld.gov.au



Advisory Notes	
	or State heritage features may be prosecuted and fined with the maximum penalty under the <i>Planning Act 2016</i> . Please contact Council prior to commencing any works, to determine if there are any Local or State heritage features within or adjacent to the premises.
Aboriginal and Cultural Heritage	
F.	The <i>Aboriginal Cultural Heritage Act 2003</i> and <i>Torres Strait Islander Cultural Heritage Act 2003</i> requires anyone who carries out a land-use activity to exercise a duty of care. Land users must take all reasonable and practicable measures to ensure their activity does not harm Aboriginal or Torres Strait Islander cultural heritage. Prior to carrying out works, it is advised that you contact the Department of Aboriginal and Torres Strait Islander Partnerships on (07) 4799 7470 or by post at PO Box 5620 TOWNSVILLE QLD 4810. For further information on cultural heritage duty of care please visit: https://www.datsip.qld.gov.au/people-communities/aboriginal-torres-strait-islander-cultural-heritage/cultural-heritage-duty-care
Abandoned Mine Shafts	
G.	The city of Charters Towers is subject to a significant number of abandoned mine shafts due to the former gold rush era. It is recommended that all searches be undertaken through the Queensland State Government's Department of Natural Resources Mines and Energy (DNRME) to ensure that the development is not unduly impacted upon by these shafts. The DNRME can be contacted on 13 74 68.
Workplace Health and Safety	
H.	Ensure compliance with the <i>Work Health and Safety Act 2011</i> . It states that the project manager is obliged to ensure construction work is planned and managed in a way that prevents or minimises risks to the health and safety of members of the public at or near the workplace during construction work. It is the principal contractor's responsibility to ensure compliance with the <i>Work Health and Safety Act 2011</i> . It states that the principal contractor is obliged on a construction workplace to ensure that work activities at the workplace prevent or minimise risks to the health and safety of the public at or near the workplace during the work. It is the responsibility of the person in control of the workplace to ensure compliance with the <i>Work Health and Safety Act 2011</i> . It states that the person in control of the workplace is obliged to ensure there is appropriate, safe access to and from the workplace for persons other than the person's workers.
Environmental nuisance	
I.	Ensure compliance with the <i>Environmental Protection Act 1994</i> . It states that a person must not carry out any activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practicable measures to prevent or minimise the harm. Environmental harm includes environmental nuisance. In this regard persons and entities, involved in the civil, earthworks and construction phases of this development, are to adhere to their "general environmental duty" to minimise the risk of causing environmental harm. Environmental harm is defined by the Act as any adverse effect, or potential adverse effect whether temporary or permanent and of whatever magnitude, duration or frequency on an environmental value and includes environmental nuisance. Therefore, no person should cause any interference with the environment or amenity of the area because of the emission of noise, vibration, smell, fumes, smoke, vapour, steam, soot, ash, dust, waste water, waste products, grit, sediment, oil or otherwise, or cause hazards likely in the opinion of the Council to cause undue disturbance or annoyance to persons or affect property not connected with the use.
Ergon Energy and Telstra Corporation Contact Details	
J.	Where a condition requires connections to reticulated electricity and/or telecommunications or a certificate of supply, please contact the below; a) Ergon Energy Connection Solution's Team – (07) 4931 1012, and/or



Advisory Notes

b) NBN Co – 1800 687 626.

Council Forms, Policies and Drawings

- K. In achieving compliance with conditions, the below Council forms will need to be completed for this development;
- a) [F0339/RI - Application to carry out public access/footpath work](#)
 - b) F0188 – Trade waste application
 - c) F0312/PSD – Application for food business/mobile food business licence
 - d) F0313/IS – Request for water supply connection
 - e) S0069/CCS - Trade Waste Environmental Management Policy, and
 - f) STRAT0071/CCS - Charters Towers Trade Waste Environmental Management Plan.

In addition, Council's Standard Drawings for roads, driveways and grids can be found at www.charterstowers.qld.gov.au/drawings-specifications.

3. Currency period for the development application approval

In accordance with section 85 of the *Planning Act 2016*, this approval has a currency period of six years.

4. Further development permits

Please be advised that the following development permits are required to be obtained before the development can be carried out:

- 1) Building Works, and
- 2) Plumbing and Drainage Works.

5. Referral agencies

The referral agencies for this application are:

Agency:	Trigger:	Advice/Concurrence:	Address:	Date and Ref:
Department of State Development, Manufacturing, Infrastructure and Planning	10.9.4.2.4.1 Development within 25m of a State Transport Corridor requiring State Code 1: Development in a State-controlled Road Environment	Concurrence	North and Central West Office PO Box 5666 TOWNSVILLE QLD 4810 NQSARA@dsgdmip.qld.gov.au	10 June 2020 2002-15436 SRA



The conditions imposed by the referral agencies are included as an attachment.

6. Submission(s)

Properly made submissions were not made in relation this development.

7. Notice of reasons

This notice is prepared in accordance with Section 63(5) of the *Planning Act 2016* to inform the public about a decision that has been made in relation to a development application.

Description of the development:	Material Change of Use for Service Station.	
Reasons for the decision:	The proposal seeks the redevelopment of a site containing a Service station within the Industry Zone for a Service station which is of a scale and intensity considered appropriate by the Charters Towers Regional Town Plan. The proposal will not significantly detract from the commercial viability of the Centre Zone with conditions recommended to ensure amenity impacts are managed.	
Assessment benchmarks:	The proposed development was assessed against the Charters Towers Regional Town Plan including the following assessment benchmarks: a) Industry Zone Code b) Development Works Code, and c) Landscaping Code.	
Relevant matters:	Not applicable	
Matters raised in submissions:	Not applicable	
Reasons for decision:	The development was assessed against all the assessment benchmarks listed above and complies with all, with the exceptions listed below:	
	Assessment benchmark:	Reasons for the approval despite non-compliance with benchmark:
	Industry Zone Code Acceptable Outcome 3.1	The development proposes multiple points of ingress and egress which are not considered easily identifiable or clearly defined as required by Acceptable Outcome 3.1. This was raised by the Department of State Development, Manufacturing, Infrastructure and Planning as part of their Information Request. The Department of State Development, Manufacturing, Infrastructure and Planning regulates vehicular ingress and egress to the site via Thompson Street however Clara Road is within the local road network. Internally, the proposal has been conditioned to ensure compliance with Performance Outcome 3 whereby building entrances are to be legible and safe. Further to the above, the Department of State Development, Manufacturing, Infrastructure and Planning have amended their Approved Plans and Documents to provide ingress and egress clarity



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		to all road users. This is in support in meeting compliance with Performance Outcome 3.
	Industry Zone Code Acceptable Outcome 12	A condition has been recommended to erect an acoustic fence and vegetative buffer along the defined sensitive boundary to mitigate any potential noise/nuisance generated from the proposal. As such, no conditions have been recommended to directly regulate hours of operation.
	Industry Zone Code Acceptable Outcome 22	The retail space associated with the Service Station exceeds Acceptable Outcome 22 which states that the retail area of GFA is not to exceed 80m2. This noted, the existing Service Station has an approximate Gross Floor Area of 397m2 (proposed Service Station approximate Gross Floor Area is 427m2 with a sales area of 143m2). Therefore, the scale of the redevelopment and the existing retail component of the proposal is considered ancillary to the Service Station use and achieves compliance with Performance Outcome 22.

8. Other requirements under section 43 of the *Planning Regulation 2017*

There are no other requirements.

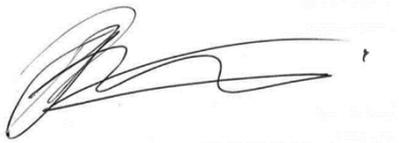
9. Appeal rights

The rights of an applicant to appeal to a tribunal or the Planning and Environment Court against a decision are set out in Chapter 6, Part 1 of the *Planning Act 2016*. For particular applications, there may also be a right to make an application for a declaration by a tribunal (see Chapter 6, Part 2 of the *Planning Act 2016*). Information about how to proceed with an appeal to the Planning and Environment Court may be found on the Court's website: <http://www.courts.qld.gov.au/courts/planning-and-environment-court>.

An applicant may also have a right to appeal to the Development tribunal. For more information, see schedule 1 of the *Planning Act 2016*. The timeframes for starting an appeal in the Planning and Environment Court are set out in Section 229 and Schedule 1 of the *Planning Act 2016*.

Should you wish to discuss this matter, please contact Paul Want on (07) 4761 5300.

Yours faithfully



Paul Want
Manager Planning & Development



CHEVRON CHARTERS TOWERS TRUCK STOP

CHEVRON AUSTRALIA PTY LTD

DEVELOPMENT APPLICATION

MOSMAN PARK - QLD
71-93 THOMPSON ST



Drg No.	Rev.	Drawing Title
DA00	G	COVER SHEET
DA01	E	DEMOLITION PLAN & SITE LOCALITY & VIEWS
DA02	H	PROPOSED OVERALL SITE PLAN
DA03	H	PROPOSED SITE LAYOUT
DA04	G	PROPOSED C-STORE BUILDING FLOOR PLAN & ELEVATIONS
DA05	E	PROPOSED CAR & TRUCK CANOPY ELEVATIONS
DA06	B	DELETED
DA07	G	SITE PERSPECTIVES
DA08	H	LANDSCAPING CONCEPT LAYOUT
DA09	H	PROPOSED SITE SIGNAGE
DA10	H	HRV TURNING PATH
DA11	H	SITE QUEUING, TANKER DELIVERY & MINE WORKER PARKING PLAN
DA12	F	CONCEPTUAL STORMWATER MANAGEMENT PLAN
DA13	E	CONCEPTUAL EROSION & SEDIMENT CONTROL PLAN





SITE LOCALITY PLAN
NOT TO SCALE



VIEW A



VIEW B

RPD
LOT: LOT 2 ON MPH20732
AREA: 2.003 HECTARES
LOT: LOT 142 ON DV425
AREA: 0,744m²
LGA: CHARTERS TOWERS REGIONAL COUNCIL



DEMOLITION NOTES

1. ALL BUILDINGS & STRUCTURES TO BE DEMOLISHED AND REMOVED FROM SITE, INCLUDING DISUSED MATERIALS, BOLLARDS, GUARD RAILS.
2. ANY EXISTING UNDERGROUND FUEL LINES OR TANKS TO BE REMOVED IN STRICT ACCORDANCE WITH THE WORK HEALTH & SAFETY ACT 2011 REGULATIONS 366 & 367. ANY EXISTING UNDERGROUND FUEL TANKS TO BE PREPARED AS PER AS4976 FOR REMOVAL & DESTRUCTION. CERTIFICATE OF DESTRUCTION TO BE ISSUED UPON COMPLETION.
3. REMOVE & DISPOSE OF EXISTING VEGETATION INCLUDING TREES UNLESS OTHERWISE NOTED - REFER TO PROPOSED LANDSCAPING PLAN

DEMOLITION LEGEND



RED HATCH SHOWS EXTENT OF DEMOLITION WORKS - TO BE CONFIRMED AT DETAIL DESIGN STAGE



VIEW C



VIEW D



1 DEMOLITION SITE PLAN
1: 1200 @ A3



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REV	DATE	BY	DESCRIPTION	CHK	PROJECT DETAILS	DRAWING TITLE		STATUS	
A	22.11.19	MG	DA ISSUE			DEMOLITION PLAN & SITE LOCALITY & VIEWS		DA ISSUE	
B	12.03.20	EEK	DA ISSUE					APPROVED JR	
C	06.05.20	MG	TMR RFI AMENDMENTS					AS INDICATED	
D	28.03.22	DGE	DA RE-ISSUE					AS INDICATED	
E	03.05.22	CZS	DA RE-ISSUE FOR CLIENT REVIEW					REV	

RPD
 LOT: LOT 2 ON MPH20732
 AREA: 2.003 HECTARES
 LOT: LOT 142 ON DV425
 AREA: 8,744m²
 LGA: CHARTERS TOWERS REGIONAL COUNCIL



NOTES

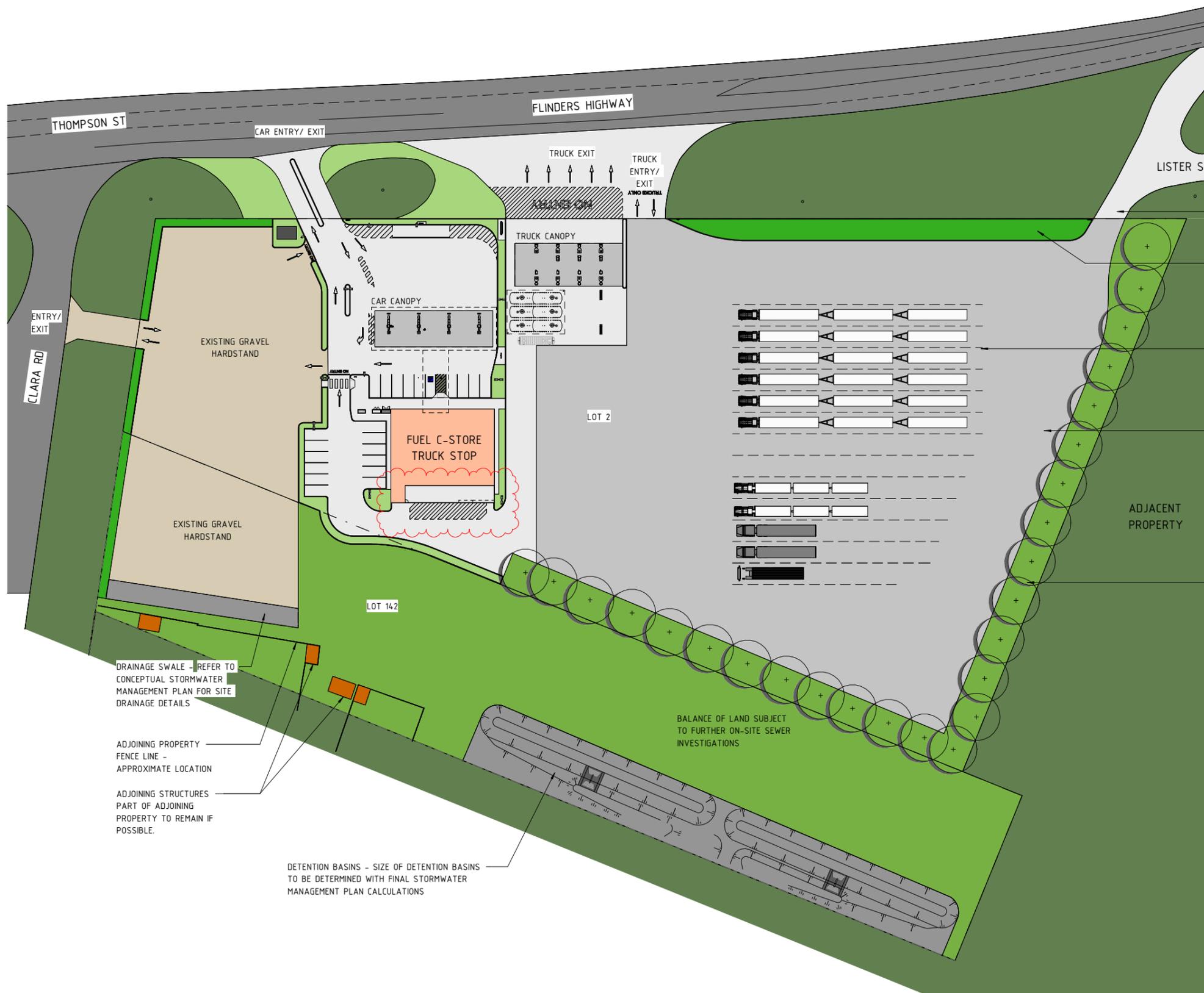
1. NOT FOR TENDER OR CONSTRUCTION
2. EXTERNAL ROAD WORKS SUBJECT TO FINAL ADVICE FROM TRAFFICE ENGINEER
3. SITE LAYOUT SUBJECT TO DETAIL SITE SURVEY AT DETAIL DESIGN STAGE

LEGEND

- EXISTING LANDSCAPE TO BE REHABILITATED REFER TO CONCEPT LANDSCAPE PLAN.
- EXISTING TREES & LANDSCAPING TO REMAIN.
- PROPOSED LANDSCAPING - REFER TO CONCEPT LANDSCAPE PLAN.
- EXISTING HARDSTAND TO BE CLEANED AND REPAIRED AS REQUIRED.
- EXISTING GRAVEL HARDSTAND TO BE CLEANED AND REPAIRED AS REQUIRED.

SITE COVERAGE SCHEDULE

FUEL SHOP C-STORE	440m ²
CAR CANOPY	290m ²
CAR CANOPY LINK	90m ²
TRUCK CANOPY (EXISTING PLUS EXTENSION SUBJECT TO SURVEY)	250m ²
PAVEMENT (INCL. SERVICE YARDS)	3131m ²
PATHWAYS	188m ²
LANDSCAPING (PROPOSED)	378m ²
EXISTING LANDSCAPE & HARDSTAND	
LANDSCAPE REJUVINATED LOT 2	569m ²
LANDSCAPE UNAFFECTED LOT 2	1889m ²
LANDSCAPE REJUVINATED LOT 142	77m ²
LANDSCAPE UNAFFECTED LOT 142	5520m ²
HARDSTAND (TRUCK PARKING)	11139m ²
HARDSTAND (MINE WORKER CAR PARK)	3431m ²



EXISTING TRUCK ENTRY AND LONG TERM PARKING FROM FLINDERS HIGHWAY

FLINDERS HIGHWAY FRONTAGE LANDSCAPING TO BE REJUVINATED AND REPLENISHED

EXISTING TRUCK PARKING (DASH LINES INDICATIVE OF PARKING - NO LINEMARKING)
 7 x A-TRIPLE (54m) SPACES
 6 x B-DOUBLE (26m) SPACES

RETAIN EXISTING HARDSTAND AREA WITH DRAINAGE ISSUES RESOLVED

ADJACENT PROPERTY

EXISTING TREES & LANDSCAPING TO REMAIN

DRAINAGE SWALE - REFER TO CONCEPTUAL STORMWATER MANAGEMENT PLAN FOR SITE DRAINAGE DETAILS

ADJOINING PROPERTY FENCE LINE - APPROXIMATE LOCATION

ADJOINING STRUCTURES PART OF ADJOINING PROPERTY TO REMAIN IF POSSIBLE.

DETENTION BASINS - SIZE OF DETENTION BASINS TO BE DETERMINED WITH FINAL STORMWATER MANAGEMENT PLAN CALCULATIONS

BALANCE OF LAND SUBJECT TO FURTHER ON-SITE SEWER INVESTIGATIONS



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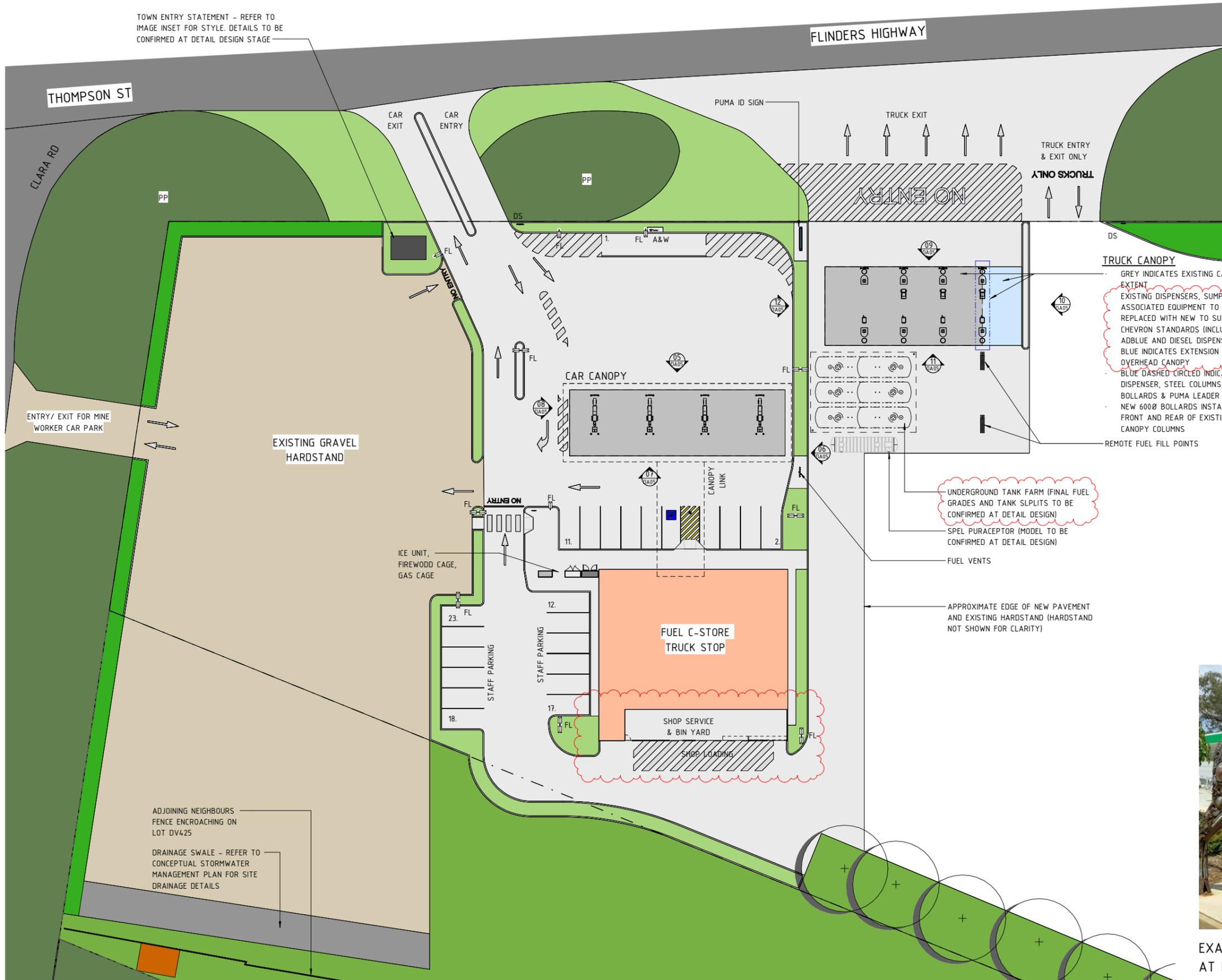
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G	30.09.22	DGC	DA UPDATED EXISTING HARDSTAND RETAINED		
H	21.10.22	DGC	REVISED TRUCK DISPENSERS & BUILDING EXTENT		

**CHEVRON TRUCK STOP
 CHARTERS TOWERS 71-93 THOMPSON
 ST MOSMAN PARK QLD 4820**

**PROPOSED OVERALL SITE
 PLAN**

STATUS		
DA ISSUE		
DRAWN	APPROVED	
MG	JR	
DATE CREATED	A1 SCALE	A3 SCALE
20.11.19	1:500	1:1000
DRAWING NO	REV	
19013	DA02	H

TOWN ENTRY STATEMENT - REFER TO IMAGE INSET FOR STYLE. DETAILS TO BE CONFIRMED AT DETAIL DESIGN STAGE



RPD
 LOT: LOT 2 ON MPH20732
 AREA: 2.003 HECTARES
 LOT: LOT 142 ON DV425
 AREA: 0,744m²
 LGA: CHARTERS TOWERS REGIONAL COUNCIL



NOTES

1. NOT FOR TENDER OR CONSTRUCTION
2. SITE LAYOUT SUBJECT TO DETAIL SITE SURVEY AT DETAIL DESIGN STAGE

LEGEND

- A&W AIR & WATER POINT
- DS DIRECTIONAL SIGNAGE - REFER SIGNAGE PLAN
- FL FLOOD LIGHT
- PP EXISTING POWER POLE
- WB WASTE BIN
- PROPOSED LANDSCAPING - REFER TO CONCEPT LANDSCAPE PLAN
- REFER TO CONCEPTUAL STORMWATER MANAGEMENT PLAN FOR DETAILS

PARKING RATES

REQUIRED		
FUEL SHOP C-STORE (SHOP)	1/15m ² of 440m ²	= 30
TOTAL REQUIRED		= 30
PROVIDED		= 31

NOTE: PROVIDED NUMBER OF CAR PARKS INCLUDES CAR & TRUCK CANOPY REFUELING PARKS

TRUCK CANOPY

- GREY INDICATES EXISTING CANOPY EXTENT
- EXISTING DISPENSERS, SUMPS & ASSOCIATED EQUIPMENT TO BE REPLACED WITH NEW TO SUIT CHEVRON STANDARDS (INCLUDING ADBLUE AND DIESEL DISPENSERS)
- BLUE INDICATES EXTENSION OF OVERHEAD CANOPY
- BLUE DASHED CIRCLED INDICATES NEW DISPENSER, STEEL COLUMNS, BOLLARDS & PUMA LEADER BOARD
- NEW 600Ø BOLLARDS INSTALLED FRONT AND REAR OF EXISTING CANOPY COLUMNS

REMOTE FUEL FILL POINTS

UNDERGROUND TANK FARM (FINAL FUEL GRADES AND TANK SPLITS TO BE CONFIRMED AT DETAIL DESIGN)

SPEL PURCEPTOR (MODEL TO BE CONFIRMED AT DETAIL DESIGN)

FUEL VENTS

APPROXIMATE EDGE OF NEW PAVEMENT AND EXISTING HARDSTAND (HARDSTAND NOT SHOWN FOR CLARITY)



EXAMPLE OF TOWN ENTRY STATEMENT. TO BE CONFIRMED AT DETAIL DESIGN STAGE

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CHEVRON TRUCK STOP
CHARTERS TOWERS 71-93 THOMPSON
ST MOSMAN PARK QLD 4820

PROPOSED SITE LAYOUT

STATUS		DA ISSUE	
DRAWN	APPROVED		
MG			
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DRAWING NO	REV		
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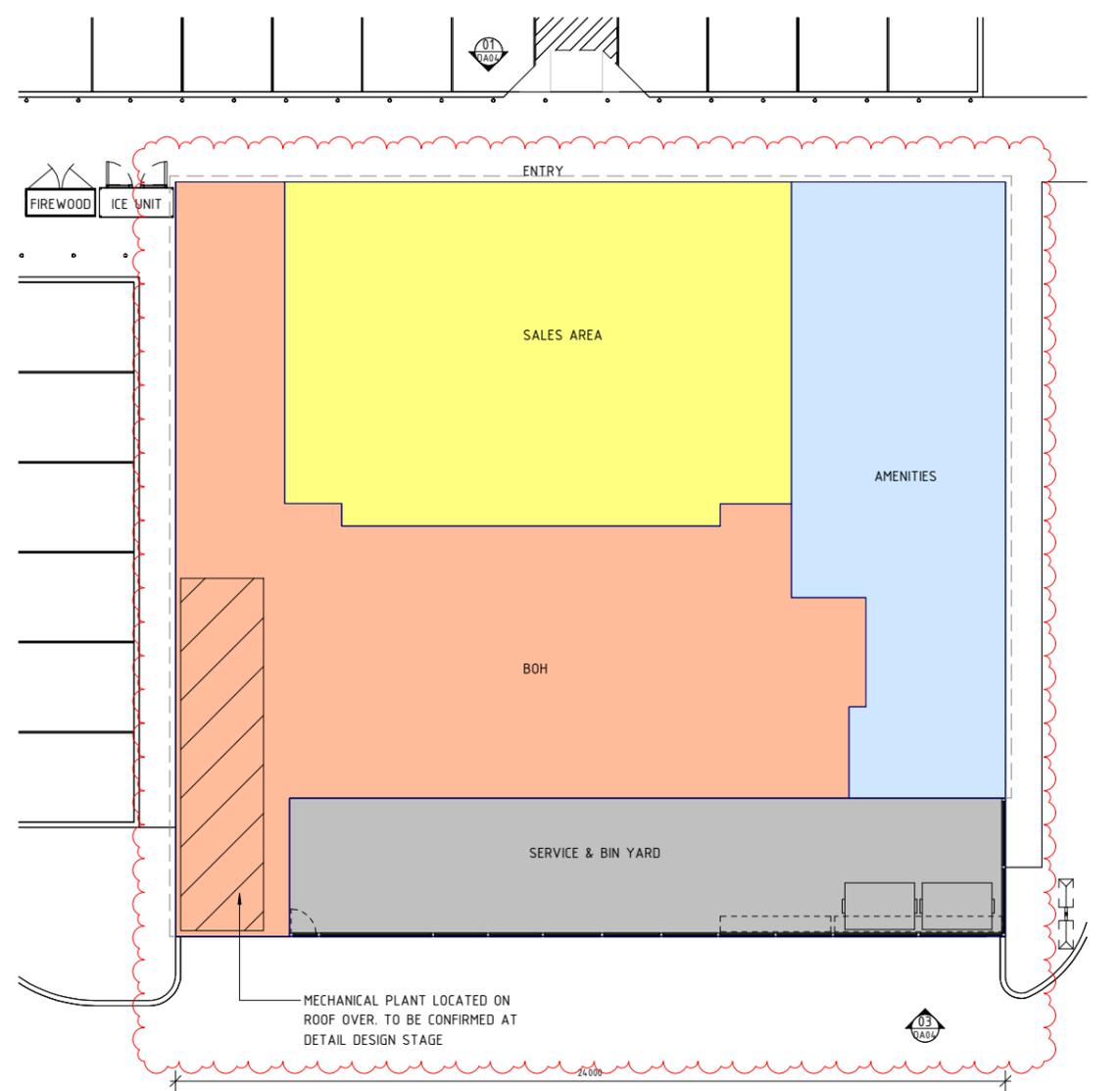
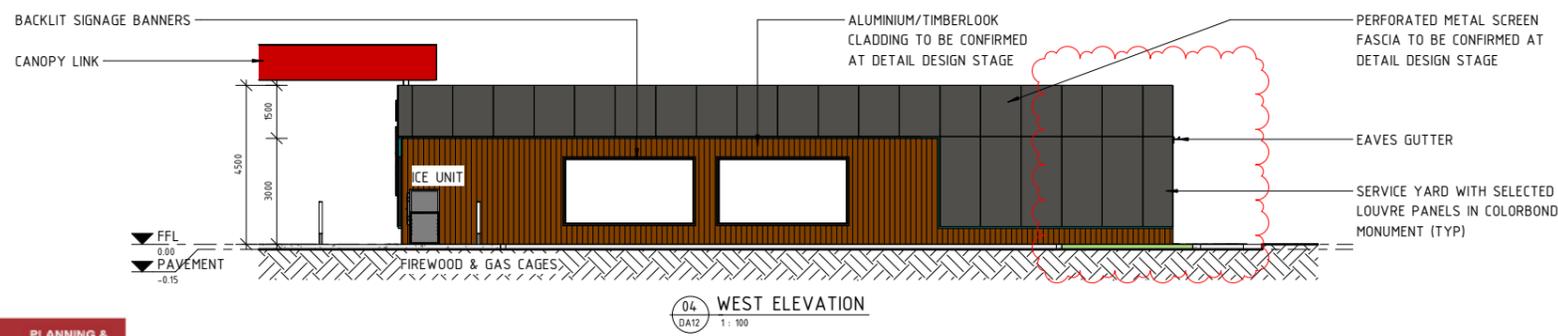
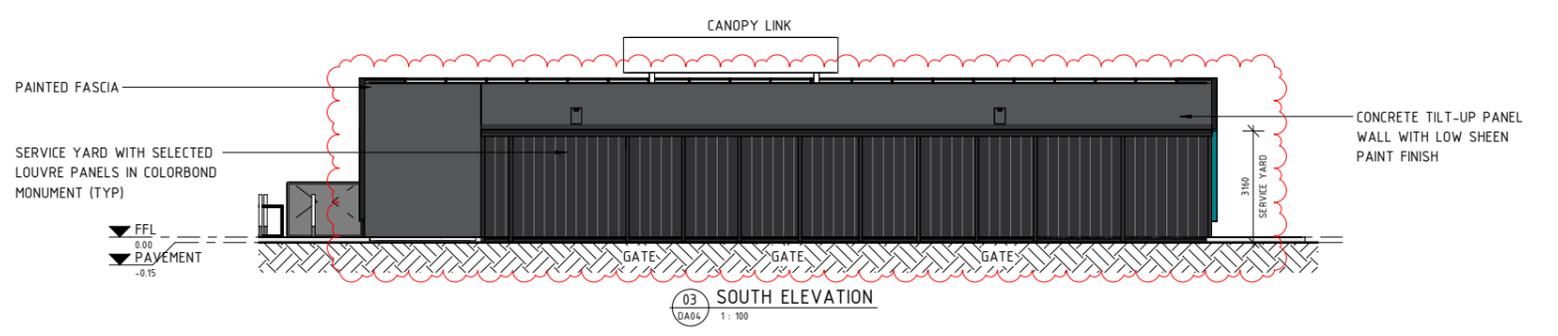
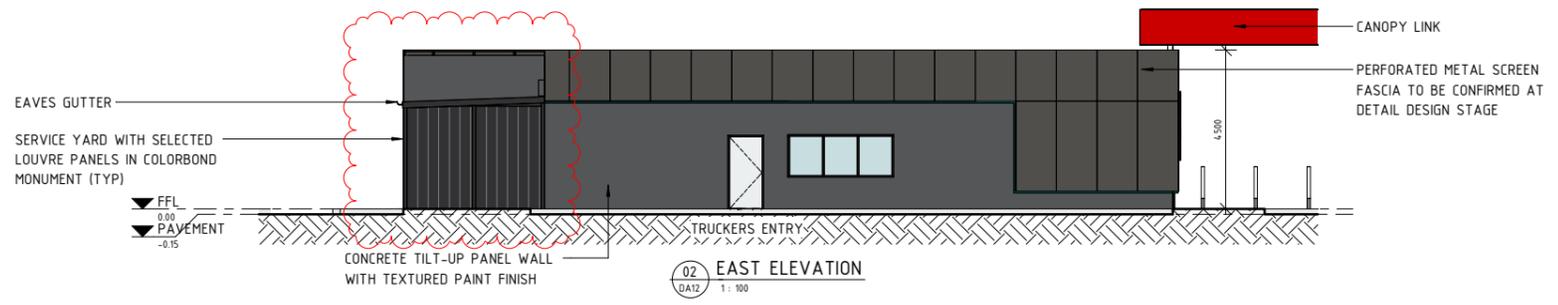
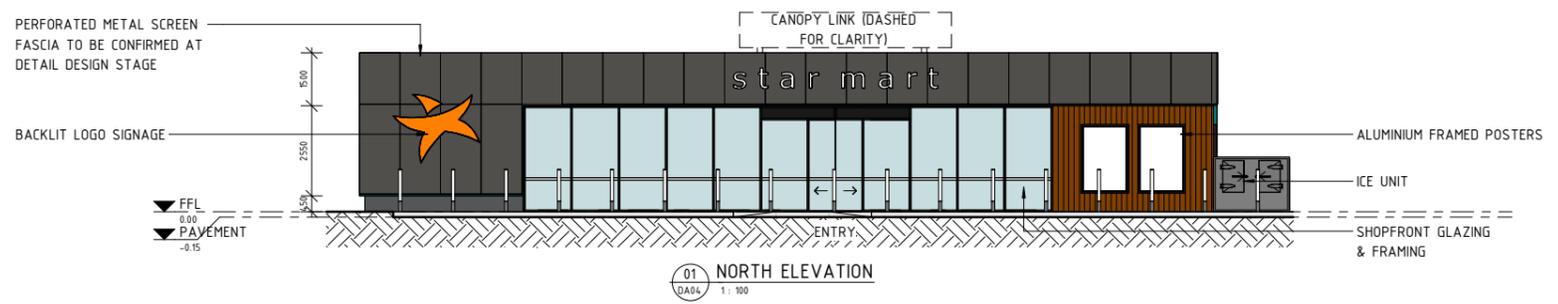
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RPD
 LOT: LOT 2 ON MPH20732
 AREA: 2.003 HECTARES
 LOT: LOT 142 ON DV425
 AREA: 8,744m²
 LGA: CHARTERS TOWERS REGIONAL COUNCIL

NOTES
 1. PROPOSED PLAN ONLY - NOT FOR TENDER OR CONSTRUCTION. INTERNAL AREAS AND SERVICE YARD ARE SUBJECT TO CHANGE AT DETAIL DESIGN

AREA LEGEND

SALES AREA	143m ²
AMENITIES	99m ²
BACK OF HOUSE/ SERVICE	198m ²
TOTAL BUILDING	440m²
SERVICE/ BIN/ PLANT YARD	83m ²



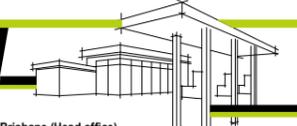
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 MC20/01
 21 December 2022

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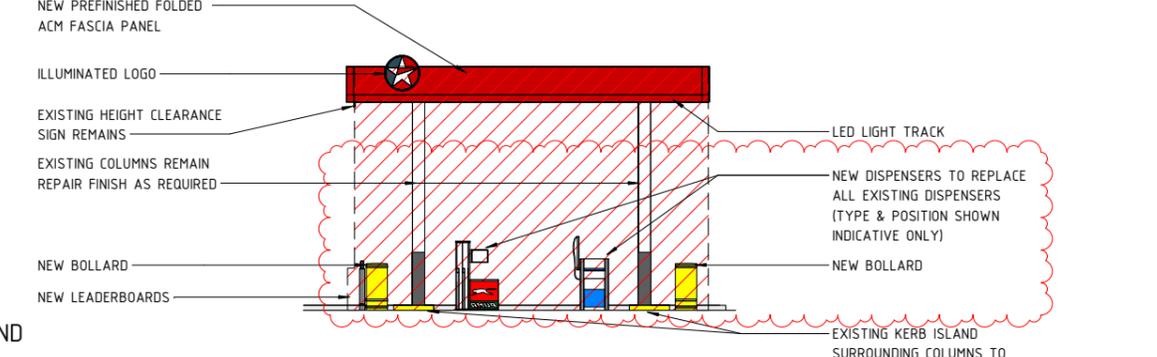
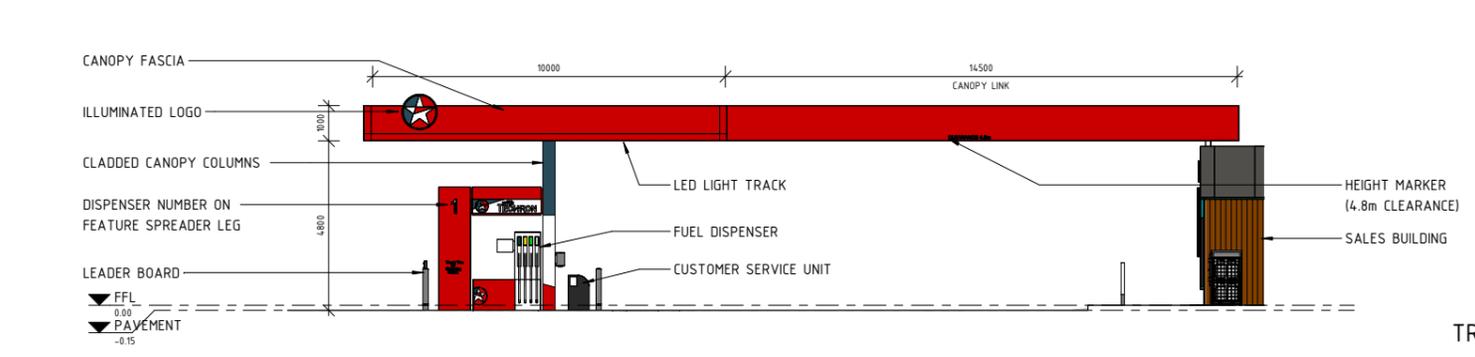
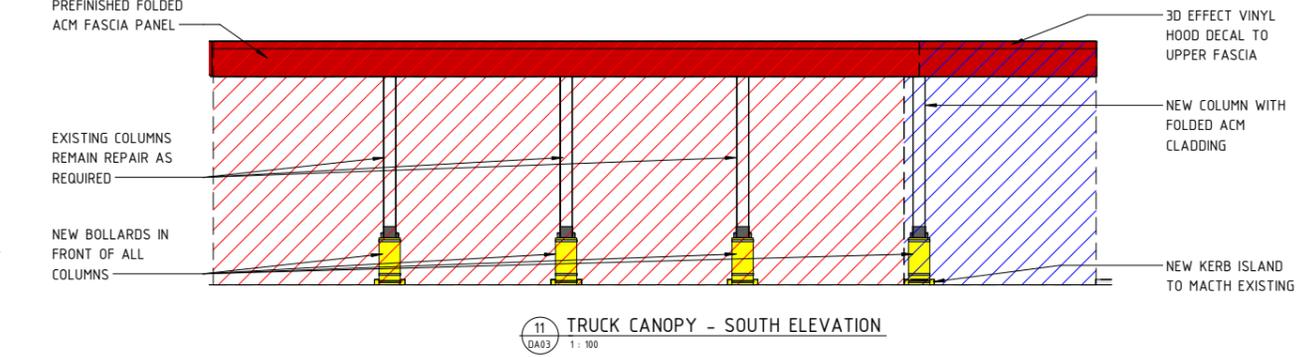
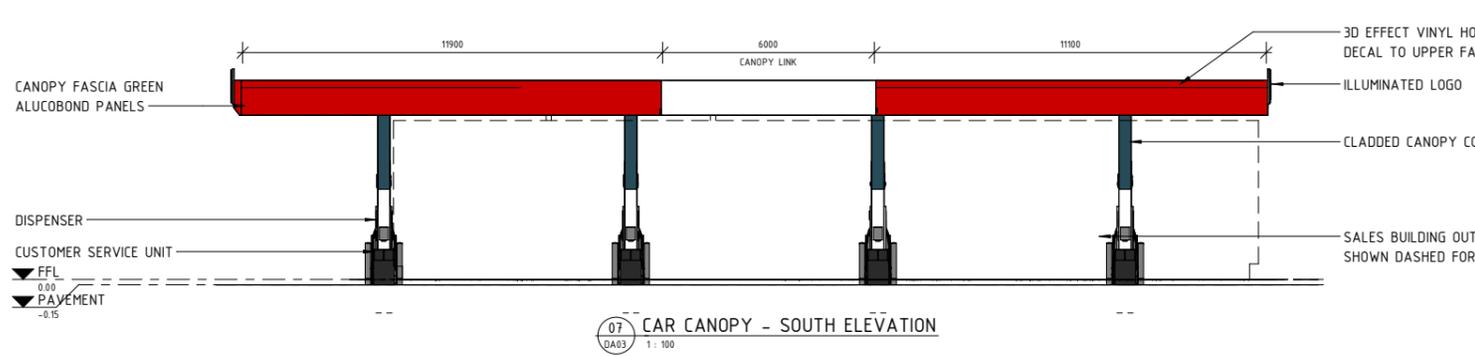
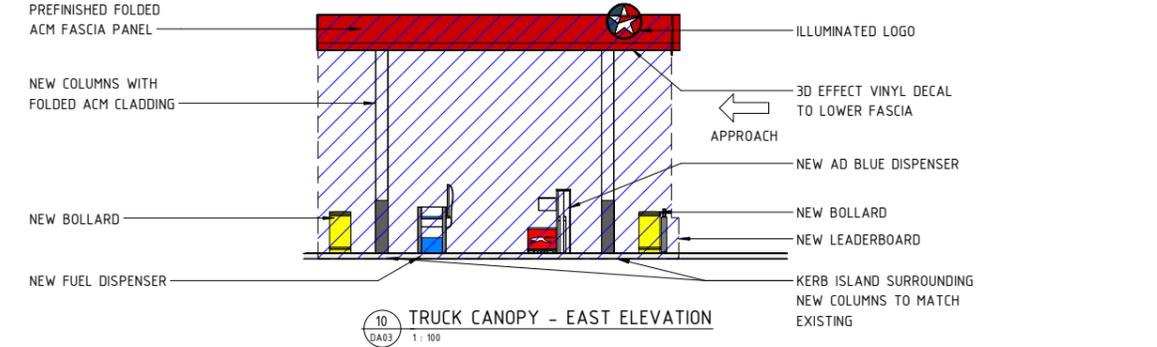
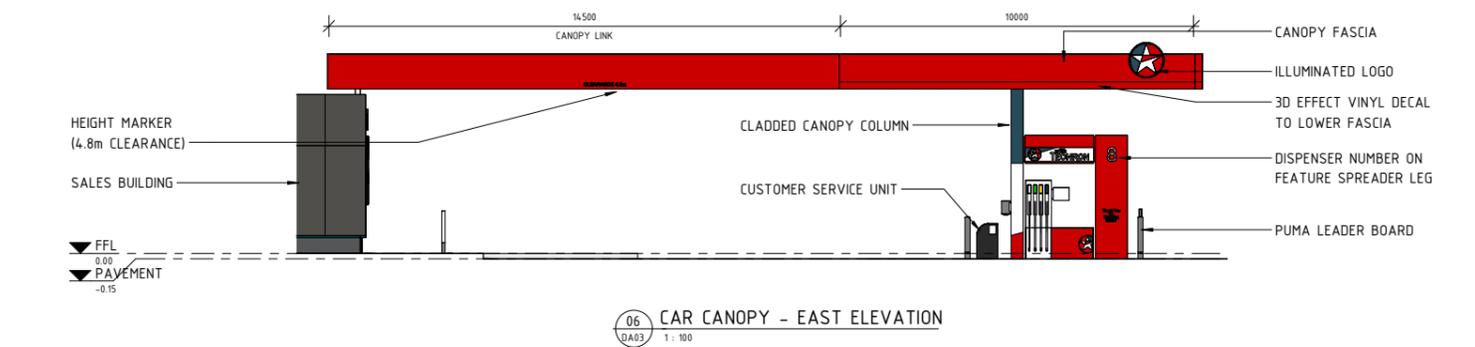
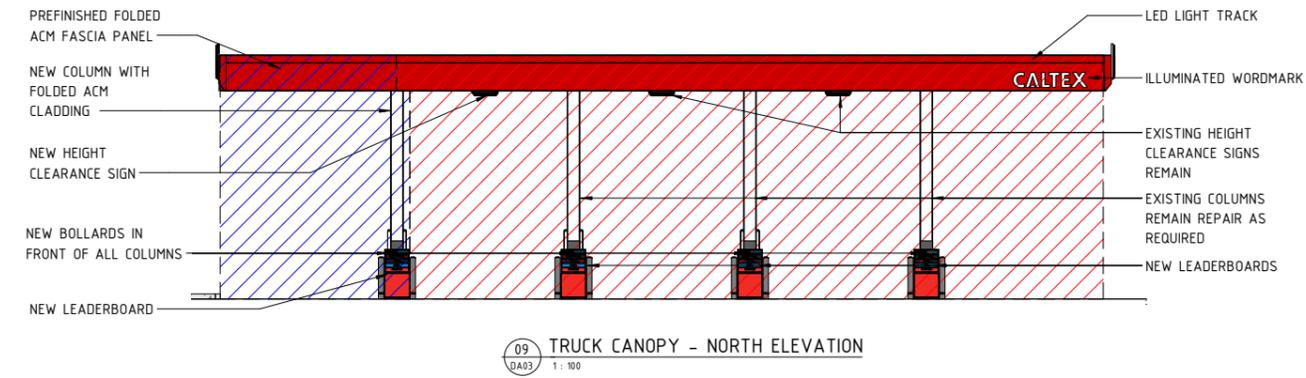
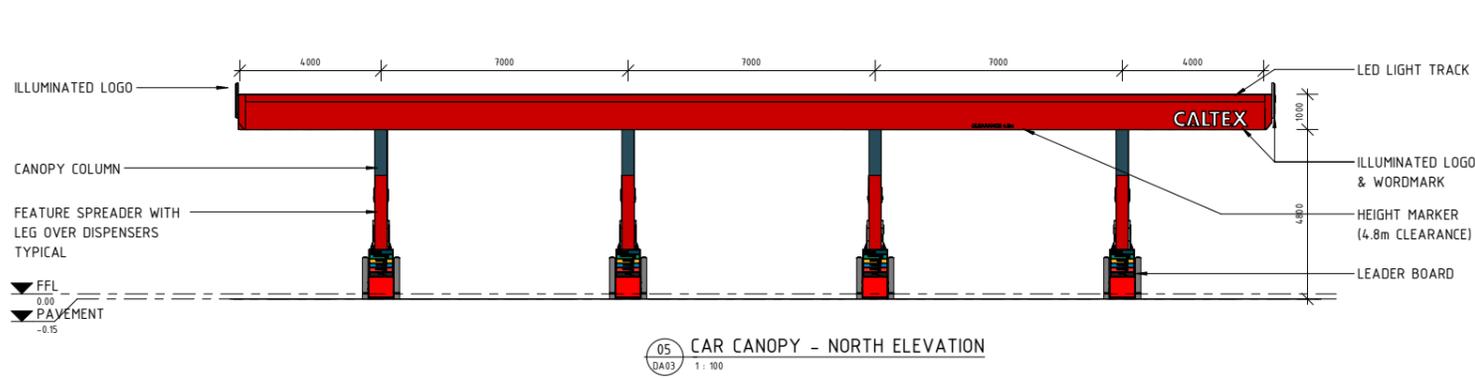


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G	21.10.22	DGC	REVISED TRUCK DISPENSERS & BUILDING EXTENT		

CHEVRON TRUCK STOP
CHARTERS TOWERS 71-93 THOMPSON
ST MOSMAN PARK QLD 4820

PROPOSED C-STORE
BUILDING FLOOR PLAN &
ELEVATIONS

STATUS		
DA ISSUE		
DRAWN	APPROVED	
MG		
DATE CREATED	A1 SCALE	A3 SCALE
20.11.19	1: 100	1:200
DRAWING NO	REV	
19013 DA04	G	



TRUCK CANOPY LEGEND

- INDICATES EXISTING CANOPY FASCIA TO BE REPLACED & EXISTING EQUIPMENT TO REMAIN
- INDICATES NEW EXTENSION OF CANOPY & NEW CANOPY EQUIPMENT

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08 CAR CANOPY - WEST ELEVATION
DA03 1:100

12 TRUCK CANOPY - WEST ELEVATION
DA03 1:100

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CAR CANOPY: NORTH WEST



C-STORE: NORTH



CAR CANOPY: NORTH EAST



TRUCK CANOPY: NORTH EAST

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CHK PROJECT DETAILS
**CHEVRON TRUCK STOP
CHARTERS TOWERS 71-93 THOMPSON
ST MOSMAN PARK QLD 4820**

DRAWING TITLE
SITE PERSPECTIVES

STATUS			
DA ISSUE			
DRAWN MG	APPROVED JR		
DATE CREATED 20.11.19	A1 SCALE NA	A3 SCALE NA	
DRAWING NO 19013	REV DA07		G





LEGEND

- PROPOSED PEBBLE/GRAVEL GARDEN BEDS WITH PLANTINGS TO ENABLE GOOD VISIBILITY FOR TRAFFIC SAFETY
- PROPOSED TURF TO EXTERNAL ROAD FRONTAGE
- EXISTING LANDSCAPE TO BE REHABILITATED
- EXISTING TREES & LANDSCAPING TO REMAIN

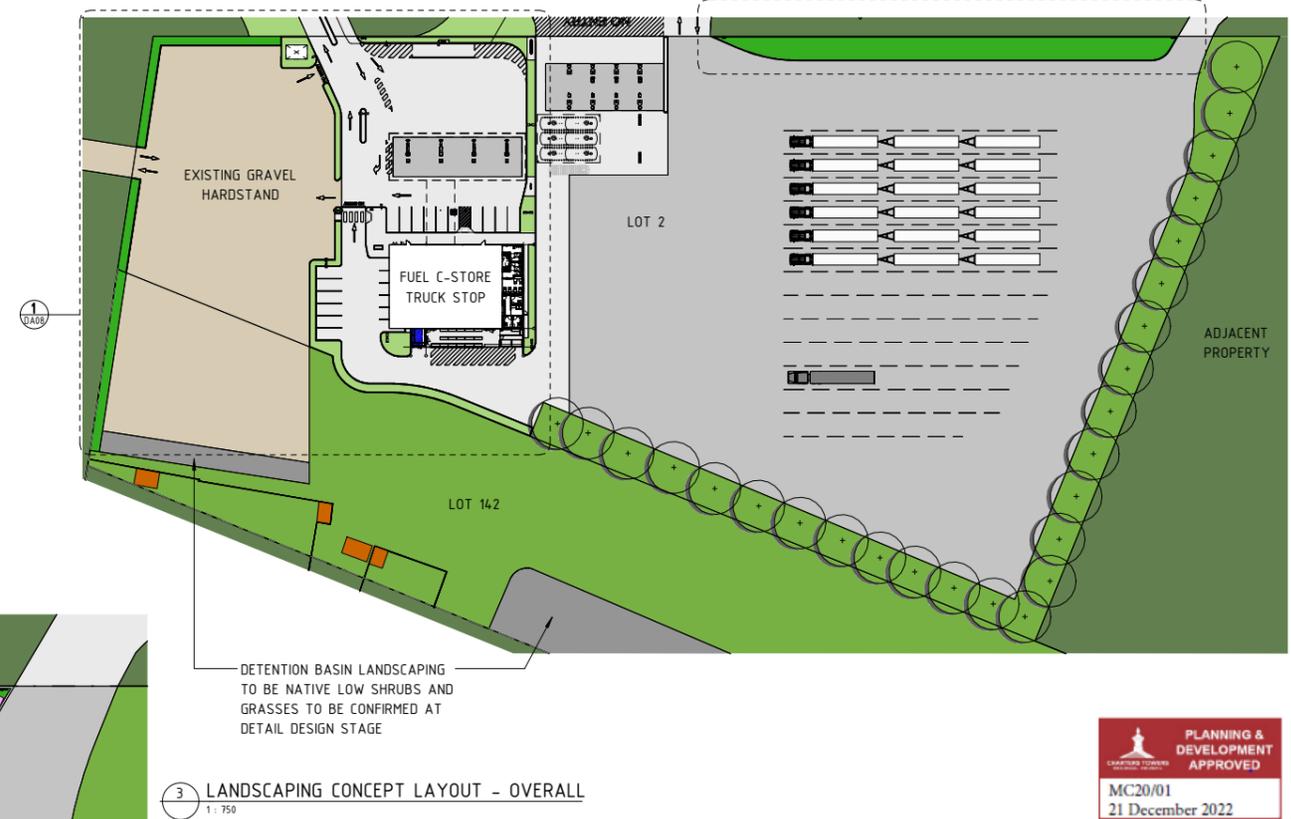
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 AREA: 2.003 HECTARES
 LOT: LOT 142 ON DV425
 AREA: 8,744m²
 LGA: CHARTERS TOWERS REGIONAL COUNCIL

NOTES:

- NOT FOR TENDER OR CONSTRUCTION
- AREAS AROUND ENTRANCES, EXITS & PEDESTRIAN CROSSING POINTS TO CONSIST OF LOW SHRUBS & GROUND COVERS TO ENABLE GOOD VISIBILITY FOR SAFE MOVEMENT OF VEHICLES & PEDESTRIANS.
- LANDSCAPE PLANTINGS TO BE VERIFIED WHEN DETAILED DESIGN LOCATES PROPOSED UNDERGROUND SERVICE LINES, WITH AN EMPHASIS ON DROUGHT HARDY SPECIES.
- ALL PAVEMENT AREAS TO HAVE 150mm CONTINUOUS CONCRETE BARRIER TO LANDSCAPE AREAS.
- THIS DRAWING IS INTENDED AS A LANDSCAPE CONCEPT DRAWING ONLY. AT THE OPERATIONAL WORKS STAGE, A FULLY DETAILED LANDSCAPE PLAN WILL BE SUBMITTED, ALONG WITH ALL RELEVANT DETAILS & PLANT SPECIES.
- LOCAL NATIVE SPECIES TO BE SELECTED APPROPRIATE FOR THE LOCAL CONDITIONS.

PROPOSED SPECIES LIST

KEY	CODE	SPECIES	COMMON NAME	HEIGHT X SPREAD AT MATURITY
[Cyan Box]	Lom LON	LOMANDRA LONGIFOLIA	BASKET GRASS	1m H x 15m
[Pink Box]	Bra MUL	BRACHYSCOME MULTIFIDA	CUT LEAF DAISY	0.3m H x 0.9m
[Orange Box]	Rho HYB	RHODODENDRON HYBRID 'CONCLEC'	AUTUMN ROYALTY	1.25m H x 1.25m
[Tree Symbol]	Bra ACE	BRACHYCHITON ACERIFOLIUS	ILLAWARRA FLAME TREE	12m H x 6m
[Circle with X]	ACA adu	ACACIA ADUNCA	WALLANGARRA WATTLE	6m H x 2m



2 EXISTING LANDSCAPING REHABILITATED
DA08 1: 250

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H	21.10.22	DGC	REVISED TRUCK DISPENSERS & BUILDING EXTENT				

STATUS
DA ISSUE

DRAWN MG **APPROVED**

DATE CREATED: 18.11.19 | A1 SCALE | A3 SCALE

DRAWING NO: 19013 | REV: DA08 | H

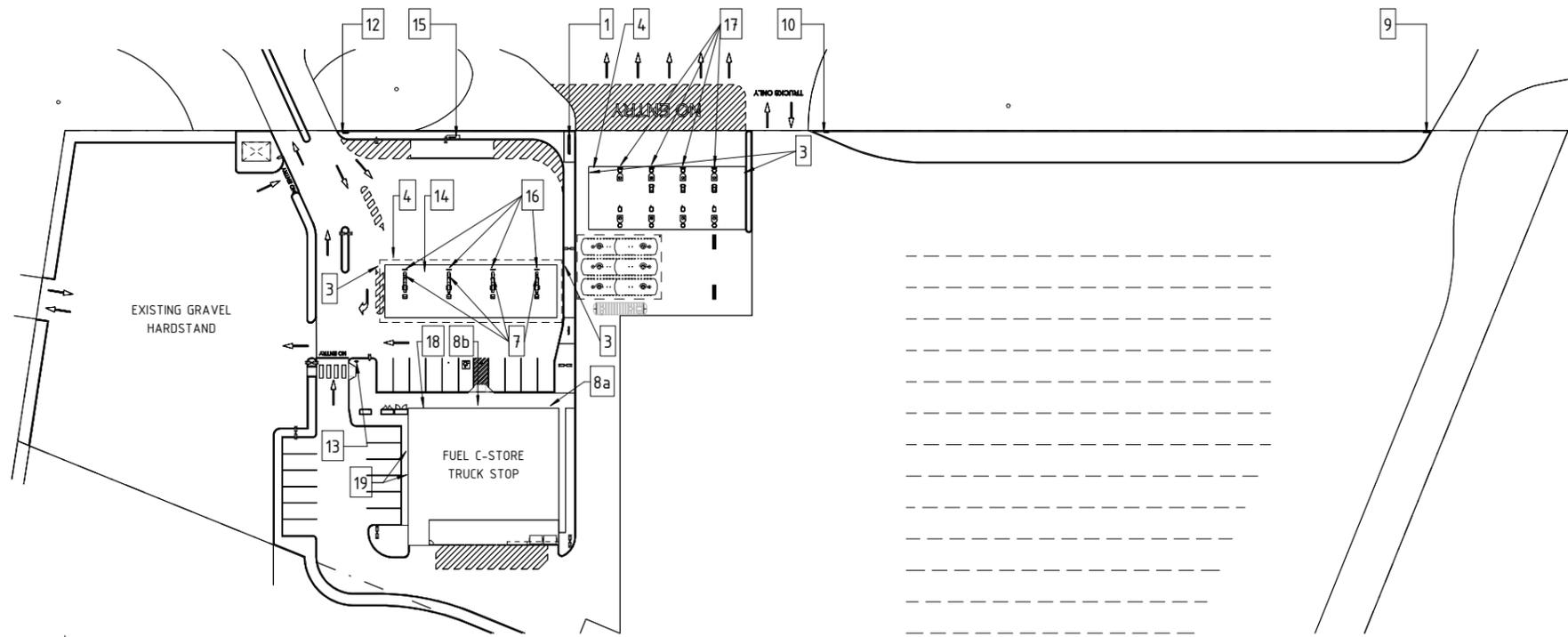
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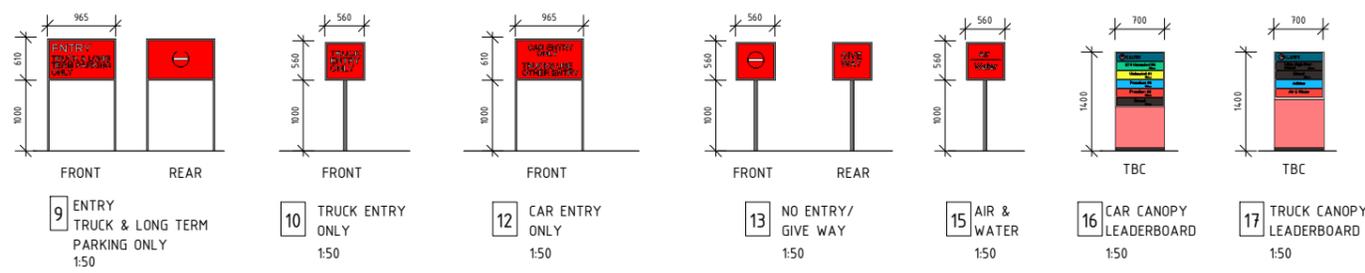
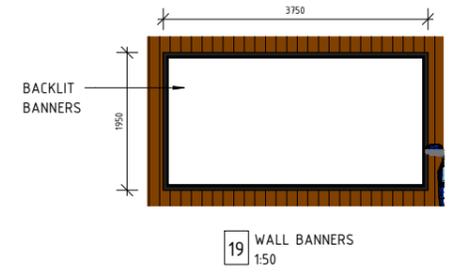
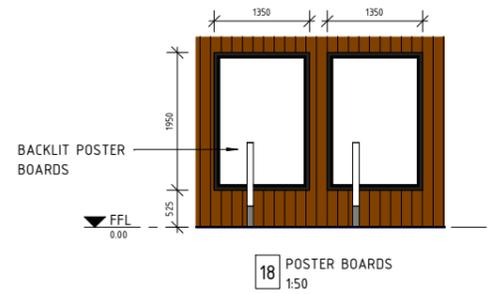
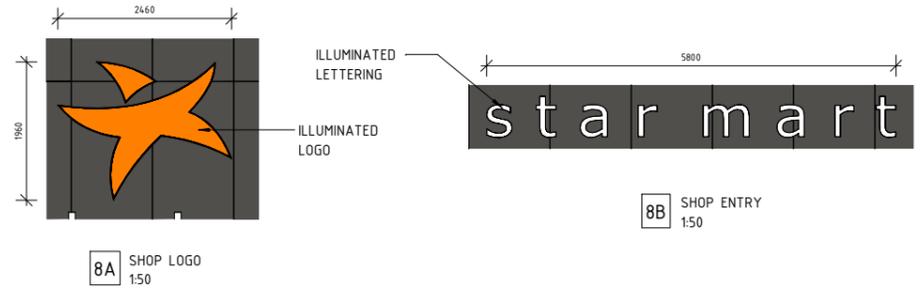
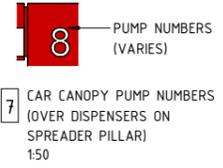
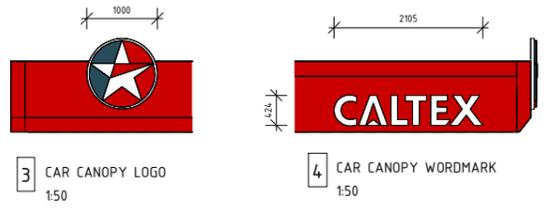
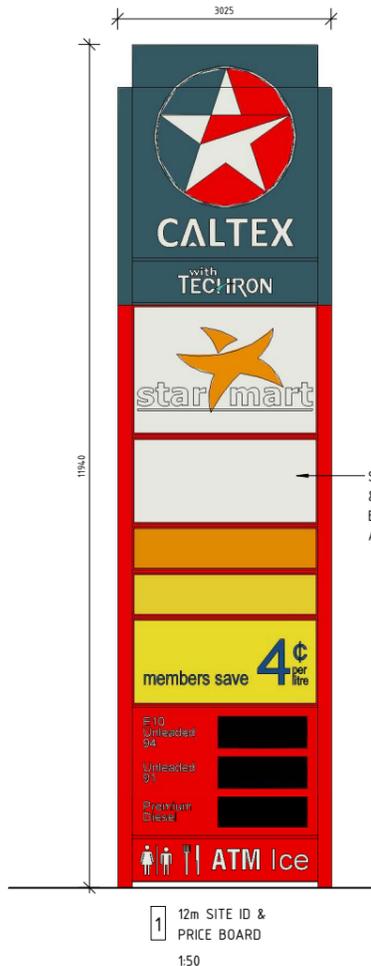


NOTES:

1. NOT FOR TENDER OR CONSTRUCTION
2. SIGNAGE SHOWN INDICATIVE ONLY AND SUBJECT TO CHANGE AT DETAIL DESIGN STAGE
3. DIRECTIONAL SIGNAGE TO SUIT INDIVIDUAL CIRCUMSTANCE AND POSITION. FINAL SIGNAGE TO BE CONFIRMED AT DETAIL DESIGN STAGE



1 PROPOSED SITE SIGNAGE
 1:500



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 DESIGNERS | ENGINEERS**

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REV	DATE	BY	DESCRIPTION	CHK	PROJECT DETAILS
A	22.11.19	MG	DA ISSUE		
B	12.03.20	EEK	DA ISSUE		
C	06.05.20	MG	TMR REF AMENDMENTS		
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**CHEVRON TRUCK STOP
 CHARTERS TOWERS 71-93 THOMPSON
 ST MOSMAN PARK QLD 4820**

PROPOSED SITE SIGNAGE

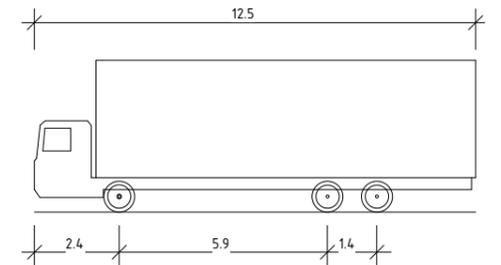
STATUS		
DA ISSUE		
DRAWN MG	APPROVED JR	
DATE CREATED 20.11.19	A1 SCALE	A3 SCALE
DRAWING NO 19013	DA09	REV H

RPD
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 AREA: 2.003 HECTARES
 LOT: LOT 142 ON DV425
 AREA: 8,744m²
 LGA: CHARTERS TOWERS REGIONAL COUNCIL



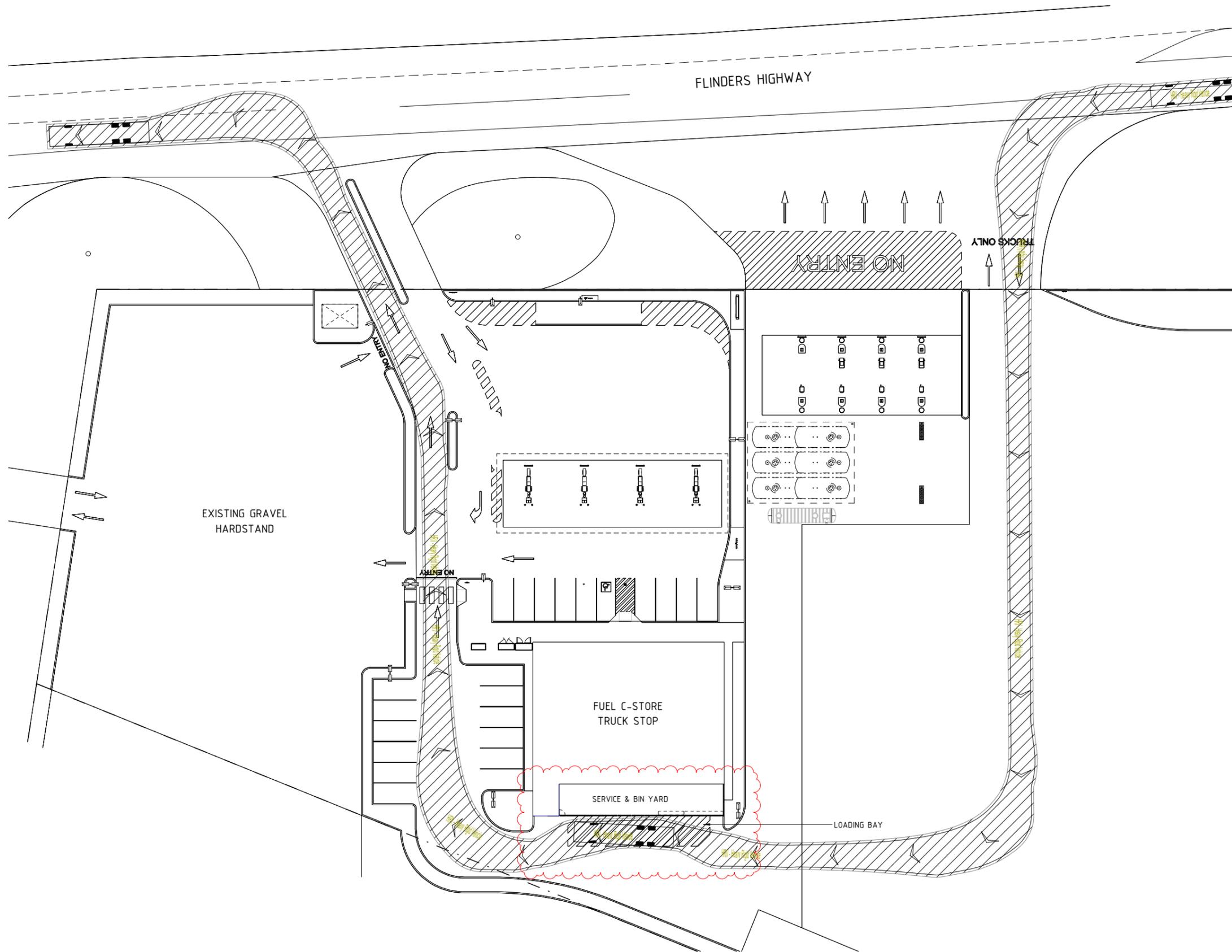
NOTES:

1. NOT FOR TENDER OR CONSTRUCTION



NOT TO SCALE

HRV - Heavy Rigid Vehicle	
Overall Length	12.500m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.417m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m



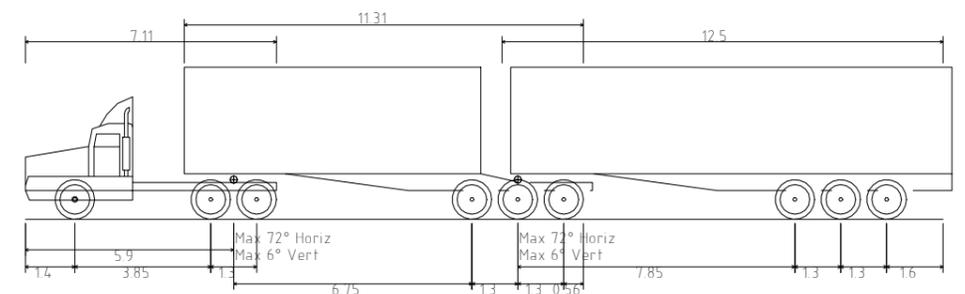
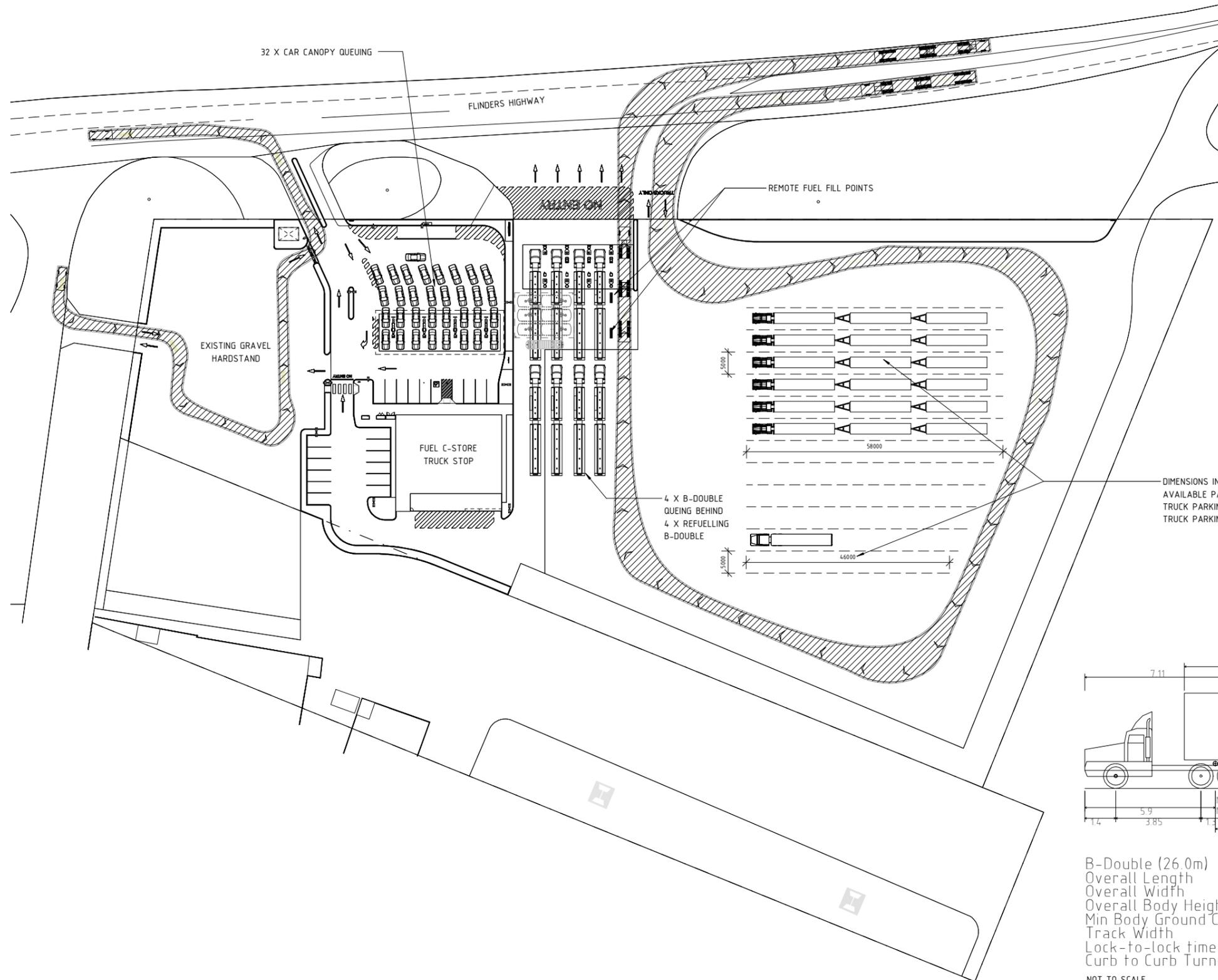
<p><small>COPYRIGHT</small> © Copyright TFA Group Pty Ltd</p>	<p>PROJECT MANAGERS PLANNERS DESIGNERS ENGINEERS</p>		<p><small>This drawing including design & information is covered by Copyright and all rights are reserved by TFA Group Pty Ltd. This document may not be copied, reproduced, retained or disclosed to any unauthorized person either wholly or in part without prior consent in writing from TFA Group Pty Ltd. ACN 612 132 233 Do not scale this drawing. Check and verify all dimensions on site prior to commencement of works.</small></p>	<p>Brisbane (Head office) 166 Knapp St Fortitude Valley QLD 4006 Australia Ph: 61 7 3854 2900 Aust Wide: 1300 794 300 Email: enquiry@tfa.com.au</p> <p>Sydney Ph: 61 2 8814 5219 Melbourne Ph: 61 3 9640 0206 Perth Ph: 61 8 9480 0430</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REV</th> <th>DATE</th> <th>BY</th> <th>DESCRIPTION</th> <th>CHK</th> <th>PROJECT DETAILS</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>22.11.19</td> <td>MG</td> <td>DA ISSUE</td> <td></td> <td></td> </tr> <tr> <td>B</td> <td>12.03.20</td> <td>EEK</td> <td>DA ISSUE</td> <td></td> <td></td> </tr> <tr> <td>C</td> <td>06.05.20</td> <td>MG</td> <td>TMR RFI AMENDMENTS</td> <td></td> <td></td> </tr> <tr> <td>D</td> <td>28.03.22</td> <td>DGC</td> <td>DA RE-ISSUE</td> <td></td> <td></td> </tr> <tr> <td>E</td> <td>03.05.22</td> <td>CZS</td> <td>DA RE-ISSUE FOR CLIENT REVIEW</td> <td></td> <td></td> </tr> <tr> <td>F</td> <td>17.05.22</td> <td>DGC</td> <td>DA REVISION</td> <td></td> <td></td> </tr> <tr> <td>G</td> <td>30.09.22</td> <td>DGC</td> <td>DA UPDATED EXISTING HARDSTAND RETAINED</td> <td></td> <td></td> </tr> <tr> <td>H</td> <td>21.10.22</td> <td>DGC</td> <td>REVISED TRUCK DISPENSERS & BUILDING EXTENT</td> <td></td> <td></td> </tr> </tbody> </table>	REV	DATE	BY	DESCRIPTION	CHK	PROJECT DETAILS	A	22.11.19	MG	DA ISSUE			B	12.03.20	EEK	DA ISSUE			C	06.05.20	MG	TMR RFI AMENDMENTS			D	28.03.22	DGC	DA RE-ISSUE			E	03.05.22	CZS	DA RE-ISSUE FOR CLIENT REVIEW			F	17.05.22	DGC	DA REVISION			G	30.09.22	DGC	DA UPDATED EXISTING HARDSTAND RETAINED			H	21.10.22	DGC	REVISED TRUCK DISPENSERS & BUILDING EXTENT			<p>CHEVRON TRUCK STOP CHARTERS TOWERS 71-93 THOMPSON ST MOSMAN PARK QLD 4820</p>	<p>DRAWING TITLE HRV TURNING PATH</p>	<p>STATUS DA ISSUE</p>
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RPD
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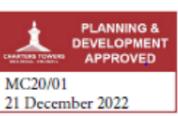


NOTES:

1. NOT FOR TENDER OR CONSTRUCTION
2. EXTERNAL ROAD WORKS SUBJECT TO FINAL ADVICE FROM TRAFFICE ENGINEER



B-Double (26.0m)
 Overall Length 26.000m
 Overall Width 2.500m
 Overall Body Height 4.300m
 Min Body Ground Clearance 0.540m
 Track Width 2.500m
 Lock-to-lock time 6.00s
 Curb to curb Turning Radius 15.000m
 NOT TO SCALE



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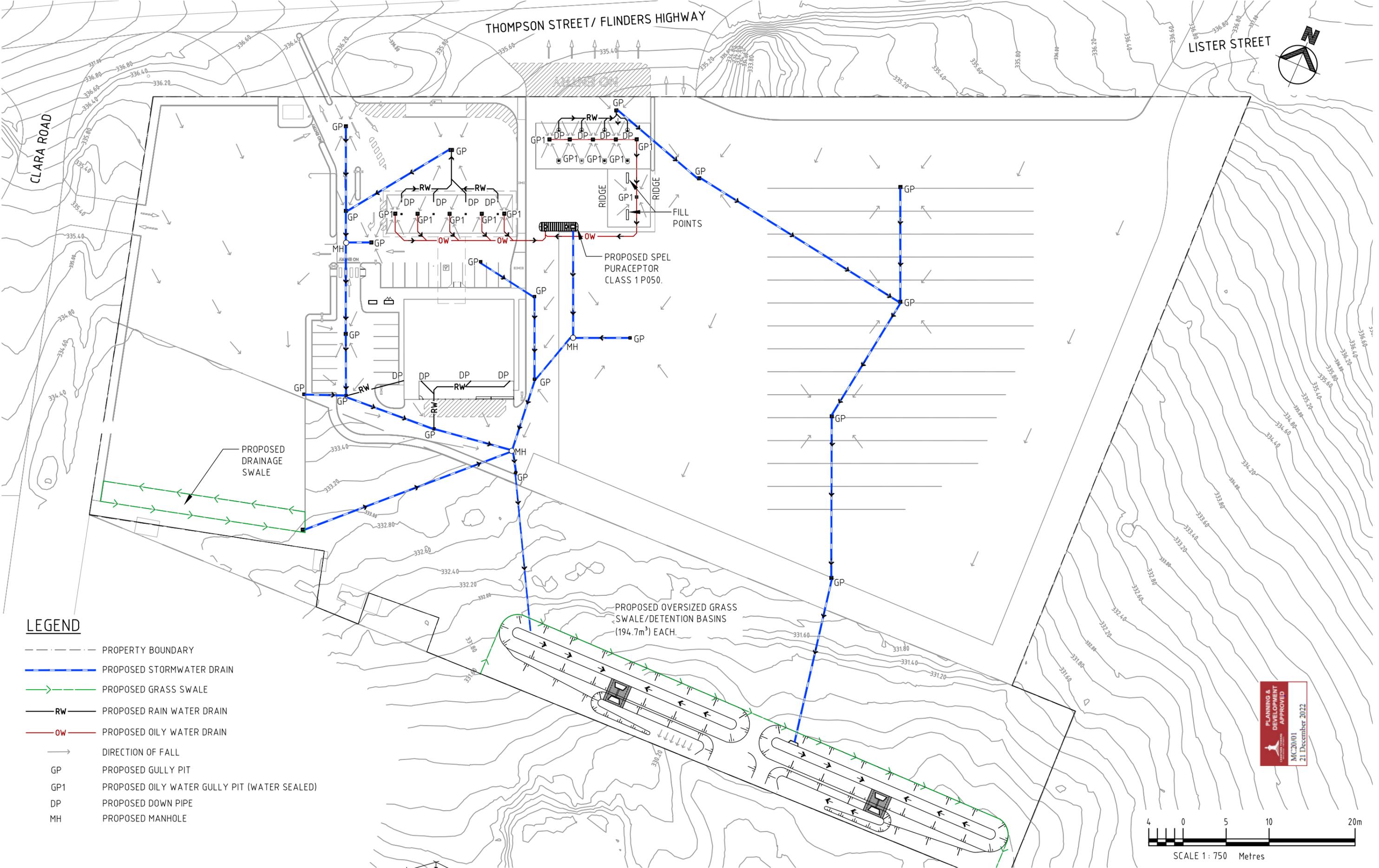


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**CHEVRON TRUCK STOP
 CHARTERS TOWERS 71-93 THOMPSON
 ST MOSMAN PARK QLD 4820**

**SITE QUEUING, TANKER
 DELIVERY & MINE WORKER
 PARKING PLAN**

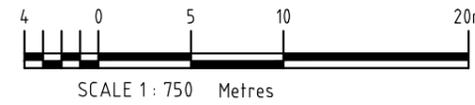
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DA ISSUE		
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DATE CREATED 20.11.19	A1 SCALE 1:250	A3 SCALE 1:500
DRAWING NO 19013	DA11	H



LEGEND

- PROPERTY BOUNDARY
- PROPOSED STORMWATER DRAIN
- PROPOSED GRASS SWALE
- RW --- PROPOSED RAIN WATER DRAIN
- OW --- PROPOSED OILY WATER DRAIN
- DIRECTION OF FALL
- GP PROPOSED GULLY PIT
- GP1 PROPOSED OILY WATER GULLY PIT (WATER SEALED)
- DP PROPOSED DOWN PIPE
- MH PROPOSED MANHOLE

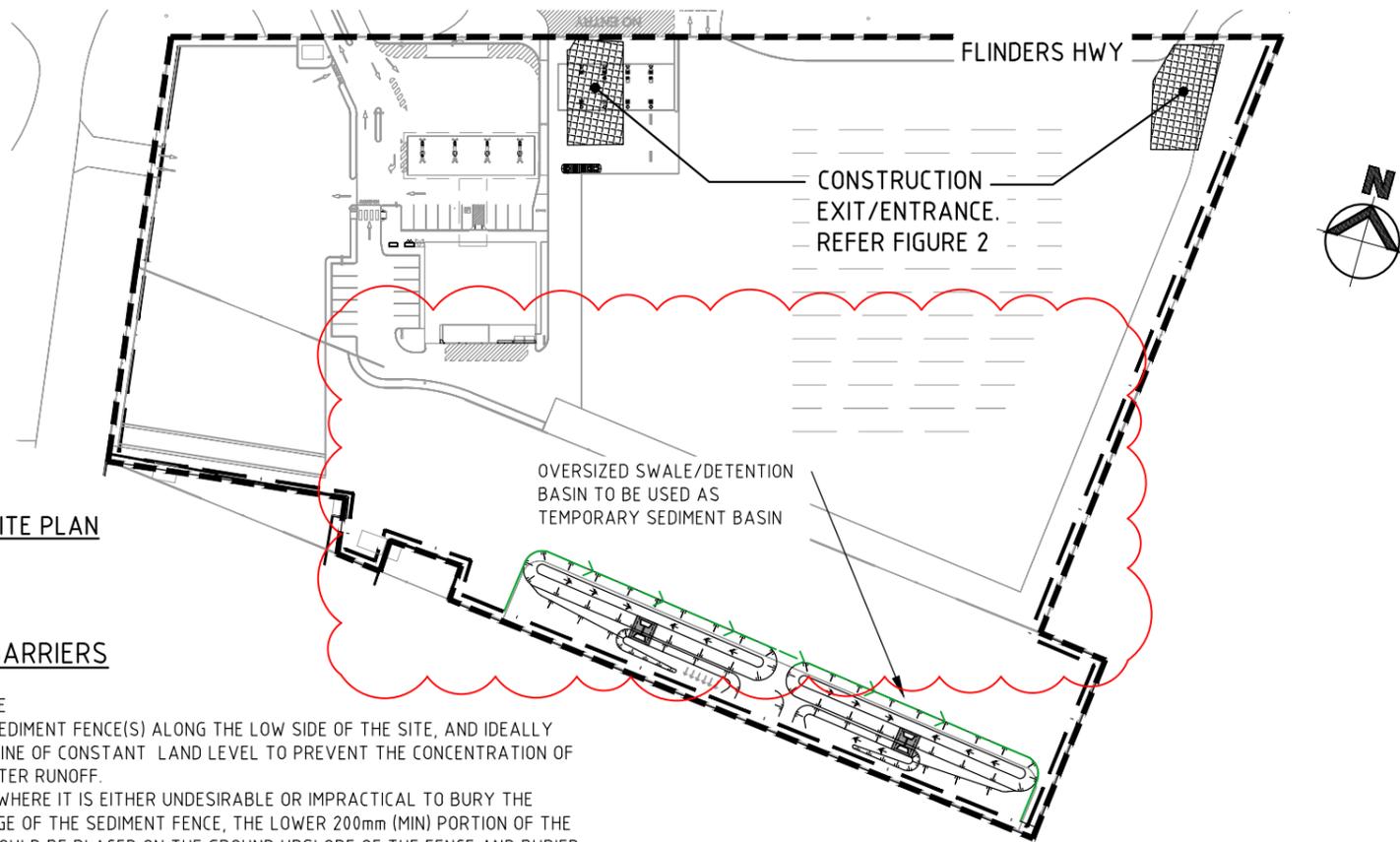
PLANNING & DEVELOPMENT APPROVED
 MC20/01
 21 December 2022



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PROPOSED SITE PLAN
SCALE 1:1500



SEDIMENT BARRIERS

- SEDIMENT FENCE**
- INSTALL SEDIMENT FENCE(S) ALONG THE LOW SIDE OF THE SITE, AND IDEALLY ALONG A LINE OF CONSTANT LAND LEVEL TO PREVENT THE CONCENTRATION OF STORMWATER RUNOFF. IN AREAS WHERE IT IS EITHER UNDESIRABLE OR IMPRACTICAL TO BURY THE LOWER EDGE OF THE SEDIMENT FENCE, THE LOWER 200mm (MIN) PORTION OF THE FABRIC SHOULD BE PLACED ON THE GROUND UPSLOPE OF THE FENCE AND BURIED UNDER A 100mm (MIN) LAYER OF AGGREGATE. SEDIMENT FENCES ON BUILDING SITES CAN BE STAPLED TO APPROXIMATELY 4.0m SQUARE HARDWOOD POSTS OR WIRE TIED TO STEEL POSTS.
- FIELD INLET GULLIES**
- SEDIMENT CONTROLS FOR STORMWATER INLETS LOCATED WITHIN THE PROPERTY BOUNDARIES MAY CONSIST OF GEOTEXTILE FABRIC PLACED EITHER DIRECTLY OVER THE GRATED INLET OR AROUND THE INLET SUPPORT BY A TIMBER FRAME. FIELD INLET PROTECTION IS NECESSARY WHERE INLETS DRAIN AREAS OF BARE AND UNPROTECTED SOIL. DURING STORMS, PONDING SHOULD BE ALLOWED TO OCCUR AROUND THE STORMWATER INLET TO ASSIST IN THE SETTLING OUT OF SEDIMENTS.
- PAVEMENT INLET GULLY**
- A ROADSIDE INLET BARRIER IS TO BE INSTALLED, SO THAT IT SHOULD NOT BE ALLOWED TO FULLY BLOCK THE INLET STRUCTURE. ON A HILLSIDE, SEDIMENT BARRIERS MAY CONSIST OF A TEMPORARY DAM CONSTRUCTED FROM SAND AND GRAVEL BAGS AT LEAST 4 METRES UP SLOPE FROM THE GULLY INLET.

BUILDING OPERATIONS

- ERODABLE MATERIAL MISTAKENLY PLACED WITHIN THE ROAD RESERVE (INCLUDING ACCIDENTAL SPILLAGE AND TRACKING OF SUCH MATERIALS ONTO THE ROAD) THAT CAN NOT BE PREVENTED THROUGH REASONABLE MEANS, MUST BE (a) REMOVED IMMEDIATELY IF RAINFALL IS IMMINENT OR OCCURRING. (b) REMOVED PRIOR TO THE END OF THE DAY'S WORK IF RAINFALL NOT EXPECTED. MATERIALS SHOULD BE SWEEPED FROM THE ROAD, NOT WASHED DOWN THE GUTTER.
- ALL SOLID WASTE SHOULD BE STORED ON SITE IN SUCH A MANNER THAT IT IS PREVENTED FROM LEAVING THE SITE EITHER BY THE ACTION OF WIND OR WATER.
- SMALLER MATERIALS, SUCH AS LITTER, SHOULD BE CONTAINED IN COVERED BINS OR LITTER TRAPS FORMED ON THREE SIDES BY A GEOTEXTILE WIND BREAK.
- CONCRETE WASTE WASHED FROM TRUCKS AND MIXERS UNITS SHALL BE CONTAINED ON SITE AND SHALL NOT BE PLACED IN A POSITION WHERE IT COULD REASONABLY BE EXPECTED TO WASH FROM THE SITE AND HARM THE ENVIRONMENT.

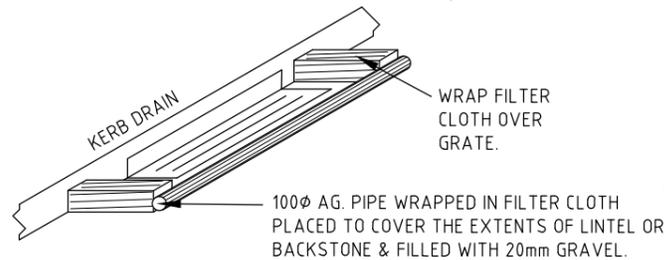
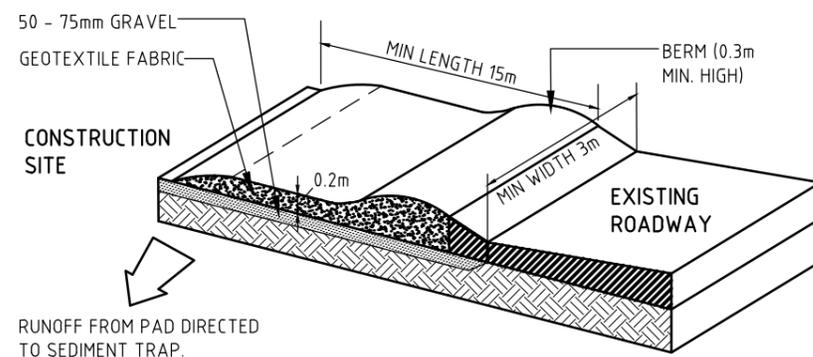


FIG. 3. - KERB INLET PROTECTION



MAINTENANCE:

- THE ENTRANCE SHOULD BE MAINTAINED SO THAT IT PREVENTS TYRES FROM TRACKING.
- DRESSING WITH ADDITIONAL AGGREGATE IF REQUIRED.
- REGULARLY REMOVE SEDIMENT FROM ROADWAY.

FIG. 2. - CONSTRUCTION EXIT/ENTRY

LEGEND

- AREA DEFINING EXTENT OF WORKS TO HAVE SEDIMENT AND EROSION CONTROLS INSTALLED
- APPROXIMATE EXTENT OF SEDIMENT FENCE

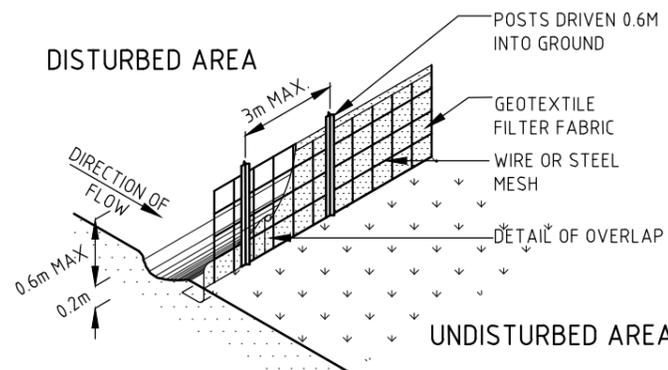


FIG. 1. - SEDIMENT FENCE

SEDIMENT AND EROSION CONTROL NOTES

GENERAL

- ALL THE SEDIMENT & EROSION CONTROL MEASURES TO BE IN ACCORDANCE WITH LOCAL COUNCIL'S GUIDE LINES.

PRIOR TO THE COMMENCEMENT OF CONSTRUCTION

- AVOID STRIPPING & EXCAVATING UNTIL READY TO BUILD.
- INSTALL SEDIMENT FENCES.

SPECIFICATION

- SILT FENCE SHALL NOT BE REMOVED UNTIL SITE HAS BEEN PAVED & SURFACED.
- BUNDWALLS SHALL BE LOCATED AROUND ALL PITS & MAINTAINED UNTIL THE CATCHMENT AREA HAS BEEN PAVED.
- KERB DRAIN EXCLUDER SHALL INCORPORATE TRAFFIC CONTROL BARRICADES IN ACCORDANCE WITH AS1742.3 - 1985, & SHALL NOT BE PLACED UNTIL WORKS ARE BEING CARRIED OUT ON THE FOOTPATH AREA, OR AS OTHERWISE DIRECTED BY COUNCIL.
- ALL SEDIMENT TRAPS, EXCLUDERS, BUNDWALLS SHALL BE INSPECTED & CLEANED AFTER EACH STORM EVENT. DAMAGED OR CLOGGED BUNDING ARE TO BE REMOVED AND REPLACED.
- THE BUILDER SHALL CARRY OUT ANY ADDITIONAL WORKS DEEMED NECESSARY AND DIRECTED BY COUNCIL TO BE CARRIED OUT.
- THE SEDIMENT CONTROL PLAN SHALL BE IMPLEMENTED PRIOR TO ANY WORKS BEING CARRIED OUT ON SITE.

STOCKPILES

- STOCKPILES ARE NOT TO BE STORED ON THE FOOTPATH OR THE ROAD RESERVE.
- WHERE NECESSARY STOCKPILE LOSSES CAN BE MINIMISED WITH THE USE OF COVERS.
- ALL STOCKPILES AND BUILDING MATERIAL SHOULD BE LOCATED WITHIN SEDIMENT CONTROL ZONE.
- TO MINIMISE EROSION AND THE LOSS OF SAND AND SOIL, STOCKPILES SHOULD BE NOT LOCATED WITHIN AN OVERLAND FLOW PATH. IF IT IS IMPRACTICAL TO AVOID STORMWATER RUNOFF BEING DIRECTED TO A STOCKPILE, THEN A PERIMETER BANK SHOULD BE CONSTRUCTED UP SLOPE OF THE STOCKPILE TO DIRECT RUNOFF IN A CONTROLLED MANNER AROUND THE STOCKPILE.

MAINTENANCE

- SEDIMENT FENCES SHOULD BE REPLACED IF THE FABRIC IS RIPPED OR OTHERWISE DAMAGED. THE MAINTENANCE OF THE SEDIMENT FENCES INCLUDES THE REMOVAL OF SEDIMENT DEPOSITED UP SLOPE OF THE FENCE AND RETRENCHING THE FABRIC WHEN THE FENCE IS 25% FULL.
- FOLLOWING STORM EVENTS, THE ROAD RESERVE AND ALL SEDIMENT BARRIERS SHOULD BE INSPECTED AND ANY EXCESSIVE RESIDUE SHOULD BE APPROPRIATELY REMOVED.

SITE REHABILITATION

- ALL GROUND DISTURBED BY THE CONSTRUCTION ACTIVITY SHOULD BE PROMPTLY AND PROGRESSIVELY STABILISED SO IT CAN NO LONGER ACT AS A SOURCE OF SEDIMENT.

SERVICES TRENCHES

- TO AVOID UNNECESSARY SOIL EROSION, SERVICE TRENCHES SHOULD BE BACK FILLED, CAPPED AND COMPACTED TO A LEVEL AT LEAST 75-100mm ABOVE THE ADJOINING GROUND LEVEL.

BULK EARTHWORKS

- AVOID STRIPPING & EXCAVATING UNTIL READY TO BUILD.
- CONSTRUCTION OF AN ENTRY/EXIT POINT TO THE SITE SHOULD BE MANAGED SO THAT SEDIMENT IS NOT TRACKED OFF THE SITE.
- TOP SOIL SHOULD BE STOCKPILED ON SITE FOR LATER USE.
- WHERE PRACTICABLE MAINTAIN KERB VEGETATION IN A HEALTHY STATE DURING THE CONSTRUCTION PROCESS.
- WHEN UP SLOPE WATER IS DIVERTED AROUND A WORK SITE IT IDEALLY SHOULD BE DISCHARGED AS SHEET FLOW THROUGH AN UNDISTURBED AREA BESIDE THE WORKS.

NOTES:

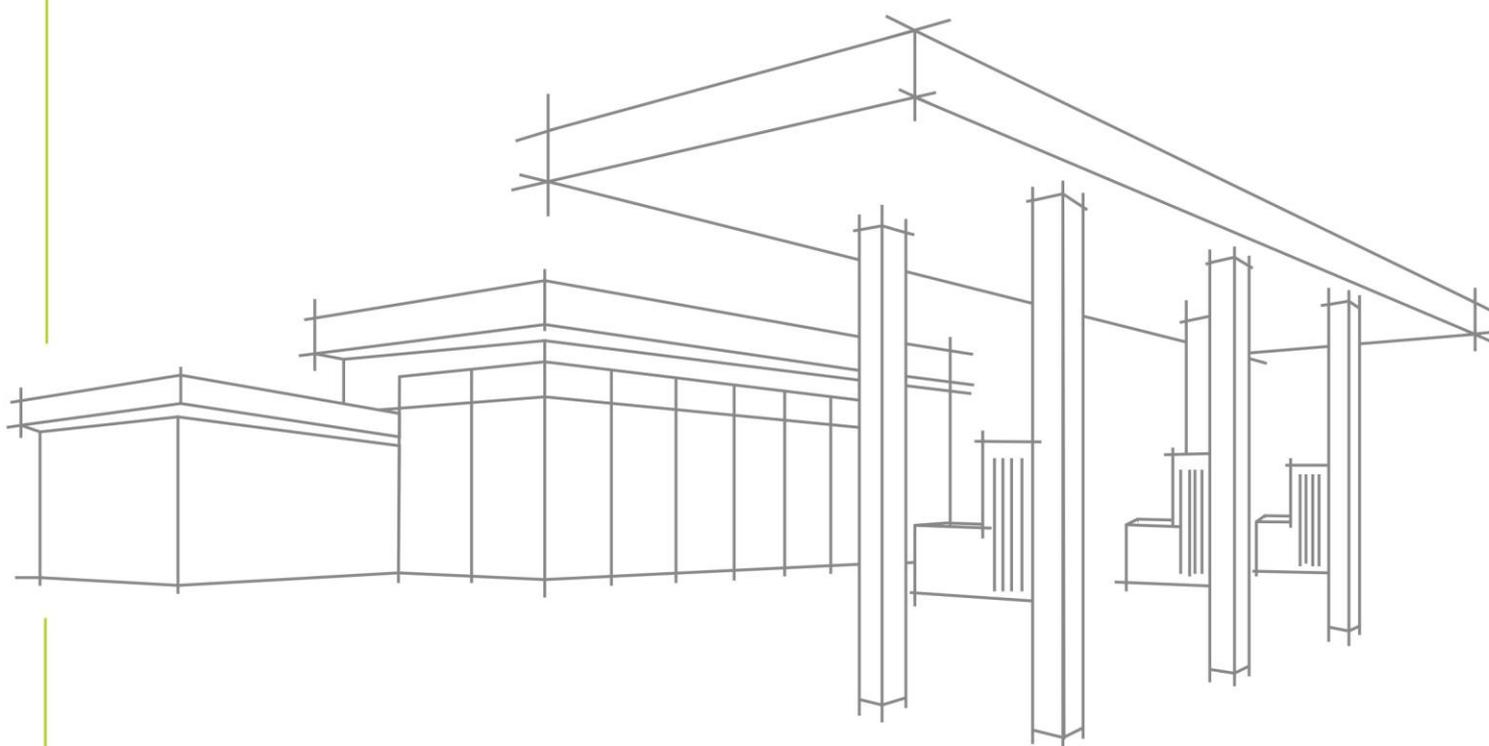
EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE DESIGNED AND PROVIDED IN ACCORDANCE WITH THE INTERNATIONAL EROSION CONTROL ASSOCIATION AUSTRALASIA - "BEST PRACTICE FOR EROSION AND SEDIMENT CONTROL."

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SITE BASED STORMWATER MANAGEMENT PLAN

CHARTERS TOWERS TRUCK STOP

71-93 THOMPSON STREET, MOSMAN PARK QLD 4820



CREATE • PLAN • DELIVER

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SITE BASED STORMWATER MANAGEMENT PLAN

Charters Towers Truck Stop

71-93 Thompson Street, Mosman Park QLD 4820

CLIENT: Chevron Australia Downstream Fuels Pty Ltd (Chevron)**ADDRESS:** 71-93 Thompson Street, Mosman Park QLD 4820**TFA REFERENCE:** 19013**TFA CONTACT:** John Rowell**Document Control**

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C	18 May 2022	B. Masuku	J. Avella	Issued for approval
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1.0 INTRODUCTION

This Site Based Stormwater Management Plan (SBSMP) has been prepared by TFA Group on behalf of Chevron Australia Downstream Fuels Pty Ltd (Chevron) (the applicant). The proposed redevelopment of the existing service station and warehouse storage comprises a car canopy over fuel dispensing areas linked to a paypoint store building, a canopy over truck fuel dispensing areas and a car and truck parking areas with associated driveways, walkways and landscape areas. The purpose of this document is to verify that stormwater quality and quantity have been considered as part of this development and do not have any adverse impact on the downstream environment as outlined in the Queensland State Planning Policy July 2017, Charters Towers Regional Town Plan, performance outcomes P012 to P014 of the Department of Infrastructure Local Government and Planning State Code 1 and the Queensland Urban Drainage Manual (QUDM) 2016.

The SBSMP is part of the Development Approval process and addresses both the construction and operational phases of the development. Table 1 below shows additional details of the proposed development. The proposed site layout plan is shown in **Appendix A**.

Table 1: Details of proposed development

Developer	Chevron Australia Downstream Fuels Pty Ltd
Address	71-93 Thompson Street, Mosman Park QLD 4820
Property Description	Lot 2 on MPH20732 and Lot 142 on DV425
Area of Development	27,393 m ² - Site Works, (28,774m ² – Overall site)
Stormwater Risk Classification	High Risk (due to the storage and transfer on site of petroleum products that have the potential to cause harm to the environment, if released)
Existing Land Use	Puma Service station comprising car and truck canopies, Puma building, warehouse/storage building, with associated driveways, walkways, landscape and parking areas.

2.0 THE SITE

2.1 Site Description

The development site is located at 71-93 Thompson Street, Mosman Park QLD 4820 within Charters Towers Regional Council area. For the purposes of the stormwater management planning and, consistent with the original / approved stormwater management plan, the subject site for the purposes of this report is over Lot 2 on MPH20732.

The site has a regular shape containing an area of approximately 27,393 m². The site is currently a Puma service station comprising a paypoint building, warehouse/storage building with associated parking, landscaping and driveway areas. The Lot is bound by Thompson Street to the North, Clara Road to the West, Lot 142 on DV425 to the South and Lot 1 on MPH21611 to the East.

A geotechnical investigation will be completed to determine soil type and any specific treatment or management requirements to mitigate erosion or pollution of the environment prior to the commencement of works. A location of the site is shown on Figure 1.

Figure 1: Location of the proposed development site (Source: QLD Globe)



3.0 SITE TOPOGRAPHY AND EXISTING DRAINAGE

3.1 Description of the site current condition

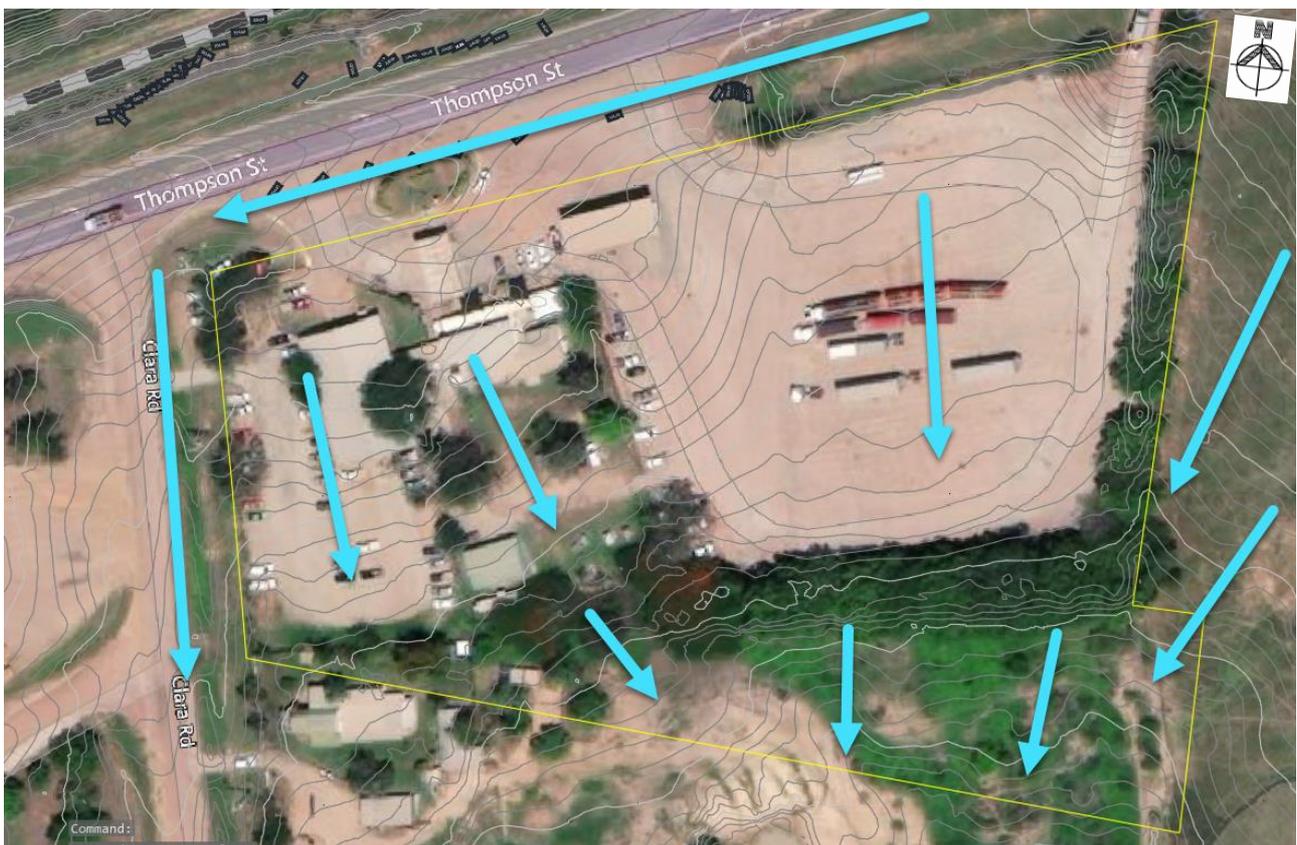
The subject site, formally referenced as Lot 2 on MPH20732, comprises 2.74 hectares in area. Survey plans were provided by Kevin Holt Surveyors and Town Planners, Consulting on 23rd of May 2022 for site topography and existing drainage assessment. Refer to **Appendix B** for the survey plans

The development site has one catchment of varying slope with existing surface levels approximately between RL 329.80 m AHD and 336.25 m AHD and falls from Northwest to Southeast.

The site currently does not have a stormwater network, as such, the majority of stormwater runoff generated from the site flows unmitigated as overland flow to the southern neighbouring property.

The site's upper catchment is currently diverted by Thompson Street stormwater infrastructure and neighbouring properties do not discharge runoff to the site. Figure 2 below shows the survey information obtained from ELVIS website and the current flow paths identified in the development area.

Figure 2: Site survey information (Source: ELVIS website)



4.0 FLOODING

4.1 Flooding information

Based on the information obtained from the Queensland Government (FloodCheck Queensland website) on 13 November 2019, in particular the Charters Towers Flood Investigation Flood Hazard Map – 92 mm in 1 hour (i.e. 1% AEP Event) at the BoM Gauge 03484 and Flood Hazard Map – Depth Component 92 mm in 1 hour (i.e. 1% AEP Event) at the BoM Gauge 03484 the extension of flood events near the site generally affects parking areas. Nonetheless, buildings final floor levels will be raised 0.3m above the flood depth identified and therefore it is anticipated that flooding will not affect the proposed buildings on this site. Extracts of the above mentioned maps are shown in Figure 3 and Figure 4 which indicate the extension of flood hazards and depth of flood near the site. Refer to **Appendix C** for the Flood Maps obtained from the Queensland Government (FloodCheck website).



Figure 3: Development Flooding Information – Flood Hazard Map 1% AEP Event



Figure 4: Development Flooding Information – Flood Hazard Map- Depth Component 1% AEP Event

5.0 PROPOSED DRAINAGE LAYOUT

5.1 Proposed drainage

The post development stormwater drainage design will generally maintain the overall catchment boundaries. The design will separate the high risk (hydrocarbon generating e.g. under the canopies) area from the low risk areas (the rest of the site). Any spillage or minor spills from under the canopy will be captured by gully pits and then directed to a Spel Puraceptor for hydrocarbon removal. Treated discharge from the SPEL Puraceptor will be connected to the stormwater network.

There will be two fuel tanker delivery fill points (unloading areas) that will be located outside the truck canopy within an isolated area and any spills that might occur during unloading of fuel in these areas will be also directed to the proposed SPEL Puraceptor. The tanker delivery stand catchment areas (unloading areas) will be graded to drain any spill to the proposed SPEL Puraceptor at all times. A licensed contractor will remove the contents of the Puraceptor when required. For details of the oily water system refer to section 7.4 of this report.

Stormwater runoff generated from low risk areas (the rest of the site) will be directed to oversized vegetated swales/detention basins for the removal of coarse to medium sized sediments (and attached pollutants) and on-site detention. This includes the drainage from the proposed gravel / hardstand mine-worker car parking area which directed to the swale shown on the plan and piped to the detention basin. Discharge from vegetated swales/detention basins will be spread out via level spreaders to replicate pre-development conditions and ensuring that post-development flows match the pre-development scenario. Consequently, adjoining land, downstream areas and/or state road infrastructure will not be adversely affected through any ponding or site discharge. It is important to note the detention basins have been sized to cater for the mine-worker car parking area being upgraded to a sealed / bitumen surface (in the event this was to occur at some point).

Refer to **Appendix D** for a concept plan of the stormwater drainage proposed.

6.0 WATER QUANTITY ASSESSMENT

The purpose of this part of the assessment is to investigate whether there is a need to attenuate stormwater flows to negate any adverse impacts on upstream or downstream environments. Stormwater runoff from both pre and post-development scenarios will be calculated and the results analysed and possible solutions proposed.

6.1 Catchment Analysis

The total development site area is 27,393 m² (2.74 ha), details of the pre-development catchment are shown in Figure 5 and Table 2 below, which show the surface types, areas, percentage imperviousness and fraction impervious.



Figure 5: Pre-development catchment details

Table 2: Pre-development catchment characteristics

Catchment	Surface Type	Area (m ²)	Percentage Imperviousness	Fraction impervious
A	Roofed Area	1,633	100	0.64
	Paved + Gravel Hardstand Area	15,831	100	
	Landscaped Area	9,929	0	
TOTAL		27,393		

Details of the post-development catchment are shown in Figure 6 and

Table 3 below, which show the surface types, areas, percentage imperviousness and fraction impervious.

Figure 6: Post-development catchment details.

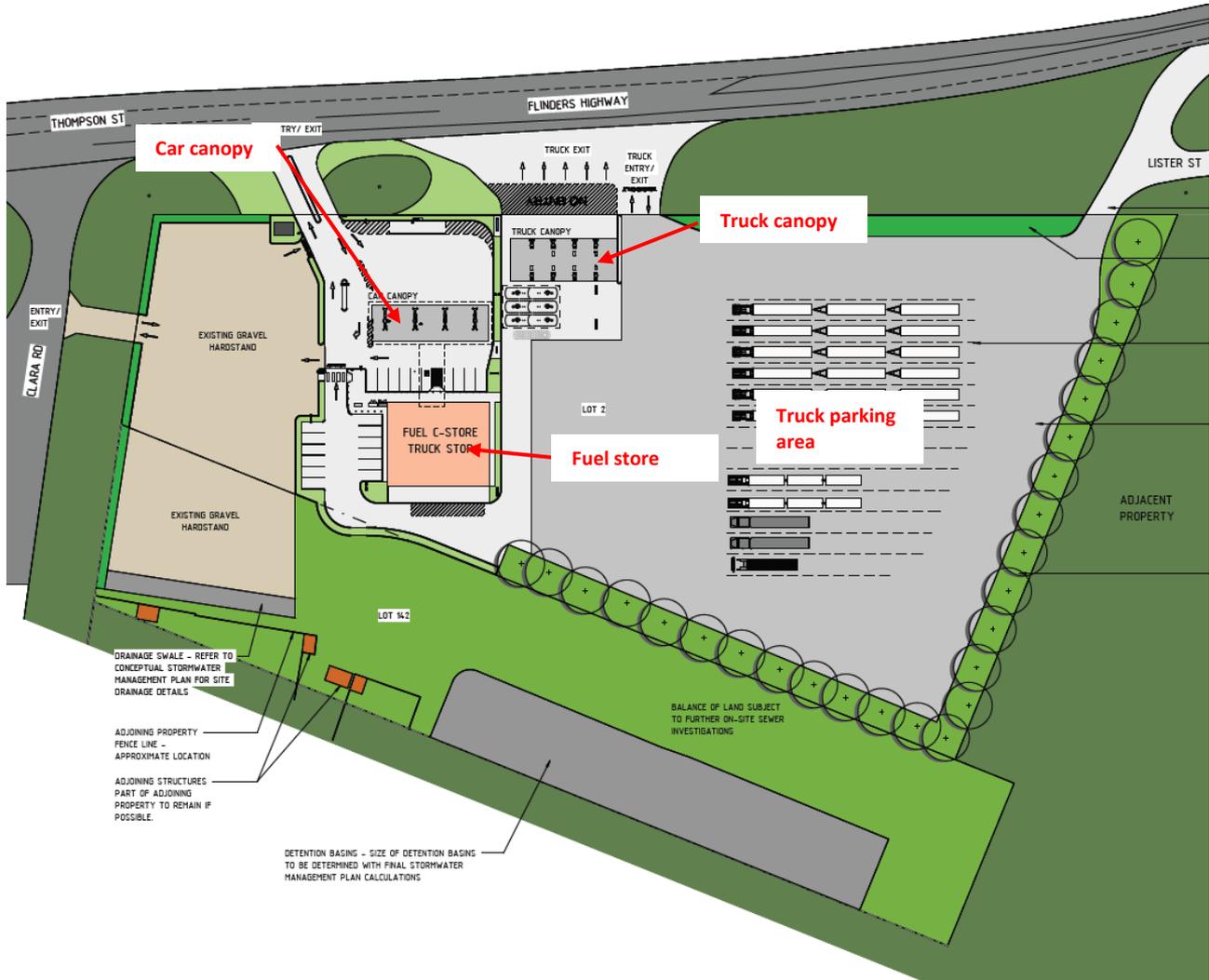


Table 3: Post-development catchment characteristics

Catchment	Surface Type	Area (m ²)	Percentage Imperviousness	Fraction impervious
A	Roofed Area	1,105	100	0.69
	Paved Area	17,855	100	
	Landscaped Area	8,433	0	
TOTAL		27,393		

Table 2 and

Table 3 above show that the fraction impervious for the post-development case is higher than the fraction impervious of the pre-development case, this will result in increased peak flows in the post-development case therefore onsite stormwater detention is required.

6.2 Stormwater Detention Sizing

6.2.1 Rational Method

The rational method was used to calculate the stormwater runoff flows from the site for the pre and post-development scenarios. The formula is as follows:

$$Q_y = (C_y \times I_y \times A) / 360 \quad \text{(QUDM 2016 Equation 4.2)}$$

Where:

Q_y = peak flow rate (m³/s) for average recurrence interval (ARI) of 'y' years

C_y = coefficient of discharge (dimensionless) for ARI of 'y' years

A = area of catchment (ha)

I_y = average rainfall intensity (mm/h) for a design duration of 't' hours and an ARI of 'y' years.

t = the nominal design storm duration as defined by the time of concentration (t_c).

The value '360' is a conversion factor to suit the units used.

6.2.2 Catchments

The existing catchment boundary has been maintained in the post development scenario. Pre and post-development catchment information is tabulated in Table 4 below.

Table 4: Catchment details

Catchment	Pre-development Area (Ha)	Pre-development fraction impervious	Post-development Area (Ha)	Post-development fraction impervious
A	2.74	0.64	2.74	0.69
TOTAL	2.74		2.74	

6.2.3 Time of concentration

The time of concentration of the pre-development scenario was calculated using the Friend's equation for overland sheet flow and figure 4.8 and 4.9 of the Queensland Urban Drainage Manual (QUDM 2016). The equation is shown below:

$$t_c = (107 \cdot n \cdot L^{0.333}) / S^{0.2} \quad \text{(QUDM 2016: Equation 4.5)}$$

Where:

t_c = overland sheet flow travel time (min)

L = overland sheet flow path length (m)

n = Horton's surface roughness factor

S = slope of surface (%)

The value '107' is a conversion factor to suit the units used.

Based on the survey information the assumed flow path for this calculation is indicated in Figure 7. A thick red line represents the flow path. It starts from the north-eastern corner of the site and ends at the south-eastern side boundary. It is assumed a gravelled surface for Horton's coefficient as the flow path is on the shoulder of the truck car parking driveway.

Table 5: Pre-development time of concentration assumptions

Assumptions	Catchment A- Value
Overland sheet flow length (m)	180
Overland sheet flow slope (%)	5.8
Horton's coefficient	0.03
Overland sheet flow travel time (min)	8.31

The time of concentration for post-development scenarios was determined using clause 5.4.4 of AS3500.3:2018 Plumbing and Drainage: Stormwater Drainage. Table 6 below shows the times of concentration used in the water quantity assessment.



Figure 7: Assumed site overland flow path for time of concentration calculations

Table 6: Time of concentration for the catchment

Catchment	Time of concentration
Pre-development – Catchment A	8.31
Post-development – Catchments A	5.00

6.2.4 Coefficient of discharge

From Table 4. 5.3 and 4.5.4 of QUDM, a one hour rainfall intensity for a 1 in 10 year ARI (I_{10}) of 62.5 mm/hr and fraction impervious f_i of 0.64 has a C10 value for the pre-development catchment of 0.79. The post- development C10 value is 0.81 for a fraction impervious f_i of 0.69. Table 7 below shows the F_y factor used to calculate the C_y value for each ARI.

Table 7: F_y factors for the nominated ARI's

	1 year ARI (mm/hr)	2 year ARI (mm/hr)	5 year ARI (mm/hr)	10 year ARI (mm/hr)	20 year ARI (mm/hr)	50 year ARI (mm/hr)	100 year ARI (mm/hr)
F_y	0.80	0.85	0.95	1.00	1.05	1.15	1.20

The coefficient of discharge for both pre and post-development catchments is calculated based on equation 4.3 of QUDM and the results shown in Table 8.

Table 8: Coefficients of discharge for pre and post-development scenarios

Coefficient of Discharge	1 year ARI	2 year ARI	5 year ARI	10 year ARI	20 year ARI	50 year ARI	100 year ARI
Pre-development Catchment-A	0.63	0.67	0.75	0.79	0.83	0.91	0.95
Post-development Catchment-A	0.65	0.69	0.77	0.81	0.85	0.93	0.97

6.2.5 Rainfall Intensities

The rainfall intensities for the site were read from an IFD table obtained from the BOM website for the project site on 12 November 2019. The rainfall intensities for a given time of concentration for the pre and post-development cases for the nominated ARI's are shown in Table 9.

Table 9: Rainfall intensities for the nominated ARI's

t_c (mins)	1 year ARI (mm/hr)	2 year ARI (mm/hr)	5 year ARI (mm/hr)	10 year ARI (mm/hr)	20 year ARI (mm/hr)	50 year ARI (mm/hr)	100 year ARI (mm/hr)
5.00	101.0	131.0	168.0	189.0	218.0	256.0	285.0
8.31	85.5	110.5	141.4	159.7	183.8	215.3	239.4

6.2.6 Stormwater Design Flows

Table 10 shows the stormwater runoff flows for the pre-development case calculated using the rational method.

Table 10: Stormwater flows generated by the pre-development catchment

Catchment	Q1 (l/s)	Q2 (l/s)	Q5 (l/s)	Q10 (l/s)	Q20 (l/s)	Q50 (l/s)	Q100 (l/s)
A (QoutPC)	411.2	564.4	807.5	959.8	1160.0	1488.5	1727.2

Table 11 shows the stormwater runoff flows for the post-development case calculated using the rational method

Table 11: Stormwater flows generated by the post-development catchment

Catchment	Q1 (l/s)	Q2 (l/s)	Q5 (l/s)	Q10 (l/s)	Q20 (l/s)	Q50 (l/s)	Q100 (l/s)
A (Q _{in})	507.8	699.8	1003.1	1187.8	1438.6	1850.3	2149.4

As can be seen from Table 12 below, the development will increase stormwater runoff for the catchment for the nominated ARI's, therefore onsite stormwater detention will be required to mitigate the peak discharge and achieve the "no worsening" of the stormwater drainage conditions external to the site.

Table 12: Stormwater flow differences between post and pre-development for standard ARI's

Catchment	Q1 (l/s)	Q2 (l/s)	Q5 (l/s)	Q10 (l/s)	Q20 (l/s)	Q50 (l/s)	Q100 (l/s)
A	498.0	686.3	983.7	1164.9	1410.8	1814.5	2107.9

The aim of the stormwater system is to capture and convey all stormwater generated from the site with no catchments bypassing the detention swales. Consequently, Table 13 shows that there will not be areas bypassing detention.

Table 13: Stormwater runoff bypassing the detention basin for the post-development catchment

Catchment	Q1 (l/s)	Q2 (l/s)	Q5 (l/s)	Q10 (l/s)	Q20 (l/s)	Q50 (l/s)	Q100 (l/s)
A (Q _{outL})	0.0	0.0	0.0	0.0	0.0	0.0	0.0

The adjusted allowable discharge from the detention basin is shown in Table 14 below.

$$Q_{out} = Q_{outPC} - Q_{outL}$$

Table 14: Allowable stormwater discharge from the detention basin

Catchment	Q1 (l/s)	Q2 (l/s)	Q5 (l/s)	Q10 (l/s)	Q20 (l/s)	Q50 (l/s)	Q100 (l/s)
A (Q _{outPC})	411.2	564.4	807.5	959.8	1160.0	1488.5	1727.2
A (Q _{outL})	0.0	0.0	0.0	0.0	0.0	0.0	0.0
A (Q _{out})	411.2	564.4	807.5	959.8	1160.0	1488.5	1727.2

6.2.7 Required Detention Volume

The onsite detention volume will restrict the post-development flows to pre-development conditions. The required detention volume and outlet arrangement was modelled, designed and sized using computer software (DRAINS V2019.09). Table 15 below shows the required detention volume for a range of design storms for the development. The table also compares the pre & post development flows to the designed output flows from DRAINS based on the detention storage volume. A snapshot of the DRAINS model is shown in Figure 8 below and Figure 9 shows a plan view of the detention configuration modelled.

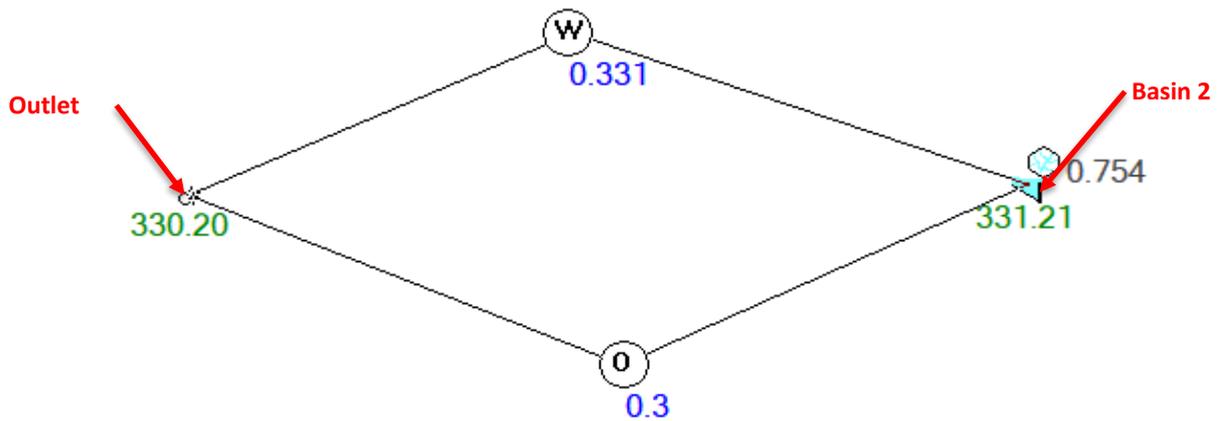
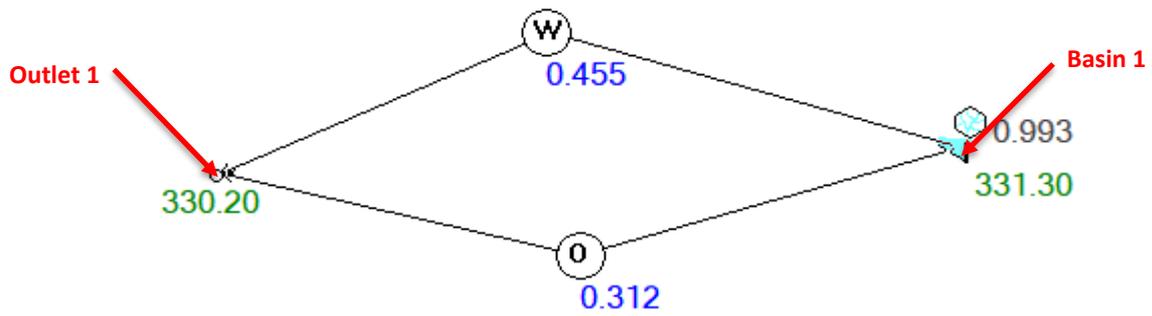


Figure 8: Print Screen of the Drains Stormwater drainage model

Table 15: Onsite Detention Volume requirement (DRAINS Outputs) Catchment A

Design Storm	Post Development	Allowable stormwater discharge from the Detention Basin(s)	Design Flow (Calculated by DRAINS)	Post Development mitigated	Required Detention volume
<i>ARI</i>	<i>Flow rate</i>	<i>Flow rate</i>	<i>Flow rate</i>	<i>Flow rate</i>	<i>Volume</i>
<i>Years</i>	<i>L/S</i>	<i>L/S</i>	<i>L/S</i>	<i>L/S</i>	<i>L</i>
1	520.7	411.2	366.0	154.7	83.364
2	717.5	564.4	434.0	283.5	133.109
5	1,028.5	807.5	523.0	505.5	236.474
10	1,217.9	959.8	598	619.9	308.325
20	1,475.0	1,160.0	948.0	527.0	360.627
50	1,897.1	1,488.5	1,398.0	499.1	410.33
100	2,203.8	1,727.2	1,650.0	553.0	435.572

Based on Table 15 above, the minimum required detention volume for the site is 435, 572(L) to mitigate post-development flows.

6.2.8 Proposed On-Site Detention System

It is proposed to provide two oversized swales that will act as detention basins in order to restrict post-development flows to pre-development conditions. Figure 9 below shows details of one of the proposed detention basins system modelled in DRAINS.

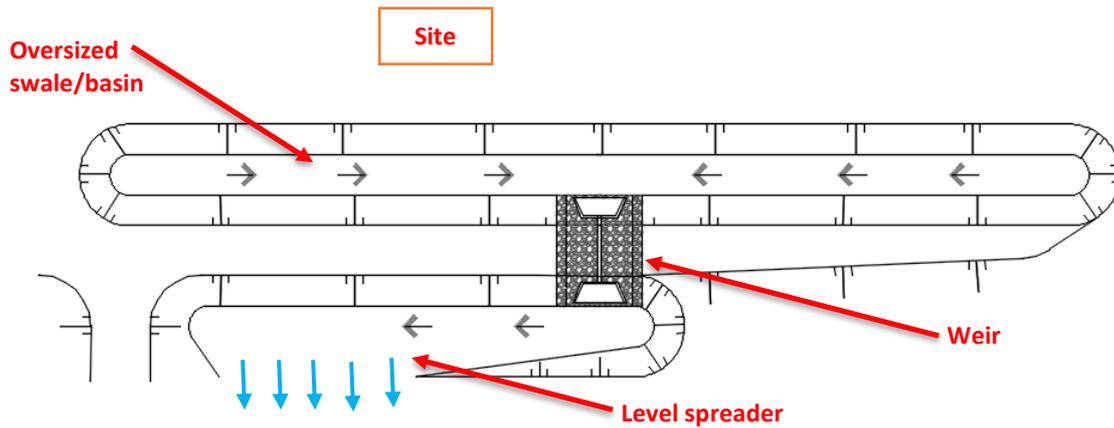


Figure 9: Proposed Detention System

The basins were modelled with the outlet arrangements described in Table 16.

Table 16: Characteristics of detention basins modelled in DRAINS

Description	Value
Basin capacity	Basin 1 – 289.641 L, Basin 2 – 145.931 L (435,572 L combined)
Pipe outlet	1 x 375mm RCP at bottom each basin
Weir	1 x 3000mm L x 900mm H at each basin
Swale/basin section	2.0m base width, 1.15m depth and 1:3.0 batters.

Refer to **Appendix E** for inflow-outflow hydrographs, and storage volume graphs outputs from DRAINS software.

7.0 WATER QUALITY ASSESSMENT

7.1 Construction Phase

Impacts on receiving waters and surrounding areas will be minimised during the construction phase with measures as outlined in this SBMP and the Erosion and Sediment Control Plan enclosed on **Appendix H**.

7.1.1 Pollutants

Typical pollutants generated during the construction phase of the development are shown below in Table 17.

Table 17: Pollutant typically generated during the construction phase

Pollutant	Sources
Litter	Paper, construction packaging, food packaging, cement bags, off-cuts
Sediment	Unprotected exposed soils and stockpiles during earthworks and building
Hydrocarbons	Fuel and oil spills, leaks from construction equipment
Toxic materials	Cement slurry, asphalt prime, solvents, cleaning agents, wash-waters
pH altering substances	Acid sulphate soils, cement slurry and wash-waters

7.1.2 Performance objectives

The objectives are:

- Minimise the amount of sediment entering waterways and stormwater drains;
- Minimise or prevent environmental harm to waterways and associated ecosystems;
- Minimise localised flooding caused by sediment runoff;
- Minimise exposure of soils.

Table 18: Construction phase performance criteria

Indicator	Water Quality Objectives
pH	6.5 – 8.5
Suspended Solids	Annual Mean < 10mg/L
Oils and Grease	No visible films or odour
Litter/ Gross pollutants	No anthropogenic (man-made) materials greater than 5mm in any dimension
Dissolved oxygen	80-100% saturation

7.1.3 Monitoring and maintenance

The general requirement of monitoring during the construction phase will be:

- Work activities are restricted to designated construction areas;
- Earthworks and site clearing are undertaken in accordance with an Erosion and Sediment Control Plan;
- Erosion and sediment control devices are to be constructed/installed in accordance with the Erosion and Sediment Control Plan;
- Inspection of sediment fences, erosion and sediment control structures/devices on a weekly basis as well as after any rain event exceeding 25mm in 24hrs (major storm event);

- Stormwater discharges from the site are not having any adverse effect on the downstream environment;
- Monitoring and recording of the performance of the drainage control devices including water quality testing where required;
- Any failure in the stormwater system shall be immediately rectified to prevent uncontrolled discharge from the site;
- Any failure to the stormwater system causing damage to surroundings should implement immediate remedial work to the damaged area.

7.1.4 Responsibility and reporting

- The contractor shall be responsible for monitoring the performance of all drainage control and erosion and sediment control devices;
- Records of any failures to devices should be kept and reported to the Construction Manager;
- Regular inspections of the devices shall be reported to the Construction Manager;
- Inspections of the devices after heavy rainfall shall be reported to the Construction Manager;

7.2 Operational Phase

7.2.1 Pollutants

The key pollutants typically generated during this phase for the entire catchment are shown in Table 19.

Table 19: Pollutant typically generated during the operational phase

Pollutant	Potential Source
Litter / Gross Pollutants	Waste materials, food, food packaging etc.
Hydrocarbons	Fuel and oil spills, dispensing areas, car park
Nutrients (N & P)	Nitrogen, Phosphorus
Sediments	Aggregates bins, wind deposits and car trails
Surfactants	Detergents, cleaning agents

7.3 Proposed Stormwater Treatment

7.3.1 Stormwater treatment philosophy

Waterways and other aquatic environments are valued by the community for their social, cultural, economic and environmental benefits. Urban runoff, contaminated with nutrients, sediment and other pollutants adversely impacts these valued resources. Water Sensitive Urban Design (WSUD) is a holistic approach to the planning and design of urban landscapes that minimises these negative impacts. This approach is used on this project to select the treatment options that considers the civil, landscape and ecological aspects of the site.

7.3.2 Source Controls

Rubbish bins can be an effective source control for litter and are appropriate for most developments. Bins will be placed in appropriate areas (such as buildings and staff amenity) to encourage thoughtful waste disposal.

7.3.3 At-source gross pollutant traps

A gross pollutant trap (GPT) is a treatment device designed to capture coarse sediment, trash and vegetation matter in stormwater runoff. GPTs are often used as the first treatment element in a treatment train. Spel Stormsacks or a

similar approved product will be used within this development; the Stormsacks capture 99.99% of gross pollutants and will be installed in gully pits, refer to **Appendix E** for typical details.

7.3.4 Vegetated Swales/Detention basin

Vegetated Swales are used to convey stormwater; they are effective in removing coarse and medium sediment (such as nutrients, free oils/grease and metals). Also, surface runoff flowing on vegetated swales with mild slopes results in slower travel times, thus reducing the impact of increased peak flow rates and temporarily detaining collected stormwater runoff. Refer to **Appendix F** for typical details of vegetated swales.

7.4 Fuel Related Stormwater Treatment

The treatment train shown in Figure 10 uses the Best Management guidelines to treat stormwater runoff from the site.

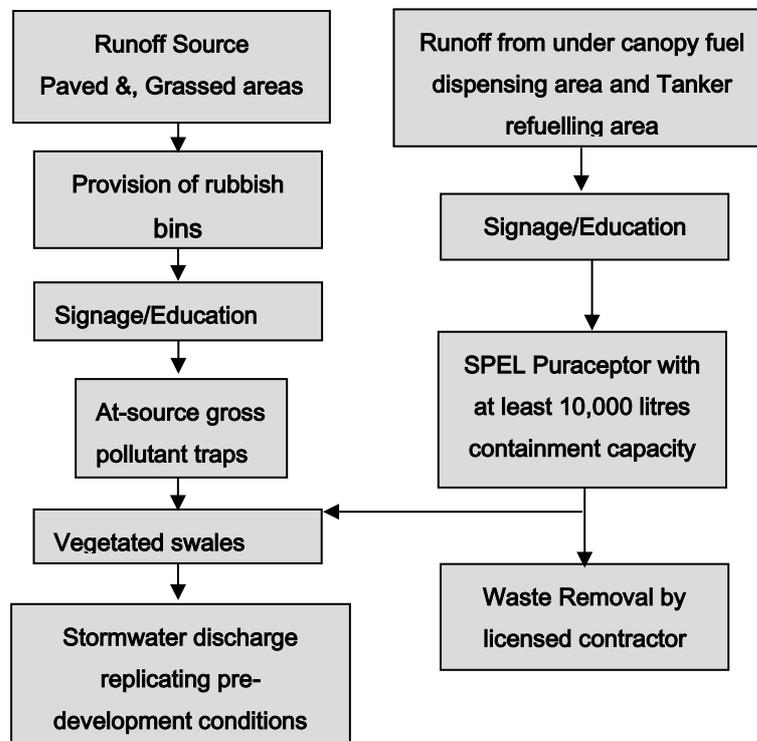


Figure 10: Fuel related stormwater treatment philosophy

7.4.1 Fuel Dispensing Areas

The fuel dispensing areas will be concrete surfaced and covered by canopies. Fuel dispensing areas will be bounded to prevent stormwater runoff from outside the canopy flowing into the dispensing area and to ensure that any spills are contained within these areas. The perimeter of the canopies will overhang the dispensing containment areas by 10 degrees to reduce windblown rain into the area. Any flows/spills in the containment area will drain to gully pits which will discharge to an appropriately sized Spel Purceptor.

Bulk fuel transfers from a road tanker to underground tanks will take place in a remote Fill Point located outside the truck canopy within a bunded concrete area. A gully pit will be located within this area to capture and convey any possible spill to the SPEL Purceptor; also any runoff from the dispensing areas will be directed to a SPEL Purceptor

at all times. A spill containment box at fill point will capture any minor fuel spills that may occur during unloading; the spilt fuel will then drain from the containment box into the fuel storage tanks.

7.4.1.1 Spel Purceptor

The Purceptor P.050 (Class 1) unit has a minimum containment volume of 10,000 litres, which allows for containment for spill from an 8,000 litre tanker compartment plus allowances for wind-blown rain. The Purceptor will remove hydrocarbons, gross pollutants and total suspended solids. Refer to **Appendix F** for details of the Spel Purceptor P.050.

7.4.2 Underground Fuel Storage Tanks

Underground fuel storage tanks, piping and fuel dispensers will be installed in accordance with the Australian Institute of Petroleum (AIP) standards.

8.0 SITE MAINTENANCE AND MANAGEMENT PROCEDURES

8.1 Petrol Station Maintenance and Management Procedure

The service station operator will have a Petrol Handling Manual that will set out all requirements for the safe handling of combustible and flammable materials. This manual will dictate weekly, monthly and annual checking procedures with checklists, which will be completed, and the records stored.

The manual will also set out dry cleaning methods to be employed within the fuel dispensing area in lieu of washing down to reduce possible contaminated runoff. Emergency procedures will be also clearly set out detailing actions to be taken by site personnel in the case of varying possible emergencies such as spills, fire or risk of fire, vehicle accidents, etc.

In addition a regular cleaning, maintenance program/contract is to be established for emptying of rubbish bins located around the site, removal of general litter from the site, inspection of stormwater gully pits and removal of any sediment or captured litter from the Spel Stormsacks and vegetated swale/basin systems. The Spel Stormsacks and Spel Purceptor will be inspected and maintained in accordance with the manufacturer’s instructions. Refer to **Appendix G** for maintenance plans.

The maintenance plan will address the following:

- Inspection frequency;
- Maintenance frequency;
- Data collection/storage requirements;
- Detailed cleanout procedures.

The plan will include inspection procedures covering aspects such as equipment needs, maintenance techniques, occupational health and safety, public safety, environmental management considerations, disposal requirements of pollutants collected and access issues.

8.2 Maintenance Plans for Stormwater treatment devices

All stormwater quality improvement systems require regular maintenance in order to function adequately. Table 20 details the basic maintenance requirements for each type of stormwater quality improvements systems. A detailed maintenance schedule will be developed as part of the detailed design of the site.

Table 20: Maintenance Requirements

Control	Maintenance Requirement	Maintenance Period
Spel Stormsacks	Remove sediment and captured litter	4 months (inspect after major storms)
Spel Purceptor	Replacement of oil separators and coalescer units, removal of oil, sediment & gross pollutants (skimmers and vacuum truck)	6 Months (inspect after major spill)
Vegetated Swales/Detention Basin	Monitor for erosion along swale. Maintaining vegetation by weed removal and replanting.	6 months (inspect after major storms)

For operational and maintenance guidelines refer to **Appendix G** and relevant manufacturer’s documentation.

9.0 LIFECYCLE COSTS

A lifecycle cost analysis is not part of the scope of this report. All the recommended water quality treatment infrastructure lies within the development site and it shall be maintained and serviced by the owners of the development at no cost to Council.

10.0 CONCLUSION

A Site Based Stormwater Management Plan has been prepared with respect to the proposed Truck Stop development. The location of the site is shown on Figure 1 and the proposed development site layout is shown in **Appendix A**.

- **Stormwater Quantity**
To mitigate post development flows from the proposed development and to achieve a “no worsening” of stormwater conditions external to the site, an assessment of the water quantity has been undertaken resulting in the requirement of a 435.6 KL swale/detention basin system. Refer to Section 5 for the stormwater quantity assessment details and **Appendix E** for inflow-outflow hydrographs outputs from DRAINS software.
- **Stormwater Quality- Construction Phase**
An Erosion and Sediment Control Plan aimed at minimising unacceptable impacts during the construction phase has been prepared. Refer to **Appendix H**.
- **Stormwater Quality- Operational Phase**
At source gross pollutant traps and vegetated Swales/detention basins have been proposed as stormwater treatment measures to provide for removal of coarse and medium sediment and facilitate for pollutant settlement. The location of proposed treatment measures is shown in **Appendix D**.

This Site Based Stormwater Management Plan has demonstrated that adequate stormwater management principles and techniques will be employed during the construction and operational phases of this development to comply with the Queensland State Planning Policy July 2017, Charters Towers Regional Town Plan, performance outcomes P012 to P014 of the Department of Infrastructure Local Government and Planning State Code 1 and the Queensland Urban Drainage Manual (QUDM) 2016. The methods proposed are considered current best management practice for a development of this type, on this site.

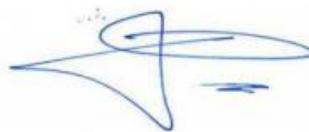
Yours faithfully



Butholezwe Masuku
BEng, MIEAust
Civil Engineer

For and on behalf of TfA Group

Reviewed by



Juan Avella (RPEQ 11899)
BEng, MIEAust, CPEng, RPEQ, NER
Director Civil/Structural Engineering

For and on behalf of TfA Group

APPENDIX A – PROPOSED SITE LAYOUT PLAN

RPD
 LOT: LOT 2 ON MPH20732
 AREA: 2.003 HECTARES
 LOT: LOT 142 ON DV425
 AREA: 8,744m²
 LGA: CHARTERS TOWERS REGIONAL COUNCIL



NOTES

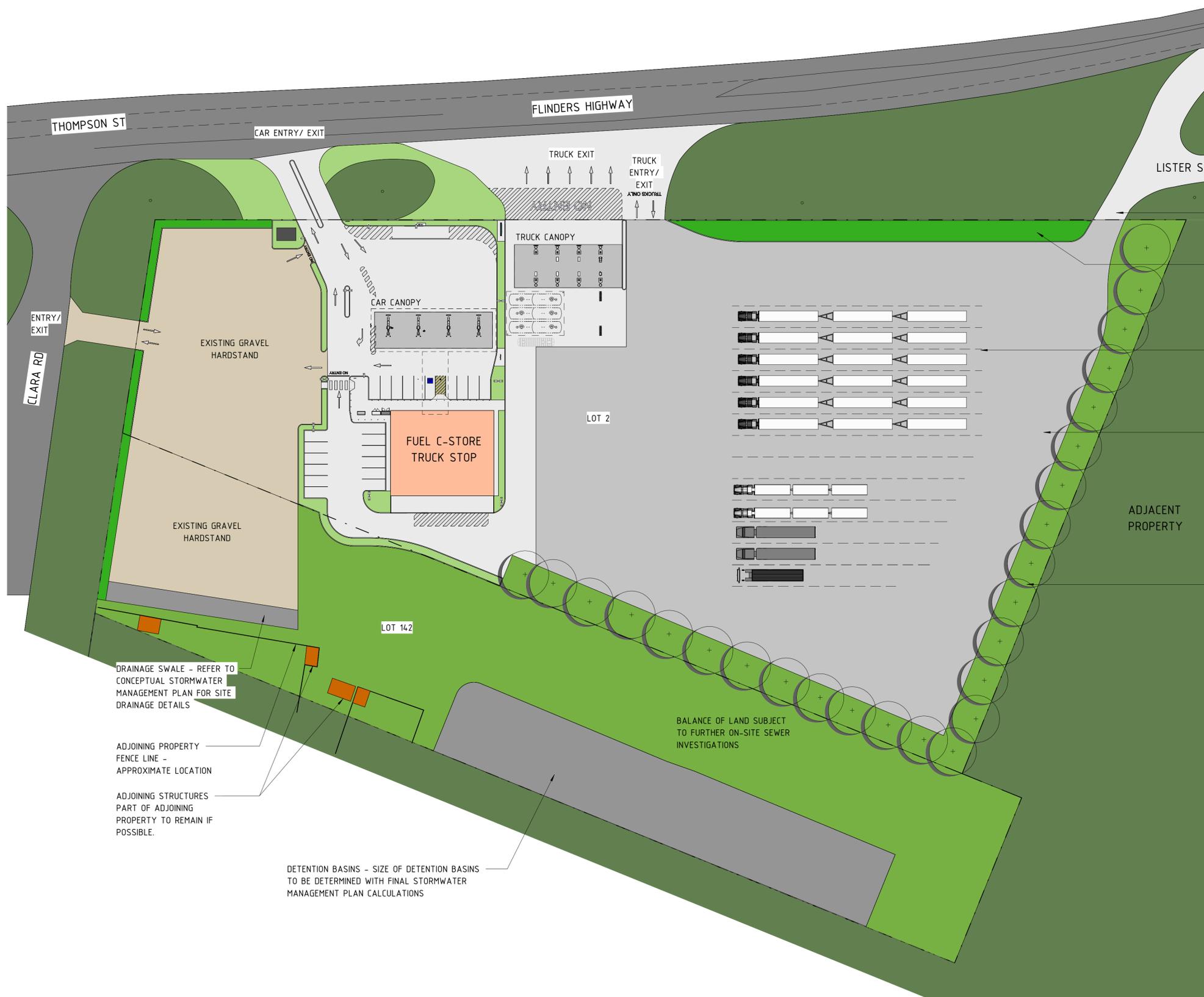
1. NOT FOR TENDER OR CONSTRUCTION
2. EXTERNAL ROAD WORKS SUBJECT TO FINAL ADVICE FROM TRAFFICE ENGINEER
3. SITE LAYOUT SUBJECT TO DETAIL SITE SURVEY AT DETAIL DESIGN STAGE

LEGEND

- EXISTING LANDSCAPE TO BE REHABILITATED REFER TO CONCEPT LANDSCAPE PLAN.
- EXISTING TREES & LANDSCAPING TO REMAIN.
- PROPOSED LANDSCAPING - REFER TO CONCEPT LANDSCAPE PLAN.
- EXISTING HARDSTAND TO BE CLEANED AND REPAIRED AS REQUIRED.
- EXISTING GRAVEL HARDSTAND TO BE CLEANED AND REPAIRED AS REQUIRED.

SITE COVERAGE SCHEDULE

FUEL SHOP C-STORE	475m ²
CAR CANOPY	290m ²
CAR CANOPY LINK	90m ²
TRUCK CANOPY (EXISTING PLUS EXTENSION SUBJECT TO SURVEY)	250m ²
PAVEMENT (INCL. SERVICE YARDS)	3097m ²
PATHWAYS	188m ²
LANDSCAPING (PROPOSED)	378m ²
EXISTING LANDSCAPE & HARDSTAND	
LANDSCAPE REJUVINATED LOT 2	569m ²
LANDSCAPE UNAFFECTED LOT 2	1889m ²
LANDSCAPE REJUVINATED LOT 142	77m ²
LANDSCAPE UNAFFECTED LOT 142	5520m ²
HARDSTAND (TRUCK PARKING)	11139m ²
HARDSTAND (MINE WORKER CAR PARK)	3431m ²



EXISTING TRUCK ENTRY AND LONG TERM PARKING FROM FLINDERS HIGHWAY

FLINDERS HIGHWAY FRONTAGE LANDSCAPING TO BE REJUVINATED AND REPLENISHED

EXISTING TRUCK PARKING (DASH LINES INDICATIVE OF PARKING - NO LINEMARKING)
 7 x A-TRIPLE (54m) SPACES
 6 x B-DOUBLE (26m) SPACES

RETAIN EXISTING HARDSTAND AREA WITH DRAINAGE ISSUES RESOLVED

ADJACENT PROPERTY

EXISTING TREES & LANDSCAPING TO REMAIN

DRAINAGE SWALE - REFER TO CONCEPTUAL STORMWATER MANAGEMENT PLAN FOR SITE DRAINAGE DETAILS

ADJOINING PROPERTY FENCE LINE - APPROXIMATE LOCATION

ADJOINING STRUCTURES PART OF ADJOINING PROPERTY TO REMAIN IF POSSIBLE.

DETENTION BASINS - SIZE OF DETENTION BASINS TO BE DETERMINED WITH FINAL STORMWATER MANAGEMENT PLAN CALCULATIONS

BALANCE OF LAND SUBJECT TO FURTHER ON-SITE SEWER INVESTIGATIONS

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REV	DATE	BY	DESCRIPTION	CHK	PROJECT DETAILS											
A	05.09.22	DGC	CONCEPT FOR CLIENT REVIEW													

APPENDIX B – SITE SURVEY PLAN



CONTROL TABLE

STN.	EASTING	NORTHING	BL.	DESCRIPTION
100	230277.761	77763.499	335.797	SPK PEG/STAK
101	231818.292	77626.897	338.862	SCREW IN IRON
102	231821.202	77626.897	338.862	SCREW IN IRON
103	231821.202	77626.897	338.862	SCREW IN IRON
104	231831.317	77525.500	334.485	SPK PEG/STAK
105	231818.292	77526.846		DUMPEY
106	231973.242	77610.000		SPK/STAK

Coordinate grid is given (false north 1,000) based on horizontal datum of Canada 2000
 Vertical datum of Canada 2000
 SNT00223227.761 [6] 4232327.761 [6]
 420 700 000.000 to North for Approx. NAD 2000
 Government Origin NAD 2000
 # Meters 77763.499 [6]
 Note: Property boundaries are approximate
 they are not subject to survey

REVISIONS

NO.	DATE	BY	DESCRIPTION
1	12/22/22	BRISHAN KAVANA	INITIAL DESIGN
2	12/22/22	BRISHAN KAVANA	REVISIONS
3	12/22/22	BRISHAN KAVANA	REVISIONS
4	12/22/22	BRISHAN KAVANA	REVISIONS
5	12/22/22	BRISHAN KAVANA	REVISIONS

DETAIL SURVEY PLAN

CLIENT: TFA Project Group
SITE ADDRESS: No. 71493 Thompson Street, Moosman Park

REAL PROPERTY DESCRIPTION:
 Lot: 2 on MPH20732
 out: 142 on DV425
 Local Authority: Chertres Towers R. C.
 Datum: AHD0 (FWS65642-338.944)

DATE SURVEYED: 23/05/2022
SCALE: 1:300
DATE DESIGNED: 02/06/2022
JOB NO.: PLAN NO. RKN
J223676 J222408-01C

LEGEND

- Boundary
- Structure
- Tree
- Contour
- Spot Height
- Survey Point
- Property Line
- Right of Way
- Proposed
- Existing
- As Shown
- Not Shown
- Not to Scale
- Not to Be Used
- Not to Be Relied Upon
- Not to Be Used for
- Not to Be Relied Upon
- Not to Be Used for
- Not to Be Relied Upon

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APPENDIX C – FLOODING INFORMATION

This map is for general planning purposes only

The extent of the event shown on this map has been estimated using a model that has not been validated against any historical flood levels.

The *Charters Towers Regional Council* may be able to provide additional data to provide an improved indication of the extent of this flood event.

Refer to "uncertainty comments" in the accompanying report and the notes accompanying the Flood Frequency Analysis.

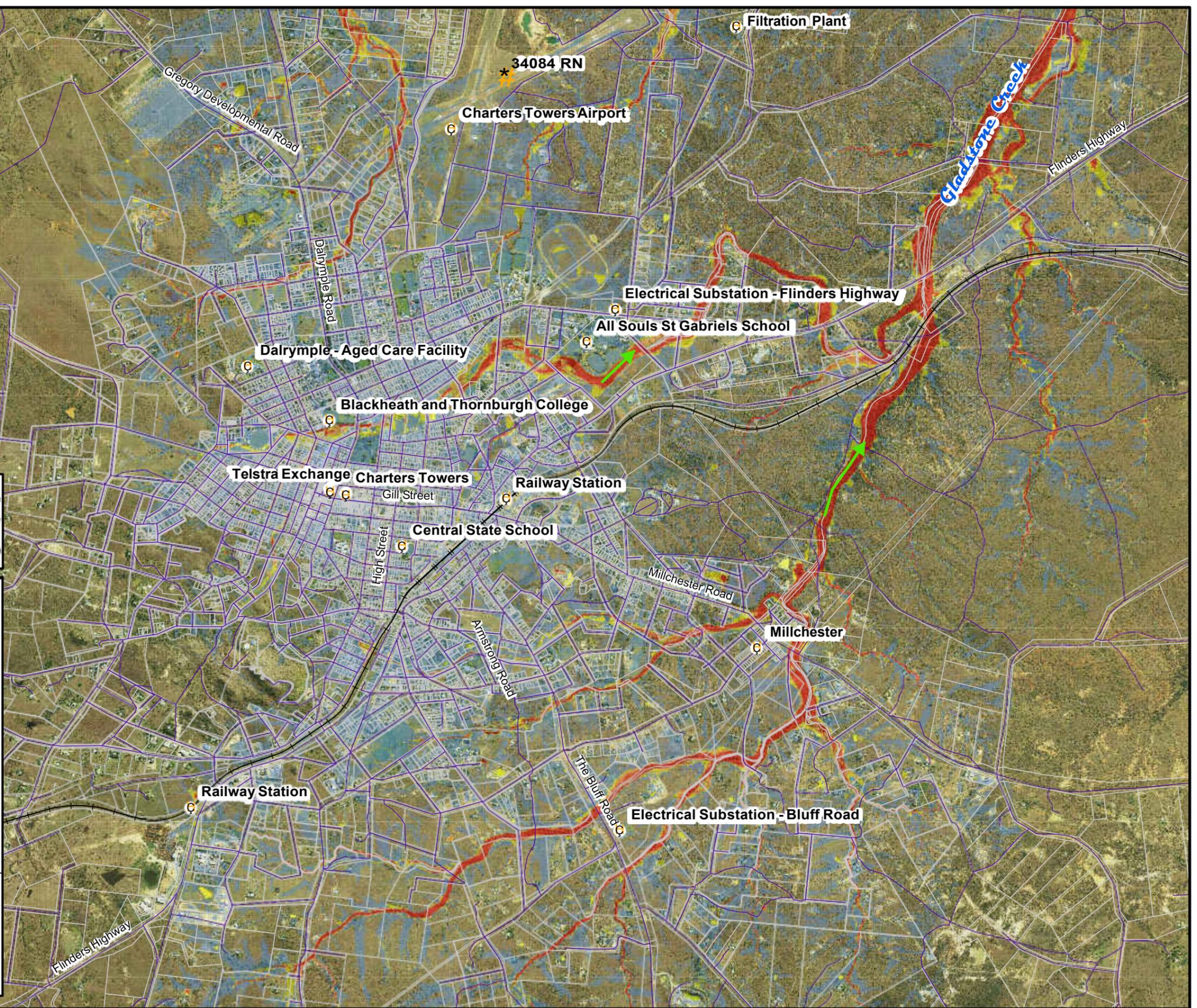
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Charters Towers - Millchester Design Flood Estimates

Annual Exceedence Probability (%)	Peak Rainfall (mm/hr)
10	NA
5	NA
2	56
1	92
0.5	NA
0.2	137

Note - Use this data with extreme caution and use in conjunction with the report:

- These estimates of levels could change as a result of more detailed flood modelling and/or measurements during higher flood events.
- Flows have been estimated using a 'rain-on-grid' modelling approach using rainfall from Intensity-Frequency-Duration curves for Charters Towers Airport BoM station 034084.



www.dnrm.qld.gov.au



Scale at A3 - 1:35,000

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Investigation Flood Hazard Map - 10% AEP Event)
 034084

This map is for general planning purposes only

The extent of the event shown on this map has been estimated using a model that has not been validated against any historical flood levels.

The *Charters Towers Regional Council* may be able to provide additional data to provide an improved indication of the extent of this flood event.

Refer to "uncertainty comments" in the accompanying report and the notes accompanying the Flood Frequency Analysis.

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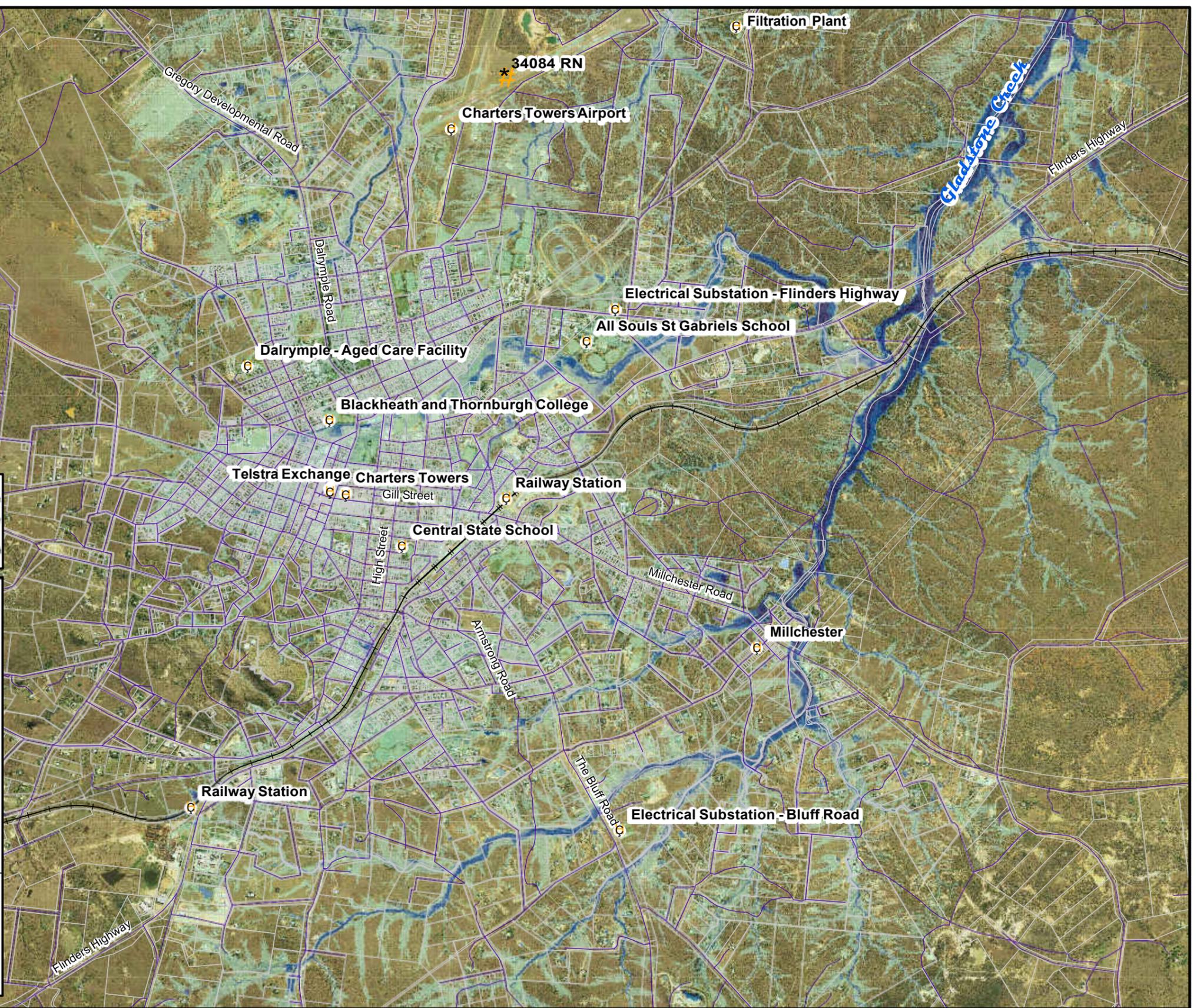
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Charters Towers - Millchester Design Flood Estimates

Annual Exceedence Probability (%)	Peak Rainfall (mm/hr)
10	NA
5	NA
2	56
1	92
0.5	NA
0.2	137

Note - Use this data with extreme caution and use in conjunction with the report:

- These estimates of levels could change as a result of more detailed flood modelling and/or measurements during higher flood events.
- Flows have been estimated using a 'rain-on-grid' modelling approach using rainfall from Intensity-Frequency-Duration curves for Charters Towers Airport BoM station 034084.

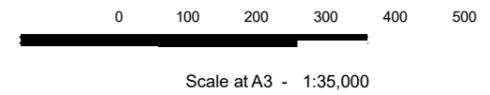


 Points of interest
  BoM gauging station

 0.8
  1

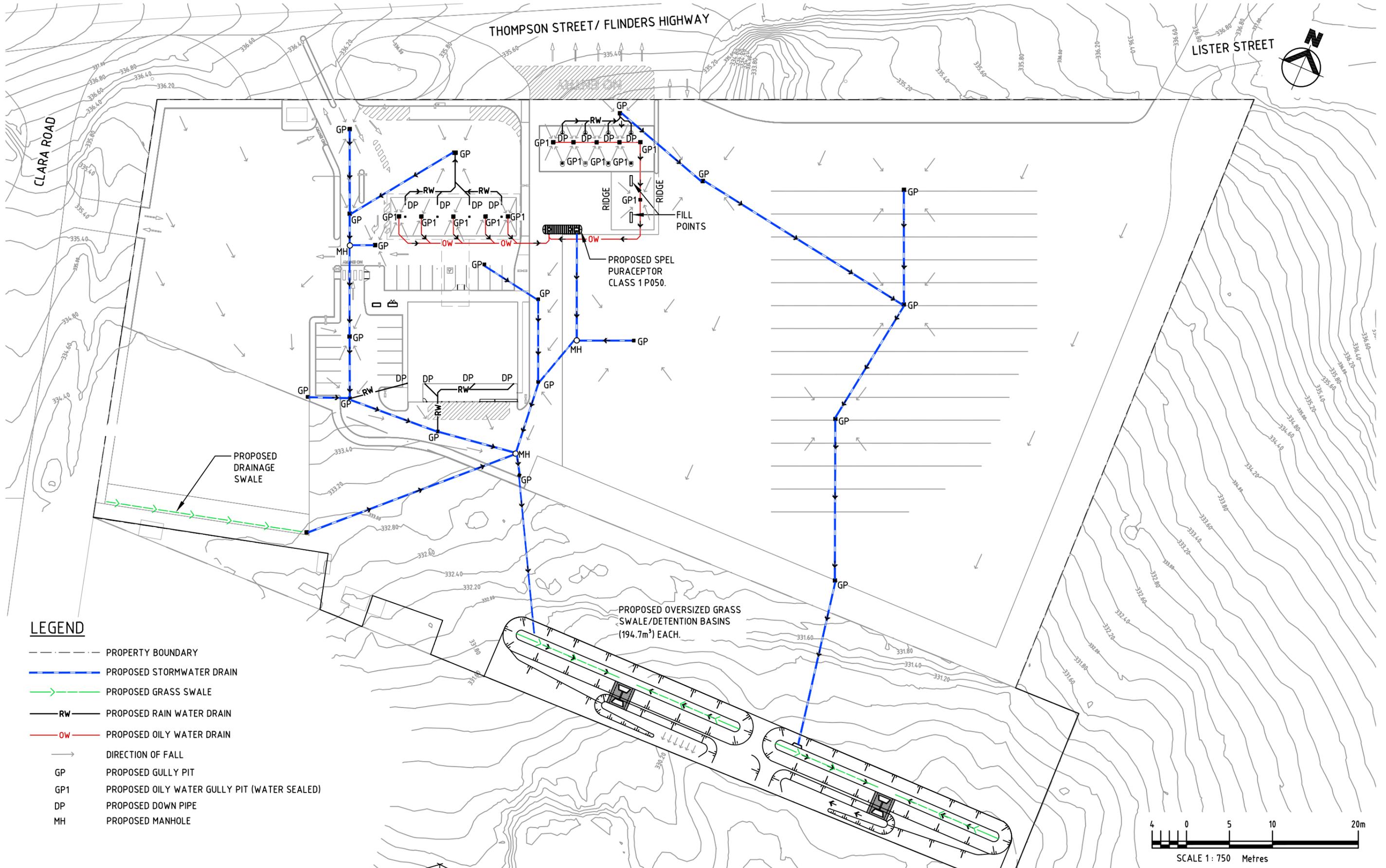
 0.8 - 1 Roads

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Charters Towers Flood Hazard Map -
Millchester (0.2% AEP Event)
BoM Station 034084

APPENDIX D – CONCEPTUAL STORMWATER MANAGEMENT PLAN



LEGEND

- PROPERTY BOUNDARY
- PROPOSED STORMWATER DRAIN
- PROPOSED GRASS SWALE
- RW --- PROPOSED RAIN WATER DRAIN
- OW --- PROPOSED OILY WATER DRAIN
- DIRECTION OF FALL
- GP PROPOSED GULLY PIT
- GP1 PROPOSED OILY WATER GULLY PIT (WATER SEALED)
- DP PROPOSED DOWN PIPE
- MH PROPOSED MANHOLE

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 DESIGNERS | ENGINEERS**

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REV	DATE	BY	DESCRIPTION	CHK
A	19.11.19	CV	DA ISSUE	
B	05.05.20	LS	ENTRY/EXIT CROSSOVER AMENDED. CLARA RD ACCESS ADDED	
C	24.03.22	DH	SITE LAYOUT UPDATED	
D	18.05.22	BM	SITE LAYOUT UPDATED	
E	06.10.22	DH	SITE LAYOUT UPDATED	
F	21.10.22	DGC	BUILDING UPDATED	JA
G	26.10.22	BM	PROPOSED SWALE UPDATED	JA

PROJECT DETAILS

**PUMA ENERGY
 CHARTERS TOWERS TRUCK STOP
 71-93 THOMPSON ST
 MOSMAN PARK
 QLD 4820**

DRAWING TITLE

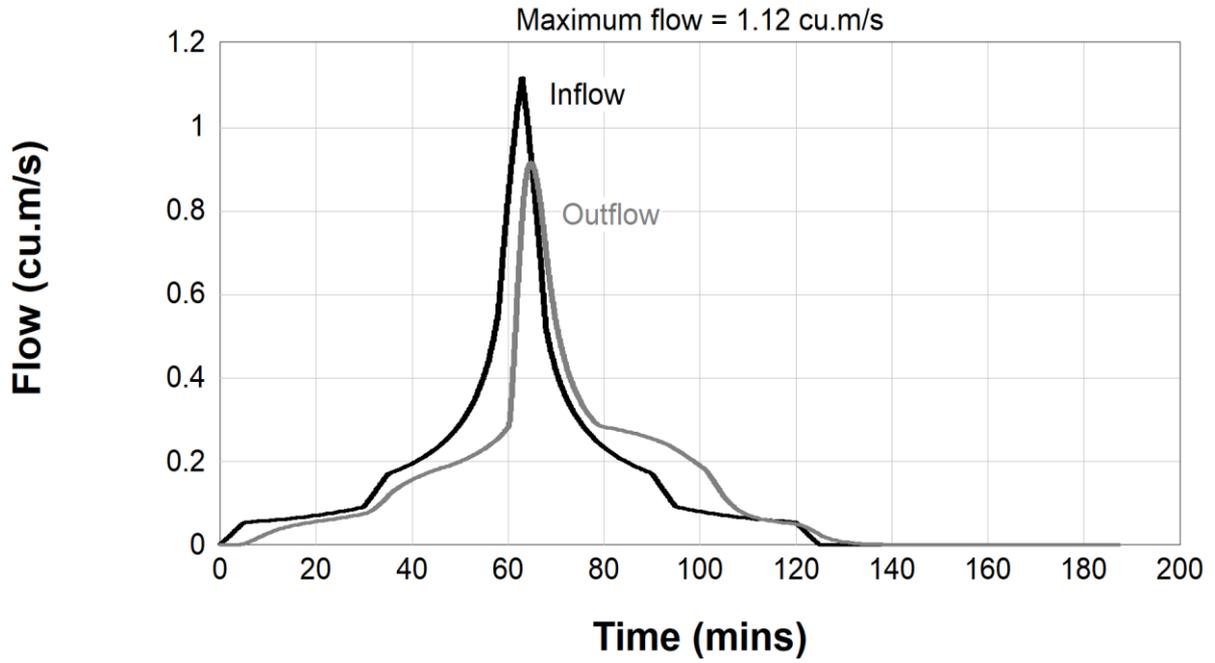
**CONCEPTUAL STORMWATER
 MANAGEMENT PLAN**

STATUS		
DA ISSUE		
DRAWN DH	APPROVED 	
DATE CREATED 20.09.22	A1 SCALE 1:750	A3 SCALE 1:750
DRAWING NO 19013-DA12	REV G	

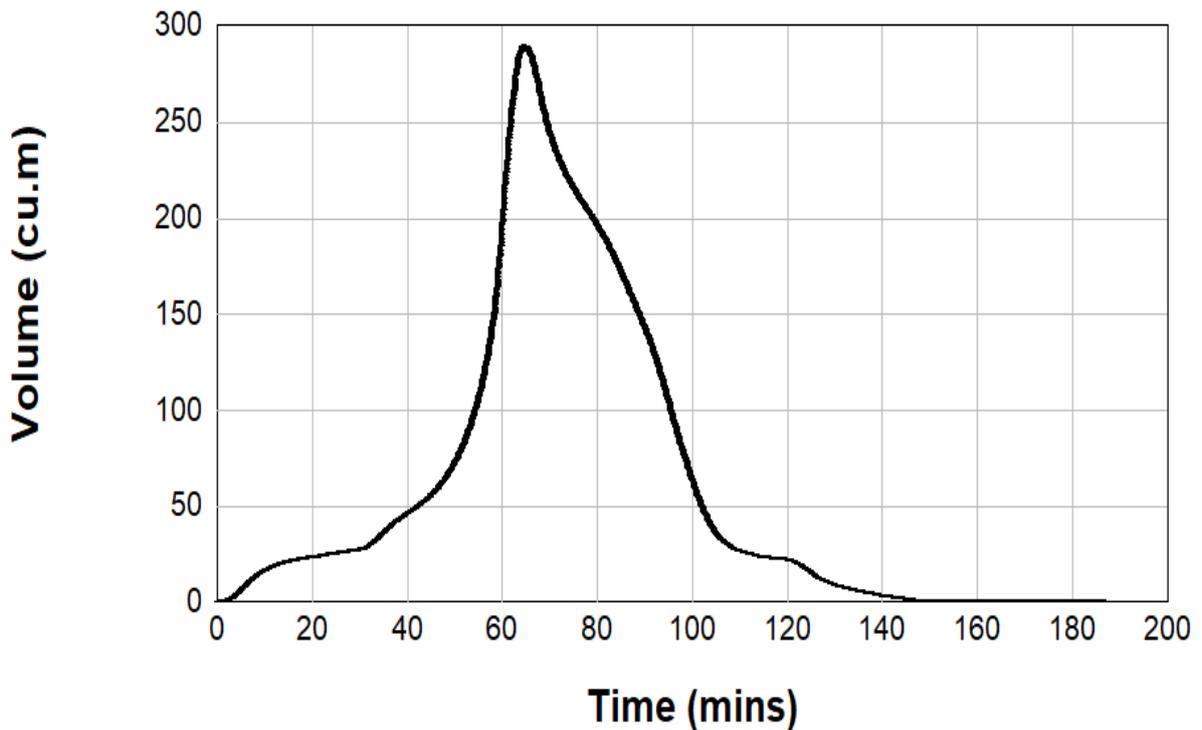
APPENDIX E – DRAINS STORMWATER MODELLING SOFTWARE OUTPUTS

BASIN A – DRAINS OUTPUTS

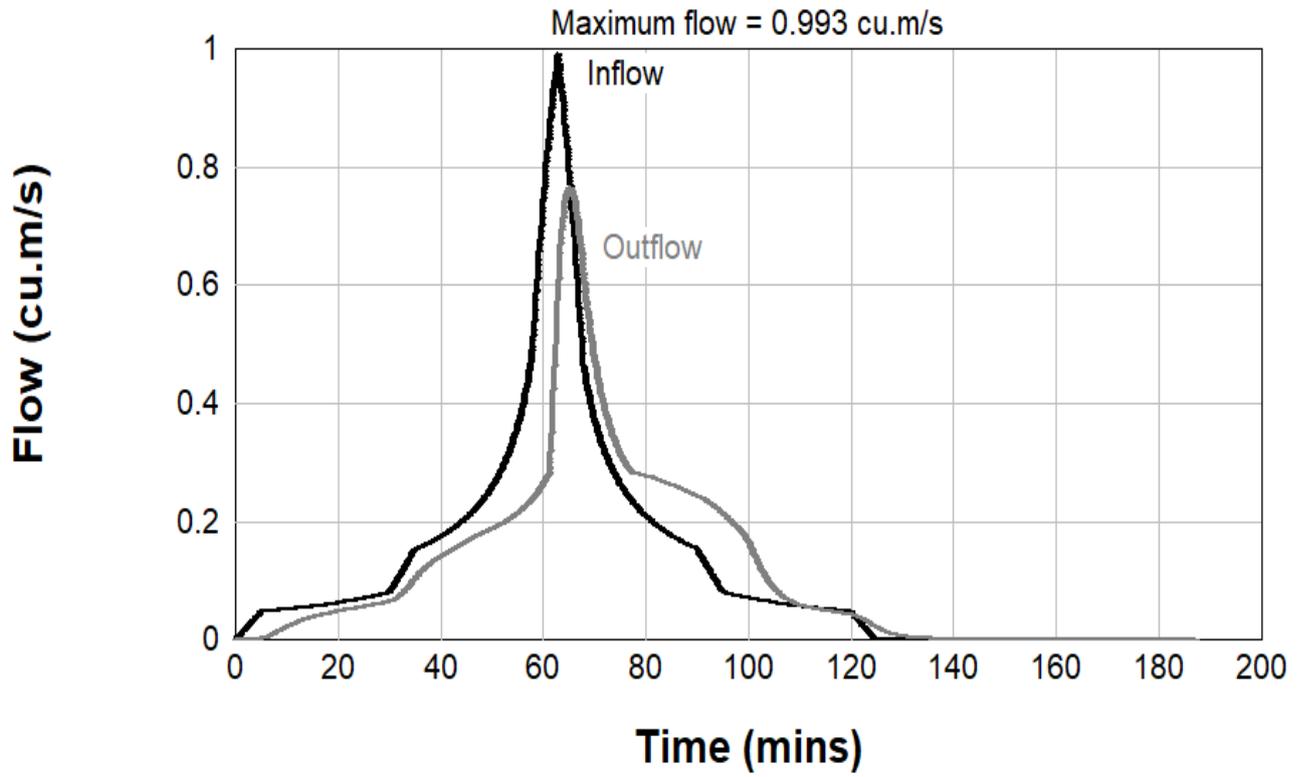
Detention Inflow/Outflow – 100 year ARI Synthetic Storm



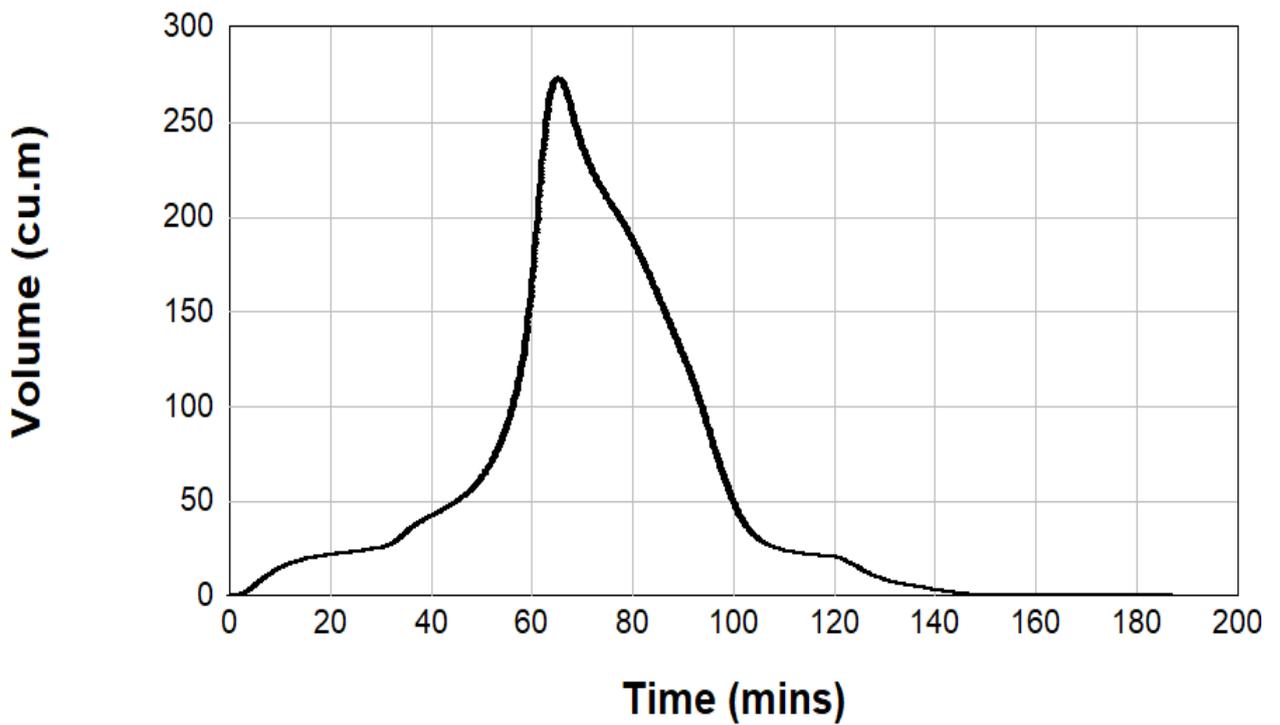
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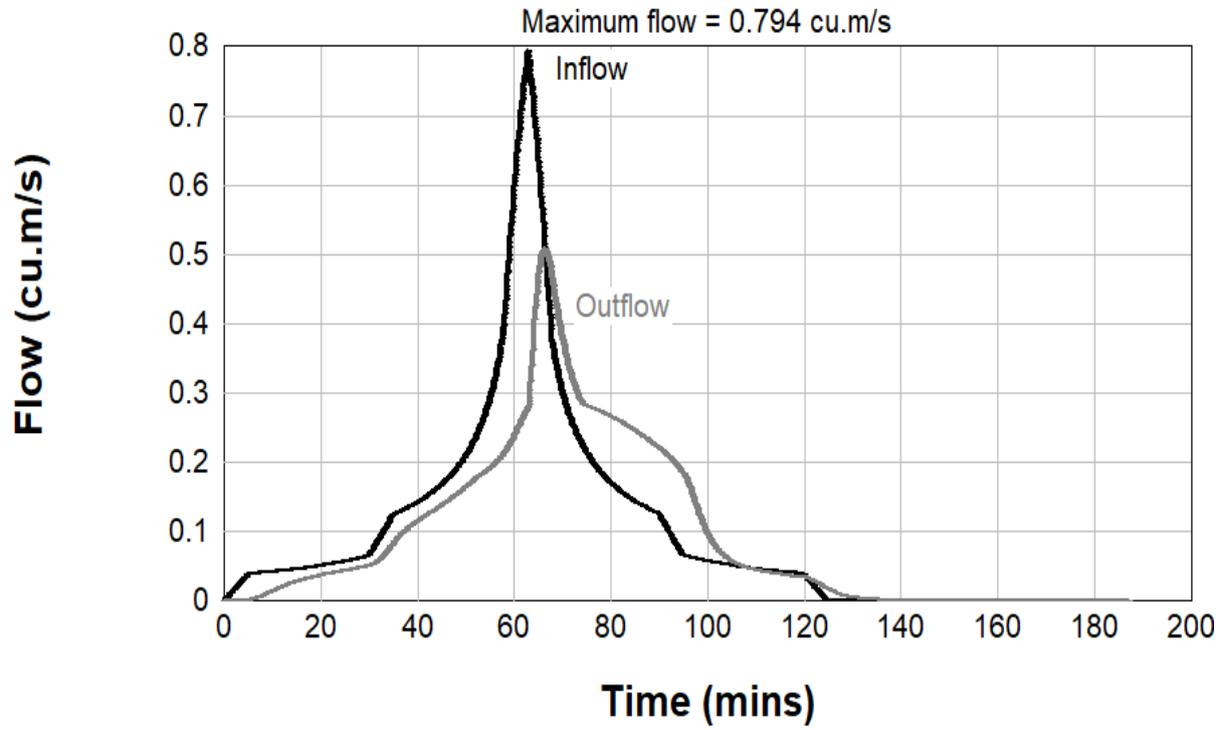
Detention Inflow/Outflow – 50 year ARI Synthetic Storm



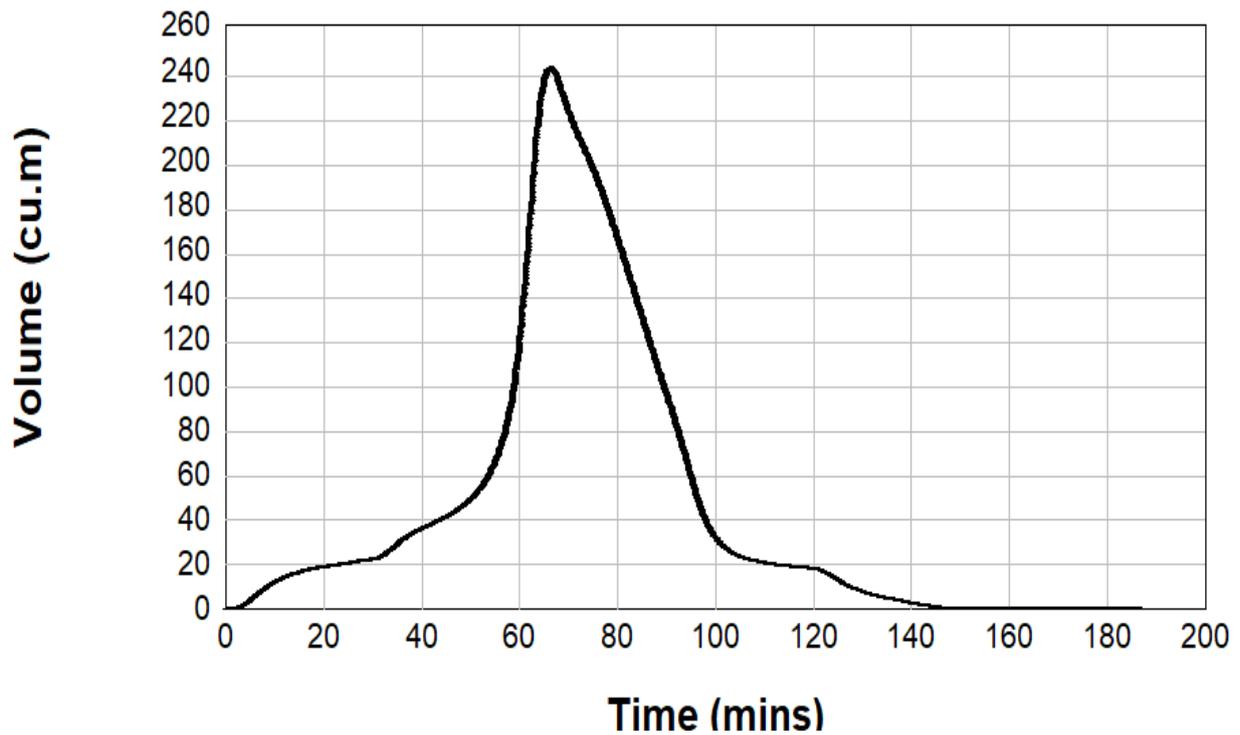
Storage Volume – 50 year ARI Synthetic Storm



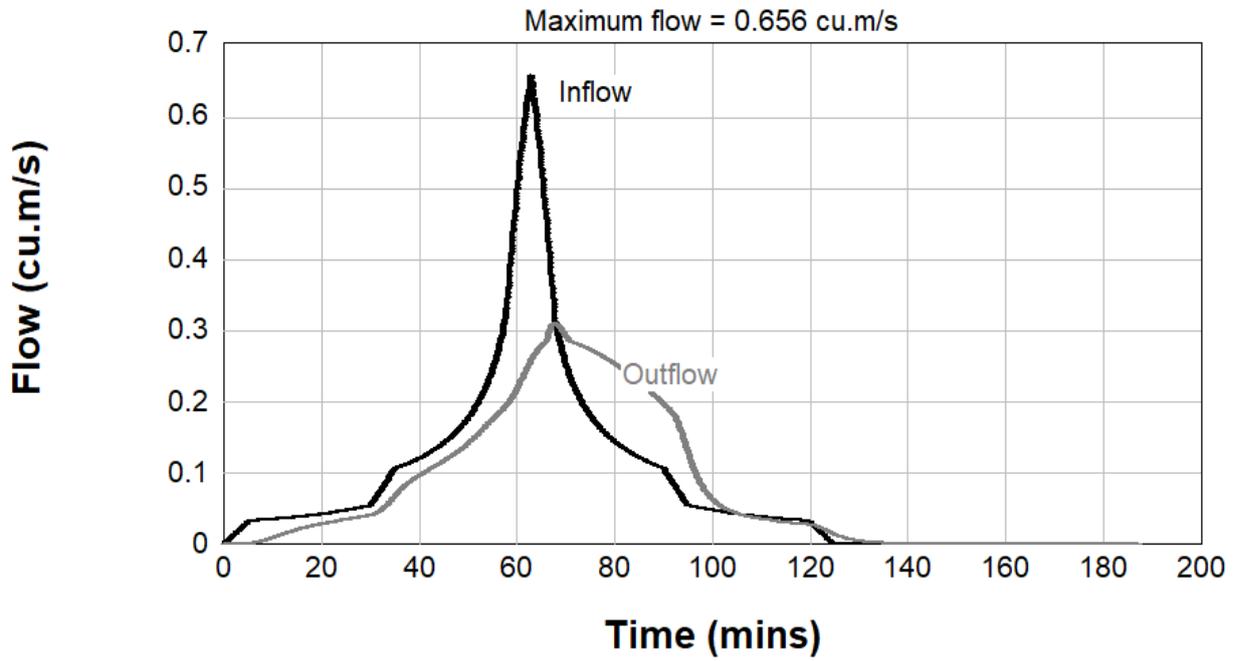
Detention Inflow/Outflow – 20 year ARI Synthetic Storm



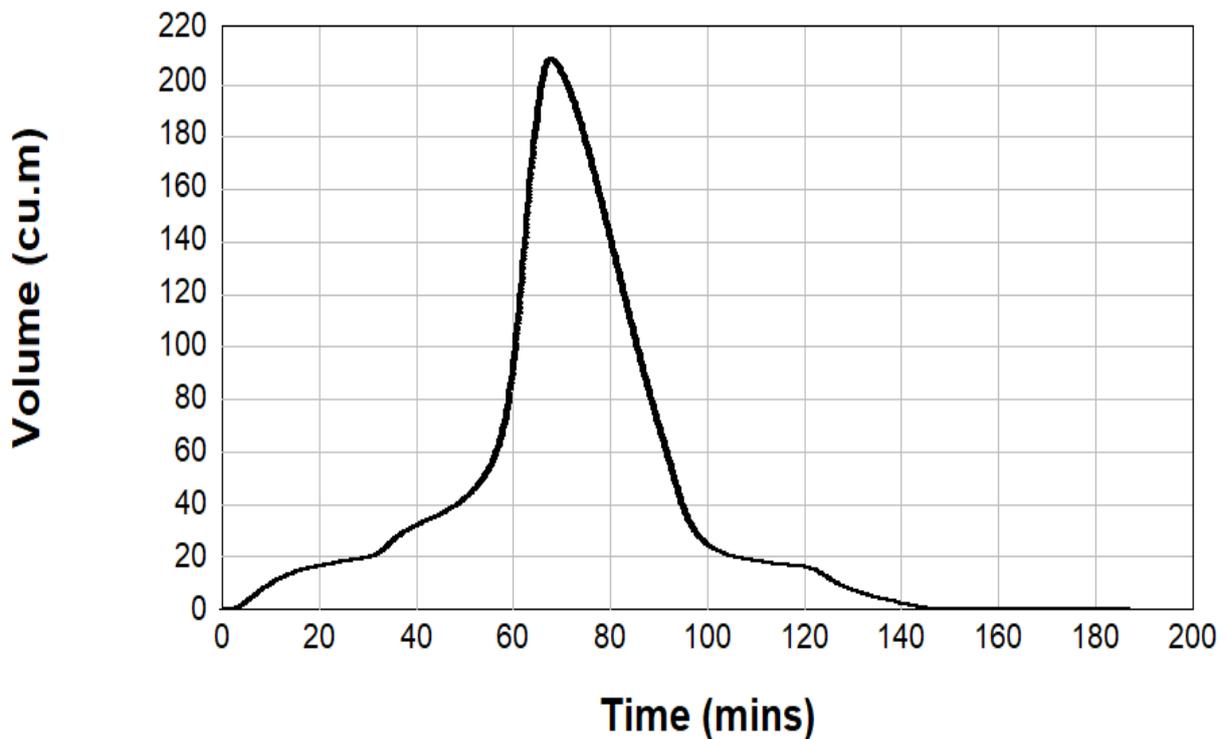
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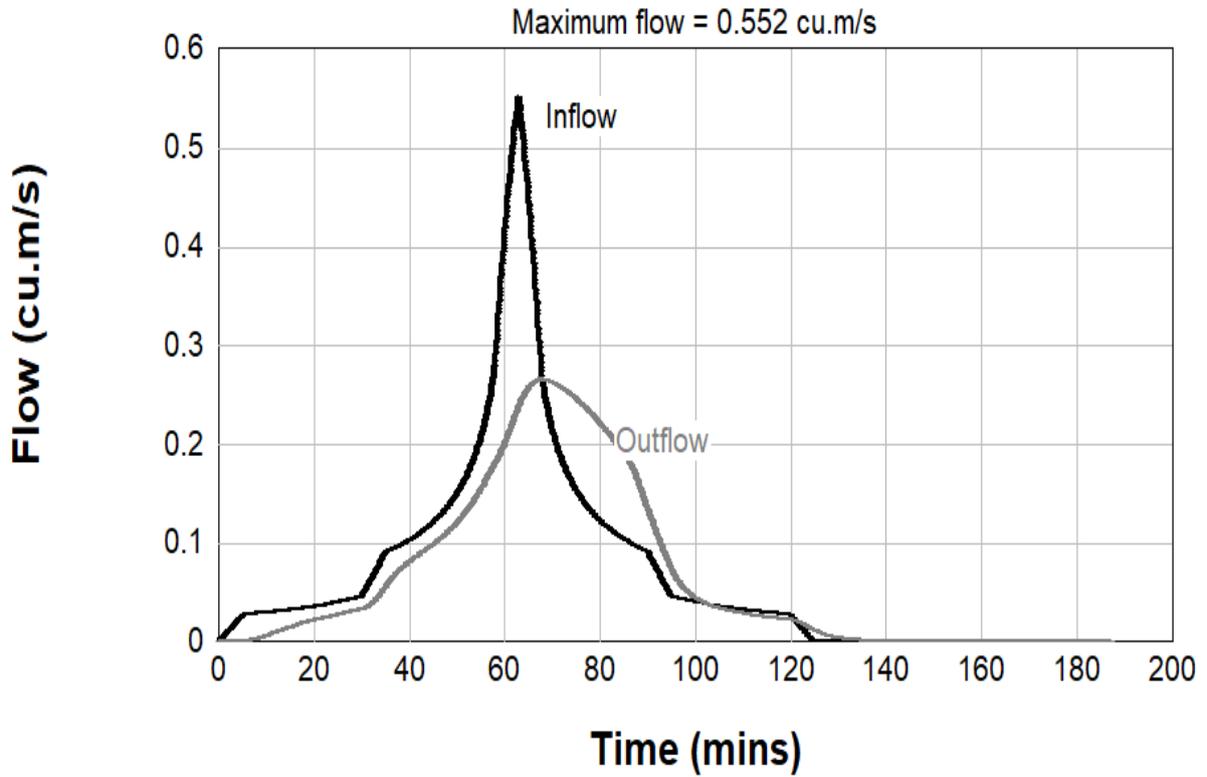
Detention Inflow/Outflow – 10 year ARI Synthetic Storm



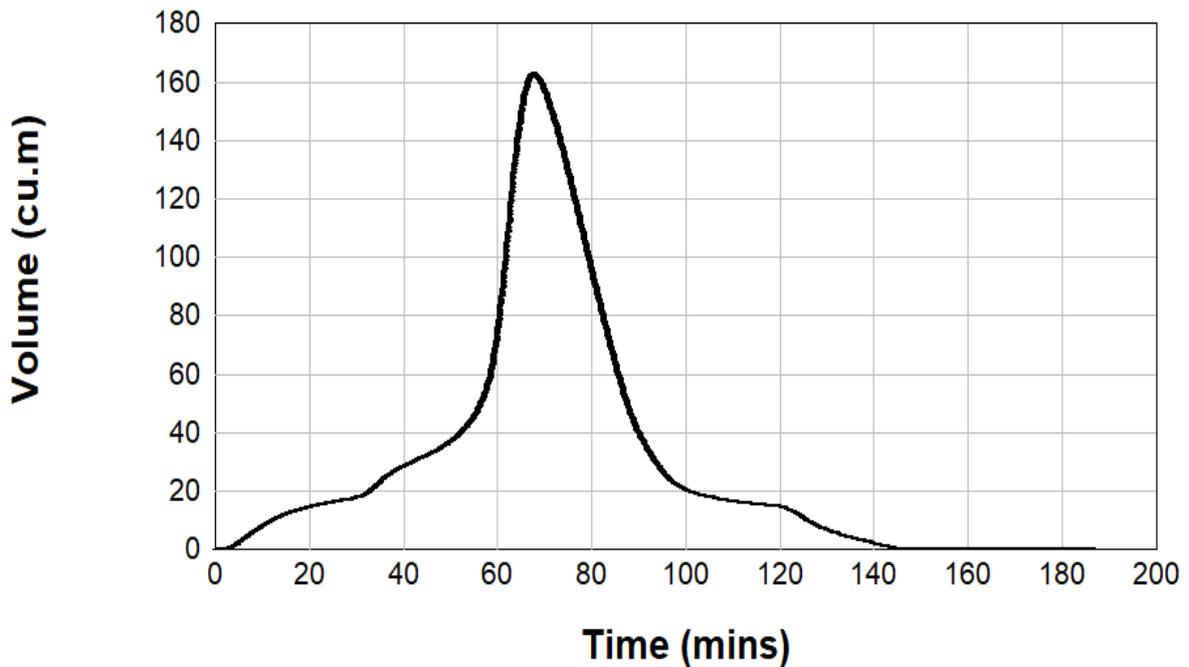
Storage Volume – 10 year ARI Synthetic Storm



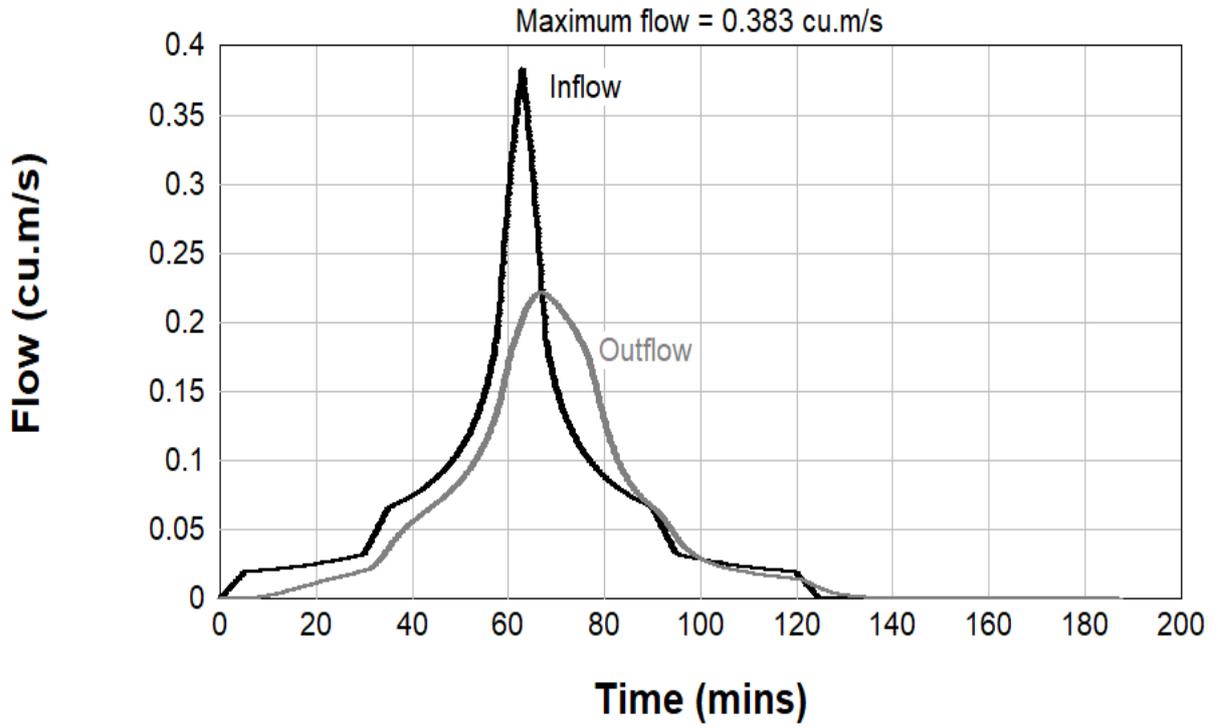
Detention Inflow/Outflow – 5 year ARI Synthetic Storm



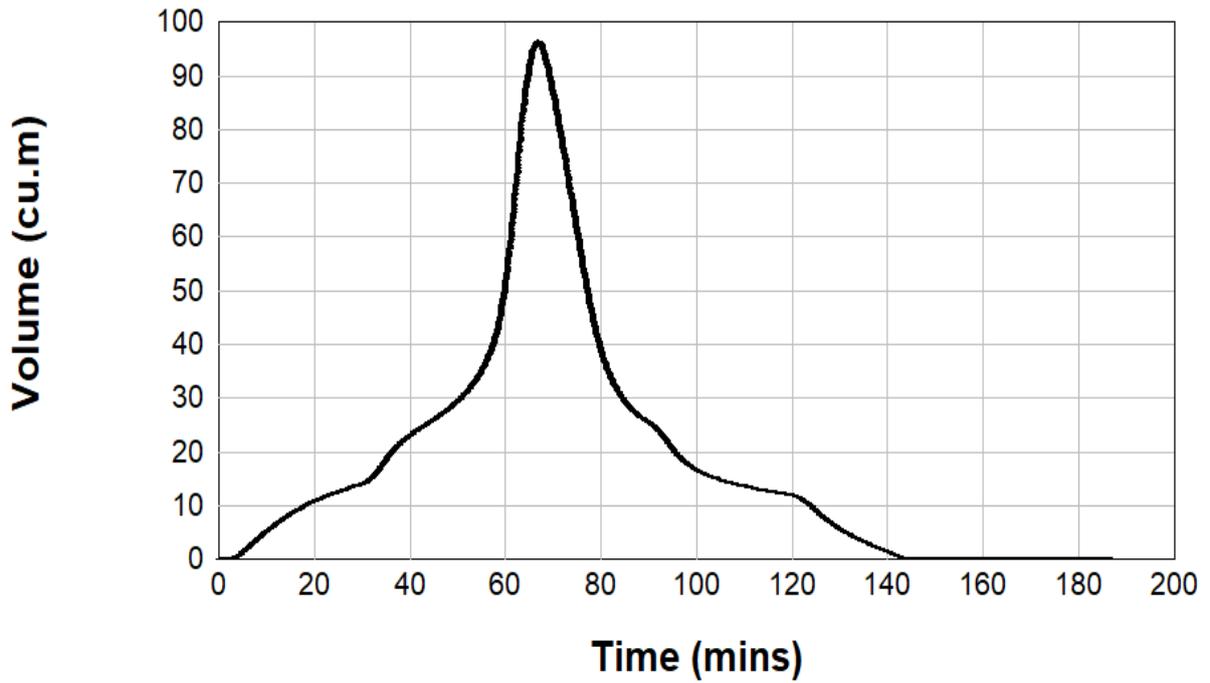
Storage Volume – 5 year ARI Synthetic Storm



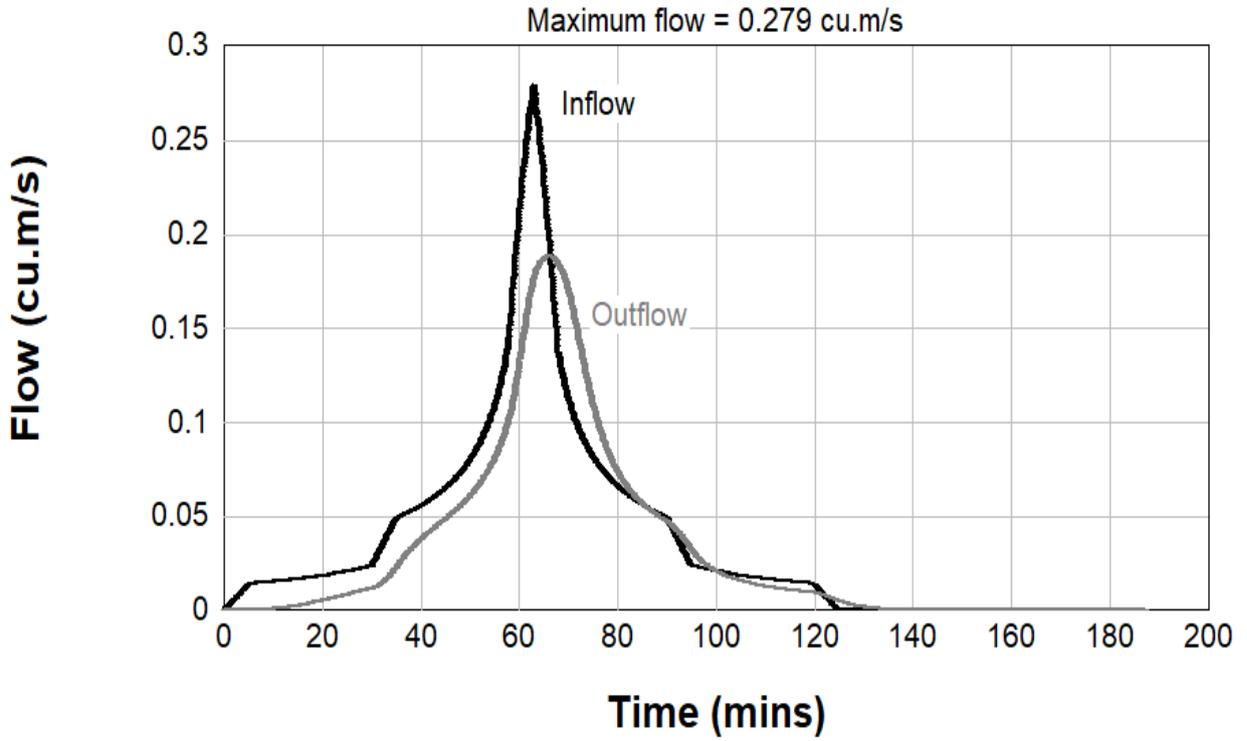
Detention Inflow/Outflow – 2 year ARI Synthetic Storm



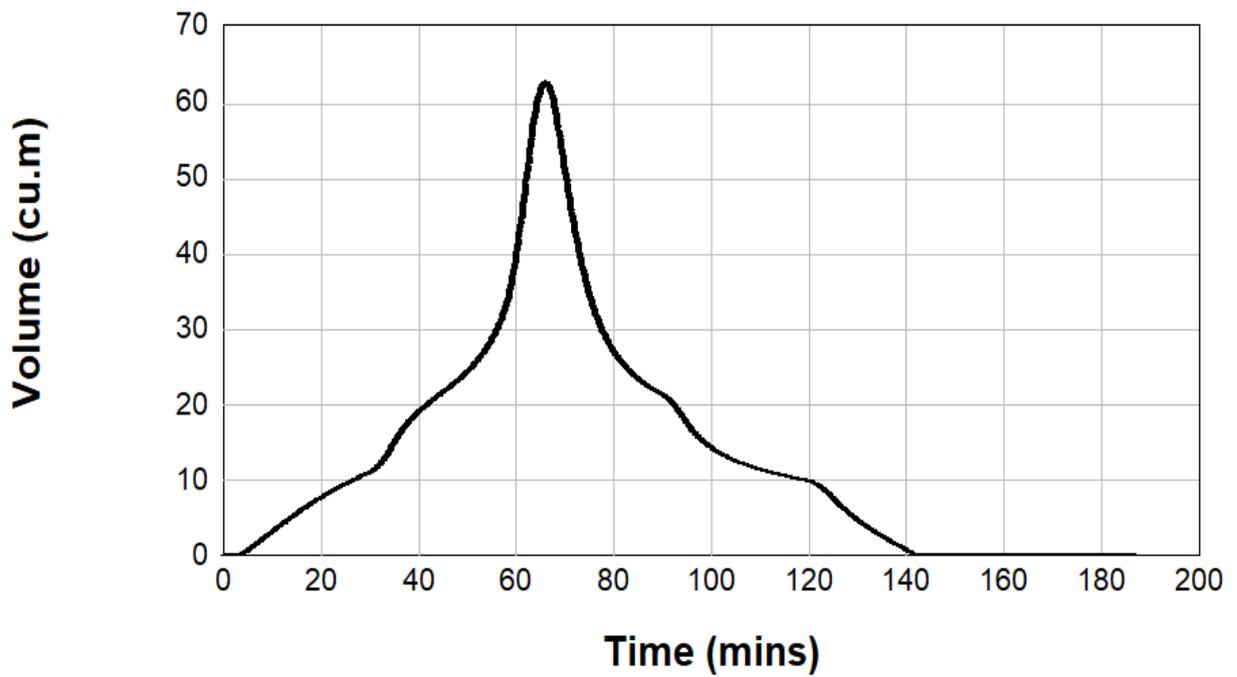
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Detention Inflow/Outflow – 1 year ARI Synthetic Storm

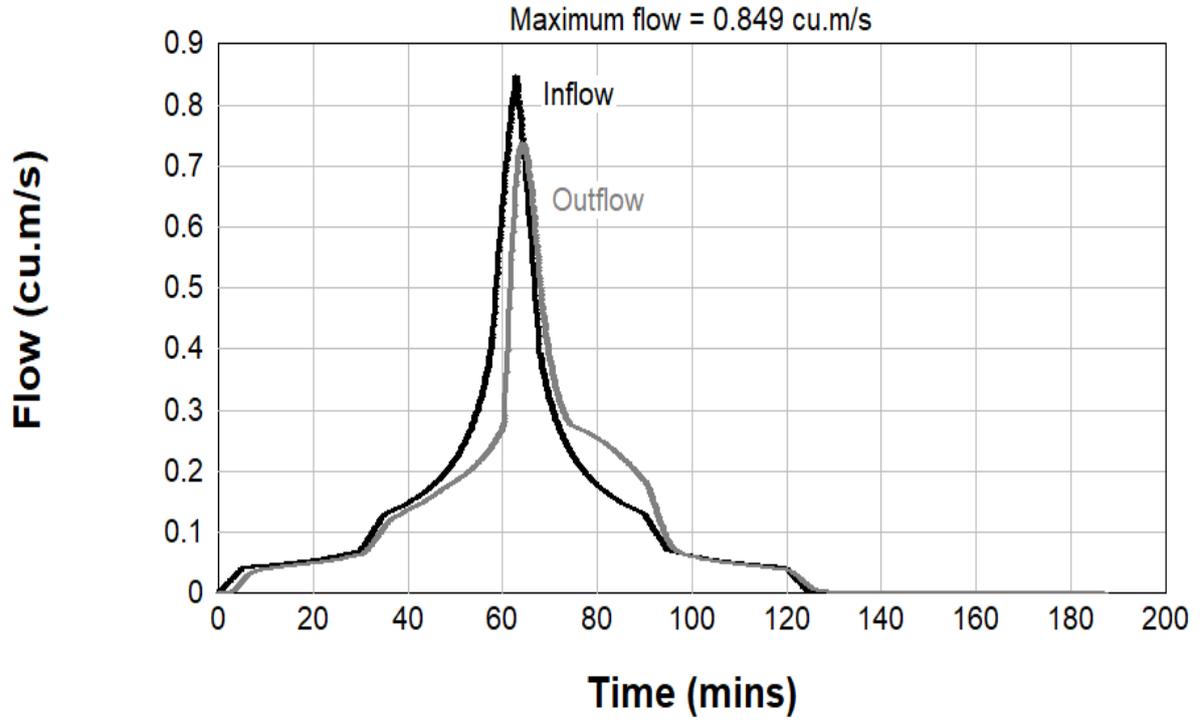


Storage Volume – 1 year ARI Synthetic Storm

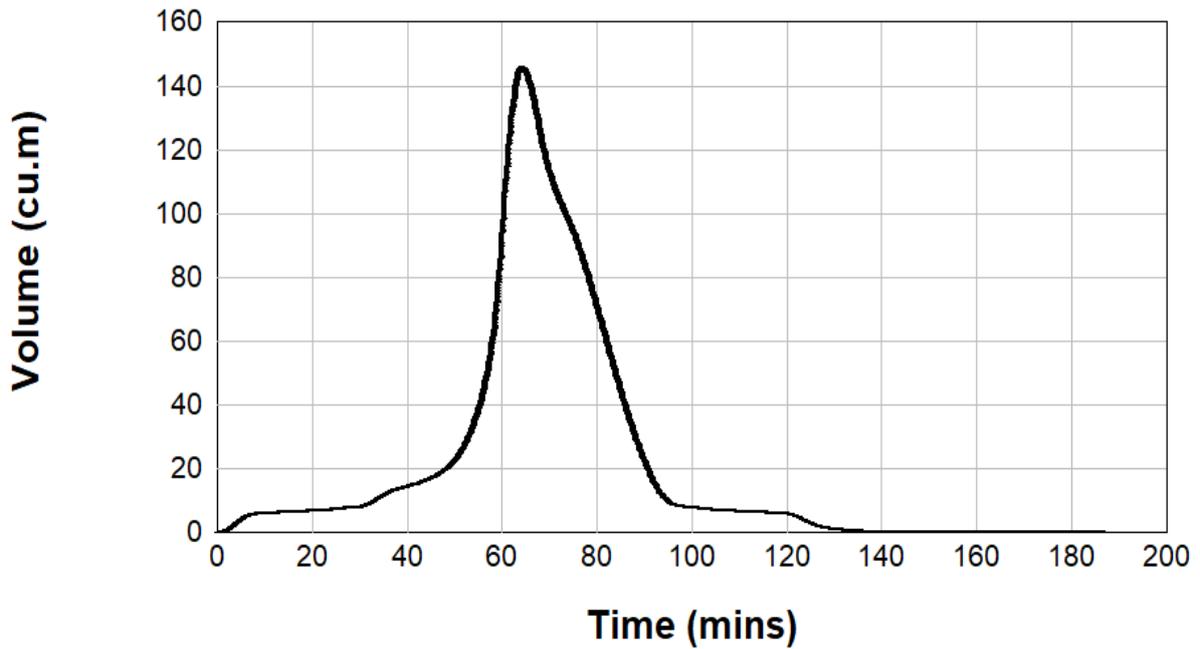


BSIN B – DRAINS OUTPUTS

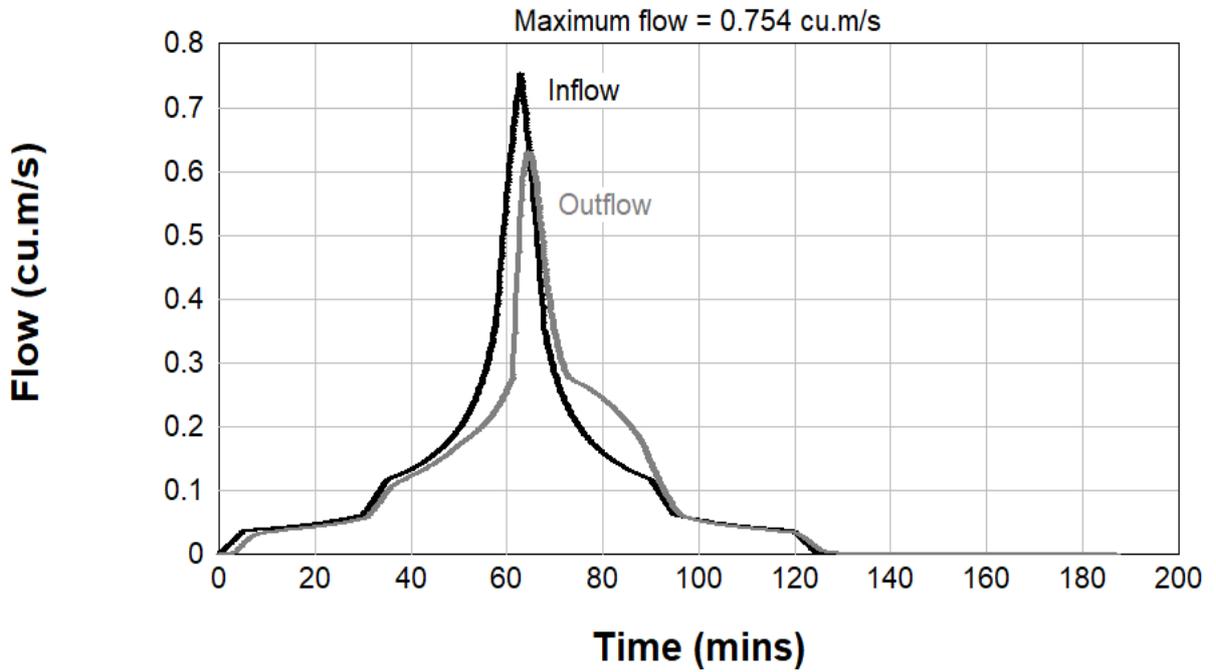
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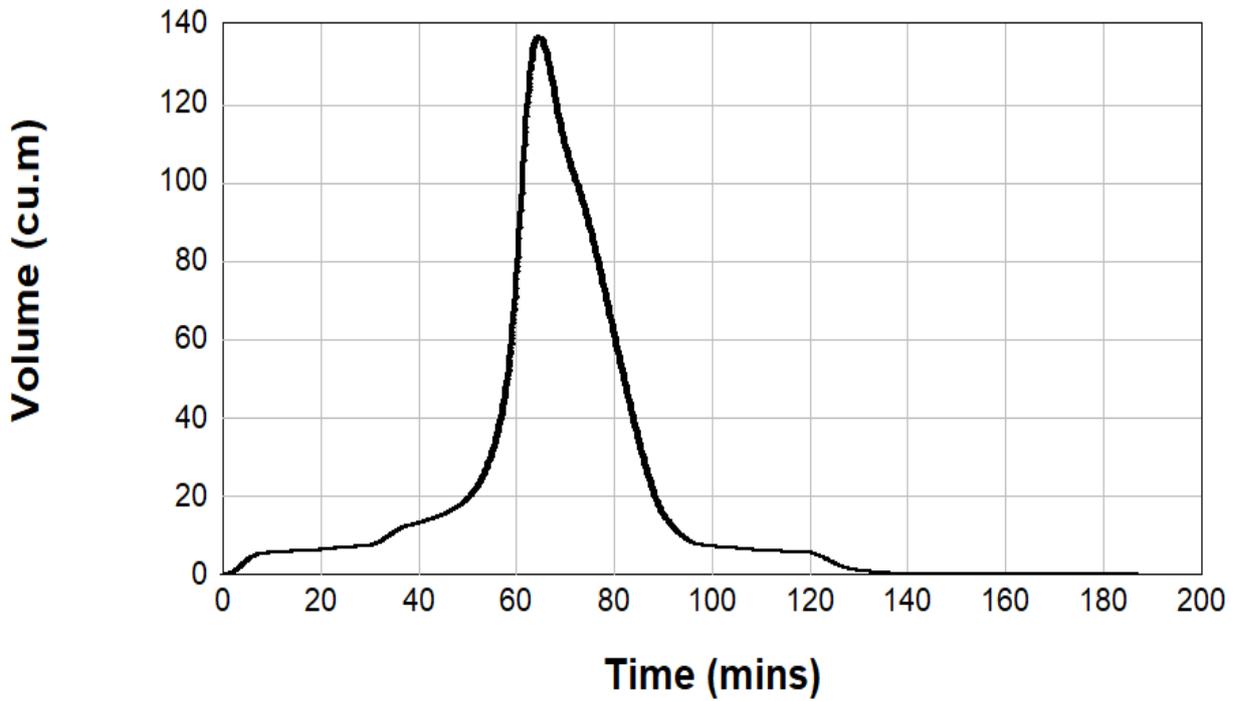
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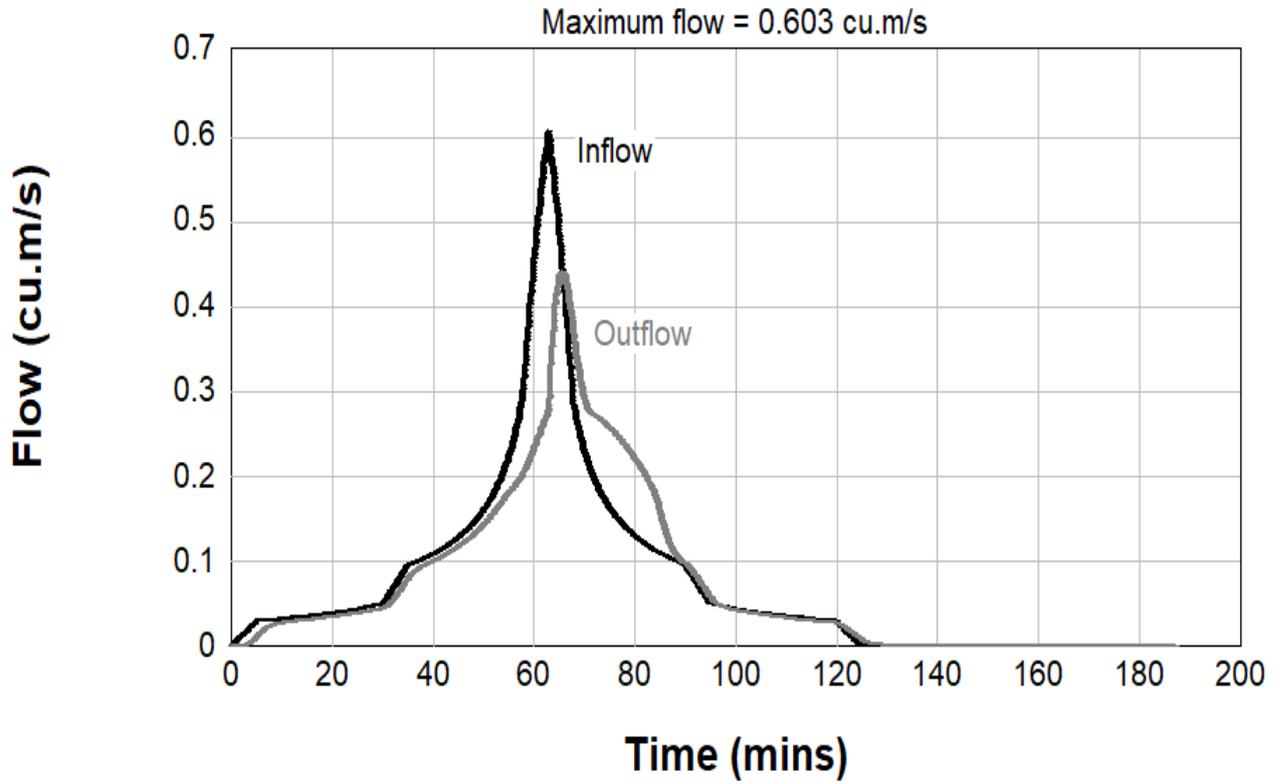
Detention Inflow/Outflow – 50 year ARI Synthetic Storm



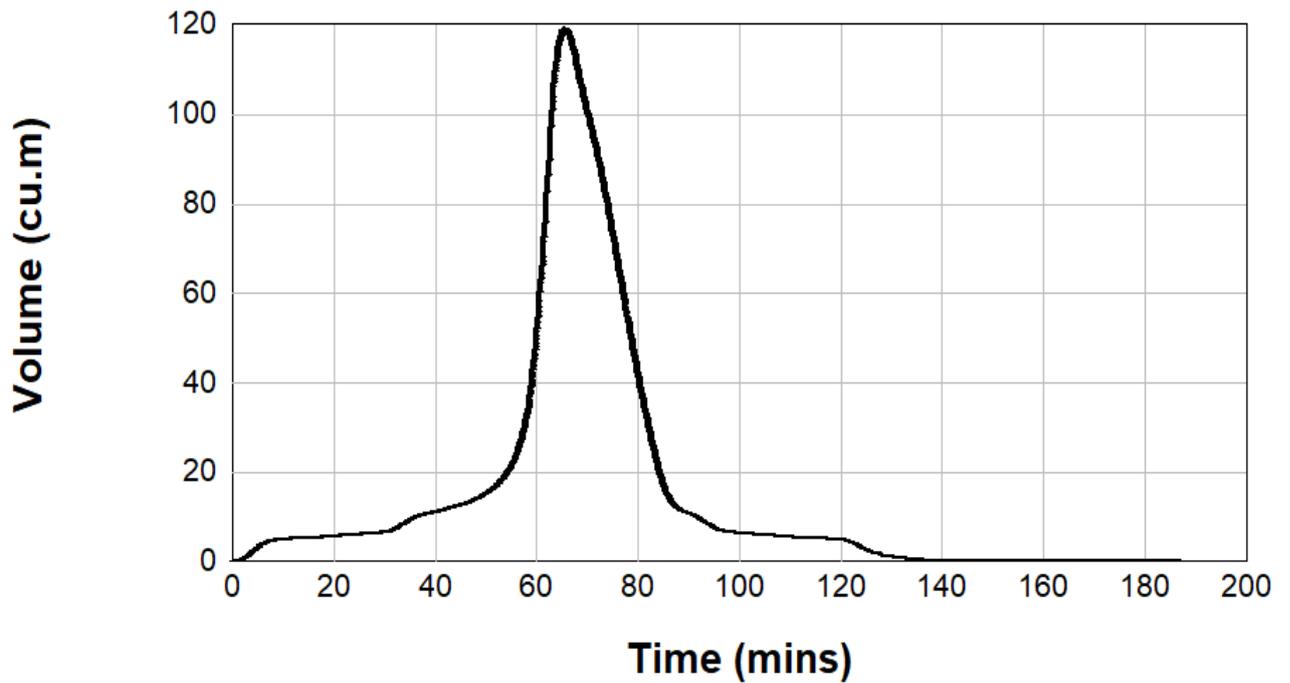
Storage Volume – 50 year ARI Synthetic Storm



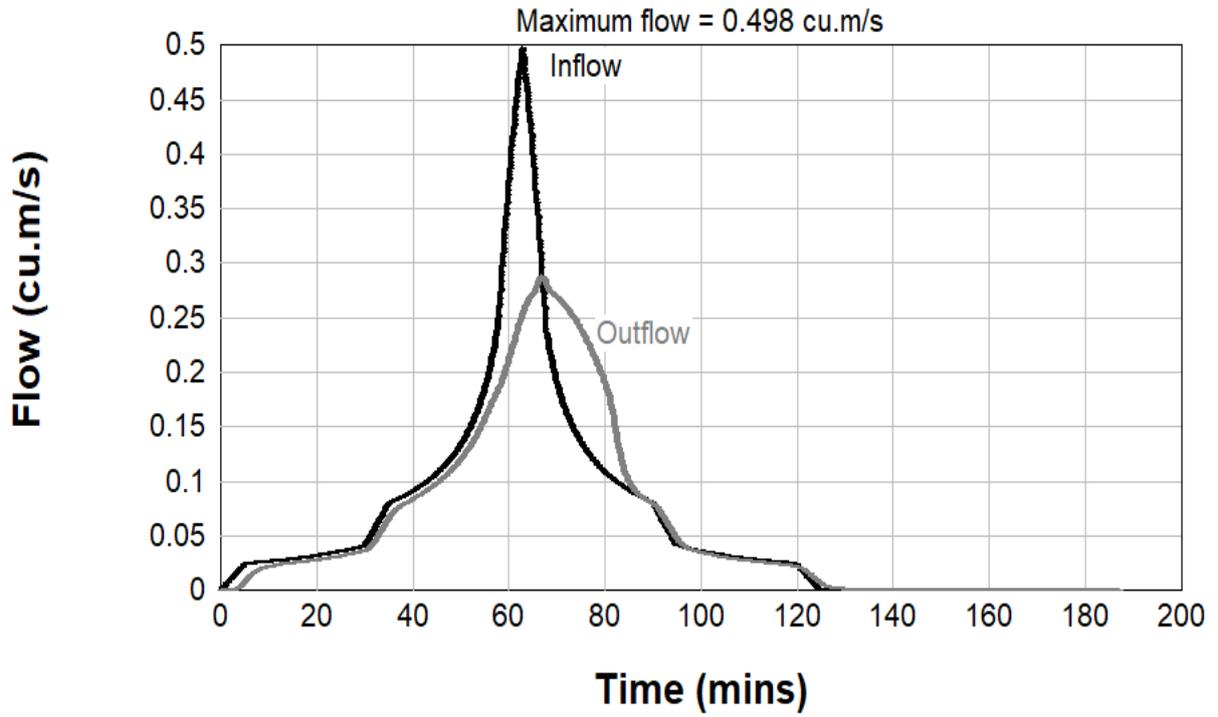
Detention Inflow/Outflow – 20 year ARI Synthetic Storm



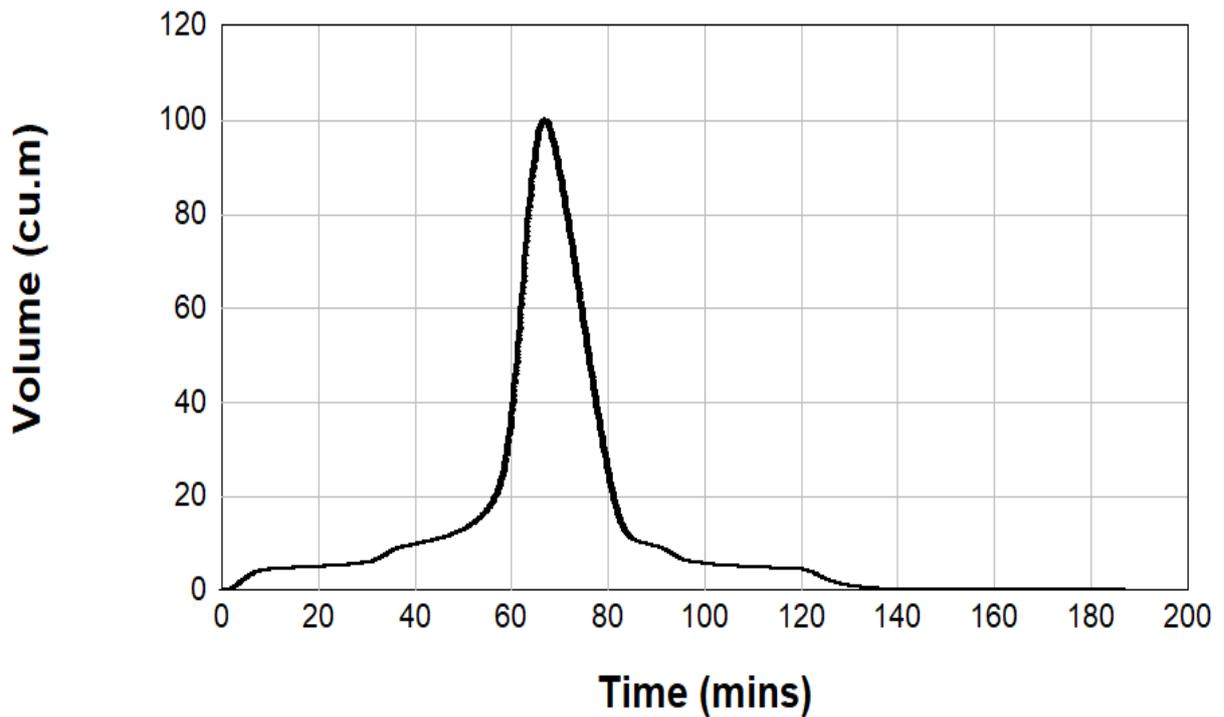
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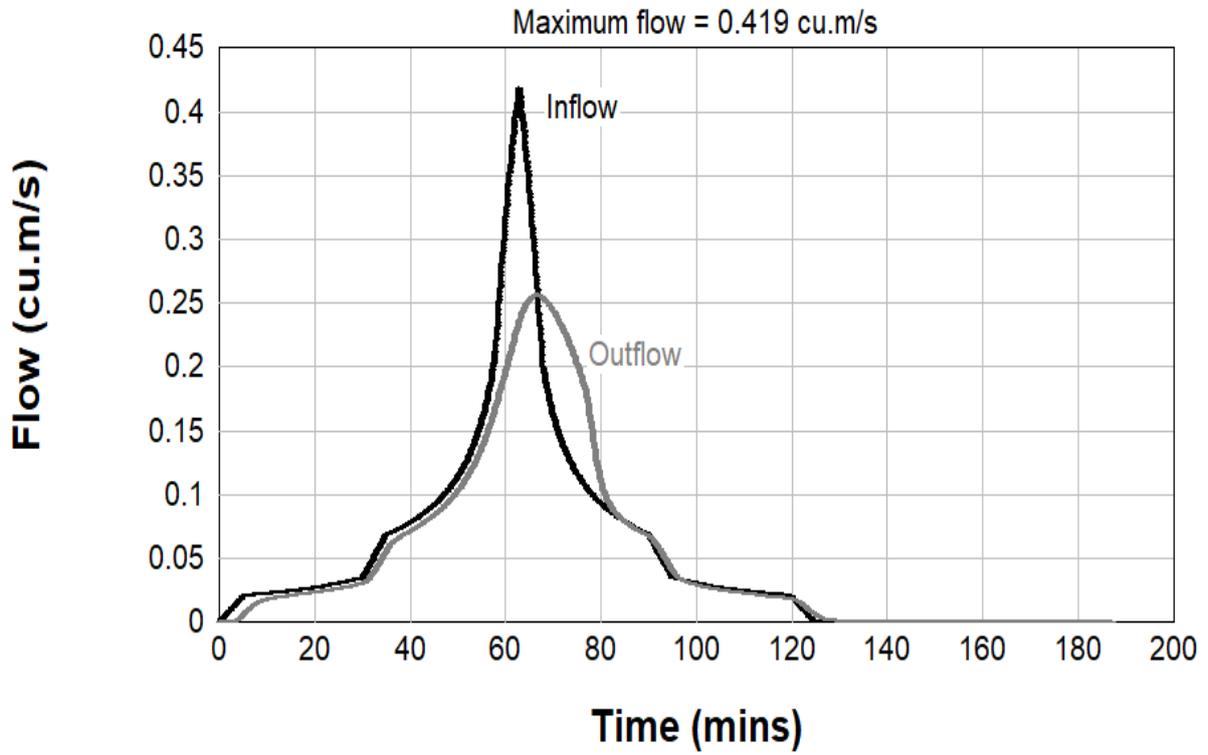
Detention Inflow/Outflow – 10 year ARI Synthetic Storm



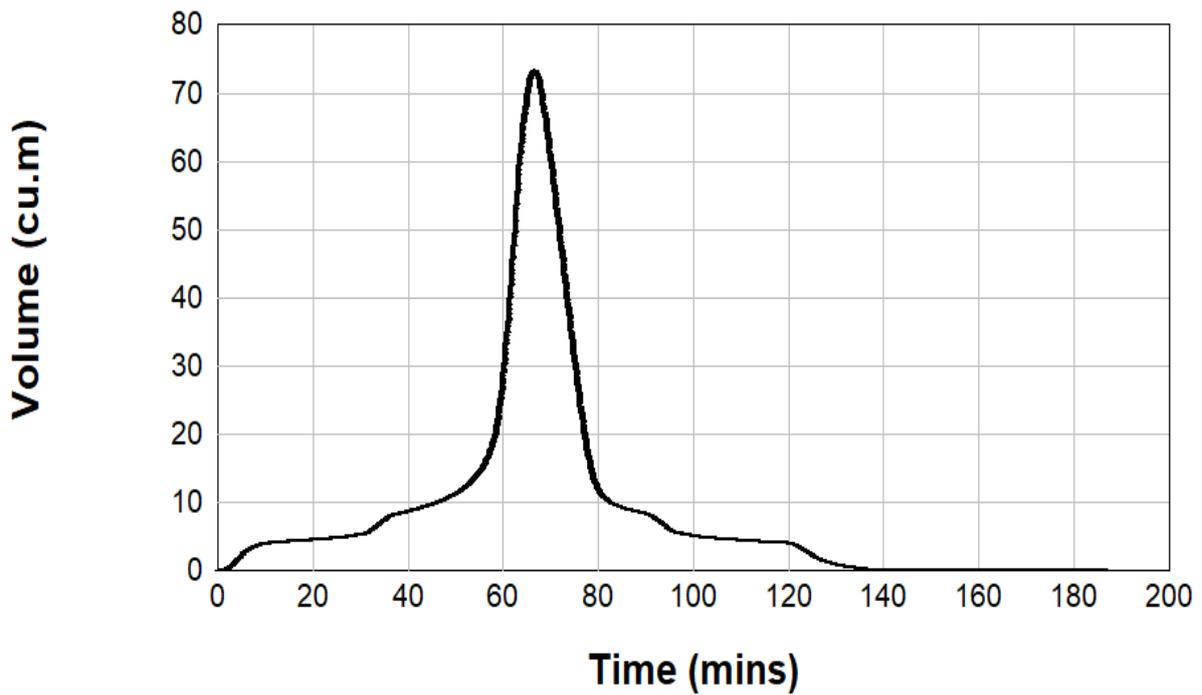
Storage Volume – 10 year ARI Synthetic Storm



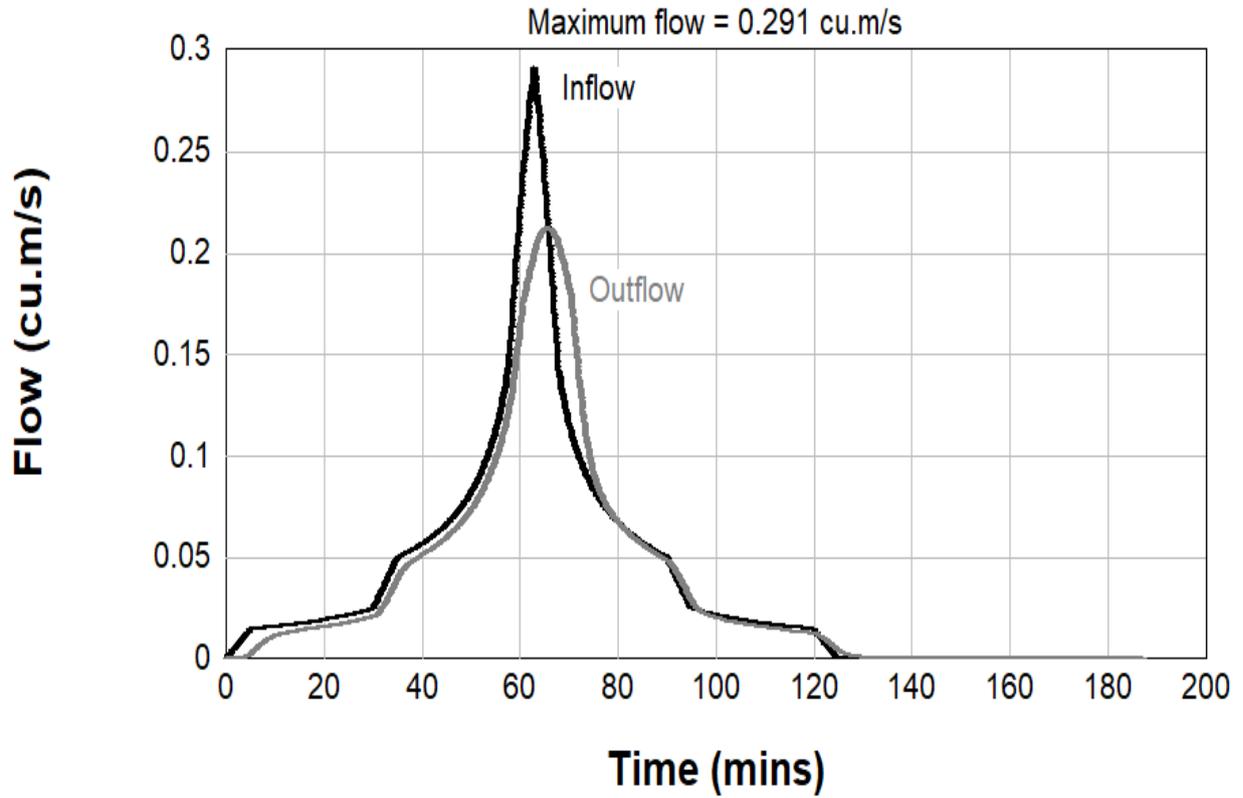
Detention Inflow/Outflow – 5 year ARI Synthetic Storm



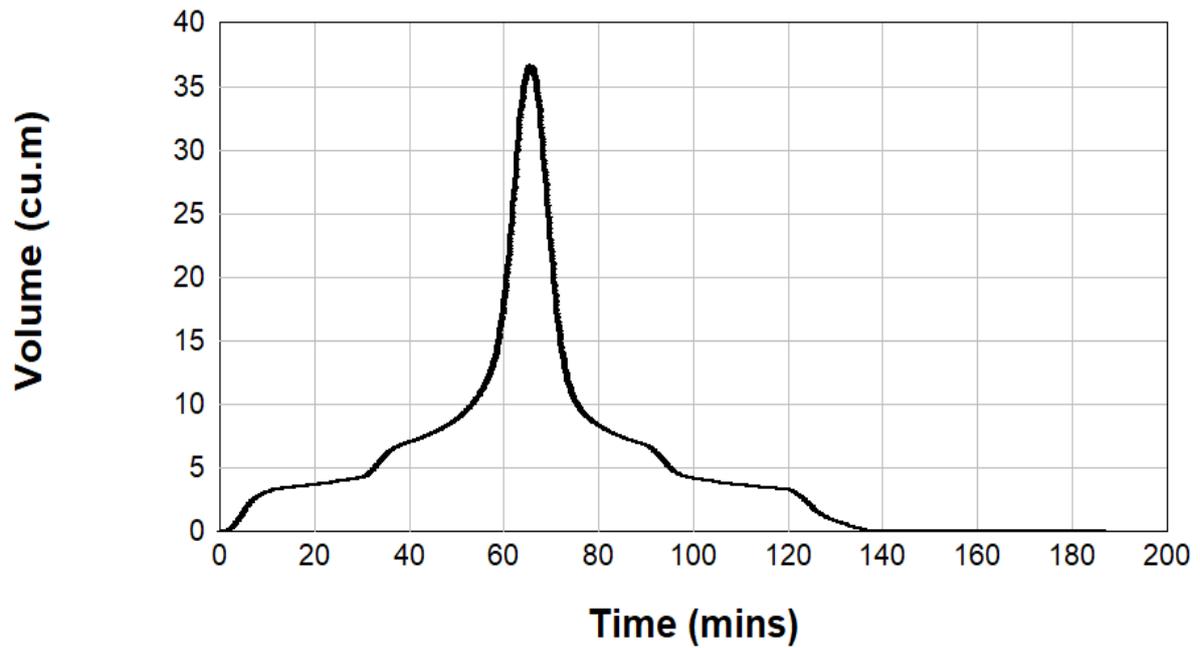
Storage Volume – 5 year ARI Synthetic Storm



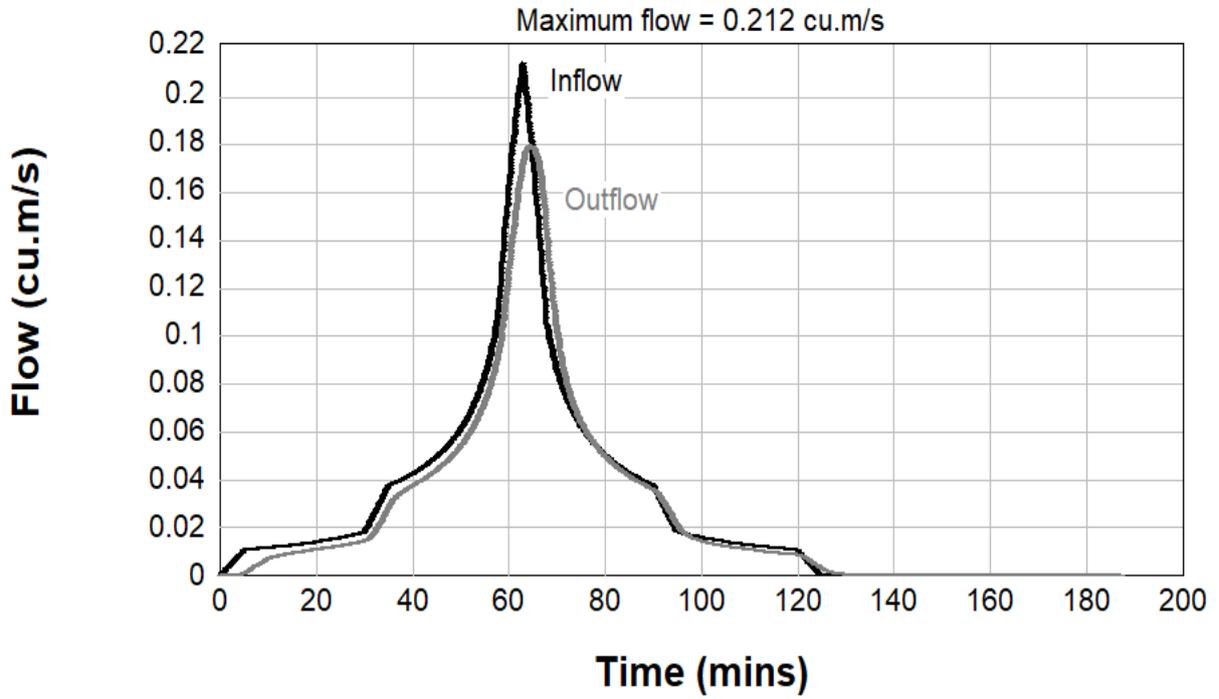
Detention Inflow/Outflow – 2 year ARI Synthetic Storm



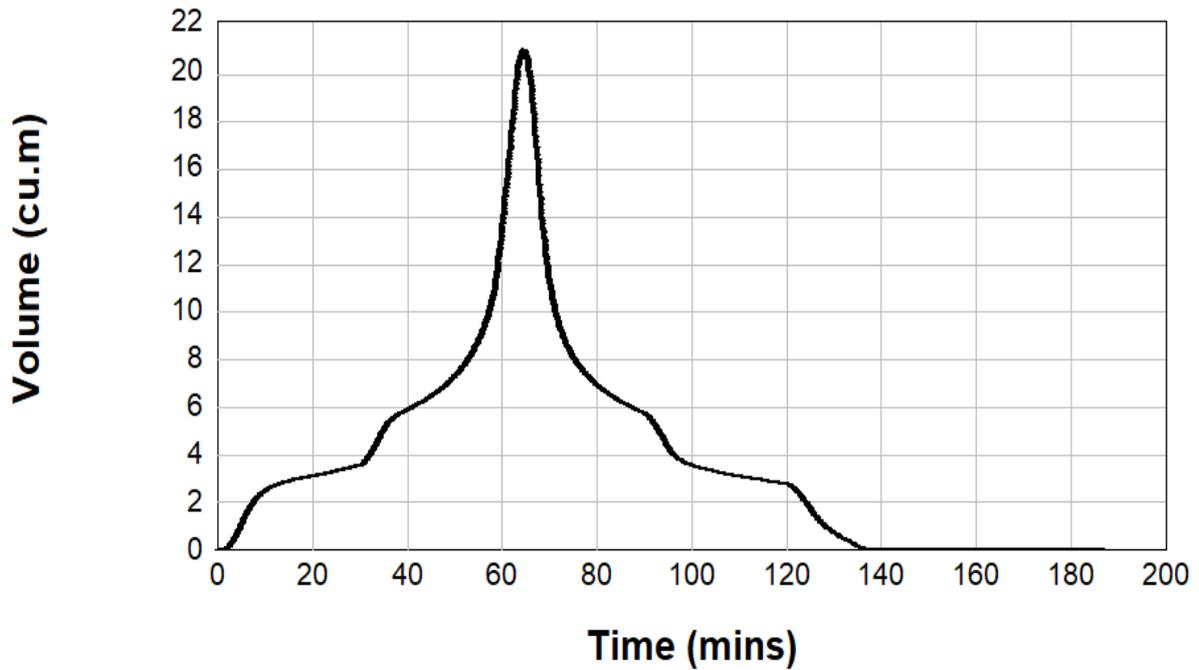
Storage Volume – 2 year ARI Synthetic Storm



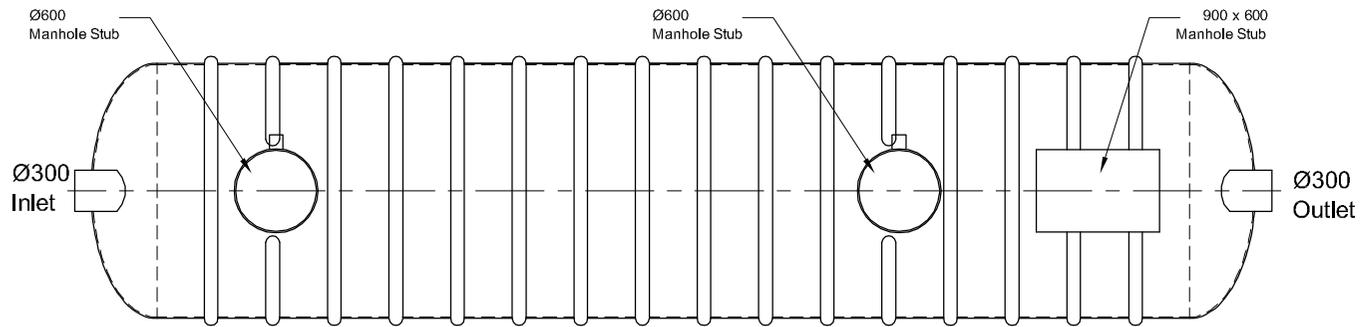
Detention Inflow/Outflow – 1 year ARI Synthetic Storm



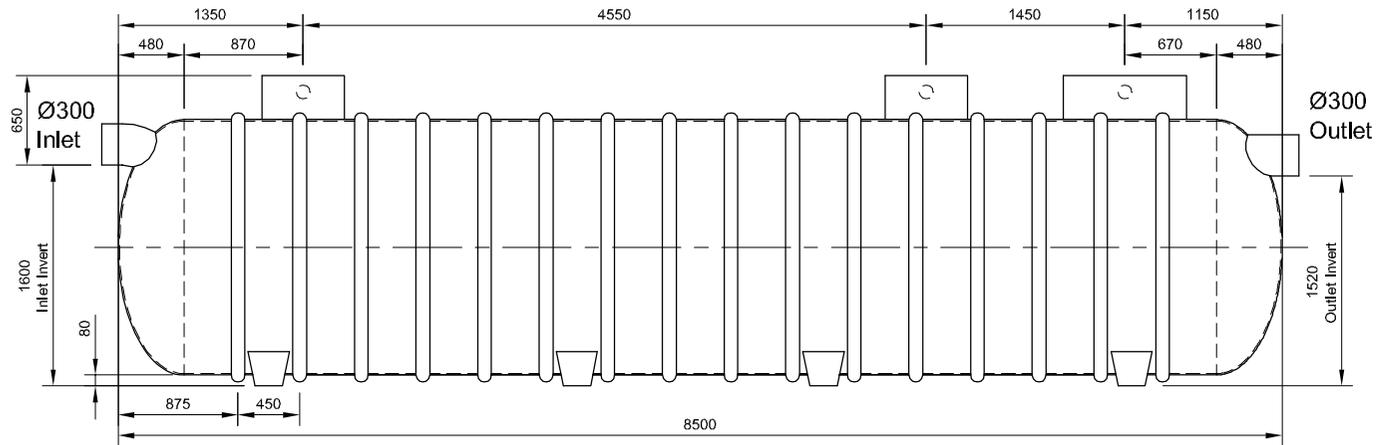
Storage Volume – 1 year ARI Synthetic Storm



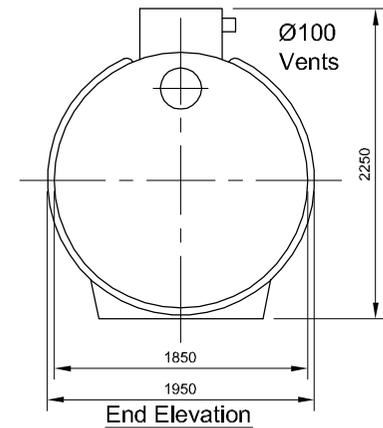
APPENDIX F – STORMWATER & OILY WATER TREATMENT SYSTEM



Plan



Elevation

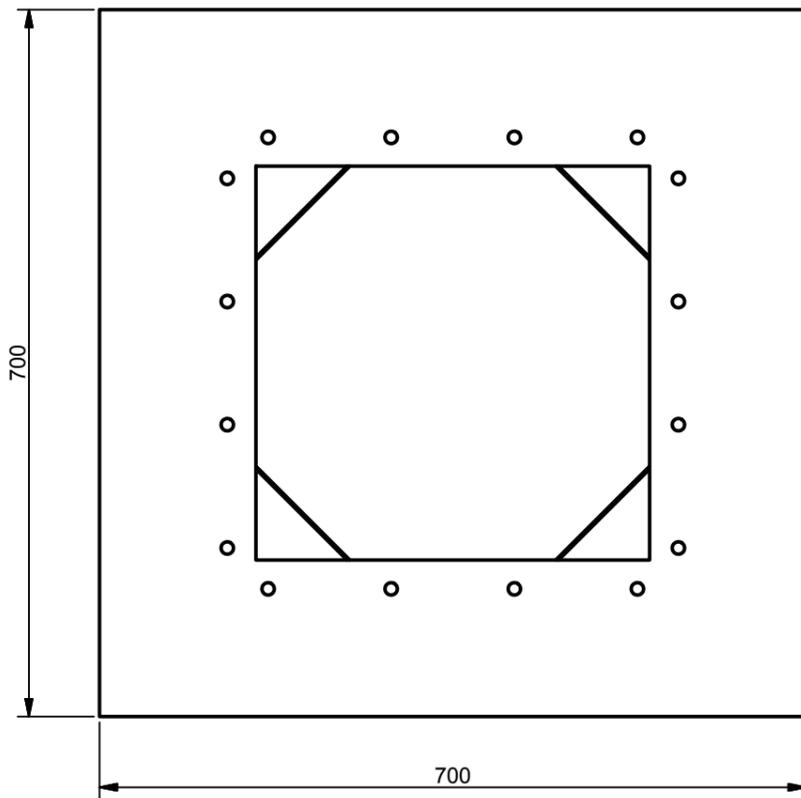


End Elevation

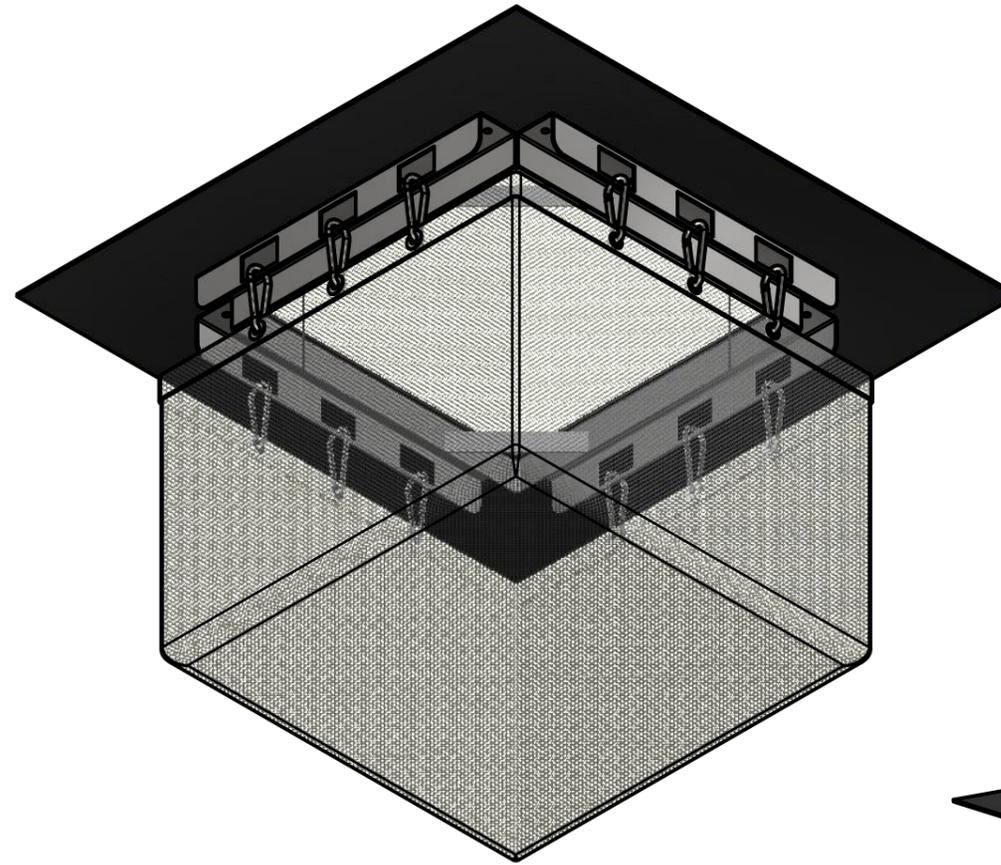
DATE	REVISION	BY				
16.10.08	Original Issue	MCW	SPEL ENVIRONMENTAL <small>"SOLUTIONS IN STORMWATER POLLUTION"</small>			
1.10.09	Revised Manhole & Rib Locations	CJG				
			PURCEPTOR Model P050.C1.2C.SC			
			DRAWN	CHECKED	SCALE	DRAWING NUMBER
			M.Watts	NEP	NTS	

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 Email: sales@spelproducts.com.au

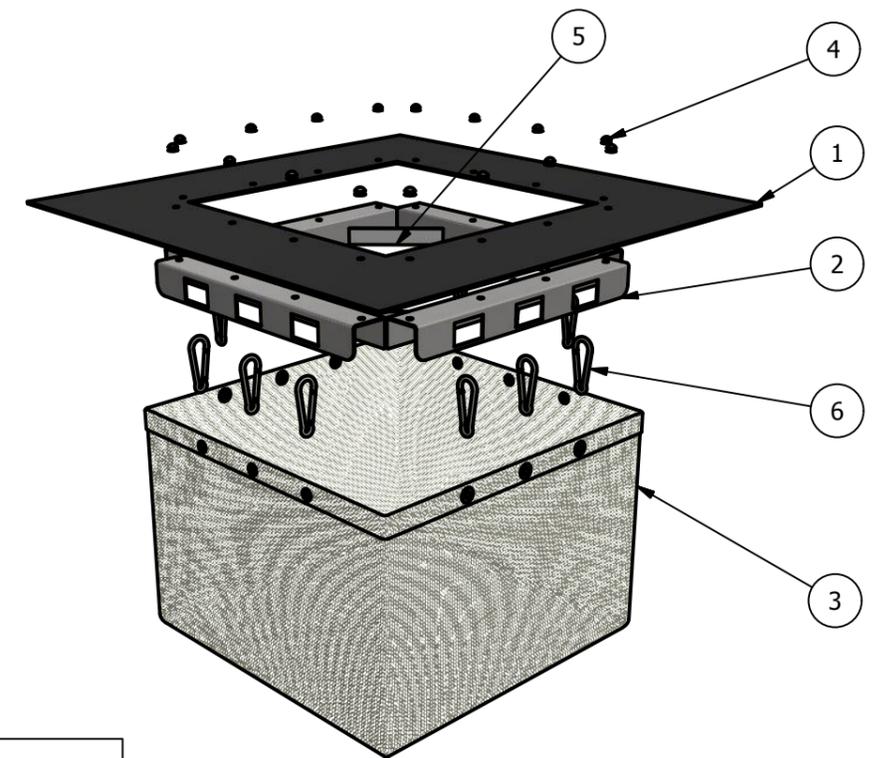
REVISION HISTORY				
REV	DESCRIPTION	DESIGNER	DATE	CHECKED BY
1	INITIAL RELEASE	M.M	25/03/2015	



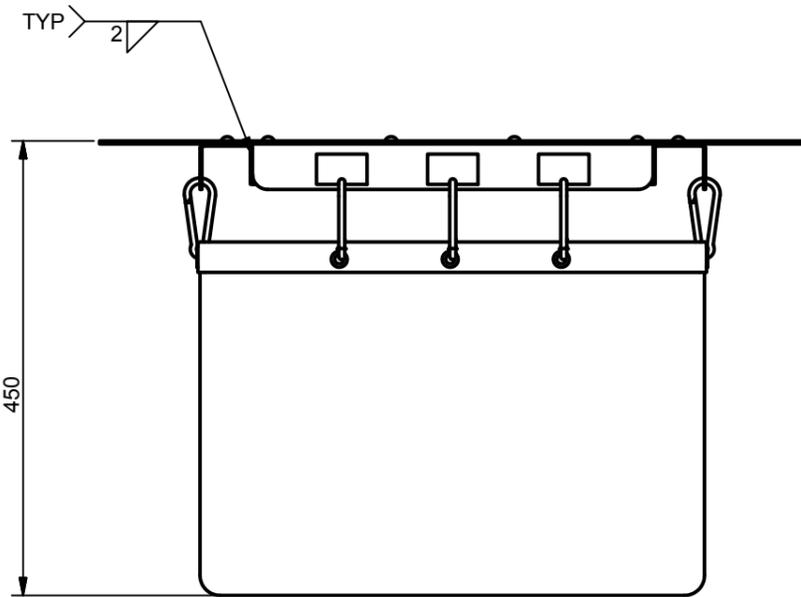
PLAN VIEW



**ISOMETRIC VIEW
BOTTOM VIEW**



**ISOMETRIC VIEW
EXPLOSION**



ELEVATION VIEW

PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	PLASTIC SHEETING	HDPE
2	4	SHEET METAL BENDING	STAINLESS STEEL 304
3	1	TEXTILE FABRIC & MESH LINER	HDPE
4	16	BLIND RIVIT 7 DIA.	STAINLESS STEEL 304
5	4	CORNER ESTIFFENER - FLAT BAR 25 x 2 - 141 LG	STAINLESS STEEL 304
6	12	CARABINER CLIP 6	ALUMINIUM

CLIENT:

DISTRIBUTOR

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Drawn M.M	Date 25/03/2015
CHECKED BY	Date
Verified	Date
Approved	Date
Customer Code :	

100 Silverwater Road Silverwater NSW 2128
 PH: 1300 773 500 | E: sales@spel.com.au
 www.spel.com.au

TITLE SPEL STOMSACK FRAME 600 x 600 BASKET MOUNTING ASSEMBLY DRAWING			
REQUEST No. D20194	SIZE A3	SHEET 1	REV 1
SCALE N.T.S		DWG No. SP15-BB4610-S	

**APPENDIX G – STORMWATER & OILY WATER TREATMENT SYSTEM
MANAGEMENT PLAN**

SPEL Separator Commissioning Operation and Maintenance

SPEL

Puraceptor Class 1

Operation and Maintenance Manual

Introduction

Congratulations on your purchase of a SPEL Environmental Stormwater Quality Improvements Device. With proper care and by following a few simple guide lines your system will give you many years of dependable service.

Important

Only qualified personnel should maintain, operate and repair you Stormwater system. Any wiring of equipment should be performed by a qualified electrician.

Warning

Operation may cause injury. Take all necessary precautions, wear protective equipment, refer to Engineers Department. For your own safety, read all instruction manuals prior to working on equipment.

Safety Precautions

- Follow all “occupation, health and safety” regulations.
- Ensure maintenance personnel are aware of “Confined Spaces” guidelines, which must be followed.
 - Make sure that there is sufficient oxygen and that there are no poisonous gases present.
 - Check the explosion risk before welding or using electric hand tools.
 - Do not ignore health hazards. Observe strict cleanliness.
 - Ensure that the lifting equipment (where required) is in good condition.
- All personnel who are to work with these systems should be vaccinated against diseases that can occur.
 - Keep a first aid kit handy.

Health & Safety

Maintenace should be carried out by a competent contractor in accordance with the above procedures.

Health and Safety at Work legislation and good building practice.

A warning notice should be visible at the top of each access shaft - ‘danger, harmful fumes’ and ‘ respirators should be worn in this tank.’ Before entering persons must be qualified in accordance with ‘confined space’ requirements



Information contained in this data sheet is approximate and for general guidance only. In accordance with the companies policy of constant improvement and development SPEL Products reserves the right to change the specification without prior notice.

SPEL Puraceptor Class 1 **Operation and Maintenance Manual**

Service Stations

Fuel Depots

Windfarms

Switchyards

Sub Stations

Power Stations

Industrial Locations

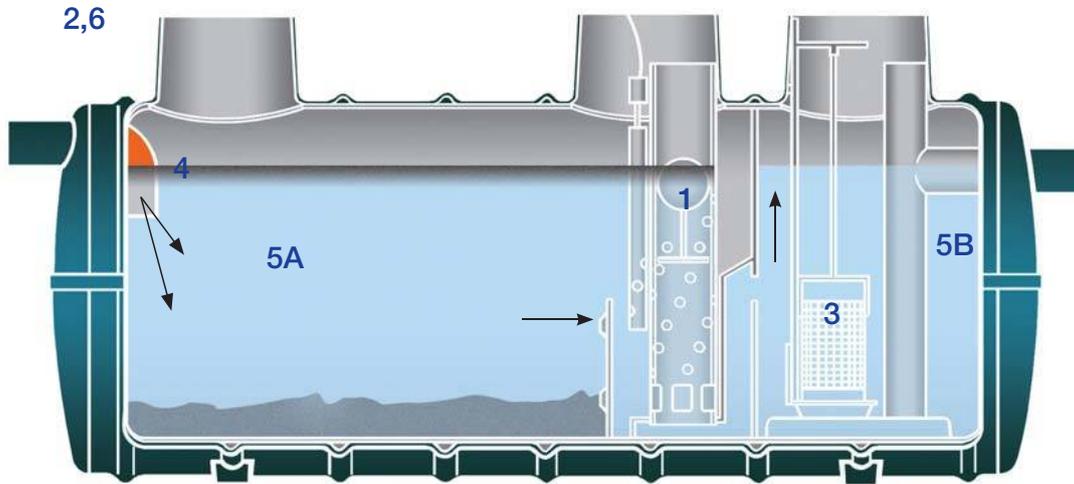
Contents

SPEL Puraceptor - How it works	page 2
SPEL Puraceptor Maintenance	page 3
SPEL Coalescer Units	page 4
SPEL Auto Closure Device	page 5
SPEL Oil Alert System	page 6
Spare Parts List	page 8

SPEL PURACEPTOR™ CLASS 1

Oil containment

“How it works”



SPEL PURACEPTOR™ is a **FULL RETENTION** separator that treats all flows and is sized to contain more than the anticipated maximum oil spillage enabling it to be fully operational at all times.

It has two chambers, a coalescer and is fitted with an automatic closure device specifically designed to treat and contain major oil spills thereby making it suitable for high risk applications.

It achieves a water discharge quality of 5mg light liquids per litre complying to European Standard BS EN 858.1. 2006. Treatable flow rates range from 2LPS to 200LPS. Pipe sizes range from 100mm to 450mm (larger sizes on request).

Careful and proper planning by corporate Australia and government bodies is essential when designing and implementing systems that are effective in protecting our environment. The proven and independently accredited SPEL PURACEPTOR™ (complies to European Standard BS EN 858.1 2006) is an Australian made stormwater treatment and oil containment device that can contain and prevent light liquid pollutants from discharging into our waterways.

1 AUTOMATIC CLOSURE DEVICE

The AUTOMATIC CLOSURE DEVICE (A.C.D.) is a precisely engineered device comprising a water-bouyant ball that is sensitive to any change in the water density as a consequence of light liquids build up, thereby automatically activating a process of depressing the A.C.D. to SHUT OFF the separator, preventing pollutants from discharging to drains and waterways.

2 FULL RETENTION

All liquid is treated. There is no by-pass operation.

3 COALESCER EQUIPPED

Provides a coalescing process for the separation of smaller globular of light liquid pollutants to reduce the light liquid content in the outlet to **5mg/litre or less**.

4 INLET DIP PIPE - FLAME TRAP

For minimum turbulence and to prevent fire and inflammable vapours passing through to the drainage system.

5 TWO CHAMBER

A non-turbulent flow through two horizontal treatment chambers, utilising the underflow principle to retain light liquids in all flow conditions.

A. CONTAINMENT CHAMBER: Where Total Suspended Solids (TSS) silt, sediments, sludge and gross pollutants are trapped and settle on the chamber floor and where light liquids are contained.

B. COALESCER CHAMBER: Where light liquids separation is enhanced reducing it to **5mg/litre** or less prior to discharge.

6 GRAVITY OPERATED

Will function in the event of power failure and fits into existing pipe drainage systems or new sites.

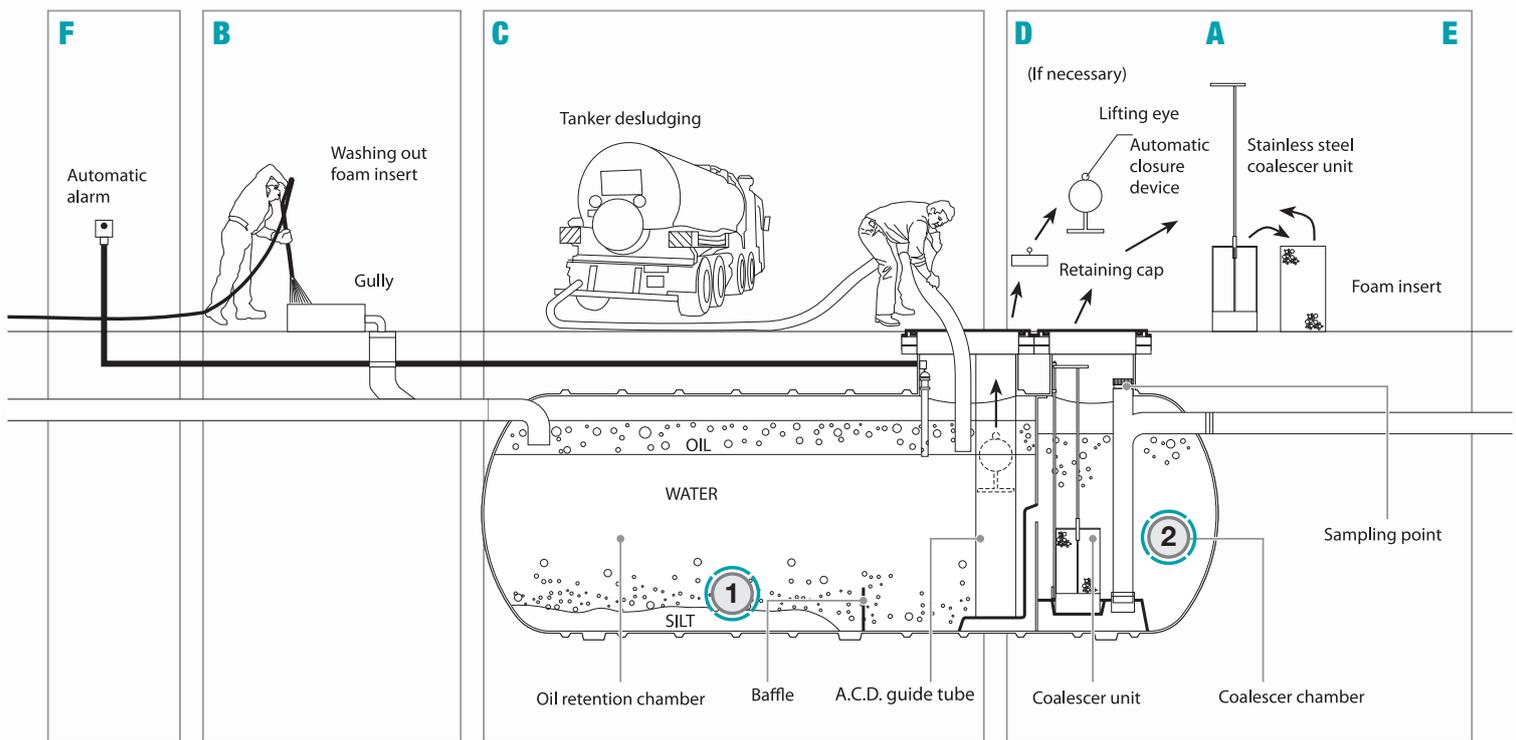
7 MAINTENANCE

Easy and safe with no entering of the tank required.

SPEL SPEL PURACEPTOR™

Puraceptors™ should be inspected at three - six - or twelve monthly intervals depending on site conditions, to determine the depth of retained pollutants and silt in both chambers and the correct operating of the ACD (automatic closure device). When the depth of the oil/fuel retained has reached the predetermined design level, (approx. 50mm) or after a spill it should be cleaned out.

- 1 CONTAINMENT CHAMBER:** Where silt, sediments, sludge, gross pollutants settle out and light liquids are retained. The auto closure device operates in its retaining tube next to the oil alert sensor probe.
- 2 COALESCER CHAMBER:** Where light liquids separation is enhanced prior to discharge and where the coalescer unit is incorporated, the coalescer should be removed and cleaned in accordance with the requirements set out in the coalescer data sheet.



MAINTENANCE PROCEDURE

A Coalescer unit

Use the lifting handle or the chain and lift the coalescer unit out of the tank and place it near the Puraceptor™. In a retained area so pollutants do not escape.

B Cleaning foam insert

Remove foam insert and wash with normal water pressure ensuring the dirty water runs into the Puraceptor™.

Important note:

When cleaning out, ensure both chambers are sucked out equally starting with the first chamber and then the second chamber and back again. Ensuring even water pressure against baffle wall.

C Sucking out oil/fuel and silt

Suck off the retained oil from both chambers of the Puraceptor™ and then the silt deposited on the bottom, leaving sufficient water to ensure the (auto closure device) ACD remains floating.

D Sucking out complete contents (if necessary)

If the quantity of pollutants exceeds recommended level, the complete contents of the Puraceptor™ may need to be removed. After sucking out completely, remove the ACD. Using a pole with a hook, lift out the ACD using the lifting eye on the float, if fitted.

E Re-insert coalescer unit and ACD

Re-insert the foam insert into the stainless steel coalescer unit and re-insert the coalescer unit into the Puraceptor™ as provided with the SPEL lifting/location/locking system.

Partially fill the Puraceptor™ with clean water (if necessary) to ensure the ACD when re-inserted remains floating. Re-insert the ACD.

Finally check the ACD is floating after it has been replaced to safeguard against its removal by unauthorised persons, unless depth of tank precludes doing so from ground level.

F SPEL automatic alarm/monitoring system

The SPEL automatic alarm/monitoring system probe should be lifted out of the probe protection tube, wiped clean and re-inserted. The system should now be reset according to instructions.

SPEL SPEL COALESCER UNITS

The SPEL Puraceptor™ Class 1 separator and the SPEL Stormceptor™ Class 1 by-pass separators incorporate coalescer units. The coalescer units provide a coalescence process for the separation of small globules of light liquid pollutants before final discharge to the surface water drain.

Coalescers are found in the second chamber of the SPEL Puraceptor™ and the second chamber of the SPEL Stormceptor™ Class 1

Prior to installation

1. Remove any strapping / ropes which have been used to hold the coalescer units from shifting in transit.
2. The access shaft(s) above the coalescer units should be covered to prevent ingress of concrete, dust, debris etc., which could clog the foam inserts.
3. On completion of installation, check that the coalescer unit is inserted securely into the base socket.

On heavily polluted sites silt and contaminants may build up in the coalescer unit foam inserts and add significantly to its weight. Use lifting chain sets that are on hooks at ground level for safe lifting with a tripod or hoist.

Installation

During installation, it is important that the foam inserts are not clogged with dust, debris or drops of wet concrete. To safeguard against this, we recommend covering the access shaft with a sheet of polythene, if not already covered.

Commissioning

On completion of installation, check the foam insert is fitted inside the stainless steel coalescer unit and the coalescer unit is inserted securely into the base socket.

Maintenance

1. Lift handle and coalescer unit out of the tank and place in a retained area so pollutants do not escape.
2. Remove foam insert and wash with normal water pressure ensuring the dirty water runs into the Puraceptor™ / Stormceptor™.
3. Make sure the hole in the centre of the coalescer foam is facing towards the manhole when installed in the tank.
4. Re-insert the foam insert into the stainless steel coalescer unit and re-insert the coalescer into the Puraceptor™ / Stormceptor™. After the tank has been cleaned.

SPEL COALESCER UNITS GUIDE RAIL SYSTEM/LIFTING, LOCATING AND LOCKING SYSTEM

SPEL coalescer unit guide rail system

This facilitates easy insertion and removal of coalescer units. The system is robust, manufactured throughout in stainless steel and is action positive, leaving no doubt the coalescer unit is located properly.

Brackets fixed to the top and bottom of the coalescer unit simply engage the stainless steel guide rail fixed to the top of the stub access shaft. The coalescer is then lowered in the normal way, being guided at the correct angle into the conical base unit which finally locates the coalescer unit into its final position.

Extension guide rails can be incorporated into the SPEL extension shafts to suit (preferably when ordered with the separator).

However, when the separator is full of water, debris or sludge accumulated over a period could prevent the coalescer unit from re-seating correctly after servicing.

The coalescer unit lifting / locating / locking system ensures the coalescer unit is seated correctly and can be locked into position to prevent tampering.

The stainless steel lifting handle can be extended to suit deep tank invert and provide easy access for lifting manually or with a tripod and hoist utilising the lifting hook.

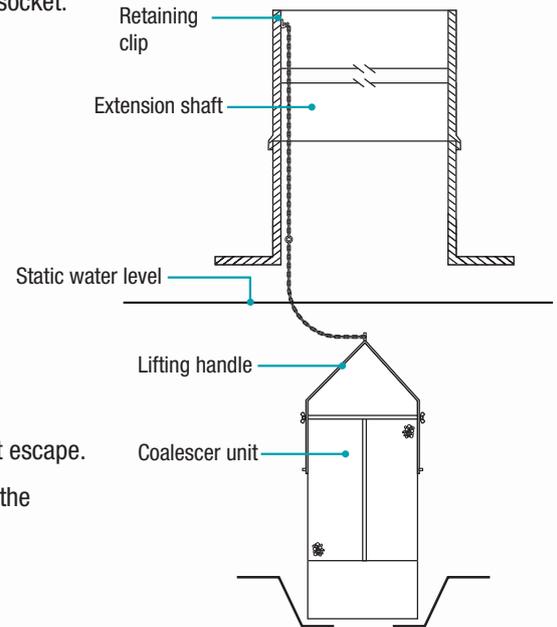


Figure 1. Coalescer unit with lifting chains

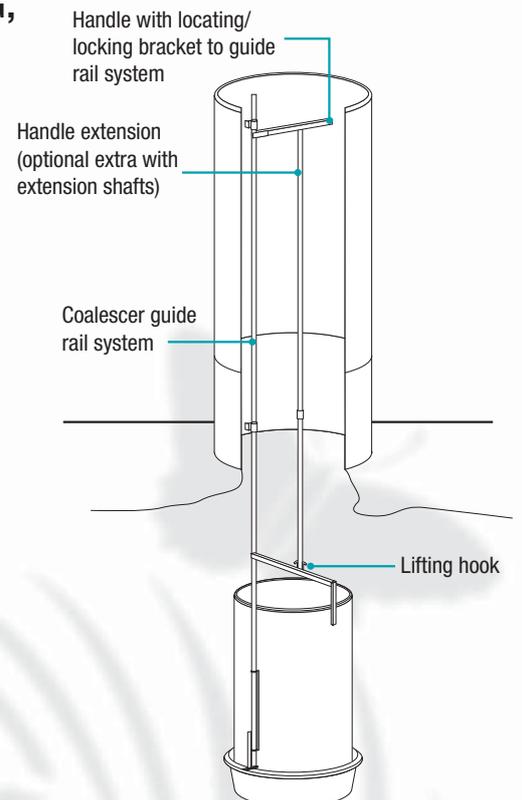


Figure 2. SPEL coalescer unit guide rail system/lifting, locating and locking system

• **SPEL ACD**The Automatic Closure Device (ACD) is found in the first chamber of a Puraceptor™. The purpose of the ACD is to close the separator off automatically when the maximum storage capacity of light liquid is attained.

The ACD is to ensure that in the event of a major spillage, pollutants do not pass into the drainage system; it should not be regarded as a substitute for an automatic alarm / monitoring system.

Prior to installation

Prior to installation the ACD retaining tube should be covered to prevent ingress of concrete etc., which could fall onto the ACD and upset it's calibration.

Operation and Maintenance

If the tank should fill with light liquid, the ACD which is calibrated for a specific gravity of 0.85, will automatically sink and close off the SPEL Puraceptor™.

Normally routine maintenance would include removing light liquid intercepted within the Puraceptor™. If a SPEL automatic alarm / monitoring system is incorporated, it will automatically indicate when the Puraceptor™ should be emptied. Only in an emergency will the Puraceptor™ fill to it's maximum and operate the ACD.

In such an event the Puraceptor™ should be completely sucked out and the ACD lifted out. Check that the ACD is in good working condition – ie. Lifting hook secure and sealed; float not leaking; knuckle joint free and clean; sealing ring intact and complete. Clean with warm soapy water before re-inserting.

To re-insert the ACD, partially fill the Puraceptor™ with clean water (if necessary) to ensure the ACD when re-inserted remains floating. Re-insert the ACD.

Finally check the ACD is floating after it has been replaced.

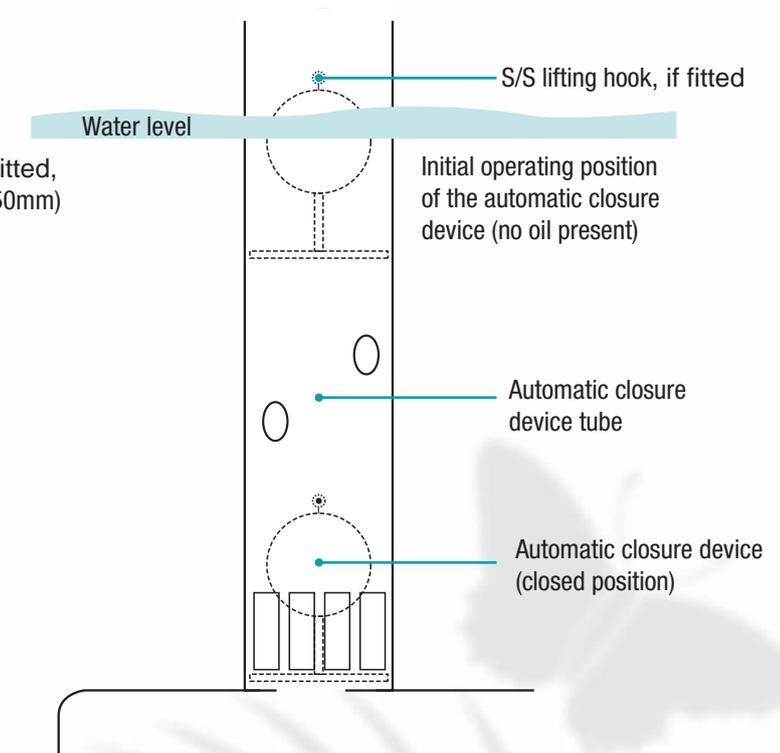
Automatic closure device SPEL Puraceptor™ Class 1 separators (two chamber)

SPEL Puraceptor™ Class 1 separators – Two Chamber Models

Commissioning

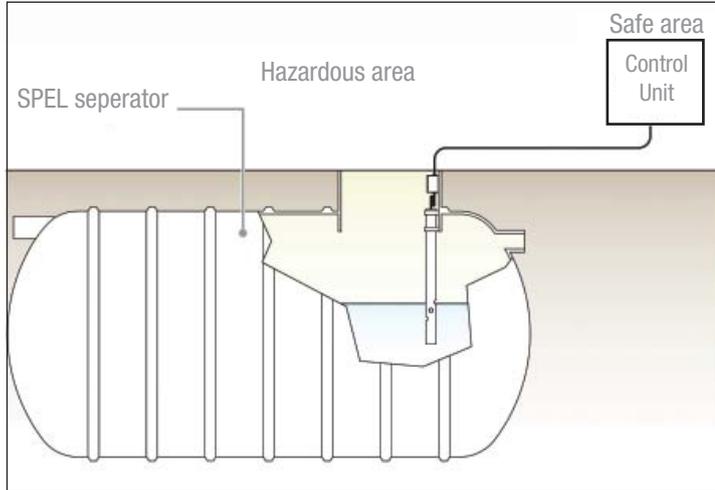
After the tank has been installed, leave the water in.

1. Remove the ACD from the packing box, taking care not to cause damage.
2. Insert the ACD into the retaining tube using the lifting eye, if fitted, ensuring it floats correctly with the float (top section approx. 50mm) just visible above the water level.



The SPEL automatic alarm/monitoring system provides a audible warning alarm when the level of the oil in the SPEL separator reaches approximately 10% of the storage volume under static liquid level conditions. This is a early warning system that is used for spills or lack of maintenance.

The system comprises of a probe mounted in the main separation chamber which senses when the designed volume of light liquids has accumulated and sends a signal to the electronic control unit activating a red 'empty now' warning light and an audible alarm,



Operation

The probe is freely suspended in the probe protection tube in the separator at the correct level. When the oil-layer or depth of hydrocarbons reaches the predetermined level, the top of the probe will be immersed in the oil, breaking the circuit and activating the alarm. It is a 'fail-safe' system providing complete assurance that it is operative. If a fault occurs it will be signalled immediately.

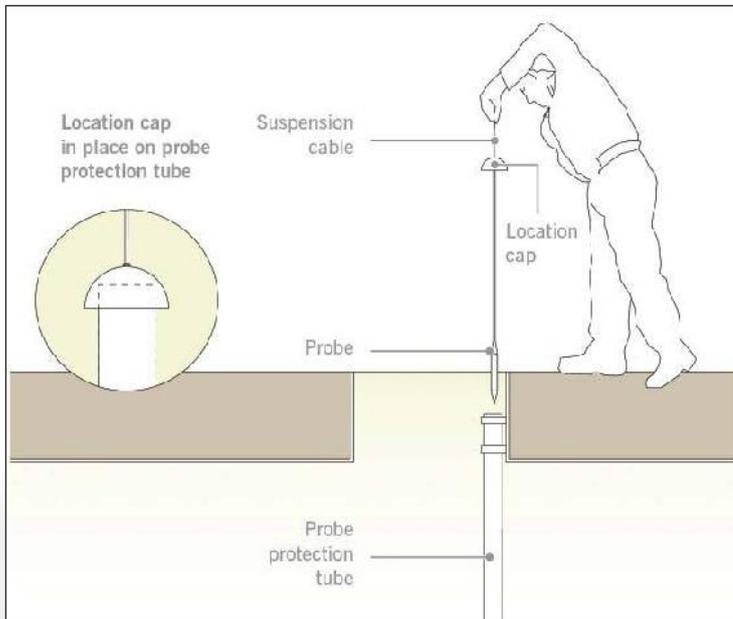
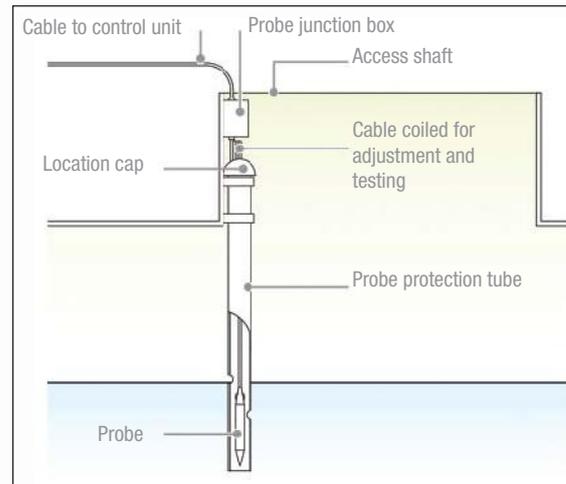
Installation

Control unit (general positioning)

The control unit has been designed to be located indoors and outdoors, within a nonhazardous area. It should be wall mounted and positioned such that the LED display and push switches on the front panel can be readily seen and accessed. The unit can be secured to the wall by using the four mounting holes provided. Included within the control is an intrinsically safe circuit (approved according to ATEX Directive 94/9/EC), to which the probe unit is connected.

Maintenance

When the separator is maintained, lift the probe out of the probe protection tube, check it operates the alarm (see under Tests Ref. 10.2) and at the same time wipe oil and contaminants from the probe to prevent a fake alarm after re-inserting.



Insert probe onsite

The probe protection tube is factory fitted and the probe matched to ensure the alarm is activated when the light liquids reach approximately 10% of the storage volume the SPEL separator is designed for.

All that is required on site is to undertake the electrical installation in accordance with the instructions provided and lower the probe with the pre-fixed location cap into the probe protection tube. When the cap locates onto the top of the probe protection tube, the probe is suspended at the correct level.

Control unit (electrical connections)

1. Mains voltage connection;

The control unit should be connected to a suitable 220/240V AC supply and fused at 3 amps.

Note: This appliance must be earthed.

2. Control unit/probe junction box connection

Wiring from the control unit to the probe junction box in the separator chamber requires a 3-core screened, 0.75mm core section cable.

Maximum cable length: 300 metres.

3. Probe connection

A 5 metre 3-core probe cable is normally fitted to the junction box and the probe.

After all connections have been made, the cables must be secured by tightening each entry gland.

Probe

The probe is installed freely suspended in the SPEL separator within the probe protection tube. The 3-core cable is connected into the junction box mounted in the access shaft above the probe protection tube. Extra cable is provided to enable raising the junction box where extension shafts are incorporated.

Important note: In all cases good, standard electrical practice should be followed and the installation must conform to the Australian Wiring Rules – AS 3000 – 2007. In essence, the installation must be such that the intrinsic safety is no compromised by:

- Exposure to risk of mechanical damage
- Unauthorised modification of interference
- Exposure to moisture, dust and foreign bodies
- Excessive heat
- Invasion of intrinsically safe circuit by other electrical equipment or circuitry

Certificate of conformity

The alarm device has been approved to be used in explosion-hazardous areas. The control unit and probe are approved according to ATEX Directive 94/9/EC. These approvals mean that the probes can be installed in Zone 0, which is continuously explosion-hazardous.

The SPEL oilset control unit must be located in the safe area, but it can be connected to the probe without any barrier.

Tests (10.2)

The function can be tested by lifting the probe within the probe protection tube. In approximately 5 seconds, the alarm is given by a red light and audible signal. Both relays release. Push the RESET button - the buzzer goes off and relay pulls in.

When the probe is placed in water again, relay pulls in and the red light goes off.

Cable break and short circuit test

Also the function can be tested in case of cable fault or short circuit. First cause short circuit in probe cable terminals 1 and 2. Then the yellow light of short circuit is lit. Both the relays pick up and the buzzer goes on. Remove the short circuit and reset the buzzer.

Simulated Function Test

The function of probe, cable and electronics can be tested. Push the TEST button for 2 to 5 seconds. Both relays pick up, and the red light is lit. When the TEST button is released, the red light goes off and relay returns to its normal position. The buzzer and relay must be reset.

Installation

Important note: It is important that installation is carried out by a competent technician familiar with this type of equipment or contact our Special Products Division for installation, commissioning and maintenance service.

SPARE PARTS LIST

DATE: _____

INVOICE NO: _____

TYPE: _____

MODEL: _____

SERIAL NO: _____

JOB NO: _____

LINE	DESCRIPTION	QTY	PART No.
1			
2			
3			
4			
5			
6			
7			
8			

For all spare parts enquiries, please ring 13 SPEL or 13 77 35

STORMWATER SOLUTIONS - STORMWATER QUALITY IMPROVEMENT DEVICES

MAINTENANCE SERVICE LEDGER						
MODEL No						
INSTALLATION ADDRESS						
INITIAL OPERATING DATE						
WORKING CAPACITY						
PRIMARY CHAMBER SPILL CAPACITY						
OIL ALERT PROBE trigger threshold						
MINIMUM MAINTENANCE FREQUENCIES			<i>ANNUALLY from the initial operational date or if indicated by the oil alert probe alarm</i>			
<i>Note: Oil Alert Probe alarm is triggered when fuel/oil hydrocarbons reaches 10% of primary chamber capacity.</i>						
MAINTENANCE RECORD						
SERVICE DATE	COALESCER FLUSHED	PRIMARY CHAMBER SEDIMENT REMOVED & HYDROCARBONS SKIMMED	SECONDARY CHAMBER SEDIMENT REMOVED & HYDROCARBONS SKIMMED	OIL ALERT PROBE CLEANED & ALARM CHECKED	SERVICE MANAGER NAME & SIGNATURE	



SPEL Stormsack

At-source Gross Pollutant Trap

www.spel.com.au

SPEL ENVIRONMENTAL
INTEGRATED WATER SOLUTIONS

Document Set ID: 4733212
Version: 4, Version Date: 21/12/2022

Stormwater Treatment

An all too common issue with today's highly impervious landscape is how to meet stormwater regulations with limited budgets and tight space constraints.

SPEL StormSack filtration solutions are highly engineered water quality devices that are deployed directly in the stormwater system to capture contaminants close the surface for ease of maintenance. Easily retrofitted into new or existing structures, SPEL StormSack filtration technology is a decentralized approach to stormwater treatment that essentially repurposes traditional site infrastructure and customizes it to meet specific site water quality goals. In this way, it satisfies important objectives of today's LID (Low Impact Development) criteria.

From an operations perspective, catch basins with SPEL Stormsack filters are also easier and quicker to clean out because pollutants are trapped just under the grate.

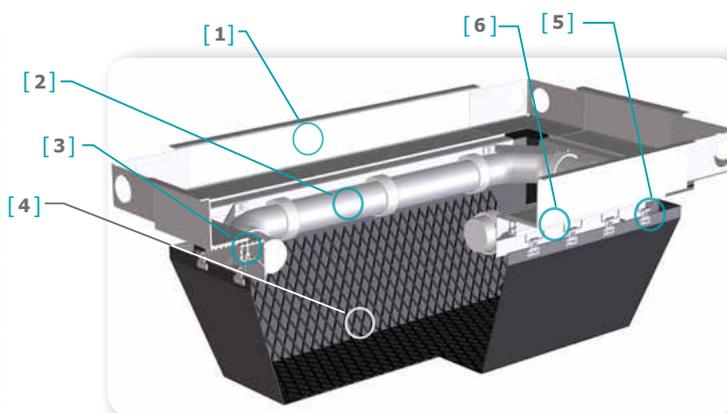
StormSack

The SPEL StormSack is specifically designed for the capture of gross pollutants: sediment, litter, and oil and grease. Ideally suited for municipal storm drain retrofits, the SPEL StormSack's unique design allows maintenance to be performed using conventional vacuum suction equipment.



Application	Regulatory Issue	Target Pollutants
Council Storm Drain Retrofits	At-source litter capture	Sediment, Litter, O&G
Commercial/Retail/Residential	Stormwater Compliance	Sediment, Litter, O&G
Litter Prone Urban Areas	Cost effective litter control	Litter \geq 5 mm
Scrap Metal/Solid Waste/Oil Storage/Etc	Industrial Multi-Sector General Permit	Gross Pollutants, O&G
Part of Treatment Train	Council Stormwater Quality Improvement Targets	Sediment, Litter, O&G
Construction Sediment/Erosion	Sediment Control Plan	Sediment/Erosion Control

Features	
1.	Durable, aluminum frame construction has 15 year service life
2.	Integral oil boom effectively captures oil and grease from spills
3.	Patented dovetailed flange – allows 12cm of length/width field adjustment
4.	Polypropylene netting protects sack from suction hose during maintenance
5.	Steel clip with locking tab holds replaceable filter sack in place
6.	Baffled bypass traps floatables



Standard SPEL Stormsack to suit Pit Sizes
450x450mm
600x600mm
900x600mm
900x900mm

Custom sizes (i.e. 1200x900mm) can be manufactured on short lead times

Specifications & Details

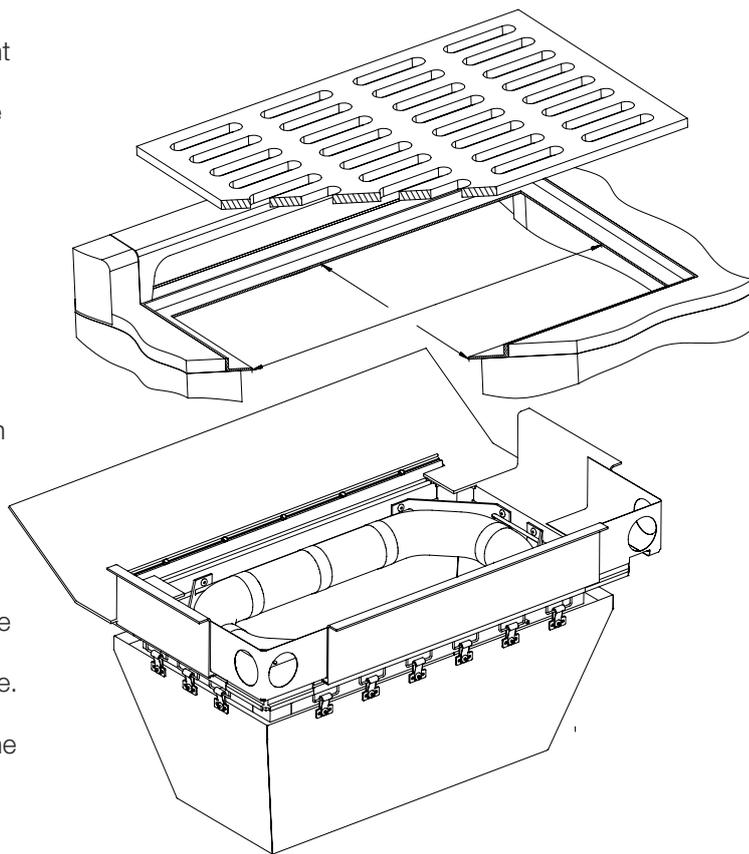
General Description

This technology is a post developed stormwater treatment system. The SPEL StormSack provides effective filtration of solid pollutants and debris typical of urban runoff, while utilising the existing or new storm drain infrastructure. The StormSack is designed to rest on the flanges of conventional catch basin frames and is engineered for most hydraulic and cold climate conditions.

Installation And Maintenance

Installation procedures shall include removing the storm grate, cleaning the ledge of debris and solids, measuring catch basin clear opening and adjusting flanges to rest on grate support ledge. Install SPEL StormSack with splash guard under curb opening so the adjustable flanges are resting on the grate support ledge. Install corner filler pieces. Reinstall storm grate directly on support flanges [rise shall be no more than 1/8 inch (3 mm)].

Maintenance: Typically the SPEL StormSack is serviceable from the street level, and therefore maintenance does not require confined space entry into the catch basin structure. The unit is designed to be maintained in place with a vacuum hose attached to a sweeper or a vactor truck. The oil boom is also designed to easily be replaced from the street level. Use only SPEL replaceable parts.



Products

Material and Design

- A. Adjustable Flange and Deflector: Aluminum Alloy 6063-T6
- B. Splash Guard: neoprene rubber
- C. Stormsack: woven polypropylene geotextile with US Mesh 20
- D. Corner Filler: Aluminum Allow 5052-H32
- E. Lifting Tabs: Aluminum Allow 5052-H32
- F. Replaceable Oil Boom: polypropylene 3 inch (76 mm) diameter
- G. Mesh Liner: HDPE, diamond configuration
- H. Support Hardware: CRES 300 Series

Typical Performance Characteristics

- A. Debris capacity: 8.5cu. ft. (0.24 m³)
- B. Filtered flow rate: 7.3 cfs (207 lps)
- C. Primary baffled bypass flow rate: 4.2cfs (119 lps)
- D. Secondary bypass flow rate: 0.4 cfs (10 lps)
- E. Total bypass flow rate: 4.6 cfs (130 lps)
- F. Oil boom sorption capacity: 376 oz (11 L)

Recommended minimum clearance from bottom of SPEL StormSack to inside bottom of vault is 2 inches (50 mm)
Typical frame adjustability range of 5 inches (127 mm) in each direction.

Benefits

- Low cost gross pollutant capture
- Quick & easy installation
- Simple maintenance
- At source capture
- Adjusts to custom pit sizes

Field Performance

The SPEL Stormsack was introduced to the Australian market in 2012 and field testing is underway at several locations in South-east Queensland. Laboratory testing has shown capture of 99.99% of gross pollutants up to the bypass flow rate.* Further results will be provided as they become available.



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Northern Territory 61 2 8705 0255

New Zealand 64 9 276 9045



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Vegetated swales and drains

This fact sheet is one of a series which provides advice to extension officers and land owners on the use of vegetated swales and drains to improve farm run-off water quality, specific to coastal agriculture in the wet/dry tropics region between central and Far North Queensland.

Vegetated swales and drains

Vegetated swales and drains are shallow, open, vegetated channels primarily designed for conveying water in a longitudinal manner through a drainage pathway. They can also be designed to manage water quality by reducing flow velocities (speeds) compared to bare soil, piped or concreted conveyance systems.

They can remove coarse and medium sized sediments and are commonly combined with buffer strips, sediment basins and constructed wetlands to provide further treatment.

The main difference between swales and drains is how they hold water. Swales are located in areas which can fully drain and are therefore typically dry. Swales can also be headlands or access tracks that are not used regularly for farm traffic. Drains are located on flat or backwatered locations which results in them holding water. Swales ideally have a trapezoidal cross-section with a flat base, while drains have a shallow 'v'-shaped configuration (Figure 1).

Swales and drains should be designed to convey the required run-off volume effectively, and be well vegetated to allow for seasonal slashing. Ideally they will be located on slopes with 1-4% grade.

Treatment processes

The interaction between water flow and vegetation within these systems facilitates settlement and retention of pollutants. Vegetation type/height will influence the treatment performance.

- **Swales/drains with low vegetation** (such as mown grass) can achieve moderate sediment deposition rates provided flows are well distributed across the full width and length of the swale and the longitudinal grade of the swale is kept low enough to maintain slower flow conditions (less than 4%).
- **Swales/drains with taller/reed type vegetation** can offer improved sediment retention by slowing flows more and providing enhanced sedimentation for deeper flows. However, densely vegetated swales have higher hydraulic roughness and therefore require a larger area to convey flows compared to grass swales.

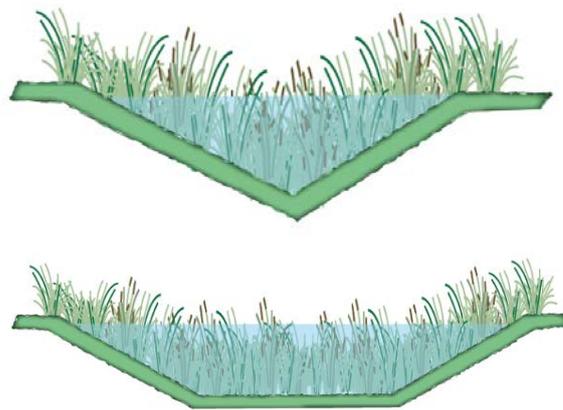


Figure 1 - Vegetated drain (top) and vegetated swale (bottom) cross sections.

Table 1 - Summary of vegetated swale and drain treatment processes

Pollutant Size / Type	Treatment Performance	Description of Vegetated Swales and Drains Treatment Process
Coarse to medium sized pollutants (e.g. sediments)		Vegetation facilitates enhanced sedimentation of particles, particularly coarse to medium sediments, through filtration and deposition.
Fine particulates (e.g. fine sediments and particulate nutrients)		Vegetation may also trap some fine particles which may retain or adsorb pollutants.
Dissolved pollutants (e.g. nutrients, chemicals and pesticides)		There may be some direct uptake of nutrients by vegetation. Regular wetting and drying in swales and drains will enhance the decomposition of organic matter and decreases the availability of phosphorus trapped in the sediments.



Use of vegetated swales and drains on farms to manage run-off

Vegetated swales and drains can be used as part of an overall farm drainage strategy to improve run-off water quality provided best practice farm management practices are implemented and a number of key design considerations are addressed. Planning treatment elements should also consider their position in the catchment and whether the location is suitable.

Sizing

Typically, swales and drains are applicable for smaller scale contributing catchments up to 2 hectares provided the pollutant load is not excessive. For an area of this size the vegetated swales and drains should be able to convey and treat frequent storm flows effectively. The width and length required to treat flows from catchment areas larger than this can be problematic (especially for flat bottom swales).

Site constraints

Vegetated swales and drains are not ideally suited to sites with:

- Steep topography (>4%) - check dams may be required for these slopes to protect scour.
- Flat topography (<1%) - swales can become waterlogged or boggy if they are unable to drain effectively, which can be difficult to maintain and can be problematic for vehicle movement and result in problems with mosquitoes. Drains are more suited to these conditions.
- Large catchment (>2ha) - swales and drains would need to be large and specifically designed to reduce risk of failure due to large flow depths and velocities generated from larger catchment.
- Acid sulphate soils (follow best practice guidelines).

These site characteristics don't preclude the use of swales or drains, but it may require additional design considerations and have cost implications.



Position and role in a run-off treatment train

The adoption of in-paddock best management practices and appropriate location within the farm are critical to reduce the loads entering the swales and drains.

Once these preventative methods have been employed, swales and drains can be used. They alone cannot provide sufficient treatment to significantly reduce pollutant loads in farm run-off, but can provide an important pre-treatment function for other elements in a treatment train.

Swales and drains are ideally located as one of the first elements in a treatment train, removing coarse sediments from farm run-off before it enters tertiary treatment systems such as sediment basins or constructed wetlands (Figure 2).

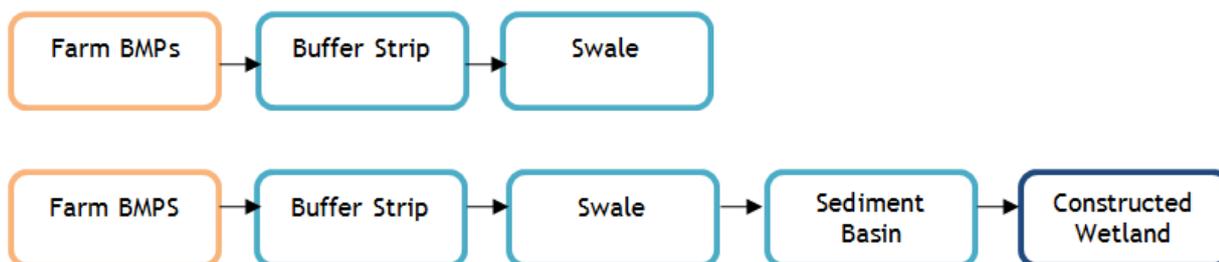


Figure 2 - Possible locations of vegetated swales and drains in farm run-off treatment trains.

Design, construction and maintenance

Design requirements

For water quality improvement functions, swales and drains should focus on ensuring frequent storm flows (typically up to the 3 month Average Recurrence Interval flow (ARI)) are conveyed within the swale or drain profile. Flows above these levels should exit the farm via breakout and overflow channels as these high flows can damage the swales and drains. In most cases, a swale or drain will also be required to provide a flow conveyance function as part of a larger drainage system.

The design of vegetated swales and drains should consider the following design features:

Batter slope and depth

Depth and batter slope will influence the conveyance capacity and overall footprint (top width) of the swale or drain and should be designed with consideration of maintenance (mown/slashed edges shouldn't be steeper than 1 in 4) and vehicle crossings (at grade crossings shouldn't be steeper than 1 in 9). For vegetated swales the floor of the drainage path should be configured to have a flat cross section.

Width

Width will be driven largely by the available space, but the greater the width, the greater the conveyance and treatment capacity for a shallow swale or drain.

Length

Length will be driven by the available space but the greater the length the greater the area for treatment.

Soils

Soils need to be appropriate to support construction of swales and drains and not be erosive.

Longitudinal slope

The longitudinal slope of the drainage path should be between 0.5% and 5%. A steeper longitudinal slope will still provide an effective drain, but can increase erosion risk and diminish treatment effectiveness.

Additional design considerations:

Weed management

Densely vegetated emergent macrophytes (reeds and sedges) within the swale or drain can make it difficult for weeds to establish by occupying the habitat.

Flow velocities

Velocities within swales and drains should be kept low, preferably less than 0.1m/s for frequent flows and less than 2 m/sec in major storm events to prevent damaging the vegetation.

Check dams

If check dams are required to manage flow velocities (e.g. on steep sites), these can be small e.g. 100mm rock weirs or equivalent, placed along the base of the swale to slow flows and protect it from scour. A rule of thumb for locating check dams is for the crest of a downstream check dam to be at 4% grade from 100mm below the toe of an upstream check dam (Figure 3).

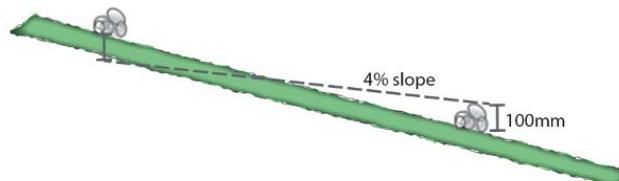


Figure 3 - Rock check dams on base of steep swales/drains

Design checklist:

Vegetated drain:

- Upstream catchment <2ha
- 1 in 4 batters
- Longitudinal slope less than 5%

Vegetated swale:

- Upstream catchment <2ha
- Batters between 1 in 4 and 1 in 9 (for vehicle access)
- Longitudinal slope between 0.5% and 5%
- Floor of swale has a flat cross section
- Swale is able to drain completely

Typical construction issues

Existing vegetation and approvals

Swales and drains should be established to minimise impacts on existing wetlands/waterways and native vegetation. Typically, swales and drains would be located within the production area. The likelihood of requiring a clearance approval would be low.

Earthworks

Swales and drains will require some earthworks to create the conveyance/treatment channel. The amount of earthworks should be minimal to avoid disturbing acid sulfate soils and shallow bedrock. Exposing bare soils should be minimised during construction to reduce the risk of sediment moving off site of earthworks approvals.

Any potential changes in hydrology resulting from flows being directed into or away from existing wetlands or waterways needs to be carefully managed to avoid creek bank erosion. Also, earthworks and any changes to hydrology within the vicinity of an area mapped as a wetland protection area may require an approval.

Planting and establishment

Swales and drains need to be well vegetated with grasses, sedges and rushes. The most cost effective approach is to seed the system with a mix of native species or if suitable vegetation exists nearby on farm, allow the vegetation to recruit or colonise naturally. Natural recruitment however increases the risk of erosion, weeds and increased maintenance.

Use local guidelines if they are available to assist with plant selection or contact your local Landcare or NRM group. Natural wetlands and riparian zones are a good reference from which to create a species template.

The dry season is the best time to establish vegetation in the swales and drains to reduce the risk of erosion. This allows for adequate establishment/root growth before the heavy summer rainfall period. Establishing it early in the dry season allows for growth of the root system while the ground is still moist. Some watering may still be required during the dry season.

Cost implications/risk

The risk of not achieving the desired design planting densities is poor treatment performance and the colonisation of weeds. Therefore it is important that the vegetation in the swales and drains is established successfully.



Swale being established in new block
Photo: QDAFF

Maintenance

Swales and drains rely on good vegetation for optimal treatment, therefore ensuring adequate vegetation growth is the key maintenance objective for these systems. Plant cover should be at least 80% with plants not slashed lower than 300mm.

Typical maintenance of swales and drains can be done with slashers or by hand and will involve:

- Removing weeds and pest habitat (slashing, not spraying).
- Reseeding of to achieve design densities.
- Irrigating vegetation, if required. This could be necessary if headlands and tracks are the swales and are damaged by machinery during harvest. Irrigation may be needed to re-establish cover before the onset of the wet season.
- Removing sediment where it is building up and impeding flows. This should be done during the dry season and removed sediment should be disposed of in the farm blocks, away from drainage lines.
- Filling in any areas impacted by erosion especially if it is creating isolated pools.
- Protecting boggy, wet swales from traffic. As part of farm BMP wet season routes need to be identified.

Swales and drains should be inspected every six months and before the wet season to ensure they are ready to receive run-off.

Further information

This fact sheet is part of a series on run-off treatment systems, as listed below. The Wetland Management Handbook provides more detail on treatment structures and general farm management to improve water quality leaving farms.

These resources and other wetland management tools and guides are available at <http://wetlandinfo.ehp.qld.gov.au/wetlands/management/wetland-management/>

Number	Publication Title
Fact sheet 1	Farm runoff treatment systems— toolkit
Fact sheet 2	Buffer strips
Fact sheet 3	Vegetated swales and drains
Fact sheet 4	Sediment basins
Fact sheet 5	Constructed (treatment) wetlands

These factsheets were developed by the Queensland Department of Agriculture, Fisheries and Forestry (QDAFF), Healthy Waterways and E2DesignLab with funding from the Queensland Wetlands Program.

The Queensland Wetlands Program supports projects and activities that result in long-term benefits to the sustainable management, wise use and protection of wetlands in Queensland. The tools developed by the Program help wetlands landholders, managers and decision makers in government and industry. The Program is a joint initiative of the Australian and Queensland governments.

Contact wetlands@ehp.qld.gov.au
or visit www.wetlandinfo.ehp.qld.gov.au

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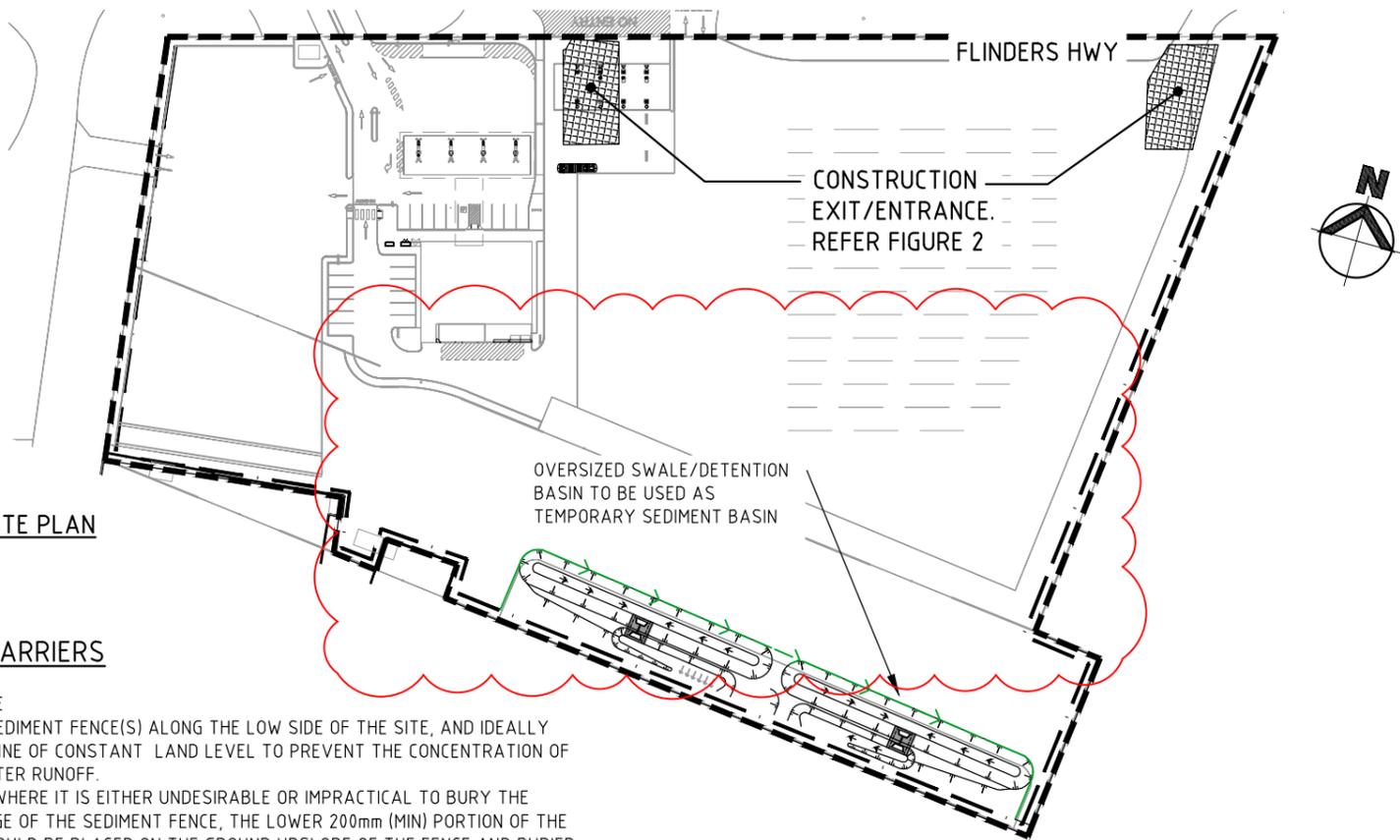


E2DESIGNLAB



APPENDIX H – EROSION AND SEDIMENT CONTROL PLAN

PROPOSED SITE PLAN
SCALE 1:1500



SEDIMENT BARRIERS

SEDIMENT FENCE

- INSTALL SEDIMENT FENCE(S) ALONG THE LOW SIDE OF THE SITE, AND IDEALLY ALONG A LINE OF CONSTANT LAND LEVEL TO PREVENT THE CONCENTRATION OF STORMWATER RUNOFF.
- IN AREAS WHERE IT IS EITHER UNDESIRABLE OR IMPRACTICAL TO BURY THE LOWER EDGE OF THE SEDIMENT FENCE, THE LOWER 200mm (MIN) PORTION OF THE FABRIC SHOULD BE PLACED ON THE GROUND UPSLOPE OF THE FENCE AND BURIED UNDER A 100mm (MIN) LAYER OF AGGREGATE.
- SEDIMENT FENCES ON BUILDING SITES CAN BE STAPLED TO APPROXIMATELY 4.0mm SQUARE HARDWOOD POSTS OR WIRE TIED TO STEEL POSTS.

FIELD INLET GULLIES

- SEDIMENT CONTROLS FOR STORMWATER INLETS LOCATED WITHIN THE PROPERTY BOUNDARIES MAY CONSIST OF GEOTEXTILE FABRIC PLACED EITHER DIRECTLY OVER THE GRATED INLET OR AROUND THE INLET SUPPORT BY A TIMBER FRAME. FIELD INLET PROTECTION IS NECESSARY WHERE INLETS DRAIN AREAS OF BARE AND UNPROTECTED SOIL. DURING STORMS, PONDING SHOULD BE ALLOWED TO OCCUR AROUND THE STORMWATER INLET TO ASSIST IN THE SETTLING OUT OF SEDIMENTS.

PAVEMENT INLET GULLY

- A ROADSIDE INLET BARRIER IS TO BE INSTALLED, SO THAT IT SHOULD NOT BE ALLOWED TO FULLY BLOCK THE INLET STRUCTURE.
- ON A HILLSIDE, SEDIMENT BARRIERS MAY CONSIST OF A TEMPORARY DAM CONSTRUCTED FROM SAND AND GRAVEL BAGS AT LEAST 4 METRES UP SLOPE FROM THE GULLY INLET.

BUILDING OPERATIONS

- ERODABLE MATERIAL MISTAKENLY PLACED WITHIN THE ROAD RESERVE (INCLUDING ACCIDENTAL SPILLAGE AND TRACKING OF SUCH MATERIALS ONTO THE ROAD) THAT CAN NOT BE PREVENTED THROUGH REASONABLE MEANS, MUST BE (a) REMOVED IMMEDIATELY IF RAINFALL IS IMMINENT OR OCCURRING.
- REMOVED PRIOR TO THE END OF THE DAY'S WORK IF RAINFALL NOT EXPECTED. MATERIALS SHOULD BE SWEEPED FROM THE ROAD, NOT WASHED DOWN THE GUTTER.
- ALL SOLID WASTE SHOULD BE STORED ON SITE IN SUCH A MANNER THAT IT IS PREVENTED FROM LEAVING THE SITE EITHER BY THE ACTION OF WIND OR WATER.
- SMALLER MATERIALS, SUCH AS LITTER, SHOULD BE CONTAINED IN COVERED BINS OR LITTER TRAPS FORMED ON THREE SIDES BY A GEOTEXTILE WIND BREAK.
- CONCRETE WASTE WASHED FROM TRUCKS AND MIXERS UNITS SHALL BE CONTAINED ON SITE AND SHALL NOT BE PLACED IN A POSITION WHERE IT COULD REASONABLY BE EXPECTED TO WASH FROM THE SITE AND HARM THE ENVIRONMENT.

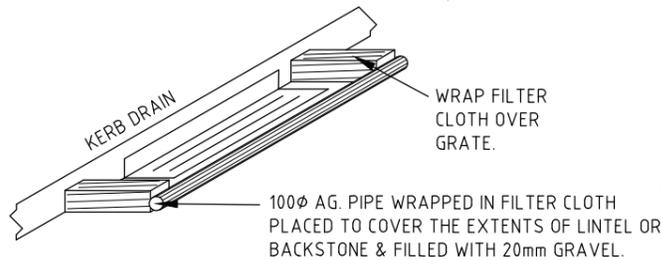
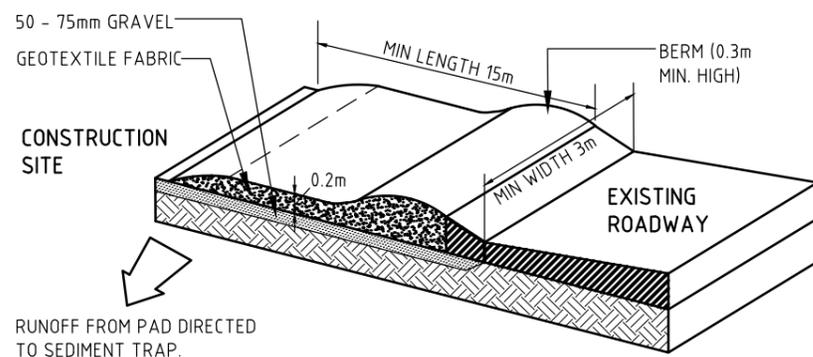


FIG. 3. - KERB INLET PROTECTION



MAINTENANCE:

- THE ENTRANCE SHOULD BE MAINTAINED SO THAT IT PREVENTS TYRES FROM TRACKING.
- DRESSING WITH ADDITIONAL AGGREGATE IF REQUIRED.
- REGULARLY REMOVE SEDIMENT FROM ROADWAY.

FIG. 2. - CONSTRUCTION EXIT/ENTRY

LEGEND

- AREA DEFINING EXTENT OF WORKS TO HAVE SEDIMENT AND EROSION CONTROLS INSTALLED
- APPROXIMATE EXTENT OF SEDIMENT FENCE

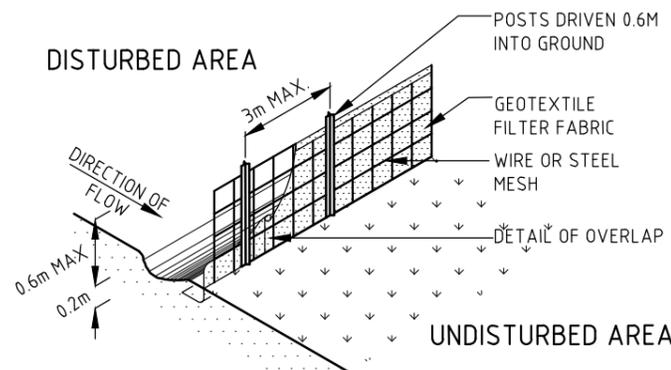


FIG. 1. - SEDIMENT FENCE

SEDIMENT AND EROSION CONTROL NOTES

GENERAL

- ALL THE SEDIMENT & EROSION CONTROL MEASURES TO BE IN ACCORDANCE WITH LOCAL COUNCIL'S GUIDE LINES.

PRIOR TO THE COMMENCEMENT OF CONSTRUCTION

- AVOID STRIPPING & EXCAVATING UNTIL READY TO BUILD.
- INSTALL SEDIMENT FENCES.

SPECIFICATION

- SILT FENCE SHALL NOT BE REMOVED UNTIL SITE HAS BEEN PAVED & SURFACED.
- BUNDWALLS SHALL BE LOCATED AROUND ALL PITS & MAINTAINED UNTIL THE CATCHMENT AREA HAS BEEN PAVED.
- KERB DRAIN EXCLUDER SHALL INCORPORATE TRAFFIC CONTROL BARRICADES IN ACCORDANCE WITH AS1742.3 - 1985, & SHALL NOT BE PLACED UNTIL WORKS ARE BEING CARRIED OUT ON THE FOOTPATH AREA, OR AS OTHERWISE DIRECTED BY COUNCIL.
- ALL SEDIMENT TRAPS, EXCLUDERS, BUNDWALLS SHALL BE INSPECTED & CLEANED AFTER EACH STORM EVENT. DAMAGED OR CLOGGED BUNDING ARE TO BE REMOVED AND REPLACED.
- THE BUILDER SHALL CARRY OUT ANY ADDITIONAL WORKS DEEMED NECESSARY AND DIRECTED BY COUNCIL TO BE CARRIED OUT.
- THE SEDIMENT CONTROL PLAN SHALL BE IMPLEMENTED PRIOR TO ANY WORKS BEING CARRIED OUT ON SITE.

STOCKPILES

- STOCKPILES ARE NOT TO BE STORED ON THE FOOTPATH OR THE ROAD RESERVE.
- WHERE NECESSARY STOCKPILE LOSSES CAN BE MINIMISED WITH THE USE OF COVERS.
- ALL STOCKPILES AND BUILDING MATERIAL SHOULD BE LOCATED WITHIN SEDIMENT CONTROL ZONE.
- TO MINIMISE EROSION AND THE LOSS OF SAND AND SOIL, STOCKPILES SHOULD BE NOT LOCATED WITHIN AN OVERLAND FLOW PATH. IF IT IS IMPRACTICAL TO AVOID STORMWATER RUNOFF BEING DIRECTED TO A STOCKPILE, THEN A PERIMETER BANK SHOULD BE CONSTRUCTED UP SLOPE OF THE STOCKPILE TO DIRECT RUNOFF IN A CONTROLLED MANNER AROUND THE STOCKPILE.

MAINTENANCE

- SEDIMENT FENCES SHOULD BE REPLACED IF THE FABRIC IS RIPPED OR OTHERWISE DAMAGED. THE MAINTENANCE OF THE SEDIMENT FENCES INCLUDES THE REMOVAL OF SEDIMENT DEPOSITED UP SLOPE OF THE FENCE AND RETRENCHING THE FABRIC WHEN THE FENCE IS 25% FULL.
- FOLLOWING STORM EVENTS, THE ROAD RESERVE AND ALL SEDIMENT BARRIERS SHOULD BE INSPECTED AND ANY EXCESSIVE RESIDUE SHOULD BE APPROPRIATELY REMOVED.

SITE REHABILITATION

- ALL GROUND DISTURBED BY THE CONSTRUCTION ACTIVITY SHOULD BE PROMPTLY AND PROGRESSIVELY STABILISED SO IT CAN NO LONGER ACT AS A SOURCE OF SEDIMENT.

SERVICES TRENCHES

- TO AVOID UNNECESSARY SOIL EROSION, SERVICE TRENCHES SHOULD BE BACK FILLED, CAPPED AND COMPACTED TO A LEVEL AT LEAST 75-100mm ABOVE THE ADJOINING GROUND LEVEL.

BULK EARTHWORKS

- AVOID STRIPPING & EXCAVATING UNTIL READY TO BUILD.
- CONSTRUCTION OF AN ENTRY/EXIT POINT TO THE SITE SHOULD BE MANAGED SO THAT SEDIMENT IS NOT TRACKED OFF THE SITE.
- TOP SOIL SHOULD BE STOCKPILED ON SITE FOR LATER USE.
- WHERE PRACTICABLE MAINTAIN KERB VEGETATION IN A HEALTHY STATE DURING THE CONSTRUCTION PROCESS.
- WHEN UP SLOPE WATER IS DIVERTED AROUND A WORK SITE IT IDEALLY SHOULD BE DISCHARGED AS SHEET FLOW THROUGH AN UNDISTURBED AREA BESIDE THE WORKS.

NOTES:

EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE DESIGNED AND PROVIDED IN ACCORDANCE WITH THE INTERNATIONAL EROSION CONTROL ASSOCIATION AUSTRALASIA - "BEST PRACTICE FOR EROSION AND SEDIMENT CONTROL."

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		<p>Document Set ID: 4733212 Version: 4, Version Date: 21/12/2022</p>			

Traffic Impact Assessment

Thompson Street Service Station

QTT19118



Prepared for
TfA Project Group

20 December 2019

This plan and/or document has been approved by the Charters Towers Regional Council in accordance with the conditions stated within the attached Decision Notice.

App Ref: *MC20/01*
Date: *29 June 2020*
Signed: *ML*

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1 Introduction

1.1 Overview

Cardno (Qld) Pty Ltd (Cardno) has been commissioned by the TfA Project Group (Client) to prepare a traffic engineering report for a material change of use located at 71-93 Thompson Street, Mosman Park. The proposed development comprises the redevelopment of the existing Puma Service Station and the addition of a fast food outlet.

A copy of the proposed development plans has been provided by TfA Project Group and are included in Appendix A.

1.2 Background

It is understood that the Client sought pre-lodgement advice from SARA for the proposed development. This traffic impact assessment has been prepared to address the specific items raised by SARA, taking into consideration:

- > Developments car parking layout and quantum;
- > Anticipated development traffic impact; and
- > Design vehicle turning paths of circulation and access

1.3 References

In preparing this report, references are made to the following traffic engineering sources:

- > Australian/New Zealand Standards: Parking Facilities
 - Part 1: Off-Street car parking (AS2890.1:2004)
 - Part 2: Off-street commercial vehicle facilities (AS2890.2:2018)
- > Charters Towers Regional Council Planning Scheme, 2019
- > Department of Transport and Main Roads TMR's *Preconstruction Processes Manual (PPM)*
- > RMS Guide to Traffic Generating Developments, 2002
- > Plans for the proposed development prepared by TfA Project Group provided in Appendix A.

1.4 Limitations

Cardno has completed this traffic report in accordance with the usual care and thoroughness of the consulting profession. The assessment is based on accepted traffic engineering practises and standards applicable at the time of undertaking the assessment. The assessment was completed in December 2019, and is based upon the conditions encountered and project information available at the time. Cardno disclaims responsibility for any changes to project planning or road conditions that may occur after completion of the assessment.

2 Existing Situation

2.1 Site Location

The proposed development is located on 71 Thompson Street, Mosman Park, as illustrated in Figure 2-1. The site has frontage along Thompson Street, also known as Flinders Highway, which leads to Charters Towers to the east and toward western Queensland to the west. Clara Road runs parallel to the site's western boundary and perpendicular to Thompson Street. The existing site is located in the south-west of Charters Towers.

Figure 2-1 Site Context



Source: Nearmap

2.2 Local Road Network

The key roads related to the development are illustrated on Figure 2-1 with the key characteristics of these roads summarised in Table 2-1.

Table 2-1 Local Road Network

Road	Road Hierarchy	Posted Speed Limit	Typical Form
Thompson Street/Flinders Highway	State-controlled Road	80km/hr	Two lanes, two way, undivided
Clara Road	Local Road	60km/hr	Two lanes, two way, undivided

2.3 Existing Site Use and Operations

The site consists of an existing and operational service station, which has a total site area of 2.003 hectares. The service station facility operates as Puma Charters Towers and facilitates refuelling for both cars and trucks. Puma Charters Towers is currently operational 24 hours a day and provides toilets, semi-trailer access, road train access and ancillary retail.

2.4 Existing On-Site Parking

There are a number of parking areas on-site for vehicles to park while utilising the service station facilities and also longer term parking for large trucks to the east of the site. The existing car parking spaces are not formalised, however it is estimated that there are currently 15 spaces for staff and customers.

2.5 Existing Site Access

The existing development gains access from Thompson Street and Clara Road. This includes the following access points as shown on Figure 2-2:

1. Entry only access for trucks - Thompson Street
2. All movements access for trucks - Thompson Street
3. All movements access for cars - Thompson Street
4. All movements access for cars – Clara Road

Figure 2-2 Existing Site Access Configuration



Source: Nearmap

3 Proposed Development

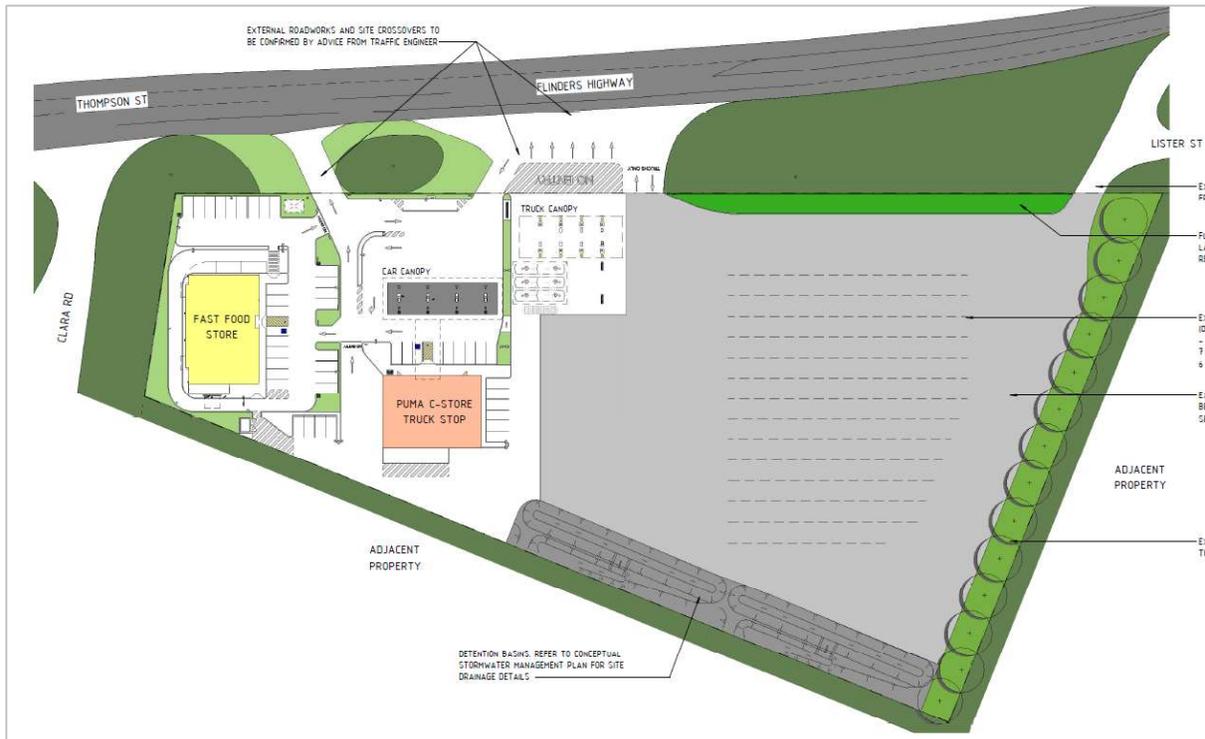
3.1 Overview

The proposed development involves a material change of use and refurbishment of the existing Charters Towers Puma Service Station. The service station component is proposed to have a gross floor area (GFA) of 427sq.m and space for truck and car pumping. The site will resurface and repair existing bitumen for the truck parking bays on the east of the site to provide 13 truck parking spaces, including 7 A-Triples (54m) and 6 B-Doubles (26m) spaces.

The site redevelopment also includes the addition of a drive-through fast food outlet with a GFA of 450sq.m.

The proposed development site layout is provided at Figure 3-1.

Figure 3-1 Proposed Development



Source: TFA Project Group 19013-D02_A

3.2 Development Access

The proposed development does not intend to change the existing access arrangement, however the access point surfaces will be rejuvenated/formalised and additional landscaping added.

3.3 Car Parking Provision

Minimum car parking requirements have been sourced from the Charters Towers Regional Council Planning Scheme rate to determine the requirements for the site. It is noted that Table 8.3.1.3(b) does not specify a car parking rate for a service station.

The minimum car parking rates have been summarised in Table 3-1.

Table 3-1 Car Parking Requirements

Land Use	Yield	Car Parking Rate	Car Parking Requirement	Parking Provision
Service Station	427sq.m	Not specified	-	14 spaces
Food and Drink	450sq.m	1 space per 15sq.m GFA	30 spaces	30 spaces
Total	877sq.m	-	30 spaces	44 spaces

As shown in Table 3-1, while the Service Station land use does not have a requirement to provide a minimum number of car parking spaces, 14 spaces have been provided for this use. This is considered sufficient to accommodate the parking demand at the service station as cars are typically parked at a pump bowser and may utilise the 'shop' portion of the service station while refuelling. As stated in the Transport and Main Roads (TMR) Preconstruction Processes Manual (PPM): *Chapter 2: Pre Project Planning*, it is estimated that only 30% of visitors to service stations are for goods only, which would require individual parking spaces. Therefore, the provided parking is considered sufficient.

3.3.2 Persons with Disability Parking

The development provides 44 car parking spaces, therefore, based on a rate of one (1) persons with disability (PWD) per 50 standard spaces, the development is required to provide 1 PWD space.

The development provides two (2) PWD spaces, one for each land use, which is considered suitable.

3.4 Truck Parking Provision

While there are no minimum parking requirements for trucks, it is acknowledged that the service station is intended to operate as a truck stop and facilitate truck parking. The service station incorporates the following truck parking facilities:

- > 7 A-Triple truck bays
- > 6 B-Double truck bays

3.5 Queuing Provision

3.5.1 Access Queuing

Australian Standard 2890 Part 1: Off-street parking facilities (AS2890.1) Table 3.3 indicates required queuing for access driveways. For the proposed development, with a capacity of 44 car parking spaces, the queuing requirement is two (2) vehicles (12m). The development provides in excess of 12m of queuing capacity, therefore is considered appropriate.

3.5.2 Drive-through Queuing

The fast food drive-through provides queuing capacity for approximately 10 vehicles (60m) back from the collection point. Additionally, two waiting bays have been provided. The CTRC Planning Scheme does not indicate a requirement for queuing for fast food outlets, however, based on Cardno's previous experience and other Council planning schemes, the provision for 10 vehicles is considered to be suitable.

4 Traffic Assumptions and Characteristics

4.1 Background Traffic Volumes

To understand the existing traffic conditions, traffic surveys were undertaken by Austraffic during the 3-hour AM and PM peak periods on Tuesday, 17 December 2019 for the following intersections:

1. Thompson Street / Truck only Entry
2. Thompson Street / Main Service Station Access
3. Thompson Street / Service Station Access 2

A review of the surveys indicated that the AM peak period was between 7:45 – 8:45am and the PM peak period was between 4:30-5:30pm.

4.2 Traffic Growth

Cardno has sourced TMR Census data for the previous five-year period (2014-2018) to determine a suitable growth rate to apply to the through traffic on Thompson Street (Flinders Highway). The closest survey point to represent the traffic along the road segment past the development site is identified as *Site 91299: 350m Ch. Towers side of DSC depot*. The traffic volumes and cumulative growth rate have been summarised in Table 4-1.

Table 4-1 TMR Census Data

Year	Annual Average Daily Traffic (AADT) Volumes	Cumulative Growth
2018	2609 vehicles	16%
2017	2609 vehicles	16%
2016	2091 vehicles	-7%
2015	2371 vehicles	5%
2014	2249 vehicles	-

As the daily traffic volumes are quite low and show fluctuations over the previous five-year period, the average growth over the past five years has been calculated. An average linear growth rate of 4% per annum was determined and has been adopted for this traffic assessment.

4.3 Development Traffic Volumes

4.3.1 Service Station Traffic Generation

The service station sites surveyed to inform the *RMS Guide to Traffic Generating Developments (2002)* were all located in relatively urban environments compared to the proposed development site. Particularly considering the low daily traffic volumes passing the site, as indicated in Table 4-1, the traffic generation rate for a service station (66 trips per 100sq.m) is considered onerous and not an accurate representation of this rural site.

The background traffic surveys indicated that there were a total of 78 vehicles and 73 vehicles that travelled in and out of the site across all accesses for the AM and PM peak periods, respectively.

Therefore, the existing floor area and the in and out volumes determined in the traffic surveys have been utilised to calculate a site-specific traffic generation rate. This is summarised in Table 4-2.

Table 4-2 TMR Census Data

Land Use	Yield	AM Peak Trips	PM Peak Trips	AM Trip Gen	PM Trip Gen
Service Station	Approx. 430sq.m	78vph	73vph	19 trips per 100sq.m	17 trips per 100sq.m

4.3.2 Traffic Generation Rates

Traffic generation rates have been sourced from the *RMS Guide to Traffic Generating Developments (2002)* and site specific traffic generation rate calculated from the traffic surveys.

- > **Service Station:** site specific traffic generation rate has been determined based on existing operation captured in traffic surveys
- > **Food and drink:** 100 vehicles per hour per site is considered most appropriate as this is unlikely to be a McDonalds restaurant which would warrant a higher trip rate

A summary of the traffic generation rates for the existing and proposed uses on-site is provided in Table 4-3.

Table 4-3 Development Traffic Generation

Land Use	Yield	Trip Generation Rate		Trip Generation	
		AM Peak	PM Peak	AM Peak	PM Peak
Existing Development					
Service Station	430 sq.m GFA	78 trips per hour	73 trips per hour	78 vph	73 vph
Proposed Development					
Service Station	427 sq.m GFA	78 trips per hour	73 trips per hour	78 vph	73 vph
Food and Drink	450 sq.m GFA	100 trips per hour	100 trips per hour	100 vph	100 vph
Total	+ 450sq.m			+ 100 vph	+ 100 vph

As shown in Table 4-3, the proposed development is anticipated to generate 100 vph during the weekday AM and PM peak periods.

4.3.3 Trip Type

Due to the type of development, not all trips generated by the site will be new. TMR's *Preconstruction Processes Manual (PPM)* includes information about the impact of new, diverted and drop-in trips. New trips are those that would not have appeared on the road network had the development not opened. Therefore, they are purely traffic generated by the development.

Diverted trips are those which are linked to the regional road network and are diverted from their original route to access the development. For the purposes of this analysis, new trips and diverted trips have been combined as the assessed catchment area only includes local traffic.

Drop-in trips are linked trips which would have appeared in the local network, irrespective of whether the development exists. In this case, they relate to vehicles which currently travel along the external road network and 'drop-in' to access the site. This is considered to be most applicable for the retail use onsite, which is considered appropriate to adopt a drop-in trip reduction.

Table 4-4 summarises the proportions of new, diverted and drop in trips adopted for the proposed fast food outlet.

Table 4-4 Trip Proportions by Type

Land Use	New + Diverted Trips	Drop In Trips	Total Proportion
Food and Drink	20%	80%	100%

4.3.4 Trip Distribution

The traffic distribution has been informed from the traffic survey data collected as part of this assessment. For the purposes of this assessment, the adopted trip distributions are:

- > 50% eastbound
- > 50% westbound

4.3.5 Directional Distribution

A summary of the in / out splits adopted for the proposed development uses are summarised in Table 4-5.

Table 4-5 In / Out Splits

Land Use	Weekday AM Peak		Weekday PM Peak	
	IN	OUT	IN	OUT
Food and Drink	50%	50%	50%	50%

4.3.6 Development Volumes

Based on the above, the peak hour development generated traffic volumes are summarised in Table 4-6.

Table 4-6 Development Traffic Volumes

Land Use	Yield	AM		PM	
		IN	OUT	IN	OUT
New + Diverted Trips					
Food and Drink	450 sq.m GFA	10 vph	10 vph	10 vph	10 vph
Drop in Trips					
Food and Drink	450 sq.m GFA	40 vph	40 vph	40 vph	40 vph
Total	+ 450 sq.m GFA	50 vph	50 vph	50 vph	50 vph

4.4 Traffic Impact

The addition of the fast food outlet will attract majority of drop in trips and also multi-purpose trips with the service station. As a result, it is anticipated that the fast food outlet will generate approximately 20 new vehicles trips per hour (10 trips in and 10 trips out) in each of the peak periods.

The traffic surveys indicated that the background through volumes were very low (up to a maximum of 145 vehicles recorded in the PM peak) compared to the hierarchy and capacity of the road type (Highway).

Therefore, the addition of 20 trips onto Thompson Street is not expected to significantly impact the external road network.

5 Design Considerations

5.1 Car Parking Design

Cardno has conducted a design review of the proposed car park layout to assess the design against AS2890.1 – Off-street car parking. The results are summarised in Table 5-1.

Table 5-1 Parking Design Compliance

Design Criteria Description	AS2890.1 Standard	Proposed Design	AS2890.1 Compliant
Bay length – standard	5.4m	5.4m	✓
Bay width – visitors	2.6m	2.6m	✓
Bay width – PWD	2.4m plus 2.4m shared zone	2.4m plus 2.4m shared zone	✓
Aisle width	5.8m	Min. 6.6m	✓

The design review indicates that the car parking layout is in compliance with AS2890.1.

5.2 Servicing Design

5.2.1 Design Vehicle

The Charters Towers Regional Council Planning Scheme does not specify design vehicles required for different land uses. Therefore, based on previous experience with similar developments, Cardno has selected the following design vehicles for the proposed uses:

- > Service Station: Articulated Vehicle
- > Fast Food Outlet: Heavy Rigid Vehicle

Additionally, based on correspondence with the Client and Council, parking for up to an A-Triple is required on-site for the east of the site.

5.2.2 Swept Path Assessment

A swept path assessment has been undertaken for the largest design vehicle anticipated on site, which has been identified as an A-triple (Type 2 Road Train). Additionally, swept path assessment has been undertaken for the following scenarios:

- > Articulated Vehicle (fuel tanker) to service the service station
- > Heavy Rigid Vehicle (HRV) to service the fast food outlet
- > B99 vehicle through drive-through

The swept path assessment indicates that the service vehicles are able to enter and exit the site in forward gear and manoeuvre into the respective loading areas where applicable. Based on this, the site layout is considered suitable for the anticipated design vehicles.

6 Summary

Cardno (Qld) Pty Ltd (Cardno) has been commissioned by TfA Project Group to prepare a traffic engineering assessment for a proposed development to the existing Puma service station site located at 71-93 Thompson Street, Mosman Park.

The proposal includes redeveloping the service station to a similar scale of retail store and the addition of a drive-through fast food facility.

This traffic engineering assessment has identified the following:

- > The proposed redeveloped site involves a 427sq.m GFA service station (retail portion) and a 450sq.m GFA fast food outlet
- > Council's Planning Scheme does not specify a parking rate for service station use, however the fast food component is required to provide a minimum of 30 spaces
- > The site proposes 44 car parking spaces which is considered sufficient to accommodate parking for each of the land uses on-site
- > The site provides sufficient queuing at the site access points and for the fast food drive-through
- > Based on traffic survey data and published literature, the development is anticipated to generate 20 new vehicle trips in the AM and PM peak periods
- > The background traffic volumes were significantly low for the hierarchy of the road, therefore the addition of 20 new trips in each peak is not considered to have a significant impact on the operation of the road
- > Swept path assessment indicates that all design vehicles up to an A-triple are able to access the site and manoeuvre into respective loading areas if applicable

Based on the above, Cardno believe that the development is acceptable from a traffic engineering perspective.

APPENDIX

A

DEVELOPMENT PLANS



RPD
 LOT: 2 ON MPH20732
 LGAL: CHARTERS TOWERS REGIONAL COUNCIL
 AREA: 2.003 HECTARES

NOTES

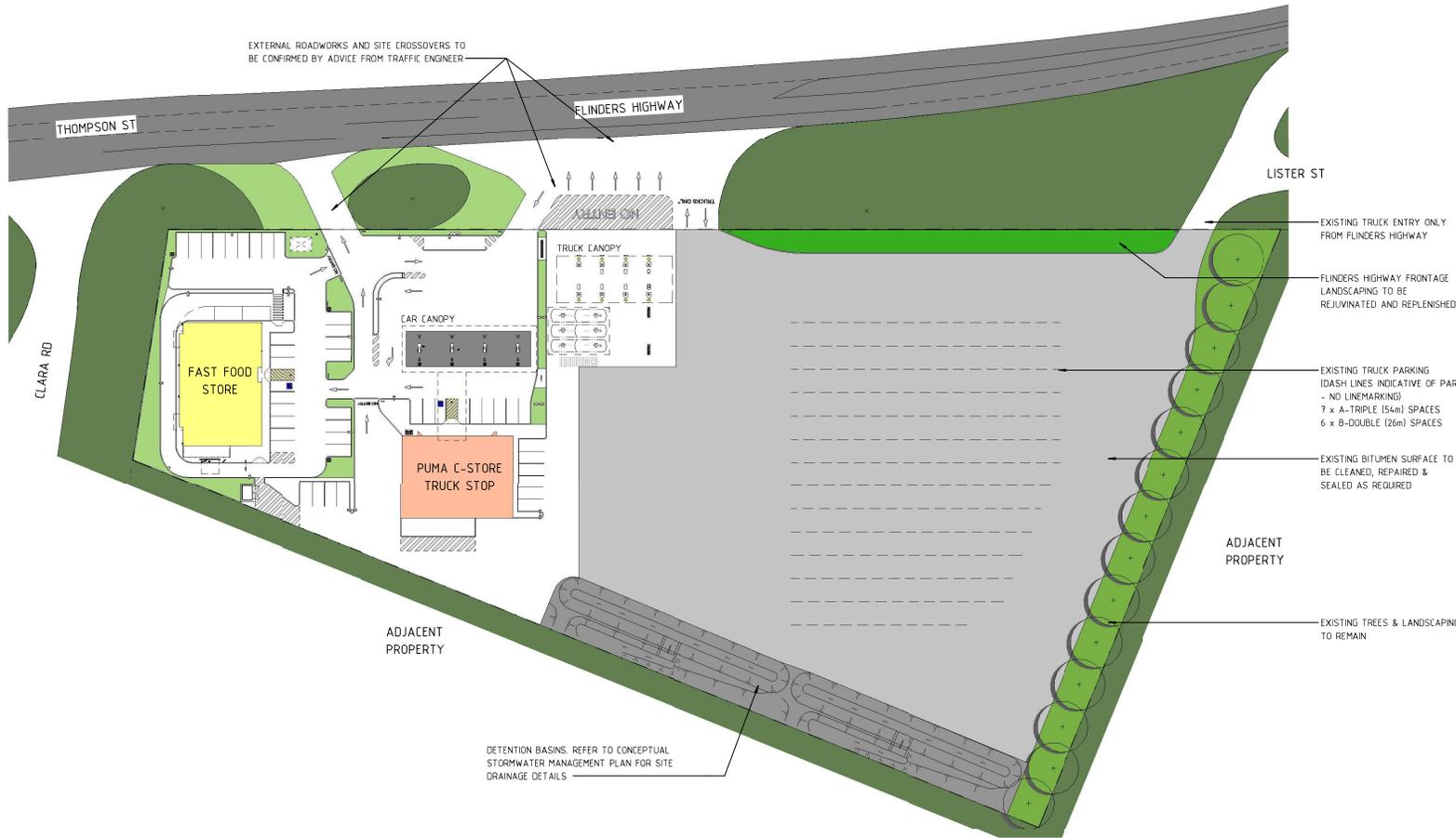
1. NOT FOR TENDER OR CONSTRUCTION
2. EXTERNAL ROAD WORKS SUBJECT TO FINAL ADVICE FROM TRAFFIC ENGINEER
3. SITE LAYOUT SUBJECT TO DETAIL SITE SURVEY AT DETAIL DESIGN STAGE

LEGEND

-  EXISTING LANDSCAPE TO BE REHABILITATED REFER TO CONCEPT LANDSCAPE PLAN
-  EXISTING TREES & LANDSCAPING TO REMAIN
-  PROPOSED LANDSCAPING - REFER TO CONCEPT LANDSCAPE PLAN
-  EXISTING BITUMEN TO BE CLEANED AND REPAIRED AS REQUIRED

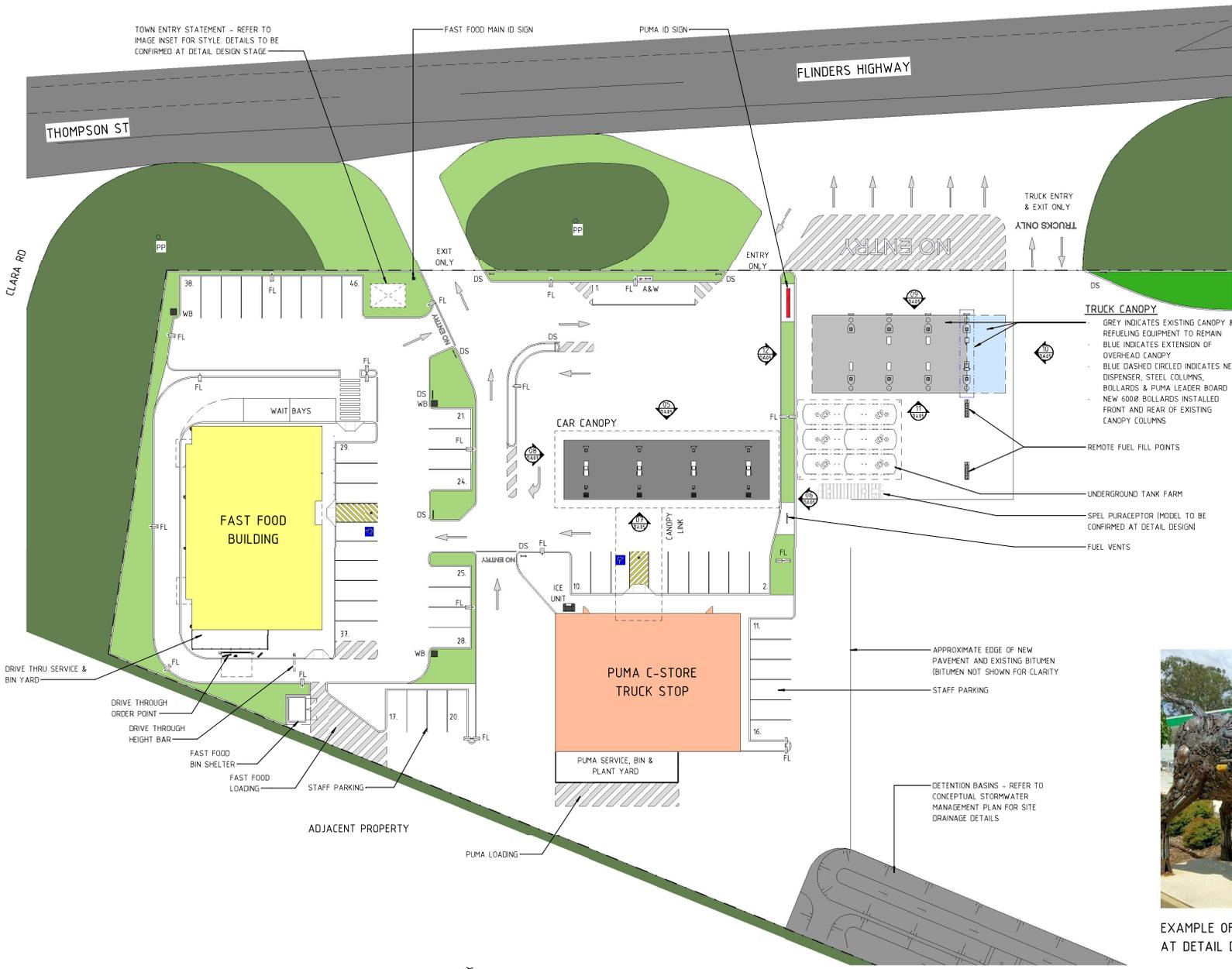
SITE COVERAGE SCHEDULE

PUMA SHOP C-STORE	427m ²
FAST FOOD STORE	450m ²
CAR CANOPY	250m ²
CAR CANOPY LINK	90m ²
TRUCK CANOPY	250m ²
(EXISTING PLUS EXTENSION SUBJECT TO SURVEY)	
PAVEMENT (INCL. SERVICE YARDS)	571.70m ²
PATHWAYS	379.89m ²
LANDSCAPING	458m ²
EXISTING LANDSCAPE REHABILITATED	472m ²
EXISTING LANDSCAPE UNAFFECTED	154.4m ²
EXISTING BITUMEN	114.27m ²



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REV	DATE	BY	DESCRIPTION	CHK	PROJECT DETAILS																			
A	20/11/19	MG	DA ISSUE																					
<small>DRAWN</small> MG	<small>APPROVED</small> JR																							
<small>DATE CREATED</small> 20.11.19	<small>AT SCALE</small> 1:500																							
<small>DRAWING NO</small> 19013 DA02	<small>REV</small> A																							





RPD
 LOT: 2 ON MH20732
 LGA: CHARTERS TOWERS REGIONAL COUNCIL
 AREA: 2,003 HECTARES (20030m²)



- NOTES**
1. NOT FOR TENDER OR CONSTRUCTION
 2. EXTERNAL ROAD WORKS SUBJECT TO FINAL ADVICE FROM TRAFFIC ENGINEER
 3. SITE LAYOUT SUBJECT TO DETAIL SITE SURVEY AT DETAIL DESIGN STAGE

- LEGEND**
- A&W AIR & WATER POINT
 - DS DIRECTIONAL SIGNAGE - REFER SIGNAGE PLAN
 - FL FLOOD LIGHT
 - PP EXISTING POWER POLE
 - WB WASTE BIN
 - PROPOSED LANDSCAPING - REFER TO CONCEPT LANDSCAPE PLAN
 - REFER TO CONCEPTUAL STORMWATER MANAGEMENT PLAN FOR DETAILS

PARKING RATES

REQUIRED

FAST FOOD	
1/15m ² OF 450m ²	= 30
SERVICE STATION (SHOP)	
1/15m ² OF 427m ²	= 29
TOTAL REQUIRED	= 59
PROVIDED	= 59

NOTE: PROVIDED NUMBER OF CAR PARKS INCLUDES CAR & TRUCK CANOPY REFUELING PARKS & DRIVE THRU WAIT BAYS. DRIVE THRU QUEUING NOT ACCOUNTED FOR!

- TRUCK CANOPY**
- GREY INDICATES EXISTING CANOPY & REFUELING EQUIPMENT TO REMAIN
 - BLUE INDICATES EXTENSION OF OVERHEAD CANOPY
 - BLUE DASHED CIRCLED INDICATES NEW DISPENSER, STEEL COLUMNS, BOLLARDS & PUMA LEADER BOARD
 - NEW 600Ø BOLLARDS INSTALLED FRONT AND REAR OF EXISTING CANOPY COLUMNS
- REMOTE FUEL FILL POINTS
- UNDERGROUND TANK FARM
- SPEL PURCEPTOR (MODEL TO BE CONFIRMED AT DETAIL DESIGN)
- FUEL VENTS



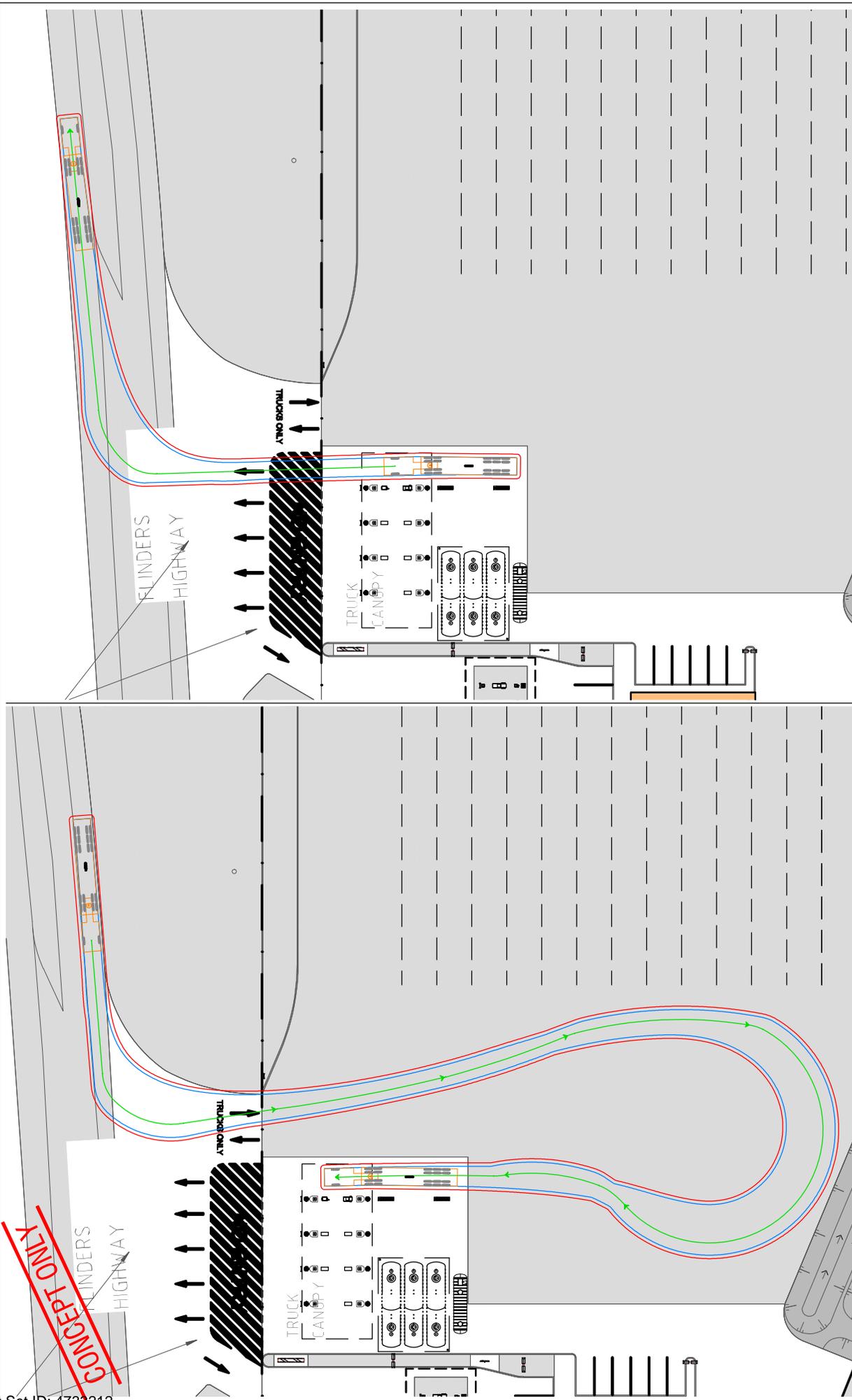
EXAMPLE OF TOWN ENTRY STATEMENT. TO BE CONFIRMED AT DETAIL DESIGN STAGE

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REV	DATE	BY	DESCRIPTION	CHK																		
DRAWN MG	APPROVED JR																					
DATE-CREATED 20.11.19	AT SCALE 1:250																					
DRAWING NO 19013	REV DA03																					

APPENDIX

B

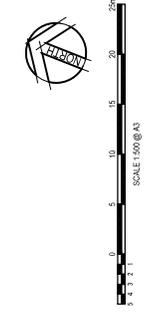
SWEPT PATH DRAWINGS



TIA Project Group
 7403 Thompson Street, Mosman Park
 95m² Parkside Warehouse
 Entry and Exit Manoeuvre
 City and East Manoeuvre
 Date: 20/12/2019
 M.E. Bell
 Drawing Number: QTT19119-SK02
 Revision: A

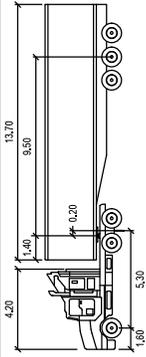
Cardno
 Cardno (Qld) Pty Ltd | ABN 57 051 074 802
 Level 11, 516 St Pauls Terrace
 Brisbane QLD 4000
 Tel: 07 3369 8822 Fax: 07 3369 9722
 Web: www.cardno.com.au

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19M AV

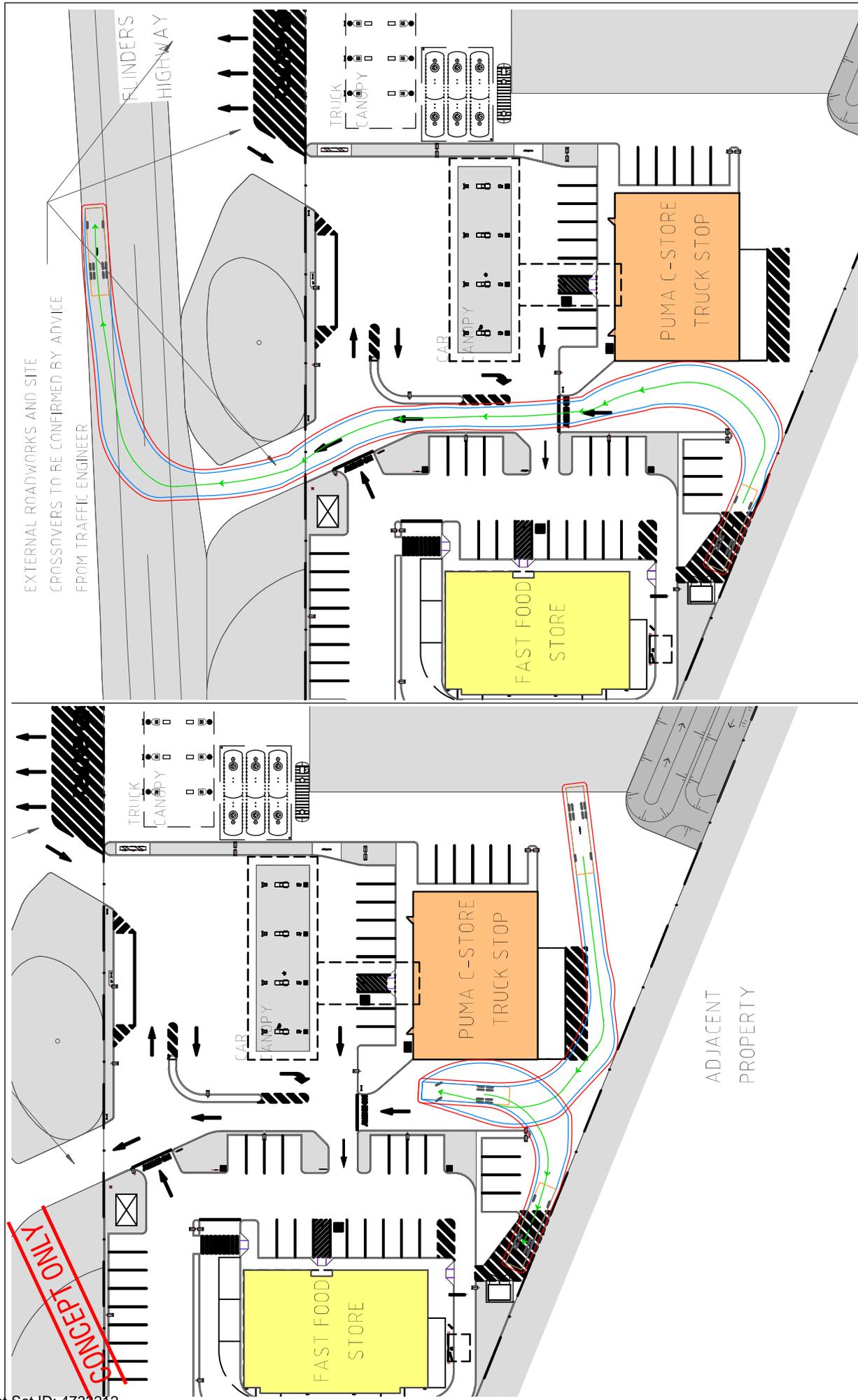
Meters	Value
Tractor Width	2.50
Tractor Length	2.50
Tractor Track	2.50
Lock to Lock, Time	4.0
Steering Angle	27.7
Articulating Angle	70.0



SWEPT PATH LEGEND

- VEHICLE BODY (Red line)
- VEHICLE PATH (Green line)
- VEHICLE CLEARANCE (500mm) (Blue line)
- VEHICLE (Orange line)

CONCEPT ONLY



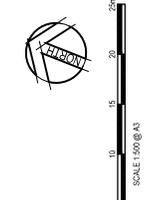
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 Web: www.caradno.com.au

Project Group	TIA Project Group
Client	7403 Thompson Street, Mooran Park
Design	Light Rail Rapid Vehicle (LRV)
Drawn	Entry and Exit Manoeuvre
Checked	ME/BJL
Date	20/12/2019
Scale	1:500
Revision	A



EXTERNAL ROADWORKS AND SITE CROSSOVERS TO BE CONFIRMED BY ADVICE FROM TRAFFIC ENGINEER



FAST FOOD STORE

PUMA C-STORE TRUCK STOP

TRUCK CANOPY

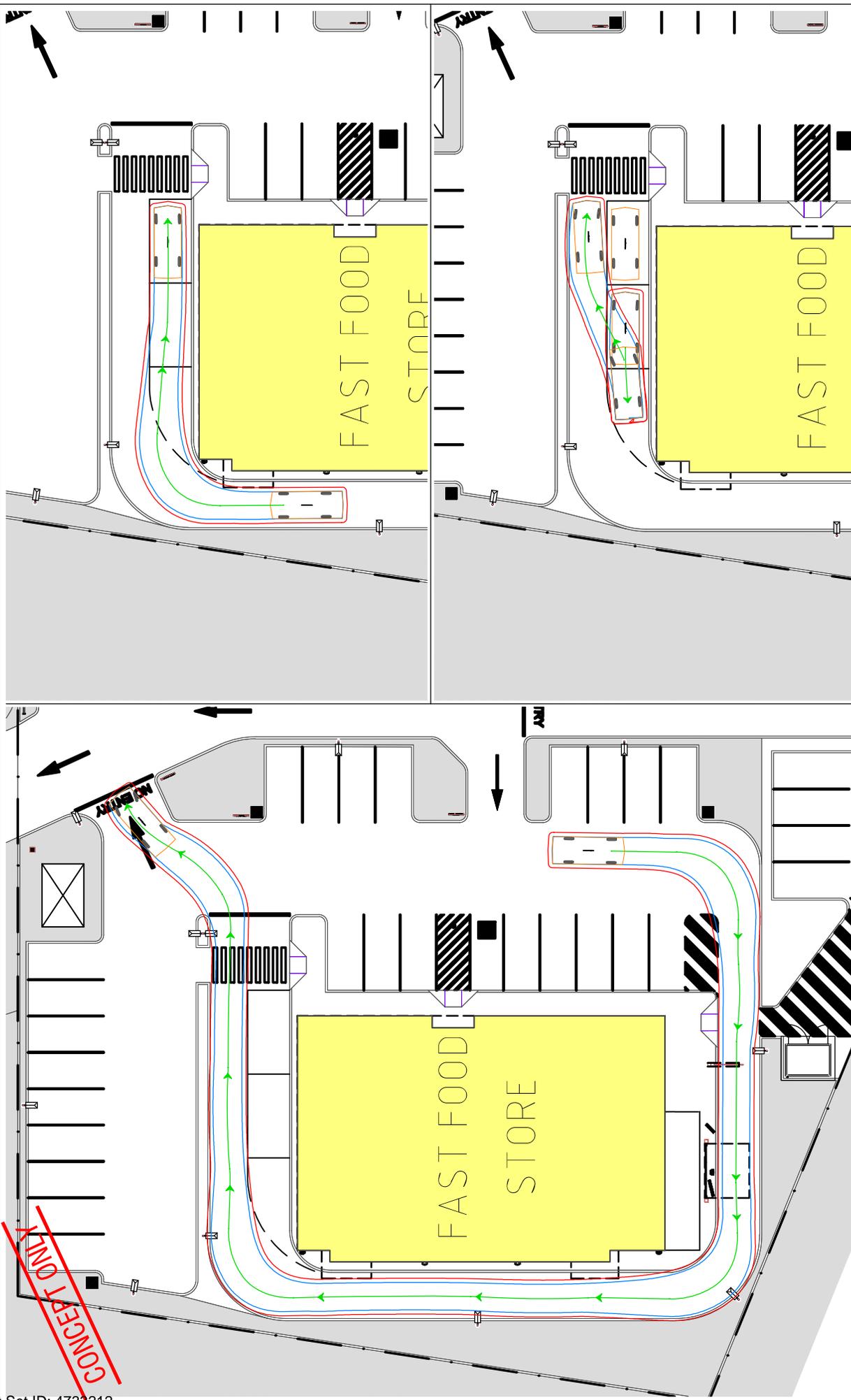
CAR CANOPY

FLINDERS HIGHWAY

CONCEPT ONLY

PROPERTY

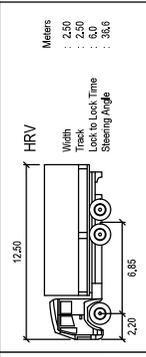
CP# 010719119 - 7403 Thompson Street, Mooran Park, QLD 4000 (SRK4-20191219) 4/4



TIA Project Group
 7433 Thompson Street, Moanan Park
 8081
 Drive-through assessments
 Date: 20/12/2019
 MLE Ref: 2012.2019
 Drawing Number: QTT19119-SK04
 Revision: A

Cardno
 Cardno (Qld) Pty Ltd | ABN 57 051 074 982
 Level 11, 516 St Pauls Terrace
 Brisbane QLD 4000
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SWEPT PATH LEGEND

- VEHICLE BODY
- VEHICLE PATH
- VEHICLE CLEARANCE (500mm)
- VEHICLE

Queensland Treasury

SARA reference: 2002-15436 SRA
Council reference: MC20/01
Applicant reference: 19013

10 June 2020

Chief Executive Officer
Charters Towers Regional Council
PO Box 189
Charters Towers Qld 4820
mail@charterstowers.qld.gov.au

Attention: Prue Miller

Dear Prue

SARA response — Material Change of Use for Service Station and Food and Drink Outlet at 71-93 Thompson Street, Mosman Park

(Referral agency response given under section 56 of the *Planning Act 2016*)

The development application described below was confirmed as properly referred by the State Assessment and Referral Agency on 17 March 2020.

Response

Outcome:	Referral agency response – with conditions.
Date of response:	10 June 2020
Conditions:	The conditions in Attachment 1 must be attached to any development approval.
Advice:	Advice to the applicant is in Attachment 2 .
Reasons:	The reasons for the referral agency response are in Attachment 3 .

Development details

Description:	Development permit	Material Change of Use for Service Station and Food and Drink Outlet
SARA role:	Referral Agency.	
SARA trigger:	Schedule 10, Part 9, Division 4, Subdivision 2, Table 4 (Planning Regulation 2017) Development application for a material change of use within 25m of a state-controlled road	

SARA reference: 2002-15436 SRA
Assessment Manager: Charters Towers Regional Council
Street address: 71-93 Thompson Street, Mosman Park
Real property description: Lot 2 on MPH20732 and Lot 142 on DV425
Applicant name: Puma Energy Australia Pty Ltd C/- TFA Project Group
Applicant contact details: 166 Knapp Street, (PO Box 2339)
Fortitude Valley QLD 4006
Brendan.Easton@tfa.com.au

State-controlled road access permit: This referral included an application for a road access location, under section 62A(2) of *Transport Infrastructure Act 1994*. Below are the details of the decision:

- Approved
- Reference: TMR20-029660
- Date: 9 June 2020

If you are seeking further information on the road access permit, please contact the Department of Transport and Main Roads at North.Queensland.IDAS@tmr.qld.gov.au or on (07) 4421 870.

Representations

An applicant may make representations to a concurrence agency, at any time before the application is decided, about changing a matter in the referral agency response (s.30 Development Assessment Rules). Copies of the relevant provisions are in **Attachment 4**.

A copy of this response has been sent to the applicant for their information.

For further information please contact Mac Haque, Senior Planning Officer, on 47583414 or via email NQSARA@dsmip.qld.gov.au who will be pleased to assist.

Yours sincerely



Graeme Kenna
Manager (Planning)

cc Puma Energy Australia Pty Ltd C/- TFA Project Group, Brendan.Easton@tfa.com.au

enc Attachment 1 – Referral agency conditions
Attachment 2 – Advice to the applicant
Attachment 3 – Reasons for referral agency response
Attachment 4 – Change representations provisions
Attachment 5 – Approved plans and specifications

Attachment 1 — Referral agency conditions

(Under section 56(1)(b)(i) of the *Planning Act 2016* the following conditions must be attached to any development approval relating to this application) (Copies of the plans and specifications referenced below are attached)

No.	Conditions	Condition Timing
Material Change of Use		
Schedule 10, Part 9, Division 4, Subdivision 2, Table 4 – Material change of use of premises near a State transport corridor – The chief executive administering the <i>Planning Act 2016</i> nominates the Director-General of the Department of Transport & Main Roads to be the enforcement authority for the development to which this development approval relates for the administration and enforcement of any matter relating to the following condition:		
1.	<p>(a) The road access locations, are to be located generally in accordance with Proposed Overall Site Plan, prepared by TFA Project Group dated 6 May 2020, reference 19013-DA02 and revision C (as amended in red by SARA on 10 June 2020).</p> <p>(b) Road access works comprising commercial vehicle crossings must be provided at all access locations.</p> <p>(c) The road access works must be designed and constructed in accordance with the following:</p> <ol style="list-style-type: none"> i. Department of Transport and Main Roads' Road Planning and Design Manual, Second Edition; ii. Manual on Uniform Traffic Control Devices (MUTCD); iii. Charters Towers Regional Council Standard Drawings for commercial driveways; and iv. Relevant Traffic and Road Use Management Manuals (TRUM). 	<p>(a) At all times</p> <p>(b) and (c) Prior to the commencement of use</p>
2.	<p>(a) The development must be carried out generally in accordance with the Site Based Stormwater Management Plan prepared by TFA Project Group dated 6 January 2020, reference 19013 and revision A, in particular:</p> <ul style="list-style-type: none"> • Conceptual Stormwater Management Plan, Drawing Number 19013-DA12 dated 6 January 2020 and revision A. <p>(b) RPEQ certification with supporting documentation must be provided to North.Queensland.IDAS@tmr.qld.gov.au within the Department of Transport and Main Roads, confirming that the development has been designed and constructed in accordance with part (a) of this condition.</p>	<p>(a) At all times</p> <p>(b) Prior to the commencement of use</p>

Attachment 2 — Advice to the applicant

General advice	
1.	Terms and phrases used in this document are defined in the <i>Planning Act 2016</i> its regulation or the State Development Assessment Provisions (SDAP) v2.6. If a word remains undefined it has its ordinary meaning.
2.	<p>Advertising</p> <p>Advertising devices have the potential to cause unsafe distraction, glare or other nuisance to drivers, which affects safety on the state-controlled road. Any proposed advertising devices are to be in accordance with the Department of Transport and Main Roads' Roadside Advertising Manual. In particular:</p> <ul style="list-style-type: none"> Proposed pylon signage must be placed within the subject site, clear of the state-controlled road reserve (without overhang). Construction and maintenance of a pylon sign must be carried out from within the subject site. Any proposed illumination must not exceed 350cd/m² and must not contain a variable message component. <p>The applicant is to submit detailed plans of any advertising sign/device that is visible from the State-controlled road to the Department of Transport and Main Roads for review and its installation be approved.</p> <p>Any flood lights or illumination on the subject site must be shielded, directed downwards and away from the State-controlled roads.</p>
3.	<p>Underground fuel tank and supporting infrastructure</p> <p>Any groundwater testing bores for fuel tanks are to be located entirely within the subject site and must not require maintenance activities within the state-controlled road reserve.</p>
4.	<p>Road Access Works Approval</p> <p>Road Access Works Approval Required – Written approval is required from the department to carry out road works that are road access works (including driveways) on a state-controlled road in accordance with section 33 of the TIA.</p> <p>As part of the above Road Access Works application, a detailed landscaping plan is also required to be submitted for the department's approval, that specifies the particulars of the proposed landscaping within the state-controlled road reserve, as shown on the submitted <i>Landscaping Concept Layout, prepared by TFA Project Group, referenced 19013 DA08, Revision C, dated 6 May 2020.</i></p> <p>This approval must be obtained prior to commencing any works on the state-controlled road. The approval process may require the approval of engineering designs of the proposed works, certified by a Registered Professional Engineer of Queensland (RPEQ). Please contact the department at: North.Queensland.IDAS@tmr.qld.gov.au to make an application.</p>

Attachment 3 — Reasons for referral agency response

(Given under section 56(7) of the *Planning Act 2016*)

The reasons for the department's decision are:

- To ensure the development does not create a safety hazard for users of a state-controlled road.
- To ensure the development does not compromise the structural integrity of state-controlled roads, road transport infrastructure or road works.
- To ensure the development does not result in a worsening of the physical condition or operating performance of state-controlled roads and the surrounding road network.
- To ensure the development does not compromise the state's ability to construct, or significantly increase the cost to construct state-controlled roads and future state-controlled roads.
- To ensure the development does not compromise the state's ability to maintain and operate state-controlled roads, or significantly increase the cost to maintain and operate state-controlled roads.

Material used in the assessment of the application:

- The development application material and submitted plans
- *Planning Act 2016*
- Planning Regulation 2017
- The *State Development Assessment Provisions* (version 2.6), as published by the department
- The Development Assessment Rules
- SARA DA Mapping system
- State Planning Policy mapping system

Attachment 4 — Change representation provisions

(page left intentionally blank)

Attachment 5 — Approved plans and specifications

(page left intentionally blank)

Our ref TMR20-029660
Your ref
Enquiries Denise Hinneberg



Department of
Transport and Main Roads

9 June 2020

Decision Notice – Permitted Road Access Location (s62(1) *Transport Infrastructure Act 1994*)

This is not an authorisation to commence work on a state-controlled road¹

Development application reference number MC20/01, lodged with Charters Towers Regional Council involves constructing or changing a vehicular access between Lot 142DV425, 2MPH20732, the land the subject of the application, and Thompson Street (Flinders Highway) (a state-controlled road).

In accordance with section 62A(2) of the *Transport Infrastructure Act 1994* (TIA), this development application is also taken to be an application for a decision under section 62(1) of TIA.

Applicant Details

Name and address Puma Energy Australia Pty Ltd C/- TFA Project Group
PO Box 2339
Fortitude Valley QLD 4006

Application Details

Address of Property 71-93 Thompson Street, Mosman Park QLD 4820
Real Property Description 142DV425, 2MPH20732
Aspect/s of Development Material Change of Use seeking a Development Permit for a Service Station and Food and Drink Outlet.

Decision (given under section 67 of TIA)

It has been decided to approve the application, subject to the following conditions:

No.	Conditions of Development Approval	Condition Timing
Material Change of Use – Service Station and Food and Drink Outlet		
In accordance with approved plans		
Vehicular access to the state-controlled road		
1.	The road access locations, are to be located generally in accordance with <i>Proposed Overall Site Plan</i> , prepared by TFA Project Group, reference 19013-DA02, Revision C, dated 6 May 2020.	At all times
Road access works		

¹ Please refer to the further approvals required under the heading 'Further approvals'

No.	Conditions of Development Approval	Condition Timing
2.	<p>(a) Road access works comprising commercial vehicle crossings must be provided at all access locations.</p> <p>(b) The road access works must be designed and constructed in accordance with the following:</p> <ul style="list-style-type: none"> i. Department of Transport and Main Roads' Road Planning and Design Manual, Second Edition; ii. Manual on Uniform Traffic Control Devices (MUTCD); iii. Charters Towers Regional Council Standard Drawings for commercial driveways; and iv. Relevant Traffic and Road Use Manuals (TRUM). 	Prior to the commencement of the use and to be maintained at all times

Reasons for the decision

The reasons for this decision are as follows:

- a) To ensure access to the state-controlled road from the site does not compromise the safety and efficiency of the state-controlled road.
- b) To provide safe access for all vehicles associated with the Service Station and Food and Drink Outlet.

Please refer to **Attachment A** for the findings on material questions of fact and the evidence or other material on which those findings were based.

Information about the Decision required to be given under section 67(2) of TIA

1. There is no guarantee of the continuation of road access arrangements, as this depends on future traffic safety and efficiency circumstances.
2. In accordance with section 70 of the TIA, the applicant for the planning application is bound by this decision. A copy of section 70 is attached as **Attachment B**, as required, for information.

Further information about the decision

1. In accordance with section 67(7) of TIA, this decision notice:
 - a) starts to have effect when the development approval has effect; and
 - b) stops having effect if the development approval lapses or is cancelled; and
 - c) replaces any earlier decision made under section 62(1) in relation to the land.
2. In accordance with section 485 of the TIA and section 31 of the *Transport Planning and Coordination Act 1994* (TPCA), a person whose interests are affected by this decision may apply for a review of this decision only within 28 days after notice of the decision was given under the TIA. A copy of the review provisions under TIA and TPCA are attached in **Attachment C** for information.
3. In accordance with section 485B of the TIA and section 35 of TPCA a person may appeal against a reviewed decision. The person must have applied to have the decision reviewed

before an appeal about the decision can be lodged in the Planning and Environment Court. A copy of the Appeal Provisions under TIA and TPCA is attached in **Attachment C** for information.

Further approvals

The Department of Transport and Main Roads also provides the following information in relation to this approval:

Road access works approval

Under section 33 of the Transport Infrastructure Act 1994, written approval is required from the Department of Transport and Main Roads to carry out road works that are road access works (including driveways) on a state-controlled road. Please contact the Department of Transport and Main Roads at North.Queensland.IDAS@tmr.qld.gov.au to make an application for road works approval.

As part of the above Road Access Works application, a detailed landscaping plan is also required to be submitted for the department's approval, that specifies the particulars of the proposed landscaping within the state-controlled road reserve, as shown on the submitted *Landscaping Concept Layout, prepared by TFA Project Group, referenced 19013 DA08, Revision C, dated 6 May 2020*.

This approval must be obtained prior to commencing any works on the state-controlled road reserve. The approval process may require the approval of engineering designs of the proposed works, certified by a Registered Professional Engineer of Queensland (RPEQ). The road access works approval process takes time – please contact Transport and Main Roads as soon as possible to ensure that gaining approval does not delay construction.

If further information about this approval or any other related query is required, Ms Denise Hinneberg, Town Planner, Infrastructure Management and Delivery should be contacted by email at North.Queensland.IDAS@tmr.qld.gov.au or on (07) 4421 8701.

Yours sincerely



Lisa Brooks
A/Principal Advisor (Corridor Management)

Attachments: Attachment A - Decision evidence and findings
Attachment B - Section 70 of TIA
Attachment C - Appeal Provisions
Attachment D - Permitted Road Access Location Plan

Attachment A

Decision Evidence and Findings

Findings on material questions of fact:

1. The objective of the *Transport Infrastructure Act 1994* requires the establishment of a road regime that is safe and efficient.
2. Section 62 of the *Transport Infrastructure Act 1994* allows the Department of Transport and Main Road to make decisions about permitted road access locations between particular/adjacent land and a state-controlled road.
3. Thompson Street (Flinders Highway) is declared as a state-controlled road.
4. Thompson Street (Flinders Highway) is not declared a limited access road in this vicinity.
5. The speed limit for this stretch of Thompson Street (Flinders Highway) is 80km/hr.
6. The proposed development is for a Service Station and Food and Drink Outlet.
7. The subject site has two (2) road frontages, being Thompson Street (Flinders Highway) (state-controlled road) and Clara Road (local road).
8. Access (entry and exit) to the mine workers car park is to be obtained via Clara Road. An alternative exit is proposed to be provided through the Service Station site (Lot 1 on MP20732).
9. An access (entry only) is proposed to be provided to the site via Clara Road.
10. Access to the site (Lot 1 MP20732) is currently obtained via Thompson Street (Flinders Highway).
11. The existing access points have been rationalised as part of this development.
12. The proposed access points are required to be designed in accordance with relevant Charters Towers Regional Council and TMR standards.
13. The access points have been assessed on the current conditions and not on any future planning within the area.

Evidence or other material on which findings were based:

Title of Evidence / Material	Prepared by	Date	Reference no.	Version/Issue
Transport Infrastructure Act 1994	Queensland Government	Current at 13/12/2019	N/A	N/A
Traffic Impact Assessment	Cardno	20 December 2019	QTT1918	01
Proposed Overall Site Plan	TFA Project Group	6 May 2020	19013-DA02	C
Technical Memorandum	Cardno	25 May 2020	QTT19118	Final

Attachment B

Section 70 of TIA

Transport Infrastructure Act 1994

Chapter 6 Road transport infrastructure

Part 5 Management of State-controlled roads

70 Offences about road access locations and road access works, relating to decisions under s 62(1)

- (1) This section applies to a person who has been given notice under section 67 or 68 of a decision under section 62(1) about access between a State-controlled road and adjacent land.
- (2) A person to whom this section applies must not—
 - (a) obtain access between the land and the State-controlled road other than at a location at which access is permitted under the decision; or
 - (b) obtain access using road access works to which the decision applies, if the works do not comply with the decision and the noncompliance was within the person's control; or
 - (c) obtain any other access between the land and the road contrary to the decision; or
 - (d) use a road access location or road access works contrary to the decision; or
 - (e) contravene a condition stated in the decision; or
 - (f) permit another person to do a thing mentioned in paragraphs (a) to (e); or
 - (g) fail to remove road access works in accordance with the decision.

Maximum penalty—200 penalty units.

- (3) However, subsection (2)(g) does not apply to a person who is bound by the decision because of section 68.

Attachment C
Appeal Provisions

Transport Infrastructure Act 1994
Chapter 16 General provisions

485 Internal review of decisions

- (1) A person whose interests are affected by a decision described in schedule 3 (the *original decision*) may ask the chief executive to review the decision.
- (2) The person is entitled to receive a statement of reasons for the original decision whether or not the provision under which the decision is made requires that the person be given a statement of reasons for the decision.
- (3) The *Transport Planning and Coordination Act 1994*, part 5, division 2—
 - (a) applies to the review; and
 - (b) provides—
 - (i) for the procedure for applying for the review and the way it is to be carried out; and
 - (ii) that the person may apply to QCAT to have the original decision stayed.

485B Appeals against decisions

- (1) This section applies in relation to an original decision if a court (the appeal court) is stated in schedule 3 for the decision.
- (2) If the reviewed decision is not the decision sought by the applicant for the review, the applicant may appeal against the reviewed decision to the appeal court.
- (3) The *Transport Planning and Coordination Act 1994*, part 5, division 3—
 - (a) applies to the appeal; and
 - (b) provides—
 - (i) for the procedure for the appeal and the way it is to be disposed of; and
 - (ii) that the person may apply to the appeal court to have the original decision stayed.
- (4) Subsection (5) applies if—
 - (a) a person appeals to the Planning and Environment Court against a decision under section 62(1) on a planning application that is taken, under section 62A(2), to also be an application for a decision under section 62(1); and

(b) a person appeals to the Planning and Environment Court against a decision under the Planning Act on the planning application.

(5) The court may order—

(a) the appeals to be heard together or 1 immediately after the other; or

(b) 1 appeal to be stayed until the other is decided.

(6) Subsection (5) applies even if all or any of the parties to the appeals are not the same.

(7) In this section—

original decision means a decision described in schedule 3.

reviewed decision means the chief executive's decision on a review under section 485.

31 Applying for review

- (1) A person may apply for a review of an original decision only within 28 days after notice of the original decision was given to the person under the transport Act.
- (2) However, if—
 - (a) the notice did not state the reasons for the original decision; and
 - (b) the person asked for a statement of the reasons within the 28 days mentioned in subsection (1)the person may apply within 28 days after the person is given the statement of the reasons.
- (3) In addition, the chief executive may extend the period for applying.
- (4) An application must be written and state in detail the grounds on which the person wants the original decision to be reviewed.

32 Stay of operation of original decision

- (1) If a person applies for review of an original decision, the person may immediately apply for a stay of the decision to the relevant entity.
- (2) The relevant entity may stay the original decision to secure the effectiveness of the review and any later appeal to or review by the relevant entity.
- (3) In setting the time for hearing the application, the relevant entity must allow at least 3 business days between the day the application is filed with it and the hearing day.
- (4) The chief executive is a party to the application.
- (5) The person must serve a copy of the application showing the time and place of the hearing and any document filed in the relevant entity with it on the chief executive at least 2 business days before the hearing.
- (6) The stay—
 - (a) may be given on conditions the relevant entity considers appropriate; and
 - (b) operates for the period specified by the relevant entity; and
 - (c) may be revoked or amended by the relevant entity.
- (7) The period of a stay under this section must not extend past the time when the chief executive reviews the original decision and any later period the relevant entity allows the applicant to enable the applicant to appeal against the decision or apply for a review of the decision as provided under the QCAT Act.

(8) The making of an application does not affect the original decision, or the carrying out of the original decision, unless it is stayed.

(9) In this section—

relevant entity means—

(a) if the reviewed decision may be reviewed by QCAT—QCAT; or

(b) if the reviewed decision may be appealed to the appeal court—the appeal court.

35 Time for making appeals

(1) A person may appeal against a reviewed decision only within—

(a) if a decision notice is given to the person—28 days after the notice was given to the person; or

(b) if the chief executive is taken to have confirmed the decision under section 34(5)—56 days after the application was made.

(2) However, if—

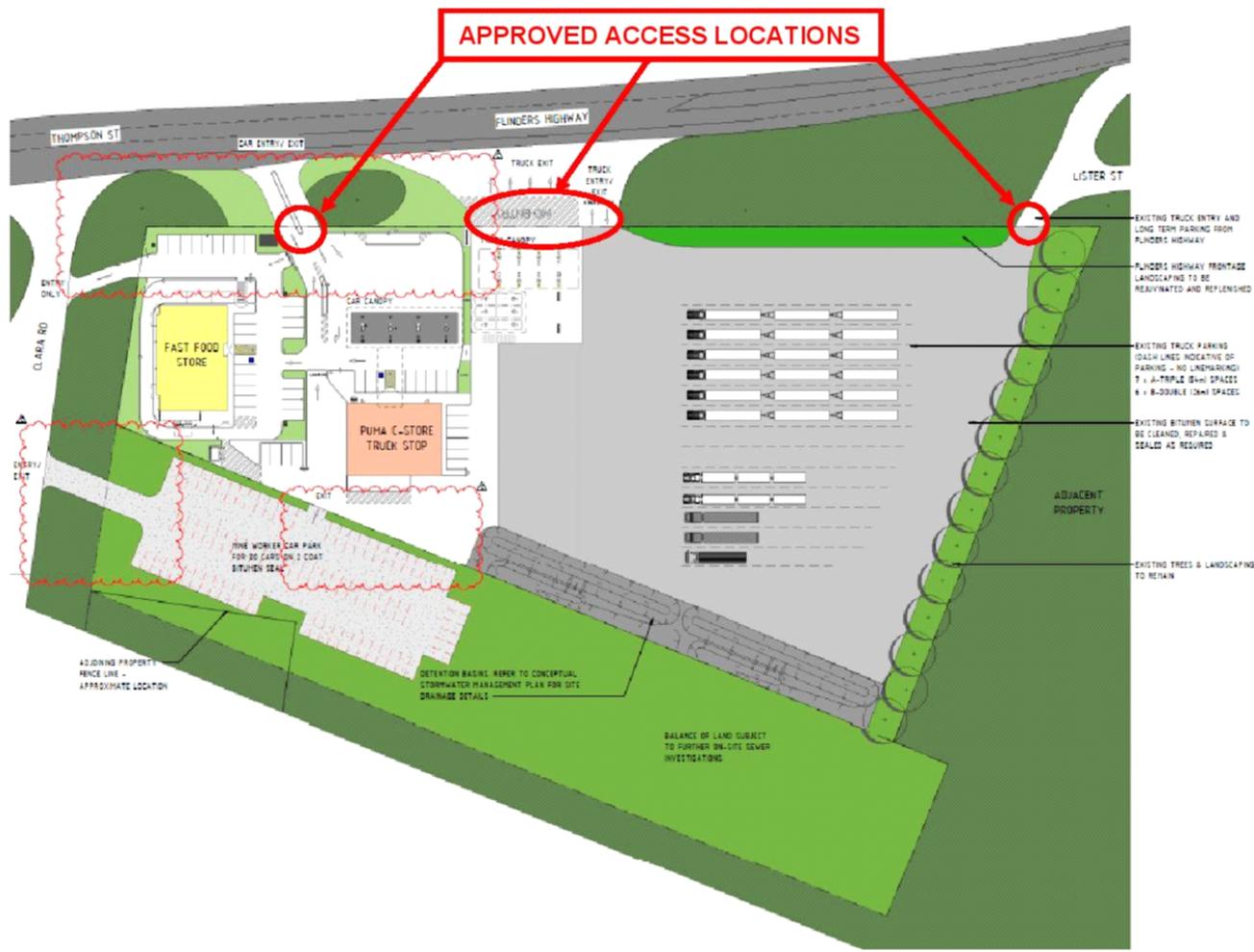
(a) the decision notice did not state the reasons for the decision; and

(b) the person asked for a statement of the reasons within the 28 days mentioned in subsection (1)(a);

the person may apply within 28 days after the person is given a statement of the reasons.

(3) Also, the appeal court may extend the period for appealing.

Attachment D



RPD
 LOT 2 ON HP402102
 AREA 1.003 HECTARES
 LOT 142 ON DV4245
 AREA 1.944m
 LGA: CHARTERS TOWERS REGIONAL COUNCIL

NOTES
 1. NOT FOR TENDER OR CONSTRUCTION
 2. EXTERNAL ROAD WORKS SUBJECT TO FINAL ADVICE FROM TRAFFIC ENGINEER
 3. SITE LAYOUT SUBJECT TO DETAIL SITE SURVEY AT DETAIL DESIGN STAGE

LEGEND
 [Green Box] EXISTING LANDSCAPE TO BE REHABILITATED REFER TO CONCEPT LANDSCAPE PLAN
 [Green Box with +] EXISTING TREES & LANDSCAPING TO RETAIN
 [Light Green Box] PROPOSED LANDSCAPING - REFER TO CONCEPT LANDSCAPE PLAN
 [Grey Box] EXISTING BITUMEN TO BE CLEANED AND REPAIRED AS REQUIRED

SITE COVERAGE SCHEDULE

PUMA SHOP C-STORE	428m ²
FAST FOOD STORE	488m ²
CAR CANOPY LINK	290m ²
TRUCK CANOPY	285m ²
EXISTING PLUS EXTENSION (SUBJECT TO SURVEY)	
PAVEMENT INCL. SERVICE YARDS	81819m ²
PATHWAYS	37926m ²
LANDSCAPING	4462m ²
LONG TERM CAR PARK (GRAVEL)	2288m ²
EXISTING LANDSCAPE & HARDSCAPE LANDSCAPE REHABILITATED (LOT 2)	472m ²
LANDSCAPE UNAFFECTED (LOT 2)	1544m ²
LANDSCAPE UNAFFECTED (LOT 142)	6511m ²
BITUMEN	5427m ²

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				PREPARED BY DA/PLW	APPROVED BY 	DATE 15/02	REVISION 1/002

Development Assessment Rules—Representations about a referral agency response

The following provisions are those set out in sections 28 and 30 of the Development Assessment Rules¹ regarding **representations about a referral agency response**

Part 6: Changes to the application and referral agency responses

28 Concurrence agency changes its response or gives a late response

- 28.1. Despite part 2, a concurrence agency may, after its referral agency assessment period and any further period agreed ends, change its referral agency response or give a late referral agency response before the application is decided, subject to section 28.2 and 28.3.
- 28.2. A concurrence agency may change its referral agency response at any time before the application is decided if—
- (a) the change is in response to a change which the assessment manager is satisfied is a change under section 26.1; or
 - (b) the Minister has given the concurrence agency a direction under section 99 of the Act; or
 - (c) the applicant has given written agreement to the change to the referral agency response.²
- 28.3. A concurrence agency may give a late referral agency response before the application is decided, if the applicant has given written agreement to the late referral agency response.
- 28.4. If a concurrence agency proposes to change its referral agency response under section 28.2(a), the concurrence agency must—
- (a) give notice of its intention to change its referral agency response to the assessment manager and a copy to the applicant within 5 days of receiving notice of the change under section 25.1; and
 - (b) the concurrence agency has 10 days from the day of giving notice under paragraph (a), or a further period agreed between the applicant and the concurrence agency, to give an amended referral agency response to the assessment manager and a copy to the applicant.

¹ Pursuant to Section 68 of the *Planning Act 2016*

² In the instance an applicant has made representations to the concurrence agency under section 30, and the concurrence agency agrees to make the change included in the representations, section 28.2(c) is taken to have been satisfied.

Part 7: Miscellaneous

30 Representations about a referral agency response

- 30.1. An applicant may make representations to a concurrence agency at any time before the application is decided, about changing a matter in the referral agency response.³

³ An applicant may elect, under section 32, to stop the assessment manager's decision period in which to take this action. If a concurrence agency wishes to amend their response in relation to representations made under this section, they must do so in accordance with section 28.

RPD
 LOT, LOT 2 ON MP4/20732
 AREA: 2.003 HECTARES
 LOT, LOT 142 ON DV425
 AREA: 8,744m²
 LGA: CHARTERS TOWERS REGIONAL COUNCIL



NOTES

1. NOT FOR TENDER OR CONSTRUCTION
2. EXTERNAL ROAD WORKS SUBJECT TO FINAL ADVICE FROM TRAFFIC ENGINEER
3. SITE LAYOUT SUBJECT TO DETAIL SITE SURVEY AT DETAIL DESIGN STAGE

LEGEND

- EXISTING LANDSCAPE TO BE REHABILITATED REFER TO CONCEPT LANDSCAPE PLAN
- EXISTING TREES & LANDSCAPING TO REMAIN
- PROPOSED LANDSCAPING - REFER TO CONCEPT LANDSCAPE PLAN
- EXISTING BITUMEN TO BE CLEANED AND REPAIRED AS REQUIRED

SITE COVERAGE SCHEDULE

PUMA SHOP C-STORE	427m ²
FAST FOOD STORE	450m ²
CAR CANOPY	290m ²
CAR CANOPY LINK	90m ²
TRUCK CANOPY	250m ²
(EXISTING PLUS EXTENSION SUBJECT TO SURVEY)	
PAVEMENT (INCL. SERVICE YARDS)	5181.70m ²
PATHWAYS	379.80m ²
LANDSCAPING	448m ²
LONG TERM CAR PARK (GRAVEL)	2255m ²
EXISTING LANDSCAPE & HARDSTAND	
LANDSCAPE REHABILITATED LOT 2	472m ²
LANDSCAPE UNAFFECTED LOT 2	1544m ²
LANDSCAPE UNAFFECTED LOT 142	6519m ²
BITUMEN	11427m ²

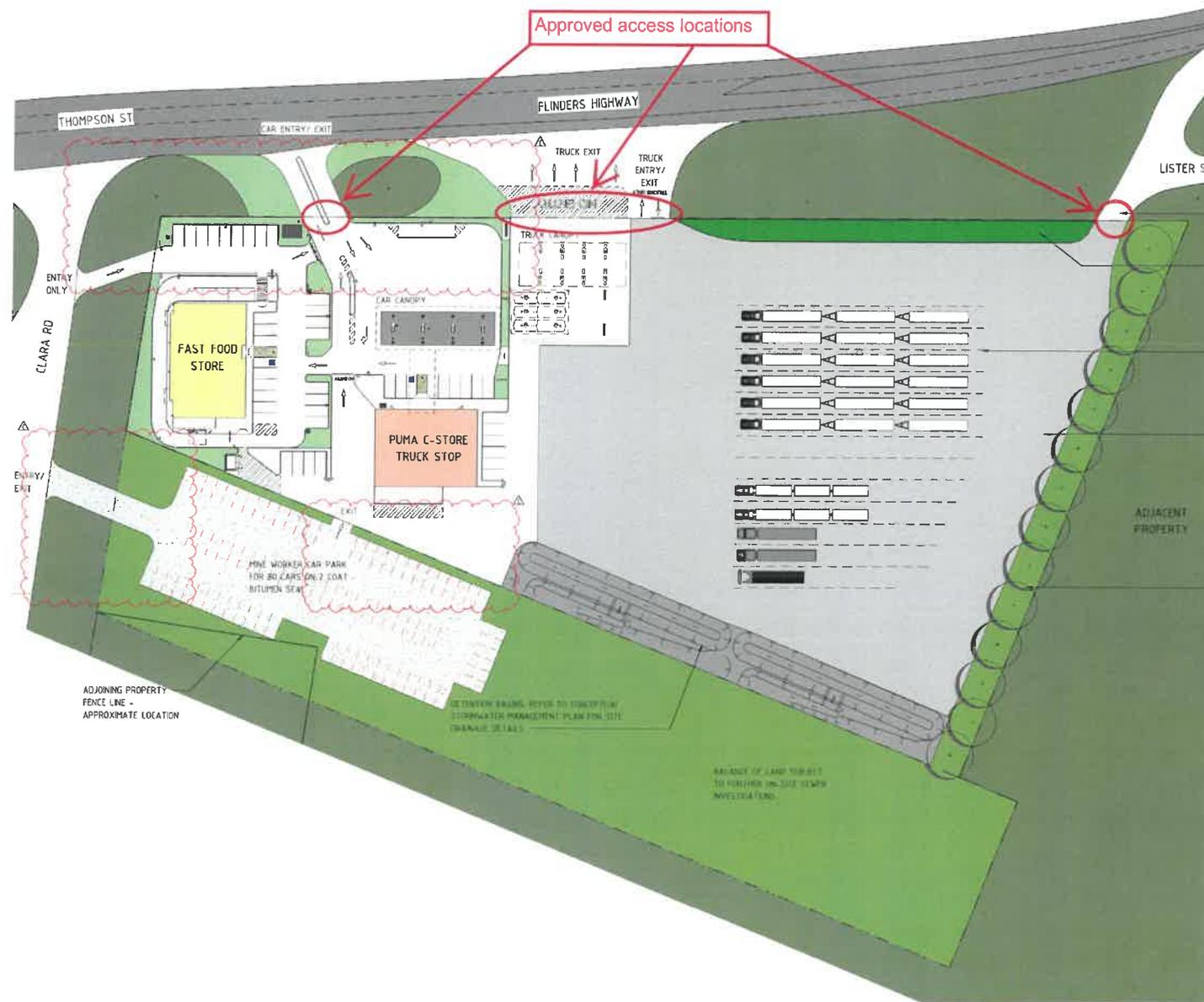
Amended in red by SARA on
 10 June 2020

PLANS AND DOCUMENTS referred to in the REFERRAL AGENCY RESPONSE



SARA ref: 2002-15436 SRA

Date: 10 June 2020



Approved access locations

FLINDERS HIGHWAY

LISTER ST

FAST FOOD STORE

PUMA C-STORE TRUCK STOP

PINE WORKER CAR PARK FOR 80 CARS ON 2 TON BITUMEN SEAT

ADJOINING PROPERTY FENCE LINE - APPROXIMATE LOCATION

SEE INTERVIEW BRIEFING REFER TO CONCEPT SITE WATER MANAGEMENT PLAN FOR SITE DRAINAGE DETAILS

VARIANCE OF LAND SUBJECT TO FURTHER ON-SITE DESIGN INVESTIGATION

EXISTING TRUCK ENTRY AND LONG TERM PARKING FROM FLINDERS HIGHWAY

FLINDERS HIGHWAY FRONTAGE LANDSCAPING TO BE REJUVENATED AND REPLENISHED

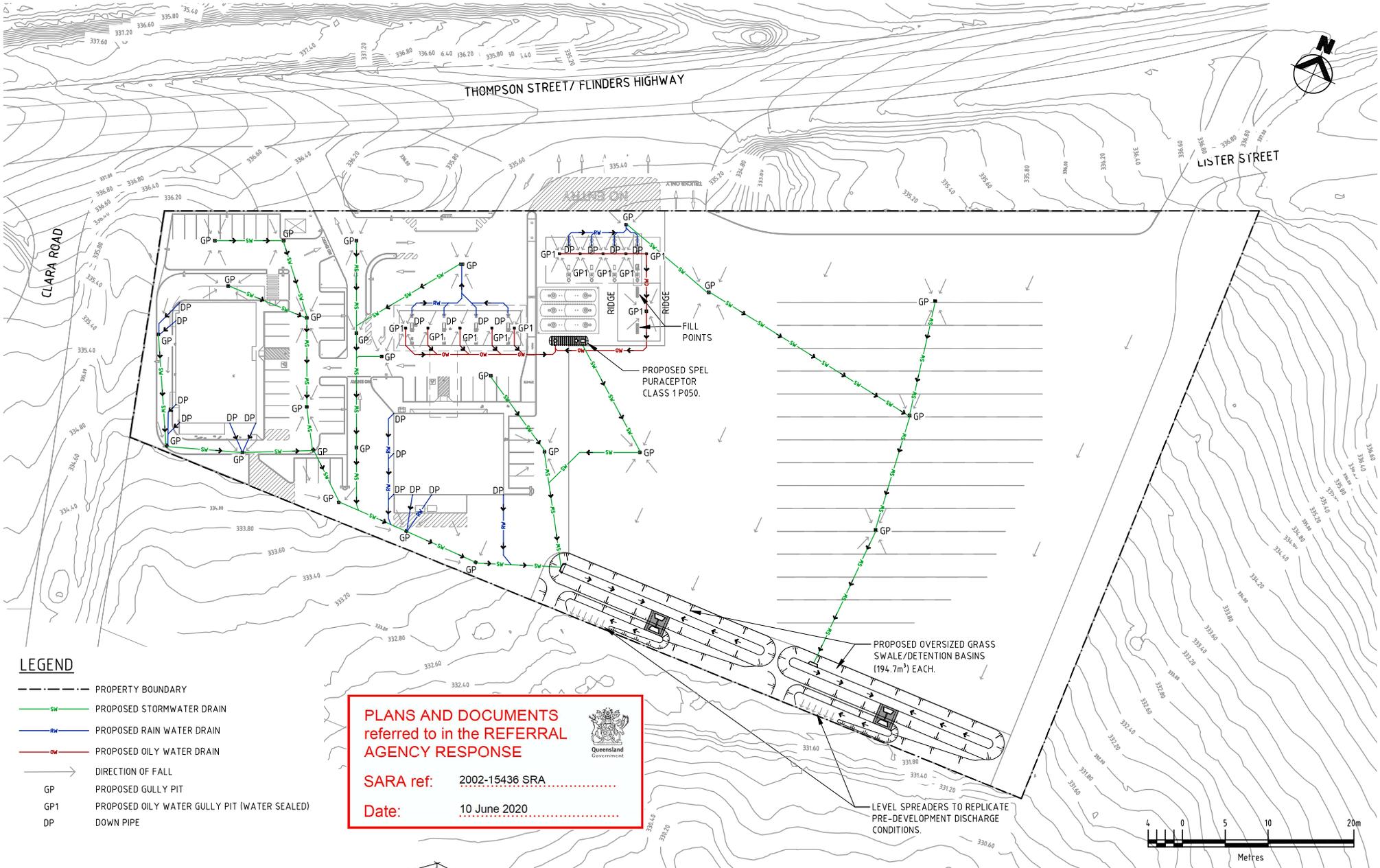
EXISTING TRUCK PARKING (DASH LINES INDICATIVE OF PARKING - NO LINEMARKING) 7 x A-TRIPLE (15m) SPACES 6 x B-DOUBLE (26m) SPACES

EXISTING BITUMEN SURFACE TO BE CLEANED, REPAIRED & SEALED AS REQUIRED

EXISTING TREES & LANDSCAPING TO REMAIN

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			<p>PUMA TRUCK STOP CHARTERS TOWERS 71-93 THOMPSON ST ST MOSMAN PARK QLD 4820</p>	<p>PROPOSED OVERALL SITE PLAN</p>	<p>DA ISSUE</p> <p>DRAWN: HG APPROVED: JR</p> <p>DATE CREATED: 20.11.19 AT SCALE: 1:500 AS SCALE: 1:1000</p> <p>DRAWING NO: 19013 REV: DA02 C</p>											





LEGEND

- PROPERTY BOUNDARY
- PROPOSED STORMWATER DRAIN
- PROPOSED RAIN WATER DRAIN
- PROPOSED OILY WATER DRAIN
- DIRECTION OF FALL
- GP PROPOSED GULLY PIT
- GP1 PROPOSED OILY WATER GULLY PIT (WATER SEALED)
- DP DOWN PIPE

PLANS AND DOCUMENTS referred to in the REFERRAL AGENCY RESPONSE

SARA ref: 2002-15436 SRA

Date: 10 June 2020



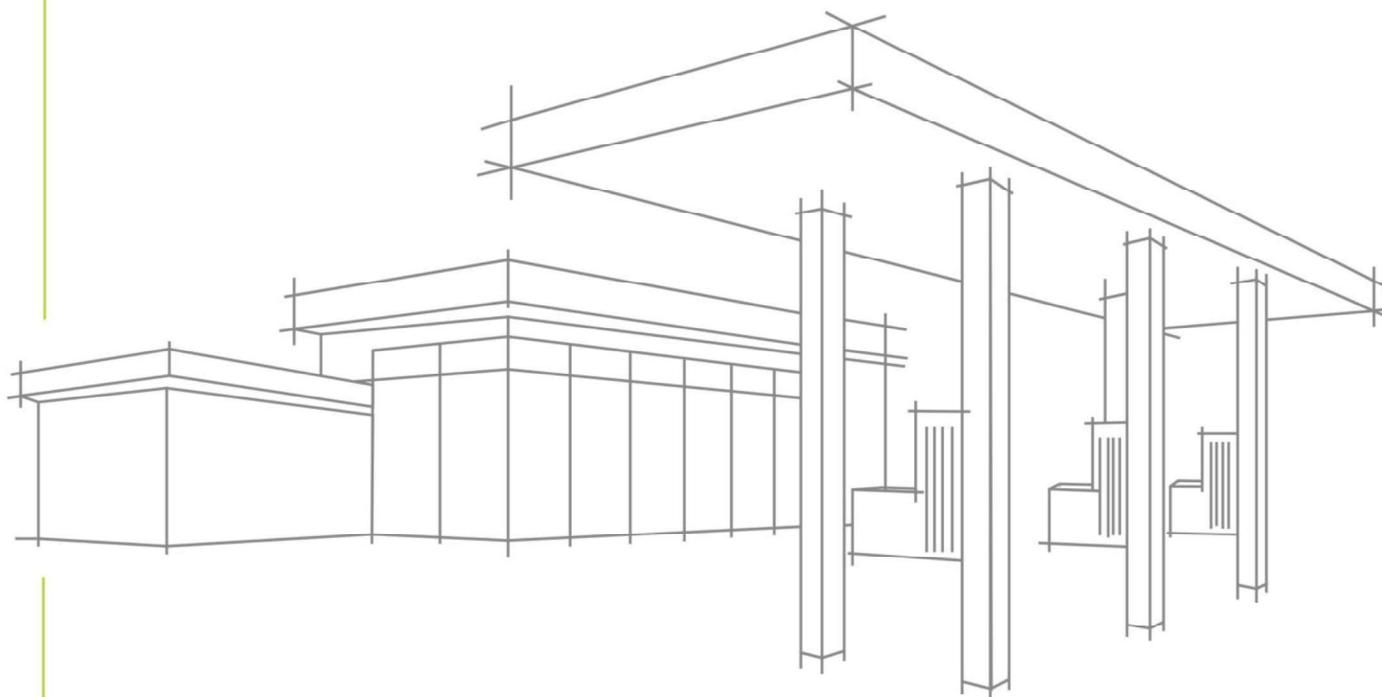
Queensland Government

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SITE BASED STORMWATER MANAGEMENT PLAN

CHARTERS TOWERS TRUCK STOP

71-93 THOMPSON STREET, MOSMAN PARK QLD 4820



CREATE • PLAN • DELIVER

PLANS AND DOCUMENTS
referred to in the REFERRAL
AGENCY RESPONSE



SARA ref: 2002-15436 SRA

Date: 10 June 2020

PROJECT MANAGERS | PLANNERS | DESIGNERS | ENGINEERS

SITE BASED STORMWATER MANAGEMENT PLAN

Charters Towers Truck Stop

71-93 Thompson Street, Mosman Park QLD 4820

CLIENT: Puma Energy Australia Pty Ltd (Puma)
ADDRESS: 71-93 Thompson Street, Mosman Park QLD 4820
TFA REFERENCE: 19013
TFA CONTACT: Brendan Easton

Document Control

REVISION	DATE	PREPARED BY	REVIEWED BY	COMMENTS
A	6 January 2020	L. Salinas	J. Avella	Issued for approval

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1.0 INTRODUCTION

This Site Based Stormwater Management Plan (SBSMP) has been prepared by TFA Group on behalf of Puma Energy Australia Pty Ltd (Puma) (the applicant). The proposed redevelopment of the existing service station and warehouse storage comprises a car canopy over fuel dispensing areas linked to a Puma store building, a canopy over truck fuel dispensing areas, a drive thru building and car and truck parking areas with associated driveways, walkways and landscape areas. The purpose of this document is to verify that stormwater quality and quantity have been considered as part of this development and do not have any adverse impact on the downstream environment as outlined in the Queensland State Planning Policy July 2017, Charters Towers Regional Town Plan, performance outcomes P012 to P014 of the Department of Infrastructure Local Government and Planning State Code 1 and the Queensland Urban Drainage Manual (QUDM) 2016.

The SBSMP is part of the Development Approval process and addresses both the construction and operational phases of the development. Table 1 below shows additional details of the proposed development. The proposed site layout plan is shown in **Appendix A**.

Table 1: Details of proposed development

Developer	Puma Energy Australia Pty Ltd
Address	71-93 Thompson Street, Mosman Park QLD 4820
Property Description	Lot 2 on MPH20732
Area of Development	20,030 m ²
Stormwater Risk Classification	High Risk (due to the storage and transfer on site of petroleum products that have the potential to cause harm to the environment, if released)
Existing Land Use	Puma Service station comprising car and truck canopies, Puma building, warehouse/storage building, with associated driveways, walkways, landscape and parking areas.

2.0 THE SITE

2.1 Site Description

The development site is located at 71-93 Thompson Street, Mosman Park QLD 4820 within Charters Towers Regional Council area. The subject site is in Lot 2 on MPH20732. It has regular shape containing an area of approximately 20,030 m². The site is currently a Puma service station comprising a paypoint building, warehouse/storage building with associated parking, landscaping and driveway areas. The Lot is bound by Thompson Street to the North, Clara Road to the West, Lot 142 on DV425 to the South and Lot 1 on MPH21611 to the East.

A geotechnical investigation will be completed to determine soil type and any specific treatment or management requirements to mitigate erosion or pollution of the environment prior to the commencement of works. A location of the site is shown on Figure 1.

Figure 1: Location of the proposed development site (Source: QLD Globe)



3.0 SITE TOPOGRAPHY AND EXISTING DRAINAGE

3.1 Description of the site current condition

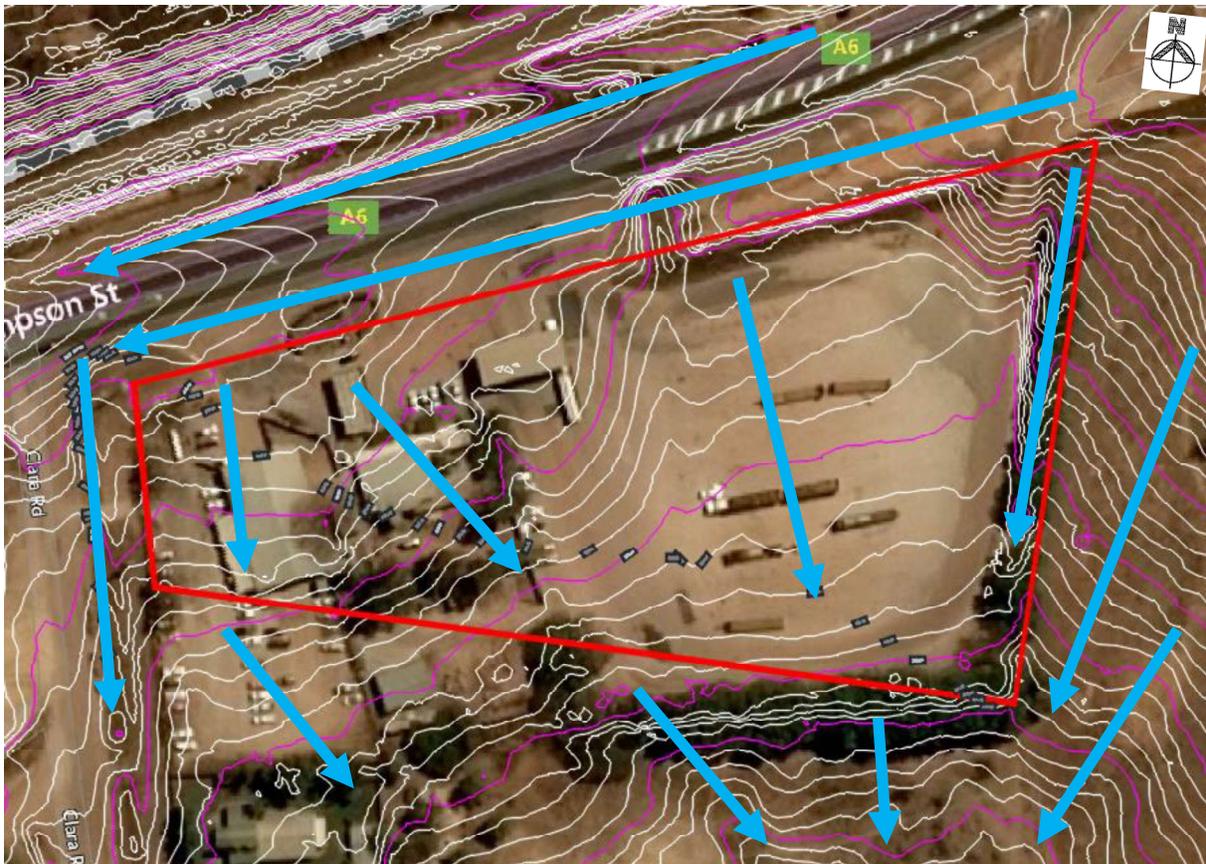
The overall site, formally referenced as Lot 2 on MPH20732, comprises 2.03 hectares in area. Preliminary survey information has been obtained from the Intergovernmental Committee on Surveying and Mapping website (ELVIS – Elevation and Depth – Foundation Spatial Data website) on 13 of November 2019 for site topography and existing drainage assessment.

The development site has one catchment of varying slope with existing surface levels approximately between RL 331.40 m AHD and 336.00 m AHD and falls from Northwest to Southeast.

The site currently does not have a stormwater network, as such, the majority of stormwater runoff generated from the site flows unmitigated as overland flow to the southern neighbouring property.

The site's upper catchment is currently diverted by Thompson Street stormwater infrastructure and neighbouring properties do not discharge runoff to the site. Figure 2 below shows the survey information obtained from ELVIS website and the current flow paths identified in the development area.

Figure 2: Site survey information (Source: ELVIS website)



4.0 FLOODING

4.1 Flooding information

Based on the information obtained from the Queensland Government (FloodCheck Queensland website) on 13 November 2019, in particular the Charters Towers Flood Investigation Flood Hazard Map – 92 mm in 1 hour (i.e. 1% AEP Event) at the BoM Gauge 03484 and Flood Hazard Map – Depth Component 92 mm in 1 hour (i.e. 1% AEP Event) at the BoM Gauge 03484 the extension of flood events near the site generally affects parking areas. Nonetheless, buildings final floor levels will be raised 0.3m above the flood depth identified and therefore it is anticipated that flooding will not affect the proposed buildings on this site. Extracts of the above mentioned maps are shown in Figure 3 and Figure 4 which indicate the extension of flood hazards and depth of flood near the site. Refer to **Appendix B** for the Flood Maps obtained from the Queensland Government (FloodCheck website).



Figure 3: Development Flooding Information – Flood Hazard Map 1% AEP Event



Figure 4: Development Flooding Information – Flood Hazard Map- Depth Component 1% AEP Event

5.0 PROPOSED DRAINAGE LAYOUT

5.1 Proposed drainage

The post development stormwater drainage design will generally maintain the overall catchment boundaries. The design will separate the high risk (hydrocarbon generating e.g. under the canopies) area from the low risk areas (the rest of the site). Any spillage or minor spills from under the canopy will be captured by gully pits and then directed to a Spel Puraceptor for hydrocarbon removal. Treated discharge from the SPEL Puraceptor will be connected to the stormwater network.

There will be two fuel tanker delivery fill points (unloading areas) that will be located outside the truck canopy within an isolated area and any spills that might occur during unloading of fuel in these areas will be also directed to the proposed SPEL Puraceptor. The tanker delivery stand catchment areas (unloading areas) will be graded to drain any spill to the proposed SPEL Puraceptor at all times. A licensed contractor will remove the contents of the Puraceptor when required. For details of the oily water system refer to section 7.4 of this report.

Stormwater runoff generated from low risk areas (the rest of the site) will be directed to oversized vegetated swales/detention basins for the removal of coarse to medium sized sediments (and attached pollutants) and on-site detention. Discharge from vegetated swales/detention basins will be spread out via level spreaders to replicate pre-development conditions and ensuring that post-development flows match the pre-development scenario. Consequently, adjoining land, downstream areas and/or state road infrastructure will not be adversely affected through any ponding or site discharge. Refer to **Appendix C** for a concept plan of the stormwater drainage proposed.

6.0 WATER QUANTITY ASSESSMENT

The purpose of this part of the assessment is to investigate whether there is a need to attenuate stormwater flows to negate any adverse impacts on upstream or downstream environments. Stormwater runoff from both pre and post-development scenarios will be calculated and the results analysed and possible solutions proposed.

6.1 Catchment Analysis

The total development site area is 20,030 m² (2.03 ha), details of the pre-development catchment are shown in Figure 5 and Table 2 below, which show the surface types, areas, percentage imperviousness and fraction impervious.

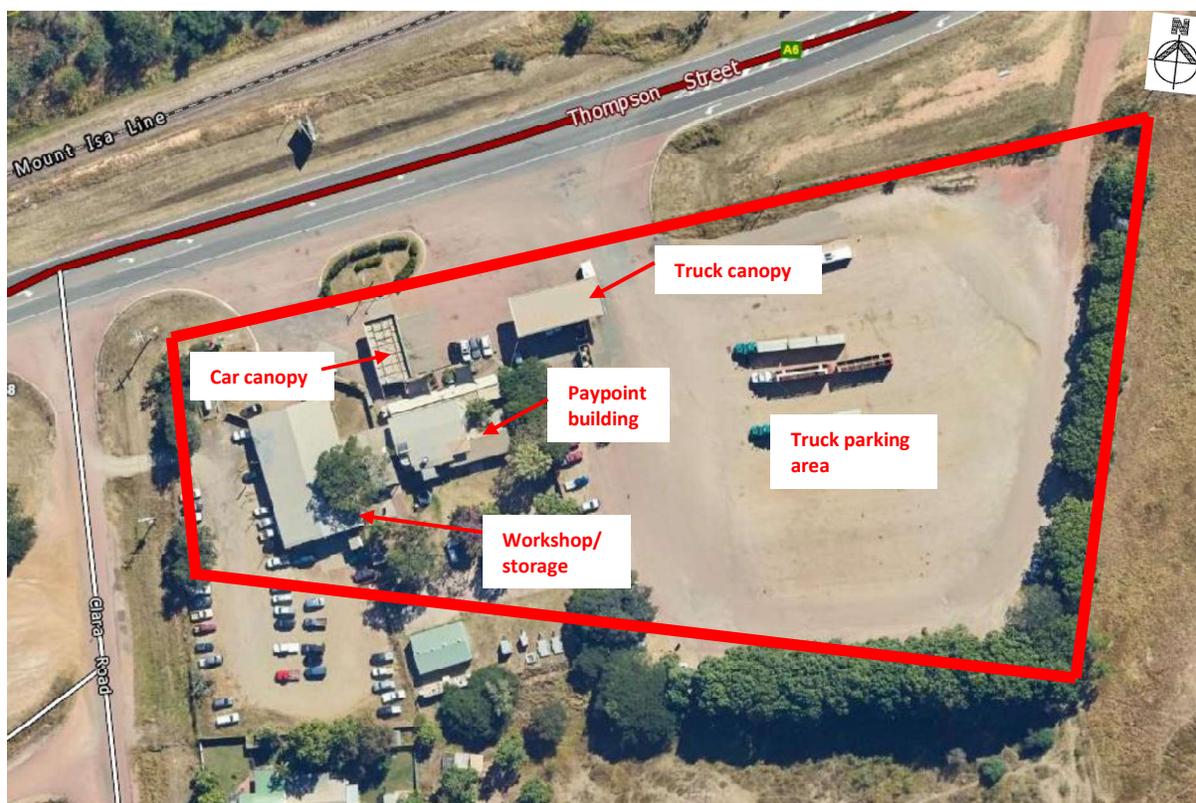


Figure 5: Pre-development catchment details

Table 2: Pre-development catchment characteristics

Catchment	Surface Type	Area (m ²)	Percentage Imperviousness	Fraction impervious
A	Roofed Area	1,632.5	100	0.80
	Paved Area	14,320.9	100	
	Landscaped Area	4,076.6	0	
TOTAL		20,030		

Details of the post-development catchment are shown in Figure 6 and Table 3 below, which show the surface types, areas, percentage imperviousness and fraction impervious.

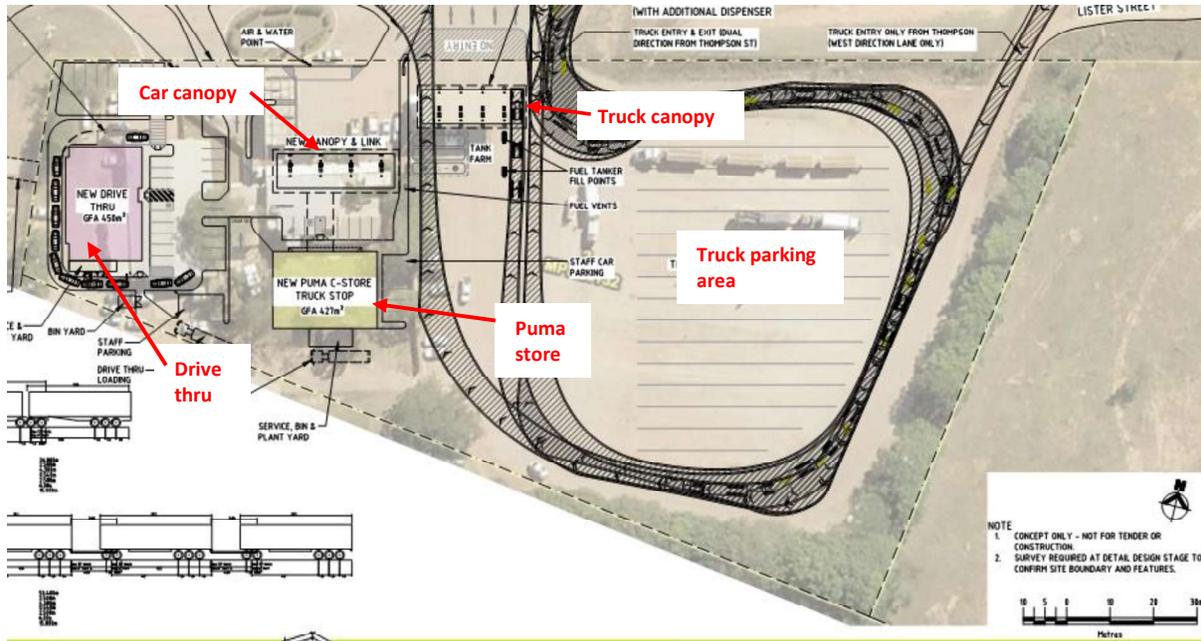


Figure 6: Post-development catchment details.

Table 3: Post-development catchment characteristics

Catchment	Surface Type	Area (m ²)	Percentage Imperviousness	Fraction impervious
A	Roofed Area	1,417	100	0.92
	Paved Area	16,955	100	
	Landscaped Area	1,658	0	
TOTAL		20,030		

Table 2 and Table 3 above show that the fraction impervious for the post-development case is higher than the fraction impervious of the pre-development case, this will result in increased peak flows in the post-development case therefore onsite stormwater detention is required.

6.2 Stormwater Detention Sizing

6.2.1 Rational Method

The rational method was used to calculate the stormwater runoff flows from the site for the pre and post-development scenarios. The formula is as follows:

$$Q_y = (C_y \times I_y \times A) / 360 \quad \text{(QUDM 2016 Equation 4.2)}$$

Where:

Q_y = peak flow rate (m³/s) for average recurrence interval (ARI) of 'y' years

C_y = coefficient of discharge (dimensionless) for ARI of 'y' years

A = area of catchment (ha)

t_y = average rainfall intensity (mm/h) for a design duration of 't' hours and an ARI of 'y' years.

t = the nominal design storm duration as defined by the time of concentration (t_c).

The value '360' is a conversion factor to suit the units used.

6.2.2 Catchments

The existing catchment boundary has been maintained in the post development scenario. Pre and post-development catchment information is tabulated in Table 4 below.

Table 4: Catchment details

Catchment	Pre-development Area (Ha)	Pre-development fraction impervious	Post-development Area (Ha)	Post-development fraction impervious
A	2.03	0.80	2.03	0.92
TOTAL	2.03		2.03	

6.2.3 Time of concentration

The time of concentration of the pre-development scenario was calculated using the Friend's equation for overland sheet flow and figure 4.8 and 4.9 of the Queensland Urban Drainage Manual (QUDM 2016). The equation is shown below:

$$t_c = (107 \cdot n \cdot L^{0.333}) / S^{0.2} \quad \text{(QUDM 2016: Equation 4.5)}$$

Where:

t_c = overland sheet flow travel time (min)

L = overland sheet flow path length (m)

n = Horton's surface roughness factor

S = slope of surface (%)

The value '107' is a conversion factor to suit the units used.

Based on the survey information the assumed flow path for this calculation is indicated in Figure 7. A thick red line represents the flow path. It starts from the north-eastern corner of the site and ends at the south-eastern side boundary. It is assumed a gravelled surface for Horton's coefficient as the flow path is on the shoulder of the truck car parking driveway.

Table 5: Pre-development time of concentration assumptions

Assumptions	Catchment A- Value
Overland sheet flow length (m)	133
Overland sheet flow slope (%)	5.8
Horton's coefficient	0.03
Overland sheet flow travel time (min)	7.68

The time of concentration for post-development scenarios was determined using clause 5.4.4 of AS3500.3:2018 Plumbing and Drainage: Stormwater Drainage. Table 6 below shows the times of concentration used in the water quantity assessment.



Figure 7: Assumed site overland flow path for time of concentration calculations

Table 6: Time of concentration for the catchment

Catchment	Time of concentration
Pre-development – Catchment A	7.68
Post-development – Catchments A	5.00

6.2.4 Coefficient of discharge

From Table 4.5.3 and 4.5.4 of QUDM, a one hour rainfall intensity for a 1 in 10 year ARI ($^1I_{10}$) of 62.5 mm/hr and fraction impervious f_i of 0.80 has a C10 value for the pre-development catchment of 0.84. The post-development C10 value is 0.88 for a fraction impervious f_i of 0.92. Table 7 below shows the F_y factor used to calculate the C_y value for each ARI.

Table 7: F_y factors for the nominated ARI's

	1 year ARI (mm/hr)	2 year ARI (mm/hr)	5 year ARI (mm/hr)	10 year ARI (mm/hr)	20 year ARI (mm/hr)	50 year ARI (mm/hr)	100 year ARI (mm/hr)
F_y	0.80	0.85	0.95	1.00	1.05	1.15	1.20

The coefficient of discharge for both pre and post-development catchments is calculated based on equation 4.3 of QUDM and the results shown in Table 8.

Table 8: Coefficients of discharge for pre and post-development scenarios

Coefficient of Discharge	1 year ARI	2 year ARI	5 year ARI	10 year ARI	20 year ARI	50 year ARI	100 year ARI
Pre-development Catchment-A	0.67	0.71	0.80	0.84	0.88	0.97	1.01
Post-development Catchment-A	0.70	0.75	0.84	0.88	0.92	1.00	1.00

6.2.5 Rainfall Intensities

The rainfall intensities for the site were read from an IFD table obtained from the BOM website for the project site on 12 November 2019. The rainfall intensities for a given time of concentration for the pre and post-development cases for the nominated ARI's are shown in Table 9.

Table 9: Rainfall intensities for the nominated ARI's

t_c (mins)	1 year ARI (mm/hr)	2 year ARI (mm/hr)	5 year ARI (mm/hr)	10 year ARI (mm/hr)	20 year ARI (mm/hr)	50 year ARI (mm/hr)	100 year ARI (mm/hr)
5.00	101.0	131.0	168.0	189.0	218.0	256.0	285.0
7.68	87.9	113.6	145.7	164.4	189.3	221.8	246.7

6.2.6 Stormwater Design Flows

Table 10 shows the stormwater runoff flows for the pre-development case calculated using the rational method.

Table 10: Stormwater flows generated by the pre-development catchment

Catchment	Q1 (l/s)	Q2 (l/s)	Q5 (l/s)	Q10 (l/s)	Q20 (l/s)	Q50 (l/s)	Q100 (l/s)
A (QoutPC)	328.8	451.3	646.7	768.4	929.0	1192.0	1383.5

Table 11 shows the stormwater runoff flows for the post-development case calculated using the rational method

Table 11: Stormwater flows generated by the post-development catchment

Catchment	Q1 (l/s)	Q2 (l/s)	Q5 (l/s)	Q10 (l/s)	Q20 (l/s)	Q50 (l/s)	Q100 (l/s)
A (Qin)	395.6	545.2	781.4	925.4	1120.7	1424.4	1585.7

As can be seen from Table 12 below, the development will increase stormwater runoff for the catchment for the nominated ARI's, therefore onsite stormwater detention will be required to mitigate the peak discharge and achieve the "no worsening" of the stormwater drainage conditions external to the site.

Table 12: Stormwater flow differences between post and pre-development for standard ARI's

Catchment	Q1 (l/s)	Q2 (l/s)	Q5 (l/s)	Q10 (l/s)	Q20 (l/s)	Q50 (l/s)	Q100 (l/s)
A	66.8	93.9	134.7	157.0	191.8	232.4	202.2

The aim of the stormwater system is to capture and convey all stormwater generated from the site with no catchments bypassing the detention swales. Consequently, Table 13 shows that there will not be areas bypassing detention.

Table 13: Stormwater runoff bypassing the detention basin for the post-development catchment

Catchment	Q1 (l/s)	Q2 (l/s)	Q5 (l/s)	Q10 (l/s)	Q20 (l/s)	Q50 (l/s)	Q100 (l/s)
A (QoutL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0

The adjusted allowable discharge from the detention basin is shown in Table 14 below.

$$Q_{out} = Q_{outPC} - Q_{outL}$$

Table 14: Allowable stormwater discharge from the detention basin

Catchment	Q1 (l/s)	Q2 (l/s)	Q5 (l/s)	Q10 (l/s)	Q20 (l/s)	Q50 (l/s)	Q100 (l/s)
A (QoutPC)	328.8	451.3	646.7	768.4	929.0	1192.0	1383.5
A (QoutL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
A (Qout)	328.8	451.3	646.7	768.4	929.0	1192.0	1383.5

6.2.7 Required Detention Volume

The onsite detention volume will restrict the post-development flows to pre-development conditions. The required detention volume and outlet arrangement was modelled, designed and sized using computer software (DRAINS V2019.09). Table 15 below shows the required detention volume for a range of design storms for the development. The table also compares the pre & post development flows to the designed output flows from DRAINS based on the detention storage volume. A snapshot of the DRAINS model is shown in Figure 8 below and Figure 9 shows a plan view of the detention configuration modelled.

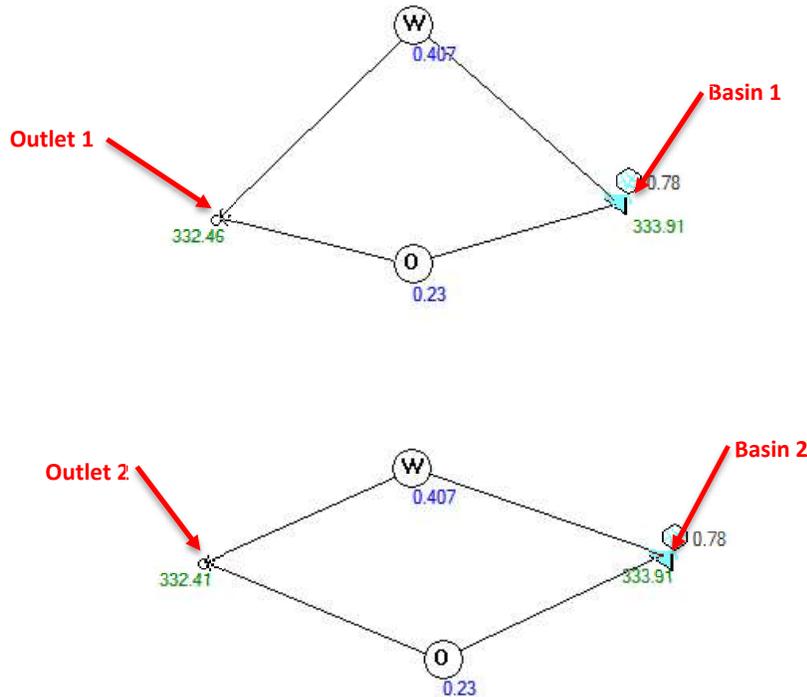


Figure 8: Print Screen of the Drains Stormwater drainage model

Table 15: Onsite Detention Volume requirement (DRAINS Outputs) Catchment A

Design Storm	Post Development	Allowable stormwater discharge from the Detention Basin(s)	Design Flow (Calculated by DRAINS)	Post Development mitigated	Required Detention volume
<i>ARI</i>	<i>Flow rate</i>	<i>Flow rate</i>	<i>Flow rate</i>	<i>Flow rate</i>	<i>Volume</i>
<i>Years</i>	<i>L/S</i>	<i>L/S</i>	<i>L/S</i>	<i>L/S</i>	<i>L</i>
1	395.6	328.8	234.0	161.6	100,570
2	545.2	451.3	276.0	239.2	156,364
5	781.4	646.7	328.0	453.4	262,866
10	925.4	768.4	548.0	377.4	304,584
20	1,120.7	929.0	826.0	294.7	337,560
50	1,424.4	1,192.0	1,166.0	258.4	372,322
100	1,585.7	1,383.5	1,346.0	239.7	389,288

Based on Table 15 above, the minimum required detention volume for the site is 389,300(L) to mitigate post-development flows.

6.2.8 Proposed On-Site Detention System

It is proposed to provide two oversized swales that will act as detention basins in order to restrict post-development flows to pre-development conditions. Figure 9 below shows details of one of the proposed detention basins system modelled in DRAINS.

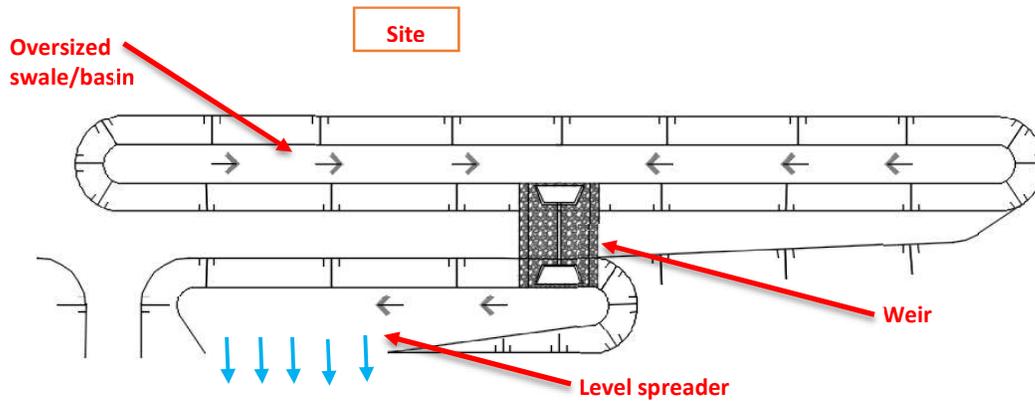


Figure 9: Proposed Detention System

The basins were modelled with the outlet arrangements described in Table 16.

Table 16: Characteristics of detention basins modelled in DRAINS

Description	Value
Basin capacity	194,644 L each basin (389,288 L combined)
Pipe outlet	1 x 300mm RCP at bottom each basin
Weir	1 x 3000mm L x 200mm high at each basin
Swale/basin section	2.0m base width, 1.0m depth and 1:2.5 batters.

Refer to **Appendix D** for inflow-outflow hydrographs, and storage volume graphs outputs from DRAINS software.

7.0 WATER QUALITY ASSESSMENT

7.1 Construction Phase

Impacts on receiving waters and surrounding areas will be minimised during the construction phase with measures as outlined in this SBMP and the Erosion and Sediment Control Plan enclosed on **Appendix G**.

7.1.1 Pollutants

Typical pollutants generated during the construction phase of the development are shown below in Table 17.

Table 17: Pollutant typically generated during the construction phase

Pollutant	Sources
Litter	Paper, construction packaging, food packaging, cement bags, off-cuts
Sediment	Unprotected exposed soils and stockpiles during earthworks and building
Hydrocarbons	Fuel and oil spills, leaks from construction equipment
Toxic materials	Cement slurry, asphalt prime, solvents, cleaning agents, wash-waters
pH altering substances	Acid sulphate soils, cement slurry and wash-waters

7.1.2 Performance objectives

The objectives are:

- Minimise the amount of sediment entering waterways and stormwater drains;
- Minimise or prevent environmental harm to waterways and associated ecosystems;
- Minimise localised flooding caused by sediment runoff;
- Minimise exposure of soils.

Table 18: Construction phase performance criteria

Indicator	Water Quality Objectives
pH	6.5 – 8.5
Suspended Solids	Annual Mean < 10mg/L
Oils and Grease	No visible films or odour
Litter/ Gross pollutants	No anthropogenic (man-made) materials greater than 5mm in any dimension
Dissolved oxygen	80-100% saturation

7.1.3 Monitoring and maintenance

The general requirement of monitoring during the construction phase will be:

- Work activities are restricted to designated construction areas;
- Earthworks and site clearing are undertaken in accordance with an Erosion and Sediment Control Plan;
- Erosion and sediment control devices are to be constructed/installed in accordance with the Erosion and Sediment Control Plan;

- Inspection of sediment fences, erosion and sediment control structures/devices on a weekly basis as well as after any rain event exceeding 25mm in 24hrs (major storm event);
- Stormwater discharges from the site are not having any adverse effect on the downstream environment;
- Monitoring and recording of the performance of the drainage control devices including water quality testing where required;
- Any failure in the stormwater system shall be immediately rectified to prevent uncontrolled discharge from the site;
- Any failure to the stormwater system causing damage to surroundings should implement immediate remedial work to the damaged area.

7.1.4 Responsibility and reporting

- The contractor shall be responsible for monitoring the performance of all drainage control and erosion and sediment control devices;
- Records of any failures to devices should be kept and reported to the Construction Manager;
- Regular inspections of the devices shall be reported to the Construction Manager;
- Inspections of the devices after heavy rainfall shall be reported to the Construction Manager;

7.2 Operational Phase

7.2.1 Pollutants

The key pollutants typically generated during this phase for the entire catchment are shown in Table 19.

Table 19: Pollutant typically generated during the operational phase

Pollutant	Potential Source
Litter / Gross Pollutants	Waste materials, food, food packaging etc.
Hydrocarbons	Fuel and oil spills, dispensing areas, car park
Nutrients (N & P)	Nitrogen, Phosphorus
Sediments	Aggregates bins, wind deposits and car trails
Surfactants	Detergents, cleaning agents

7.3 Proposed Stormwater Treatment

7.3.1 Stormwater treatment philosophy

Waterways and other aquatic environments are valued by the community for their social, cultural, economic and environmental benefits. Urban runoff, contaminated with nutrients, sediment and other pollutants adversely impacts these valued resources. Water Sensitive Urban Design (WSUD) is a holistic approach to the planning and design of urban landscapes that minimises these negative impacts. This approach is used on this project to select the treatment options that considers the civil, landscape and ecological aspects of the site.

7.3.2 Source Controls

Rubbish bins can be an effective source control for litter and are appropriate for most developments. Bins will be placed in appropriate areas (such as buildings and staff amenity) to encourage thoughtful waste disposal.

7.3.3 At-source gross pollutant traps

A gross pollutant trap (GPT) is a treatment device designed to capture coarse sediment, trash and vegetation matter in stormwater runoff. GPTs are often used as the first treatment element in a treatment train. Spel Stormsacks or a similar approved product will be used within this development; the Stormsacks capture 99.99% of gross pollutants and will be installed in gully pits, refer to **Appendix E** for typical details.

7.3.4 Vegetated Swales/Detention basin

Vegetated Swales are used to convey stormwater; they are effective in removing coarse and medium sediment (such as nutrients, free oils/grease and metals). Also, surface runoff flowing on vegetated swales with mild slopes results in slower travel times, thus reducing the impact of increased peak flow rates and temporarily detaining collected stormwater runoff. Refer to **Appendix E** for typical details of vegetated swales.

7.4 Fuel Related Stormwater Treatment

The treatment train shown in Figure 10 uses the Best Management guidelines to treat stormwater runoff from the site.

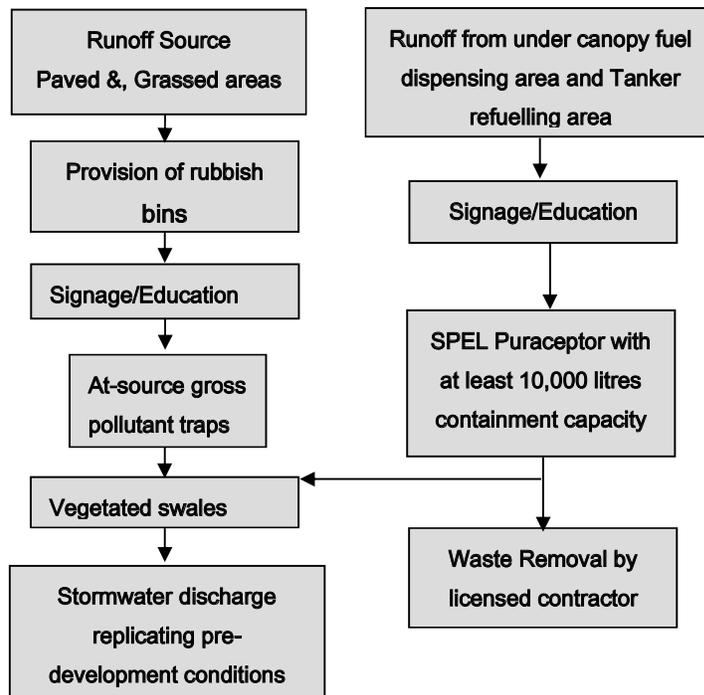


Figure 10: Fuel related stormwater treatment philosophy

7.4.1 Fuel Dispensing Areas

The fuel dispensing areas will be concrete surfaced and covered by a canopies. Fuel dispensing areas will be bounded to prevent stormwater runoff from outside the canopy flowing into the dispensing area and to ensure that any spills are contained within these areas. The perimeter of the canopies will overhang the dispensing containment areas by 10 degrees to reduce windblown rain into the area. Any flows/spills in the containment area will drain to gully pits which will discharge to an appropriately sized Spel Purceptor.

Bulk fuel transfers from a road tanker to underground tanks will take place in a remote Fill Point located outside the truck canopy within a bunded concrete area. A gully pit will be located within this area to capture and convey any possible spill to the SPEL Puraceptor; also any runoff from the dispensing areas will be directed to a SPEL Puraceptor at all times. A spill containment box at fill point will capture any minor fuel spills that may occur during unloading; the spilt fuel will then drain from the containment box into the fuel storage tanks.

7.4.1.1 Spel Puraceptor

The Puraceptor P.050 (Class 1) unit has a minimum containment volume of 10,000 litres, which allows for containment for spill from an 8,000 litre tanker compartment plus allowances for wind-blown rain. The Puraceptor will remove hydrocarbons, gross pollutants and total suspended solids. Refer to **Appendix E** for details of the Spel Puraceptor P.050.

7.4.2 Underground Fuel Storage Tanks

Underground fuel storage tanks, piping and fuel dispensers will be installed in accordance with the Australian Institute of Petroleum (AIP) standards.

8.0 SITE MAINTENANCE AND MANAGEMENT PROCEDURES

8.1 Petrol Station Maintenance and Management Procedure

The service station operator will have a Petrol Handling Manual that will set out all requirements for the safe handling of combustible and flammable materials. This manual will dictate weekly, monthly and annual checking procedures with checklists, which will be completed, and the records stored.

The manual will also set out dry cleaning methods to be employed within the fuel dispensing area in lieu of washing down to reduce possible contaminated runoff. Emergency procedures will be also clearly set out detailing actions to be taken by site personnel in the case of varying possible emergencies such as spills, fire or risk of fire, vehicle accidents, etc.

In addition a regular cleaning, maintenance program/contract is to be established for emptying of rubbish bins located around the site, removal of general litter from the site, inspection of stormwater gully pits and removal of any sediment or captured litter from the Spel Stormsacks and vegetated swale/basin systems. The Spel Stormsacks and Spel Puraceptor will be inspected and maintained in accordance with the manufacturer's instructions. Refer to **Appendix F** for maintenance plans.

The maintenance plan will address the following:

- Inspection frequency;
- Maintenance frequency;
- Data collection/storage requirements;
- Detailed cleanout procedures.

The plan will include inspection procedures covering aspects such as equipment needs, maintenance techniques, occupational health and safety, public safety, environmental management considerations, disposal requirements of pollutants collected and access issues.

8.2 Maintenance Plans for Stormwater treatment devices

All stormwater quality improvement systems require regular maintenance in order to function adequately. Table 20 details the basic maintenance requirements for each type of stormwater quality improvements systems. A detailed maintenance schedule will be developed as part of the detailed design of the site.

Table 20: Maintenance Requirements

Control	Maintenance Requirement	Maintenance Period
Spel Stormsacks	Remove sediment and captured litter	4 months (inspect after major storms)
Spel Puraceptor	Replacement of oil separators and coalescer units, removal of oil, sediment & gross pollutants (skimmers and vacuum truck)	6 Months (inspect after major spill)
Vegetated Swales/Detention Basin	Monitor for erosion along swale. Maintaining vegetation by weed removal and replanting.	6 months (inspect after major storms)

For operational and maintenance guidelines refer to **Appendix F** and relevant manufacturer's documentation.

9.0 LIFECYCLE COSTS

A lifecycle cost analysis is not part of the scope of this report. All the recommended water quality treatment infrastructure lies within the development site and it shall be maintained and serviced by the owners of the development at no cost to Council.



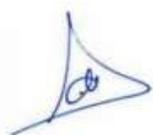
10.0 CONCLUSION

A Site Based Stormwater Management Plan has been prepared with respect to the proposed Truck Stop development. The location of the site is shown on Figure 1 and the proposed development site layout is shown in **Appendix A**.

- **Stormwater Quantity**
To mitigate post development flows from the proposed development and to achieve a “no worsening” of stormwater conditions external to the site, an assessment of the water quantity has been undertaken resulting in the requirement of a 389.3 KL swale/detention basin system. Refer to Section 5 for the stormwater quantity assessment details and **Appendix F** for inflow-outflow hydrographs outputs from DRAINS software.
- **Stormwater Quality- Construction Phase**
An Erosion and Sediment Control Plan aimed at minimising unacceptable impacts during the construction phase has been prepared. Refer to **Appendix G**.
- **Stormwater Quality- Operational Phase**
At source gross pollutant traps and vegetated Swales/detention basins have been proposed as stormwater treatment measures to provide for removal of coarse and medium sediment and facilitate for pollutant settlement. The location of proposed treatment measures is shown in **Appendix C**.

This Site Based Stormwater Management Plan has demonstrated that adequate stormwater management principles and techniques will be employed during the construction and operational phases of this development to comply with the Queensland State Planning Policy July 2017, Charters Towers Regional Town Plan, performance outcomes P012 to P014 of the Department of Infrastructure Local Government and Planning State Code 1 and the Queensland Urban Drainage Manual (QUDM) 2016. The methods proposed are considered current best management practice for a development of this type, on this site.

Yours faithfully



Leo Salinas
BEng, MIEAust
Civil Engineer

For and on behalf of TfA Group

Reviewed by

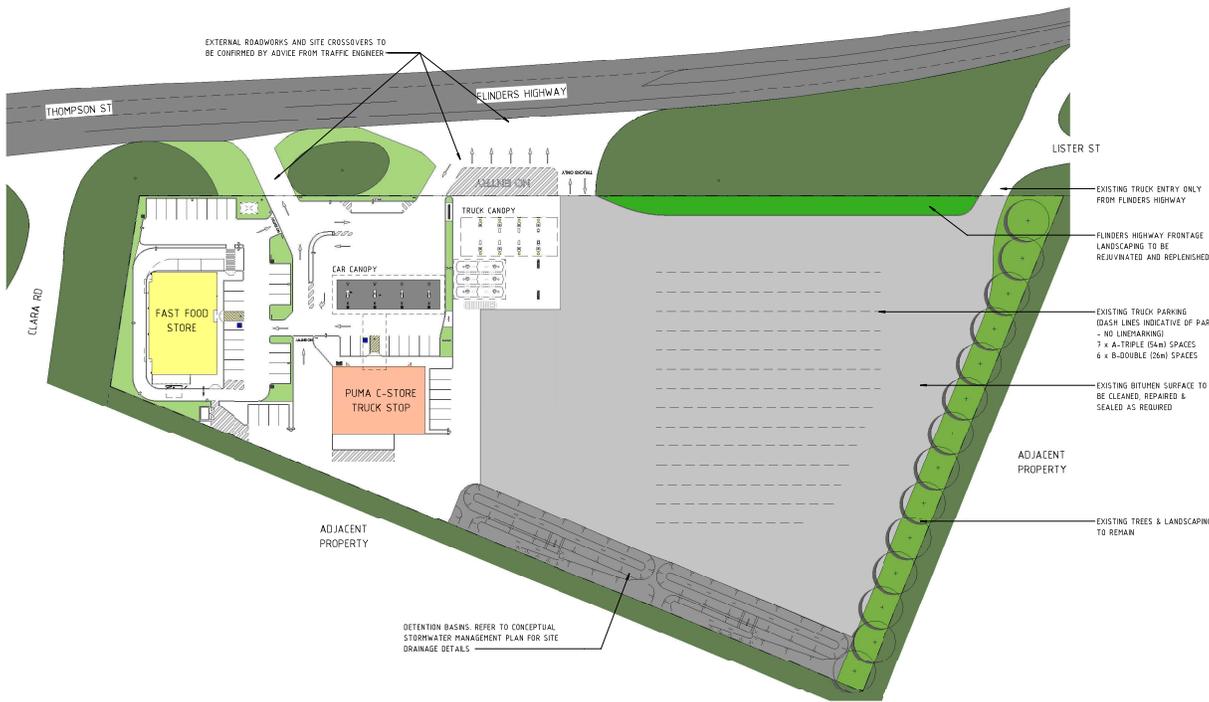


Juan Avella (RPEQ 11899)
BEng, MIEAust, CPEng, RPEQ, NER
Director Civil/Structural Engineering

For and on behalf of TfA Group

APPENDIX A – PROPOSED SITE LAYOUT PLAN





RPD
 LOT: 2 DN MPH20732
 LGA: CHARTERS TOWERS REGIONAL COUNCIL
 AREA: 2,000 HECTARES



NOTES

1. NOT FOR TENDER OR CONSTRUCTION
2. EXTERNAL ROAD WORKS SUBJECT TO FINAL ADVICE FROM TRAFFIC ENGINEER
3. SITE LAYOUT SUBJECT TO DETAIL SITE SURVEY AT DETAIL DESIGN STAGE

LEGEND

- EXISTING LANDSCAPE TO BE REHABILITATED REFER TO CONCEPT LANDSCAPE PLAN
- EXISTING TREES & LANDSCAPING TO REMAIN
- PROPOSED LANDSCAPING - REFER TO CONCEPT LANDSCAPE PLAN
- EXISTING BITUMEN TO BE CLEANED AND REPAIRED AS REQUIRED

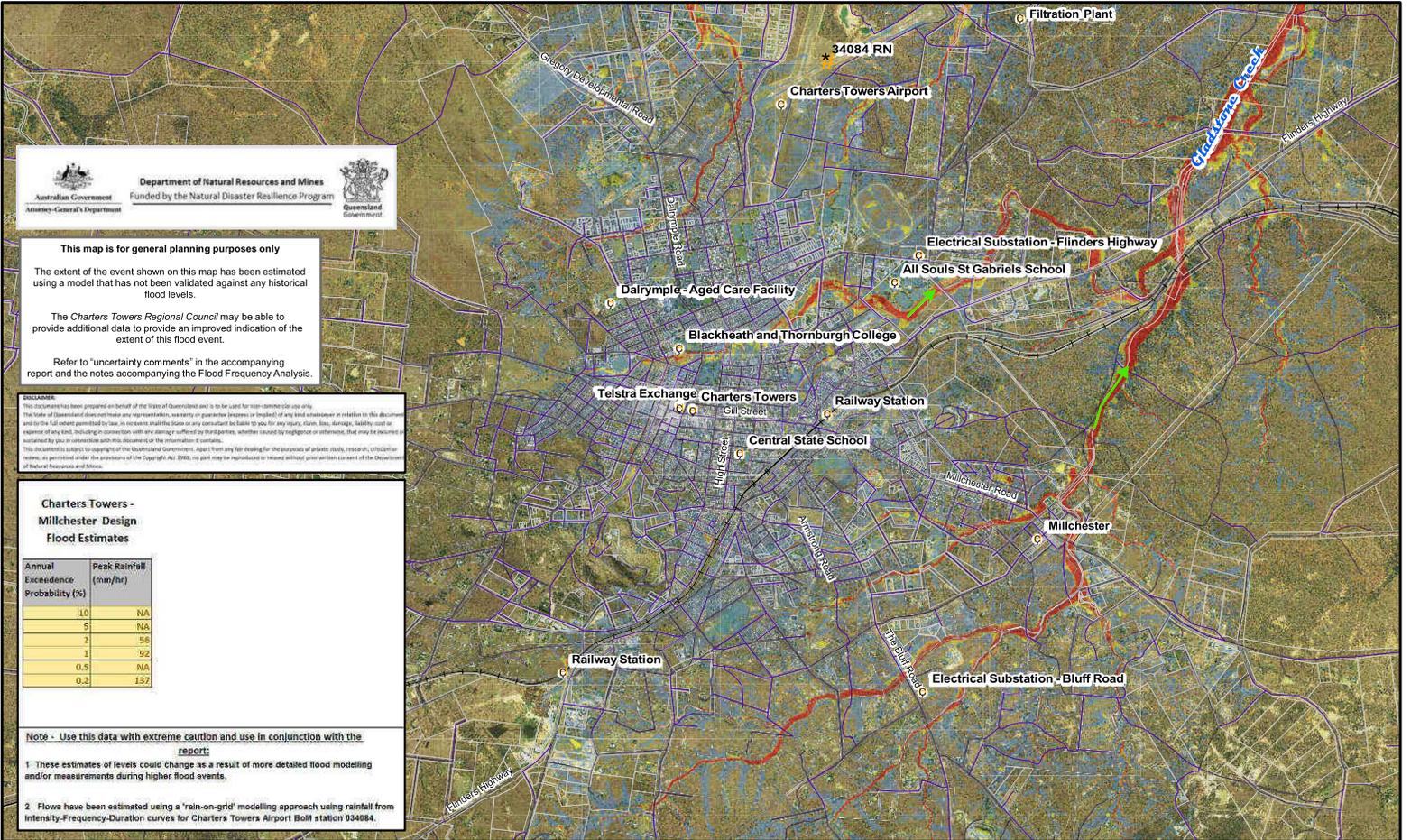
SITE COVERAGE SCHEDULE

PUMA SHOP C-STORE	427m ²
FAST FOOD STORE	450m ²
CAR CANOPY	290m ²
CAR CANOPY LINK	90m ²
TRUCK CANOPY	250m ²
EXISTING PLUS EXTENSION (SUBJECT TO SURVEY)	
PAVEMENT (INCL. SERVICE YARDS)	5171.70m ²
PATHWAYS	379.80m ²
LANDSCAPING	450m ²
EXISTING LANDSCAPE REHABILITATED	470m ²
EXISTING LANDSCAPE UNAFFECTED	154m ²
EXISTING BITUMEN	11427m ²

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REV	DATE	BY	DESCRIPTION	CHK																				
DA ISSUE																								
DRAWN MG	APPROVED JR																							
DATE 20.11.19	SCALE 1:500																							
DRAWING NO 19013	REV DA02 A																							

APPENDIX B – FLOODING INFORMATION






Department of Natural Resources and Mines
 Funded by the Natural Disaster Resilience Program


This map is for general planning purposes only
 The extent of the event shown on this map has been estimated using a model that has not been validated against any historical flood levels.
 The Charters Towers Regional Council may be able to provide additional data to provide an improved indication of the extent of this flood event.
 Refer to "uncertainty comments" in the accompanying report and the notes accompanying the Flood Frequency Analysis.

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Charters Towers - Millchester Design Flood Estimates

Annual Exceedence Probability (%)	Peak Rainfall (mm/hr)
10	NA
5	NA
2	96
1	92
0.5	NA
0.2	137

Note - Use this data with extreme caution and use in conjunction with the report:
 1. These estimates of levels could change as a result of more detailed flood modelling and/or measurements during higher flood events.
 2. Flows have been estimated using a 'rain-on-grid' modelling approach using rainfall from Intensity-Frequency-Duration curves for Charters Towers Airport Boll station 034084.



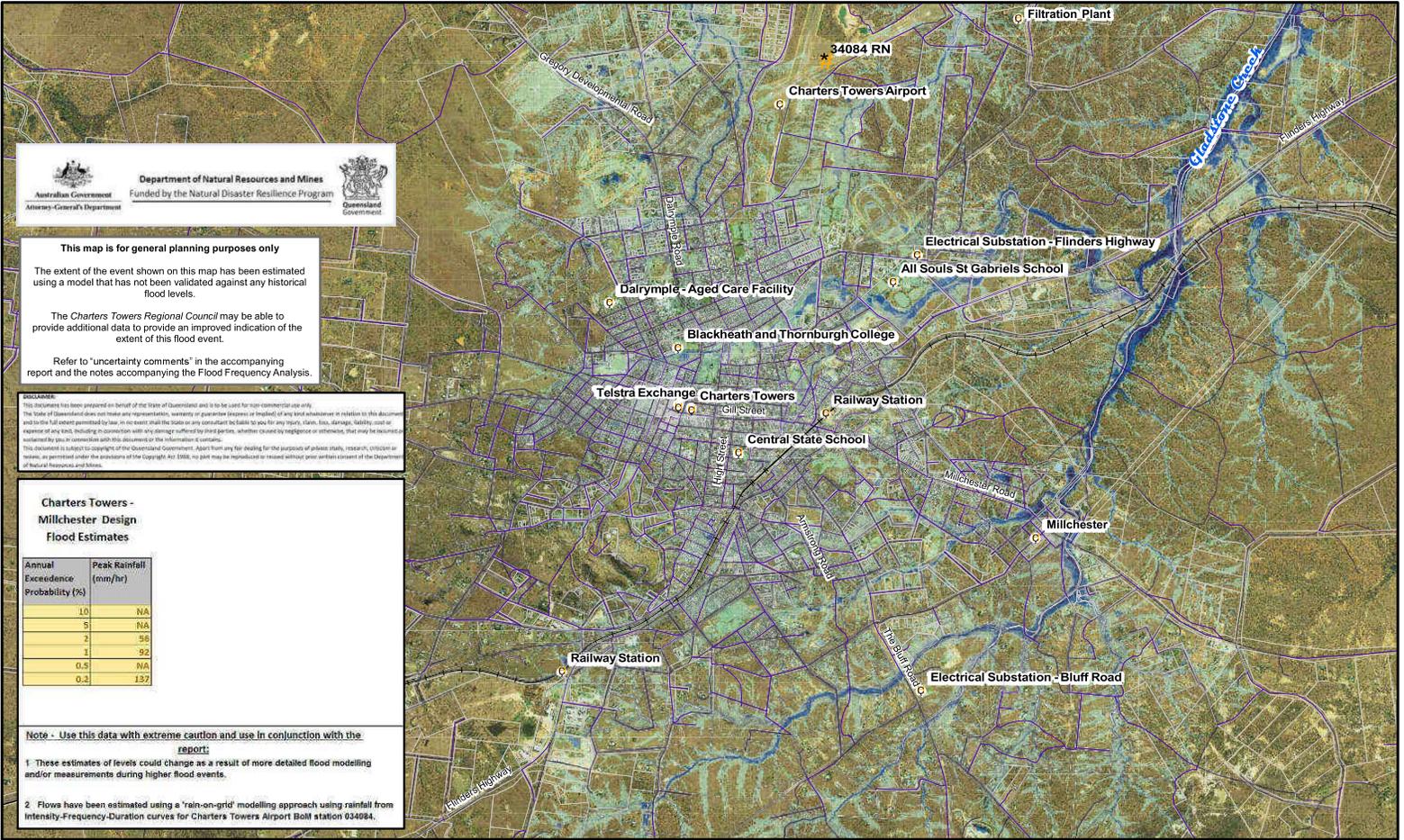
www.dnm.qld.gov.au



Scale at A3 - 1:35,000

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Charters Towers Flood Hazard Map - 1% AEP Event
 034084






Department of Natural Resources and Mines
 Funded by the Natural Disaster Resilience Program
 Attorney-General's Department

This map is for general planning purposes only
 The extent of the event shown on this map has been estimated using a model that has not been validated against any historical flood levels.
 The Charters Towers Regional Council may be able to provide additional data to provide an improved indication of the extent of this flood event.
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Charters Towers - Millchester Design Flood Estimates

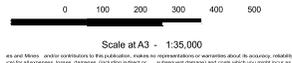
Annual Exceedence Probability (%)	Peak Rainfall (mm/hr)
10	NA
5	NA
2	96
1	92
0.5	NA
0.2	137

Note - Use this data with extreme caution and use in conjunction with the report:
 1. These estimates of levels could change as a result of more detailed flood modelling and/or measurements during higher flood events.
 2. Flows have been estimated using a "rain-on-grid" modelling approach using rainfall from Intensity-Frequency-Duration curves for Charters Towers Airport BoM station 034084.



 Points of interest
 BoM gauging station
 0.8
 0.8 - 1 Roads
 1.0
 1.5
 2.0

www.dnm.qld.gov.au

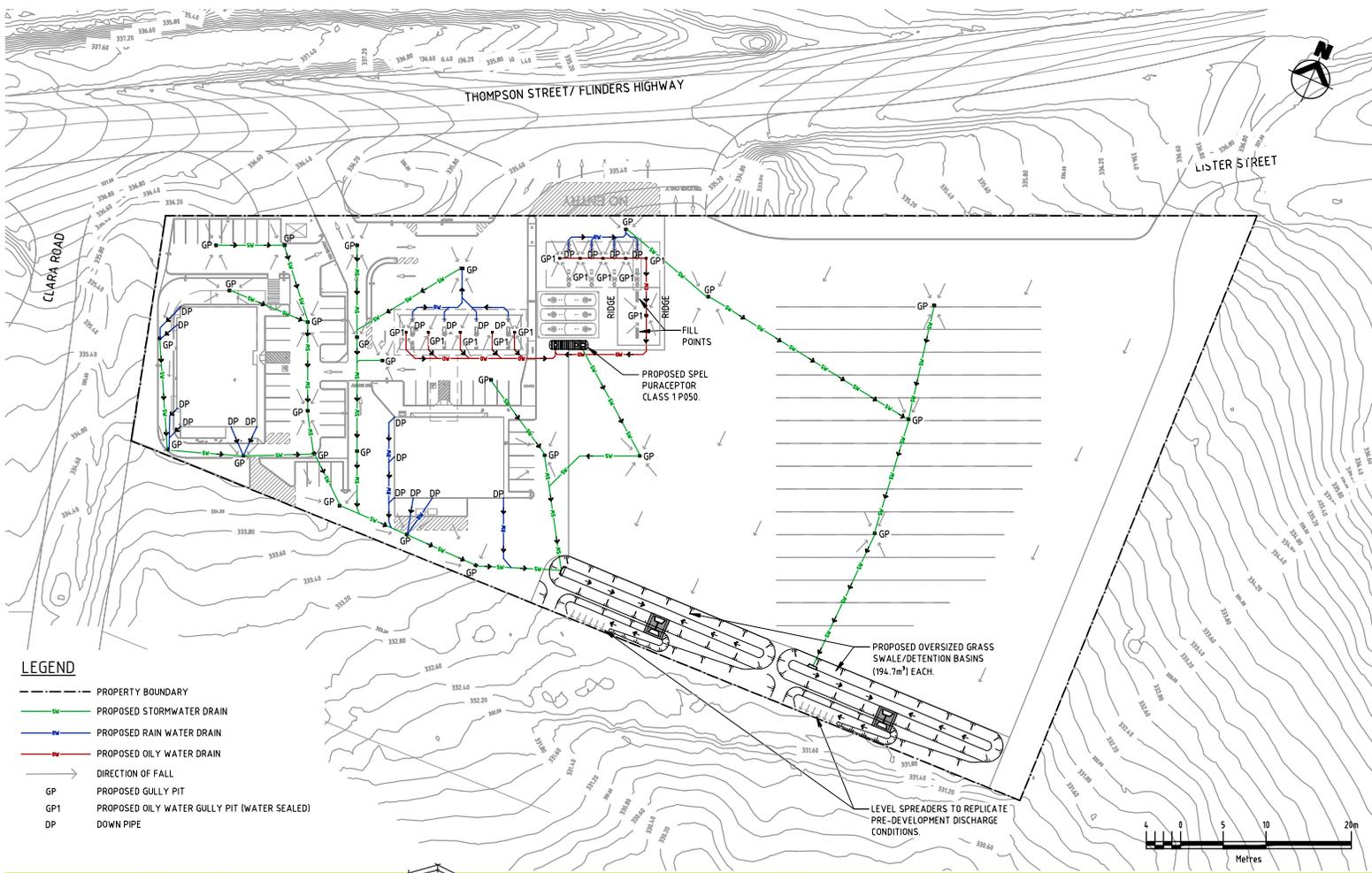



We acknowledge the contributions of the public, industry representatives and contractors about its accuracy, reliability, currency and for any omissions, errors, omissions, including but not limited to, information and data which you might have as a result of any use of this report. Data must not be used for any purpose other than that for which it was provided.

gation Flood Hazard Map - ment
% AEP Event)
034084

APPENDIX C – CONCEPTUAL STORMWATER MANAGEMENT PLAN





- LEGEND**
- PROPERTY BOUNDARY
 - PROPOSED STORMWATER DRAIN
 - PROPOSED RAIN WATER DRAIN
 - PROPOSED OILY WATER DRAIN
 - DIRECTION OF FALL
 - GP PROPOSED GULLY PIT
 - GP1 PROPOSED OILY WATER GULLY PIT (WATER SEALED)
 - DP DOWN PIPE

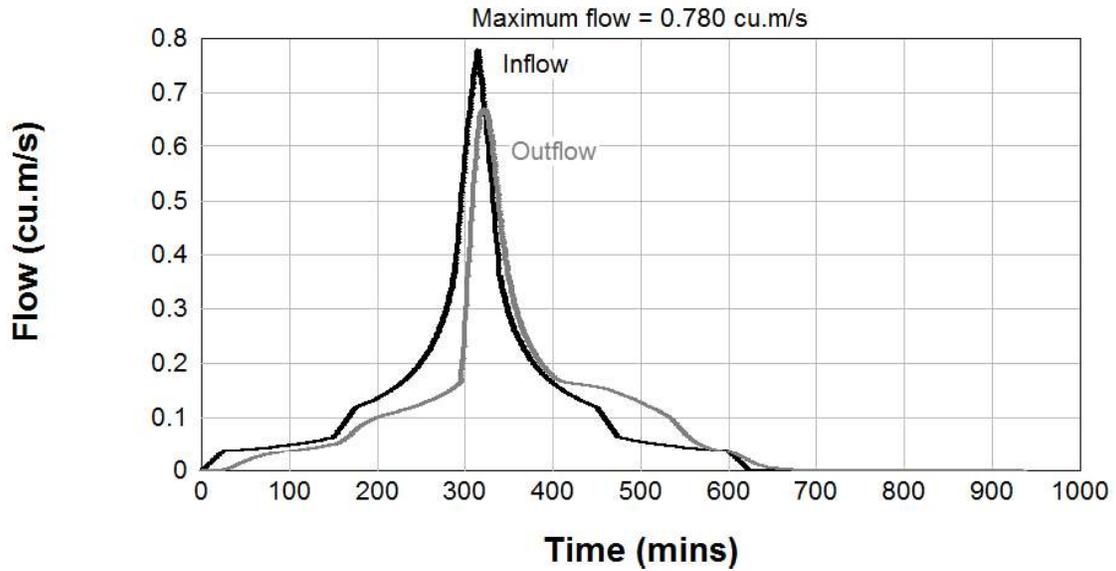
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DATE CREATED 15.11.19	AS SCALE 1:750													
DRAWING NO	REV													
19013-DA12	A													

APPENDIX D – DRAINS STORMWATER MODELLING SOFTWARE OUTPUTS

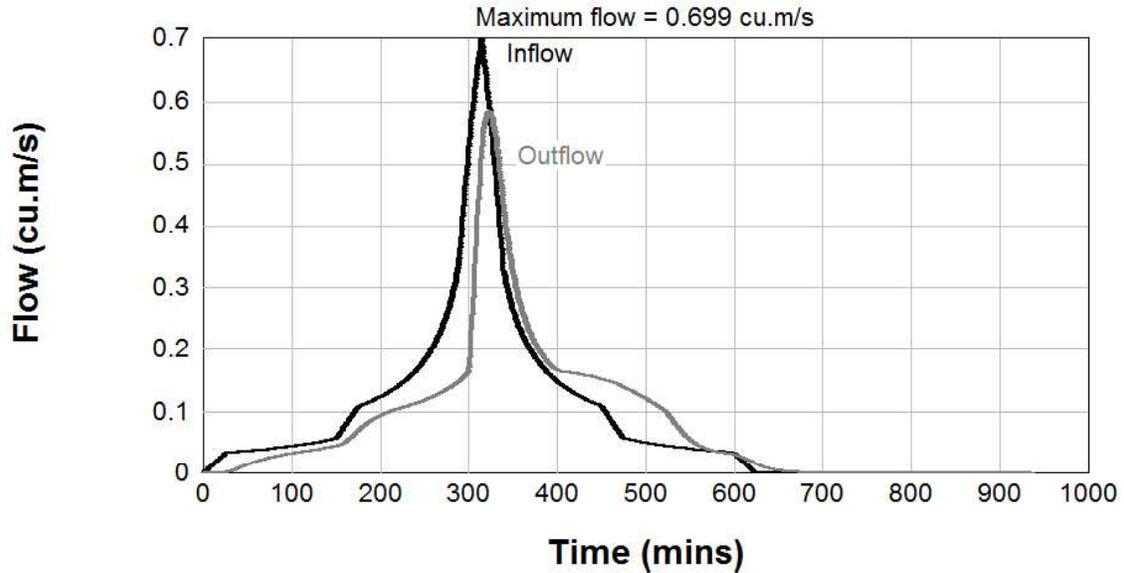


BASIN 1

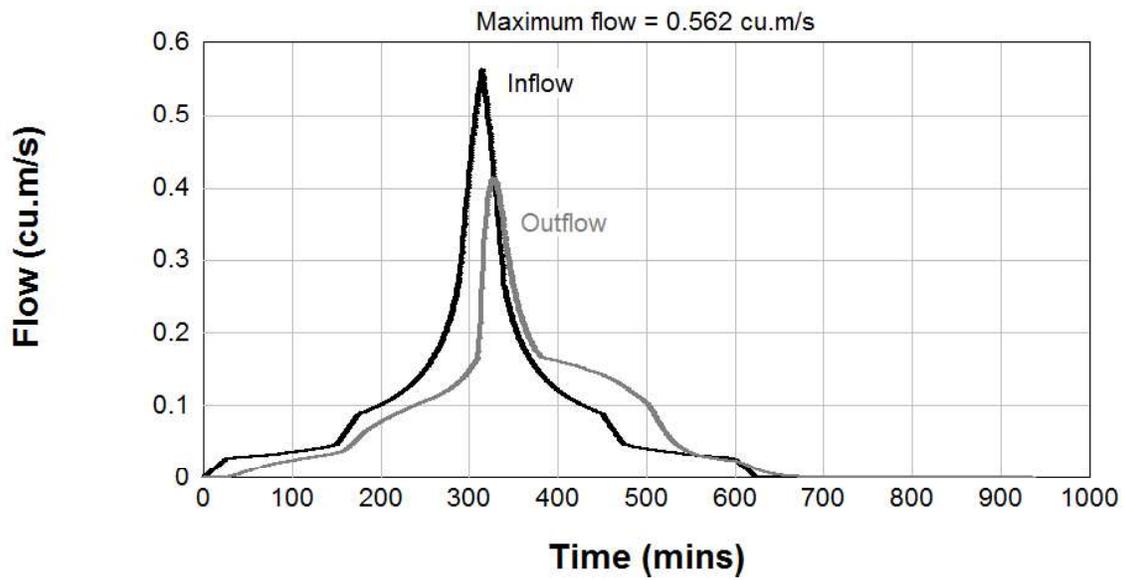
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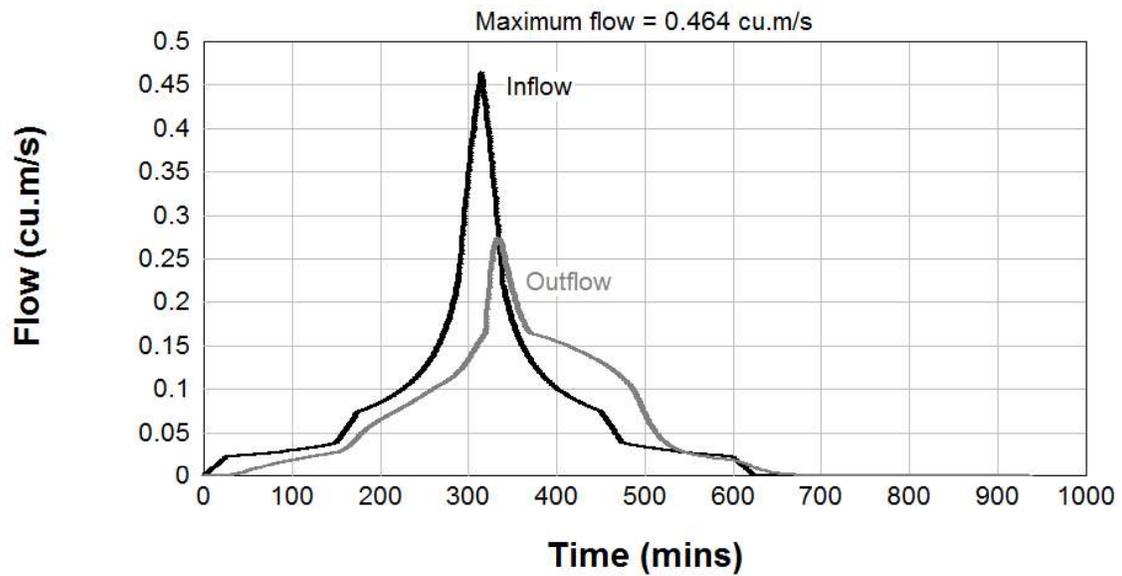
Detention Inflow/Outflow Hydrographs – 50 year ARI synthetic storm



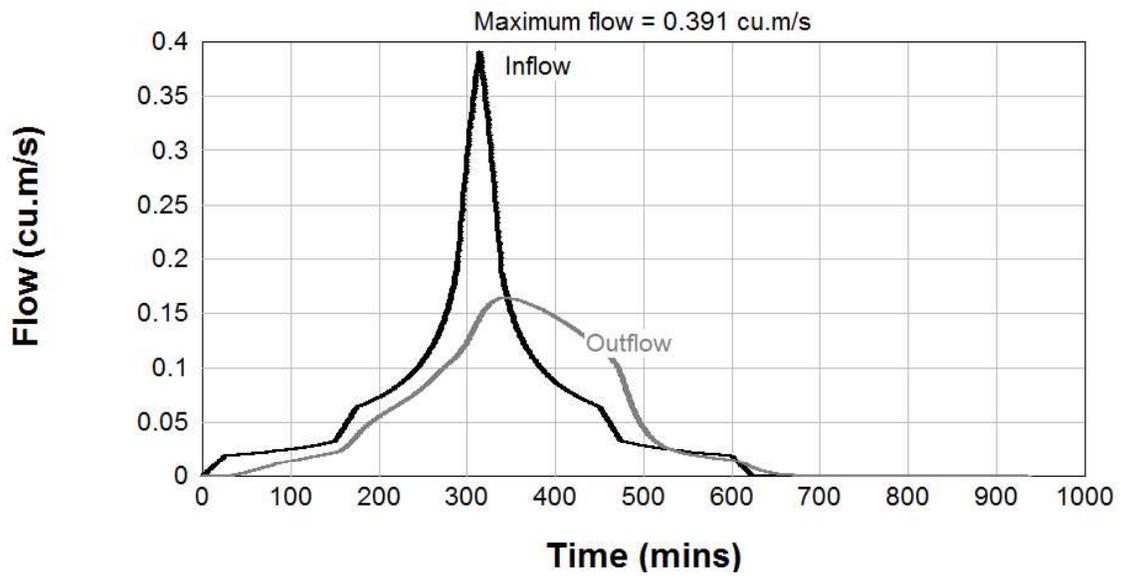
Detention Inflow/Outflow Hydrographs – 20 year ARI synthetic storm



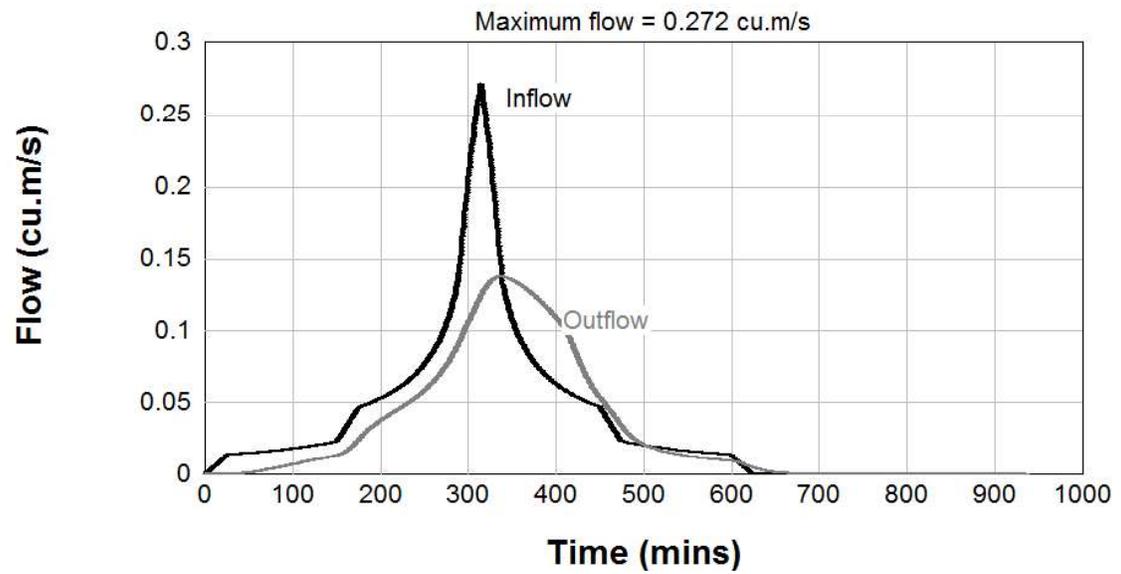
Detention Inflow/Outflow Hydrographs – 10 year ARI synthetic storm



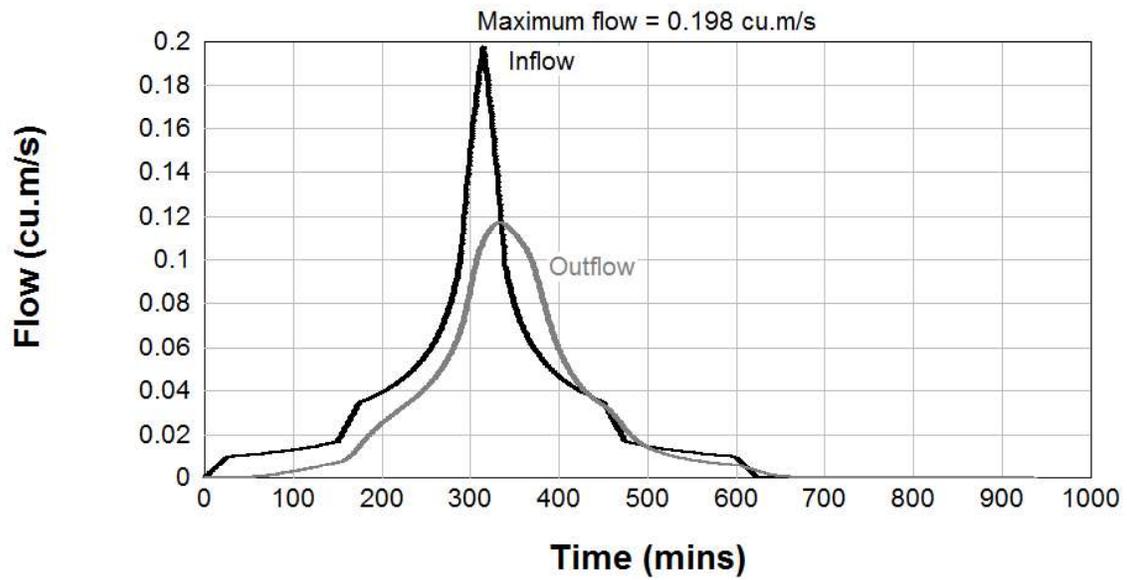
Detention Inflow/Outflow Hydrographs – 5 year ARI synthetic storm



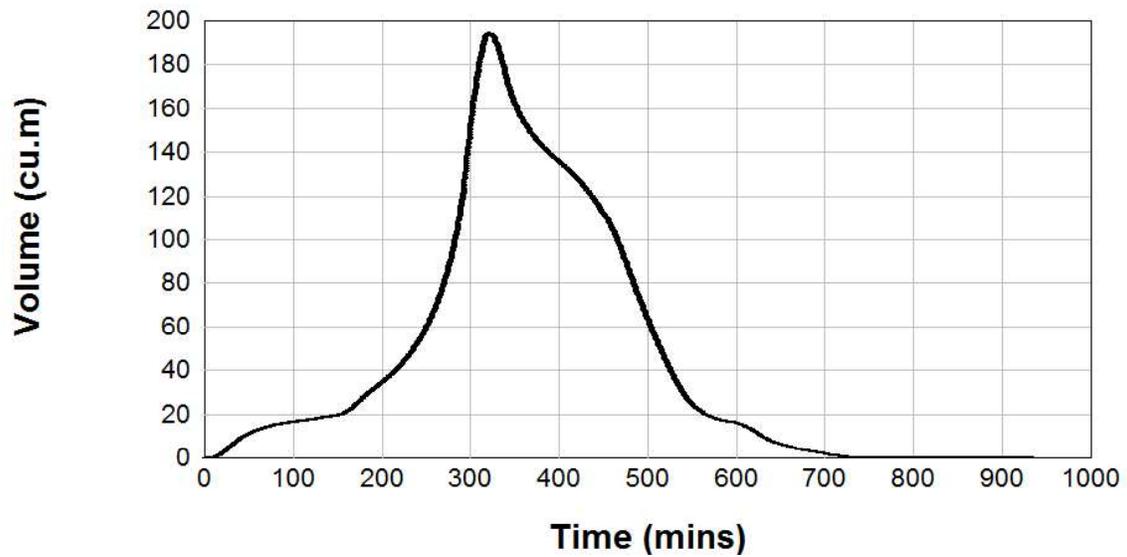
Detention Inflow/Outflow Hydrographs – 2 year ARI synthetic storm



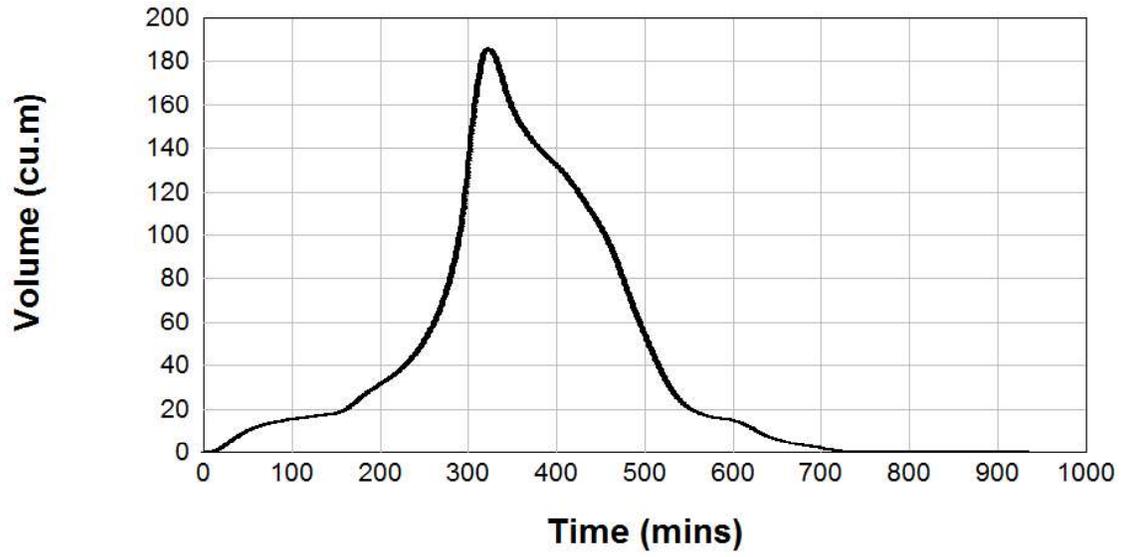
Detention Inflow/Outflow Hydrographs – 1 year ARI synthetic storm



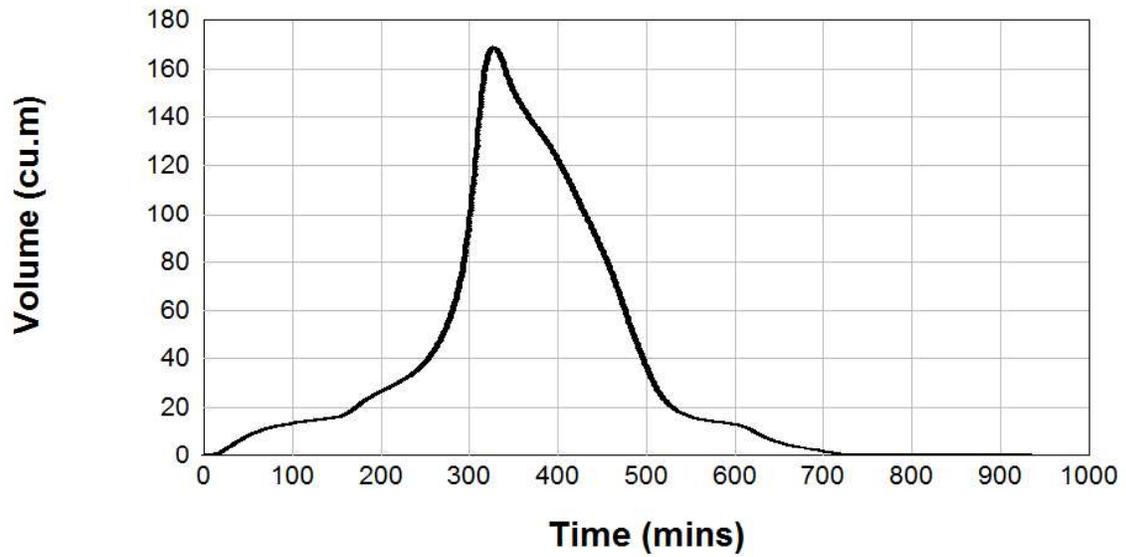
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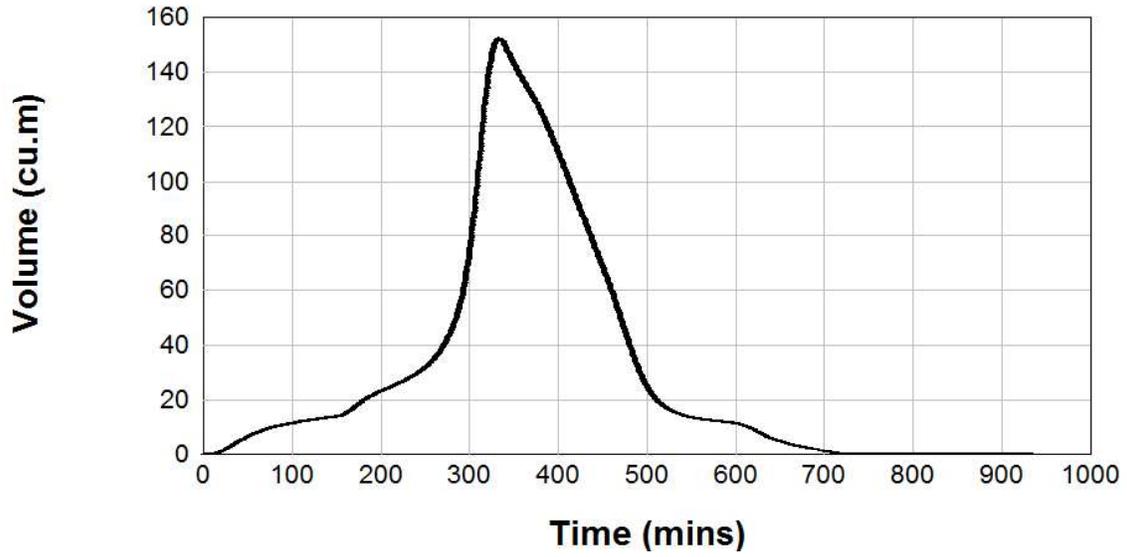
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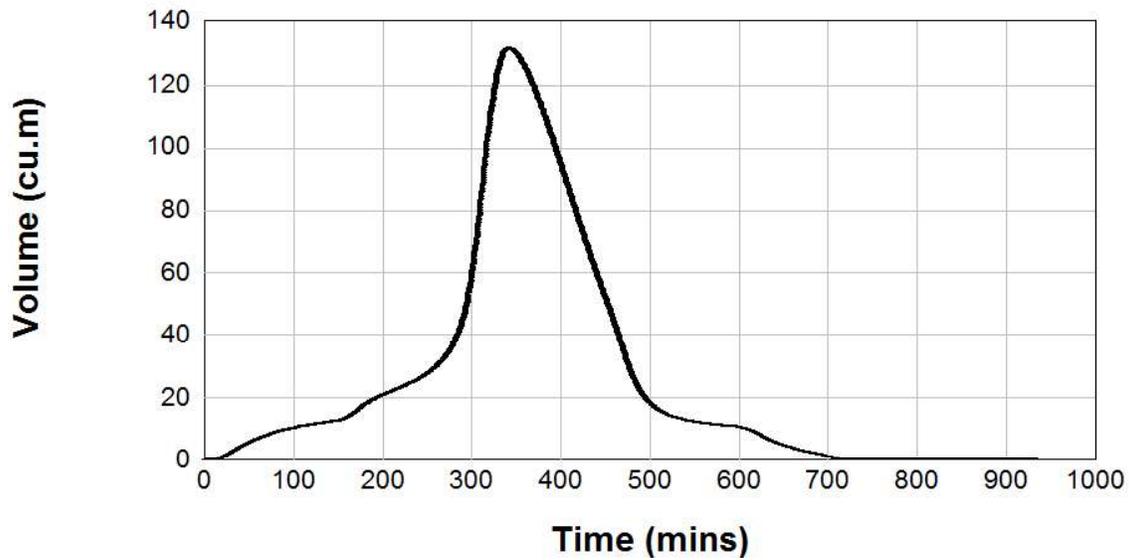
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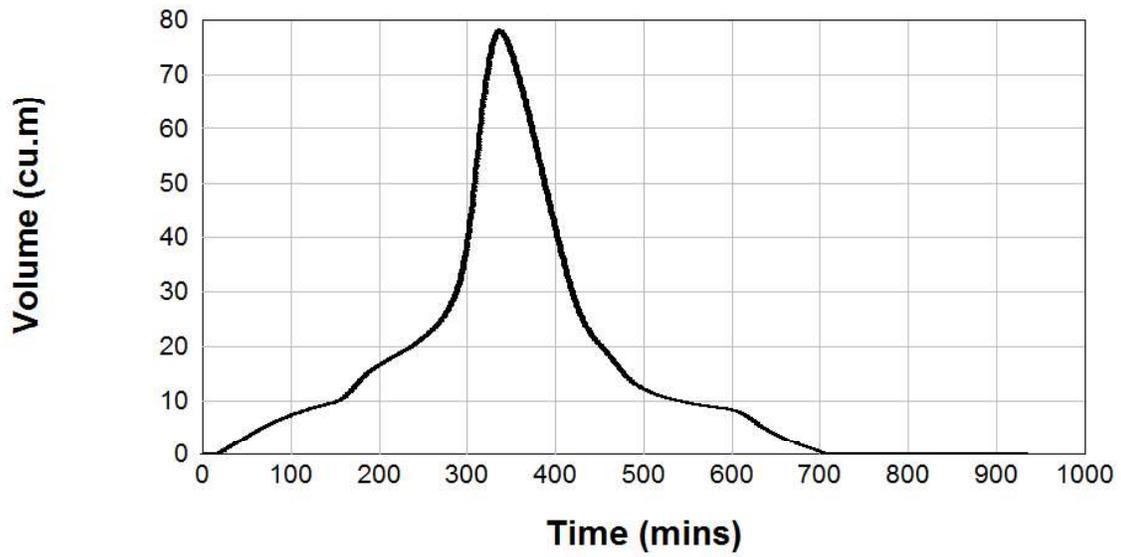
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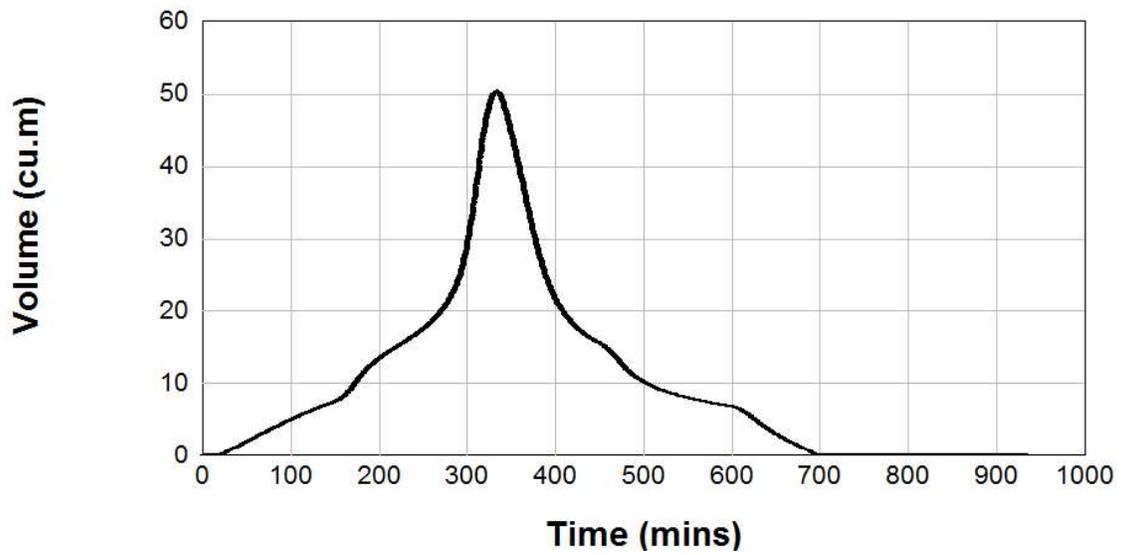
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Storage Volume – 2 year ARI synthetic storm

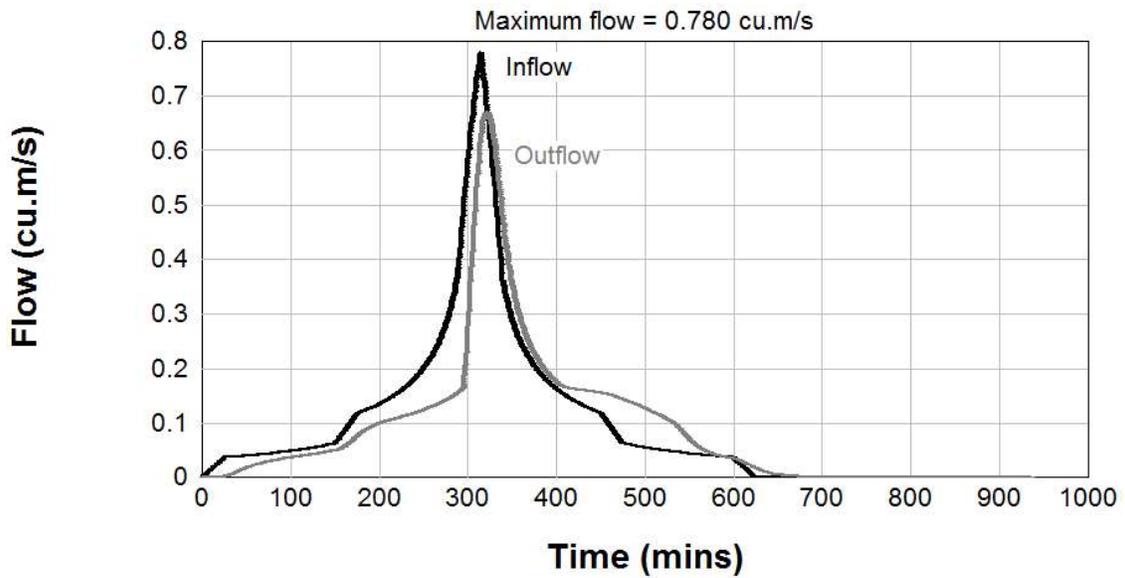


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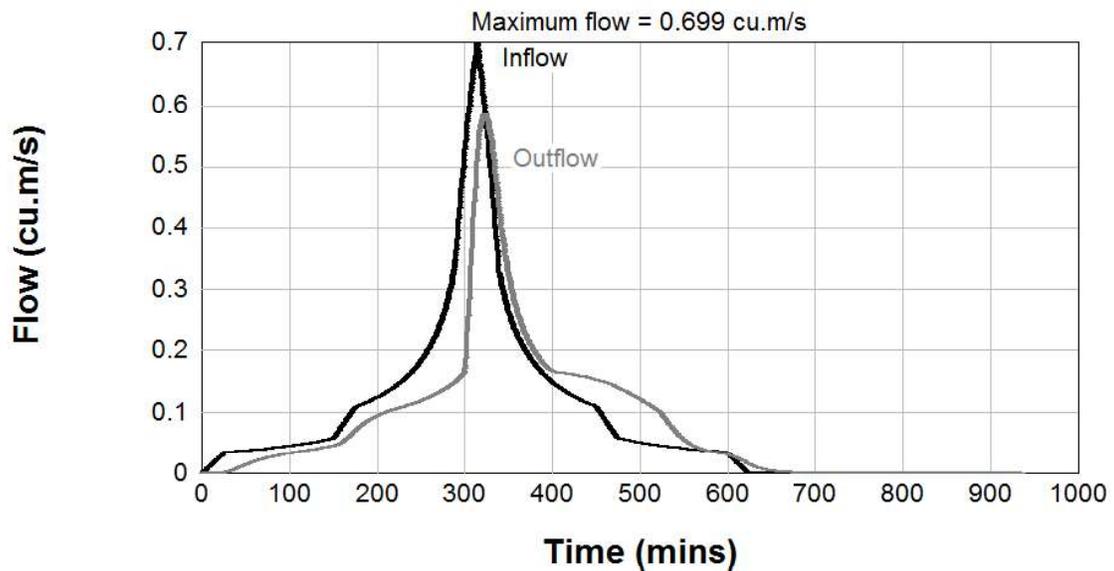


BASIN 2

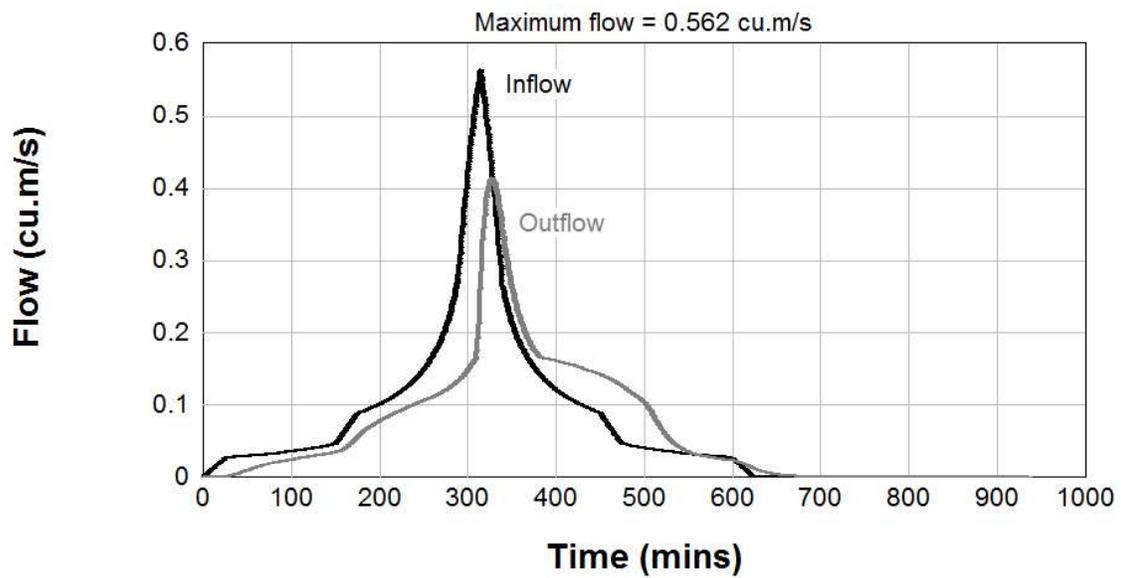
Detention Inflow/Outflow Hydrographs – 100 year ARI synthetic storm



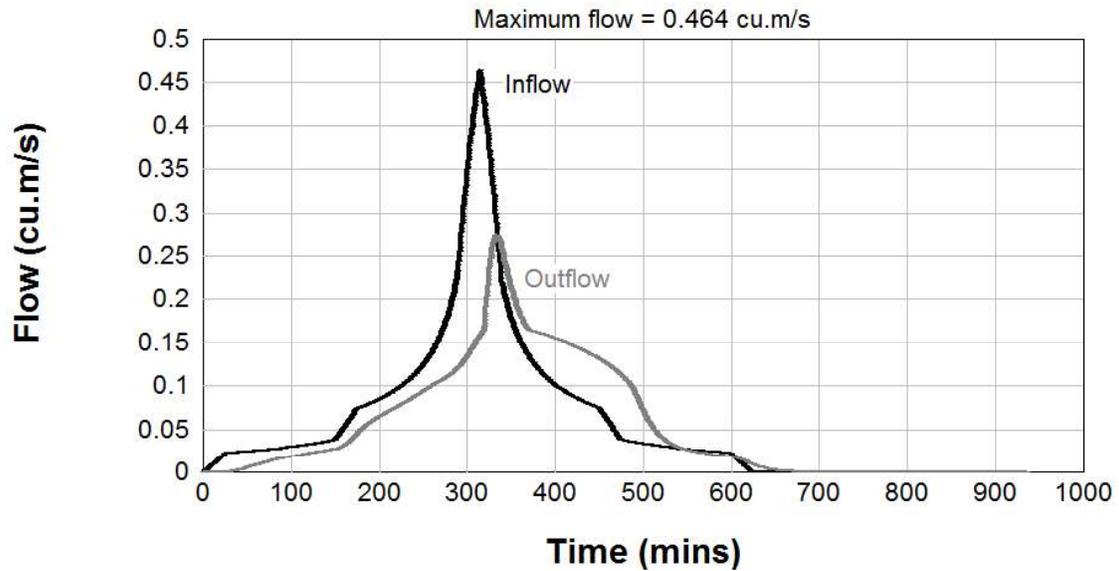
Detention Inflow/Outflow Hydrographs – 50 year ARI synthetic storm



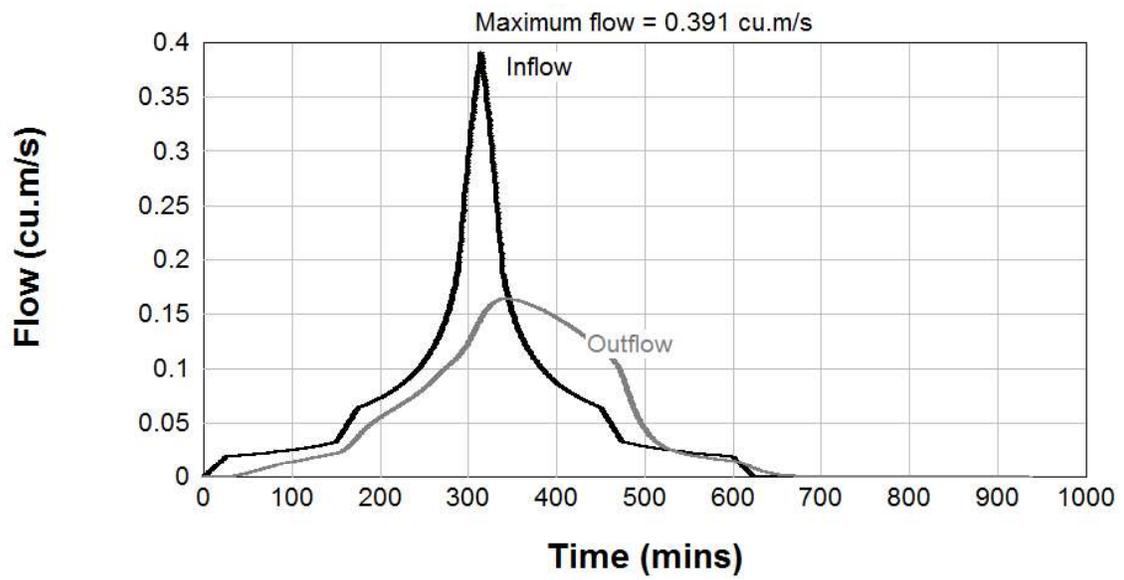
Detention Inflow/Outflow Hydrographs – 20 year ARI synthetic storm



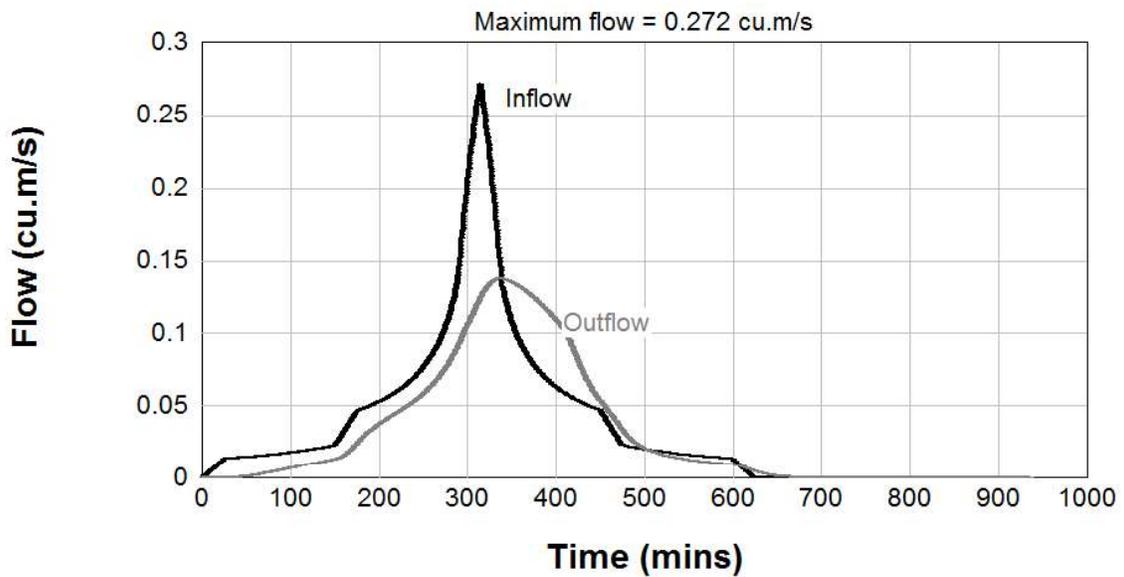
Detention Inflow/Outflow Hydrographs – 10 year ARI synthetic storm



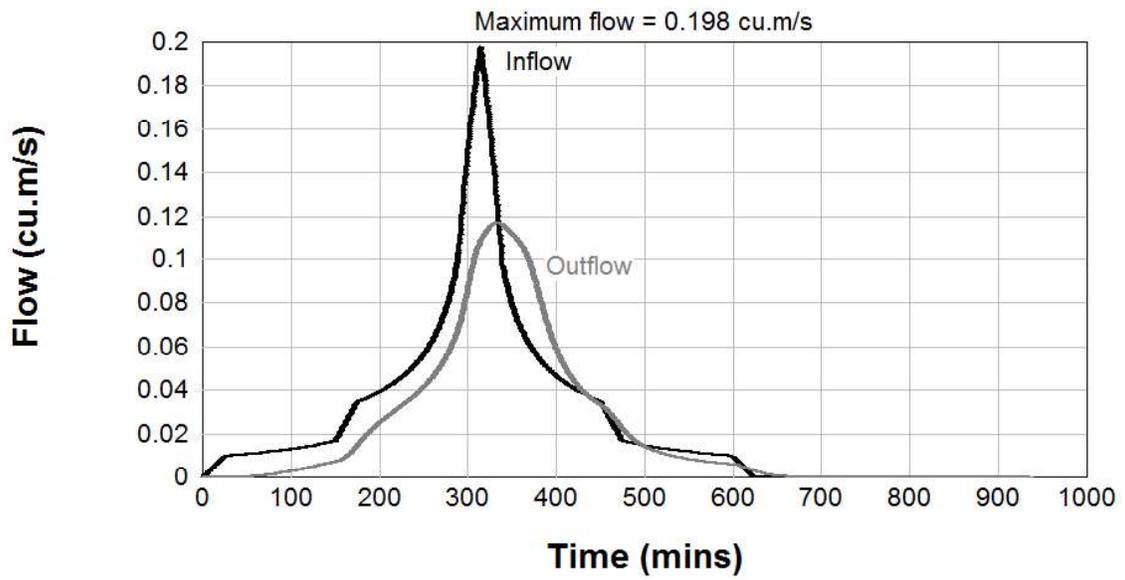
Detention Inflow/Outflow Hydrographs – 5 year ARI synthetic storm



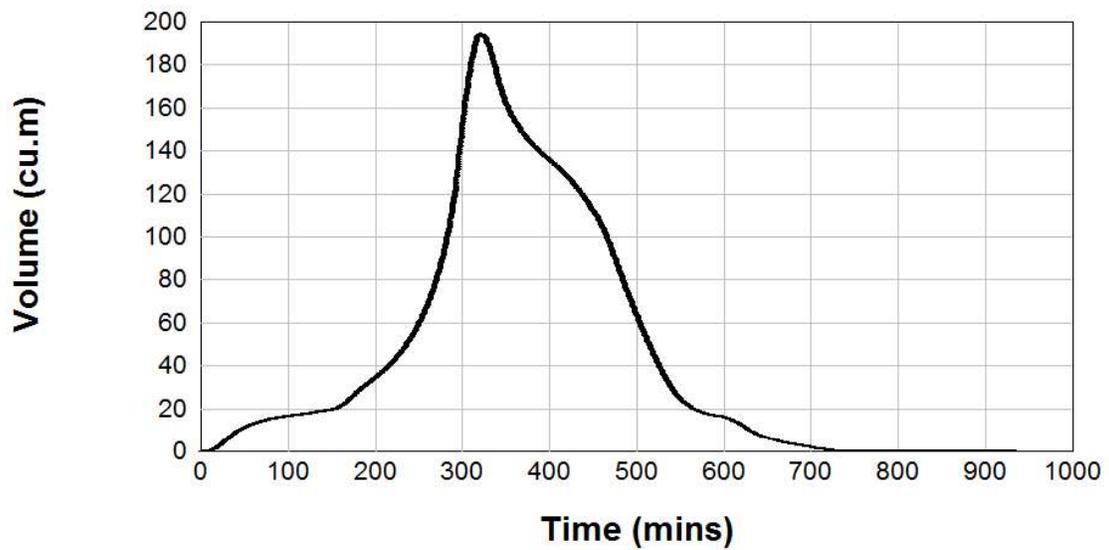
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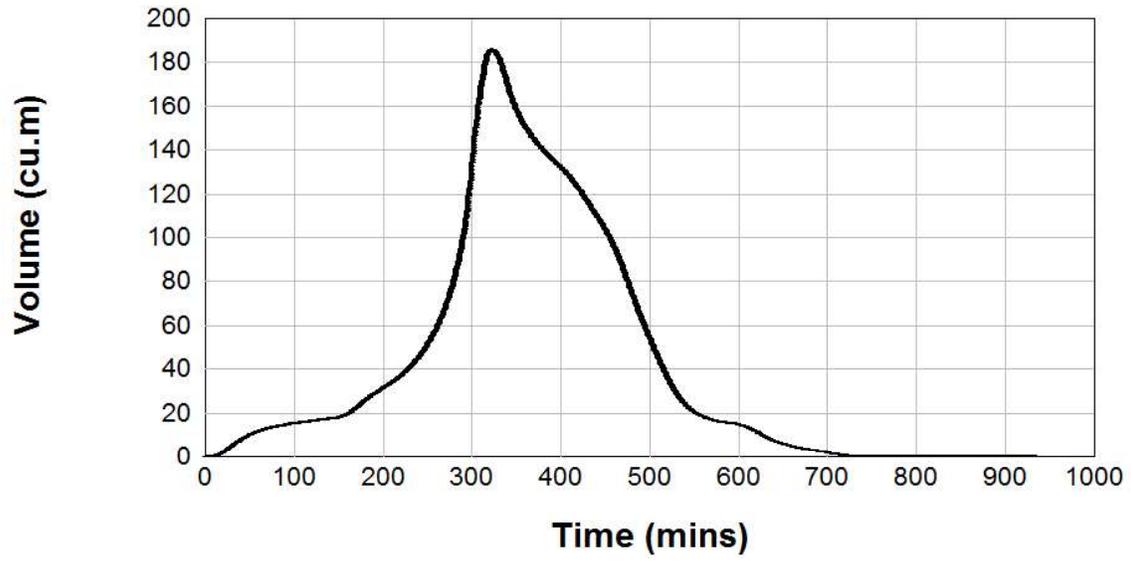
Detention Inflow/Outflow Hydrographs – 1 year ARI synthetic storm



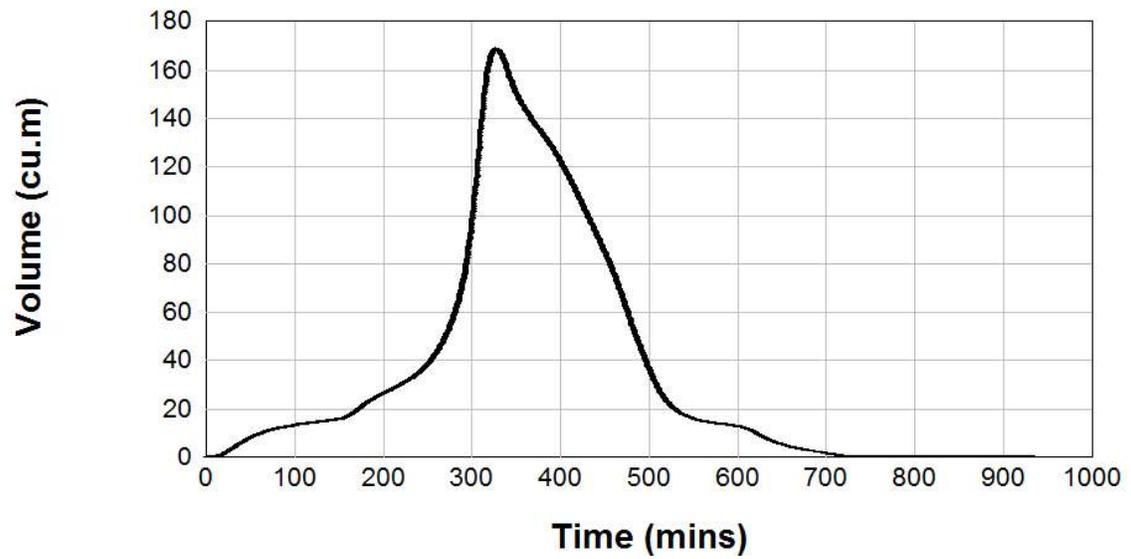
Storage Volume – 100 year ARI synthetic storm



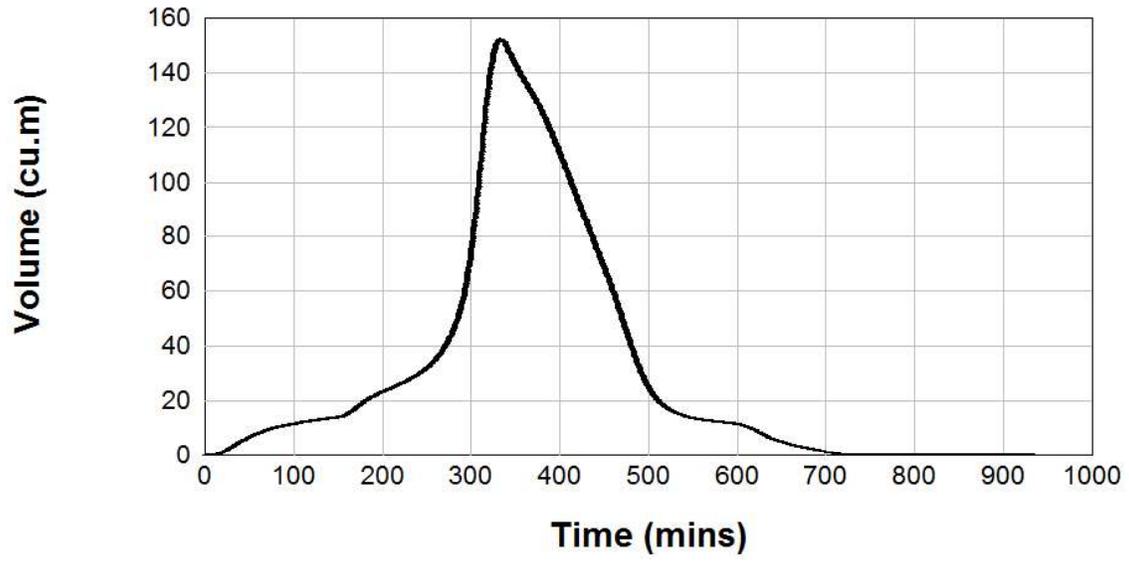
Storage Volume – 50 year ARI synthetic storm



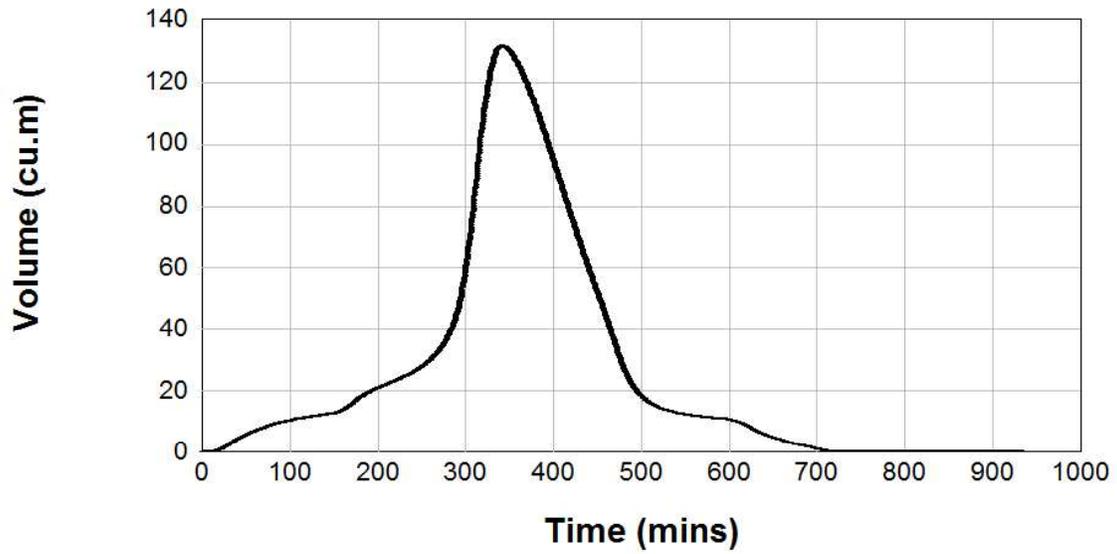
Storage Volume – 20 year ARI synthetic storm



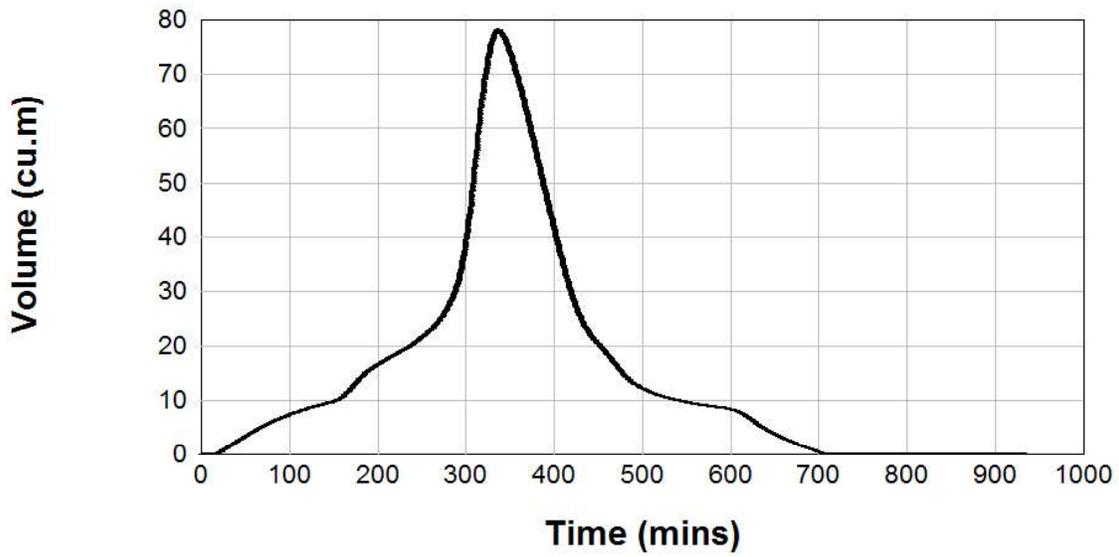
Storage Volume – 10 year ARI synthetic storm



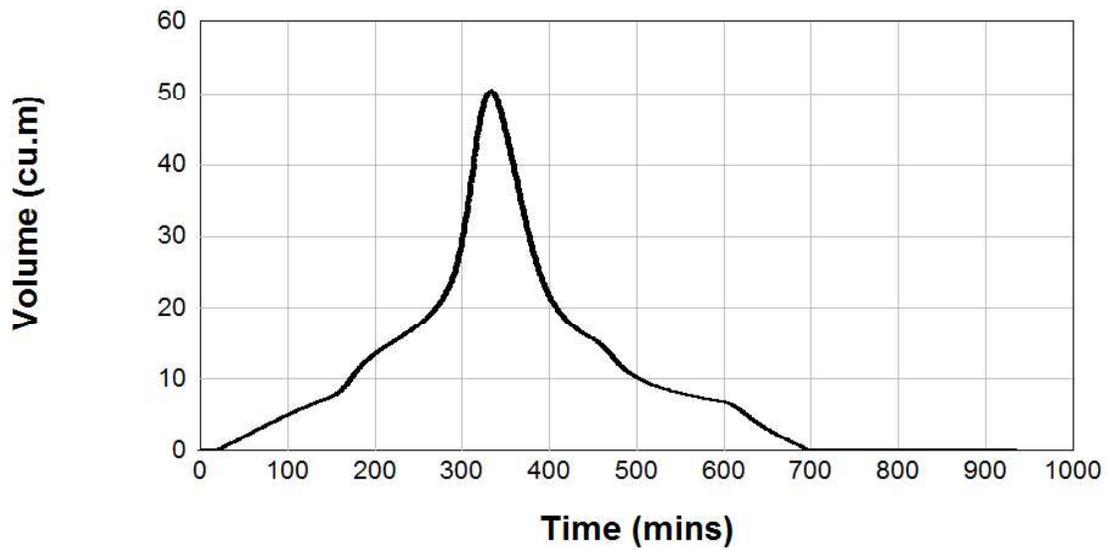
Storage Volume – 5 year ARI synthetic storm



Storage Volume – 2 year ARI synthetic storm



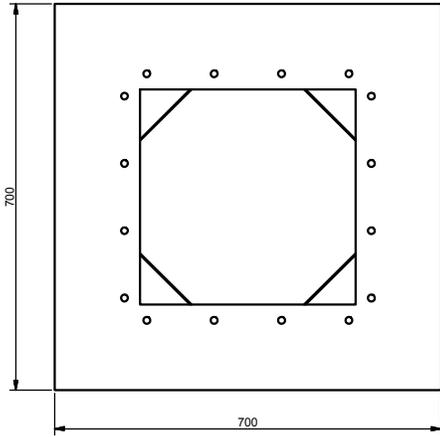
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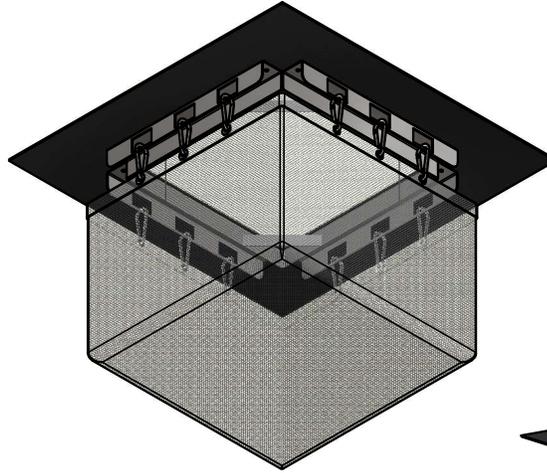
APPENDIX E – STORMWATER & OILY WATER TREATMENT SYSTEM



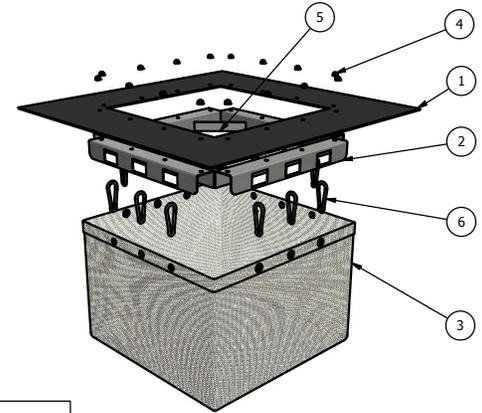
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REV	DESCRIPTION	DESIGNER	DATE	CHECKED BY
1	INITIAL RELEASE	M.M	25/03/2015	



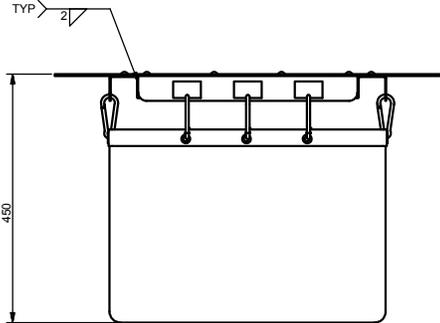
PLAN VIEW



ISOMETRIC VIEW
BOTTOM VIEW



ISOMETRIC VIEW
EXPLOSION



ELEVATION VIEW

PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	PLASTIC SHEETING	HDPE
2	4	SHEET METAL BENDING	STAINLESS STEEL 304
3	1	TEXTILE FABRIC & MESH LINER	HDPE
4	16	BLIND RIVIT 7 DIA.	STAINLESS STEEL 304
5	4	CORNER ESTIFFENER - FLAT BAR 25 x 2 - 141 LG	STAINLESS STEEL 304
6	12	CARABINER CLIP 6	ALUMINIUM

CLIENT:

DISTRIBUTOR

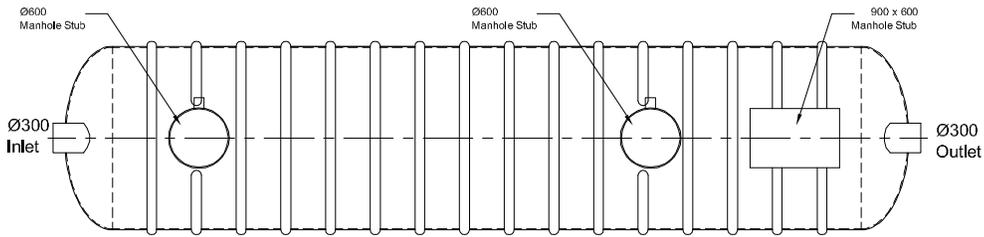
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Drawn M.M Date 25/03/2015
 Checked By Date
 Verified Date
 Approved Date
 Customer Code:

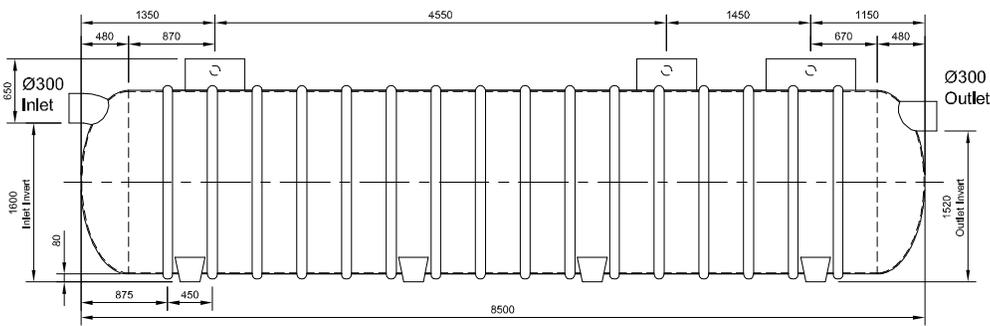


TITLE
 SPEL STOMSACK
 FRAME 600 x 600
 BASKET MOUNTING ASSEMBLY DRAWING

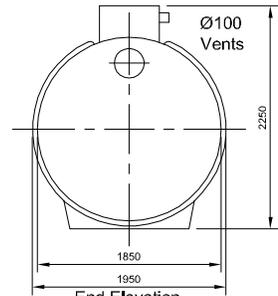
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SCALE N.T.S	DWG No. SP15-BB4610-S		



Plan



Elevation

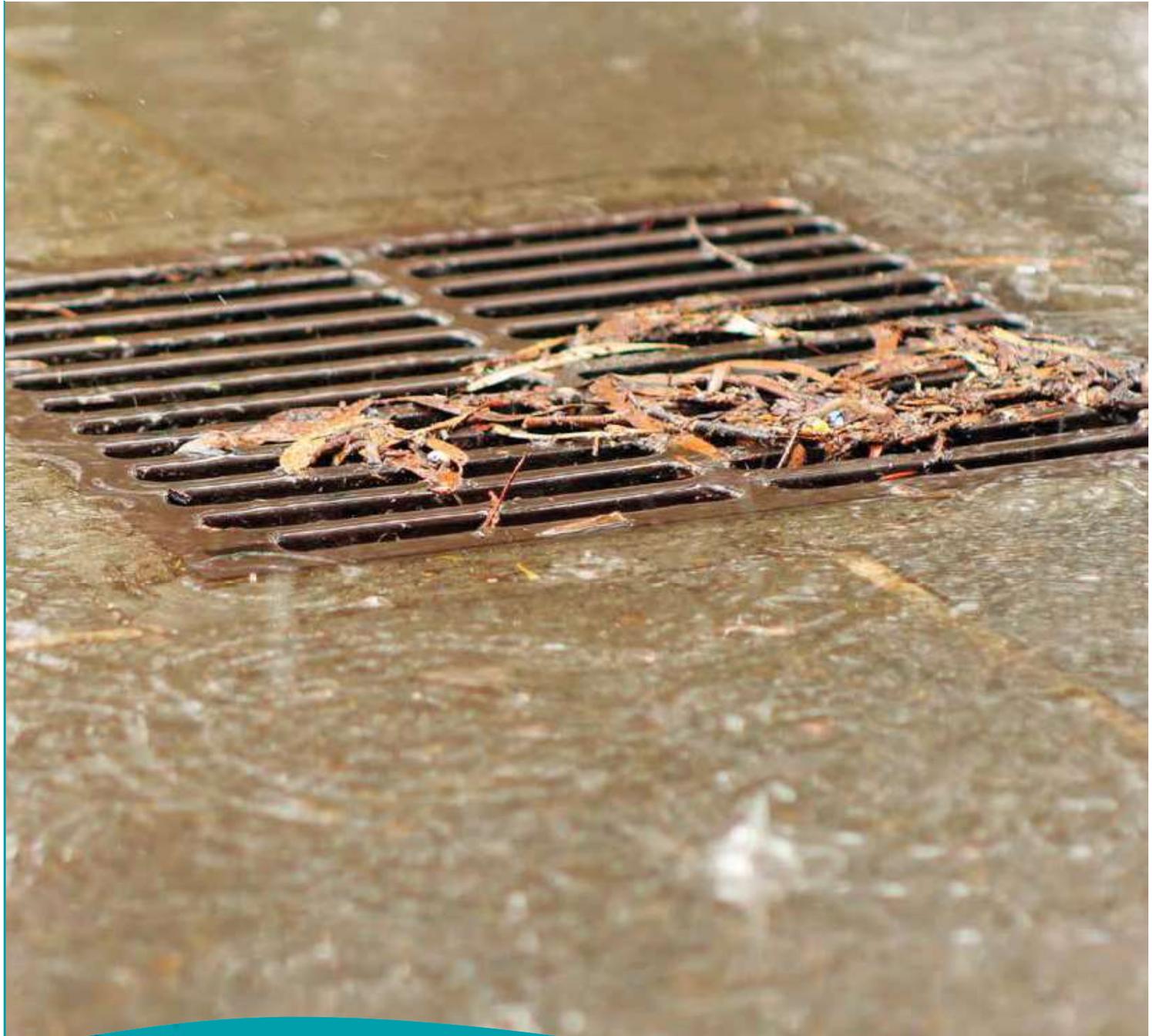


End Elevation

DATE	REVISION	BY	 <small>93 - 97 Fern Hill Street Paramatta NSW, 2155 PH: (61) 2 9683 5555 Email: sales@spelproducts.com.au</small>			
16.10.08	Original Issue	MCW	PURCEPTOR Model P050,C1.2C.SC			
1.10.09	Revised Manhole & Rib Locations	C.J.G.				
			DRAWN	CHECKED	SCALE	DRAWING NUMBER
			M.Watts	NLP	NTS	

APPENDIX F – STORMWATER & OILY WATER TREATMENT SYSTEM MANAGEMENT PLAN





SPEL Stormsack

At-source Gross Pollutant Trap

www.spel.com.au

Stormwater Treatment

An all too common issue with today's highly impervious landscape is how to meet stormwater regulations with limited budgets and tight space constraints.

SPEL StormSack filtration solutions are highly engineered water quality devices that are deployed directly in the stormwater system to capture contaminants close the surface for ease of maintenance. Easily retrofitted into new or existing structures, SPEL StormSack filtration technology is a decentralized approach to stormwater treatment that essentially repurposes traditional site infrastructure and customizes it to meet specific site water quality goals. In this way, it satisfies important objectives of today's LID (Low Impact Development) criteria.

From an operations perspective, catch basins with SPEL StormSack filters are also easier and quicker to clean out because pollutants are trapped just under the grate.

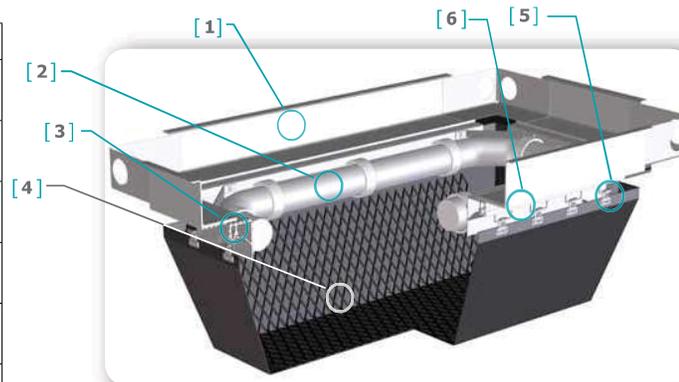
StormSack

The SPEL StormSack is specifically designed for the capture of gross pollutants: sediment, litter, and oil and grease. Ideally suited for municipal storm drain retrofits, the SPEL StormSack's unique design allows maintenance to be performed using conventional vacuum suction equipment.



Application	Regulatory Issue	Target Pollutants
Council Storm Drain Retrofits	At-source litter capture	Sediment, Litter, O&G
Commercial/Retail/Residential	Stormwater Compliance	Sediment, Litter, O&G
Litter Prone Urban Areas	Cost effective litter control	Litter \geq 5 mm
Scrap Metal/Solid Waste/Oil Storage/Etc	Industrial Multi-Sector General Permit	Gross Pollutants, O&G
Part of Treatment Train	Council Stormwater Quality Improvement Targets	Sediment, Litter, O&G
Construction Sediment/Erosion	Sediment Control Plan	Sediment/Erosion Control

Features	
1.	Durable, aluminum frame construction has 15 year service life
2.	Integral oil boom effectively captures oil and grease from spills
3.	Patented dovetailed flange – allows 12cm of length/width field adjustment
4.	Polypropylene netting protects sack from suction hose during maintenance
5.	Steel clip with locking tab holds replaceable filter sack in place
6.	Baffled bypass traps floatables



Standard SPEL Stormsack to suit Pit Sizes
450x450mm
600x600mm
900x600mm
900x900mm

Custom sizes (i.e. 1200x900mm) can be manufactured on short lead times

Specifications & Details

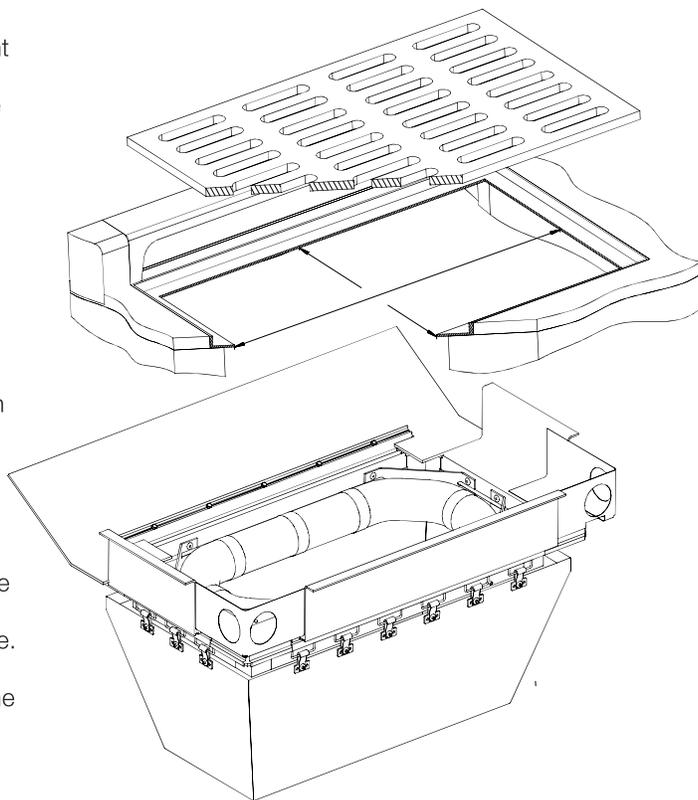
General Description

This technology is a post developed stormwater treatment system. The SPEL StormSack provides effective filtration of solid pollutants and debris typical of urban runoff, while utilising the existing or new storm drain infrastructure. The StormSack is designed to rest on the flanges of conventional catch basin frames and is engineered for most hydraulic and cold climate conditions.

Installation And Maintenance

Installation procedures shall include removing the storm grate, cleaning the ledge of debris and solids, measuring catch basin clear opening and adjusting flanges to rest on grate support ledge. Install SPEL StormSack with splash guard under curb opening so the adjustable flanges are resting on the grate support ledge. Install corner filler pieces. Reinstall storm grate directly on support flanges [rise shall be no more than 1/8 inch (3 mm)].

Maintenance: Typically the SPEL StormSack is serviceable from the street level, and therefore maintenance does not require confined space entry into the catch basin structure. The unit is designed to be maintained in place with a vacuum hose attached to a sweeper or a vactor truck. The oil boom is also designed to easily be replaced from the street level. Use only SPEL replaceable parts.



Products

Material and Design

- A. Adjustable Flange and Deflector: Aluminum Alloy 6063-T6
- B. Splash Guard: neoprene rubber
- C. Stormsack: woven polypropylene geotextile with US Mesh 20
- D. Corner Filler: Aluminum Alloy 5052-H32
- E. Lifting Tabs: Aluminum Alloy 5052-H32
- F. Replaceable Oil Boom: polypropylene 3 inch (76 mm) diameter
- G. Mesh Liner: HDPE, diamond configuration
- H. Support Hardware: CRES 300 Series

Typical Performance Characteristics

- A. Debris capacity: 8.5cu. ft. (0.24 m³)
- B. Filtered flow rate: 7.3 cfs (207 lps)
- C. Primary baffled bypass flow rate: 4.2cfs (119 lps)
- D. Secondary bypass flow rate: 0.4 cfs (10 lps)
- E. Total bypass flow rate: 4.6 cfs (130 lps)
- F. Oil boom sorption capacity: 376 oz (11 L)

Recommended minimum clearance from bottom of SPEL StormSack to inside bottom of vault is 2 inches (50 mm)
Typical frame adjustability range of 5 inches (127 mm) in each direction.

Benefits

- Low cost gross pollutant capture
- Quick & easy installation
- Simple maintenance
- At source capture
- Adjusts to custom pit sizes

Field Performance

The SPEL Stormsack was introduced to the Australian market in 2012 and field testing is underway at several locations in South-east Queensland. Laboratory testing has shown capture of 99.99% of gross pollutants up to the bypass flow rate.* Further results will be provided as they become available.



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SPEL Separator Commissioning Operation and Maintenance

SPEL

Puraceptor Class 1

Operation and Maintenance Manual

Introduction

Congratulations on your purchase of a SPEL Environmental Stormwater Quality Improvements Device.
With proper care and by following a few simple guide lines your system will give you many years of dependable service.

Important

Only qualified personnel should maintain, operate and repair you Stormwater system. Any wiring of equipment should be performed by a qualified electrician.

Warning

Operation may cause injury. Take all necessary precautions, wear protective equipment, refer to Engineers Department.
For your own safety, read all instruction manuals prior to working on equipment.

Safety Precautions

- Follow all “occupation, health and safety” regulations.
- Ensure maintenance personnel are aware of “Confined Spaces” guidelines, which must be followed.
 - Make sure that there is sufficient oxygen and that there are no poisonous gases present.
 - Check the explosion risk before welding or using electric hand tools.
 - Do not ignore health hazards. Observe strict cleanliness.
 - Ensure that the lifting equipment (where required) is in good condition.
- All personnel who are to work with these systems should be vaccinated against diseases that can occur.
 - Keep a first aid kit handy.

Health & Safety

Maintenace should be carried out by a competent contractor in accordance with the above procedures.

Health and Safety at Work legislation and good building practice.

A warning notice should be visible at the top of each access shaft - ‘danger, harmful fumes’ and ‘respirators should be worn in this tank.’ Before entering persons must be qualified in accordance with ‘confined space’ requirements



Information contained in this data sheet is approximate and for general guidance only. In accordance with the companies policy of constant improvement and development SPEL Products reserves the right to change the specification without prior notice.

Puraceptor Class 1

SPEL Operation and Maintenance Manual

Service Stations
Fuel Depots
Windfarms
Switchyards
Sub Stations
Power Stations
Industrial Locations

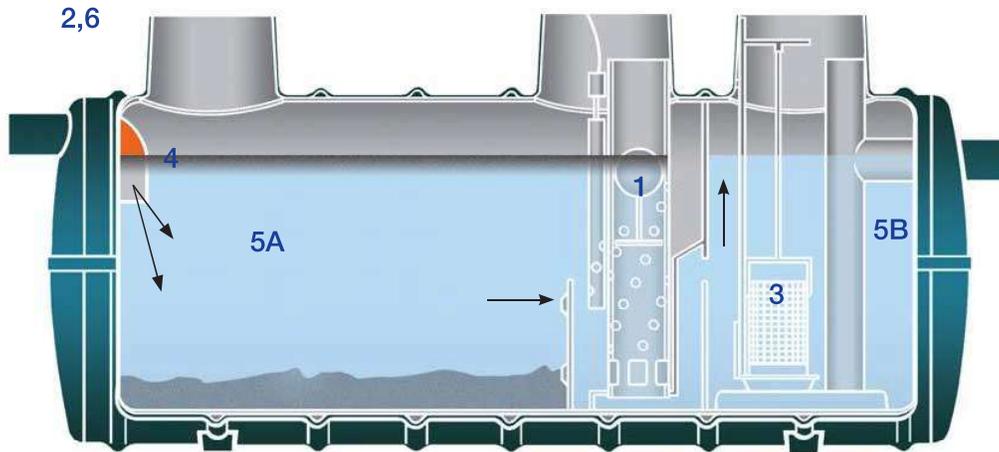
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SPEL Oil Alert System	page 6
Spare Parts List	page 8

SPEL PURACEPTOR™ CLASS 1

Oil containment

“How it works”



SPEL PURACEPTOR™ is a **FULL RETENTION** separator that treats all flows and is sized to contain more than the anticipated maximum oil spillage enabling it to be fully operational at all times.

It has two chambers, a coalescer and is fitted with an automatic closure device specifically designed to treat and contain major oil spills thereby making it suitable for high risk applications.

It achieves a water discharge quality of 5mg light liquids per litre complying to European Standard BS EN 858.1. 2006. Treatable flow rates range from 2LPS to 200LPS. Pipe sizes range from 100mm to 450mm (larger sizes on request).

Careful and proper planning by corporate Australia and government bodies is essential when designing and implementing systems that are effective in protecting our environment. The proven and independently accredited SPEL PURACEPTOR™ (complies to European Standard BS EN 858.1 2006) is an Australian made stormwater treatment and oil containment device that can contain and prevent light liquid pollutants from discharging into our waterways.

1 AUTOMATIC CLOSURE DEVICE

The AUTOMATIC CLOSURE DEVICE (A.C.D.) is a precisely engineered device comprising a water-bouyant ball that is sensitive to any change in the water density as a consequence of light liquids build up, thereby automatically activating a process of depressing the A.C.D. to SHUT OFF the separator, preventing pollutants from discharging to drains and waterways.

2 FULL RETENTION

All liquid is treated. There is no by-pass operation.

3 COALESCER EQUIPPED

Provides a coalescing process for the separation of smaller globular of light liquid pollutants to reduce the light liquid content in the outlet to **5mg/litre or less.**

4 INLET DIP PIPE - FLAME TRAP

For minimum turbulence and to prevent fire and inflammable vapours passing through to the drainage system.

5 TWO CHAMBER

A non-turbulent flow through two horizontal treatment chambers, utilising the underflow principle to retain light liquids in all flow conditions.

A. CONTAINMENT CHAMBER: Where Total Suspended Solids (TSS) silt, sediments, sludge and gross pollutants are trapped and settle on the chamber floor and where light liquids are contained.

B. COALESCER CHAMBER: Where light liquids separation is enhanced reducing it to **5mg/litre** or less prior to discharge.

6 GRAVITY OPERATED

Will function in the event of power failure and fits into existing pipe drainage systems or new sites.

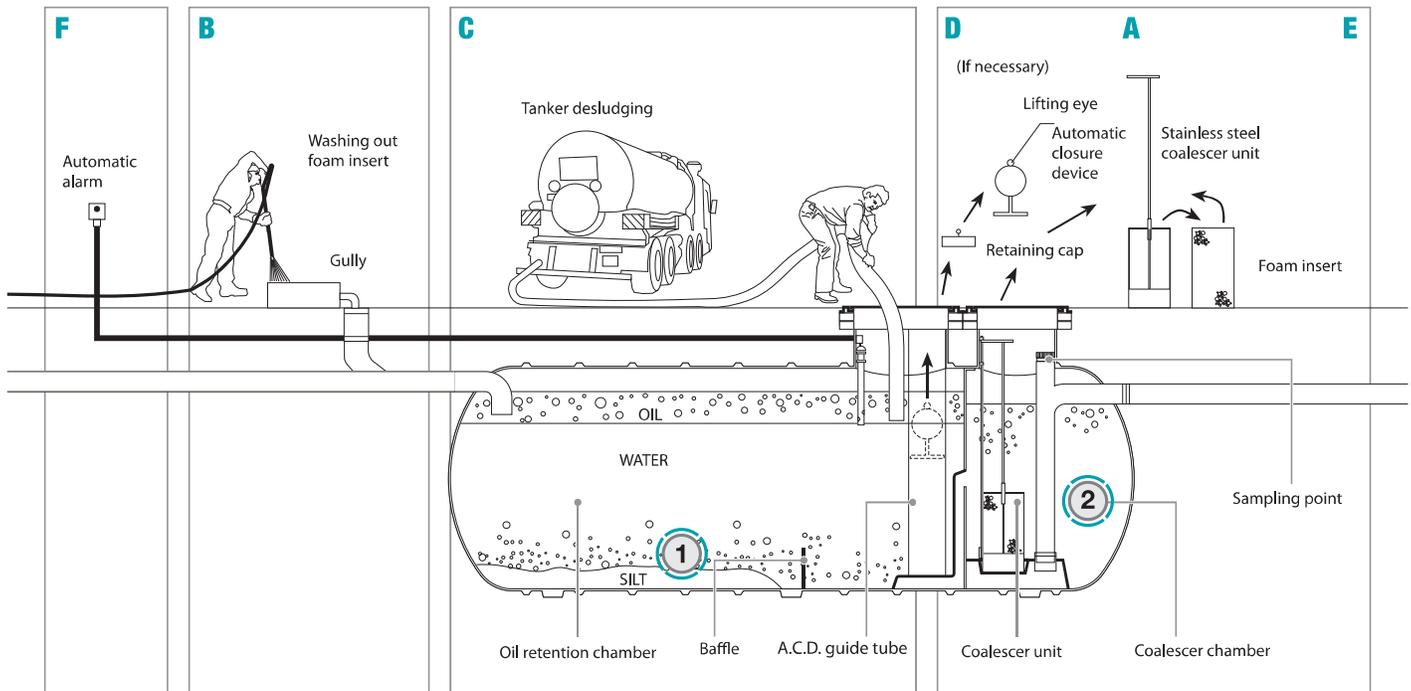
7 MAINTENANCE

Easy and safe with no entering of the tank required.

SPEL SPEL PURACEPTOR™

Puraceptors™ should be inspected at three - six - or twelve monthly intervals depending on site conditions, to determine the depth of retained pollutants and silt in both chambers and the correct operating of the ACD (automatic closure device). When the depth of the oil/fuel retained has reached the predetermined design level, (approx. 50mm) or after a spill it should be cleaned out.

- 1** **CONTAINMENT CHAMBER:** Where silt, sediments, sludge, gross pollutants settle out and light liquids are retained. The auto closure device operates in its retaining tube next to the oil alert sensor probe.
- 2** **COALESCER CHAMBER:** Where light liquids separation is enhanced prior to discharge and where the coalescer unit is incorporated, the coalescer should be removed and cleaned in accordance with the requirements set out in the coalescer data sheet.



MAINTENANCE PROCEDURE

A Coalescer unit

Use the lifting handle or the chain and lift the coalescer unit out of the tank and place it near the Puraceptor™. In a retained area so pollutants do not escape.

B Cleaning foam insert

Remove foam insert and wash with normal water pressure ensuring the dirty water runs into the Puraceptor™.

C Sucking out oil/fuel and silt

Suck off the retained oil from both chambers of the Puraceptor™ and then the silt deposited on the bottom, leaving sufficient water to ensure the (auto closure device) ACD remains floating.

D Sucking out complete contents (if necessary)

If the quantity of pollutants exceeds recommended level, the complete contents of the Puraceptor™ may need to be removed. After sucking out completely, remove the ACD. Using a pole with a hook, lift out the ACD using the lifting eye on the float, if fitted.

E Re-insert coalescer unit and ACD

Re-insert the foam insert into the stainless steel coalescer unit and re-insert the coalescer unit into the Puraceptor™ as provided with the SPEL lifting/location/locking system.

Partially fill the Puraceptor™ with clean water (if necessary) to ensure the ACD when re-inserted remains floating. Re-insert the ACD.

Finally check the ACD is floating after it has been replaced to safeguard against its removal by unauthorised persons, unless depth of tank precludes doing so from ground level.

F SPEL automatic alarm/monitoring system

The SPEL automatic alarm/monitoring system probe should be lifted out of the probe protection tube, wiped clean and re-inserted. The system should now be reset according to instructions.

Important note:

When cleaning out, ensure both chambers are sucked out equally starting with the first chamber and then the second chamber and back again. Ensuring even water pressure against baffle wall.

SPEL SPEL COALESCER UNITS

The SPEL Puraceptor™ Class 1 separator and the SPEL Stormceptor™ Class 1 by-pass separators incorporate coalescer units. The coalescer units provide a coalescence process for the separation of small globules of light liquid pollutants before final discharge to the surface water drain.

Coalescers are found in the second chamber of the SPEL Puraceptor™ and the second chamber of the SPEL Stormceptor™ Class 1

Prior to installation

1. Remove any strapping / ropes which have been used to hold the coalescer units from shifting in transit.
2. The access shaft(s) above the coalescer units should be covered to prevent ingress of concrete, dust, debris etc., which could clog the foam inserts.
3. On completion of installation, check that the coalescer unit is inserted securely into the base socket.

On heavily polluted sites silt and contaminants may build up in the coalescer unit foam inserts and add significantly to it's weight. Use lifting chain sets that are on hooks at ground level for safe lifting with a tripod or hoist.

Installation

During installation, it is important that the foam inserts are not clogged with dust, debris or drops of wet concrete. To safeguard against this, we recommend covering the access shaft with a sheet of polythene, if not already covered.

Commissioning

On completion of installation, check the foam insert is fitted inside the stainless steel coalescer unit and the coalescer unit is inserted securely into the base socket.

Maintenance

1. Lift handle and coalescer unit out of the tank and place in a retained area so pollutants do not escape.
2. Remove foam insert and wash with normal water pressure ensuring the dirty water runs into the Puraceptor™ / Stormceptor™.
3. Make sure the hole in the centre of the coalescer foam is facing towards the manhole when installed in the tank.
4. Re-insert the foam insert into the stainless steel coalescer unit and re-insert the coalescer into the Puraceptor™ / Stormceptor™. After the tank has been cleaned.

SPEL COALESCER UNITS GUIDE RAIL SYSTEM/LIFTING, LOCATING AND LOCKING SYSTEM

SPEL coalescer unit guide rail system

This facilitates easy insertion and removal of coalescer units. The system is robust, manufactured throughout in stainless steel and is action positive, leaving no doubt the coalescer unit is located properly.

Brackets fixed to the top and bottom of the coalescer unit simply engage the stainless steel guide rail fixed to the top of the stub access shaft. The coalescer is then lowered in the normal way, being guided at the correct angle into the conical base unit which finally locates the coalescer unit into it's final position.

Extension guide rails can be incorporated into the SPEL extension shafts to suit (preferably when ordered with the separator).

However, when the separator is full of water, debris or sludge accumulated over a period could prevent the coalescer unit from re-seating correctly after servicing.

The coalescer unit lifting / locating / locking system ensures the coalescer unit is seated correctly and can be locked into position to prevent tampering.

The stainless steel lifting handle can be extended to suit deep tank inverts and provide easy access for lifting manually or with a tripod and hoist utilising the lifting hook.

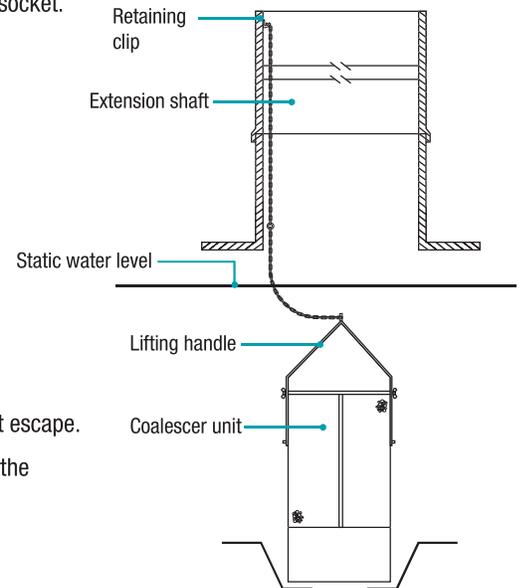


Figure 1. Coalescer unit with lifting chains

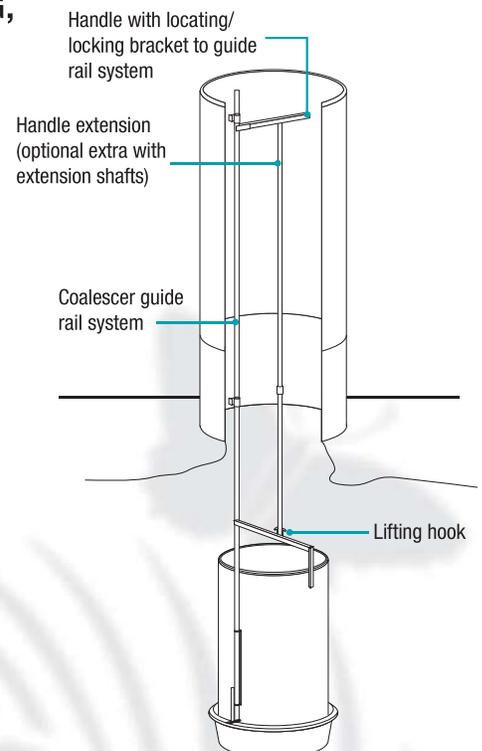


Figure 2. SPEL coalescer unit guide rail system/lifting, locating and locking system

SPEL SPEL AUTO CLOSURE DEVICE (ACD)

• **SPEL ACD**The Automatic Closure Device (ACD) is found in the first chamber of a Puraceptor™. The purpose of the ACD is to close the separator off automatically when the maximum storage capacity of light liquid is attained.

The ACD is to ensure that in the event of a major spillage, pollutants do not pass into the drainage system; it should not be regarded as a substitute for an automatic alarm / monitoring system.

Prior to installation

Prior to installation the ACD retaining tube should be covered to prevent ingress of concrete etc., which could fall onto the ACD and upset it's calibration.

Operation and Maintenance

If the tank should fill with light liquid, the ACD which is calibrated for a specific gravity of 0.85, will automatically sink and close off the SPEL Puraceptor™.

Normally routine maintenance would include removing light liquid intercepted within the Puraceptor™. If a SPEL automatic alarm / monitoring system is incorporated, it will automatically indicate when the Puraceptor™ should be emptied. Only in an emergency will the Puraceptor™ fill to it's maximum and operate the ACD.

In such an event the Puraceptor™ should be completely sucked out and the ACD lifted out. Check that the ACD is in good working condition – ie. Lifting hook secure and sealed; float not leaking; knuckle joint free and clean; sealing ring intact and complete. Clean with warm soapy water before re-inserting.

To re-insert the ACD, partially fill the Puraceptor™ with clean water (if necessary) to ensure the ACD when re-inserted remains floating. Re-insert the ACD.

Finally check the ACD is floating after it has been replaced.

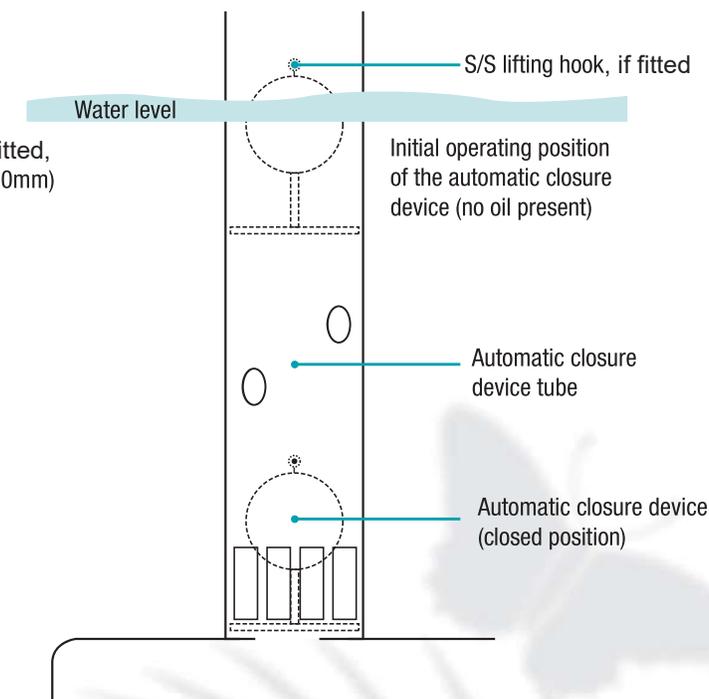
SPEL Puraceptor™ Class 1 separators – Two Chamber Models

Commissioning

After the tank has been installed, leave the water in.

1. Remove the ACD from the packing box, taking care not to cause damage.
2. Insert the ACD into the retaining tube using the lifting eye, if fitted, ensuring it floats correctly with the float (top section approx. 50mm) just visible above the water level.

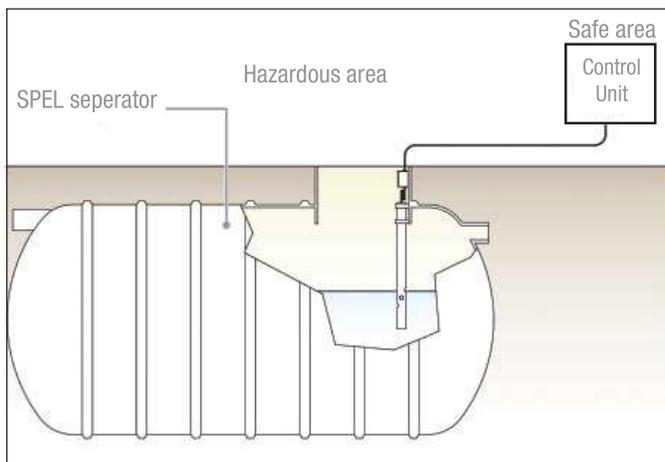
Automatic closure device SPEL Puraceptor™ Class 1 separators (two chamber)



SPEL SPEL Automatic Alarm/Monitoring System

The SPEL automatic alarm/monitoring system provides a audible warning alarm when the level of the oil in the SPEL separator reaches approximately 10% of the storage volume under static liquid level conditions. This is a early warning system that is used for spills or lack of maintenance.

The system comprises of a probe mounted in the main separation chamber which senses when the designed volume of light liquids has accumulated and sends a signal to the electronic control unit activating a red 'empty now' warning light and an audible alarm,



Operation

The probe is freely suspended in the probe protection tube in the separator at the correct level. When the oil-layer or depth of hydrocarbons reaches the predetermined level, the top of the probe will be immersed in the oil, breaking the circuit and activating the alarm. It is a 'fail-safe' system providing complete assurance that it is operative. If a fault occurs it will be signalled immediately.

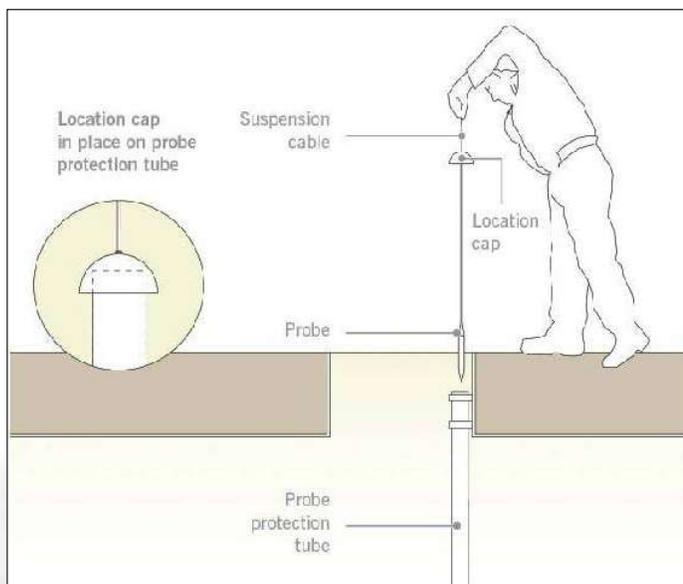
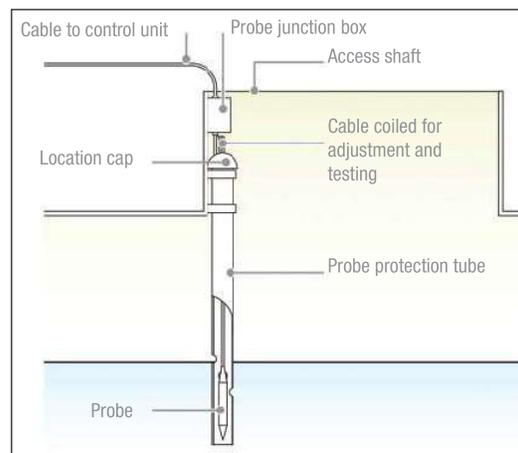
Installation

Control unit (general positioning)

The control unit has been designed to be located indoors and outdoors, within a nonhazardous area. It should be wall mounted and positioned such that the LED display and push switches on the front panel can be readily seen and accessed. The unit can be secured to the wall by using the four mounting holes provided. Included within the control is an intrinsically safe circuit (approved according to ATEX Directive 94/9/EC), to which the probe unit is connected.

Maintenance

When the separator is maintained, lift the probe out of the probe protection tube, check it operates the alarm (see under Tests Ref. 10.2) and at the same time wipe oil and contaminants from the probe to prevent a fake alarm after re-inserting.



Insert probe onsite

The probe protection tube is factory fitted and the probe matched to ensure the alarm is activated when the light liquids reach approximately 10% of the storage volume the SPEL separator is designed for.

All that is required on site is to undertake the electrical installation in accordance with the instructions provided and lower the probe with the pre-fixed location cap into the probe protection tube. When the cap locates onto the top of the probe protection tube, the probe is suspended at the correct level.

SPEL SPEL Automatic Alarm/Monitoring System

Control unit (electrical connections)

1. Mains voltage connection;

The control unit should be connected to a suitable 220/240V AC supply and fused at 3 amps.

Note: This appliance must be earthed.

2. Control unit/probe junction box connection

Wiring from the control unit to the probe junction box in the separator chamber requires a 3-core screened, 0.75mm core section cable.

Maximum cable length: 300 metres.

3. Probe connection

A 5 metre 3-core probe cable is normally fitted to the junction box and the probe.

After all connections have been made, the cables must be secured by tightening each entry gland.

Probe

The probe is installed freely suspended in the SPEL separator within the probe protection tube. The 3-core cable is connected into the junction box mounted in the access shaft above the probe protection tube. Extra cable is provided to enable raising the junction box where extension shafts are incorporated.

Important note: In all cases good, standard electrical practice should be followed and the installation must conform to the Australian Wiring Rules – AS 3000 – 2007. In essence, the installation must be such that the intrinsic safety is no compromised by:

- Exposure to risk of mechanical damage
- Unauthorised modification of interference
- Exposure to moisture, dust and foreign bodies
- Excessive heat
- Invasion of intrinsically safe circuit by other electrical equipment or circuitry

Certificate of conformity

The alarm device has been approved to be used in explosion-hazardous areas. The control unit and probe are approved according to ATEX Directive 94/9/EC. These approvals mean that the probes can be installed in Zone 0, which is continuously explosion-hazardous.

The SPEL oilset control unit must be located in the safe area, but it can be connected to the probe without any barrier.

Tests (10.2)

The function can be tested by lifting the probe within the probe protection tube. In approximately 5 seconds, the alarm is given by a red light and audible signal. Both relays release. Push the RESET button - the buzzer goes off and relay pulls in.

When the probe is placed in water again, relay pulls in and the red light goes off.

Cable break and short circuit test

Also the function can be tested in case of cable fault or short circuit. First cause short circuit in probe cable terminals 1 and 2. Then the yellow light of short circuit is lit. Both the relays pick up and the buzzer goes on. Remove the short circuit and reset the buzzer.

Simulated Function Test

The function of probe, cable and electronics can be tested. Push the TEST button for 2 to 5 seconds. Both relays pick up, and the red light is lit. When the TEST button is released, the red light goes off and relay returns to its normal position. The buzzer and relay must be reset.

Installation

Important note: It is important that installation is carried out by a competent technician familiar with this type of equipment or contact our Special Products Division for installation, commissioning and maintenance service.

SPARE PARTS LIST

DATE: _____

INVOICE NO: _____

TYPE: _____

MODEL: _____

SERIAL NO: _____

JOB NO: _____

LINE	DESCRIPTION	QTY	PART No.
1			
2			
3			
4			
5			
6			
7			
8			

For all spare parts enquiries, please ring 13 SPEL or 13 77 35

MAINTENANCE SERVICE LEDGER						
MODEL No						
INSTALLATION ADDRESS						
INITIAL OPERATING DATE						
WORKING CAPACITY						
PRIMARY CHAMBER SPILL CAPACITY						
OIL ALERT PROBE trigger threshold						
MINIMUM MAINTENANCE FREQUENCIES			<i>ANNUALLY from the initial operational date or if indicated by the oil alert probe alarm</i>			
<i>Note: Oil Alert Probe alarm is triggered when fuel/oil hydrocarbons reaches 10% of primary chamber capacity.</i>						
MAINTENANCE RECORD						
SERVICE DATE	COALESCER FLUSHED	PRIMARY CHAMBER SEDIMENT REMOVED & HYDROCARBONS SKIMMED	SECONDARY CHAMBER SEDIMENT REMOVED & HYDROCARBONS SKIMMED	OIL ALERT PROBE CLEANED & ALARM CHECKED	SERVICE MANAGER NAME & SIGNATURE	

Vegetated swales and drains

This fact sheet is one of a series which provides advice to extension officers and land owners on the use of vegetated swales and drains to improve farm run-off water quality, specific to coastal agriculture in the wet/dry tropics region between central and Far North Queensland.

Vegetated swales and drains

Vegetated swales and drains are shallow, open, vegetated channels primarily designed for conveying water in a longitudinal manner through a drainage pathway. They can also be designed to manage water quality by reducing flow velocities (speeds) compared to bare soil, piped or concreted conveyance systems.

They can remove coarse and medium sized sediments and are commonly combined with buffer strips, sediment basins and constructed wetlands to provide further treatment.

The main difference between swales and drains is how they hold water. Swales are located in areas which can fully drain and are therefore typically dry. Swales can also be headlands or access tracks that are not used regularly for farm traffic. Drains are located on flat or backwatered locations which results in them holding water. Swales ideally have a trapezoidal cross-section with a flat base, while drains have a shallow 'v'-shaped configuration (Figure 1).

Swales and drains should be designed to convey the required run-off volume effectively, and be well vegetated to allow for seasonal slashing. Ideally they will be located on slopes with 1-4% grade.

Treatment processes

The interaction between water flow and vegetation within these systems facilitates settlement and retention of pollutants. Vegetation type/height will influence the treatment performance.

- **Swales/drains with low vegetation** (such as mown grass) can achieve moderate sediment deposition rates provided flows are well distributed across the full width and length of the swale and the longitudinal grade of the swale is kept low enough to maintain slower flow conditions (less than 4%).
- **Swales/drains with taller/reed type vegetation** can offer improved sediment retention by slowing flows more and providing enhanced sedimentation for deeper flows. However, densely vegetated swales have higher hydraulic roughness and therefore require a larger area to convey flows compared to grass swales.

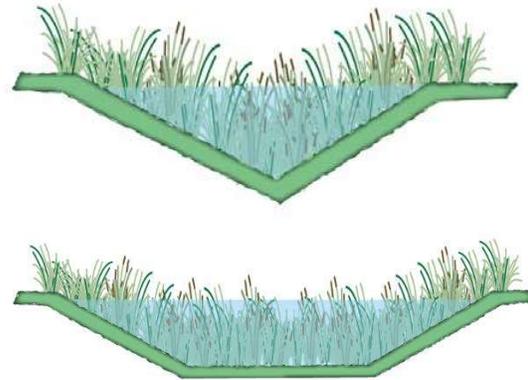


Figure 1 - Vegetated drain (top) and vegetated swale (bottom) cross sections.

Table 1 - Summary of vegetated swale and drain treatment processes

Pollutant Size / Type	Treatment Performance	Description of Vegetated Swales and Drains Treatment Process
Coarse to medium sized pollutants (e.g. sediments)		Vegetation facilitates enhanced sedimentation of particles, particularly coarse to medium sediments, through filtration and deposition.
Fine particulates (e.g. fine sediments and particulate nutrients)		Vegetation may also trap some fine particles which may retain or adsorb pollutants.
Dissolved pollutants (e.g. nutrients, chemicals and pesticides)		There may be some direct uptake of nutrients by vegetation. Regular wetting and drying in swales and drains will enhance the decomposition of organic matter and decreases the availability of phosphorus trapped in the sediments.



Use of vegetated swales and drains on farms to manage run-off

Vegetated swales and drains can be used as part of an overall farm drainage strategy to improve run-off water quality provided best practice farm management practices are implemented and a number of key design considerations are addressed. Planning treatment elements should also consider their position in the catchment and whether the location is suitable.

Sizing

Typically, swales and drains are applicable for smaller scale contributing catchments up to 2 hectares provided the pollutant load is not excessive. For an area of this size the vegetated swales and drains should be able to convey and treat frequent storm flows effectively. The width and length required to treat flows from catchment areas larger than this can be problematic (especially for flat bottom swales).

Site constraints

Vegetated swales and drains are not ideally suited to sites with:

- Steep topography (>4%) - check dams may be required for these slopes to protect scour.
- Flat topography (<1%) - swales can become waterlogged or boggy if they are unable to drain effectively, which can be difficult to maintain and can be problematic for vehicle movement and result in problems with mosquitoes. Drains are more suited to these conditions.
- Large catchment (>2ha) - swales and drains would need to be large and specifically designed to reduce risk of failure due to large flow depths and velocities generated from larger catchment.
- Acid sulphate soils (follow best practice guidelines).

These site characteristics don't preclude the use of swales or drains, but it may require additional design considerations and have cost implications.



Position and role in a run-off treatment train

The adoption of in-paddock best management practices and appropriate location within the farm are critical to reduce the loads entering the swales and drains.

Once these preventative methods have been employed, swales and drains can be used. They alone cannot provide sufficient treatment to significantly reduce pollutant loads in farm run-off, but can provide an important pre-treatment function for other elements in a treatment train.

Swales and drains are ideally located as one of the first elements in a treatment train, removing coarse sediments from farm run-off before it enters tertiary treatment systems such as sediment basins or constructed wetlands (Figure 2).

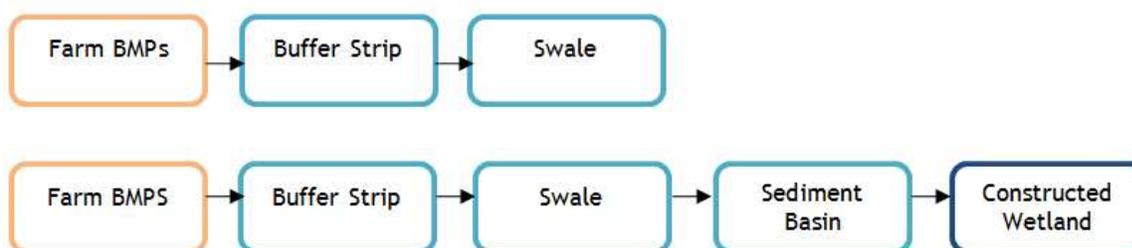


Figure 2 - Possible locations of vegetated swales and drains in farm run-off treatment trains.

Design, construction and maintenance

Design requirements

For water quality improvement functions, swales and drains should focus on ensuring frequent storm flows (typically up to the 3 month Average Recurrence Interval flow (ARI)) are conveyed within the swale or drain profile. Flows above these levels should exit the farm via breakout and overflow channels as these high flows can damage the swales and drains. In most cases, a swale or drain will also be required to provide a flow conveyance function as part of a larger drainage system.

The design of vegetated swales and drains should consider the following design features:

Batter slope and depth

Depth and batter slope will influence the conveyance capacity and overall footprint (top width) of the swale or drain and should be designed with consideration of maintenance (mown/slashed edges shouldn't be steeper than 1 in 4) and vehicle crossings (at grade crossings shouldn't be steeper than 1 in 9). For vegetated swales the floor of the drainage path should be configured to have a flat cross section.

Width

Width will be driven largely by the available space, but the greater the width, the greater the conveyance and treatment capacity for a shallow swale or drain.

Length

Length will be driven by the available space but the greater the length the greater the area for treatment.

Soils

Soils need to be appropriate to support construction of swales and drains and not be erosive.

Longitudinal slope

The longitudinal slope of the drainage path should be between 0.5% and 5%. A steeper longitudinal slope will still provide an effective drain, but can increase erosion risk and diminish treatment effectiveness.

Additional design considerations:

Weed management

Densely vegetated emergent macrophytes (reeds and sedges) within the swale or drain can make it difficult for weeds to establish by occupying the habitat.

Flow velocities

Velocities within swales and drains should be kept low, preferably less than 0.1m/s for frequent flows and less than 2 m/sec in major storm events to prevent damaging the vegetation.

Check dams

If check dams are required to manage flow velocities (e.g. on steep sites), these can be small e.g. 100mm rock weirs or equivalent, placed along the base of the swale to slow flows and protect it from scour. A rule of thumb for locating check dams is for the crest of a downstream check dam to be at 4% grade from 100mm below the toe of an upstream check dam (Figure 3).

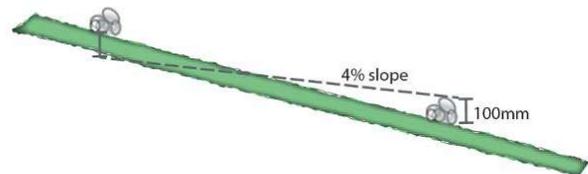


Figure 3 - Rock check dams on base of steep swales/drains

Design checklist:

Vegetated drain:

- Upstream catchment <2ha
- 1 in 4 batters
- Longitudinal slope less than 5%

Vegetated swale:

- Upstream catchment <2ha
- Batters between 1 in 4 and 1 in 9 (for vehicle access)
- Longitudinal slope between 0.5% and 5%
- Floor of swale has a flat cross section
- Swale is able to drain completely

Typical construction issues

Existing vegetation and approvals

Swales and drains should be established to minimise impacts on existing wetlands/waterways and native vegetation. Typically, swales and drains would be located within the production area. The likelihood of requiring a clearance approval would be low.

Earthworks

Swales and drains will require some earthworks to create the conveyance/treatment channel. The amount of earthworks should be minimal to avoid disturbing acid sulfate soils and shallow bedrock. Exposing bare soils should be minimised during construction to reduce the risk of sediment moving off site of earthworks approvals.

Any potential changes in hydrology resulting from flows being directed into or away from existing wetlands or waterways needs to be carefully managed to avoid creek bank erosion. Also, earthworks and any changes to hydrology within the vicinity of an area mapped as a wetland protection area may require an approval.

Planting and establishment

Swales and drains need to be well vegetated with grasses, sedges and rushes. The most cost effective approach is to seed the system with a mix of native species or if suitable vegetation exists nearby on farm, allow the vegetation to recruit or colonise naturally. Natural recruitment however increases the risk of erosion, weeds and increased maintenance.

Use local guidelines if they are available to assist with plant selection or contact your local Landcare or NRM group. Natural wetlands and riparian zones are a good reference from which to create a species template.

The dry season is the best time to establish vegetation in the swales and drains to reduce the risk of erosion. This allows for adequate establishment/root growth before the heavy summer rainfall period. Establishing it early in the dry season allows for growth of the root system while the ground is still moist. Some watering may still be required during the dry season.

Cost implications/risk

The risk of not achieving the desired design planting densities is poor treatment performance and the colonisation of weeds. Therefore it is important that the vegetation in the swales and drains is established successfully.



Maintenance

Swales and drains rely on good vegetation for optimal treatment, therefore ensuring adequate vegetation growth is the key maintenance objective for these systems. Plant cover should be at least 80% with plants not slashed lower than 300mm.

Typical maintenance of swales and drains can be done with slashers or by hand and will involve:

- Removing weeds and pest habitat (slashing, not spraying).
- Reseeding of to achieve design densities.
- Irrigating vegetation, if required. This could be necessary if headlands and tracks are the swales and are damaged by machinery during harvest. Irrigation may be needed to re-establish cover before the onset of the wet season.
- Removing sediment where it is building up and impeding flows. This should be done during the dry season and removed sediment should be disposed of in the farm blocks, away from drainage lines.
- Filling in any areas impacted by erosion especially if it is creating isolated pools.
- Protecting boggy, wet swales from traffic. As part of farm BMP wet season routes need to be identified.

Swales and drains should be inspected every six months and before the wet season to ensure they are ready to receive run-off.

Further information

This fact sheet is part of a series on run-off treatment systems, as listed below. The Wetland Management Handbook provides more detail on treatment structures and general farm management to improve water quality leaving farms.

These resources and other wetland management tools and guides are available at <http://wetlandinfo.ehp.qld.gov.au/wetlands/management/wetland-management/>

Number	Publication Title
Fact sheet 1	Farm runoff treatment systems– toolkit
Fact sheet 2	Buffer strips
Fact sheet 3	Vegetated swales and drains
Fact sheet 4	Sediment basins
Fact sheet 5	Constructed (treatment) wetlands

These factsheets were developed by the Queensland Department of Agriculture, Fisheries and Forestry (QDAFF), Healthy Waterways and E2DesignLab with funding from the Queensland Wetlands Program.

The Queensland Wetlands Program supports projects and activities that result in long-term benefits to the sustainable management, wise use and protection of wetlands in Queensland. The tools developed by the Program help wetlands landholders, managers and decision makers in government and industry. The Program is a joint initiative of the Australian and Queensland governments.

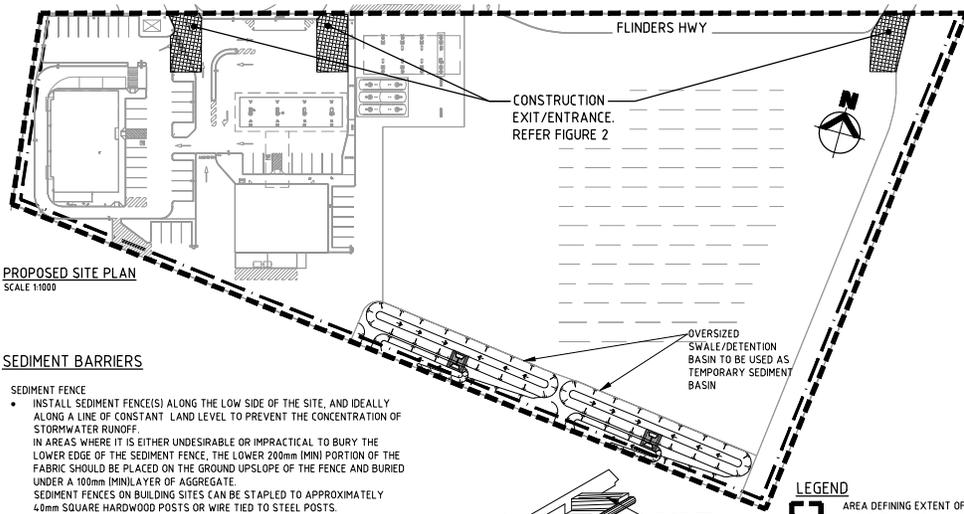
Contact wetlands@ehp.qld.gov.au
or visit www.wetlandinfo.ehp.qld.gov.au

QWP/2013/20



APPENDIX G – EROSION AND SEDIMENT CONTROL PLAN





SEDIMENT BARRIERS

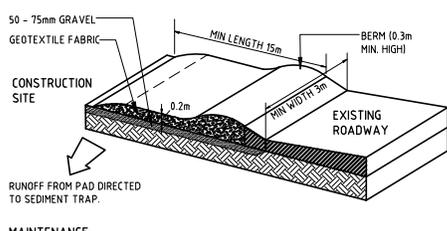
- SEDIMENT FENCE**
- INSTALL SEDIMENT FENCE(S) ALONG THE LOW SIDE OF THE SITE, AND IDEALLY ALONG A LINE OF CONSTANT LAND LEVEL TO PREVENT THE CONCENTRATION OF STORMWATER RUNOFF.
 - IN AREAS WHERE IT IS EITHER UNDESIRABLE OR IMPRACTICAL TO BURY THE LOWER EDGE OF THE SEDIMENT FENCE, THE LOWER 200mm (MIN) PORTION OF THE FABRIC SHOULD BE PLACED ON THE GROUND UPSLOPE OF THE FENCE AND BURIED UNDER A 100mm MIN LAYER OF AGGREGATE.
 - SEDIMENT FENCES ON BUILDING SITES CAN BE STAPLED TO APPROXIMATELY 40mm SQUARE HARDWOOD POSTS OR WIRE TIED TO STEEL POSTS.
- FIELD INLET GULLIES**
- SEDIMENT CONTROLS FOR STORMWATER INLETS LOCATED WITHIN THE PROPERTY BOUNDARIES MAY CONSIST OF GEOTEXTILE FABRIC PLACED EITHER DIRECTLY OVER THE GRATED INLET OR AROUND THE INLET SUPPORT BY A TIMBER FRAME. FIELD INLET PROTECTION IS NECESSARY WHERE INLETS DRAIN AREAS OF BARE AND UNPROTECTED SOIL. DURING STORMS, PONDING SHOULD BE ALLOWED TO OCCUR AROUND THE STORMWATER INLET TO ASSIST IN THE SETTLING OUT OF SEDIMENTS.
- PAVEMENT INLET GULLY**
- A ROADSIDE INLET BARRIER IS TO BE INSTALLED, SO THAT IT SHOULD NOT BE ALLOWED TO FULLY BLOCK THE INLET STRUCTURE.
 - ON A HILLSIDE, SEDIMENT BARRIERS MAY CONSIST OF A TEMPORARY DAM CONSTRUCTED FROM SAND AND GRAVEL BAGS AT LEAST 4 METRES UP SLOPE FROM THE GULLY INLET.

BUILDING OPERATIONS

- ERODABLE MATERIAL MISTAKENLY PLACED WITHIN THE ROAD RESERVE (INCLUDING ACCIDENTAL SPILLAGE AND TRACKING OF SUCH MATERIALS ONTO THE ROAD) THAT CAN NOT BE PREVENTED THROUGH REASONABLE MEANS, MUST BE (a) REMOVED IMMEDIATELY IF RAINFALL IS IMMINENT OR OCCURRING, (b) REMOVED PRIOR TO THE END OF THE DAY'S WORK IF RAINFALL NOT EXPECTED. MATERIALS SHOULD BE SWEEPED FROM THE ROAD, NOT WASHED DOWN THE GUTTER.
- ALL SOLID WASTE SHOULD BE STORED ON SITE IN SUCH A MANNER THAT IT IS PREVENTED FROM LEAVING THE SITE EITHER BY THE ACTION OF WIND OR WATER.
- SMALLER MATERIALS, SUCH AS LITTER, SHOULD BE CONTAINED IN COVERED BINS OR LITTER TRAPS FORMED ON THREE SIDES BY A GEOTEXTILE WIND BREAK.
- CONCRETE WASTE WASHED FROM TRUCKS AND MIXERS UNITS SHALL BE CONTAINED ON SITE AND SHALL NOT BE PLACED IN A POSITION WHERE IT COULD REASONABLY BE EXPECTED TO WASH FROM THE SITE AND HARM THE ENVIRONMENT.



FIG. 3. - KERB INLET PROTECTION



- MAINTENANCE:**
- THE ENTRANCE SHOULD BE MAINTAINED SO THAT IT PREVENTS TYRES FROM TRACKING.
 - DRESSING WITH ADDITIONAL AGGREGATE IF REQUIRED.
 - REGULARLY REMOVE SEDIMENT FROM ROADWAY.

FIG. 2. - CONSTRUCTION EXIT/ENTRY

SEDIMENT AND EROSION CONTROL NOTES

GENERAL

- ALL THE SEDIMENT & EROSION CONTROL MEASURES TO BE IN ACCORDANCE WITH LOCAL COUNCIL'S GUIDE LINES.

PRIOR TO THE COMMENCEMENT OF CONSTRUCTION

- AVOID STRIPPING & EXCAVATING UNTIL READY TO BUILD.
- INSTALL SEDIMENT FENCES.

SPECIFICATION

- SILT FENCE SHALL NOT BE REMOVED UNTIL SITE HAS BEEN PAVED & SURFACED.
- BUNDWALLS SHALL BE LOCATED AROUND ALL PITS & MAINTAINED UNTIL THE CATCHMENT AREA HAS BEEN PAVED.
- KERB DRAIN EXCLUDER SHALL INCORPORATE TRAFFIC CONTROL BARRICADES IN ACCORDANCE WITH AST142.3 - 1985, & SHALL NOT BE PLACED UNTIL WORKS ARE BEING CARRIED OUT ON THE FOOTPATH AREA, OR AS OTHERWISE DIRECTED BY COUNCIL.
- ALL SEDIMENT TRAPS, EXCLUDERS, BUNDWALLS SHALL BE INSPECTED & CLEANED AFTER EACH STORM EVENT. DAMAGED OR CLOGGED BUNDING ARE TO BE REMOVED AND REPLACED.
- THE BUILDER SHALL CARRY OUT ANY ADDITIONAL WORKS DEEMED NECESSARY AND DIRECTED BY COUNCIL TO BE CARRIED OUT.
- THE SEDIMENT CONTROL PLAN SHALL BE IMPLEMENTED PRIOR TO ANY WORKS BEING CARRIED OUT ON SITE.

STOCKPILES

- STOCKPILES ARE NOT TO BE STORED ON THE FOOTPATH OR THE ROAD RESERVE.
- WHERE NECESSARY STOCKPILE LOSSES CAN BE MINIMISED WITH THE USE OF COVERS.
- ALL STOCKPILES AND BUILDING MATERIAL SHOULD BE LOCATED WITHIN SEDIMENT CONTROL ZONE.
- TO MINIMISE EROSION AND THE LOSS OF SAND AND SOIL, STOCKPILES SHOULD BE NOT LOCATED WITHIN AN OVERLAND FLOW PATH. IF IT IS IMPRACTICAL TO AVOID STORMWATER RUNOFF BEING DIRECTED TO A STOCKPILE, THEN A PERIMETER BANK SHOULD BE CONSTRUCTED UP SLOPE OF THE STOCKPILE TO DIRECT RUNOFF IN A CONTROLLED MANNER AROUND THE STOCKPILE.

MAINTENANCE

- SEDIMENT FENCES SHOULD BE REPLACED IF THE FABRIC IS RIPPED OR OTHERWISE DAMAGED. THE MAINTENANCE OF THE SEDIMENT FENCES INCLUDES THE REMOVAL OF SEDIMENT DEPOSITED UP SLOPE OF THE FENCE AND RETRENCHING THE FABRIC WHEN THE FENCE IS 25% FULL.
- FOLLOWING STORM EVENTS, THE ROAD RESERVE AND ALL SEDIMENT BARRIERS SHOULD BE INSPECTED AND ANY EXCESSIVE RESIDUE SHOULD BE APPROPRIATELY REMOVED.

SITE REHABILITATION

- ALL GROUND DISTURBED BY THE CONSTRUCTION ACTIVITY SHOULD BE PROMPTLY AND PROGRESSIVELY STABILISED SO IT CAN NO LONGER ACT AS A SOURCE OF SEDIMENT.

SERVICES TRENCHES

- TO AVOID UNNECESSARY SOIL EROSION, SERVICE TRENCHES SHOULD BE BACK FILLED, CAPPED AND COMPACTED TO A LEVEL AT LEAST 75-100mm ABOVE THE ADJOINING GROUND LEVEL.

BULK EARTHWORKS

- AVOID STRIPPING & EXCAVATING UNTIL READY TO BUILD.
- CONSTRUCTION OF AN ENTRY/EXIT POINT TO THE SITE SHOULD BE MANAGED SO THAT SEDIMENT IS NOT TRACKED OFF THE SITE.
- TOP SOIL SHOULD BE STOCKPILED ON SITE FOR LATER USE.
- WHERE PRACTICABLE MAINTAIN KERB VEGETATION IN A HEALTHY STATE DURING THE CONSTRUCTION PROCESS.
- WHEN UP SLOPE WATER IS DIVERTED AROUND A WORK SITE IT IDEALLY SHOULD BE DISCHARGED AS SHEET FLOW THROUGH AN UNDISTURBED AREA BESIDE THE WORKS.

NOTES:

EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE DESIGNED AND PROVIDED IN ACCORDANCE WITH THE INTERNATIONAL EROSION CONTROL ASSOCIATION AUSTRALASIA - "BEST PRACTICE FOR EROSION AND SEDIMENT CONTROL."

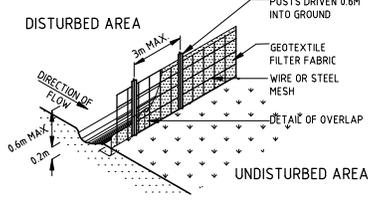
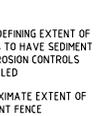


FIG. 1. - SEDIMENT FENCE

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