A large, light grey graphic element with rounded corners and a maroon-colored accent shape on its right side. The text 'Appendix H Engineering Report' is centered within the grey area.

Appendix H
Engineering Report



ENGINEERING REPORT

QUEENSLAND RESOURCES COMMON USER FACILITY
(QRCUF) AT 109 PENELOPE ROAD, STUART

FOR
RPS AAP Consulting Pty Ltd

JOB No: MJ2506-A

DOC REF: MJ2506-A-ENG

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DOCUMENT CONTROL

Rev	Author	Reviewed	Approved	Date	Issued To:	Purpose
A	Irem Guney	John Single	John Single (RPEQ 24378)	01/02/2024	RPS AAP Consulting Pty Ltd	Draft for review & comment
B	Irem Guney	John Single	John Single (RPEQ 24378)	15/05/2024	RPS AAP Consulting Pty Ltd	Development Application (DA)
C	Irem Guney	John Single	John Single (RPEQ 24378)	28/08/2024	RPS AAP Consulting Pty Ltd	Final – Changes associated with layout amendments
D	Irem Guney	John Single	John Single (RPEQ 24378)	18/12/2024	RPS AAP Consulting Pty Ltd	Quality Options and Parking Rates Update

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APPENDICES

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APPENDIX B

Turning Path Assessment prepared by NCE

APPENDIX C

Stormwater Management Conceptual Sketch (Prelim Design) by NCE

APPENDIX D

ATLAN Vault, Filter and Spillceptor Technical Data

1.0 INTRODUCTION

1.1 Background

Northern Consulting Engineers (NCE), have been commissioned by RPS AAP Consulting Pty Ltd to prepare an engineering report for a Queensland Resources Common User Facility (QRCUF) at Cleveland Bay Industrial Estate at 109 Penelope Road, Stuart. The proposed works are on land described as Lot 14 on SP338024.

The following report has been produced to support a development application for Material Change of Use (MCU). The purpose of this report is to demonstrate how the proposed development can be achieved by addressing:

- Stormwater management, both quantity and quality;
- Water and Sewer services planning assessment;
- Low Impact Traffic Impact Assessment;
- Flooding.

The information provided in this report is based on the following layout plan and documents which are provided as appendices to this report;

- Proposed Site Layout Plans, reference B071-D1-01-0001_01 Rev J, prepared by SEDGMAN (**Appendix A**).
- Turning Path Assessment prepared by NCE (**Appendix B**).
- Stormwater Management Conceptual Sketch (Prelim Design) by NCE (**Appendix C**)
- ATLAN Vault, Filter and Spillceptor Technical Data (**Appendix D**)

1.2 Existing Development

The site is located at Cleveland Bay Industrial Estate between Bruce Highway and Ron Mclean Drive. Cleveland Bay Industrial Estate is a newly developed industrial subdivision and therefore the site is an unvegetated vacant block. **Figure 1-1** shows the location of the site in context to the surrounding properties, water courses, road reserves and easements, courtesy of Queensland Globe's online mapping tool.

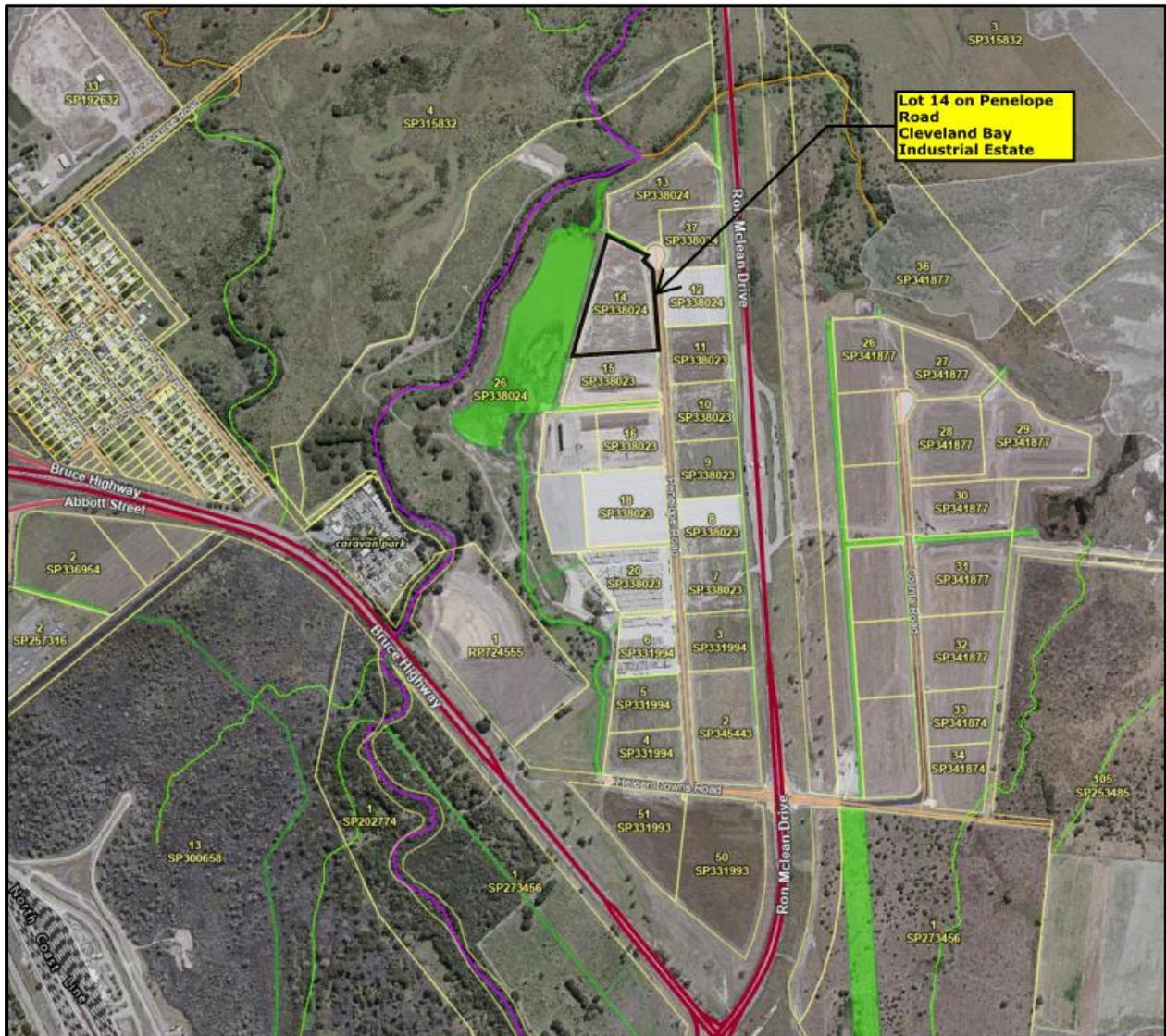


Figure 1-1 Location of the development in context to the surrounding properties

1.3 Proposed Development

The proposed development is a research and technology industry for QRCUF which involves the following;

- Operations Office/Process Buildings
- Reagent Storage Shed
- Fuel areas (bunded)
- Hardstand area
- Internal roads/car park
- Landscaping

The proposed development is illustrated in **Figure 1-2** with the original drawing provided in **Appendix A**.

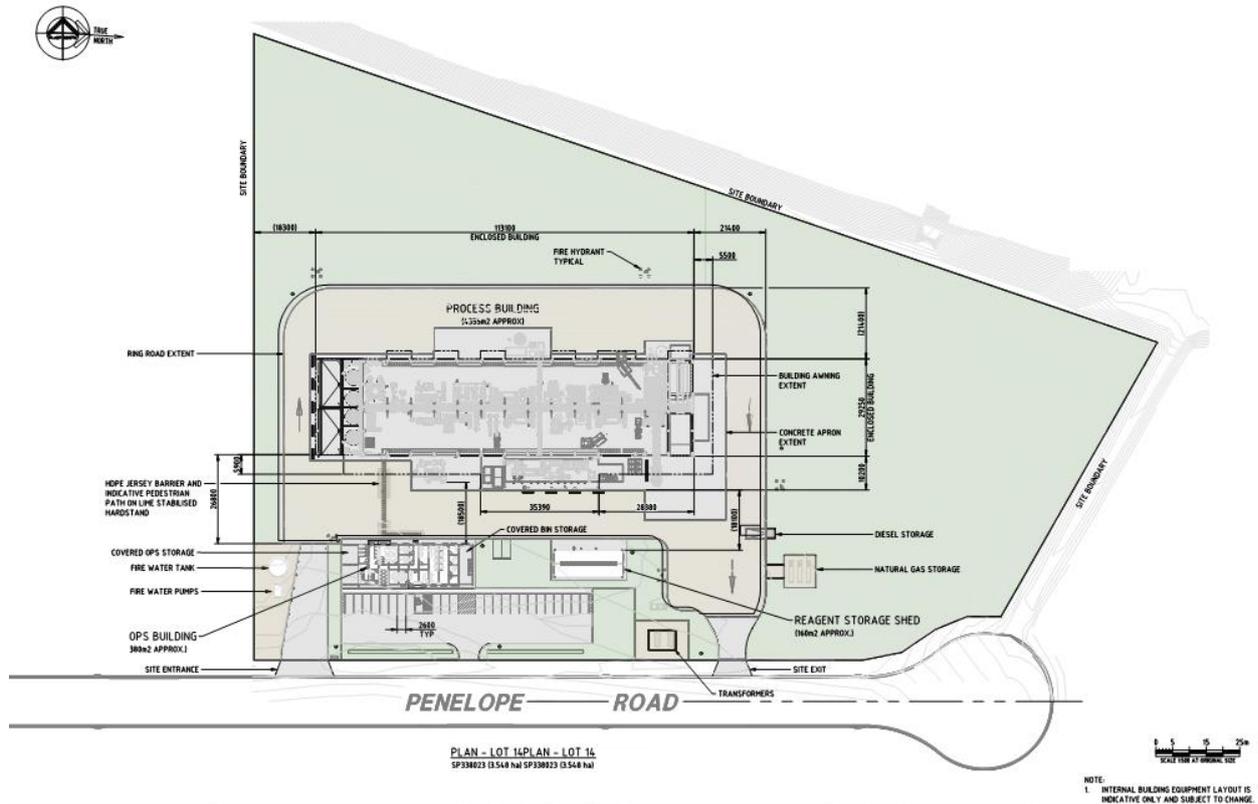


Figure 1-2 Proposed Development

2.0 STORMWATER MANAGEMENT

In accordance with the Queensland Urban Drainage Manual (QUDM) test in determining the lawful point of discharge (LPOD), the LPOD for the development has been defined as:

- The open drain at the rear (western) of site (Easement P in Lot 26 on SP338024)
- The open drain along the northern boundary (Easement R in Lot 26 on SP338024)

Currently, the site is free draining in a western direction towards the easement along the western boundary and discharging into the existing basin at the rear property (west). There is a 600mm dia (600Ø) reinforced concrete pipe (RCP) located on the western boundary to facilitate discharge to the easement for any future underground network.

The proposed development is expected to maintain the existing stormwater management strategy by draining towards the rear drainage easement being the existing basin. Run-off from the pavement areas will overland sheet flow and be captured via a pit and pipe system in which the first flush volume will be treated at an end of line device prior to discharging via the drainage easement. Roof water will be piped underground directly to the treatment system. Flows greater than the first flush volume within the underground system will by-pass the treatment system whilst the first flush flows will be treated via underground stormwater cartridge filter system that will adequately treat run-off prior to water reaching to LPOD's. Further details on water quality treatment are discussed in **Section 2.2**, while **Figure 2-1** illustrate the conceptual stormwater management describe above.

2.2.1 Stormwater Quality Objectives

The design intent for the system is to meet the current TCC Planning Scheme water quality targets, namely:

- 80% Total Suspended Solids (TSS) Reduction
- 65% Total Phosphorus (TP) Reduction
- 40% Total Nitrogen (TN) Reduction
- 90% Gross Pollutants (GP) Reduction

In the event that the above targets are not achievable, the design intent is to ensure that the post development water quality discharging the site is equal to or better than the pre-development quality. Treatment targets shall be reached before water leaves the lot.

2.2.2 MUSIC Modelling

Pollutant loads for the development have been modelled primarily using “split” land use and references the MUSIC Modelling Guidelines November 2018 for the pollutant parameters for industrial surface types. The pollutant generation parameters adopted are shown in **Figure 2-2** with **Figure 2-3** depicting the rainfall-run-off parameters.

Below is the modelling concept adopted:

- The modelling has been assessed for post development.
- The developed assessment has been considered as only one (1) catchment area. The zone has been assessed as Industrial and based only on the area that shall be developed using a “split” catchment method.
- The MUSIC nodes include runoff from roof area, road/carparking area, ground area, hardstands, and the landscaping. **Table 2-1** depicts the source nodes and their imperviousness adopted in the assessment.

Table 2-1 MUSIC Source Nodes

Node Name	Zoning/Surface Type	Surface Area (ha)	Impervious (%)
Sheds/Office/Storage (roof)	Industrial	0.490	100
Roads (breakdown below)	Industrial	2.001	58
Landscaping	Industrial	1.057	0

- Generally, water will be treated via the combination of proprietary products, i.e., Atlan Stormsacks, Vault and Filter treatment train before leaving the lot and prior to entering the open drain to the west. The proposed cartridge filters can be fitted into a single module vault as shown on drawings provided in **Appendix D**. Proposed underground cartridge filter system parameters as input into MUSIC are given in **Table 2-2**. The modelling was carried out by Atlan which were based on:
 - Roof area = 4,895m²
 - Road Area = 20,015m² at 58% impervious as follows:
 - 60% impervious road (stab-gravel) area = 7,515m²
 - 100% impervious driveway/carparks area = 1,700m²
 - 50% impervious gravel hardstand = 10,800m²
 - 100% perv ground area = 10,570m²

- The fuel areas are to be bunded and treated separately via an oil separating system i.e., Atlan Spillceptor or similar, such that run-off (run-off with hydrocarbons) can be captured treated separately prior to discharging clean run-off into the stormwater network and trade waste.
- The MUSIC model setups described above and the proposed indicative treatment train layout is depicted in **Figure 2-4**.

TABLE 3.9 POLLUTANT EXPORT PARAMETERS FOR SPLIT CATCHMENT LAND USE (LOG¹⁰ VALUES)

FLOW TYPE	SURFACE TYPE	TSS LOG ¹⁰ VALUES		TP LOG ¹⁰ VALUES		TN LOG ¹⁰ VALUES	
		MEAN	ST. DEV	MEAN	ST. DEV	MEAN	ST. DEV
URBAN RESIDENTIAL							
Baseflow parameters	Roof	N/A	N/A	N/A	N/A	N/A	N/A
	Roads	1.00	0.34	-0.97	0.31	0.20	0.20
	Ground level	1.00	0.34	-0.97	0.31	0.20	0.20
Stormflow parameters	Roof	1.30	0.39	-0.89	0.31	0.26	0.23
	Roads	2.43	0.39	-0.30	0.31	0.26	0.23
	Ground level	2.18	0.39	-0.47	0.31	0.26	0.23
INDUSTRIAL							
Baseflow parameters	Roof	N/A	N/A	N/A	N/A	N/A	N/A
	Roads	0.78	0.45	-1.11	0.48	0.14	0.20
	Ground level	0.78	0.45	-1.11	0.48	0.14	0.20
Stormflow parameters	Roof	1.30	0.44	-0.89	0.36	0.25	0.32
	Roads	2.43	0.44	-0.30	0.36	0.25	0.32
	Ground level	1.92	0.44	-0.59	0.36	0.25	0.32
COMMERCIAL							
Baseflow parameters	Roof	N/A	N/A	N/A	N/A	N/A	N/A
	Roads	0.78	0.39	-0.60	0.50	0.32	0.30
	Ground level	0.78	0.39	-0.60	0.50	0.32	0.30
Stormflow parameters	Roof	1.30	0.38	-0.89	0.34	0.37	0.34
	Roads	2.43	0.38	-0.30	0.34	0.37	0.34
	Ground level	2.16	0.38	-0.39	0.34	0.37	0.34

Figure 2-2 MUSIC “split” pollutant export parameters extracted from MUSIC Modelling Guidelines November 2018

PARAMETER	LAND USE			
	URBAN RESIDENTIAL	COMMERCIAL AND INDUSTRIAL	RURAL RESIDENTIAL	FORESTED
RAINFALL THRESHOLD (MM)	1	1	1	1
SOIL STORAGE CAPACITY (MM)	500*	18	98	120
INITIAL STORAGE (% CAPACITY)	10	10	10	10
FIELD CAPACITY (MM)	200	80	80	80
INFILTRATION CAPACITY COEFFICIENT A	211	243	84	200
INFILTRATION CAPACITY COEFFICIENT B	5.0	0.6	3.3	1.0
INITIAL DEPTH (MM)	50	50	50	50
DAILY RECHARGE RATE (%)	28	0	100	25
DAILY BASEFLOW RATE (%)	27	31	22	3
DAILY DEEP SEEPAGE RATE (%)	0	0	0	0

Figure 2-3 MUSIC recommended rainfall run-off parameters for SEQ

2.2.2.1 Results

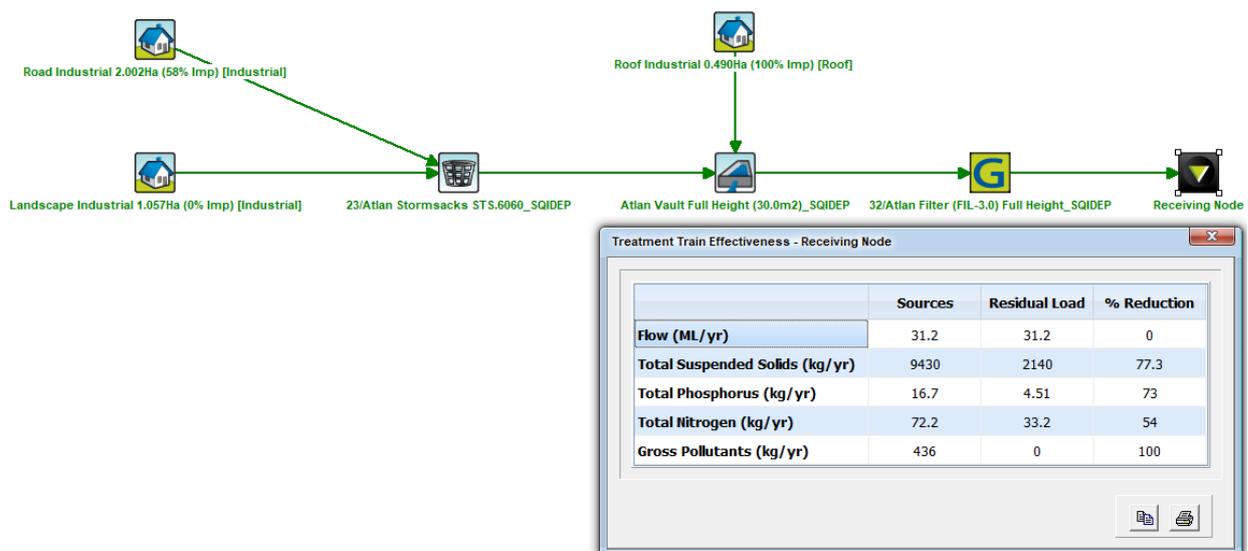


Figure 2-4 MUSIC treatment train layout

Table 2-2 MUSIC treatment input parameters

Treatment Item	Properties
Atlan Design Proposal	23x Atlan Stormsacks 32x Atlan Filters housed within 3x Atlan Vaults (Single module vault drawing attached) 1x Atlan Spillceptor P.040.C1.2C (drawing attached)

Refer to **Appendix D** for Atlan filter, vault and spillceptor drawings.

Table 2-3 summarises the results of the assessment. The data clearly indicate that the water quality leaving the site post-development generally complies with the quality objectives set by TCC, other than being 2.7%

shy of the TSS target. That said, this is a minor reduction to the overall target with the intent of water quality being achieved as each other parameter exceed the reduction targets. Overall, the proposed development can comply with TCC's healthy water policy, ensuring that water quality remains within acceptable limits across all evaluated scenarios.

Table 2-3 MUSIC treatment train effectiveness

Description	Sources	Residual Load	% Reduction	TCC Treatment %
Flow (ML/yr)	31.2	31.2	0	
Total Suspended Solids (kg/yr)	9190	1840	77.3	80
Total Phosphorus (kg/yr)	16.9	4.21	73	65
Total Nitrogen (kg/yr)	72.4	31.9	54	40
Gross Pollutants (kg/yr)	436	0	100	90

3.0 WATER AND SEWER SERVICES

3.1 Water Network

Considering the location of this development parcel within a newly established industrial zone, it is expected that a comprehensive evaluation of the water network capacity has been conducted to ascertain its sufficiency for accommodating the envisioned development.

In accordance with the Cleveland Bay Industrial Estate Subdivision plans for Lot 14, shown in below **Figure 3-1**, the site is currently serviced via Ø200 UPVC Class 16 water main along the frontage, Penelope Road. It is proposed that connection to Council's system will be via a new water meter tapping into the Ø200 main located at the front of site.

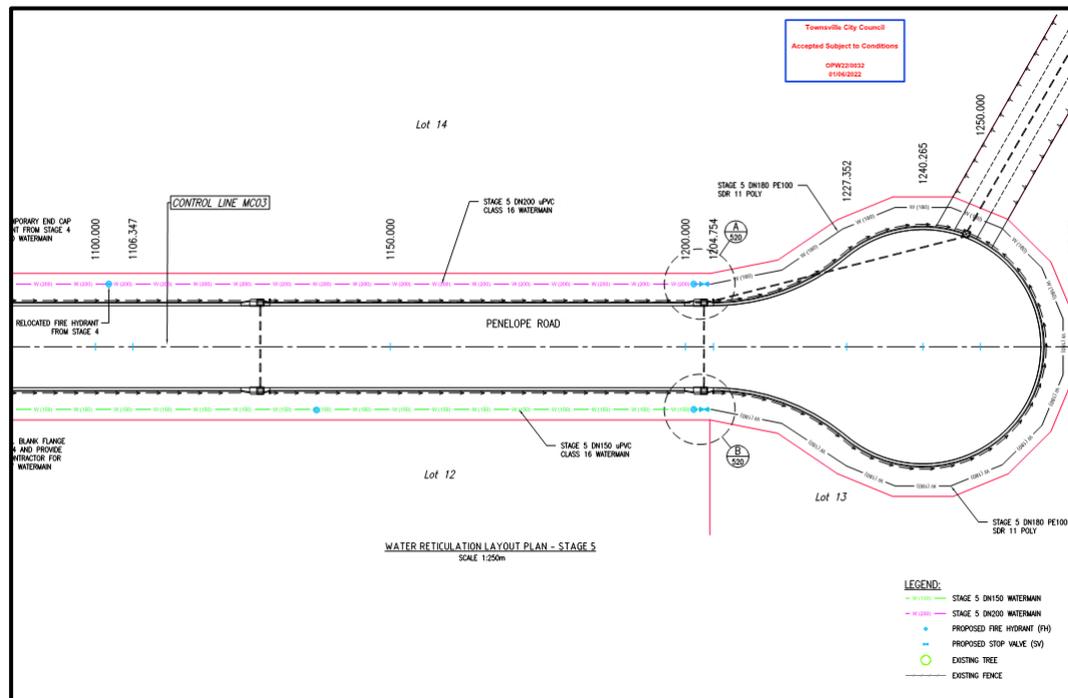


Figure 3-1 Cleveland Bay Industrial Estate Stage 5 - Water Reticulation Plans by Langtree Consulting (Extract)

3.2 Sewer Network

Similar to the adequate capacity of the water network servicing the proposed development lot, it is anticipated that a comprehensive evaluation of the sewer network capacity has been undertaken to ensure its adequacy for accommodating the proposed development.

It is understood that the sewer strategy for the estate is each lot will be serviced by its own private pump station that will discharge to a connection point and sewer pressure main located in the road reserve which will convey waste water to a Council owned centralised pump station. In accordance with the Cleveland Bay Industrial Estate Subdivision plans for Stage 4, there is OD63 PE100 P16 SDR11 pressure main along the frontage of adjacent Lot 15 on SP338023 which terminates 1.5m north of the Lot 14/15 common boundary as shown in below **Figure 3-2**. This will be the connection/discharge point for the developments private pump station.

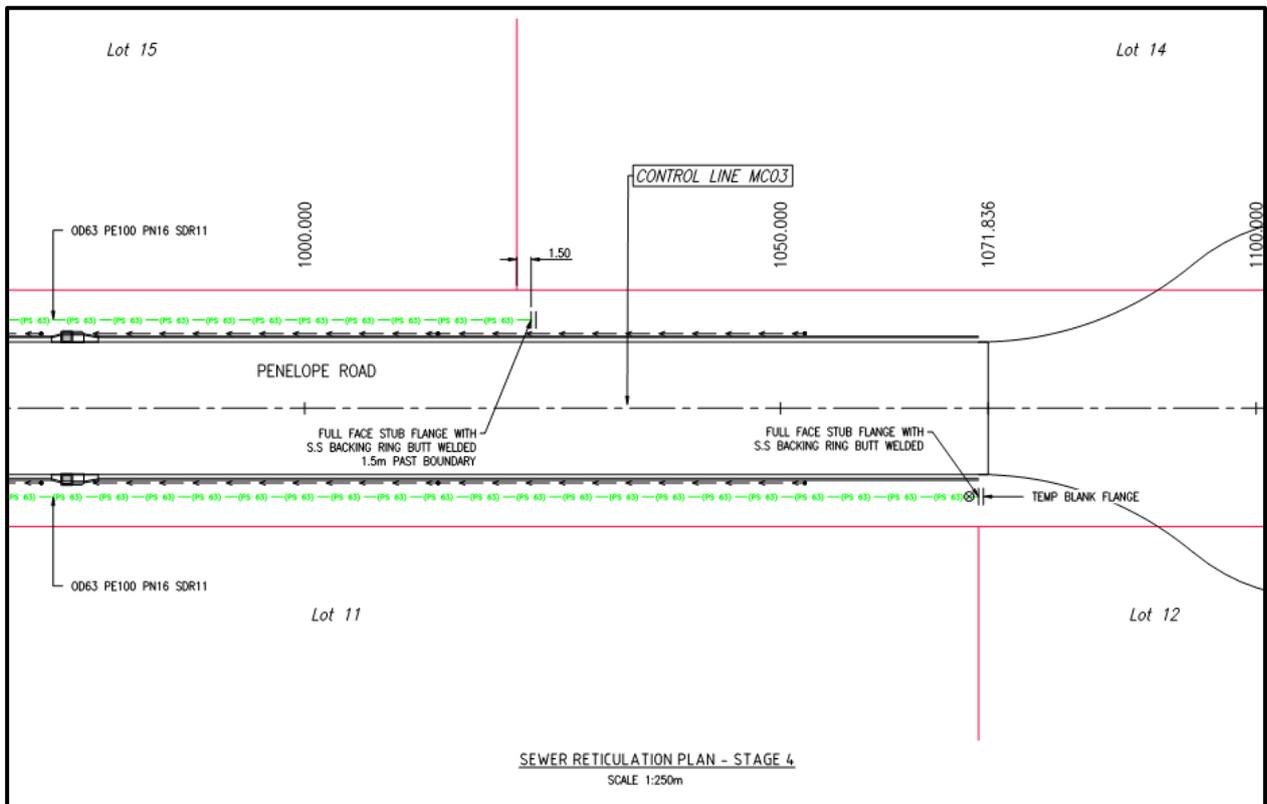


Figure 3-2 Cleveland Bay Industrial Estate Stage 4 - Sewer Reticulation Plans by Langtree Consulting (Extract)

4.0 TRAFFIC ASSESSMENT

4.1 Development Parking Facilities

The parking arrangement delineated in **Appendix A** by Sedgman was evaluated for adherence to both AS2890.1 and the TCC Planning Scheme.

TCC planning scheme, Schedule 6.10 prescribes a parking rate of one (1) space per 80m² GFA (gross floor area). As the proposed use involves a total GFA of 4,895m², this would prescribe 62 car parking spaces. The proposal provides 24 car parking spaces plus 1 PWD space; accessed directly from Penelope Road; while a further two (2) spaces provided within the processing building compound; giving a total of 26 spaces plus 1

PWD space. While this is less than prescribed within Schedule 6.10; as a specialist facility, those travelling to the QRCUF will either be staff or others having a specific reason to be there, for example, representatives of the proponents for campaigns. Access by members of the general public will not occur, meaning that vehicle demand for parking will be known and can be regulated during site operation.

The GFA of the QRCUF reflects the dimensions of the main processing building which is designed to house large and highly specialised equipment, machinery and associated controls. Operation of this machinery is largely automated, with staff being on site to monitor the equipment and assist in moving material in and out of the facility through the various stages of processing. In practical application, operation assumes an average of 25 persons will be on the site during testing campaigns, allowing for overlapping shifts. As such, the 26 car parking spaces (plus 1 PWD space) proposed are sufficient for the operations of the site and supporting administrative activities, including provision for visitor parking. Notwithstanding this, the site provides sufficient area for overflow parking adjacent to the car parking area and south of the processing building should greater car parking be required for a particular proponent. The proposed car parking rate will thus be sufficient to cater to the demand generated by the development and avoid overflow of car parking on Penelope Road.

In general, the proposed parking bay arrangement ensures adequate width (2.6m) and length (6.0m) in compliance with AS2890.1 Clause 2.4.1 (b) (ii).

4.2 Traffic Management

Figure 4-1 indicates anticipated traffic movement over the site. NCE have conducted a swept path analysis for the internal roads and access to the site utilising a 25.0m B-double. Furthermore, car park vehicle movements have been assessed to demonstrate vehicles can enter and exit the car parks safely. This analysis shows that the access and internal roads can cater for the largest design vehicle. Refer to the **Appendix B** which shows the vehicle swept paths completed by NCE.

An assessment of the current development footprint was completed against the Department of Transport and Main Roads Guideline “Treatment options to improve safety of pedestrians, bicycle riders and other path users at driveways February 2021”.

The “Access Sight Line Layout” provided in **Appendix B** evidences sufficient sight distance is provided to pedestrian/bicycle users of a typical pathway constructed in accordance with TCC Standard drawings. A control gate is proposed to be installed at the exit location of the internal road that will limit vehicle speeds prior to entering the verge/road corridor, therefore; speed humps are not required at this location. No control gate is currently proposed for the car park entry/exit, however as there is no pedestrian facilities proposed or currently in place; the site being located within a cul-de-sac and the provision for on-site parking; the likelihood of pedestrian and cyclist traffic within the verge/road corridor is very low. Subsequently, no speed controls are proposed for the car park entry exit location.

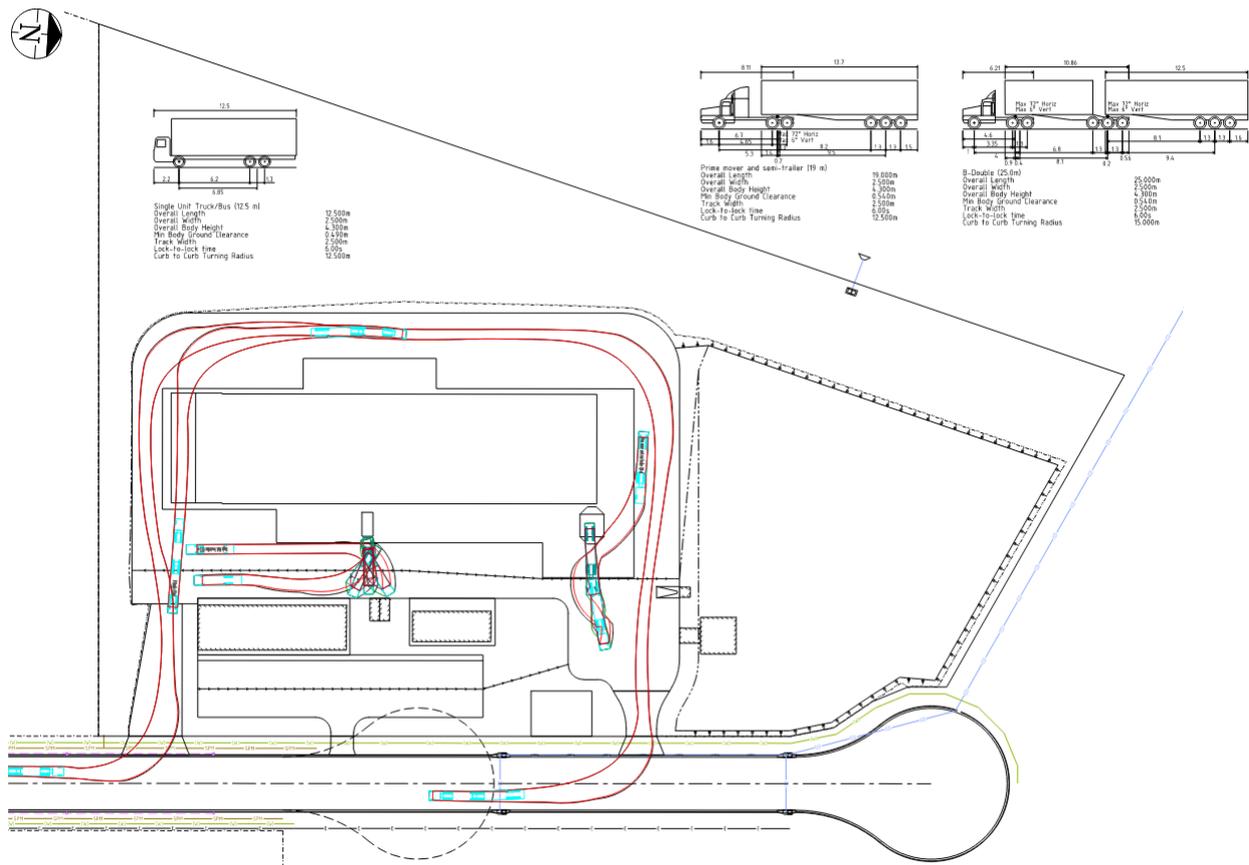


Figure 4-1 Site Traffic Movements

5.0 FLOODING

Flooding has been addressed by the flood report completed by Venant Solutions (Ref. MJ: L.M00260.02.07.docx) which addresses the flood impacts for the Cleveland Bay Industrial Precinct development stages. In accordance with this assessment the 1% AEP (defined flood event) for the site varies along the western boundary from 5.36m AHD at the common boundary of Lot14/15 to 5.30m AHD at the north-western corner. Based on the above, the site is predominately immune from the 1% AEP flood event.

5.1 Finished Floor Levels

There is some uncertainty on the triggers that constitute a structure being used for the manufacture or storage of hazardous materials and as such it's unclear as to whether the proposed warehouse needs to be designed to prevent the intrusion of flood waters up to at least 0.2% AEP flood event, refer Council's flood hazard overlay code, PO9. To gain an appreciation of the potential impact that the difference in design flood events has on the finished floor level (FFL) of the structures, advice relating to the 0.2% AEP and probable maximum flood (PMF) level were sought from Council. Based on the advice received, the following is noted:

- The increase in PMF level from the 1% AEP flood ranges from 0.19m to 0.28m, therefore is recommended to adopt 0.3m for design purposes (note this increase is based on baseline, i.e. no estate development).
- The increase from the 1% AEP flood level to the 0.2% AEP flood level is ~0.15m (note this increase is based on baseline, i.e. no estate development).

From the above, it is recommended to adopt a minimum FFL for buildings of 5.76m AHD, which will provide ~100mm freeboard to the expected PMF level, however subject to the end users desires, this FFL could be reduced to 5.50m AHD which is estimated to equal the 0.2% AEP event. The natural surface levels (NSL) over the warehouse footprint range from 6.0m to 5.60m, therefore the adoption of 5.76m is anticipated to achieve a suitable balance between compliance with flood criteria and NSL's.

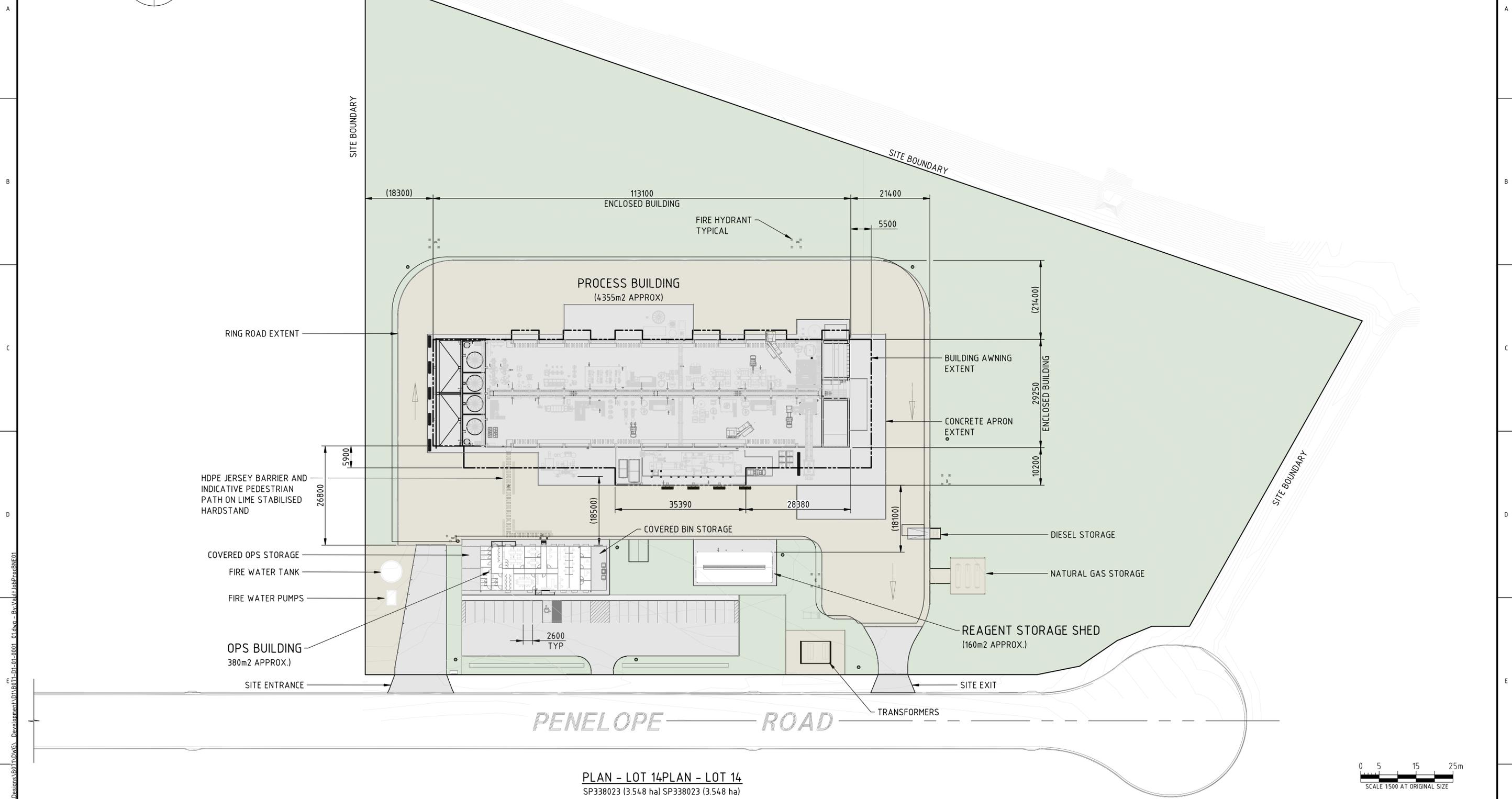
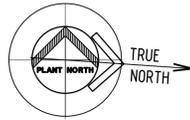
6.0 CONCLUSION

NCE have undertaken an engineering investigation associated with the Queensland Resources Common User Facility (QRCUF) development at 109 Penelope Road, Stuart (Lot 14 on SP338024). The findings of this assessment are summarised below:

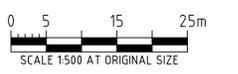
- The development site does not exceed the fraction impervious previously addressed as part of the Cleveland Bay Industrial Precinct subdivision design and thus no additional mitigation is required for the stormwater quantity.
- The stormwater quality assessment was undertaken via MUSIC and shows that the quality objectives have been met via a treatment train of cartridge system and oil separator.
- The existing water and sewer infrastructure is anticipated to have sufficient capacity to service the proposed development and is located appropriately to service the proposed lots from the frontage.
- The development proposes to provide 27 parking spaces, less than the provision 62 spaces in accordance with Council planning scheme parking rate, however due to the assumption that the facility will have an average of 25 staff (allowing for overlapping shifts); strict compliance with the planning scheme parking rates would significantly exceed the parking demand generated by proposed staffing and is considered excessive and unnecessary. Therefore, the current proposal of 27 spaces is considered to adequately service the development.
- In general, the proposed parking bay arrangement ensures adequate width and length in compliance with AS2890.1 Clause 2.4.1 (b) (ii).
- NCE have completed swept path modelling of a 25.0m B-double indicates the access and internal roads adequately cater for the largest design vehicle.
- The site is predominately immune from the 1% AEP flood event, however there is some uncertainty surrounding the minimum finished floor level (FFL) of structures. Subsequently a recommendation of a minimum FFL of 5.76m AHD has been provided in order to provide immunity to the probable maximum flood (PMF).

APPENDIX A

B071-D1-01-0001_01 Rev J, prepared by
SEDGMAN



PLAN - LOT 14 PLAN - LOT 14
 SP338023 (3.548 ha) SP338023 (3.548 ha)



NOTE:
 1. INTERNAL BUILDING EQUIPMENT LAYOUT IS INDICATIVE ONLY AND SUBJECT TO CHANGE.

PLOT DATE: 09/27/24 5:16:45 AM FILE: C:\TEMP\Venue\Decisions\B071-D1-01-0001_01.dwg - Bv\Auto\Job\Proc\BNE01

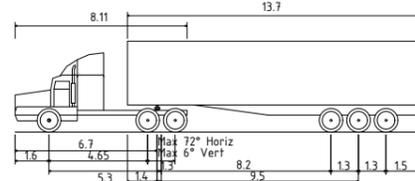
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		H	TRANSFORMER YARD AND REAGENT SHED RELOCATED	TKE	TKE	PJO	02.08.24		QUEENSLAND TREASURY	1:500	A1	QLD RESOURCES COMMON USER FACILITY	MINERALS PROCESSING FACILITY	B071-P01	B071-D1-01-0001_01	J
		G	SITE RECONFIGURED	RWE	RWE	PJO	03.07.24			DO NOT SCALE						
		F	PRELIMINARY ISSUE - LAYOUT UPDATED	RWE	RWE	PJO	07.06.24									
		E	PRELIMINARY ISSUE - STORAGE AREAS ADDED AND BUILDING SIZES UPDATED	TKE	TKE	TKE	15.03.24									
		D	PRELIMINARY ISSUE - EQUIPMENT ADDED AND ADMIN BUILDING SIZE UPDATED	TKE	TKE	---	07.02.24									
		J	PRELIMINARY ISSUE	TKE	TKE	TKE										
REFERENCE DRAWINGS		DRAWING REVISIONS														

SEDGMAN

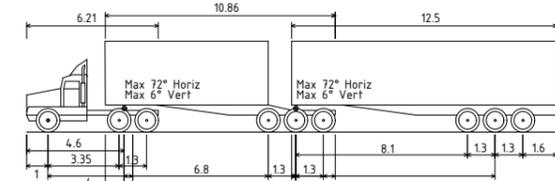
PRELIMINARY
 NOT FOR CONSTRUCTION

APPENDIX B

Turning Path Assessment prepared by NCE



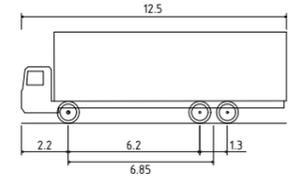
Prime mover and semi-trailer (19 m)
 Overall Length 19.000m
 Overall Width 2.500m
 Overall Body Height 4.300m
 Min Body Ground Clearance 0.540m
 Track Width 2.500m
 Lock-to-lock time 6.00s
 Curb to Curb Turning Radius 12.500m



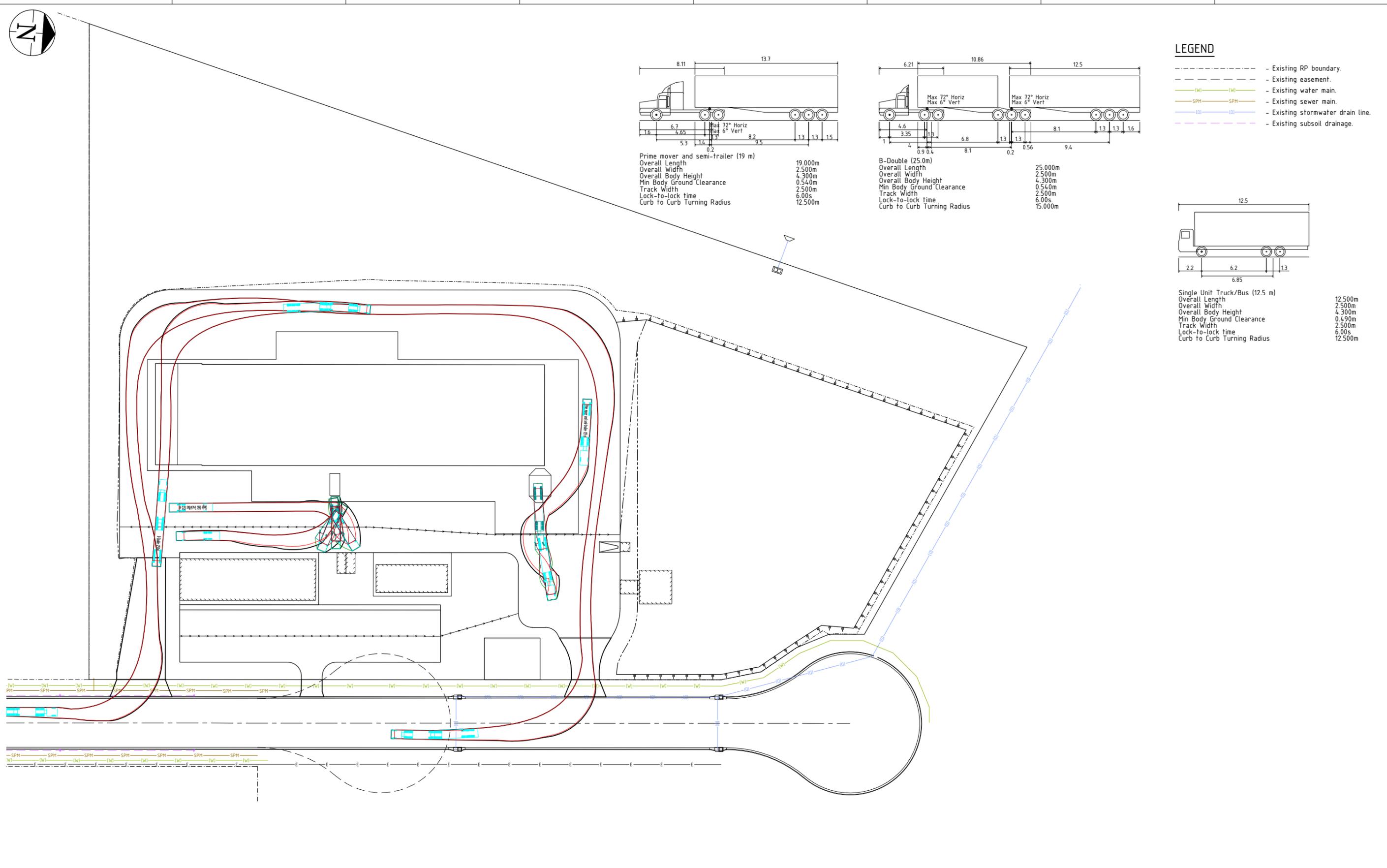
B-Double (25.0m)
 Overall Length 25.000m
 Overall Width 2.500m
 Overall Body Height 4.300m
 Min Body Ground Clearance 0.540m
 Track Width 2.500m
 Lock-to-lock time 6.00s
 Curb to Curb Turning Radius 15.000m

LEGEND

- - - Existing RP boundary.
- - - Existing easement.
- (w) - Existing water main.
- (s) - Existing sewer main.
- (d) - Existing stormwater drain line.
- - - Existing subsurface drainage.



Single Unit Truck/Bus (12.5 m)
 Overall Length 12.500m
 Overall Width 2.500m
 Overall Body Height 4.300m
 Min Body Ground Clearance 0.490m
 Track Width 2.500m
 Lock-to-lock time 6.00s
 Curb to Curb Turning Radius 12.500m



DRAWING NO	TITLE	REV	DESCRIPTION	BY	DRG CHK	ENG CHK	DATE	APPROVED
B071-D1-01-0001_01_C	SITE PLAN							
B071-XR-01-3000_04_A	TOPOGRAPHIC SURVEY SHEET 4 OF 4							
B071-XR-01-3000_03_A	TOPOGRAPHIC SURVEY SHEET 3 OF 4							
B071-XR-01-3000_02_A	TOPOGRAPHIC SURVEY SHEET 2 OF 4							
B071-XR-01-3000_01_A	TOPOGRAPHIC SURVEY SHEET 1 OF 4	A	PRELIMINARY ISSUE	KJM	JS	JS	2/08/24	

CLIENT	QUEENSLAND TREASURY
DRAWN	KJM 2/08/24
CHECKED	JS 2/08/24
DESIGNED	
LEAD ENG	JS 2/08/24
APPROVED	
SCALE	1500 OR AS SHOWN
	DO NOT SCALE A1

PROJECT	QLD RESOURCES COMMON USER FACILITY
TITLE	MINERALS PROCESSING FACILITY AREA 01 - SITE VEHICLE MOVEMENT LAYOUT PLAN
PROJECT NO	B071-P01
DRAWING NO	B071-D3-01-1050_01
REVISION	A

SEDGMAN
 Civil & Structural & Forensic
 Traffic & Road Modelling
 CONSULTING ENGINEERS
 PRELIMINARY
 NOT FOR CONSTRUCTION

APPENDIX C

Stormwater Management Conceptual Sketch
(Prelim Design) by NCE

APPENDIX D

ATLAN Vault, Filter and Spillceptor Technical Data

6 | 5 | 4 | 3 | 2 | 1

D

D

C

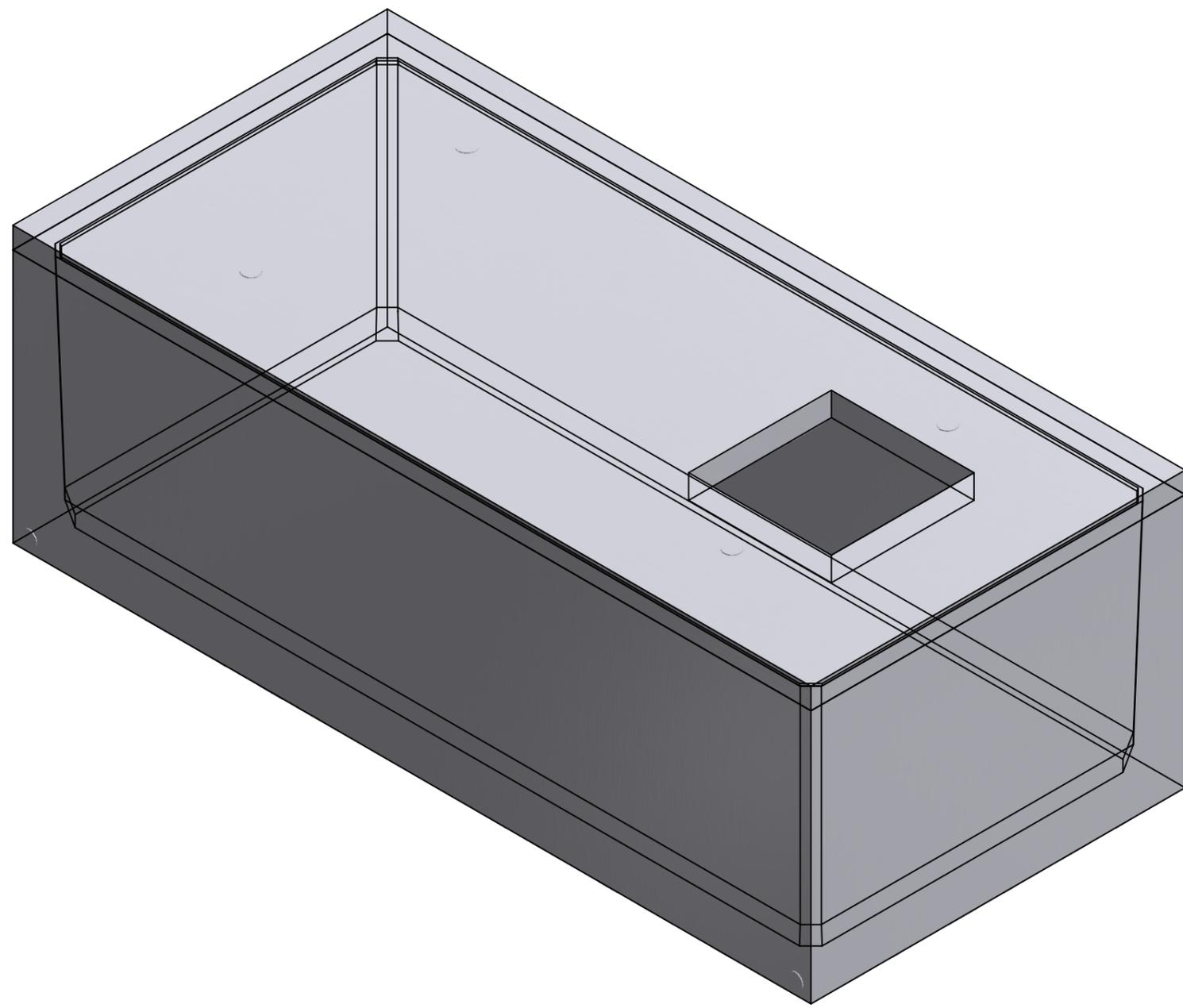
C

B

B

A

A



SV.5023-1464 - 3D VIEW

DRAWING INDEX	
DRAWING No.	DRAWING TITLE
SP21-CT19370-C	COVER SHEET AND DRAWING INDEX
SP21-CT19380-C	GENERAL NOTES
SP21-CT19390-C	GENERAL ARRANGEMENT
SP21-CT19400-C	PERMISSIBLE PENETRATIONS. SHEETS 1,2 & 3
SP21-CT24070-C	TANK LID PENETRATION OPTIONS
SP21-CT48180-C	GENERAL LIFTING ARRANGEMENT

REV	DATE	BY	DESCRIPTION	CHK
1	04/21	G.T	INITIAL RELEASE	
2	10/21	G.T	GENERAL AMENDMENTS	

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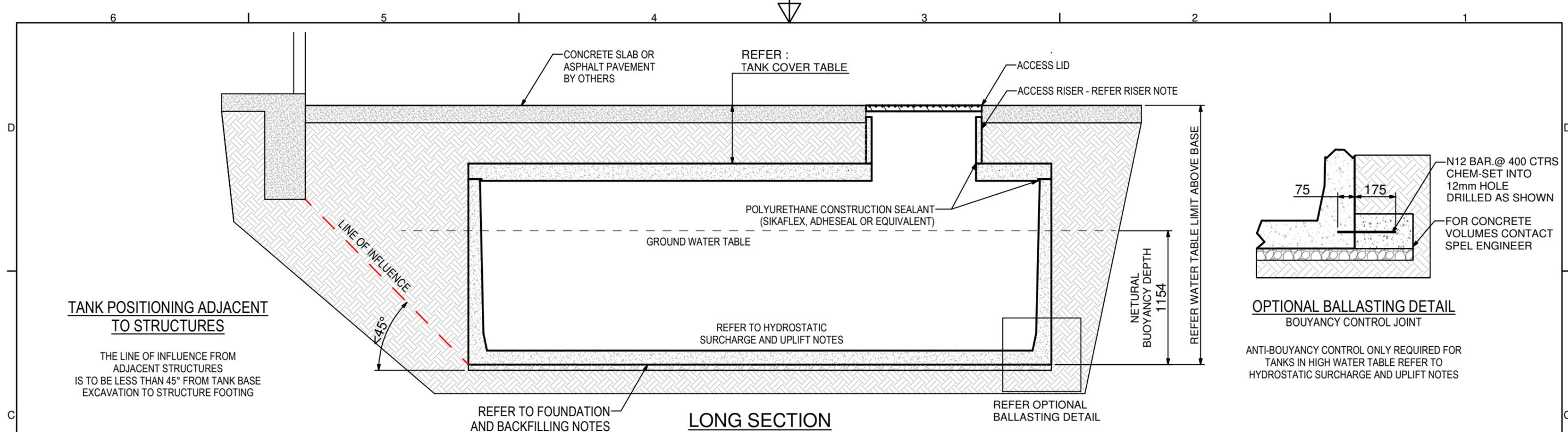
Drawn	Date
G.T	9/04/2021
Check	Date
Verified	Date
Approved	Date
Request No.	



PROJECT :			
TITLE COVER SHEET AND DRAWING INDEX 14.88 kL SPEL PRECAST CONCRETE TANK SV.5023-1464			
SCALE	SIZE	SHEET	REV
N.T.S	A3	1	2
CUSTOMER CODE :		DWG No.	
		SP21-CT19370-C	

6 | 5 | 4 | 3 | 2 | 1

SV.5023-1464 COVER PAGE.dwg



DESIGN CRITERIA

DESIGN IN ACCORDANCE WITH:
AS/NZS 1170.0 - DESIGN LOAD GENERAL REQUIREMENTS
AS/NZS 1170.1 - PERMANENT AND SUPERIMPOSED LOADS
EXPOSURE CLASSIFICATION IN ACCORDANCE WITH AS/NZS 3600 - 'B2'
THE TANK DESIGN LIFE EXPECTANCY IS UP TO 50 YRS.

HEAVY VEHICLES ARE ASSUMED TO BE WITHIN THE GROSS VEHICLE MASS (GVM) AND AXLE LIMITS PRESCRIBED BY THE QUEENSLAND DEPARTMENT OF TRANSPORT AND MAIN ROADS. THE HEAVY VEHICLES THAT THE TANK AND LID ARE DESIGNED FOR INCLUDES:

- SINGLE RIGID TRUCK
- RIGID TRUCK WITH TRAILER
- SEMI TRAILER
- B-DOUBLE
- TWIN STEER TRUCKS

WHICH REPRESENTS AXLE GROUPS OF:

- SINGLE AXLE = 9.0 TONNES
- TANDEM AXLE = 16.0 TONNES
- TRI-AXLE = 20.0 TONNES

WHEEL LOADS ARE BASED ON TANKS INSTALLED IN CONTROLLED TRAFFIC AREA (CARPARK) WITH VEHICLES OPERATING AT REDUCED SPEED.

NOTE: TANKS ARE NOT DESIGNED TO BE INSTALLED UNDER OPEN ROADS. IF W80 AND SM1600 RATING IS REQUIRED, CONSULT SPEL ENGINEERS

CONCRETE

1. TO COMPLY WITH THE REQUIREMENTS OF AS 3600-2018-CONCRETE STRUCTRES.
2. 50 MPa

TANK COVER						
TANK TYPE	COVER	BASE THICKNESS	LID THICKNESS	EXTRA REINFORCEMENT	EXCAVATION kPa	WATER TABLE LIMIT ABOVE BASE
STOCK	0-2000	120	150	-	100 kPa	5000
CUSTOM	2001-2500	150	200	Y	125 kPa	7000
CUSTOM	2501-3000	150	200	Y	150 kPa	7000
CUSTOM	3001-3500	150	200	Y	175 kPa	7000

HYDROSTATIC SURCHARGE AND UPLIFT

IMPORTANT NOTE:

NEUTRAL BUOYANCY DEPTH PROVIDED IS A GUIDE ONLY. IT IS CONSERVATIVELY CALCULATED WITH ZERO SOIL COVER AND ZERO SLAB COVER. SEEK SPEL ADVISE FOR SITE SPECIFIC BALLASTING CALCULATIONS, THAT CAN TAKE INTO CONSIDERATION SOIL / SLAB COVER OVER TANK, ANY ADDITIONAL CLEAR OPENINGS IN THE TANK LID, AND ANY PENETRATIONS IN THE TANK WALLS OR BASE.

1. TANK WITH WATER LEVEL UP TO 1154 FROM THE TANK BASE HAS NIL HYDROSTATIC UPLIFT (NEUTRAL BUOYANCY MARK). FOR WATER LEVELS GREATER THAN THIS CONTACT SPEL ENGINEERS FOR SITE SEPTIC BALLASTING ADVICE..

RISER NOTES:

IF PROCURING NON-"SPEL" MANUFACTURED RISERS. THE SUPPLIER IS TO CONFIRM THE RISER IS SUITABLE FOR:

1. THE DEPTHS REQUIRED FOR THE PROJECT.
2. THE TRAFFIC RATING REQUIRED
3. 35mm MINIMUM RISER WALL THICKNESS BEARING ON TANK LID.

FOUNDATION REQUIREMENTS AND BACKFILLING

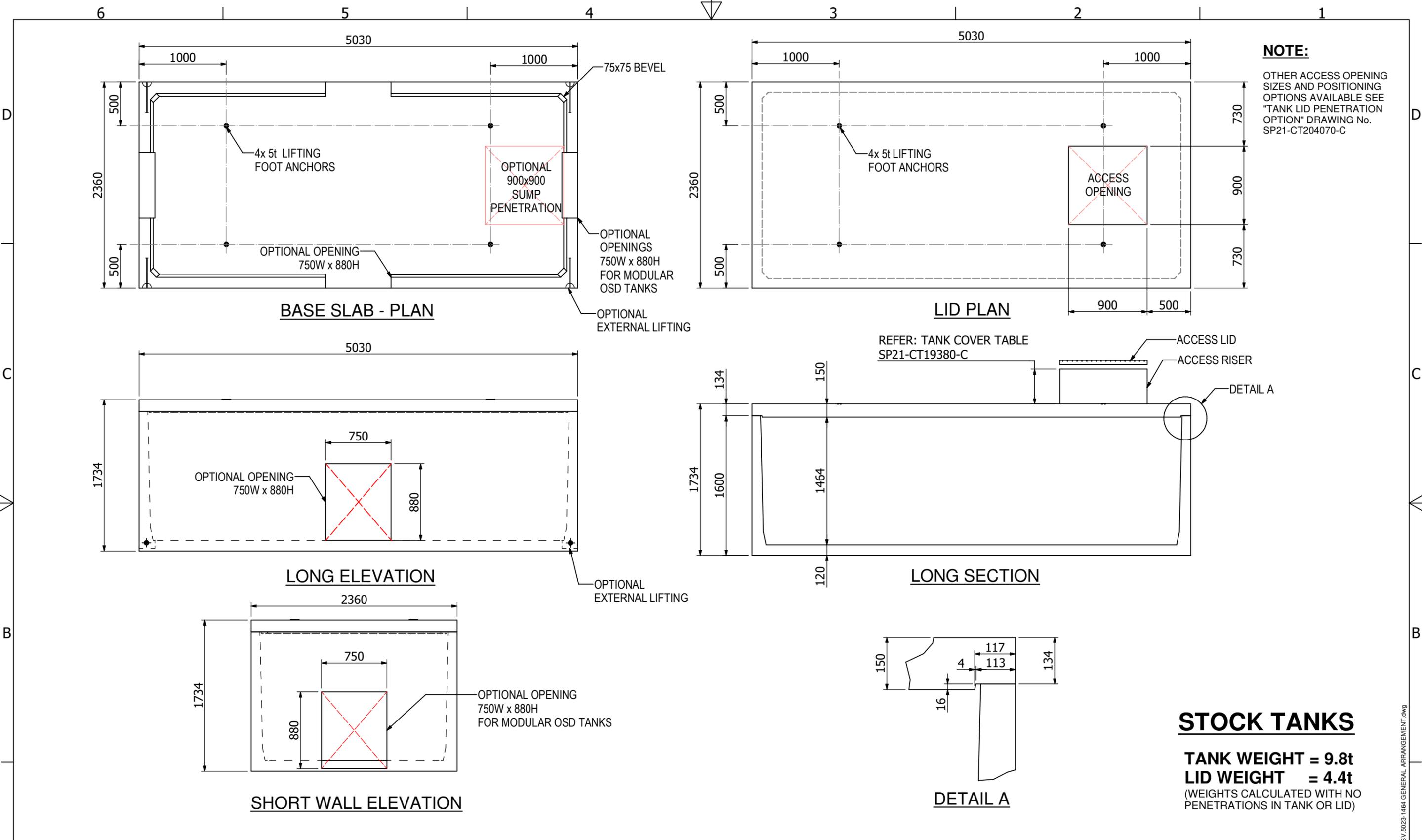
1. THE TANK MUST BE FOUNDED ON COMPACTED 50mm MINIMUM LEVELLING SUB-BASE COMPRISED OF SAND OR ROAD BASE THAT ACHIEVES CBR40 WHEN THE TANK IS SUBJECTED TO VEHICLE LOADING. CBR15 OR OTHERWISE. 5-10mm DRAINAGE GRAVEL IS AN ACCEPTABLE SUB-BASE MATERIAL WHEN TANK IS SUBJECTED TO VEHICLE LOADING, 10mm MAXIMUM TO BE STRICTLY ADHERED TO.
2. BACKFILL AROUND THE TANK WITH A WELL DRAINING GRANULAR MATERIAL IN LAYERS NO THICKER THAN 500mm. MAXIMUM VARIATION OF 500mm IN BACKFILL PLACEMENT HEIGHT FROM ONE SIDE OF TANK TO THE OTHER
3. COMPACT PAVEMENT SUBGRADES ABOVE THE TANK LID WITH LIGHT DUTY HAND OPERATED COMPACTION EQUIPMENT. DO NOT USE HEAVY MECHANICAL COMPACTION TECHNIQUES (SUCH AS VIBRATORY OR STATIC ROLLERS) ABOVE TANK LID OR ADJACENT TO THE TANK WALLS WITHIN 1500mm OF TANKS WITHOUT ENGINEER'S APPROVAL
4. BACKFILL SUPPORTING BUILDINGS OR PAVEMENTS TO HAVE LEVEL 1 SUPERVISION & TESTING (PROJECT ENGINEER TO ADVISE)
5. BACKFILL SUPPORTING TRAFFICABLE PAVEMENT MUST BE LEVEL 1 SUPERVISION & TESTING. A PAVEMENT THAT IS DESIGNED TO BE SUSPENDED OVER BACKFILL SHOULD EXTEND A NOMINAL DISTANCE BEYOND THE EDGE OF THE EXCAVATION ONTO NATURAL GROUND. THE SPECIFIC DESIGN IS THE RESPONSIBILITY OF THE PROJECT ENGINEER.

LIFTING NOTES:

1. TOTAL APPROVED 15.0 t (WLL) LIMIT AS SPECIFIED ON DRAWING. CONSULT AN RPEQ ENGINEER FOR LIFTING DESIGN OF SPECIFICALLY DESIGNED TANKS WITH ADDITIONAL FIXTURES INSTALLED AND TOTAL WEIGHT EXCEEDING APPROVED 15.0 t
2. THE ERECTOR SHALL COORDINATE WITH THE SITE PROJECT ENGINEER FOR SITE ACCESS, GROUND CONDITIONS AND PLANNED LIFTING EQUIPMENT PRIOR TO TANK DELIVERY ON SITE.
3. RIGGING ARRANGEMENT SHALL ENSURE THE LOAD IS EVENLY DISTURBED BETWEEN ALL LIFTING ANCHORS.
4. ONLY USE LIFTING PINS PROVIDED WHEN LIFTING. DAMAGED LIFTING PINS SHALL NOT BE USED UNLESS CAPACITY IS VERIFIED AND APPROVED BY A RPEQ ENGINEER.

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				<p>Check Date</p>		<p>TITLE GENERAL NOTES 14.88 kL SPEL PRECAST CONCRETE TANK SV.5023-1464</p>																												
				<p>Verified Date</p>		<p>SCALE N.T.S</p>	<p>SIZE A3</p>	<p>SHEET 1</p>	<p>REV 4</p>																									
				<p>Approved Date</p>		<p>CUSTOMER CODE : DWG No. SV.5023-1464 NOTES PAGE</p>																												
<table border="1"> <thead> <tr> <th>REV</th> <th>DATE</th> <th>BY</th> <th>DESCRIPTION</th> <th>CHK</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>04/21</td> <td>G.T.</td> <td>INITIAL RELEASE</td> <td></td> </tr> <tr> <td>2</td> <td>10/21</td> <td>GT</td> <td>GENERAL AMENDMENTS</td> <td></td> </tr> <tr> <td>3</td> <td>01/22</td> <td>GT</td> <td>FOUNDATION NOTE 3 AMENDED</td> <td></td> </tr> <tr> <td>4</td> <td>01/22</td> <td>GT</td> <td>BUOYANCY NOTE AMENDED</td> <td></td> </tr> </tbody> </table>				REV	DATE	BY	DESCRIPTION	CHK	1	04/21	G.T.	INITIAL RELEASE		2	10/21	GT	GENERAL AMENDMENTS		3	01/22	GT	FOUNDATION NOTE 3 AMENDED		4	01/22	GT	BUOYANCY NOTE AMENDED		Request No.		KEYWORDS			
REV	DATE	BY	DESCRIPTION	CHK																														
1	04/21	G.T.	INITIAL RELEASE																															
2	10/21	GT	GENERAL AMENDMENTS																															
3	01/22	GT	FOUNDATION NOTE 3 AMENDED																															
4	01/22	GT	BUOYANCY NOTE AMENDED																															

SV.5023-1464 NOTES PAGE 04



NOTE:
OTHER ACCESS OPENING SIZES AND POSITIONING OPTIONS AVAILABLE SEE "TANK LID PENETRATION OPTION" DRAWING No. SP21-CT204070-C

STOCK TANKS

TANK WEIGHT = 9.8t
LID WEIGHT = 4.4t
(WEIGHTS CALCULATED WITH NO PENETRATIONS IN TANK OR LID)

REV	DATE	BY	DESCRIPTION	CHK
1	05/21	G.T	INITIAL RELEASE	
2	10/21	GT	GENERAL AMENDMENTS	

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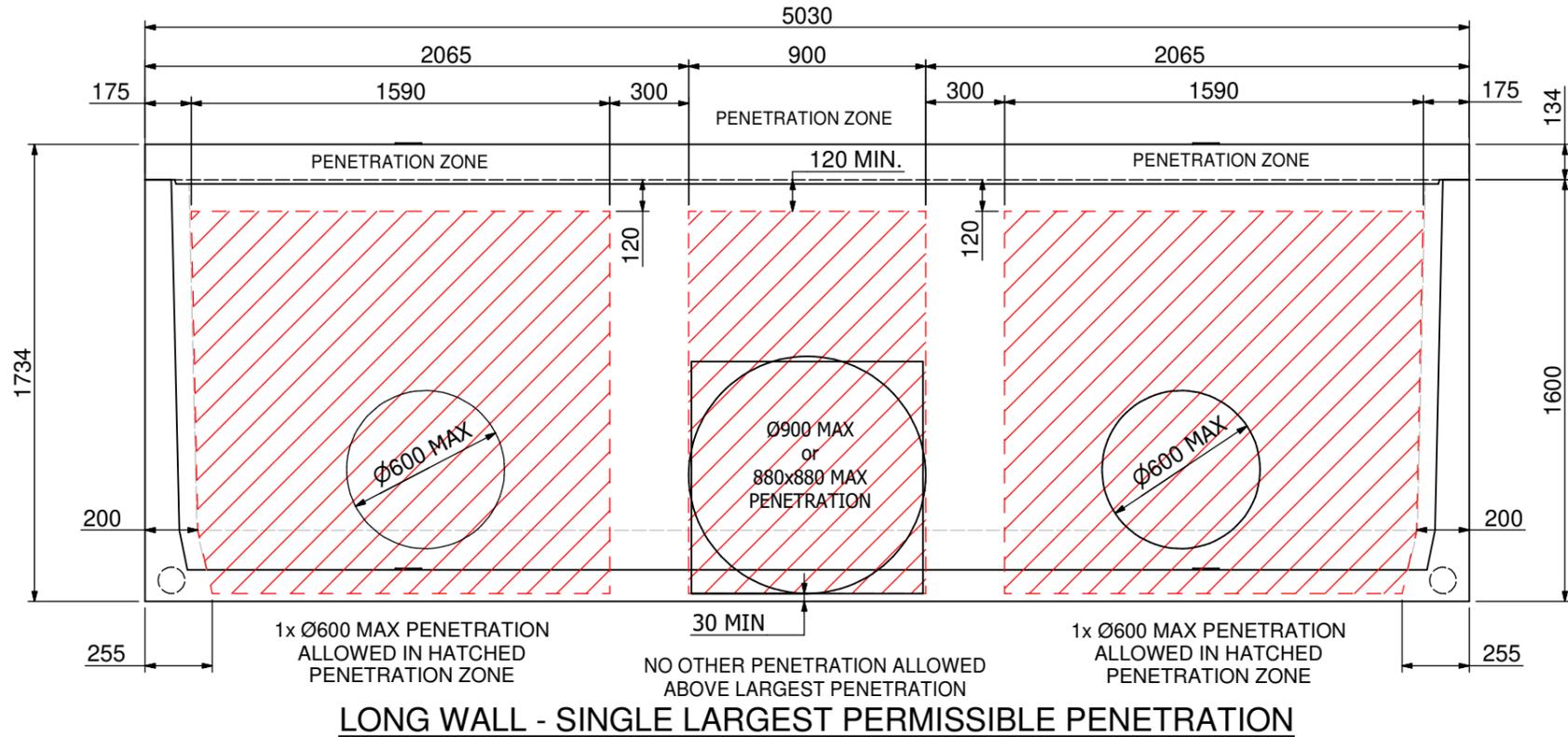
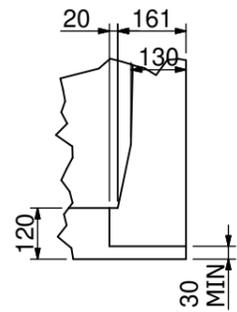


PROJECT :			
TITLE GENERAL ARRANGEMENT 14.88 kL SPEL PRECAST CONCRETE TANK SV.5023-1464			
SCALE N.T.S	SIZE A3	SHEET 1	REV 2
CUSTOMER CODE : DWG No.		SP21-CT19390-C	

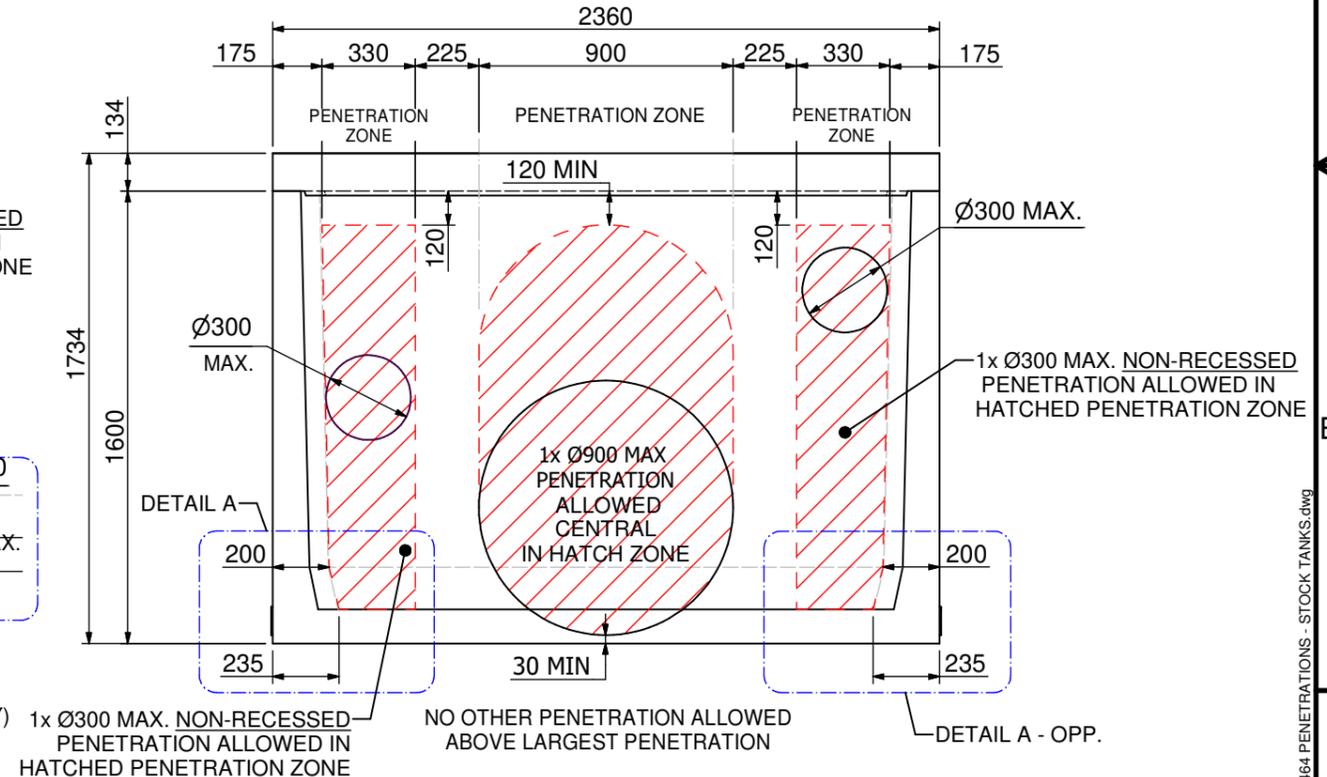
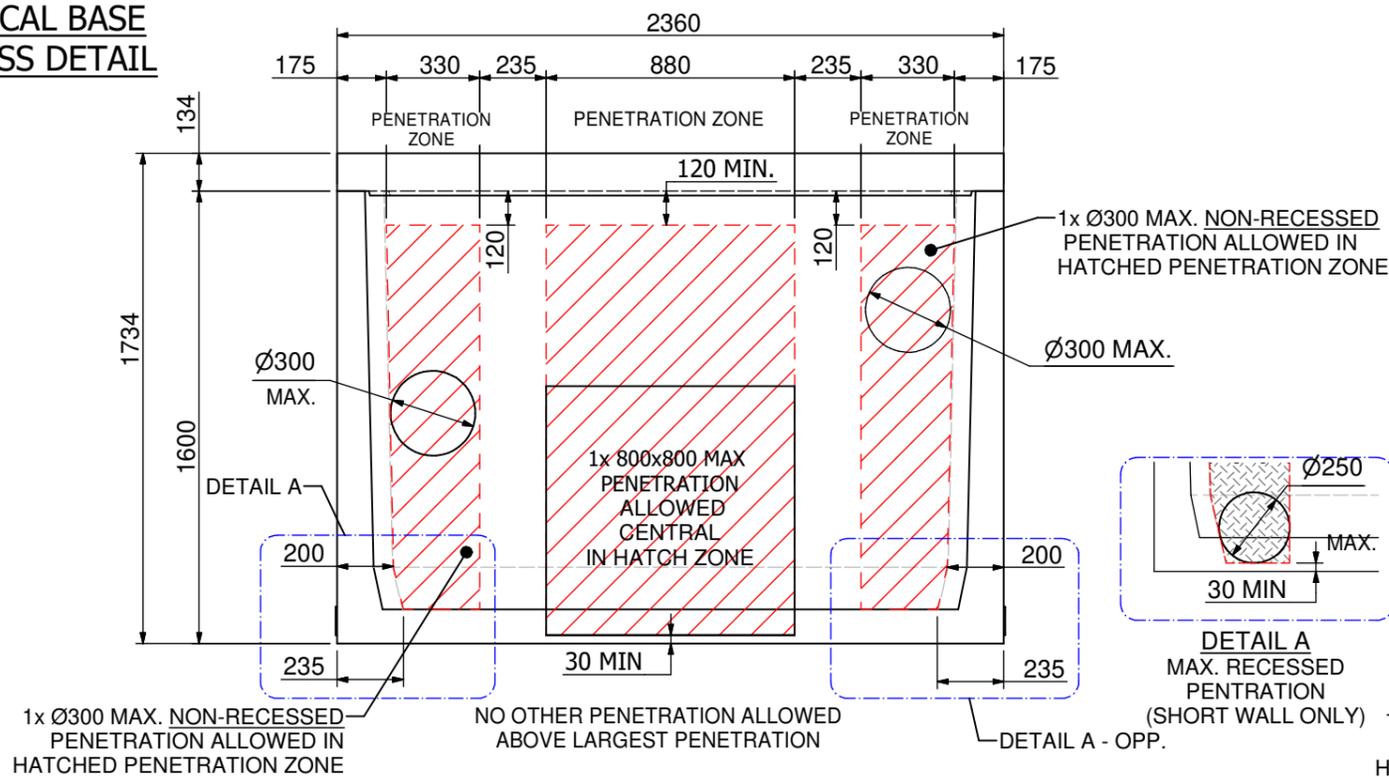
SV.5023-1464 GENERAL ARRANGEMENT.dwg

STOCK TANKS

PLEASE NOTE:
 THESE GUIDELINES ARE FOR A STOCK TANK WITH STANDARD REINFORCEMENT.
 IF REQUIRED PENETRATIONS ARE OUTSIDE OF THE GUIDELINES SHOWN, CONTACT SPEL WHO WILL SEEK FURTHER ENGINEERING ADVICE.
 CUSTOM TANKS CAN PROVIDE PENETRATIONS OUTSIDE THESE GUIDELINES REFER. "PERMISSIBLE PENETRATIONS - CUSTOM TANKS" ON DRAWINGS SP21-CT19400 - C SHEET 2 & 3 FOR A GUIDE PRIOR TO TANK PRODUCTION.



TYPICAL BASE RECESS DETAIL



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Check	Date
Verified	Date
Approved	Date
Request No.	



PROJECT :			
TITLE PERMISSIBLE PENETRATIONS 14.88 KL SPEL PRECAST CONCRETE TANK SV.5023-1464 STOCK TANKS			
SCALE	SIZE	SHEET	REV
N.T.S	A3	1	2
CUSTOMER CODE :		DWG No.	
		SP21-CT19400-C	

REV	DATE	BY	DESCRIPTION	CHK
1	07/21	G.T	INITIAL RELEASE	
2	10/21	GT	DRAWING SET EXPANDED	

SV.5023-1464 PENETRATIONS - STOCK TANKS.dwg

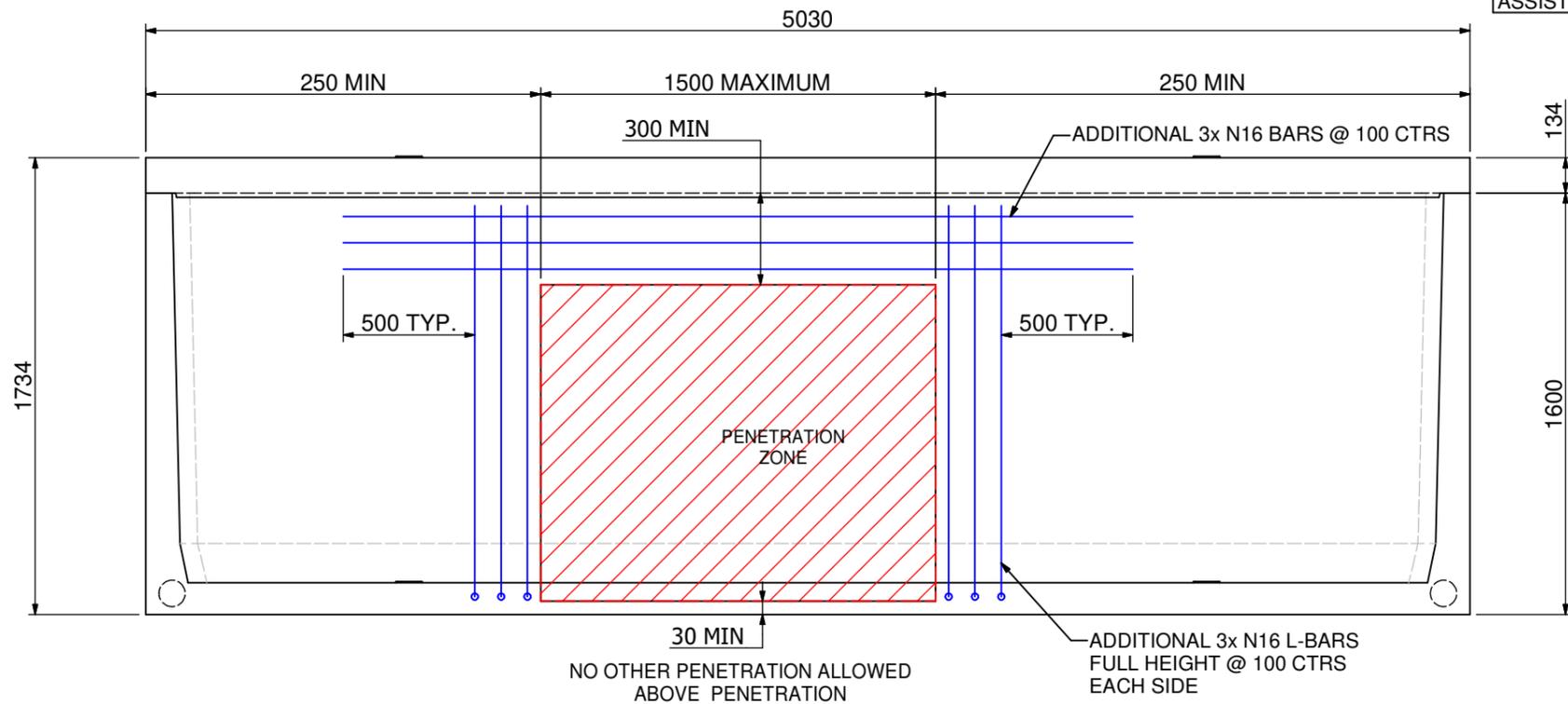
CUSTOM TANKS

IMPORTANT NOTE:

THESE PENETRATIONS CANNOT BE PERFORMED TO A STANDARD TANK.

THEY ARE REQUIRED TO BE ARRANGED WITH SPEL, PRIOR TO POURING THE TANK SO ADDITIONAL REINFORCEMENT CAN BE INCLUDED.

FOR STANDARD PERMISSIBLE PENETRATION REFER DRAWING SP21-CT19400-C SHEET 1 FOR ADDITIONAL PENETRATION COMBINATIONS CONTACT SPEL FOR DESIGN / ENGINEERING ASSISTANCE.



LONG WALL - MAXIMUM SINGLE PENETRATION

TYPICAL BASE RECESS DETAIL

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Drawn	Date
GT	7/04/2021
Check	Date
Verified	Date
Approved	Date
Request No.	



PROJECT :
TITLE PERMISSIBLE PENETRATIONS
 14.88 kL SPEL PRECAST CONCRETE TANK
 SV.5023-1464- CUSTOM TANK

SCALE	SIZE	SHEET	REV
N.T.S	A3	3	1

CUSTOMER CODE : DWG No. **SP21-CT19400-C**

1	10/11/2020	G.T	INITIAL RELEASE	
REV	DATE	BY	DESCRIPTION	CHK

SV.5023-1464 PENETRATIONS - CUSTOM TANKS PAGE 2.DWG

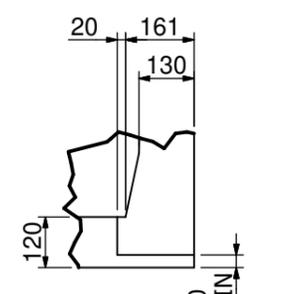
CUSTOM TANKS

IMPORTANT NOTE:

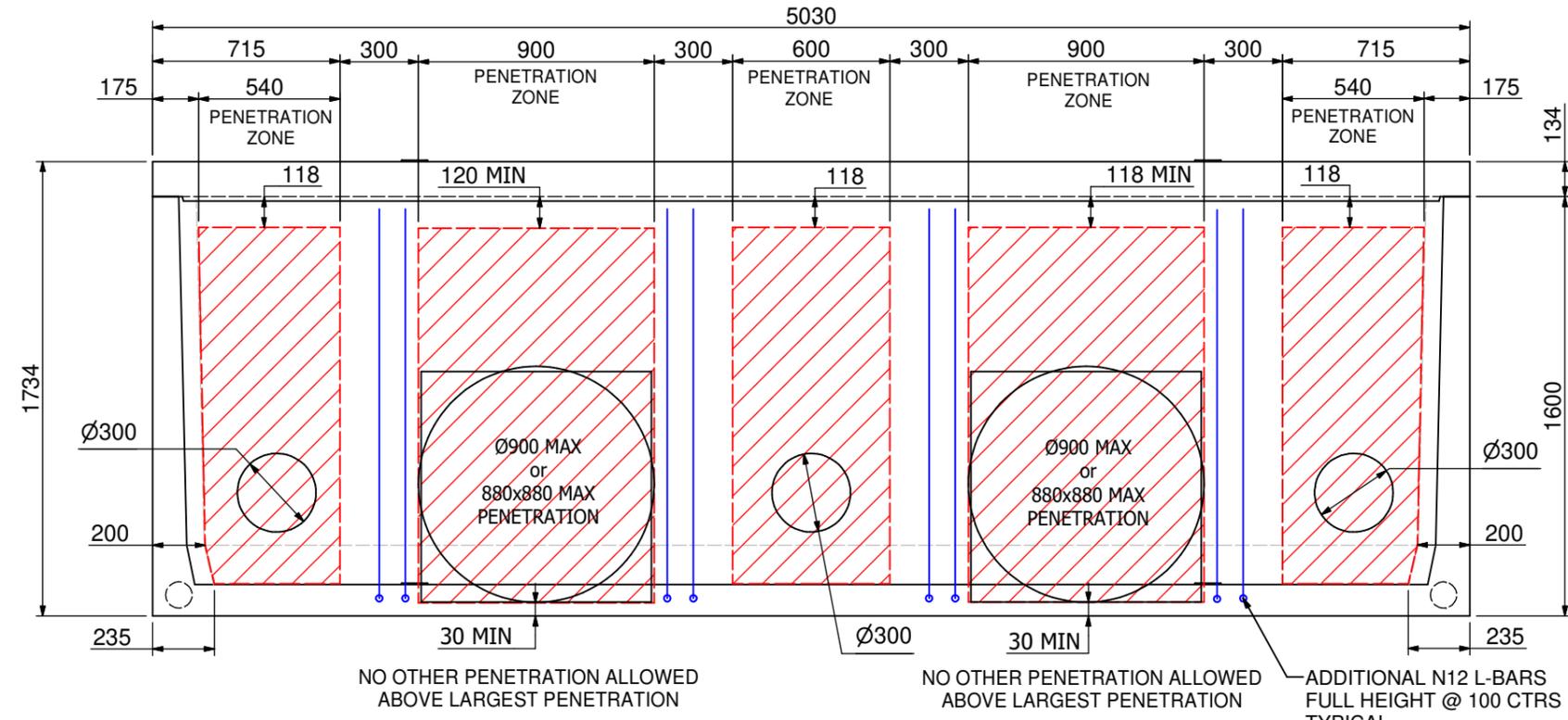
THESE PENETRATIONS CANNOT BE PERFORMED TO A STANDARD TANK.

THEY ARE REQUIRED TO BE ARRANGED WITH SPEL, PRIOR TO POURING THE TANK SO ADDITIONAL REINFORCEMENT CAN BE INCLUDED.

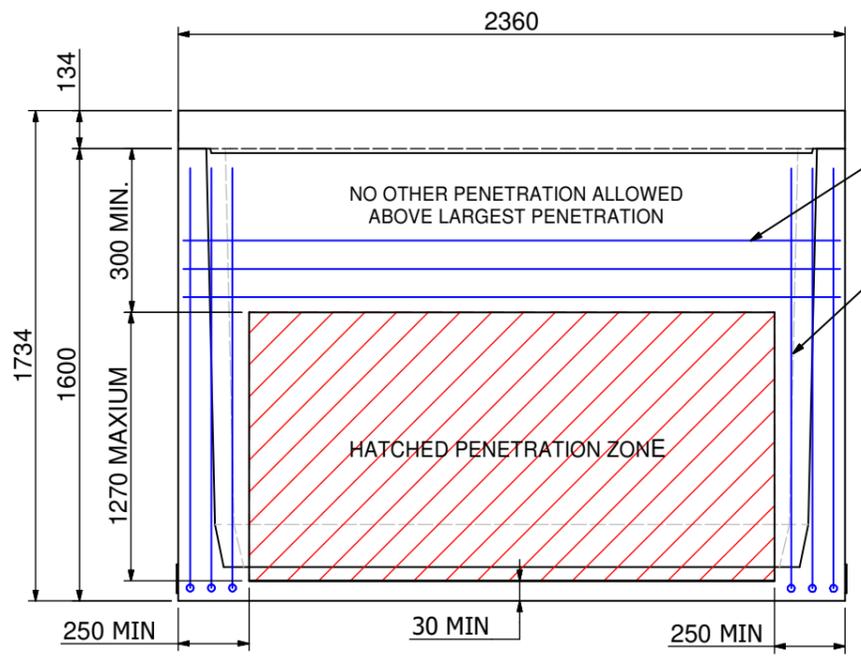
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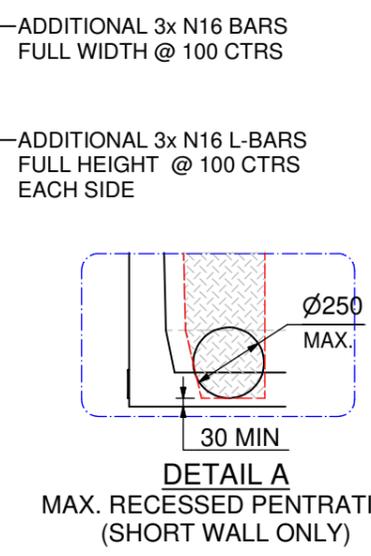
TYPICAL BASE RECESS DETAIL



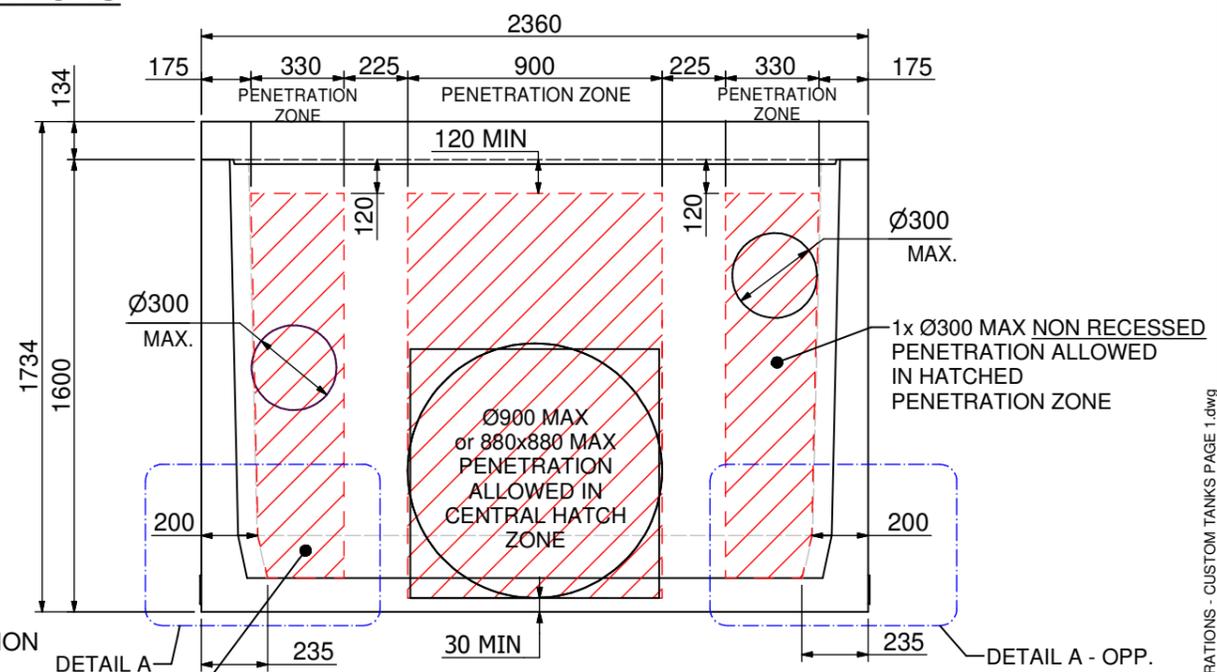
LONG WALL - 2x LARGEST PERMISSIBLE PENETRATIONS



SHORT WALL - MAX. CUSTOM PENETRATION



DETAIL A
MAX. RECESSED PENETRATION
(SHORT WALL ONLY)



SHORT WALL - Ø 900 MAX PENETRATION

1	10/11/2020	G.T	INITIAL RELEASE	
REV	DATE	BY	DESCRIPTION	CHK
6				

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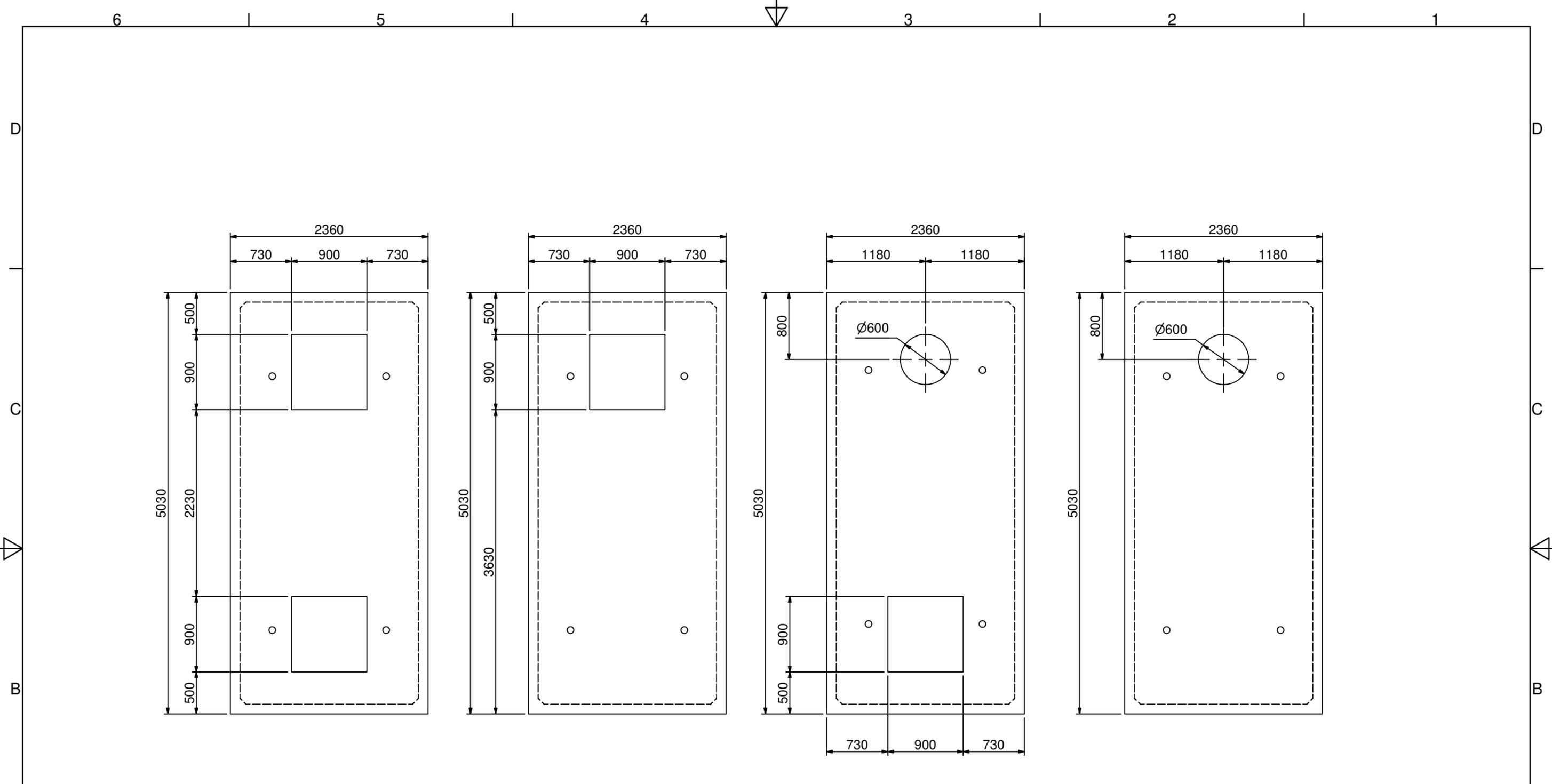
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Drawn	Date
GT	7/04/2021
Check	Date
Verified	Date
Approved	Date
Request No.	



PROJECT :			
TITLE PERMISSIBLE PENETRATIONS 14.88 kL SPEL PRECAST CONCRETE TANK SV.5023-1464- CUSTOM TANKS			
SCALE N.T.S	SIZE A3	SHEET 2	REV 1
CUSTOMER CODE : DWG No.		SP21-CT19400-C	

SV.5023-1464 PENETRATIONS - CUSTOM TANKS PAGE 1.dwg



STANDARD LID FORMATIONS
 FOR ADDITIONAL ACCESS OPENING AND POSITIONING OPTIONS
 CONTACT SPEL

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Drawn	Date
G.T	9/04/2021
Check	Date
Verified	Date
Approved	Date
Request No.	



PROJECT :			
TITLE TANK LID PENETRATION OPTIONS SPEL PRECAST CONCRETE TANK SV.5023			
SCALE	SIZE	SHEET	REV
N.T.S	A3	1	1
CUSTOMER CODE :		DWG No.	
		SP21-CT24070-C	

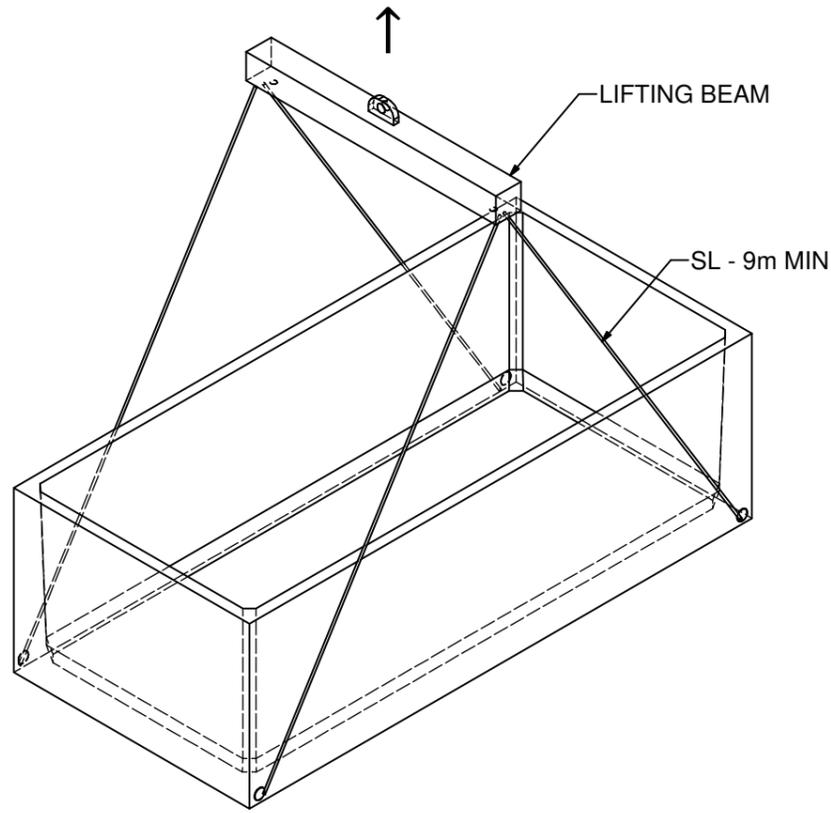
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REV	DATE	BY	DESCRIPTION	CHK

SV.5023-STD LID TYPES.dwg

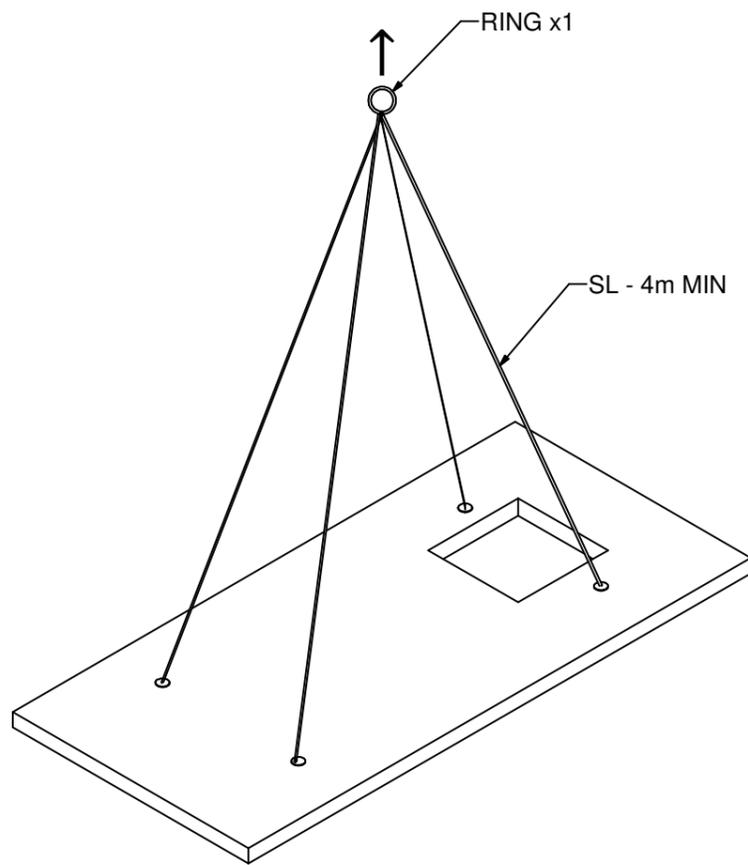
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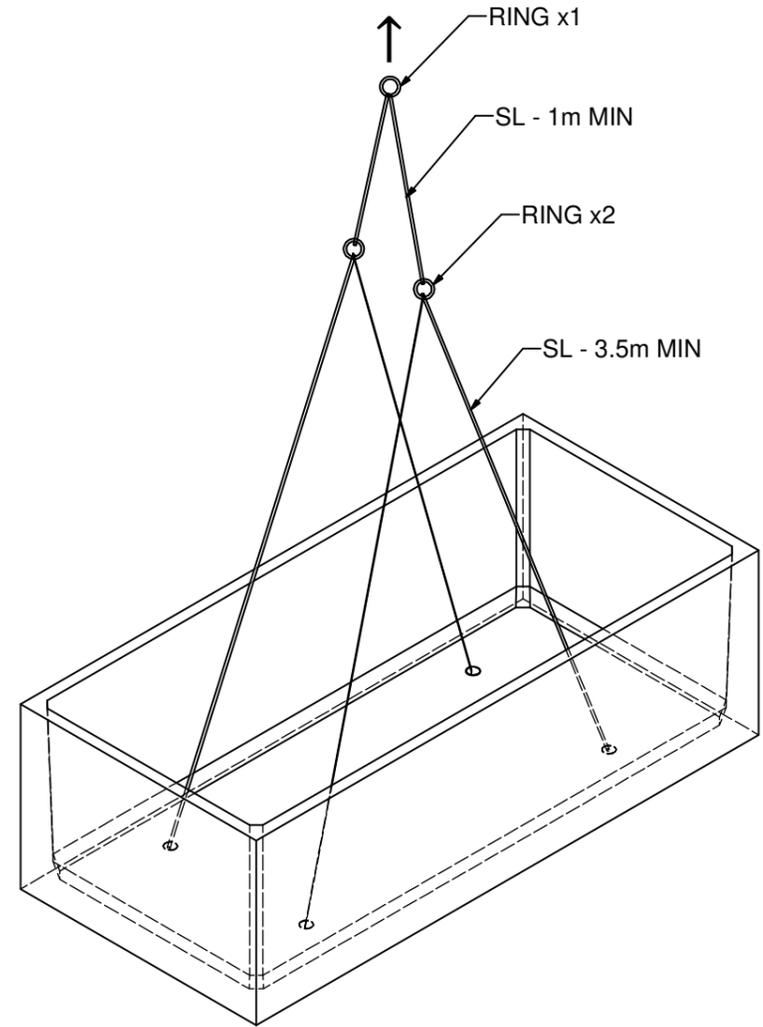
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EXTERNAL LIFTING OPTION
LIFTING BEAM w/ SL=9m MIN



TYPICAL LID LIFTING
FLAT LIFT - 4 POINT LOAD
SL = 4m MIN. EACH



INTERNAL LIFTING OPTION
SL = 3.5m MIN. EACH

B

B

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A

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Drawn	Date
GT	9/11/2021
Check	Date
Verified	Date
Approved	Date
Request No.	



PROJECT :

TITLE
GENERAL LIFTING ARRANGEMENT
SPEL PRECAST CONCRETE TANK
SV.5023

SCALE	SIZE	SHEET	REV
N.T.S	A3	1	1

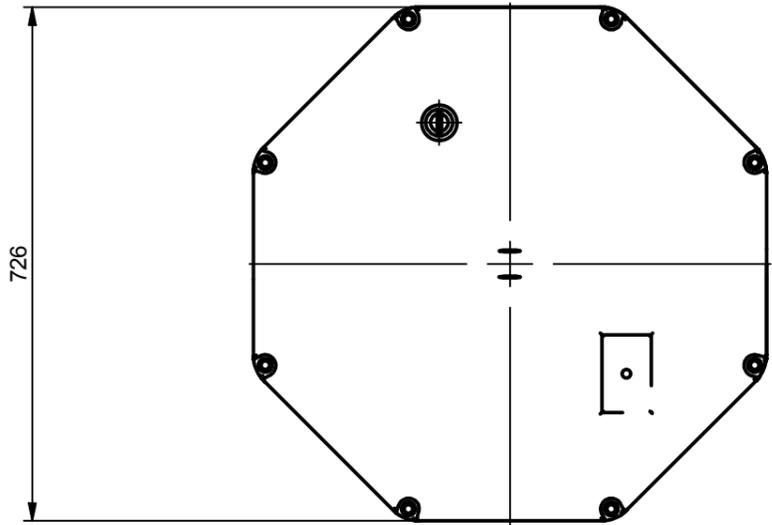
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REV	DATE	BY	DESCRIPTION	CHK
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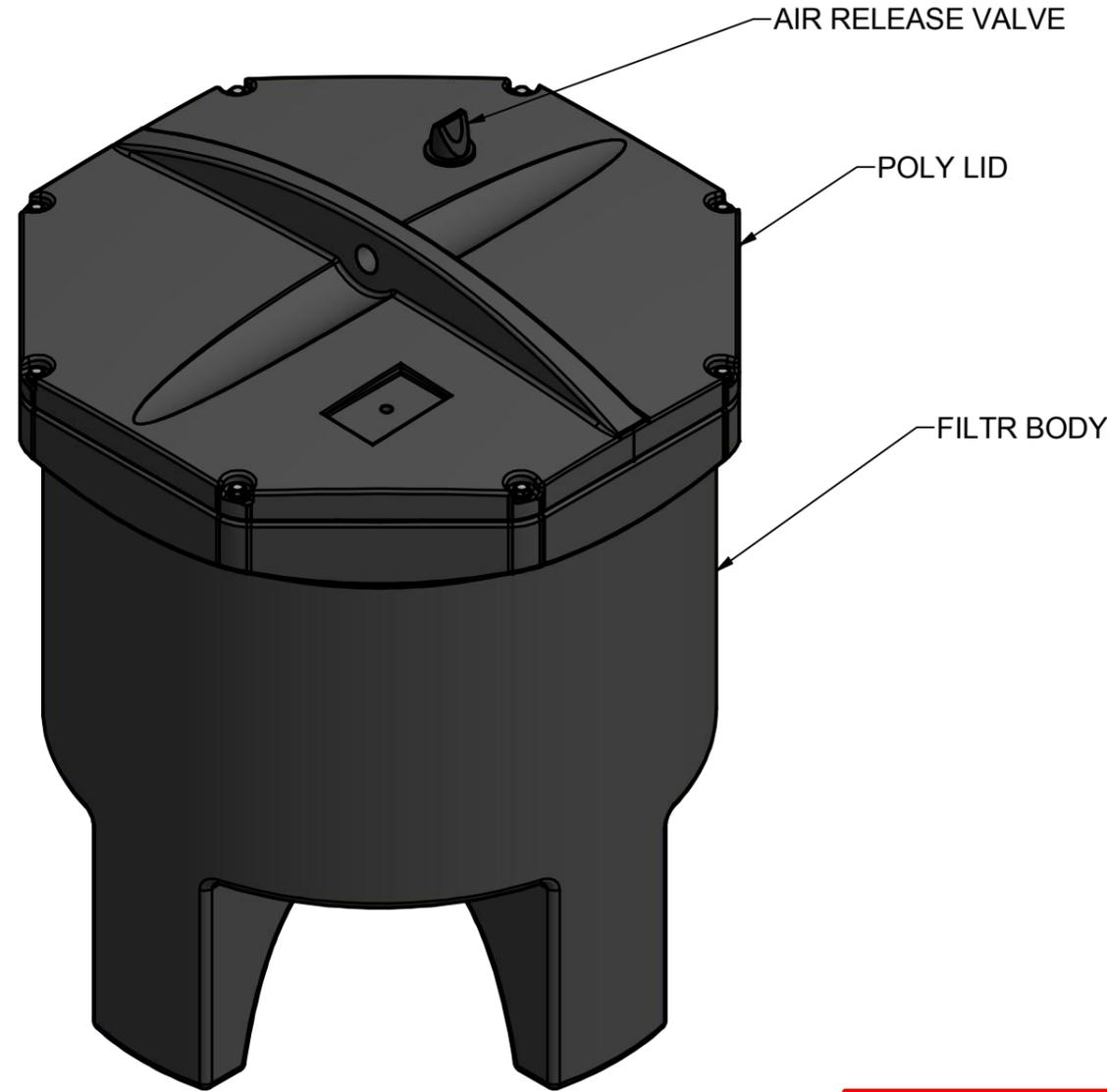
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SV.5023 - GENERAL LIFTING ARRANGEMENTS.dwg

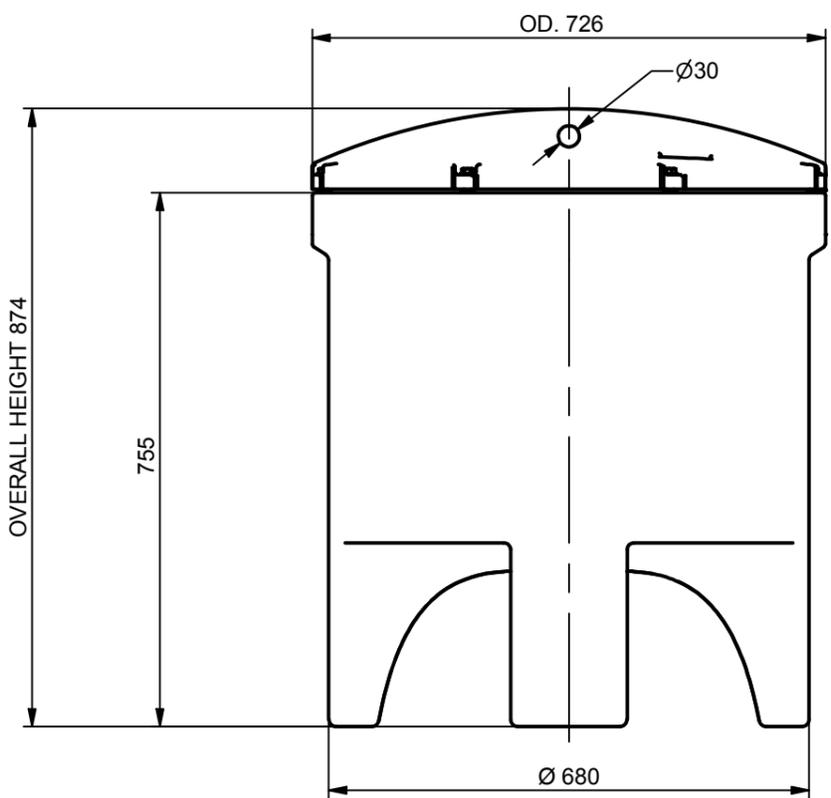
REVISION HISTORY				
REV	DESCRIPTION	DESIGNER	CREATION DATE	CHECKED BY
1	INITIAL RELEASE	M.MAKIN	7/08/2018	



PLAN VIEW



ISOMETRIC VIEW



ELEVATION VIEW

APPROVED.....	<input type="checkbox"/>
NAME.....	
SIGNED.....	
DATE...../...../.....	

ISSUED FOR CONSTRUCTION

TOLERANCE: ALL DIMENSIONS 10mm UNLESS OTHERWISE STATED.

ALL INTERCONNECTING PIPEWORK, PITS AND ASSOCIATED DRAINAGE BY OTHERS

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Drawn	Date
M.MAKIN	7/08/2018
Check	Date
Verified	Date
Approved	Date
Request No.	

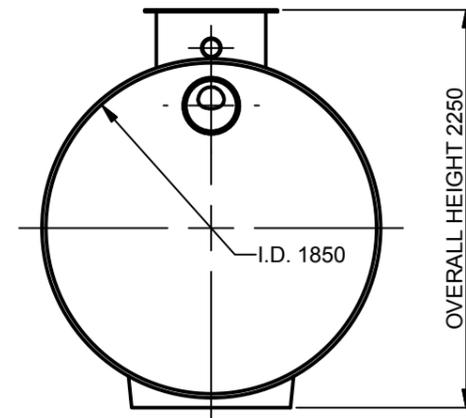
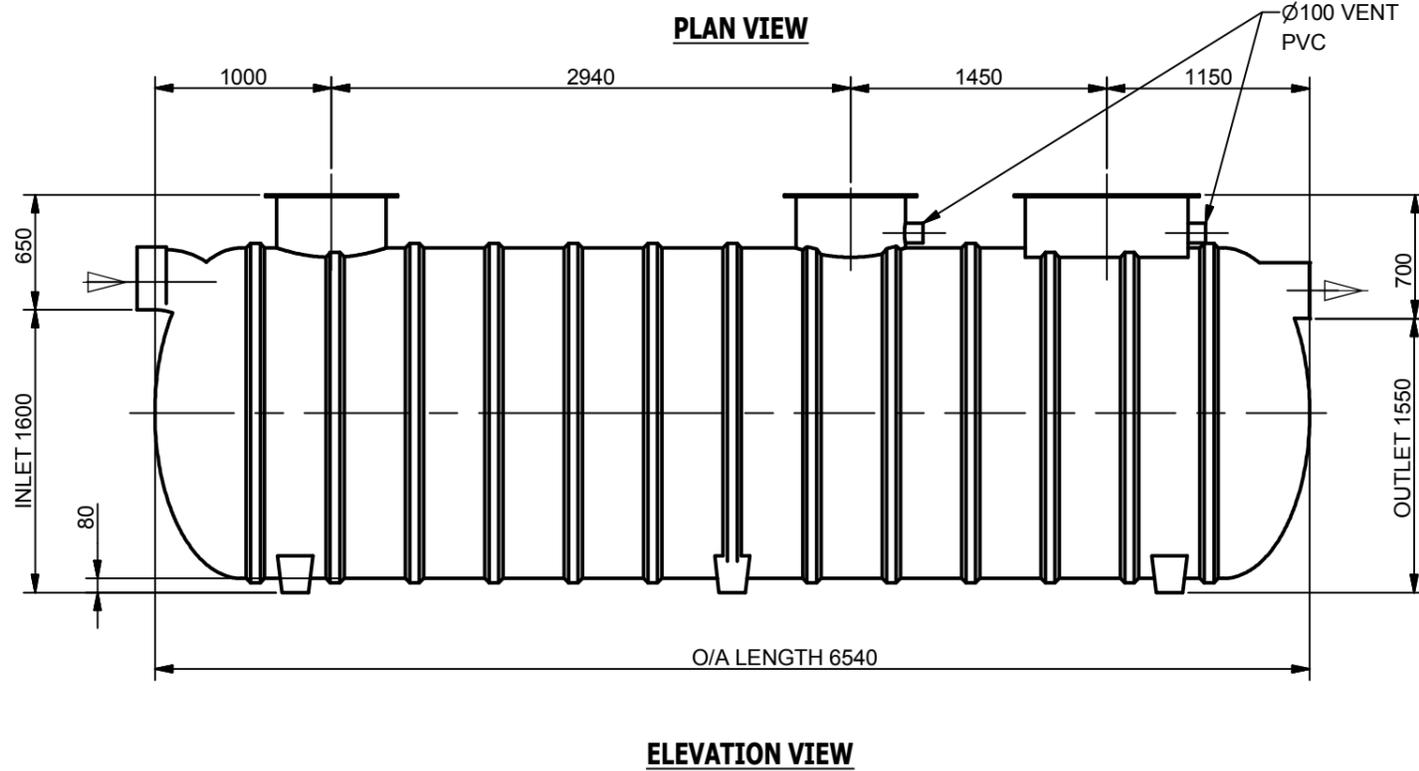
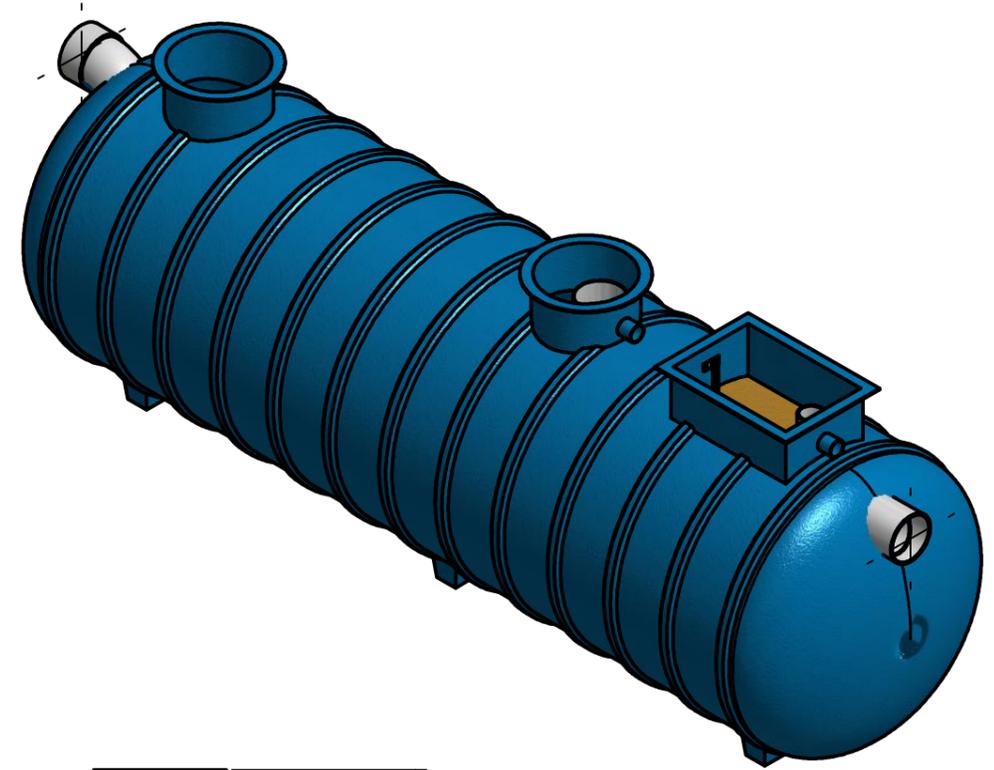
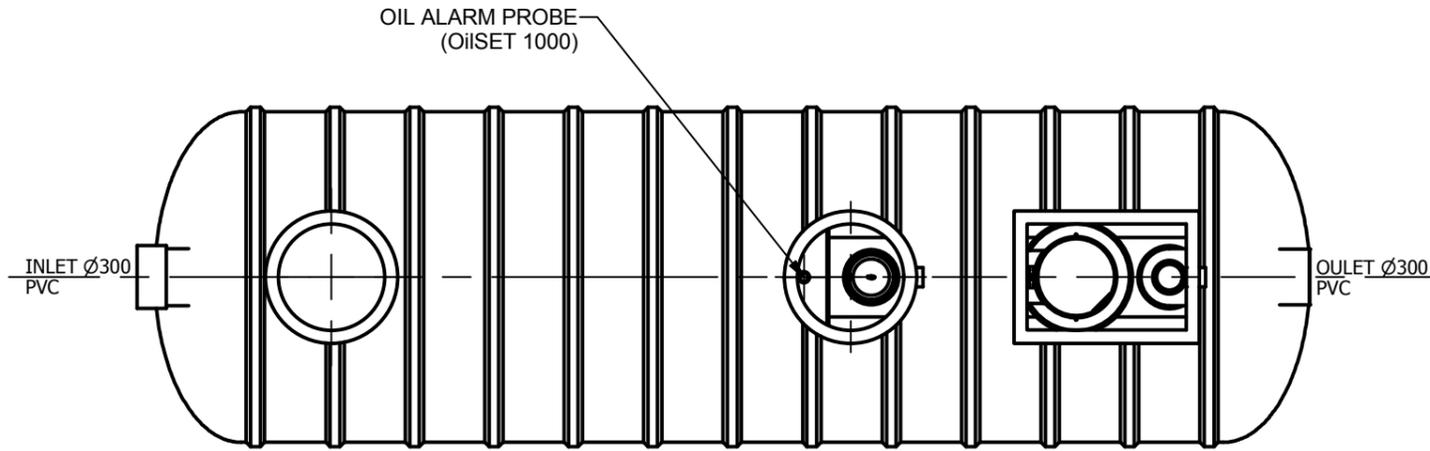
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 INTEGRATED WATER SOLUTIONS

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

PROJECT :			
TITLE SPEL FILTER MODEL : SF-3.0-EMC-M GENERAL ARRANGEMENT			
SCALE N.T.S	SIZE A3	SHEET 1	REV 1
CUSTOMER CODE :		DWG No. SP18-SF21760-S	

D:\Vault\Working Folder\Designs\SP18\ITEMS\PRODUCTS\FILTER\POLY SP18\FILTER SP18-SF21760-S.dwg

REVISION HISTORY				
REV	DESCRIPTION	DESIGNER	DATE	CHECKED BY
1	INITIAL RELEASE	M.M.	13/09/2013	J.L.



ISOMETRIC VIEW

APPROVED.....

NAME.....

SIGNED.....

DATE...../...../.....

Site Level Confirmation	
Finished Surface Level (FSL) RL:	
Access Cover Thickness	mm
Inlet Invert Level RL:	
Outlet Invert Level RL:	
Company:	
Name:	
Date:	

ISSUE FOR APPROVAL
NOT FOR CONSTRUCTION

CLIENT:

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Drawn	Date
M.M.	13/09/2013
CHECKED BY	Date
Verified	Date
Approved	Date
Dig. Add.	

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TITLE SPEL PURCEPTOR P.040.C1.2C.A.300 GENERAL ARRANGEMENT			
CODE 500060	SIZE A3	SHEET 1	REV 1
SCALE N.T.S	DWG No. SP13-PC1560-S		