

Equipment Item	Minimum Acceptance S	Standards	Approved Equipment/Fittings	
	New UPSS or complete tank/ line replacement	Existing UPSS repair	Details/drawing reference	
Product pipe				
Product Lines	Double wall, non corrodible (preferred non-metallic & non-FRP/GRP) installed with provision to pressure test the space between pipe walls	Single wall, non corrodible (preferred non-metallic & non-FRP/GRP) – for pipe lengths 3m or greater For existing metal pipe systems, galvanised steel and Denso wrapped for minor works/maintenance only - length of pipe installed less than 3m.	50NB, 80NB or 100NB proprietary system pipe as indicated on drawings	
Tank valves (suction system only)	50 or 80mm as indicated	·	Eskay with patented poppet, Treloar or Gilbarco T139D or Bowcock	



Equipment Item	Minimum Acceptance S	tandards	Approved Equipment/Fittings
-	New UPSS or complete tank/ line replacement	Existing UPSS repair	Details/drawing reference
Suction stubs	replacement		Treloar WS 65 or Eskay F-ST50 for 50mm suction stubs and Treloar 465 or Eskay F-ST75 deflector for 80mm suction stubs or equivalent
Check/ offset valves below pump (suction system only)			Treloar DTV-40 Drain & Test Valve
Elbows, Tees	Proprietary type to match pipework system	Proprietary type to match pipework system OR Galvanised steel to match existing system	·
Metallic Pipework & Fittings	Avoid direct burial of all metallic pipework fittings – place within access sumps. If a metal fitting is direct buried it must be Denso wrapped as specified on the standard drawings.		Proprietary type sized to match pipework system Or Galvanised steel to match existing system



Equipment Item	Minimum Acceptance Standards		Approved Equipment/Fittings	
	New UPSS or complete tank/ line replacement	Existing UPSS repair	Details/drawing reference	
Line valves	Stainless steel ball valve to suit line size with teflon seat		Stokes or equivalent	
Sockets, reducing sockets etc	Proprietary type to match pipework system			
Plugs	Galvanised malleable iron			,,,,,
Reducing brushes	Galvanised steel or proprietary type to match pipework system			

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Rev: 08.2 March 2008



Equipment Item	Minimum Acceptance Standards	Approved Equipment/Fittings	
	New UPSS or Existing UPSS repair complete tank/ line replacement	Details/drawing reference	
Unions	Galvanised steel with brass seatings for galvanised steel pipe		
Fill pipe			
Fill pipe - Indirect	Single wall, non corrodible (preferred non-metallic & non-FRP/GRP)	STD-F302	
Fill pipe - direct	100NB galvanised steel (denso wrapped)	STD-F305	



Equipment Item	Minimum Acceptance Standards		Approved Equipment/Fittings
	New UPSS or complete tank/ line replacement	Existing UPSS repair	Details/drawing reference
Indirect Fills Spill point containment box (Rev 08.2)	Double box system, metallic, corrosion resistant with inner box separately removable from the outer pavement mounting box/frame		STD-F301 Browning style (galvanised steel) or approved equal. Box supplied by Shipman King or Treloar equally acceptable
Direct Fill(s) Spill point containment	Not preferred – acceptable only for a single tank installation single tank installation Proprietary unit with integral drain valve, pavement anchor/mounting frame and self sealing driveway lid – minimum capacity 20L		STD-F305



Equipment Item	Minimum Acceptance Standards		Approved Equipment/Fittings	
	New UPSS or complete tank/ line replacement	Existing UPSS repair	Details/drawing reference	
Common Dip and Fill Cap			STD-F305	
Remote fill cap and Adaptor			STD-F301 100mm Eskay or Treloar OPN 61-AS fill adaptor	
Remote fill pipe test fitting			STD-F300 STD-F302	
Earthing	Integral earthing wire cor points in containment box stake, with tested insitu r	x to separate earth	STD-F303	
Overfill Protection	Rising float 'ball' valve on the vent pipe (or combination vent/VR pipe) connection to tank		Refer to Vent & Vent vapour recovery pipe	
Overfill Prevention (Rev 07.8)	Only when demanded by local authorities OPW fill tube restrictive valve type set at 95% tank capacity (SFL)		STD-F300 OPW 61-SOG	

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Rev: 08.2 March 2008



Equipment Item	Minimum Acceptance Standards		Approved Equipment/Fittings	
	complete tank/ line	sting UPSS repair	Details/drawing reference	
Lines			50NB, 80NB proprietary type pipe underground with galvanised steel pipe and fittings as vent risers above	
Vent pipe (below ground)				
Riser			STD-F332 STD-F335	
Fittings	50NB, 80NB proprietary type system	to match pipework		
Extractor Float			STD-F335 STD-F336 50mm Eskay F-V620-2 or Treloar 260S-80	
Nipples			STD-F331	

Caltex Australia Petroleum Pty Ltd ABN 17 000 032 128
Mkt. Property – Proj. Services Corp Stand
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Rev: 08.2 March 2008



Equipment Item	Minimum Acceptance Standards		Approved Equipment/Fittings	
	New UPSS or complete tank/ line replacement	Existing UPSS repair	Details/drawing reference	
Vent Caps			STD-F332 STD-F335 Eskay F-AV series or equivalent	
Vent Vapour Recovery pi	pe			
Lines	Single wall, non corrodible (preferred non-metallic & non-FRP/GRP) Pipe size to match venting requirements of tank(s) serviced		50NB, 80NB proprietary type pipe underground with galvanised steel pipe and fittings as vent risers above	
Risers			STD-F301 STD-F330	
Fittings	50NB, 80NB proprietary type to match pipework system			
Extractor Float Vent Valve			STD-F330 STD-F331 100mm Shipman King, Treloar 260S-80 or Eskay F-V620-4	



Equipment Item	Minimum Acceptance Standards		Approved Equipment/Fittings	
	New UPSS or complete tank/ line replacement	Existing UPSS repair	Details/drawing reference	
Nipples			STD-F331	
Cross	80NB cast steel			
Plugs			STD-F331	
Reducing brushes	Galvanised steel			
Vapour Recovery Adaptor/check valve	Incorporate into Multipoint indirect fill box		75mm Eskay R-611V vapour check valve with R-733 VC cap or Treloar 61ASV/2-80 vapour recovery adaptor and 62TTV cap	
Lock Box	Not Applicable		STD-F330 Treloar 63, Gilbarco series T236 or Eskay LBA10	
Syphon Pipe			STD-F350 STD-F351 STD-F352	



Equipment Item	Minimum Acceptance Standards A		Approved Equipment/Fittings
	New UPSS or complete tank/ line replacement	Existing UPSS repair	Details/drawing reference
Sumps			
Tank & Tank Fitting Access Sump (08.2)	unit(s) with water tight lid & riser extension joint(s) Sump material shall provide at least the same level of fuel permeability as secondary containment pipe Preferably of same material as tank outer		 Tank manufacturers supplied access chamber and riser complete with water tight lid Tank manufacturing endorsed 3rd party access chambers from Fibrolite also acceptable
Sump Penetration boots/collars (08.2)	wall, installed integral with the tank wall Expanding cuff type bulkhead with all boot components within the sump OR Electrofusion welded boot/seals Units that are bolted through the sump wall should not be used		STD-F351 Weaver manufacturing PetroTechnik UPP Penetration boots/seats approved by the sump manufacturer

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Rev: 08.2 March 2008



Equipment Item	Minimum Acceptance Standards		Approved Equipment/Fittings	
	New UPSS or complete tank/ line replacement	Existing UPSS repair	Details/drawing reference	
Forecourt Dispenser Sump/Containment	Single piece moulded polyethylene unit with integral galvanised dispenser based mounting frame Polyethylene sump shall be of same permeability grade as secondary containment piping	Corrosion resistant metal spill pan with sealed product pipe/electrical penetrations	STD-F320	



Equipment Item	Minimum Acceptance Standards		Approved Equipment/Fittings	
	New UPSS or complete tank/ line replacement	Existing UPSS repair	Details/drawing reference	
UPSS Leak Monitoring				
(Rev 08.2)	Proprietary 3 rd party SIA system and OR Automatic tank gauge (ATG) with comm's integrated to Point of Sale (POS) system for pressure fuel systems pressure line leak detection (PLLD) linked to ATG control console	Proprietary 3 rd party SIA system	Caltex has existing supply agreements with Leighton O'Brien & Fairbanks Environmental	



Equipment Item	Minimum Acceptance Standards		Approved Equipment/Fittings	
	New UPSS or complete tank/ line replacement	Existing UPSS repair	Details/drawing reference	
Cathodic Protection				
			For existing installations (renewal) or for special situations refer to Section 26 of Volume 2 specification	
Observation Points				
Tank Pit Observation Well(s)	 PVC pipe shall not be used UPVC pipe, if used, must not have any solvent glued fittings as the glue can contaminate ground water leading to false readings Preferred material is FRC pipe 		STD-F170 STD-F171 Refer to site layout drawing for observation positions	
Groundwater Observation Well(s)	Must have on Class A site or as for tank pit observation well(s)			



Equipment Item	Minimum Acceptance S	tandards	Approved Equipment/Fittings	
	New UPSS or complete tank/ line replacement	Existing UPSS repair	Details/drawing reference	
Other Fittings	-			
ATG	Veeder Root TLS 350R s are not acceptable due the Caltex wet stock man The option for integral PL remote install delivery tar that this model provides s specifically defined in the Note: There needs to be when ATG Tank Probes as the floats are quite ea excessive force is used	to interface issues with tagement systems. LD to the STPs and taker information station should only be used if Scope of Works a degree of care taken are removed from tanks		
Electrical Conduits (Rev 04.1)	Proprietary welded joint/r (preferably non-metallic) Avoid the use of galvanis SWA direct burry cables	conduit	NUPI Smart conduit 32 NPS complete with flameproof glands PetroTechnik UPP	



Equipment Item	Minimum Acceptance Standards		Approved Equipment/Fittings
	New UPSS or complete tank/ line replacement	Existing UPSS repair	Details/drawing reference
Jointing Material			Litharge and glycerine for all screwed galvanised steel or galvanised pipe only joints
Ground Marker			Treloar plastic surface markers 67 series dip/fill/vapour recovery



23.4 Transportation and Handling

23.4.1 General

The Contractor shall make suitable arrangements for:

- delivery of the tank(s), pump(s), and other free supply equipment ex the manufacturer's works
- cart to site as necessary, unload and install into correct position.

Refer to list of equipment supplied (Vol 1 Sect 6) by the Principal and confirm with the Superintendent at commencement of Works.

23.4.2 Tank Handling Responsibilities

Tank manufacturer

The tank manufacturer is responsible for:

- · the loading and unloading of the tank(s) from the delivery vehicle and
- ensuring that the vehicle is equipped with approved transportation equipment.

Tank installer

If the tank installer is required to deliver the tank(s) he shall provide a vehicle and transportation equipment to satisfy the tank manufacturer.

It is the tank installer's responsibility to:

- inspect the delivered tank(s) with the manufacturer on site prior to installation and
- report on manufacturer's form any damage or loss of vacuum, or liquid between tank shells, to the Company.

23.4.3 Certificate of Warrantee

Any damage to the tank(s) shall be made good by the tank manufacturer before installation and a written certificate shall be issued by the tank manufacturer for all tanks in accordance with their warrantee.

23.5 Excavation

Refer Section 4 and the Standard Drawings.

The Contractor shall:

- verify the location and finished levels, and confirm these with the Superintendent before excavation commences
- supply any temporary barricade, shoring for unstable ground, or pumping equipment for water charged excavation that is necessary for the completion of the excavation.

Excavation to be carried out in strict accordance with all Statutory regulations.

Dimensions

Excavation shall be dimensioned to allow for the tanks to be installed strictly in accordance with the manufacturer's instructions.



To the finished surface level of the driveway, the tanks shall have:

- a minimum cover of 900mm in unpaved areas or 600mm including concrete paving, for a pressure fuel delivery system, and
- a maximum cover of 600mm, for a suction delivery fuel system. Final burial depth must also allow for minimum pipe grading to drain back to tanks (refer Clause 23.7)

Spoil

All spoil is to be disposed of legally.

23.6 Tank Installation

Tanks shall be installed strictly in accordance with the manufacturer's written instructions. Refer also to Standard Drawing.

- (Rev 03.1) Tanks shall be anchored to resist buoyancy forces using a system of 'dead-man' anchors at the bottom of the excavation in conjunction with a non-corrodible tie down strap system that is fixed and tensioned on the top of the tank. This system of anchoring & tie-down will minimise the need for personnel to enter the tank pit excavation and facilitate the future removal/ replacement of tanks.
- (Rev 03.1) Top anchor systems using mass concrete shall not be used.
- (Rev 03.1) All metal components used in the tie down system shall be hot dip galvanised. They shall be further protected from corrosion by Denso wrapping/ encapsulation, after completion of the tie down process and prior to direct burial.

23.6.1 Tank Backfill and Ballasting

- (Rev 04.2) The Contractor shall provide to the Superintendent a grading Certificate for tank excavation backfill material a minimum of 7(seven) working days prior to delivery of material to Site.
- (Rev 03.2) Immediately after bedding of the tanks to correct location and levels and prior to the pipework installation, commence filling the tanks with potable water. Tanks are never to be left empty overnight after being placed in location.
- (Rev 04.2) Compact tank manufacturers specified backfill in excavation around tanks to finish at a nominal 90% of tank diameter. During backfilling operations, the level of backfill shall at no stage be higher than the level of the water ballast and level of water ballast shall not be more than 500mm higher than backfill.

 Where water is not available for ballasting or where the only water available is

unsuitable due to undesirable elements, then the use of diesel can be employed and later removed and replaced with petrol product.

23.6.2 Tank Fittings

Before removing plugs, ensure the surrounds around all plugs are free of dirt.

(Rev 03.2) Extend the dip and fill pipe(s) to correct height. This must be checked by



Contractor and Superintendent. Note that all fitting boxes are to be raised 40 mm above surrounding ground level for paving and 25mm for garden areas, to be faded out over a radius of 450 mm. Finished level of all caps shall be 75 mm below lid of fill box or lock box.

All lines are to be 50 NB (or as nominated on the Drawings).

All suction product pipe connections are to be made to non-return valve on top of the tank, if necessary, with galvanised steel reducing bush.

Fit air vent connections with screwed plugs until air vent lines are fitted.

23.7 Pipework Generally

(Rev.06.2) Note: This section applies to petrol, diesel and waste oil pipework only. Refer Section 24 for LPG system work.

23.7.1 New systems

All new complete piping systems are to be proprietary pipework system as approved by the Company and statutory authorities. Refer to section 23.3 for list of approved equipment/fittings.

23.7.2 Existing systems

(Rev.06.2) Additions and/or modifications to existing galvanised systems:

- Preferred to use approved proprietary piping system. If metal pipe used, only for less than 3 meters in total length, must be in galvanised steel and must be Denso wrapped to prevent accelerated corrosion of the new pipe.
- greater than 3 metres, the pipework shall be installed using approved proprietary piping system, in accordance with the manufacturer's written specification.
- When re-installing any existing flanged joints that were opened during additions/modifications, a new gasket must be used (DO NOT reuse old gasket)

Where existing pipework is disconnected:

- Preferred where practical to remove all disconnected pipework.
- If disconnected pipework is to be left in-situ it must be disconnected at both ends of the run. The pipe is to be grout filled for a minimum of one (1) metre from either end and capped off, not left open.
- Under no circumstances shall disconnected pipework remain connected to an underground storage tank (UST).



23.7.3 Dirt & foreign matter

Before use, examine all piping, galvanised steel or proprietary type to ensure cleanliness of bore. Thoroughly clean any piping that shows internal dirt or foreign matter. On no account is rag or similar material to be used.

During installation, take care to prevent the inclusion of foreign matter in the bore. Block off all open ends and fittings whilst work is not actually being carried out on that section of the installation:

- For galvanised steel pipe risers, use a screwed cap or plug.
- For proprietary type pipe, ensure that protective end caps are left in place until
 jointing is ready to be carried out.

23.7.4 Installing pipework

Fabrication of each line shall commence:

- · at the tank end of the line for new work and
- from the closest point to the tank for pipeline extension.

All pipe runs shall be laid with a minimum continuous fall of 1:100 back to the tank. Nominal burial depth for all piping is 600mm. Avoid cover less than 450mm under unpaved areas.

(Rev 03.1) Pipelines shall be kept as short as practicable in all cases, with the number of changes of direction kept to the absolute minimum. Note: changes in direction are required by some proprietary piping systems to minimise the impact of pipe elongation on the pipeline end fittings.

Pipework shall be laid to:

- minimise pipework over tank(s)
- · avoid crossing other tank fittings or lines
- · avoid crossing lines under dispensers.

23.7.5 Exposed fittings

All exposed galvanised steel fittings must be wrapped with Denso 600 Petrolatum base tape and over wrapped with Denso 931 self adhesive tape, applied in accordance with the manufacturer's written instructions.

23.7.6 Different diameter tanks

Tanks of different diameters must not be syphon connected, unless fitted with overfill protection.

23.7.7 Pipework Joints

Use a minimum of joints and long lengths of pipe, wherever possible. Fabrication of each line shall commence:

Rev: 08.2 March 2008



- · at the tank fitting on new work and
- · from the closest point to the tank for pipelines extension.

Proprietary pipework joins

Proprietary pipework system joints shall be done strictly in accordance with the manufacturer's written instructions.

(Rev 03.1) Galvanised steel joints

All joints shall:

- be carefully made with a good quality B.S.P. taper thread, tightly assembled in a clean and true manner. No socket fittings with parallel threads can be used for jointing of pipe lengths
- be wire brush cleaned with approved cleaning fluid and dried before assembly. Remove all traces of lubricant or cutting oil from threads before making joints
- have litharge and glycerine spread evenly on male thread only, unless otherwise specified. Take care that none is allowed to enter the pipe bore during assembly. The use of Teflon tape as a jointing material is only permitted when Ethanol is to be stored in the tank.

Adjust all dies so that not less than eight (8) threads are engaged. Tighten hard on the taper of the thread, leaving three (3) threads free of engagement.

Where flanged valves are used in the pipeline, cut the connecting thread on the pipe to a length where a thread tight joint is obtained before the end of the pipe bottom on the valve body.

Closely examine joints made with unions, to ensure that good even contact is made over each face and the faces are free from imperfections.

Running Threads shall not be used.

23.8 Remote Fills

(Rev 07.8) Remote fill lines are to be:

- 100NB proprietary system pipe as indicated
- laid with a continuous fall of 1:100 back to the tank
- laid with minimum cover as recommended by pipe manufacturer to finished surface levels.

Use galvanised steel pipe as the fill pipe risers. Connect each fill line by means of a proprietary elbow adaptor and the steel risers.

Fill piping to be tested in accordance with manufacturer's instructions.

At the fill point, seal the galvanised steel riser pipe(s) to the spill containment box. The box shall be earthed. The earthing stakes shall be stainless steel construction and sized to suit the site conditions. (Refer to STD-F301 and STD-F303).



23.8.1 Fill Point Split Containment Box (Box) – Refer to STD – F301 and F305 for details

Each fill point, VR point and the box shall be earthed. The earthing stakes shall be solid non-ferrous construction rod compliant with AS/NZS 3000 and sized to suit the site conditions. The box shall be earthed by either a static earth stake, or grid of stakes as required or by connection to the site Equipotential bonding system. When earthed by the static system resistance to earth shall not exceed 10 Ohms. When earthed through the Equipotential bonding system the resistance between the components of the system shall not exceed 0.5 Ohms.

Confirm with the Superintendent, position and connection of the box Drain. The box drain shall be connected to either the ULP or Vortex 95 petrol tank. The drain MUST NOT be connected to a diesel, Vortex 98 or ethanol blended fuel tank.

At completion of assembly of the box and installation and sealing of all pipes and electrical earthing connections the integrity of the box shall be confirmed by a hydrostatic test. The test shall be performed before burial/backfilling of pipes and again at completion of subsequent paving construction. Results of these tests shall form part of the UPSS Equipment Integrity Test (EIT). The box shall be filled with water so all penetrations are submerged and the water level marked inside the box. The box shall be checked for leaks at all penetrations at pre-backfill stage over a period of two (2) hours. At post burial test, water level shall be observed for nominal 30 minutes. To assist in identifying potential leak points 20-30 mls of coloured vegetable oil shall be added to water surface to highlight movement to leak points. Alternate third party testing of box integrity by vacuum or hydrostatic testing as part of the EIT set out in clause 23.21 is acceptable.

23.9 Air Vent Pipes

Air vent pipelines are to be:

- either 50NB or 80NB galvanised steel riser, with proprietary type pipe as indicated,
- laid with a minimum continuous fall of 1:100 back to the tank
- laid to finished levels with a minimum cover as recommended by pipe manufacturer
- connected to the tank by an extractor float vent valve assembly.
 Where proprietary type pipe is used, for the horizontal runs of underground vent piping from the tank fittings:
- · galvanised steel pipe is to be used as risers
- each vent line is to be connected underground by means of threaded adaptor to a galvanised steel tee plugged at one opening (refer to STD-F336)
- the steel riser pipes are to be suitably supported.



Vent lines are to be tested in accordance with manufacturer's requirements.

Note: Vents shall be sized and located strictly as per the relevant statutory requirements, particularly with regard to proximity to building openings, flue outlets, and lateral distance from electrical equipment and/or fittings.

23.10 Vapour Recovery Pipes (Refer Standard Drawings)

Connect vapour recovery to all Motor Spirit tanks in the areas prescribed in the local state vapour recovery regulations or wherever otherwise specified.

The cross fitting used in vapour recovery shall be:

 fitted as close as possible to the tank, so that maximum fall can be obtained when the remote fill and vapoury recovery system is installed

After installation, precision test the vapour recovery pipework.

23.11 Product Pipes (Suction & Pressure Systems)

Product suction pipelines shall be:

- 50 NB minimum proprietary system pipe work, or as detailed in project drawings
- · installed in accordance with manufacturer's written specification and
- · laid as shown on the project drawings.

Any electrical, water service lines or compressed air lines shall be located in a separate trench with required cover.

Fall back to tank

Product lines shall have a minimum continuous fall of 1:100 back to the tank, with a minimum cover in accordance with manufacturer's recommendations. This fall shall be continuous and not subject to sudden changes of gradient. Ensure that all pipes and fittings are free of all foreign material prior to assembling.

Care shall be taken to ensure that pipelines do not exert any strain on the nonreturn valve.

23.12 Leak Monitoring

23.12.1 Tanks and Tank Pit

(Rev 03.2) Excavation floor graded to promote lateral drainage to tank pit observation well(s). Observation Wells (as detailed in STD-F170 & STD-F171) shall be installed to facilitate tank pit de-watering and, if required the recovery of free product.

In addition to the above, all tanks must be double walled with interstitial space monitoring.



Where possible, all product pipe connections to the tanks will be in secondary contained access points.

23.12.2 Product Pipe Leak Detection

23.12.2.1 Pressure Systems

(Rev 08.2) Double walled piping to meet the site classification and continuous line leak detection by electronic leak detectors fitted to the STP.

Refer to STD-F310

Existing mechanical line leak detection systems can be retained and maintained. All new systems and pressure UPSS sites fitted with ATG shall be electronic PLLD

23.12.2.2 Suction Systems

(Rev 03.2) All new suction system product piping installed to be double wall incorporating a connection point for pressure testing integrity of interstitial space.

Product pipe connection to dispenser shall be via a valve that incorporates a pipeline isolation and test facility. To improve leak detection of existing suction systems, the isolation test valve shall be introduced when line work modification occurs.

Refer to STD-TANK Suction Fuel System – Standard Components

23.12.3 Dispenser

(Rev 03.2) Under pump containment sump to be installed under all new dispensers.

Refer to STD-F320

Note: This drawing shows details for a pressure system, a suction system is similar excluding the isolation ball valve.

23.13 Pump/Dispenser Bases

23.13.1 Existing site installation:

Set the steel installation bases to the pumps/dispensers firmly and level, to the required height of 40mm above the surrounding pavement.

Concrete the bases in, leaving openings sufficient to allow free passage for all pipelines, conduits, and holding down bolts, and easy manipulation of tools. Provide sufficient concrete to ensure firm support for the dispenser.

Where legs are supplied in lieu of a base, they are to be held in position by a template until the concrete has set.

Bases shall be constructed to the specification of the pump/dispenser manufacturer. Generally, they shall be constructed from 65mm x 65mm x 6mm mild steel, angle mitred at the corners, and fully welded.

The Pump/Dispenser mounting holes are to be drilled or punched, not flame-cut,



and painted as per Section 12.

23.13.2 New site installation:

(Rev 03.1) The pump bases shall be an integral part of the under pump/dispenser containment sump. The combination unit shall be installed and maintained accurately in position, to both line and level, during pipework installation and backfilling by the fuel system contractor.

23.14 Electrical Service

(Rev 03.1) Refer Section 16 for details of the electrical power and communication services required and approved conduit/cabling systems.

23.15 Equipment Integrity Test

(Rev.07.8) The integrity of the UPSS will be tested on two (2) separate occasions during construction to confirm it is "tight" free of any leaks. First test point is 'pre-bury', when all the tanks, pipes and fittings are installed, complete and the pipe work and fittings are ready for burial. The second test ensures that there has been no damage to the UPSS by subsequent construction activity.

The EIT must be performed by an independent third party specialist. UPSS integrity testing provided by the installation contractor using traditional pressure monitoring and soapy water testing of all connections will not be accepted. The EIT performed on all Caltex UPSS shall be the Pascal Perfect System Test, performed by, Mass Tech Australia Pty Ltd., arranged by the Contractor and paid for by Caltex direct.

The Contractor shall be responsible for all liaison with the Caltex EIT Special Tradesman to arrange testing to suit the construction programme. The Contractor shall advice the Superintendent of each EIT date.

Commercial in Confidence

23.16 Protection during construction and after first stage Integrity Testing (Rev 07.8)



PROTECTION DURING CONSTRUCTION AND AFTER HYDROSTATIC TESTING

PRIOR TO BACKFILLING OVER PIPEWORK AN <u>AS CONSTRUCTED</u> DRAWING MUST BE PREPARED SHOWING LOCATION OF ALL PIPEWORK RELATIVE TO A DATUM (I.E EITHER CANOPY COLUMNS OR BUILDING)

Also ALL PIPE WORK AND ADJACENT SERVICES PIPES AND CONDUITS SHALL BE PHOTOGRAPHED TO SHOW ALL PIPE RUNS. THE TOTAL SYSTEM SHALL BE PHOTOGRAPHED WITH READILY IDENTIFIED SURFACE FEATURES SUCH AS CANOPY COLUMNS AND TANK ACCESS CHAMBERS TO ASSIST IN FUTURE LOCATION OF BURIED FUEL SYSTEM AND OTHER SERVICES

THE <u>AS CONSTRUCTED</u> DRAWING COULD BE IN THE FORM OF A MARKED UP PRINT TO BE HELD <u>ON SITE</u> BY THE <u>MAIN CONTRACTOR</u>. THIS WILL ENSURE THAT, SHOULD SAND HAVE TO BE PENETRATED FOR ANY REASON I.E. STAR PICKETS FOR FORMWORK ETC. EVERYONE IS AWARE OF WHAT IS UNDER THE SAND.

AREAS OF PIPEWORK TO BE ROPED OFF TO ENSURE NO MECHANICAL MACHINES I.E BOBCATS TRAVERSE PIPEWORK. THIS ALSO APPLISE TO TRENCHES FOR REMOTE FILL LINES, VENT LINES.

ANY DAMAGE TO PIPEWORK AFTER HYDROSTATIC TESTING CAUSED BY ANY OF THE ABOVE WILL BE THE RESPONSIBILITY OF THE MAIN BUILDING CONTRACTOR.

AS CONSTRUCTED DRAWING:-

"AS CONSTRUCTED" DRAWING & PHOTOS REQUIRED FROM CONTRACTOR BEFORE FINAL PAYMENT IS MADE.

Rev: 08.2 March 2008



23.17 Backfilling

(Rev 03.2) After final inspection and pressure testing, all pipework trenching shall be backfilled with materials in accordance with pipe manufacturer's written instructions.

Compact carefully over and around the piping system, using suitable tamping equipment. (Refer Section 4).

During the course of back filling operations, use sand bags for support, as required, to ensure that all pipes are installed in straight lines and uniform grades, without sags.

If the above is not complied, with all costs associated with any remedial work that may be required shall be met by the Contractor.

23.18 Paving

Refer to <u>Section 6</u>. For driveway paving restoration on existing sites, refer to <u>Section 23.24</u>

23.19 Pump/Dispenser Installation

23.19.1 New units

Inspection on arrival

Inspect dispensers on arrival for any surface damage, missing fittings and incorrect dressings. Take the serial numbers, and forward them to the Company for verification of site correctness.

Insert galvanised plugs in all pumps and dispensers, to prevent any possible spillage.

Safekeeping

Contractor is responsible for safe keeping of dispensers once delivery accepted. Dispensers shall be protected on receipt from supplier to final hand over to the Company. They shall be completely wrapped in plastic to prevent damage to exterior surface during the construction period. Special care is to be taken to guard against cement splashes while concreting adjacent to the dispenser.

Installation

Securely bolt Pump/Dispensers to the prepared bases.

(Rev 03.1) Check alignment, level and plumb lines. Correct any discrepancy by the use of metal or plastic packers. Under no circumstances shall wood or similar material be used as packers.

Disengage belts between the pump and motors (if fitted). These will only be made operational when ready for testing.

Testing

Check dispensers for proper dressing and connection to the correct grade of fuel. Circulate a minimum of 500 litres (back to tank) through each pump/ dispenser,



to check for meter/money readout variations. Thereafter, clean the strainers in the pump/dispenser.

Measurement test each pump dispenser for volume. This shall be carried out by the calibrating authority or licensed installer, using a certified container. Adjust pumps within the tolerance allowed by the relevant State authority.

Completion

Leave all pump dispensers in a clean and tidy condition on completion.

(Rev 03.1) Number each hose according to an agreed numbering system. The numbers shall be incorporated into the pump dressing. Only use pump/ dispenser manufacturer supplied numbers on units not dressed in standard Caltex or Ampol brand livery.

23.19.2 Replaced units

Remove superseded units from their bases, after:

- · isolating the power supply
- draining surplus product into a suitable container, and then
- sealing the pipework, with a galvanised metal cap or screwed plug.

Return units to the nominated storage location as soon as possible.

(Rev 03.1) Give a signed copy of the delivery docket to the Superintendent, immediately on receipt. This docket shall give details of site location, serial numbers, and any other pertinent information.

The Contractor is responsible for safe keeping of unit until delivered to storage.



23.20 Acceptance of Product

(Rev 97.1) Acceptance of product is normally the responsibility of the Company Business Manager.

The Contractor shall give a minimum of two (2) weeks notice to the Superintendent to arrange the delivery of product to the site.

(Rev 03.1) Immediately before product delivery, the Contractor shall:

- · give notice that all tanks and lines are clean and prepared
- check the dip stick as to the compatibility with the tank for calibration and length.
- For a new site receiving first fuel delivery:

Coordinate with the Superintendent to formally notify all other contractors working on the site that site hazard status will change to a 'live site'. Indicate the prohibited activities and potential extent of hazard zone(s).

On receipt of the product, all tanks are to be re-checked for water. This is to be removed before any further action is taken. The dispenser filters must be cleared of any foreign matter.

Supply and install standard colour disc driveway markers to AIP Code of Practice 'CP-5', to all dip, fill and vapour recovery points, using adhesive and expanding masonry anchors.

23.21 Commissioning the Fuel System

The Contractor shall be responsible for:

- ensuring that all lines and tanks associated with the site works have been properly installed and tested.
- double checking that:
 - all pumps have been installed level and adequately bolted down
 - pipe joints beneath the pump are properly completed, and
 - all electrical cables and connections to the pumps are properly installed and tested.

The Contractor shall achieve liquid prime to all pumps and run the pumps to observe and correct any electrical or mechanical malfunctions.

In summary, the Contractor shall be responsible for ensuring that:

- · all equipment has been brought up to full operating condition and
- the pumps are ready for meter calibration and final commissioning by the pump manufacturer.

This must be achieved before the Contractor leaves the site.

23.21.1 Testing Pipework and Tanks

(Rev 03.1) As part of the Contractors process, a third party System Integrity Test certificate



from an independent specialist shall be provided (refer clause 23.15 and Attachment A4). Test and specialist contractor shall comply with Section 6.5 of AIP CP4

Testing to be carried out in 3 stages:

- 1. Product Line Testing including under pump containment sumps
- Initial Tank, Syphon, fill, dip, vapour & vent line Testing including tank top access chambers and fill point box(s)
- 3. Final system precision testing

(Rev 08.2) The contractor shall witness all test and complete all remedial works to the UPSS required to pass the EIT

23.21.1.1 Product Line Testing

All new product lines shall be tested, by filling with water and applying pressure, prior to being buried, covered or enclosed to confirm there are no leaks.

Give adequate notice of intent to test the lines:

- a minimum of 3 days' notice for locations outside the Metropolitan area and
- one day's notice within the Metropolitan area.

Pressure Systems Completely isolate lines from tanks but

include ball valves and any installed flex

connectors

Suction systems Remove tank valves and fit Eskay isolating

valve to tank valve body. This valve is to be shut tight to isolate the pipe pressure

from the vented tank

- All lines must be tested back to the dispenser/pump to include all the under dispenser joints
- Tanks must be vented at all times to avoid excessive pressure being applied to the tanks
- All air pockets must be eliminated to validate line tests
- The lines shall hold pressure for 10 minutes to be accepted as sound
- All lines to be tested to 350kPa
- Pressure gauge to have a maximum scale reading of no more than 500kPa

On completion of the test, all lines should be fitted with 2 new 0-100kPa pressure gauges and be repressurised with water to 50kPa.



23.21.1.2 Initial Tank, Syphon, fill, dip, vapour & vent line Testing

- After all pipework including fill, dip, vapour & vent lines have been installed, the tank shall undergo a hydrostatic test.
- Tank to be filled to maximum safe level at least 12 hours before test commences
- Fill and vapour recovery fittings to be capped and all tank sockets plugged
- Product lines will still be pressurised from previous test carried out
- Water level in dip pipe shall be raised until total head above the bottom of the tank is 3.5m
- Pressure on the bottom of the tanks should not exceed 35kPa
- Level in standpipe to be observed for 30 minutes
- During this time, all visible fitting shall be inspected

A consistent loss of > 250ml in 30 minutes or any observed leak shall be taken to indicate that the system is leaking and the following steps should be taken:

- If leaks are visible, rectify problem at source
- If leaks are not visible, lower standpipe level to 100mm above tank shell and observe again
- If all other possible sources of leaks have been eliminated, immediate arrangements must be made to precision teat the tank

Upon completion of the test, the standpipe is to be left in situ and observed daily until just prior to commissioning. Top of standpipe must not be more than 3.5m above bottom of tank.

23.21.1.3Testing of Pump, Tank Sumps and Chambers and Fill Point Box

(Rev 07.8) Under pump containment and access chambers shall be hydrostatically or vacuum tested. On completion of the test all lines should be fitted with 2 new 0-100kPa pressure gauges and be re-pressurised with water to 50kPa. The fill point spill containment box(s) shall be hydrostatically tested. Any statutory required secondary containment on the fill point(s) shall also be vacuum tested for integrity



23.21.1.4Final System Precision Testing

After all earthworks and concreting are complete but <u>prior</u> to removal of ballast form tanks, the tanks and lines shall be precision tested.

Testing period ~ 1 day/tank

Pressure systems Product line to be temporarily connected

to tank socket. Connection to incorporate ball valve, flex connector and temporary "make up" pipe in place of the STP. This will allow the product lines to be included.

in the precision test

Suction system Suction line tank valves should be re-

installed prior to testing so that the product lines are included in the precision system

test.

The precision system test must prove the above system before any product is introduced into the tanks.

23.22 Interface of Work to Building Contract

(Rev 97.1) Where UPSS works are carried out at a site at the same time as other building works, the Builder is the principal Contractor on the site. The builder will at all times make sure that necessary assistance is given with levels and locations of pumps and tanks.

The fuel system contractor must coordinate his activities with the overall project construction schedule.

During installation, it will be the fuel system contractor's responsibility to see that other trades do not damage the UPSS work.

However, after the fuel system contractor has left site on completion of installation, the Builder will be responsible for seeing that no damage is permitted to tanks or pipelines (such as caused by the passage of vehicles and heavy equipment or the installation of the concrete paving). Any work required to rectify damage through builder's neglect is to be made by fuel system contractor and all accounts rendered to the builder.

(Rev 03.1) A final UPSS integrity test shall be carried out before handover and in the presence of the building contractor. The fuel system contractor shall provide a marked up plan indicating the lines of pipework as built to the building contractor immediately upon completion of the installation and backfilling of all excavation(s).

This clause is applicable irrespective of whether the fuel system installer is an "Associated Separate Contractor" or are "Special Tradesmen".



23.23 As Built Drawings & UPSS Certification

23.23.1 As Built Drawings & Photographs

(Rev 07.8) As built records of the UPSS shall be compiled progressively. The contractor shall keep on the site at all times, throughout the course of the works, a complete set of UPSS drawings. The Contractor shall enter any changes, alterations, underground or hidden features on this set of drawings. In addition the contractor shall photograph (digital photographs preferred) all of the UPSS in sufficient detail to identify all pipe runs, tanks, power and data cable runs and the location of any fittings relative to site features that will remain visible, e.g., the canopy columns fill point spill containment box and surface access points to the system.

On completion of the works, this set of drawings and photographs shall be presented to the Superintendent, covering all works under the Contractor's control.

These shall stipulate but not be limited to:

- (a) All new equipment and pipelines.
- (b) The existence of any underground services exposed during works that were previously unmarked on the supplied drawing.
- (c) A general description of ground conditions, eg. clay, high water table, sand, gravel, rock, etc.

Note: Final invoices shall not be approved for payment until "as built" drafts and the photographs are received.

23.23.2 UPSS Certification

(Rev 03.1) In addition to the as built drawings and photographs, the Contractor shall provide a complete set of UPSS documents as required by AIP CP4 and listed in the UPSS Installation Certification Check List, at the end of this Section.

Additional Items

Related to Work on existing operational UPS Systems

23.24 Pavement Opening & Restoration (Existing Sites)

23.24.1 Existing driveway

Driveway to be marked out, saw cut to a maximum of 80mm and the rest to be jack-hammered out. Layout of the slabs should be taken into consideration when locating the proposed additional tankage.

Where necessary, concrete anchor on the existing tankage shall be removed carefully so that no strain or pressure is applied to the connected pipework.

The Contractor must:

provide barricades to the excavation area to prevent unauthorised



disturbances by others

 in particular, ensure that no large machinery is driven over the tanks/lines area.

23.24.2 Existing services

Location of any electrical, water, air or telephone service should be anticipated and not severed by saw cutting or jack hammering. The Superintendent should be notified, so that an alternate service may be provided during installation. It is recommended that the Contractor employ a services location specialist for this purpose.

23,24.3 Excavation for Additional Lines

Trenches are to be marked out, saw cut to a maximum of 80mm and the rest to be jack hammered out. Trench width to be minimum of 600 mm, or as required, for the installation of steel dowels to the existing pavement edges. Refer Standard Drawing.

No mechanical excavation is allowed within 1.5 metres of any dispenser. Damage to services within this area will be the responsibility of the Contractor. No exceptions will be considered.

23.24.4 Driveway Paving Restoration (Additional Tanks)

Before cutting

Before the final saw cut to driveway slabs, backfill the tank excavation to underside of existing concrete slab.

Contractor shall agree with the Superintendent as to the extent of removal and restoration of the driveway, with the understanding that:

- a minimum allowance of 300mm beyond the tank, all round, shall be used for tender purposes
- · where possible, restoration shall be taken to existing slab joints
- new joints shall not be created within 1000mm of an existing slab joint.

During cutting

The final saw cut is to be straight, and full depth of the driveway slab.

Dowelling

Drill and dowel edge of existing slabs at 500 mm centres at mid-depth of slab. Dowels are to be:

- N12 bars or R20 dowels as appropriate
- minimum 400 mm long
- securely epoxy-grouted for minimum 200 mm into existing slabs.
- only installed along the long edge of openings and centre third of short edges, such that the maximum length of slab edge without dowels shall be 1500mm.

For all concrete work refer Section 6.



Where tanks fitted with man-holes are installed, accurately mark 600 mm square, exactly above centre of man-hole, with edging or jointing tool to surface of driveway slabs - refer <u>Section 6</u>.

Driveway Trenching Restoration (Additional or Alternations to Lines)

Final saw cuts

Do final saw cutting, after backfilling trench to underside of concrete. Final saw cuts are to be:

- straight, and
- full depth of the driveway slab to a minimum trench width of 600 mm.

Dowels

Drill and dowel driveway slabs, as above, using N12 bars. Stagger opposite dowels along the longitudinal cut of the trench.

Concrete

Provide 150 mm thick concrete, as above, with one layer of F82 mesh - consisting of at least two longitudinal bars. If trench width is necessarily less than 600 mm, as agreed with the Superintendent, then two (2) 10 mm rods or two (2) N12 bars shall be provided as longitudinal reinforcement. Refer Section 6.

Colour and finish of concrete shall match the surrounding pavement in either natural or black. Do not install new concrete paving to colour match any other colours e.g., yellow or green.

23.24.5 Contaminated Soil Removal

Refer Section 3.8

23.25 EIT of Modified/Replaced UPSS Components

(Rev 08.2) An EIT, as set out in Attachment A4 shall be performed on all pipework runs and/or fittings modified or replaced as part of dry work on a UPSS.

Note: The complete UPSS does not have to be tested, only those portions changed as part of the work. This requirement includes, but is not limited to part replacement of a pipe run.

- Installation of a fill point box with associated changes to the tank fill pipes
- Pipe work modification under a pump to accommodate a new pump/dispenser installation.



23.26 Replacement of Gaskets and Seals

(Rev.08.2) Where maintenance work and/or UPSS modification work requires the opening and reassembly of flanged and threaded connections all existing gaskets, seals o-rings, seal compounds shall be replaced with new as part of the work.
Where the existing bolts or other mechanical connectors forming part of the joint are corroded these connectors shall also be replaced with new as part of the work.

23.27 Tanks and Associated Works

23.27.1 Cathodic Protection

The Company's policy is to install "non-corrodible" tanks that do not require cathodic protection.

Should cathodic protection be required for existing steel tanks, refer to <u>Section</u> 26.

23.27.2 Temporary Abandonment of Tanks and Reinstatement to UPSS

(Rev.08.2) Dangerous Goods regulations nominate that tanks must be abandoned if taken out of service for more than 6 months. Out of service tanks that do contain product are classified as temporarily abandoned tanks. If a tank is abandoned temporarily for more than 4 months a full EIT, as set out in Attachment A4 shall be performed on the tank and all connected pipe work as part of the recommissioning. Only equipment that passes the EIT shall be returned to service. Note: All forecourt pump/dispenser components shall be inspected for leaks and the meters shall be recalibrated before the product circuits are returned to service.

23.27.3 Removal & Disposal of Existing Tanks

(Rev 07.8) Where a tank is to be permanently taken out-of-service, it shall, wherever possible be removed from the site

If removal from the site is considered to be a risk for any adjoining tanks or underground structures then the tank should be abandoned in-situ. Approval from the Superintendent will be required under these circumstances. (Refer to section 23.27.2)

23.27.4 Removal of Existing Tanks

(Rev 03.2) The following are typical procedures and precautions to be observed when removing tanks for disposal off -site, the list is not necessarily exhaustive:

- the Superintendent shall ensure that all work instructions and relevant work permits are issued to the contractor prior to decommissioning
- remove all possible product from the tank using the normal pumping system



disconnect and isolate dispensers and other aboveground pumping equipment

(Rev 04.2)

- withdraw the residual product via the dip or other suitable fitting, ensuring that all transfer equipment is electrically bonded to the tank if steel tank or earthed if non-metallic tank. Transfer residual product to sealed drums for safe disposal
- drain and disconnect all redundant pipework, withdraw any tank mounted equipment, and plug all openings including the vent. One plug shall have a 3mm hole to act as a pressure equalising vent
- complete the excavation to expose the total width and length of the tank, and remove concrete anchors if present.
- Prior to excavating, locate and isolate all electrical cables, product pipelines
 and gas lines, including LPG lines, in the vicinity. When site excavation
 requires the use of concrete cutting or breaking equipment, a work permit
 must be issued setting out the precautions to be taken
- The work should be planned so that as soon as a tank is fully exposed, it is immediately removed from the excavation and placed on to the transport vehicle. It should then be taken to the approved storage site without delay
- when lifting the tank, ensure that the lifting lugs on the tank are in good condition and that the crane has sufficient capacity to overcome the ground suction effects. When clear of the excavation, scrape off all loose soil and inspect the shell of the tank for defects. Cold patch or plug any holes prior to loading the tank on to the transport vehicle
- after removal, tanks may be transported in a vapour rich state and later degassed in a controlled environment, or the tank may be purged on site and transported in a vapour depleted state. The procedure chosen will be dependent upon the site characteristics.
- The tank must be transported upright with the vent at the top of the tank and be properly secured to the transport vehicle with webbing straps, and chocked against rolling
- All excavations should be backfilled as soon as possible after tank removal.
 Excavations left open overnight shall be protected so as to deny public access.

23.27.4.1 Off-site purging

(Rev 03.2)

When the tank is to be purged offsite, immediately after removal from the ground, permanently mark each tank with warning labels as follows:

"NOT GAS FREE NO SMOKING NO NAKED LIGHTS TANK HAS CONTAINED LEADED PETROL NOT SUITABLE FOR STORAGE OF FOOD OR LIQUIDS INTENDED FOR HUMAN OR ANIMAL CONSUMPTION"



Text to be at least 50mm high, label should be placed so it is visible from each side and both ends of the tank while it is being transported;

23.27.4.2 On-site purging

(Rev 03.2)

When on site purging is to take place the additional procedures must be carried out before removing the tanks as detailed above in section 23.26.1.1:

- drain and disconnect all piping, and remove and plug all fittings and internal tubes not required for the selected purging method;
- purge the tank of product vapour using one of the methods below. These are described further in in Appendix A of CP22:
 - Air Education Method
 - Diffused Air Blower Method
 - Water Displacement Method
 - Inert Gas Method

23.27.5 Abandonment in-situ

(Rev 03.2)

If an agreement has been made to abandon the tank in-situ, follow the procedure outlined above for purging on site (23.26.1.2). After purging, the following actions shall take place:

- prepare the tank for filling with Bacel Hardfoam, ensuring that the openings used will allow the material to flow to all parts of the tank without leaving any pockets
- fill the tank with the Bacel Hardfoam and then disconnect vent, and plug all tank openings
- drain and recover all residual product, and remove all redundant piping associated with the abandoned tank. Any pipe that is impossible to remove shall be isolated, drained and plugged at both ends.
- A written record shall be kept of the tanks abandoned in-situ giving details
 of location, size, and filling material used. Site operators and contractors
 should keep a copy of the record on site for reference.

23,27.6 Letter of Indemnity

(Rev 08.2)

All contractors accepting tanks for disposal must acknowledge the contents of each tank by signing a letter of indemnity. Tanks will not be released until this letter has been signed.

Examples and template letters can be found in Volume 2 Section 31

UPS System Installation Check List



Site Details		
Site Name	ID.	No
Address		
Site Owner		
Owners Address		
Fuel Supplier		
UPSS Operator (if different to Owner)		
UPSS Design Details		
UPSS Designer		
Site Classification	Equipment Level	
If other than Equipme release modelling stud	nt Level 1 – attach site classification study & dy	Attached Yes() No ()
Installation Data		: · · · :
Excavation	 location correct 	Yes() No ()
	size as per design	Yes() No ()
	 correct depth(s) 	Yes() No ()
	clean/ free from foreign objects/ water	Yes() No ()
	Hold down anchors/ slab in place	Yes() No ()
	photographs available	Yes() No ()
Tanks	as per design specification	Yes() No ()
	Sound to visual inspection	Yes() No ()
	Pre-installation testing complete	Yes() No ()
	 Cathodic protection installed (when required) 	Yes() No ()
	 Tank data sheet completed (see separate data sheet) 	Yes() No()
Pipework, fill points	Trench layout as per design	Yes() No ()
	Trench depth as per design	Yes() No ()
	Trenches clean	Yes() No()



	Pipes as per specification	Yes() No ()
	Fill points as per specification	Yes() No()
Installation Data		
	Piping separation distances as per design	Yes() No()
	Seals/joints sound to visual inspection	Yes() No ()
	Pre-installation pipe testing complete	Yes() No ()
	Slopes in pipework as per design	Yes() No ()
Secondary Containment	Where specified, installed as per manufacturer's specification	Yes() No ()
Systems (Rev 07.8)	Fili point spill containment device installed as per design	Yes() No ()
	 Hydrostatic and/or vacuum integrity test of Tank access chamber(s) Under pump/dispenser containment sump(s) Tank fill point spill containment box 	Yes() No()
	Certificate – Fill point resistance to earth for each fill point, the VR connection (if present) and the total assembly	Yes() No ()
	Access manholes installed	Yes() No()
Excavation/trench backfill	Bedding in place to depth specified in design	Yes() No ()
(Rev 04.2)	Where specified, hold down pads installed as per design	Yes() No()
	Backfill material as per specification Copy of backfill Grading Cert. supplied	Yes() No()
	No voids under perimeter of tanks	Yes() No()
	Sand backfill used over tanks Filter fabric installed Fabric type recorded	Yes() No()
	Depth of cover over tank as per design	Yes() No ()
	Compaction carried out	Yes() No()



	 Fill points & vapour recovery system earthed as per design 	Yes() No()
	 Fill points & vapour recovery system resistance to earth tested 	Yes() No ()
Leak Detection	Specified	Yes() No ()
System	Functioning	Yes() No()
Vapour Recovery	 Specified 	Yes() No()
System	 Functioning 	Yes() No()
Ground Water	Specified	Yes() No()
Monitoring Wells	Functioning	Yes() No ()
Tank Pit	Specified	Yes() No ()
Observation Wells	Functioning	Yes() No ()
Installation Data	WE SERVICE OF CONTROL OF THE SERVICE	41.421.4
Equipment Integrity	 Equipment Integrity Test twice: 	
Test (Rev 08.2)	 After complete installation and before burial/concreting etc. 	Yes() No ()
	 After completion of all construction work and before commence trading. 	Yes() No ()
	 LOB/MassTech Pascal Perfect EIT Report required 	Yes() No()
As-built drawings (<i>Rev 07.8</i>)	 As-built drawings in Auto CAD format supplied and stored for safekeeping 	Yes() No ()
Photographs (Rev 07.8)	 As-built photographs in electronic format supplied and stored for safekeeping 	Yes() No ()
Installation of UPS System	 Installation complies with AS1940 - current edition The Storage and Handling of Flammable Combustible Liquids 	

Underground	Petroleum	Storage	System

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•	-
1	_

Site Tank Data sheet

Site Details	Name			ID No.	
	Address				
	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5
Tank Manufacturer					
Serial Number					
Tank Type:					
Single wall					
Double Wall					
Jacketed Steel					
Date of Installation					
Name of Installer				, ,	
•					



Operation and Maintenance of UPS System Owner/Operator Checklist

A	tion	Frequency	Reference
Fil	l Point Spill Containment	Before and after tank fill	AIP CP4, Section 4.3.5
•	Check/empty any product/water into container		
٠	Store for appropriate waste disposal		
lny	ventory Control	T ALL STATE OF THE	AIP CP4, Section 7.3
•	Dip Tanks	Daily	AIP CP4, Appendix E
•	Record Dip Measurements	Daily	AIP CP4, Appendix E
•	Reconcile	Daily	AIP CP4, Appendix E
•	Complete Statistical Inventory Analysis	Forms as per system	
٠	Despatch Statistical Inventory Analysis	Forms as per system	
•	Retain Records		AIP CP4, Appendix F
•	Investigate discrepancies		AIP CP4, Appendix F
•	Dip and fill points secured	Daily	AIP CP4, Appendix F
Ta	nk Vent Points		
•	Check for/remove blockages	Weekly	AIP CP4, Appendix F
Di	p tanks for water	Weekly	AIP CP4, Appendix F
•	If water present, remove		
_	neck Tank Pit pservation Wells	Weekly	AIP CP4, Section 4.4.3
•	If water present, use bailer to get sample		
•	If no water, use portable vapour detection device for vapour detection		



•	If product/vapour present, investigate for leaks	

Action	Frequency	Reference
Groundwater Monitoring	Weekly	AIP CP4, Section 4.5.7
Wells		
Obtain sample, check for presence of product		
 If product present, investigate for leaks 		
<u>Dipstick</u>		
Check for wear	Monthly	AIP CP4, Appendix F
<u>Dispensers</u>		
Check calibration	As Manufacturer's specifications	AIP CP4, Appendix F
Leak Detection Equipment		
(Tanks and Pipes)		
Service	As Manufacturer's specifications or at least annually	AIP CP4, Section 8.4
Cathodic Protection Systems		
Service	As corrosion specialist advice	AIP CP4, Section 8.3



A4 EQUIPMENT INTEGRITY TEST

It is a requirement that the UPS System be tested for integrity of the System through the use of an Equipment Integrity Test before burial of the system and again after the completion of all site works.

Equipment Integrity Tests shall comply with all of the following:

- shall be capable of detecting a leak of 0.38 litres per hour with a probability of detection of at least 0.95 and a probability of false detection of 0.05 or less
- the EIT shall be conducted by a competent and experienced person who shall provide Certification in compliance with section 6.5 of AIP CP4
- the EIT shall be a nationally approved and certified method of EIT that meets, as a minimum, the requirements or certification standards of the USEPA and shall be conducted by a competent and experienced person.

Air pressure tests shall not be used as an EIT for Tanks once the Tank has contained product or used oil.

Only inert gases should be used to pressure test Tanks

Nitrogen gas pressure testing of Product Piping is sufficient to qualify as an EIT for Product Piping.

Records of Equipment Integrity Tests shall be retained by the Owner of the UPS system for the life of the UPS system and shall contain as a minimum, the following information:

- a) equipment identification
- b) location of test
- c) date of test
- d) results of test
- e) test method
- certification by testing company or individual that the test method complies with AIP CP4



MARKETING PROPERTY PROJECT SERVICES

DEPARTMENT STANDARD

STD-D 920.1

Fuel Systems and Equipment UPSS Design Feature Specification Site ID & name

Contents

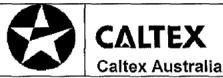
\triangleright	Section1	Purpose
>	Section2	Scope
>	Section3	Definitions
\nearrow	Section4	Responsibilities re the UPSS
\succ	Section5	Design & Acceptance Criteria
\triangleright	Section 6	Supporting Documents
\triangleright	Section 7	External References

Attachments Caltex Drawings/ Documents listed in Section 6

Instructions for completion of this document, prior to issue to a site owner/ developer:

- All items in blue highlighted text to be checked and modified to suit site specific details or deleted where not relevant to the site.
- The highlighted notes on this page are also to be deleted from document.

This UPSS Design Feature Specification has been prepared to alert developers/site owners to matters which are relevant when a UPSS is to be installed on a site that will be operated by and/ or branded Caltex. You should not act on the basis of any matter in this specification without considering, and if appropriate taking professional advice (including engineering and legal) upon the matter and your own particular circumstances. Caltex expressly disclaims any and all liability to any person in respect of anything and the consequence of anything done or omitted to be done in reliance upon any part of this publication.



1. Purpose (Rev 0 Initial Issue)

- A. Caltex is a major refiner of crude oil and marketer of petroleum products in Australia. Caltex has a valuable market reputation and its trade marks carry substantial goodwill.
- B. In conjunction with its marketing activities Caltex has developed this document to define the design criteria and acceptance criteria for a UPSS to be installed on a site that will be operated by and/ or branded Caltex. This document is not a design specification. This document is also not an installation specification.
- C. This specification may form part of the suite of documents issued by Caltex to a site owner who has entered into an agreement with Caltex to design and construct, or upgrade a site that will be operated by and/ or branded Caltex.
- D. This specification is intended for use by an industry accredited UPSS designer, as nominated in AIP Code of Practice CP4 and Australian Standard AS4897, engaged by the site owner/ site developer, to prepare the site specific UPSS design.

2. Scope

This specification defines:

- (a) The minimum UPSS equipment acceptable to Caltex at a Caltex operated and/ or branded site.
- (b) The certification and documentation required by Caltex to verify that the UPSS is 'fit for purpose' and ready to receive product.



3. Definitions

In this specification, unless the context requires otherwise:

AIP means the Australian Institute of Petroleum.

AIP Code of Practice CP4 means the code of practice titled *The Design, Installation and Operation of Underground Petroleum Storage Systems (UPSS), CP4 – 2002* developed by the AIP for UPSS design, installation and certification.

ATG means automatic tank gauging.

Caltex means Caltex Australia Petroleum Pty Ltd, its successors and assigns, and includes its related bodies corporate and agents where applicable.

Competent and Experienced Person means a person with appropriate practical and theoretical knowledge and actual experience to carry out a particular task safely and effectively. The person shall have the necessary ability and training and all the relevant qualifications, accreditations, certifications, licenses and approvals required for the particular activity with which he or she is concerned, an understanding of relevant statutory requirements and of this UPSS Design Feature Specification and an appreciation of the hazards involved. The person shall also be able to recognise the need for specialist advice or assistance when necessary and to assess the importance of the results of examinations and tests in the light of their purpose.

Equipment Integrity Test or **EIT** means a test conducted to evaluate whether a UPSS is Leaking to the Environment, or is not providing containment as originally designed

Equipment means the minimum equipment requirements for a Caltex site UPSS as determined by Caltex from time to time.

Fuelling Position means the space immediately adjacent either face of a forecourt dispenser, able to accommodate a single vehicle while refuelling (refer also canopy/ forecourt design and terminology diagrams)

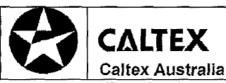
Head Lease or **H/L** means a lease entered into by Caltex with another entity to operate and/ or brand a Site as a Caltex site for a period of time, defined in the lease.

Leak means any loss of Product or used oil from a UPSS because the UPSS was not providing full and continuous containment.

Leak Monitoring means the process provided to detect a Leak in the equipment of a UPSS to the performance requirements specified.

Multi Product Dispenser or **MPD** means a forecourt dispenser able to dispense more than two (2) fuel Products to a customer vehicle where the fuel supply is via STPs separate and remote from the dispenser.

Multi Product Pump or MPP means a forecourt dispenser able to dispense more than two (2) fuel Products to a customer vehicle where the fuel supply pumping equipment is contained within the dispenser body.



Non-corrodible Piping means piping that is compatible with one (1) or all of the range of products it will contain and constructed from any of the following materials:

- (a) fibre-reinforced thermosetting resin composite; or
- (b) flexible plastic which meets the requirements of UL 971, or an equivalent standard in terms of the protection of the environment and human health and safety; or
- (c) such other material and corrosion protection method that is no less protective of the environment and human health and safety than the above options.

Non-corrodible Tank means a Tank that is compatible with one (1) or all of the range of Products it will contain and constructed from any of the following materials:

- (a) fibre-reinforced thermosetting resin composite; or
- (b) steel inner wall and fibre-reinforced thermosetting resin composite outer wall with an Interstitial Space between the walls; or
- (c) such other material(s) and corrosion protection method that is no less protective of the environment and human health and safety than the above options.

PLLD means integrated electronic pressure line leak detection. The PLLD equipment is integrated to the STPs and ATG on a site.

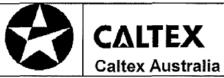
Product means a single substance or mixture of at least 70% hydrocarbon by volume, refined from crude oil, with or without additives, that is used, or could be used, as a fuel or lubricant and is liquid at standard conditions of temperature and pressure.

Product Piping means piping that routinely contains Product. For the purposes of this specification, piping that provides tank venting, connection to the vapour recovery point(s) or connects the fill point to each tank are not classified as Product Piping.

RO/RO or Retailer Owned/ Retailer Operated means a site that is branded Caltex but owned and operated by an independent entity under a legal agreement between Caltex and that entity.

Site means any property containing all or part of an UPSS.

Site Classification means the classification, based on potential for impact on the environment and/ or on human health and safety, assigned to a Site in accordance with Section 2 of AIP CP4. Sites with a high, medium and low potential for impact are assigned Class A, B and C respectively.



Spill (Spilled) means any loss of containment of Product or used oil from an UPSS during:

- Product or Used Oil transfer, delivery, or removal; (a)
- UPSS operation; (b)
- UPSS maintenance or testing; or (c)
- UPSS repair, re-use or closure.

STPs mean submersible turbine pumps. These pumps are installed within the Tanks.

Tank means a container intended for the storage of Product or used oil and remaining permanently in place once installed.

ULP means unleaded petrol.

Underground Petroleum Storage System or UPSS means one or more completely or partially buried tanks that contain or are intended to contain Product or used oil and includes Leak Monitoring Systems and all Product Piping to, from or associated with the Tanks and up to the inlet port of the forecourt dispensers.

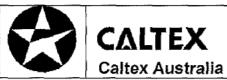
VR means vapour recovery. Stage 1, or VR1, covers collection & containment of vapours Rev: 08.1 displaced when delivering petrol to an underground storage tank. Stage 2, or VR2, covers collection & containment of vapours displaced from a vehicle petrol tank when delivering petrol into a vehicle.

Other terminology, not specifically changed by this specification shall have the same meanings as in AIP Code of Practice CP4 and/or AS 4897.

Interpretation

- In this UPSS Design Feature Specification any reference to:
 - (a) one gender includes the others;
 - the singular includes the plural and the plural includes the singular;
 - a person includes a body corporate:
 - (d) a party includes the party's executors, administrators, successors and assigns;
 - a statute, regulation or code or provision of a statute, regulation or a code (Provision) includes:
 - that Provision as amended or re-enacted; (i)
 - (ii) a statute, regulation, code or provision enacted in replacement of that Provision; and
 - another regulation, code or other statutory instrument made or issued (iii) under that Provision:

Page 5 of 17



- (f) money is to Australian dollars, unless otherwise stated;
- (g) clauses, subclauses, paragraphs, schedules, annexures and appendices are to clauses, subclauses, paragraphs, schedules, annexures and appendices in this UPSS Design Feature Specification;
- (h) anything (including any amount) is to the whole and each part of it;
- writing is to any method of producing words in a visible form (including in electronic form);
- (i) "including" and similar expressions are not words of limitation;
- (k) where a word or expression is given a particular meaning, other parts of speech and grammatical forms of that word or expression have a corresponding meaning; and
- (I) headings and any table of contents or index are for convenience only and do not form part of this UPSS Design Feature specification or affect its interpretation;

Parties

Unless otherwise specified in this UPSS Design Feature Specification, where an obligation under this Specification binds more than 1 person, or a representation, acknowledgment or warranty is made by or on behalf of more than 1 person, that obligation, representation, acknowledgement or warranty binds each of those persons separately and any 2 or more of them jointly. An obligation, representation or warranty in favour of more than 1 person is for the benefit of them separately and jointly.

Relationship of parties

Nothing in this UPSS Design Feature Specification constitutes a partnership, joint venture, agency or other form of fiduciary relationship between the site owner and/or developer and Caltex except where and to the extent that an agency relationship is expressly created.

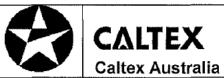
No party has the power to bind any other party except as authorised by this UPSS Design Feature Specification.

4. Responsibilities in relation to the UPSS

4.1 Caltex

Caltex is responsible for:

- (a) issuing UPSS Design Feature Specification, complete with site specific details;
- (b) communicating and informing the site owner/ developer of this specification as early in the UPSS design phase as possible, so that the design criteria are met or exceeded;
- (c) reviewing the proposed fill point location(s) for operational safety; and



(d) viewing the EIT on the UPSS at pre bury and again at completion of site construction prior to delivery of Caltex product.

4.2 Site Owner and/or Developer

The site owner's and/or developer's responsibilities include, but are not limited to:

- (a) engaging an industry accredited UPSS designer;
- (b) ensuring that the UPSS designed and constructed can be operated safely, including the fuel deliveries to the UPSS;
- (c) ensuring the UPSS is designed and constructed in compliance with all statutory requirements and to meet, or exceed the criteria set out in this specification;
- (d) arranging the EIT on the UPSS at pre bury and again at completion of site construction prior to delivery of Caltex product; and
- (e) collecting, collating and maintaining all the UPSS compliance records, as set out in AIP CP4 and listed in Section 5.4 of this specification.

5. Design and acceptance Criteria

Rev. 08.1 The new UPSS at a Caltex operated and/ or branded site will be:

- a. a pressurised system;
- b. complete with integrated PLLD;
- c. fitted with individual product isolation ball valves at each product connection to each forecourt dispenser (additional to the shear valve);
- d. fitted with ATG to each tank/ tank compartment;
- able to store and deliver up to four (4) separate petrol products/ grades and a minimum of one (1) diesel product;
- f. fitted with VR1 where required by local regulation and piped ready for VR2 to all petrol dispensers.
- g. product tanks will be manufactured with compartments to provide flexibility of storage to suit changes in product demand over the life of the UPSS; and
- h. labelled at all fill, dip and vapour recovery points to industry standards, as set out in AIP Code of Practice CP5 – "Pipeline, Road Tanker Compartment and Underground Tank Identification".

Where the proposed site has a separate dedicated diesel fuelling facility then two (2) additional grades of diesel are required.

The safe operation of the site is critical to Caltex. In addition to all the requirements of the Australian Dangerous Good Code (ADG) covering the delivery tanker discharge position and



movement, the UPSS designer must incorporate the operational safety of the delivery tanker driver while discharging fuel to the site tanks.

Without limitation this includes locating the tank fill point spill containment box to:

- (a) minimise disruption to site operation; and
- (b) provide clear view of the tanker driver and discharge points for majority of customers driving to the pumps.

Caltex will review the proposed fill point location(s) with the site owner/ UPSS designer.

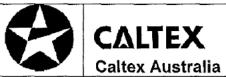
5.1 Equipment

Caltex requires all new UPSS to be constructed to meet or exceed AIP CP4 Equipment Level 1

LOVO	Level I		
	ltem	Generic Description of Level 1 Equipment Options	
Turns	Product Tank	 Preferred - Double wall fibreglass tank with liquid interstitial space monitoring system; Fibreglass jacketed steel tank with vacuum interstitial space monitoring system. Each tank compartment shall have a minimum of 5 off nominal 4 inch bungs mounted on the access point lid plus 2 off additional bungs direct in the tank compartment shell, external to the access point mounting. Single wall fibreglass tanks and steel tanks with cathodic protection are not acceptable on Caltex operated and/ or branded sites 	
2	Product Piping (Including Syphon pipe links between tanks/tank compartments)	Non-corrodible and secondary contained pipe connecting the tank(s) to the forecourt dispenser(s). Proprietary thermoplastic piping system from a single manufacturer with UL certification, near zero permeability coextruded lining to the primary pipe and written warranty specifying minimal elongation in service. Caltex is currently aware of only two (2) such pipe systems available in Australia, NUPI and Petrotechnik UPP.	

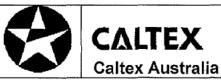


3	Other Piping	Non-corrodible single wall pipe for the tank fill pipe, tank vent pipe and/ or vapour recovery pipe. Proprietary thermoplastic piping system from a single manufacturer with UL certification, near zero permeability lining to the primary pipe and written warranty specifying minimal elongation in service. Caltex is currently aware of only two (2) such pipe systems available in Australia, NUPI and Petrotechnik UPP.
4	Tank access chamber(s)	Proprietary non-corrodible, non-metallic unit(s) with water tight lid & riser extension joint(s).
		Preferably of same material as tank outer wall, installed integral with the tank wall.
		Sump to be of same, or superior, permeability grade as secondary containment piping.
5	Dispenser	Non-corrodible, single wall, single piece, moulded structure.
	sump	Polyethylene unit with integral galvanised dispenser base mounting frame. Sump to be of same, or superior, permeability grade as secondary containment piping.
		Dispenser mounting frame shall include adjustable frame elements to allow positioning of the shear valves to sult different makes of dispenser. Adjustment is required on the long axis of the sump and laterally on the cross members.
6	Sump and Chamber pipe penetration	Expanding cuff type bulkhead with all boot components within the sump; OR
	seals	Electrofusion welded boot/seals.
		Units that are bolted through the sump wall should be avoided
7	Fill Point Spill Containment box	Double box system, metallic, corrosion resistant with inner box separately removable from the outer pavement mounting box/ frame
8	Electrical Conduit system	Non-corrodible single wall proprietary thermoplastic conduit system from a single manufacturer with UL certification. Preferred that the conduit is sourced from the same supplier as the pipe system.
		Caltex is currently aware of only two (2) such conduit systems available in Australia, NUPI and Petrotechnik UPP

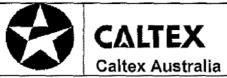


ATG	Veeder Root TLS 350R system – equivalents are not acceptable due to interface issues with the Caltex wet stock management systems. Also the Veeder Root model includes options for integral PLLD to the STPs and remote install delivery tanker information station					
Earthing and Equipotential Bonding	Integral earthing wire connections between all fill points in containment box to separate earth stake, with tested in-situ resistance.					
	Where required by electrical standards and the installed location of the UPSS equipotential bonding wire grid connecting all required components within the hazardous zone.					
Overfill Rising float 'ball' valve on the vent pipe (or combination vent/ pipe) connection to tank.						
	Overfill prevention (flow control in the tank fill pipe) is not required by Caltex at this time. If you choose to install an overfill prevention device it must not reduce the delivery discharge rate to the tank during normal delivery.					
Hydraulic Isolation Valves	Stainless steel ball valve to suit line size with teflon seat (or equivalent).					
at STPs and Dispensers	One (1) valve required on each product connection to a dispenser, located below the shear valve and one (1) required at each STP connection. These valves are essential safety features to facilitate maintenance of the UPSS and replacement of forecourt dispensers.					
Driveway covers for Access	Treloar 2 piece cast alloy lid with integral access hatches, as required, or equivalent, that complies with current OH&S single person safe manual handling limits.					
Chambers	Concrete filled cast metal frame covers are not acceptable on Caltex sites.					
Driveway	Proprietary manufactured units referred to as 'lock boxes' ~					
access points	Minimum 250mm diameter galvanised steel checker plate lid mounted in a circular metal frame/ unit ready for mounting into the concrete driveway paving. The lid shall be mechanically attached to the frame at one point to reduce the possibility of theft or being dislodged by vehicles/ pedestrians, but still permit easy hand opening without specialist tools or disconnection.					
	Earthing and Equipotential Bonding Overfill protection Hydraulic Isolation Valves at STPs and Dispensers Driveway covers for Access Chambers Driveway covers for other					

Reference to fuel isolation valves added to Clause 5.



15	Tank Pit Observation Well	Refer AIP CP4, Appendix C Figure 2. Recommend use UPVC (UV stabilised PVC) pipe, not PVC as shown in Fig. 2, to minimise potential impact on water samples from PVC degradation, also, must not have any solvent glued fittings as the glue can contaminate ground water leading to false readings. Preferred material is FRC (Fibre Reinforced Cement) pipe.
16	Ground water Monitoring wells	Only required on Class A sensitivity sites. These wells are located remote from the tank pit in natural ground. Materials and construction similar to tank pit observation well using either a double pipe system with coarse aggregate (same as tank pit back fill) between pipes or a geo-textile fabric sleeve over single pipe as filter to keep the monitoring well clear for sampling.



5.2 Product Storage

The minimum storage compartment in any product tank shall be 20kL. This allows good flexibility for product delivery and assists in scheduling full tanker load deliveries to a site. By providing 20kL minimum of storage for each product it is possible to deliver two (2) tanker compartments of a product, nominal 16kL of petrol, without the tank being empty and the site unable to provide that product to their customers.

As noted in the equipment requirements table each tank/tank chamber requires:

- (a) 5 off nominal 4 inch bungs mounted on the access point lid;
- (b) plus 2 off additional bungs direct in the tank compartment shell, external to the access point mounting

The distribution of connections and fittings on tanks that is preferred is set out below.

Connections onto the access way lid within the access chamber (max. 5 off):

- (a) STP;
- (b) Fill;
- (c) Vent/ vapour recovery; and
- (d) Syphon link pipe(s)

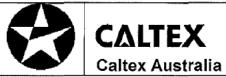
Connections via the tank chamber wall direct (max. 2 off):

- (a) ATG;
- (b) Dip.

This arrangement places all connections with highest probability of maintenance access and potential for Product leaks within the accessible secondary contained area.

Pipes and equipment should be installed to maintain access to any spare bungs (bungs not used at initial construction).

Connection of the remote fill pipe to the tank must include capacity to isolate and test pipe integrity. This is required during construction of the UPSS and periodically during the service life of the UPSS. One method of meeting this requirement is to use the Eskay F1075 Fill line isolation fitting.



5.3Certification and Documentation

The site owner shall provide a complete set of UPSS documents as required by AIP Code of Practice CP4 and as detailed, and as listed in the table under.

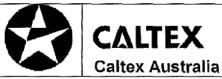
The integrity of the UPSS will be tested on two (2) separate occasions during construction to confirm it is 'tight', free of any leaks. First test point is 'pre-bury', when all the tanks, pipes and fittings are installed, complete and the pipe work and fittings are ready for burial. The second test point is when all backfilling and pavement construction over the tanks and pipe work has been completed. This second test ensures that there has been no damage to the UPSS by the subsequent construction activity.

The EIT must be performed by an independent third party specialist. *UPSS integrity testing provided by the installation contractor using traditional pressure monitoring and soapy water testing of all connections will not be accepted.* The EIT performed on Caltex UPSS shall be the equivalent of the Pascal Perfect System Test, performed by, MassTech Australia Pty Ltd.

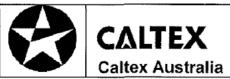
On completion of the works, a complete set of "As-built" drawings and photographs (digital format photographs required) of the UPSS in sufficient detail to identify all pipe runs, tanks and the location of any fittings relative to site features that will remain visible, e.g., the canopy columns and fill point spill containment box, shall be provided to Caltex.

The following documentation must be provided to Caltex in accordance with this Compliance Documentation Checklist

		Supp	olied
Document	Comment	Yes	No
Site Owner details	Include business name(s) contact person(s) address, phone and email		
UPSS Designer details	Include business name(s) contact person(s) address, phone and email		
Site Environmental Sensitivity Classification	Refer AIP CP4 Section 2 Include documentation to justify the assigned classification and qualifications of person/ organisation assigning the classification		



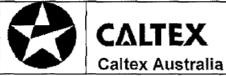
Completed Tank delivery check list	Form/ report template provided by tank manufacturer	
Completed Caltex UPSS	Template form provided by Caltex	
master record sheet,	This includes reference to:	'
incorporating EIT reports	the manufacturer of all proprietary equipment included in the UPSS	
	UPSS component installation dates	
	test reports for the EITs performed on UPSS	
Compliance statements from UPSS Designer &	Installation complies with AS1940 - current edition	
Installation Contractor(s)	Installation complies with or exceeds the applicable requirements of AIP CP4	
Electrical test reports	These tests cover:	i
	fill box earth resistance	į
	equipotential bonding continuity and resistance	i
Hydrostatic test reports	Hydrostatic integrity confirmation is required for all:	
	tank access chambers	
	under pump containment sumps	
	tank fill point spill containment box	
ATG	Supplier commissioning report	
Tank Manufacturers warranty	Obtained from the manufacturer	
Copies of warranties for any proprietary equipment installed in the UPSS	Obtained from the manufacturer	
Copies of operation and maintenance manuals for any proprietary equipment installed in the UPSS	Obtained from the manufacturer	



Meter calibration certificates	Where the site owner supplies the dispensers for the site they will be responsible for the initial calibration of all product meters.	
As- built drawings	Supplied as AutoCAD format dwg files and pdf files of the as built drawings.	
UPSS photographs	Digital photographs required in sufficient detail to identify all pipe runs, tanks and the location of any fittings relative to site features that will remain visible.	

5.4 Caltex Contacts

To review any of these requirements or to discuss issues relating to the UPSS design the first contact should be your local Caltex Marketing Property Portfolio Manager or Project Services Project Manager.



6. Supporting Documents

Caltex H/L or Agreement to Lease (where the Lessor has responsibility under the Lease for the UPSS

OR

Caltex RO/RO Schedule of Responsibilities

Existing site Plan - copy Attached

Proposed Site Plan - copy attached

Forecourt/ Canopy design Diagrams/ drawings - copies attached

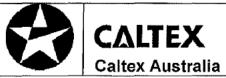
These drawings provided for guidance only showing range of dimensions used to layout Caltex forecourts. The information is not provided as mandatory design standards please arrange discussion of this information between your designers and Caltex representatives.

UPSS Master Record Sheet (Excel format template for completion) - copies attached

7. External References

For more information, refer to the current edition of:

- AIP CP4 (2002 Edition)] Design, Installation and Operation of Underground Petroleum Storage Systems.
- AIP CP5 Pipeline, Road Tanker Compartment and Underground Tank Identification
- AS1020 The Control of Undesirable Static Electricity.
- AS/NZS 1940 The Storage and Handling of Flammable and Combustible Liquids.
- AS/NZS 2430.3 & 60079.10 Classification of Hazardous Areas.
- AS 3000 Australian/New Zealand Wiring Rules.
- AS 4897 Design, Installation and Operation of Underground Petroleum Storage Systems
- AS 1596 (for sites with LPG facilities) The Storage and Handling of LP Gas.
- Australian Dangerous Goods Code.
- Tank Manufacturer's Handling & Installation Instructions.
- Petroleum Industry Contractors Association (PICA)
 RP 001 Recommended Practices for Installation of



Underground Liquid Storage Systems.

Note: attach only drawings relevant to the site specific development

Attachments

Caltex H/L or Agreement to Lease Schedule of Responsibilities

Caltex RO/RO Schedule of Responsibilities

Existing Site Plan - xxxxxxx

Proposed Site Plan - xxxxxxx

Forecourt/ Canopy design Diagrams/ drawings

STD-A301 Tandem Forecourt Plan with passing lanes

STD-A302 Starter Gate Forecourt Plan with passing lanes
 STD-A303 Starter Gate Forecourt Plan without passing lanes

STD-A304 Tandem Details Sheet 1

• STD-A306 Starter Gate Details

STD-A307 Truck Forecourt Plans
 STD-F101 Fuel System Site Plan – 3 tanks & Tandem 6 Canopy

STD-F120 Product Pipe – General Arrangement

UPSS Master Record Sheet

- Sample Blank Record Sheet (Excel format provided for completion)
- · Sample Completed Record Sheet

Section

Groundwater monitoring

"Groundwater monitoring should be undertaken biannually (twice per year) where groundwater monitoring wells are installed" (DECCEW, 2011). Additionally, groundwater monitoring wells should be sampled and analysed within 30 days of commissioning.

1.0 Groundwater Monitoring Requirements

1.1 Caltex 6 Monthly Groundwater Monitoring Program

Caltex has a National Groundwater Monitoring Program in place which involves the gauging of groundwater monitoring wells at all Caltex service station Sites located across Australia on a 6 monthly basis (twice per year) including this Site.

Attached is a plan showing the locations of existing groundwater monitoring wells and a groundwater monitoring test record sheet that is completed during each gauging event.

1.2 Monitoring of Newly Installed Wells

Within 30 days of installation, groundwater monitoring wells should be sampled and analysed for the parameters outlined in the table below.

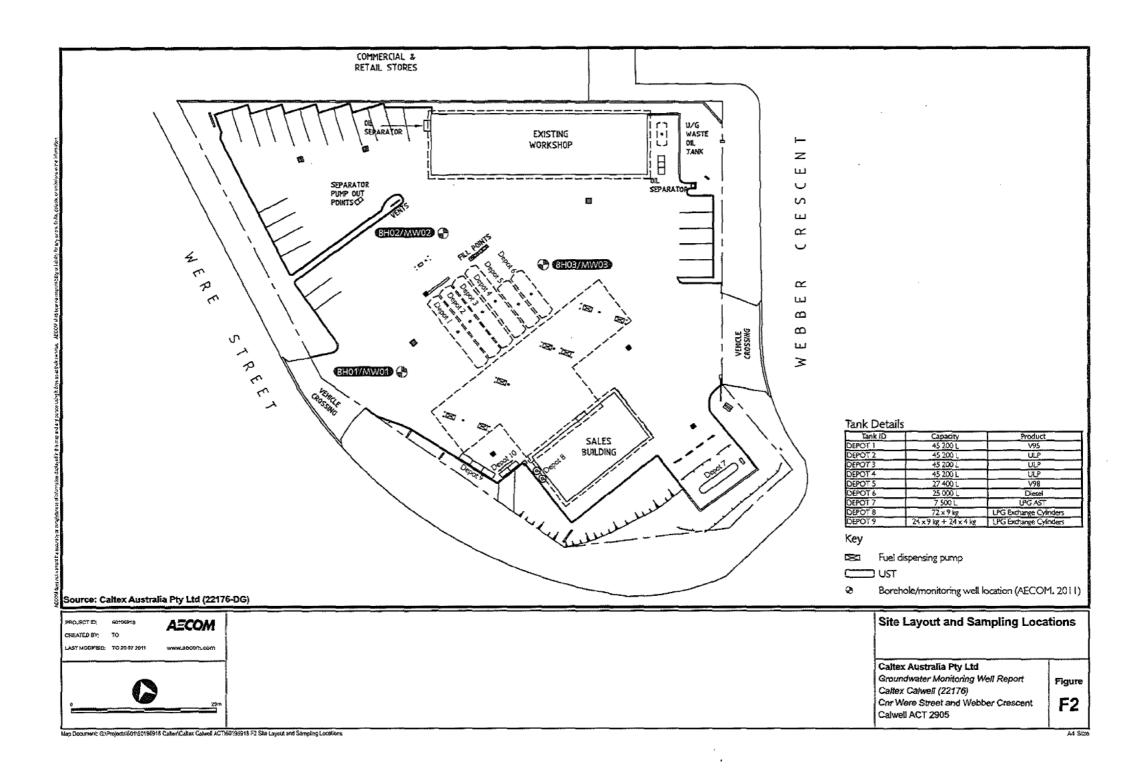
Parameter	Criteria
Depth to water	-
рН	6.5-8.5
Total Petroleum Hydrocarbons C6-C9 C10-C40	No criterion set at this time 600 µg/L
BTEX (Total) Benzene Toluene Ethyl Benzene Xylene	300 µg/L 300 µg/L 140 µg/L 380 µg/L
Lead (Total)	5.0 µg/L

[&]quot;The EPA must be notified of any exceedance of the above groundwater parameters identified by groundwater monitoring. An exceedance of the groundwater parameters may indicate a leak" (DECCEW, 2011)

1.3 Ongoing Monitoring Requirements

Following the initial groundwater sampling round, the groundwater monitoring well network must be sampled and analysed for the parameters stated in the above table on the following basis:

- Bi-annually; and
- As soon as practicable after:
 - · The discovery that the groundwater may be contaminated by petroleum; and
 - The discovery (whether through the loss monitoring procedure for the system or otherwise) that the system has a leak.



Groundwater monitoring test record sheet Six-monthly visual inspection

						Six-monthly visu	al inspection											
Caltex Site ID:										ĺ	Name of	PB gauge	r:					
Site address:	ite address: Interface Probe Model:																	
Oil / Water se	parator on-sit	e? Is it operating	g?								Interface	Probe Co	ertification Date	:				
Kerosene tank	on site? Is it	operating?																
Waste oil tank	on site? Is it	operating?									Date (dd/	/mm/yy):						-0220
				DEPTH (see Note 1)									PROBLEMS 8	DAMAGES				
WELL ID	Previous	Well type (MW, TP, Dual	ТІМЕ		QLD ONLY - PID testing of tank PSH or Shee pit observation confirmed		I detected for		be found	amaged	ld not ned	naged or	ction (eg r) not th records	dor full of ants	Consuma bles used	1 3 1	Other issues	

1				DEPTH (see Note 1)			ļ	1	1	PROBLEMS & DAMAGES										
WELL	Previous well numbe	Well type (MW, TP, Dual Purpose)	ПМЕ	TO PSH	TO WATER	QLD ONLY - PID testing of tank pit observation wells which are found to be dry	PSH or Sheen confirmed visually?	PSH characteristics (colour, clarity, odour)	PSH or Sheen detected for the 1st time?	PSH sample collected for analysis?	Well cannot be found	Wellhead damaged	Well could not be opened	Well cap damaged or missing	Well construction (eg diameter) not consistent with records	Well flooded or full of sediments	- 1	Consuma bles used (ie well caps, bolts, or other)	More repairs required	Other issues (safety risk, trip hazard, etc)	(damage,
									-				-								
												<u> </u>					_				
		<u> </u>																			
	1	1							-								-				1

Note 1. in m BTOC (3 decimal). Write "0" if no product is detected in the well or if the well is dry (ie no water)

ADD	DDITIONAL COMMENTS	1
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Mr Steve Ferguson Caltex Petroleum Pty Ltd — Calwell GPO Box 3916 Sydney NSW 2001

Dear Mr Ferguson

ENVIRONMENTAL AUTHORISATION - NOTIFICATION OF GRANT UNDER SECTION 50 OF THE ENVIRONMENT PROTECTION ACT 1997

I am writing to notify you that an environmental authorisation, subject to the conditions set out in the attached Authorisation No. 0748 has been granted to you under Section 49(1)(a) of the Environment Protection Act 1997 (the Act).

The authorisation has been granted for an unlimited period or until surrendered by yourself or cancelled or suspended by the Authority.

Please note that under Section 11 of this authorisation, you are required to inform the Authority of the names and telephone numbers of at least two senior employees within five working days of the date of this authorisation. In addition, under Section 17 of this authorisation you must prepare and submit an Environment Management Plan acceptable to the Authority within three months of the date of this authorisation.

Under Section 19 of the Act copies of the application and authorisation documents are available for public inspection, during business hours, at the office of the Environment Protection Authority, Macarthur House, 12 Wattle Street, Lyneham ACT.

The grant of this authorisation will be advertised in the Canberra Times and the Legislative Register.

An authorisation is subject to an annual fee under Section 53(1) of the Act. An invoice will be sent requesting payment.

If you permanently cease to conduct the authorised activity, under Section 67 of the Act you must notify this office in writing within ten working days of that cessation.

Should you wish to discuss any issues further please contact me on (02) 6207 5732.

Yours sincerely

Sch 2.2(a)(ii)

Hilary Rossow
Industry Liaison Officer
Environment Protection
20 October 2011



Authorisation No. 0748

AUSTRALIAN CAPITAL TERRITORY

ENVIRONMENTAL AUTHORISATION UNDER THE ENVIRONMENT PROTECTION ACT 1997

The Environment Protection Authority (the Authority), pursuant to section 49(1)(a) of the Environment Protection Act 1997 (the Act), hereby authorises:

Name:

Caltex Petroleum Pty Ltd

ABN: ACN: 11 000 007 876 000 007 876

Street:

1 Webber Crescent

Suburb: Postcode: Calwell

2905

to conduct the following activity/activities:

The operation of a facility designed to store more than 50m³ of petroleum products;

On:

Block:

Ω

Section:

787

Suburb:

Calwell

subject to the conditions set out in **Schedules 1 and 2** attached, for an unlimited period or until earlier surrendered by **Caltex Petroleum Pty Ltd** or cancelled or suspended by the Authority.

This is a standard environmental authorisation. This authorisation will be reviewed annually.

Delegate for the Environment Protection Authority

Dated this

19th day of OCTOBER

2011

SCHEDULE 1: GENERAL CONDITIONS

Definitions

Controlled Waste: as defined in the National Environment Protection Measure (Movement of Controlled Waste between States and Territories) Measure.

Groundwater Monitoring Bores: are the bores identified in the Environment Management Plan required under Section 17 of this schedule (the Environment Management Plan will detail any existing or proposed bores on individual sites).

Operation: includes the delivery, storage and dispensing of petroleum products.

Plant and Equipment: includes drainage systems, infrastructure and pollution control equipment associated with the delivery, storage and dispensing of petroleum products.

Regulated Waste: as defined in Schedule 1, Section 1.1A of the Environment Protection Act 1997.

Site: Block 8, Section 787, Calwell

Stormwater System: as defined in Schedule 1, Section 1.1 of the *Environment Protection Act 1997.*

Waterway: as defined in Schedule 1, Section 1.1 of the Environment Protection Act 1997.

Working day: a day other than a Saturday, or Sunday, a public holiday or a day that is a holiday for public servants.

1. Compliance with Environmental Authorisation

The Authorisation holder shall:

- a) comply with any Authorisation condition immediately where no time for compliance is stated; nature of contamination and chemicals of concern;
- b) notify the Authority in writing within 2 working days of becoming aware of:
 - i. any event that causes, or is likely to cause, any Authorisation condition to be exceeded; or
 - ii. any monitoring data that show that a condition of the Authorisation has been exceeded.

2 Activities must be carried out to protect the environment

2.1 All activities carried out on the site shall be carried out in such a manner that adverse impact on the environment is minimised.

6.2 Further to the provisions of section 6.1, special requirements are applied to the abandonment of any aboveground or underground tanks and should the need arise, the Authorisation holder agrees to contact the Authority and:

Office of Regulatory Services Workcover Workplace Safety Inspectorate

Telephone:

02 6207 0200

Facsimile:

02 6205 0336

Block B, Level 3 Callam Offices Easty Street

WODEN ACT 2606

(GPO Box 158 Canberra ACT 2601)

7 Reporting of environmental harm

- 7.1 In the event that an incident has caused, is causing or is likely to cause material or serious environmental harm, whether the harm occurs on or off the site, the Authorisation holder, their employee or agent shall report the incident to the Authority immediately after it becomes known to the Authorisation holder or to their employee or agent in accordance with clause 7.2.
- 7.2 The incident shall be reported to the Authority by telephoning Canberra Connect on 13 22 81 during and outside business hours.
- 7.3 The Authorisation holder shall notify the Authority in accordance with clause
 7.2 immediately after becoming aware that land is contaminated in such a way as to present, or to be likely to present
 - a) a significant risk of harm to human health; or
 - b) a risk of material environmental harm or serious environmental harm For the purposes of this section, the presence of phase separated hydrocarbon in groundwater constitutes material or serious environmental harm.
- 7.4 The Authorisation holder, their employee or agent shall also report an incident referred to in clause 7.1 and/or clause 7.3, in writing to the Authority within 2 working days of the incident occurring or becoming aware of contamination of land. The report must include:
 - a) incident or activity that has caused contamination or environmental harm;
 - b) nature of contamination and chemicals of concern;
 - c) area affected (on or off site);
 - d) aspects of the environment affected;
 - e) any planned assessment or remediation; and
 - f) any other relevant information.

7.5 The Authorisation holder shall keep a record of all other incidents in relation to pollution from, or on, the site. These records are to be provided, on request, to the Authority.

8 Record of pollution complaints

8.1 The Authorisation holder shall keep a record of all complaints received by its employees or its agents, in relation to pollution from, or on, the site. This record is to be provided, on request, to the Authority.

9 Record of activity levels

N/A.

10 Records to be maintained

- 10.1 The following records will be maintained and kept by the Authorisation holder for a period of seven (7) years:
 - a) all incidents which has affected, is affecting or could affect the integrity of the storage system;
 - b) field sampling record sheets and chain-of-custody forms;
 - c) results of environmental monitoring including surface and groundwater;
 - d) reconciliation records for all fuels and oils utilised and stored on site; and
 - e) a legible record of all complaints received by its employees or by its agents in relation to pollution associated with the activities.
- 10.2 The following records will be maintained and kept by the Authorisation holder for a period of one (1) year:
 - a) waste disposal certificates for any regulated or controlled wastes disposed off-site.

11 Responsible employees

- 11.1 The Authorisation holder shall authorise at least two senior employees or agents:
 - a) to speak on behalf of the Authorisation holder; and
 - b) to provide any information or document required under this Authorisation.
- 11.2 The Authorisation holder shall inform the Authority of the names and telephone numbers (including after hours numbers) of those persons within five (5) working days of this Authorisation coming into force. The details may be provided by facsimile to (02) 0207 0084 or email to environment.protection@act.gov.au
- 11.3 The Authorisation holder shall inform the Authority of any change in the Information provided under this condition within five (5) working days of the change.

20 Reporting Requirements

20.1 A copy of any environmental site assessment that is, or has been, carried out on the site must be forwarded to the Authority within three (3) months of this authorisation coming into force and/or within thirty (30) working days of receipt of new reports.

21 Sampling Requirements

- 21.1 All sample collection, analysis and associated paperwork under this Authorisation shall be conducted in accordance with Australian Standard/New Zealand Standard 5667.1:1998, "Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples", and with the American Public Health Association, American Water Works Association, and the Water Pollution Control Federation Standard Methods for the Examination of Water and Wastewater, 18th Edition, 1989, or other standards and methods agreed to by the Authority.
- 21.2 The sample collection shall be undertaken and documented by a suitably qualified person in accordance with clause 21.1. All required documentation shall be countersigned by a person authorised under clause 11.1 and shall be made available for inspection by the Authority. Sample analysis of parameters shall be conducted by a person employed as an analyst in any of the following organisations:
 - a) a Government laboratory;
 - b) an Australian university;
 - c) a laboratory where Authorisation parameters are accredited by the National Association of Testing Authorities; or
 - d) a laboratory approved by the Environment Protection Authority.

SCHEDULE 2

TABLE 1: AIR POLLUTION

Accessories/ Equipment/ Station	Requirement
Trafficked areas	Pave, seal or otherwise treat and maintain all trafficked areas within site to prevent or minimise the generation of airbourne dust.
Fuel tanks vapour venting	Take practical measures to ensure vents are not blocked. Venting vapours must not impact adjoining premises.
Refuelling	Take practical measures to ensure vapour recovery equipment is fitted and operated during fuel deliveries.
	Fuel deliveries must take place within the noise levels specified in Schedule 2, Table 3.

TABLE 2: WATER POLLUTION

Requirement

Manage the water catchment on the property so that runoff from:

- a) areas adjacent to the fuel dispensers is diverted to the sewer system (with ActewAGL approval),
- b) areas outside of the fuel dispensing area, without waste generating activities occurring, are permitted to drain to the stormwater system,
- c) all other areas are to drain to the sewer system (with ActewAGL approval).

TABLE 3: NOISE POLLUTION

Requirement :

Shall manage the operations at the site so that noise levels do not exceed the following levels at any point on the boundary of the site

Mon - Saturday

7 am to 10pm - 55 dB(A)

10pm to 7am - 45 dB(A)

Sunday and Public Holidays 8 am to 10 pm - 55 dB(A)

10pm to 8am - 45 dB(A)

The noise standard specified is in accordance with the Environment Protection Regulation 2005 (for specific noise zones refer to: www.legislation.act.gov.au).

SCHEDULE 2 (Continued)

TABLE 4: GROUNDWATER PARAMETERS

Parameter - Water	Criteria
Depth to water	-
рH	6.5 – 8.5
Total Petroleum Hydrocarbons	600μg/L
C ₆ - C ₉	
$C_{10} - C_{40}$	
BTEX (Total)	•
Benzene	300μg/L
Toluene	300μg/L
Ethyl Benzene	140μg/L
Xylene	380μg/L
Lead (Total)	5,0μg/L

All analysis for organic and inorganic substances must be for total concentrations unless detailed otherwise.



From: "McIntyre, Sara" Sent: 07/06/2017 1:26 AM

Sch 2.2(a)(ii)@northrop.com.au"Sch 2.2(a)(ii)@northrop.com.au> Subject:RE: Caltex Calwell - Stormwater Treatment CR166654

Hi Aaron,

Stormwater discharging to the sewer system is an issue for ICON Water.

The installation of a stormwater improvement device (ie. Puraceptor) at the site is acceptable to the EPA. The stormwater improvement device will need to capture, at a minimum, the drainage from under the canopy and the area around the diesel pump.

Upon installation, the Environmental Authorisation and the Environment Management Plan for this site will need to be varied to reflect the upgrading of the infrastructure.

You will also need to check if development approval is required. You can contact ACT Planning and Land Authority on 6207 1923 for further advice on this.

Kind regards,

Sara McIntyre | Environment Protection Officer | Environment Regulation and Protection

Phone: 02 6207 2144 | Fax: 02 6207 6084 | email: sara.mcintyre@act.gov.au

Construction, Environment and Workplace Protection | Access Canberra | ACT Government

Dame Pattie Menzies House, 16 Challis Street, Dickson | GPO BOX 158 | CANBERRA ACT 2601 | www.accesscanberra.act.gov.au

Please note that my work hours are Monday to Friday, 9.30 am to 2.30 pm.

From: Aaron Cordina Sch 2.2(a)(ii) @northrop.com.au]

Sent: Tuesday, 6 June 2017 5:52 PM

To: McIntyre, Sara

Subject: Caltex Calwell - Stormwater Treatment CR166654

Importance: High

Hi Sara,

Hope you are doing well.

I have recently received a copy of the EPA report for the site arising from the site inspection carried out late last year. Essentially from what I can gather at present there is no issue from an EPA perspective as the site stormwater is currently discharging to sewer (hence Icon waters issue). Are you able to confirm this is correct.

Secondly, moving forward to achieve compliance with Icon and the EPA we are looking to separate the sanitary and stormwater systems. The by-product of which would require stormwater treatment for the site.

As such we would like to confirm prior to procuring the unit, installation etc. that the proposed Puraceptor will satisfy the requirements of the EPA.

The proposed unit would be a;

- Qmax Class (1) Puraceptor certified to discharge to stormwater (model P.080.Cl.2C.A.300)
- Maximum flowrate 80.0 LPS

 This unit has a Spill Capacity of 14,900Litres, and guarantees no contamination to the environment during a spill event or during normal flow conditions, and is sized to capture the volume of a refuelling tanker compartment.

All the drawings and approvals of the proposed unit attached for information from Qmax.

If you could please get back to me at your earlies convenience and please let me know if you require any further information.

Regards,

NORTHROP

Aaron Cordina

Principal, Hydraulic & Fire Services Manager Northrop Consulting Engineers

Pty Ltd T: 02 6285 1822

F: 02 6285 1863 M: Sch 2.2(a)(ii)

2 Shea Street, Phillip ACT 2606 www.northrop.com.au



















From: "McIntyre, Sara" Sent: 28/11/2018 11:44 PM

To: 'Sch 2.2(a)(ii) @caltex.com.au'Sch 2.2(a)(ii) @caltex.com.au>

Subject:Caltex Calwell and Out of scope [SEC=UNCLASSIFIED]

Hi Dinesh,

Following on from our conversation yesterday, I have confirmed with the owners of the Calwell site that a SPEL system has been installed and is operating. The Authorisation will need to be varied to incorporate conditions relating to the SPEL. I will send out a draft varied Authorisation for your review.

Out of scope

Kind regards,

Sara McIntyre | Environment Protection Officer | Environment Protection

Phone: 02 6207 2144 | Email: sara.mcintyre@act.gov.au

Office of the Environment Protection Authority | Access Canberra | ACT Government

TransACT House, 470 Northbourne Avenue, Dickson | GPO BOX 158 | CANBERRA ACT 2601 | www.accesscanberra.act.gov.au

Please note that my work hours are Monday to Friday, 9.30 am to 2.30 pm.



From: "McIntyre, Sara" Sent: 22/08/2017 12:23 AM

To:"'Aaron Cordina" Sch 2.2(a)(ii) @northrop.com.au>; Sch 2.2(a)(ii) @iconwater.com.au>

Subject:RE: Caltex Calwell Stormwater & Sanitary Drainage Alterations CR166654

Hi Aaron,

The Environment Protection Authority supports the installation of the stormwater improvement device at Caltex Calwell subject to the following:

- 1. All soil subject to disposal from site must be assessed in accordance with Environment Protection Authority (EPA) Information Sheet 4 Requirements for the reuse and disposal of contaminated soil in the ACT.
- 2. No soil is to be disposed from site without EPA approval.
- All sediment controls are constructed in accordance with the "Environment Protection Guidelines for Construction and Land Development in the ACT, August 2011."
- 4. Any storage areas or stock piles of materials on site have erosion and sediment controls in place on the lower side of the storage areas or stock piles.
- 5. All rain water that enters the pit during a rain storm event would be considered as a sediment control pond and must meet the following conditions:
 - No discharge from dam all stormwater must be pumped out and disposed in at an approved location.
 - No discharge is allowed to enter the stormwater system.
 - Water level must not exceed 20% capacity at all times to allow runoff storage during a rain event.
- 6. The stormwater improvement device must be accessible for servicing/maintenance and water sampling. We have had some systems installed that have 100kg lids that cannot be lifted.

You will need to check if development approval is required for the works. You can contact ACT Planning and Land Authority on (02) 6207 1923 or submit an online enquiry at https://www.planning.act.gov.au/about_us/contact_us

Kind regards,

Sara McIntyre | Environment Protection Officer | Environment Regulation and Protection

Phone: 02 6207 2144 | Fax: 02 6207 6084 | email: sara.mcintyre@act.gov.au

Construction, Environment and Workplace Protection | Access Canberra | ACT Government

Dame Pattie Menzies House, 16 Challis Street, Dickson | GPO BOX 158 | CANBERRA ACT 2601 | www.accesscanberra.act.gov.au

Please note that my work hours are Monday to Friday, 9.30 am to 2.30 pm.

From: Aaron Cordina [mailto Sch 2.2(a)(ii) @northrop.com.au]

Sent: Monday, 21 August 2017 12:34 PM **To:** McIntyre, Sara; Jason Campbell

Subject: Caltex Calwell Stormwater & Sanitary Drainage Alterations CR166654

Importance: High

Hi Jason & Sarah,

Hope your both well.

Please find attached the hydraulic design for the upgrades works at Caltex. Could you have a look over the design and provide any comments if applicable in relation to the EPA and Icon requirements or if you approve the intended philosophy.

We just want to ensure that all parties approve the design intent before getting underway.

Regards,



Aaron Cordina

Principal, Hydraulic & Fire Services Manager Northrop Consulting Engineers Pty Ltd T: 02 6285 1822

F: 02 6285 1863 M: Sch 2.2(a)(ll)

2 Shea Street, Phillip ACT 2606 www.northrop.com.au



From: "Aaron Cordina" \$2.20\(\tilde{\text{m}}\) @northrop.com.au>

Sent:06/06/2017 5:52 PM

To: "McIntyre, Sara" <Sara.McIntyre@act.gov.au>

Subject: Caltex Calwell - Stormwater Treatment CR166654

Attachments: Annexure T.ZIP, Puraceptor P.080 C1 2C.PDF, Puraceptor Treatment Service Stations ACT EPA Letter of Consideration Ca....docx

Importance:High

Hi Sara,

Hope you are doing well.

I have recently received a copy of the EPA report for the site arising from the site inspection carried out late last year. Essentially from what I can gather at present there is no issue from an EPA perspective as the site stormwater is currently discharging to sewer (hence Icon waters issue). Are you able to confirm this is correct.

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The proposed unit would be a;

- Qmax Class (1) Puraceptor certified to discharge to stormwater (model P.080.Cl.2C.A.300)
- Maximum flowrate 80.0 LPS
- This unit has a Spill Capacity of 14,900Litres, and guarantees no contamination to the environment during a spill event or during normal flow conditions, and is sized to capture the volume of a refuelling tanker compartment.

All the drawings and approvals of the proposed unit attached for information from Qmax.

If you could please get back to me at your earlies convenience and please let me know if you require any further information.

Regards,



Aaron Cordina

Principal, Hydraulic & Fire Services Manager

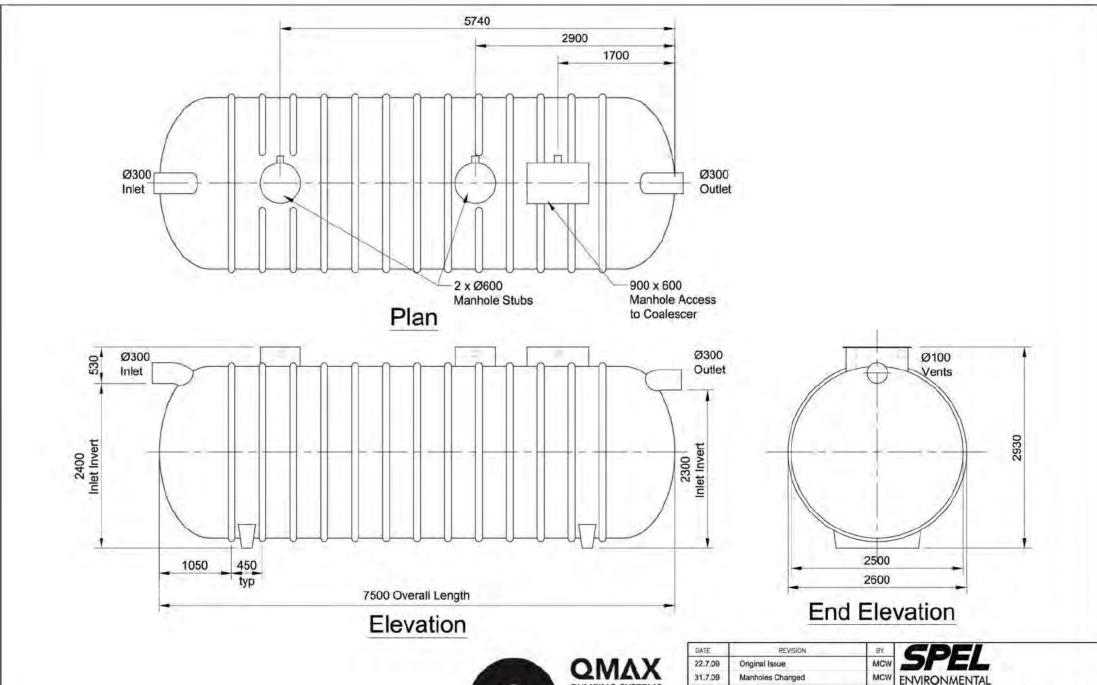
Northrop Consulting Engineers
Pty Ltd

T: 02 6285 1822 F: 02 6285 1863 M: Sch 2.2(a)(f)

2 Shea Street, Phillip ACT 2606

www.northrop.com.au







DATE	REVISION	BY.		BE	7		
22.7.09	Original Issue	MCW					
31.7.09	Manholes Changed MCW		ENVIRONMENTAL "SOLUTIONS IN STORMWATER POLLUTION"				
			PURAC	CEPTOR	P080 - 0	C1 - 2C	
			DRAWN	CHECKED	SCALE	DRAWING NUMBER	
			M.Watts	NEP	NTS		



Consideration for the SPEL Puraceptor Class 1 Treatment & Capture Solution of Hydrocarbons & Sediment off Fuel Forecourt at Calwell, Were Street, Calwell ACT.

The principal seeks to implement environmental improvements to each site in order to capture and retain hydrocarbons (fuel/oil) that currently egress to stormwater.

The sites' fuel forecourt, including a high proportion of the under-cover canopy zones, discharge hydrocarbons to stormwater or the soil in spite in of the correct code requiring under-cover canopy drainage to sewer.

The principal requests consideration for the overriding of the current ACT EPA code's guideline stipulating sewer discharge of under-covered forecourt areas, and for the approval of the installation of the SPEL Puraceptor Class 1 system with respect to achieving water quality compliance with the EPA's water quality guidelines.

Current Environmental Issues with Calwell Service Station, Calwell, ACT Site.

- 1. Small canopy that potentially allows hydrocarbons to egress to stormwater.
- 2. Non 'Bunded" fuel/diesel refilling zones.
- 3. Canopy drip line that does not allow for the 10° inset
- 4. Fuel hose lines that extend beyond the drip line and the' bunded' zone.
- 5. Sewer authority's (ACTEWAGL) refusal to receive stormwater.

SPEL Puraceptor Class 1™ Solution

Water Quality

- > Removes oil and fuels to 'no visible trace', from a tested inflow concentration of 5,000ppm, complying with ACT EPA guidelines.
- > Puraceptor is independently tested by the University of South Australia and HR Wallingford UK.
- > Test methodology to European Standard BS EN 858.1 Section 8.
- Reduces >85% total suspended solids from particulate size of 10um.
- > Retains 100% gross pollutants >5mm.
- > The unit is self-contained and watertight, with no joints and seals providing complete protection from leaching.

Automatic System

- > Puraceptor is fitted with an alarm-probe providing an early warning detection that will alarm when hydrocarbons accumulate to 10% of the separator's spill which can be monitored at all times, either on site or remotely.
- Contains an auto closure device (ACD) that will shut-off the flow from the Puraceptor, if the spill exceeds the designed capacity of the Puraceptor (8000L), which will also contain the spill of a refuelling tanker compartment, preventing pollutants from discharging to public drains and waterways.
- > The ACD is sensitive to any change in the water density as a consequence of hydrocarbons build-up, thereby automatically activating a process of depressing the ball to shut off the flow from the Puraceptor, providing the site with full protection
- > Passive, gravity /coalescing treatment ensuring complete and optimal operation at all times.
- No power required for treatment or spill capture.
- > Will continue to operate in the event of an emergency power failure.

Full Retention Treatment Function

- > Laminar flow function that ensures quiescent conditions facilitating efficient separation of hydrocarbons.
- Minimum 6 minutes residence of the flow through the Puraceptor.
- > All liquid is treated. There is no bypass operation, ensuring all inflow concentration of hydrocarbons and sediment is captured.

Coalescer-Filter

> The Puraceptor provides a coalescing process for the separation of smaller globular of hydrocarbons (12um).

Safety

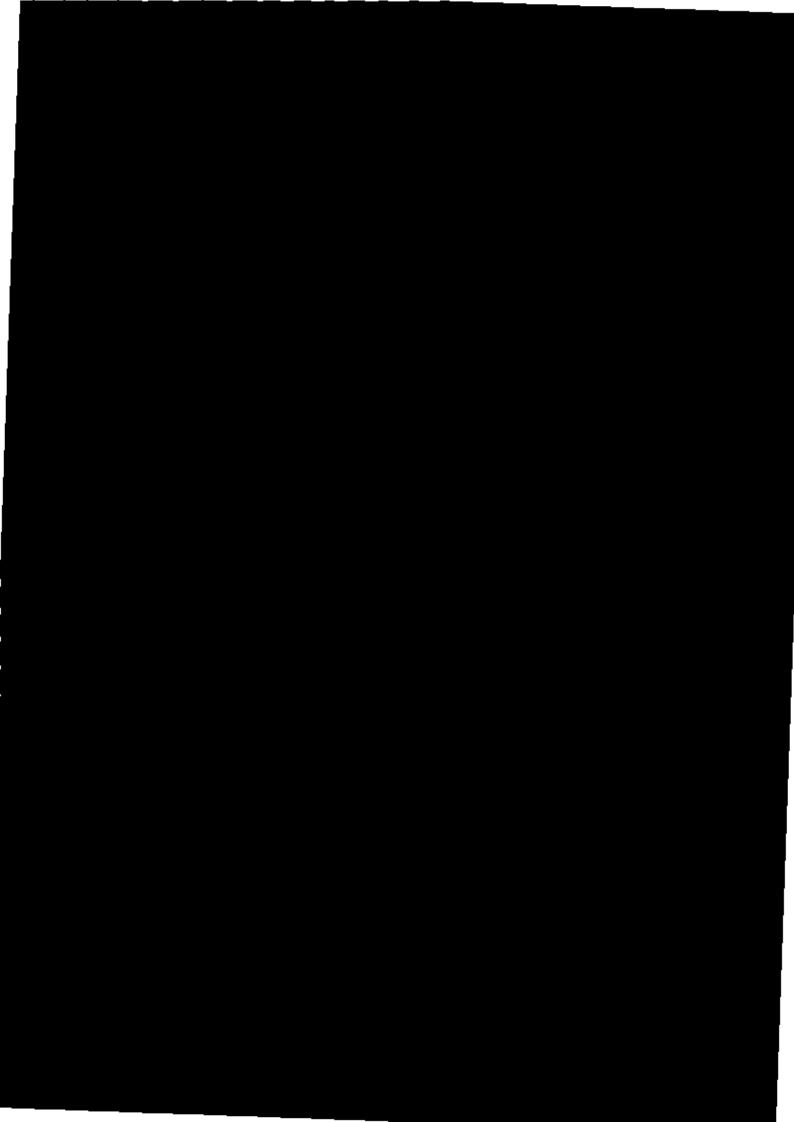
- > Equipped with a flame trap to extinguish fire water, and an integrated vent system to prevent the release of vapours into the stormwater system.
- > In the event of fire all spill is safely removed from ground level and retained below-ground in the Puraceptor.
 - O This reduces the risk to fire spreading and impacting on the outside environment.
- Tank cleaning is conducted from above-ground;-no entering of the tank is required

Maintenance

- > The Puraceptor is accompanied by a comprehensive Operations & Maintenance Manual with a Maintenance Ledger for accurate reporting of maintenance operations making it non-onerous for council random auditing procedures.
 - O The ledger can be sent to the council electronically following each maintenance service.
- Maintenance frequencies are recommended every 6 months.

Annexure

- > HR Wallingford Certification
- ➤ University of South Australia Test Results
- > NATA site test of Sydney metro fuel station
- > SPEL Certification Forecourt Profile containing a list of selected installations in NSW.
- > European Standard BE EN 858.1



From:"Aaron Cordina'Sci 22/a(ii)@northrop.com.au>

Sent:21/08/2017 12:33 PM

To: "McIntyre, Sara" <Sara. McIntyre@act.gov.au>; "Jason Campbell" Sch 2.2(a)(ii) @iconwater.com.au>

Subject: Caltex Calwell Stormwater & Sanitary Drainage Alterations CR166654

Attachments: CR166654 - H100 (1).pdf, CR166654 - H001 (1).pdf

Importance:High

Hi Jason & Sarah,

Hope your both well.

Please find attached the hydraulic design for the upgrades works at Caltex. Could you have a look over the design and provide any comments if applicable in relation to the EPA and Icon requirements or if you approve the intended philosophy.

We just want to ensure that all parties approve the design intent before getting underway.

Regards,

NORTHROP

Aaron Cordina

Principal, Hydraulic & Fire Services

Manager

Northrop Consulting Engineers

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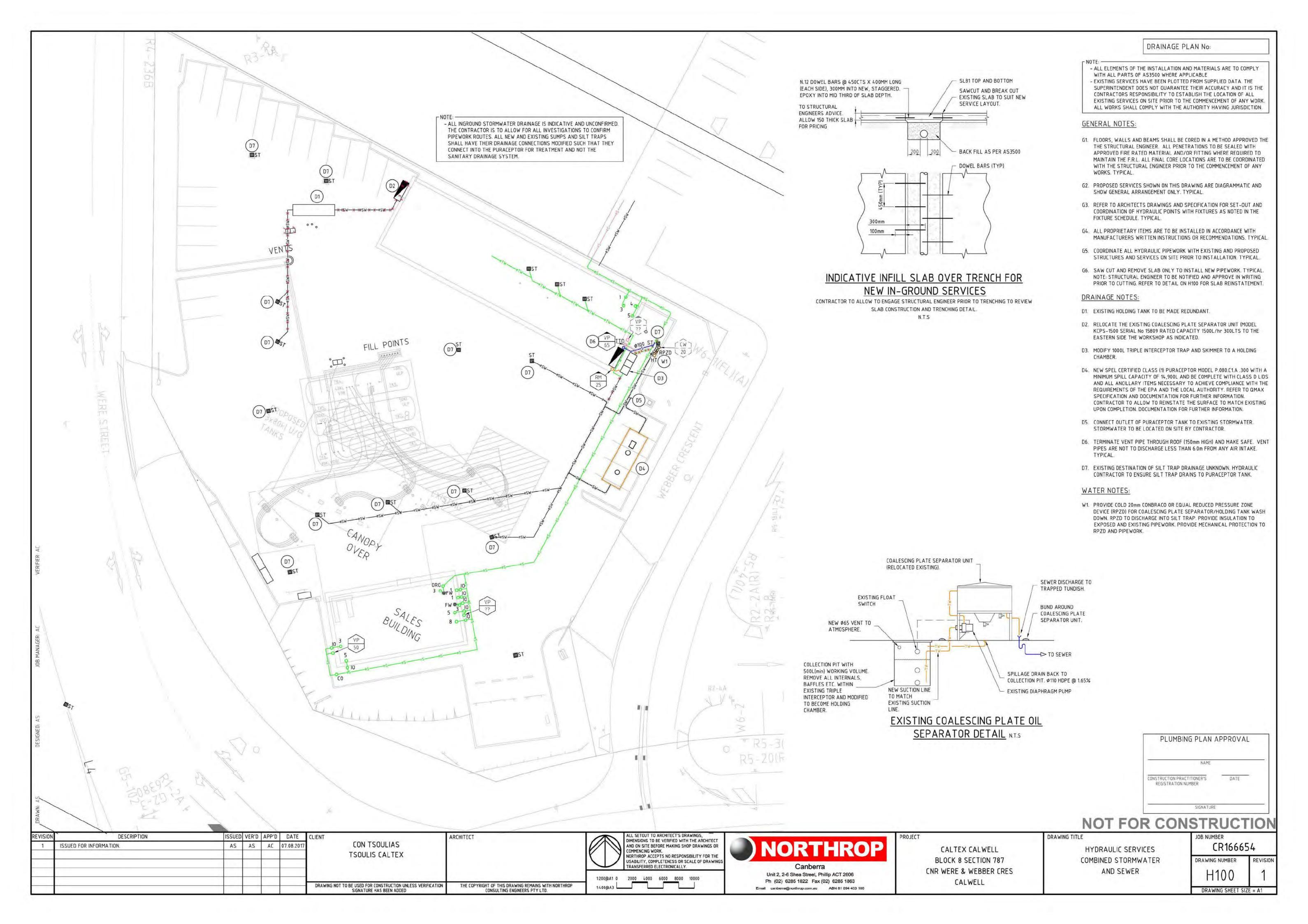
T: 02 6285 1822

F: 02 6285 1863

M: Sch 2.2(a)(ii)

2 Shea Street, Phillip ACT 2606

www.northrop.com.au



CALTEX SERVICE STATION CALWELL

HYDRAULIC SERVICES

GENERAL

- ALL WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH RELEVANT AUTHORITY REQUIREMENTS, ICON WATER, ACTEWAGL REGULATIONS, SUPERINTENDENTS APPROVAL, HYDRAULIC SPECIFICATION AND NATIONAL PLUMBING CODES AS.3500 (2015), AS.1221 (1997), AS.2441 (2005) AND AS.2419.1
- 2. THIS PLAN SHALL BE READ IN CONJUNCTION WITH THE APPROVED ARCHITECTURAL, LANDSCAPE, STRUCTURAL, MECHANICAL AND ELECTRICAL PLANS AND SPECIFICATIONS.
- DRAINS TO BE SUPPORTED ON OR FROM SOLID GROUND. LOCATION AND DEPTH/INVERT OF BRANCH SHALL BE VERIFIED ON SITE PRIOR TO COMMENCEMENT OF WORK.
- 4. DRAINS UNDER BUILDING SHALL BE RE-TESTED WHERE DIRECTED BY THE SUPERINTENDENT.
- INSPECTION OPENINGS SHALL BE PROVIDED IN ACCORDANCE WITH AS3500.2 (2015). SECTION 4.7 AND THE FOLLOWING: OUTSIDE OF A BUILDING NO FURTHER THAN 2.5M, ALONG EACH BRANCH DRAIN CONNECTING ONE OR MORE WATER
- CLOSETS OR SLOP HOPPERS: AT INTERVALS OF NOT MORE THAN 30M, WITH A MINIMUM OF ONE INSPECTION OPENING ON EACH MAIN DRAIN;
- AT THE CONNECTION TO THE NETWORK UTILITY OPERATOR'S SEWER IF NOT PROVIDED BY THE NETWORK UTILITY OPERATOR;
- ON THE DOWNSTREAM END OF THE DRAIN WHERE ANY DRAIN PASSES UNDER A BUILDING EXCEPT WHERE WASTE FIXTURES ONLY ARE CONCERNED;
- WHERE ANY NEW SECTION OF DRAIN IS CONNECTED TO AN EXISTING DRAIN;
- IMMEDIATELY AT OR UPSTREAM OF THE UPPER BEND OF A JUMP-UP: AND
- UPSTREAM OF ALL REDUCERS.
- THE SUPERINTENDENT DOES NOT GUARANTEE THEIR ACCURACY AND IT IS THE THE CONTRACTORS RESPONSIBILITY TO ESTABLISH THE LOCATION OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY WORK. ALL CLEARANCES SHALL BE 20. ANY NON-METALLIC INGROUND WATER SERVICE IS TO BE OBTAINED FROM THE RELEVANT AUTHORITY.
- THE CONTRACTOR SHALL ARRANGE ALL SURVEY SETOUTS BY A REGISTERED SURVEYOR.
- 8. ALL SERVICES THAT CROSS FOOT PATHS, FOOTINGS ETC. SHALL BE BACKFILLED WITH APPROVED GRANULAR MATERIAL TO SUBGRADE LEVEL AND COMPACTED TO 100% STANDARD MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS.1289.E1.1.
- ON COMPLETION OF PIPE INSTALLATION, ALL DISTURBED AREAS MUST BE RESTORED TO ORIGINAL CONDITION INCLUDING KERBS, FOOTPATHS, CONCRETE AREAS, GRAVEL AREAS, GRASSED AREAS AND ROAD PAVEMENTS.

SAFETY IN DESIGN REPORT

DOES THIS PROJECT CONTAIN ANY ADDITIONAL RISKS/HAZZARDS

NOT NORMALLY ASSOCIATED WITH THE TYPES OF WORKS

DETAILED WITHIN THE HYDRAULIC DOCUMENTATION?

YES - REFER TO THE FOLLOWING:

- 10. TRENCHES THROUGH EXISTING ROAD AND CONCRETE AREAS SHALL BE SAWCUT TO FULL DEPTH OF CONCRETE AND A MINIMUM OF 50MM IN BITUMINOUS PAVING, REINSTATE TO EQUIVALENT OF ORIGINAL ROAD AND CONCRETE AREA.
- 11. WHERE NEW WORK ABUTS EXISTING, THE CONTRACTOR SHALL ENSURE THAT A SMOOTH, EVEN PROFILE, FREE FROM ABRUPT CHANGES, IS OBTAINED.
- 12. CARE SHALL BE TAKEN WHEN EXCAVATING NEAR EXISTING SERVICES. NO MECHANICAL EXCAVATION SHALL BE TAKEN OVER TELSTRA OR ELECTRICAL SERVICES. EXCAVATE BY HAND IN THESE AREAS.
- 13. ALL CORE HOLE LOCATIONS SHALL BE APPROVED BY THE SUPERINTENDENT PRIOR TO COMMENCEMENT OF CORING.
- 14. CONTRACTOR SHALL ALLOW FOR ALL TIMBERING, SHORING AND SHUTTERING AS NECESSARY TO CONSTRUCT PIPEWORK AND INCLUDE THE REMOVAL OF SAME UPON COMPLETION OF PIPEWORK.
- 15. ALL UPVC PIPE EXPOSED TO SUNLIGHT SHALL BE DWV.
- 16. CONTRACTOR IS TO ALLOW FOR THE REMOVAL OF ALL DEBRIS TO THE TIP AND INCLUDING ALL TIP FEES.
- 17. THE CONTRACTOR IS TO LOCATE AND CONFIRM LEVELS OF ALL EXISTING SERVICE CONNECTIONS PRIOR TO COMMENCING WORK. NOTIFY THE SUPERINTENDENT IMMEDIATELY IF ANY DIFFERENCES IN POSITION AND LEVEL ARE FOUND.
- THE CONTRACTOR MUST VISIT THE SITE OF WORKS BEFORE TENDERING AND ALLOWANCES ON THEIR TENDER FOR ALL TOPOGRAPHICAL CONSTRAINTS AFFECTING THE EXECUTION OF THE WORKS AND THE RESTORATION OF THE SITE.
- EXISTING SERVICES HAVE BEEN PLOTTED FROM SUPPLIED DATA. 19. THE CONTRACTOR MUST SECURE ALL PERMITS, ARRANGE ALL CLEARANCES AND PAY ALL FEES REQUIRED TO COMPLETE THE PROJECT BEFORE COMMENCING WORK.
 - INSTALLED WITH TRACE WIRE AND TESTED.
 - 21. THESE DRAWING SHALL NOT BE COPIED OR AMENDED WITHOUT THE WRITTEN CONSENT FROM NORTHROP CONSULTING ENGINEERS PTY LTD.
 - 22. THE CONTRACTOR IS TO ALLOW FOR THE PROCUREMENT AND INSTALLATION OF ALL APPLICABLE SIGNAGE FOR THE HYDRAULIC AND WET FIRE SERVICES IN ACCORDANCE WITH THE REQUIREMENTS OF LOCAL AUTHORITY HAVING JURISDICTION AND THE CURRENT EDITION OF THE FOLLOWING STANDARDS:
 - AS3500 (2015)
 - AS2419 (2005) AS2441 (2005)
 - AS5601 (2013)
 - AS2118 (2006)

WORK AS EXECUTED DRAWINGS

- THE SUB-CONTRACTOR SHALL PREPARE AND SUBMIT "WORK AS EXECUTED" DRAWINGS AND SUBMIT TO RELEVANT AUTHORITIES FOR APPROVAL AND PAY ALL FEES AS REQUIRED.
- THE "WORK AS EXECUTED" DRAWING SHALL SHOW ALL CHANGES TO THE INSTALLATION AND AS INSTALLED WORK NOT SHOWN ON THE APPROVED DESIGN DRAWINGS.
- CONTRACTOR SHALL ALLOW TO PRODUCE A FULL SET OF WORK AS EXECUTED DRAWINGS TO THE SAME STANDARD AS THE TENDER DOCUMENTATION. CONTRACTOR TO ALLOW \$1,500 + GST TO COMPLETE THE WORK AS EXECUTED DOCUMENTATION, CERTIFIER FEES AND CHARGES ARE NOT INCLUDED IN THIS PRICE. THE TENDER DRAWINGS HAVE BEEN PRODUCED USING EXISTING SERVICES INFORMATION. CONTRACTOR TO VERIFY ALL PIPEWORK LAYOUTS ON SITE AND SHOW ALL VARIATIONS OF EXISTING PIPEWORK ON THE WORK AS EXECUTED DRAWINGS.

SANITARY DRAINAGE/PLUMBING

MATERIAL SCHEDULE: INGROUND SANITARY WASTE PIPES - 65-150UPVC INGROUND TRADE WASTE PIPES - 110 HDPE - 50-100UPVC UNLESS OTHERWISE NOTED, ALL INTERNAL EXPOSED PIPEWORK ADJACENT TO PLUMBING FIXTURES INCLUDING TRAP FITTINGS

SHALL BE CHROME PLATED.

- CONTRACTOR SHALL ALLOW FOR ADDITIONAL EXCAVATION (INCLUDING ROCK) AND BACKFILL OF PIPES, FITTINGS AND ALL JUMP-UPS TO THE LOCAL AUTHORITY REQUIREMENTS. INCLUDING THOSE TO BRANCH DRAINS.
- ALL BRANCH LINES SHALL BE GRADED AND/OR LOWERED TO AVOID PENETRATING FOOTING BEAMS UNLESS SHOWN OTHERWISE. THE CONTRACTOR SHALL ALLOW FOR ADDITIONAL PIPE LENGTHS AND WORK INCLUDING CONSTRUCTION OF ADDITIONAL INSPECTION OPENINGS AS REQUIRED BY THE LOCAL AUTHORITY.
- CO-ORDINATE WITH STRUCTURAL DRAWINGS, NO STEEL REINFORCING BARS TO BE CUT WITHOUT PRIOR WRITTEN
- 5. ORG GRATE LEVEL SHALL BE IN ACCORDANCE WITH AS 3500.2 CLAUSE 4.6.6.6 AND 4.6.6.7.

APPROVAL FROM STRUCTURAL ENGINEER.

- 6. ALL SEWER MAINTENANCE HOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH ICON WATER STANDARD DRAWINGS WSS.002, WSS.051, WSS.052 AND NSW GOVERNMENT SEWERAGE STANDARD DRAWING No.1381, AND UNLESS NOTED OTHERWISE BE FITTED WITH A HEAVY DUTY GATTIC
- NEW DRAINS TO BE CONSTRUCTED ARE SHOWN IN BLUE LINES. EXISTING DRAINS ARE SHOWN IN GREEN LINES. EXISTING AUTHORITY MAINS ARE SHOWN IN RED.
- 8. EXISTING DRAINS SHOWN "X'ed" IN RED ARE TO BE EXHUMED OR ABANDONED (AS NOTED) AND ENDS SHALL BE SEALED TO
- ALL VENT PIPES SHALL BE INSTALLED WITHIN EXTERNAL WALL CAVITIES OR INTERNAL STUD WALLS.
- 10. ALL CLEAROUTS SHALL BE RAISED TO FINISHED FLOOR LEVEL AND PROVIDED WITH A SCREWED BRASS COVER.
- 11. HYDRAULIC CONTRACTOR TO ENSURE THAT ALL IN-WALL TRAPPED TUNDISHES ARE TO HAVE NON-REMOVEABLE TRAPS AND BE OF THE PERMANENT CONNECTION TYPE UNLESS OTHERWISE NOTED ON THE HYDRAULIC DESIGN DRAWINGS.
- 12. ALL ROOF PENETRATIONS TO DETAIL AND PAINTED COLOUR TO BE ADVISED. ALL VENTS SHALL BE OFFSET IN ROOF SPACE MINIMUM 600MM FROM EAVES AND AS SHOWN ON ARCHITECTURAL DRAWINGS, ALL VENTS TO TERMINATE 150MM ABOVE ROOF LEVEL.
- 13. EXPOSED INTERNAL PIPEWORK SHALL BE CHROME-PLATED.
- 14. ALL ROOF PENETRATIONS SHALL BE FLASHED WITH "DEKTITE" FLASHING. COLOUR TO MATCH ROOF.

STORMWATER DRAINS

- MATERIAL SCHEDULE: STORMWATER DRAINAGE - 100-225 UPVC DWV STORMWATER PLUMBING - 100-225 UPVC STORMWATER DRAINAGE - 300 STORMPRO PP SUB SOIL DRAINAGE - 100 PERFORATED PVC PIPE OR OTHER APPROVED MATERIAL).
- 2. MINIMUM GRADE TO STORMWATER LINES TO BE 1% (U.N.O.)
- CONTRACTOR TO SUPPLY AND INSTALL ALL FITTINGS AND SPECIALS INCLUDING VARIOUS PIPE ADAPTERS TO ENSURE PROPER CONNECTION BETWEEN DISSIMILAR PIPEWORK.
- ALL CONNECTIONS TO EXISTING DRAINAGE PITS SHALL BE MADE IN A TRADESMAN-LIKE MANNER AND THE INTERNAL WALL OF THE PIT AT THE POINT OF ENTRY SHALL BE CEMENT RENDERED TO ENSURE A SMOOTH FINISH.
- WHERE TRENCHES ARE IN ROCK. THE PIPE SHALL BE BEDDED ON A MINIMUM SOMM CONCRETE BED (OR 75MM THICK BED OF 12MM BLUE METAL) UNDER THE BARREL OF THE PIPE. THE PIPE COLLAR AT NO POINT SHALL BEAR ON THE ROCK. IN OTHER THAN ROCK, PIPES SHALL BE LAID ON A 75MM THICK SAND BED. IN ALL CASES BACKFILL THE TRENCH WITH SAND TO 200MM ABOVE THE PIPE. WHERE THE PIPE IS UNDER PAVEMENTS, BACKFILL REMAINDER OF TRENCH WITH APPROVED GRANULAR MATERIAL TO SUBGRADE LEVEL IN 150MM LAYERS COMPACTED TO 100% STANDARD MAXIMUM DRY DENSITY. A MINIMUM PAVEMENT OF 125MM THICK DGB20 BASE AND 25MM THICK AC10 WEARING COURSE SHALL BE PROVIDED.
- WHERE STORMWATER LINES PASS UNDER FLOOR SLABS, SEWER GRADE PIPEWORK IS TO BE USED. FLEXIBLE JOINTS, BEDDING AND BACKFILL SHALL BE IN ACCORDANCE WITH
- EXPANSION JOINTS SHALL BE PROVIDED IN H.D.P.E DRAINS WHERE THEY ENTER AND LEAVE PITS.

HYDRAULIC SYMBOLS

PROPOSED SERVICE TYPE

PROPOSED SERVICE SIZE

PIPE RISER FROM BEND

- PIPE RISER FROM TEE

SOLENOID VALVE

CLEAR OUT

TUNDISH

INSPECTION OPENING

TRAPPED TUNDISH

DISCONNECTOR TRAP

RAINWATER OUTLET

HIGH END RISER

FLOOR WASTE

BUCKET TRAP

SILT TRAP

PIPE DROPPER FROM BEND

CW __EXISTING SERVICE TYPE

25 EXISTING SERVICE SIZE

ISOLATION VALVE

0 10

000

OTD

OTTO

ODT

@RW0

OHER

PIPE CONTINUED ON LEVEL ABOVE

PIPE CONTINUED ON LEVEL BELOW

—PIPE CONTINUED ON LEVEL ABOVE

PIPE CONTINUED ON LEVEL BELOW

ABBREVIATIONS AAV AIR ADMITTANCE VALVE AWTS AERATED WASTEWATER TREATMENT SYSTEM BASKET TRAP COVER LEVEL CO CLEAR OUT Cu. COPPER C/S CEILING SPACE CV CHAMBER VENT COLD WATER SERVICE CW DICL DUCTILE IRON CEMENT LINED DOWNPIPE **EXPANSION JOINT** FIRST FLUSH DEVICE FINISHED FLOOR LEVEL FIRE HYDRANT FIRE HOSE REEL

HYDRAULIC LEGEND

GAS MAIN TO BE DEMOLISHED

SEWER MAIN TO BE DEMOLISHED

* STORMWATER MAIN TO BE DEMOLISHED

eg EXISTING GAS MAIN

PROPOSED GAS MAIN

EXISTING SEWER MAIN

PROPOSED SEWER MAIN

EXISTING WATER MAIN

PROPOSED WATER MAIN

----- EXISTING STORMWATER MAIN

EXISTING SANITARY DRAIN

PROPOSED SANITARY DRAIN

EXISTING SANITARY VENT

PROPOSED SANITARY VENT

EXISTING TRADE WASTE

PROPOSED TRADE WASTE

EXISTING GREY WATER DRAIN

EXISTING TRADE WASTE VENT

EXISTING STORM WATER

PROPOSED TRADE WASTE VENT

* STORM WATER TO BE DEMOLISHED

X SANITARY DRAIN TO BE DEMOLISHED

SANITARY VENT TO BE DEMOLISHED

TRADE WASTE TO BE DEMOLISHED

GREY WATER DRAIN TO BE DEMOLISHED

TRADE WASTE VENT TO BE DEMOLISHED

PROPOSED GREY WATER DRAIN

GMS GALVANISED MILD STEEL HER HIGH END RISER HOSE TAP H/D HEAVY DUTY HDPE HIGH DENSITY POLYETHYLENE HOT WATER HOT WATER FLOW HOT WATER RETURN INVERT LEVEL INSPECTION OPENING

INSPECTION SHAFT

MAXIMUM MODIFIED DRY DENSITY

REDUCED PRESSURE ZONE DEVICE

NON POTABLE COLD WATER

OVERFLOW RELIEF GULLY

PRESSURE RELIEF VALVE

LOADING UNIT

OVER FLOW

RAIN WATER

SEWER MANHOLE

STONEWARE PIPE DRAIN

STORMWATER MAN HOLE

TESTABLE DOUBLE CHECK VALVE

UNPLASTICISED POLYVINYL CHLORIDE

THERMOSTATIC MIXING VALVE

SEWER RISING MAIN

STOP COCK

SILT TRAP

STOP VALVE

STORMWATER

THRUST BLOCK

TRAPPED TUNDISH TRADE WASTE

TRADE WASTE VENT

TEMPERING VALVE UNDER BENCH

VITRIFIED CLAY PIPE

VERTICAL JUMP UP

VENT PIPE

WATER METER

WARM WATER

TUNDISH

SEWER VENT PIPE

PLANTER OUTLET

RAINWATER OUTLET

FLOOR WASTE

NPCW

RPZD

SPD

SRM

SV

SVP

SWMH

TDCV

TMV

TWV

U/B

UPVC

VJU

O PO PLANTER OUTLET O+HT HOSE TAP **PRPZD** REDUCED PRESSURE ZONE DEVICE THERMOSTATIC MIXING VALVE TEMPERING VALVE

> T.B THRUST BLOCK WATER METER ■ WM □ GM GAS METER GAS REGULATOR CH/BWU CHILLED/BOILING WATER UNIT

BOILING WATER UNIT BWU DW DISH WASHER

II FHR FIRE HOSE REEL FIRE HYDRANT

PROPOSED STREET FIRE HYDRANT

- (N1)

O-QFH

PROPOSED SEWER MAINTENANCE HOLE EXISTING SEWER MAINTENANCE HOLE

NOTE REFERENCE

PROPOSED STORMWATER MAINTENANCE HOLE

EXISTING STORMWATER MAINTENANCE HOLE

1000 2000 3000 4000 5000

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Canberra Unit 2, 2-6 Shea Street, Phillip ACT 2606 Ph (02) 6285 1822 Fax (02) 6285 1863 Email canberra@northrop.com.au ABN 81 094 433 100 CALTEX CALWELL

BLOCK 8 SECTION 787 CNR WERE & WEBBER CRES CALWELL

CONSTRUCTION PRACTITIONER'S DATE REGISTRATION NUMBER

PLUMBING PLAN APPROVAL

DRAWING TITLE GENERAL NOTES AND LEGEND

SITE LOCATION PLAN - N.T.S

JOB NUMBER DRAWING NUMBER

CR166654 REVISION DRAWING SHEET SIZE = A1

DRAWN AS	DESIGNED
DA WWARD	UZNICIONE IN

ISSUED VER'D APP'D DATE CLIENT EVISION DESCRIPTION ISSUED FOR INFORMATION AC 07.08.20

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19 December 2014

Jacqui Balazs
Contaminated Sites Officer
ACT Environmental Protection Unit
Environmental Protection & Water Regulation
GPO Box 158
Canberra ACT 2601

Dear Jacqui,

Re: Twelve-monthly groundwater monitoring at Caltex ACT Sites and site update

Enclosed herewith on CD are copies of the recent groundwater monitoring event (GME) reports for Caltex's ACT sites. The GMEs were conducted by environmental consultants Parsons Brinckerhoff (PB) in November 2014.

A list of the reports and a brief summary of the findings for each sampling event is provided below:

		Report and brief summary of findings	Author	Report
	+	of sco	10	16
	-	01 300	1	
22176 Calwell	Were St & Webber Crescent	 Groundwater Monitoring Event Concentrations of F1 fraction, TRH C₁₀-C₄₀, BTEX and lead exceeded the assessment criteria for the groundwater sample obtained from MW02. The benzene concentration reported for groundwater sampled from MW03 exceeded the assessment criteria. 	РВ	25/11/14

Corporate Office: Level 24 2 Market Street Sydney NSW 2000 Mail: GPO Box 3916 Sydney NSW 2001 Telephone: (02) 9250 5000 Facsimile: (02) 9250 5742 www.cattex.com.au NSW Banksmeadow Office: Corner Foreshore Drive and Penrhym Road Banksmeadow NSW 2019 Mail: PO Box 441 Matraville NSW 2036 Telephone: (02) 9250 5000 Facsimile: (02) 9693 3646 VIC/TAS/SA Newport Office: Newport Customer Service Centre 411 Douglas Parade Newport VIC 3015 Mail: PO Box 57 Melbourne VIC 3015 Telephone: (03) 9287 9555 Facsimile: (03) 9287 9572 QLD/NT Lytton Office: Tanker Street (off Port Drive) Lytton QLD 4178 Mail: PO Box 794 Wynnum QLD 4178 Telephone: (07) 3877 7333 Facsimile; (07) 3877 7464 WA Fremantle Office: 85 Bracks Street North Fremantle WA 6159 Mail: PO Box 39 North Fremantle WA 6159 Telephone: (08) 9430 2888 Facsimile: (08) 9335 3062



Out of scope

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Out of scope

TRH - Total recoverable hydrocarbon F1 - TRH C₆-C₁₀ minus BTEX

LNAPL – light-non aqueous phase liquid BTEX – benzene, toluene, ethylbenzene, xylene

Caltex would also like to provide you with the quarterly update for the sites (also provided in the CD).

Should you have any questions regarding the above, please feel free to contact me on (02) 9250 5862 or a caltex.com.au.

Kind Regards,

Sch 2.2(a)(ii)

Colin Roberts
Senior Environmental Specialist
CALTEX AUSTRALIA PETROLEUM PTY LTD

Cc: Mark Heckenberg

Attachment: CD of GME reports - November 2014 sampling and quarterly site update

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URS

FINAL

Groundwater Data Report

Caltex Calwell Service Station (Site ID 22176), 1 Webber Cres, Calwell ACT 2905

27 October 2015 43218537/01/01

Prepared for: Caltex Australia Petroleum Pty Ltd

Prepared by URS Australia Pty Ltd

AUSTRALIA













Issue No.	Name	Signature	Date	Position Title
Prepared by	Elaine Gibson	Sch 2.2(a)(i	27/10/2015	Environmental Scientist
Checked by	Tanya Stanton		27/10/2015	Environmental Geologis
Approved by	Scott Robinson		27/10/2015	Principal Environmental Geologist

FINAL Name:

Groundwater Data Report

Sub Title:

Caltex Calwell Service Station (Site ID 22176), 1 Webber Cres, Calwell ACT 2905

FINAL No.

43218537/01/01

Status:

Final

Client Contact Details:

Oliver King Caltex Australia Petroleum Pty Ltd 2 Market Street Sydney NSW 2000

Issued by:

URS Australia Pty Ltd Level 8, 420 George St Sydney NSW 2000 Australia

T: +61 2 8925 5500 F: +61 2 8925 5555

2 23/10/2015 Draft report reduced to a Ground Report	and the second
- Ostro	water Data

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TABLE OF CONTENTS

EXECU.	TIVE SUMMARY	III
1	INTRODUCTION	1
1.1	Background	1
1.2	Objectives	1
1.3	Site Definition	1
1.4	Geological and Hydrogeological Information	2
1.5	Groundwater Bore Search	2
1.6	List of Previous Investigations	2
2	ASSESSMENT METHODOLOGY	3
2.1	Data Quality Objectives	3
2.2	Sampling and Analysis Quality Plan (SAQP)	4
2.2.1	Rationale for Sample Locations	4
2.2.2	Groundwater Investigation Methodology	5
2.3	Quality Assurance / Quality Control Methodology	6
3	ADOPTED INVESTIGATION LEVELS (ILS)	7
4	RESULTS	9
4.1	Groundwater	9
4.1.1	Site Hydrogeological Results	s
4.1.2	Groundwater Field Parameters and Observations	s
4.1.3	Groundwater Analytical Results	10
4.2	Quality of Analytical Data	10
5	CONCLUSIONS	11
5.1	Hydrogeology	11
5.2	Dissolved Phase Impacts	11
5.3	Compliance	11
6	REFERENCES	13
7	LIMITATIONS	15



INTERNAL TABLES

Table 1-1	Site Identification Information	1
Table 1-2	Registered Groundwater Bores within 500 m of Site	2
Table 2-1	Data Quality Objectives	3
Table 2-2	Sample Location Rationale	4
Table 2-3	Groundwater Investigation Methodology	5
Table 2-4	Groundwater Analytical Program	5
Table 3-1	Adopted Investigation Levels	7
Table 4-1	Summary of Works	9
Table 4-2	Hydrogeological Summary	9
Table 4-3	Groundwater Field Parameters	9
Table 4-4	QA/QC Program	10

EXTERNAL TABLES

Table 1 Groundwater Elevation DataTable 2 Groundwater Field ParametersTable 3 Groundwater Analytical Results

FIGURES

Figure 1 Site Locality Plan

Figure 2 Site Layout

Figure 3 Inferred Groundwater Contours (mRL)

APPENDICES

Appendix A Registered Groundwater Bores - Bureau of METEOROLOGY

Appendix B Monitoring Well Borehole Logs

Appendix C Data Validation

Appendix D Field Sheets

Appendix E Waste Documents

Appendix F Hydrological Testing Calculations

Appendix G Groundwater Analytical Reports

Appendix H Calibration Records



ABBREVIATIONS

Abbreviation Description

Caltex Cope Caltex Australia Petroleum Pty Ltd
Cope Chemicals of potential concern

DECC Department of Environment and Climate Change

DO Dissolved oxygen
DP Deposited Plan

DQI Data Quality Indicators
DQO Data Quality Objectives

Eh Redox Potential

EPA Environmental Protection Authority

Er Reference electrode

ESA Environmental Site Assessment
GIL Groundwater Investigation Level

IL Investigation Level

HSL Health Screening Level

LNAPL Light non-aqueous phase liquid

LOR Limit of Reporting
LPG Liquid petroleum gas

mbgl metres below ground level mbtoc metres below top of casing

mV millivolts
MS Matrix Spike

NEPC National Environmental Protection Council
NEPM National Environmental Protection Measure

PAH Polycyclic aromatic hydrocarbon

PARCC Precision, accuracy, representativeness, completeness and comparability

PID Photo-ionisation Detector

ppm parts per million

QA/QC Quality assurance/quality control

SA Standards Australia

SAQP Sampling and Analysis Quality Plan (SAQP)

SWL Standing water level TDS Standing water level Total Dissolved Solids

ULP Unleaded Petrol





EXECUTIVE SUMMARY

URS Australia Pty Ltd (URS) was commissioned by Caltex Australia Petroleum Pty Ltd (Caltex) to conduct a Groundwater Monitoring Event (GME) at the Caltex Calwell Service Station (22176) at 1 Webber Crescent, Calwell, ACT 2905 referred to hereafter as "the site". Previously dissolved phase concentrations indicative of LNAPL have been detected at MW02.

Objectives

The objective of the investigation was to undertake Environmental Authorisation compliance monitoring for onsite wells and to report on the current groundwater conditions of these wells

Scope of works

- Gauging of 3 onsite groundwater wells.
- Collection of 3 groundwater samples for analysis.

Conclusions

Hydrogeology

- Groundwater onsite was encountered within volcanic bedrock during drilling from a depth
 of 11.0 mbgl to 17 mbgl. The aquifer is confined and the depth to the potentiometric
 surface ranged from 3.2 mbgl to 4.9 mbgl during this monitoring event.
- Groundwater is expected to flow to the north east and the hydraulic gradient was calculated to be 0.06.
- Field testing of MW02 resulted in a hydraulic conductivity value of 0.07001 m/day.
 Seepage velocity was then calculated to be 5.90 m/year.

Dissolved Phase Impacts

- Concentrations of benzene at MW02 exceeded the Health Screening Levels (HSL) protective of commercial site users.
- Concentrations at MW01 and MW03 were below all relevant investigation levels (ILs).

Compliance

 The site is considered to be compliant with the Environmental Authorisation requirement for annual groundwater sampling.



1 INTRODUCTION

1.1 Background

URS Australia Pty Ltd (URS) was commissioned by Caltex Australia Petroleum Pty Ltd (Caltex) to conduct a Groundwater Monitoring Event (GME) at the Caltex Calwell Service Station (22176) at 1 Webber Crescent, Calwell, ACT 2905 referred to hereafter as "the site", Previously dissolved phase concentrations indicative of LNAPL have been detected at MW02.

1.2 Objectives

The objective of the investigation was to undertake Environmental Authorisation compliance monitoring for onsite wells and to report on the current groundwater conditions of these wells

1.3 Site Definition

Table 1-1 Site Identification Information

Items	Details				
Site address	Caltex Calwell, 1 Webber Crescent, Calwell, ACT 2905.				
Title identification (Lot & DP)	Block 8, Section 787,				
Approximate site area	4975 m ² (six viewer accessed 7/9/15)				
Zoning of site and surrounding area	Onsite: CZ3 Service Zone which allows commercial and residential land use, with development consent.				
	Surrounding land use: To the north, east and south land is zoned as CZ3 Service zone (Commercial) and to the west RZ2: Suburban core (Residential)				
Current site use	At the time this Groundwater Data Report was prepared (October 2015), the site was an operational service station, with a mechanical workshop present on the northern side of the site.				
Adjacent site uses	 North: Commercial properties including a restaurant and an ambulance station. Tuggeranong Creek is located approximately 150 m north-east of the site. Residential properties are located 300 m to the north east. East: Calwell Shopping Centre and Tuggernong Creek 200 m east of the site. Tuggernong creek is a concrete lined stormwater channel. South: Were Street followed by residential properties 100 m from the southern site boundary. West: Were Street, followed by residential properties 40 m from the western site boundary. 				
Site infrastructure	A summary of the site infrastructure is provided below: The sales building is located in the southern portion of the site and the canopy extends north of it with seven fuel bowsers located beneath and one bowser to the north of the canopy. The mechanic workshop is located along the northern boundary of the site, Six Underground Storage Tanks (UST)s are located just north of the canopy detailed below, One Liquefied Natural Gas (LPG) Aboveground Storage Tank (AST) is located in the south eastern corner of the site.				



Items	Details		
UST and AST Storage	USTID	Tank Capacity (kL)	Contents
	- Depot 1	• 45.2	- V95
	Depot 2	• 45.2	• ULP
	Depot 3	• 45.2	• ULP
	Depot 4	• 45.2	• ULP
	Depot 5	• 27.4	• V98
	Depot 6	• 25.0	 Diesel
	AST ID	Tank Capacity (kL)	Contents
	Depot 7	• 7.5	• LPG

1.4 Geological and Hydrogeological Information

A summary of the geological and hydrogeological conditions are presented in **Section 4** and in the Conceptual Site Model in **Section 5.3**.

1.5 Groundwater Bore Search

A search for registered groundwater uses located within a 500 m radius of the site was undertaken using the Australian Government, Bureau of Meteorology - Australian Groundwater Explorer online database of registered groundwater bores (**Appendix A**). Details of the groundwater bores are provided in **Table 1-2.**

Table 1-2 Registered Groundwater Bores within 500 m of Site

Borehole number	Direction from Site	rom Site from Site D	Total swL Depth (mbgl)		Screened Interval (mbgl)		Geology in WBZ	Use
				From	To	111111111111111111111111111111111111111		
50	North west	500	20.4	unknown	unknown	unknown	unknown	unknown

Notes:

SWL - Static Water Level

mggl - metres below ground level

WBZ - Water Bearing Zone

1.6 List of Previous Investigations

Historical reports are listed below and the results are discussed in the context of the site in **Section 5** and in the Conceptual Site Model in **Section 5.3**.

- AECOM Australia Pty Ltd (AECOM), 2011. Groundwater Monitoring Well Report, Caltex Calwell (22176), Corner Were Street and Webber Crescent, Calwell, ACT (17 November 2011). Document no. 60196918-006-0.
- Parson Brinckerhoff (PB), 2013. 2013 Round 1 ACT Groundwater Monitoring Event, Caltex Calwell, Corner Were Street and Webber Crescent, Calwell ACT 2905.



2 ASSESSMENT METHODOLOGY

As stated in Appendix B of Schedule B *Guidelines on Site Characterisation* (NEPC 1999, amended 2013), the Data Quality Objectives (DQO) process is used to "define the type, quantity, and quality of data needed to support decisions relating to the environmental condition of a site". The seven-step DQO process that was adopted for this investigation is outlined below.

2.1 Data Quality Objectives

The Data Quality Objectives (DQOs) steps for these works are described in Table 2-1 below.

Table 2-1 Data Quality Objectives

DC	00 Steps	Details of DQO Process			
1.	State the Problem	 Environmental Authorisation requires annual monitoring of groundwater monitoring wells. Field data on hydraulic conductivity is not available. 			
2.	Identify the Goals of the Investigation	The principal goals / objectives that arise from Step 1 are: The principal objectives were to undertake annual Environmental Authorisation compliance monitoring for onsite wells and to report on the current groundwater conditions of these wells. Conduct field tests to characterise field hydraulic conductivity			
3.	Identify the Information Inputs	The primary inputs required include: Zoning and current landuse of the site. Distance to potential human health and environmental receptors. Field results/observations. Laboratory results. Assessment of the suitability of the data through the assessment of data quality indicators (DQIs), namely precision, accuracy, representativeness, completeness and comparability (PARCC) parameters (Section 2.2). Historical reports and other information sources available to URS as referenced throughout report.			
4.	Define the Study Boundaries	 Lateral: The site boundaries as defined by Block 8, Section 147 at 1 Webber Street Calwell, ACT 2905 and shown on Figure 2. Vertical: Monitoring wells are screened within volcanic bedrock from a minimum depth of 8.0 mbgl to a maximum depth of 18.0 mbgl as see monitoring well borehold logs (Appendix B). 			
5.	Develop an Analytical Approach	 Site specific data was utilised to focus on potential sources of contamination and likely chemicals of potential concern (COPC). Sampling ratios, quality assurance/quality control (QA/QC) sampling and laboratory analysis were based on Australian Standards and National Environmental Protection Measure (NEPM) guidelines. URS standard sampling methodology was followed for sample collection and preservation. Laboratories utilised were National Association of Testing Authorities (NATA) approved for the analyses undertaken. The decision rules for the investigation are: If the contaminant concentrations were less than the adopted investigation levels (ILs) (Section 3), then any potential risk was assumed to be low and acceptable. If the concentrations were equal to or greater than the ILs, then a qualitative Tier 1 risk assessment was undertaken to further assess any potential risk. 			
6.	Specify Limits on Decision Errors	There are two types of decision errors: Sampling errors, which occur when samples collected are not representative of the conditions within the investigation area; and Measurement errors, which occur during sampling collection, handling, preparation,			



DQO Steps	Details of DQO Process		
	analysis and data reduction. An assessment was made as to the likelihood of a decision error being made based on the results of a QA/QC assessment and the closeness of the data to assessment criteria. Decision criteria for QA/QC measures are defined in Appendix C . A decision on the acceptance of the analytical data was made on the basis of the data quality indicators (DQI) in the context of the precision, accuracy, representativeness, completeness and comparability (PARCC) parameters as follows.		
	 Precision: A quantitative measure of the variability (or reproducibility) of data; Accuracy: A quantitative measure of the closeness of reported data to the "true" value; Representativeness: The confidence (expressed qualitatively) that data are representative of each media present on site; Completeness: A measure of the amount of useable data from a data collection activity; and Comparability: The confidence (expressed qualitatively) that data may be considered to be equivalent for each sampling and analytical event. 		
	Specific limits for this project are in accordance with the appropriate guidance in NEPM (2013), appropriate indicators of data quality, and standard procedures for field sampling and handling. The step also examines the certainty of conclusive statements based on the available site data collected.		
7. Optimise the Design	Based on the previous Steps 1 to 6 of the DQO process, the design (i.e scope of works o sample and analysis quality plan) for obtaining the required data (i.e. proposed field and laboratory programs) is presented below in Section 2.2 .		

2.2 Sampling and Analysis Quality Plan (SAQP)

The scope of works for this investigation consisted of the following main steps which are detailed in the following sub-sections:

- Gauging of MW01 MW03 for depth to groundwater and for the presence of light non aqueous phase liquid (LNAPL).
- Collection of water quality parameters and sampling of MW01- MW03.
- Hydraulic conductivity testing of MW02.

2.2.1 Rationale for Sample Locations

Table 2-2 Sample Location Rationale

Location ID	Rationale			
Existing Locations				
MW01	West of the tank farm and up hydraulic gradient			
MW02	Down hydraulic gradient of tank farm			
MW03	East of the tank farm and down hydraulic gradient			



2.2.2 Groundwater Investigation Methodology

Table 2-3 Groundwater Investigation Methodology

Activity/Item	Details		
Date of Field Activities	A groundwater monitoring event was carried on the 31st August 2015.		
Well Construction	Wells are screened within volcanic bedrock from a minimum depth of 8.0 mbgl to a maximum depth of 18.0 mbgl.		
Groundwater Sampling Method	Groundwater samples were collected after purging using low flow techniques. Wells were purged using a peristaltic pump, dedicated tubing and flow through at a low flow rate and until groundwater quality parameters stabilised.		
	Purge volumes and groundwater quality parameters are presented in Table 2 and Appendix D .		
Decontamination Procedure	Dedicated tubing was used for each well and single use sterile gloves to reduce the potential for cross contamination. The interface probe was rinse with Decon 90 and water between wells to prevent cross contamination.		
Sample Preservation	Samples were stored in laboratory provided containers with appropriate preservative and stored on ice in eskys for dispatch to the laboratory.		
Disposal of Purged Groundwater	Purged water was stored in a 205 L drum for waste disposal and disposed of offsite by Volman Enterprises Pty Ltd. The waste disposal docket and classification documentation is presented in Appendix E .		
Slug Tests for Hydraulic Conductivity	A slug test was conducted on MW02 by removing approximately 1 L of groundwater with a bailer and measuring the time it took for the groundwater to recover to the initial standing water level (SWL).		

Table 2-4 Groundwater Analytical Program

A . A . A	THE CONTRACTOR OF STREET	The same area and the same area are
Analysis	Number of Samples Analysed by Primary Laboratory (ALS)	Number of Samples Analysed by Secondary Laboratory (Eurofins)
Total Recoverable Hydrocarbons (TRH)	3 primary samples 1 field duplicate 1 trip blanks 1 rinsate blanks	1 field triplicate
Benzene, toluene, ethyl benzene xylenes and naphthalene (BTEXN)	3 primary samples 1 field duplicate 1 trip blanks 1 rinsate blanks	1 field triplicate
Poly Aromatic Hydrocarbons (PAH)	3 primary samples 1 field duplicate 1 trīp blanks 1 rinsate blanks	1 field triplicate

It is noted that lead was not analysed as it was not considered to be a COPC. There were two historical sampling events in 2011 and 2013. The lead concentrations in 2103 were less than the laboratory LOR of 1 ug/L at two wells and 110 ug/L at one well. In Australia on 1 January 2002, leaded petrol was completely phased out of use. Any new petrol spill or release would be from unleaded petrol. Additionally as detailed in **Section 3**, groundwater as drinking water is not an exposure pathway for the site and the nearest relevant freshwater receptor is too far (greater than 1 km) to be considered a receptor for petroleum hydrocarbon impacts from the



site. Therefore there are no exposure pathways for lead in groundwater to receptors either onsite or nearby offsite.

2.3 Quality Assurance / Quality Control Methodology

Quality assurance and control measures (QA /QC) were incorporated into the sampling and analysis works to ensure that the specified data quality objectives could be achieved and to demonstrate accuracy, precision, comparability, representativeness and completeness with regard to the data generated.

The Data Quality Indicators (DQIs) adopted are based upon data validation guidance documents published by Standards Australia (SA), National Environmental Protection Council (NEPC) and United States Environmental Protection Agency (US EPA). These include Standard guide to the investigation and sampling of sites with potentially contaminated soil (AS 4482.1-2005) Schedule B2 Site Characterisation (NEPC 1999, amended 2013), Schedule B3 Laboratory Analysis of Potentially Contaminated Soils (NEPC 1999, amended 2013), the US EPA Contract Laboratory Program for Organic Data Review, October 1999; US EPA Contract Laboratory Program for Inorganic Data Review, July 2002; and the US EPA Guidance on Environmental Data Verification and Data Validation, November 2002. The process involves the checking of analytical procedure compliance and an assessment of the accuracy and precision of analytical data from a range of quality control measurements, generated from both the field sampling and analytical programs.

Specific elements that have been checked and assessed for this project include:

- preservation and storage of samples upon collection and during transport to the laboratory;
- sample holding times;
- use of appropriate analytical and field sampling procedures;
- required limits of reporting;
- frequency of conducting quality control measurements;
- rinsate, field and trip blank results;
- laboratory blank results;
- · field duplicate and triplicate results;
- · laboratory duplicate results;
- matrix spike (MS) results;
- surrogates spike results;
- review of chromatograms; and
- the occurrence of apparently unusual or anomalous results, e.g., laboratory results that appear to be inconsistent with field observations or measurements.



3 ADOPTED INVESTIGATION LEVELS (ILS)

The primary reference for environmental site assessment in Australia is the amended National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPC, 2013). This document includes criteria for use in evaluating potential risk to human health and ecosystems from chemical impacts, which are presented as generic investigation levels and screening levels appropriate to a Tier 1 risk-based assessment applicable to the first stage of site assessment. The application of these investigation levels and screening levels is subject to a range of limitations, and their selection and use must be in the context of a conceptual site model (CSM) relating to the nature and distribution of impacts and potential exposure pathways. The adopted investigation levels for this site assessment have been summarised below in **Table 3-1**.

Table 3-1 Adopted Investigation Levels

Media	Adopted IL	Rationale
	Health Screening Levels HSL, Amended ASC	HSLs protective of a Commercial/ Industrial (D) scenario were selected for onsite receptors and offsite commercial properties surrounding the site.
	NEPM (NEPC, 2013)	Borehole logs record saturated zones from 11.0 mbgl to 17.4 mbgl within volcanic bedrock during drilling and standing water levels were recorded from 3.248 mbgl to 4.953 mbgl during this groundwater monitoring event indicating confined groundwater. A depth range of 8 m+ was chosen as this reflects the aquifer depth.
lwater		Sand was chosen as the strata as this is the most conservative lithology.
	Australian Drinking Water Guidelines (ADWG) (NHMRC – 2011)	One groundwater bore is reported to be 500 m north west of the site installed to a depth of 20.4 mbgl. The use and screen details of the bore are not known. But due to the distance it is unlikely to be receptor. The California State Water Resources Control Board (CSWRCB), (2012) states "a total separation distance from the source area to the receptor of about 1,000 ft (305 m) should be protective for virtually all plumes from UST sites".
Groundwater		It is also noted that the ACT's water supply is managed by the ACTEW Corporation, a government-owned company that administers Canberra's water systems. The drinking water supply is primarily sourced from four storage reservoirs (Cotter Dam, Bendora Dam, Corin Dam and Googong Dam) within two catchment areas (Cotter and Queanbeyan Rivers) and the surface water is run through two water treatment plants (WTP), Mount Stromlo WTP and Googong WTP.
		These guidelines have been used as conservative screening for other potential unknown bores.
	Protection of Aquatic Ecosystems –	NEPM (2011) suggests a search radius of 500 m from site boundary for ecological receptors.
	Freshwater - 'slighty to moderately disturbed ecosystems' (ANZECC, 2000)	Tuggeranong Creek is located 150 m north east of the site however it is concrete lined and acts as a storm water drain therefore is not considered a freshwater receptor nor is it likely to act as a preferential pathway as groundwater is deeper than the base of the channel.
		No other freshwater receptors were identified within 500 m of the site.
		These criteria have not been adopted for this investigation.



4 RESULTS

A high-level summary of the works completed is provided below:

Table 4-1 Summary of Works

Dates	Activities	Contractors / URS Personnel
31/08/15	GME carried out on MW01, MW02 and MW03	Anna Andrzejewski (URS) Daniel Der Tateossian (URS)

4.1 Groundwater

4.1.1 Site Hydrogeological Results

Table 4-2 Hydrogeological Summary

Aspect	Results
Depth to Groundwater	Groundwater was encountered between 3.248 mbgl and 4.953 mbgl during this groundwater monitoring event which is similar to previous events.
Groundwater Inferred Flow Direction	Groundwater elevations indicate groundwater flow is to the north east.
Groundwater Hydraulic Gradient	A hydraulic gradient of 0.06 was calculated based on groundwater contours presented on Figure 3 ,
Hydraulic Conductivity	A hydraulic conductivity of 0.07001 m/day was calculated using field test data from MW02 (calculations are presented in Appendix F).
Aquifer Porosity	From reviewing borehole logs the wells were installed using solid flight auger. Therefore, it is assumed that "volcanic bedrocks" were weathered as solid flight auger would not be able to advance through solid bedrock. A porosity value of 26% for schist (McWorther & Sunada, 1977) has been used as this would most reflect ground conditions (calculations are presented in Appendix F).
Seepage Velocity	A seepage velocity of between 5.90m/year was calculated based on the above data (Calculations are presented in Appendix F).

4.1.2 Groundwater Field Parameters and Observations

Table 4-3 Groundwater Field Parameters

Parameter	Results and Comments						
рН	pH ranged from 6.87 at MW02 to 7.15 at MW01 which indicate neutral groundwater conditions.						
Redox Potential (Eh)	Redox ranged from 124 millivolts (mV) at MW02 to 266.8 mV at MW03.						
Dissolved Oxygen (DO)	DO ranged from 2.7 % at MW03 to 11.0 % at MW01. Readings at MW01 may be elevated due to an equipment fault. MW01 and MW02 readings indicate poorly oxygenated water while MW03 indicates well oxygenated water.						
Electrical Conductivity (EC)	Electrical conductivity ranged from 89.6 µS/cm to 2233 µS/cm indicative of fresh to brackish water.						
Total Dissolved Solids (TDS)	TDS values ranged from 53.76 mg/L (MW03) to 1339.8 mg/L (MW02) indicating that groundwater is fresh to brackish and could be suitable as a potable supply.						
Temperature	Temperature ranged from 18.37°C to 19.63°C.						



During the field works, the following observations were noted:

- Waters were clear to yellow with no strong odours or sheens noted at any locations.
- Well PID readings ranged from 0.2 ppm at MW03 to 8.8ppm at MW01.

Calibration sheets for the water quality metre and PID are located in Appendix D.

4.1.3 Groundwater Analytical Results

Groundwater Analytical Results are summarised in the following:

- Table 3 Groundwater Analytical Results
- Figure 3 Groundwater Data

4.2 Quality of Analytical Data

A summary of the field QA/QC samples collected is provided in Table 4-4 below.

Table 4-4 QA/QC Program

QA/QC Sample ID	Parent Sample ID	Date Obtained	QA/QC Sample Type											
Groundwater Sampling														
22176_QC100_150831	22176_MW02_150831	31/08/15	Field Duplicate											
22176_QC200_150831	22176_MW02_150831	31/08/15	Field Triplicate											
22176_QC300_150831	N/A	31/08/15	Rinsate Blank											
TB_22176	N/A	31/08/15	Trip Blank											
22176_MW01_150831	22176_MW01_150831	31/08/15	Matrix Spike											
22176_MW02_150831	22176_MW02_150831	31/08/15	Laboratory Duplicate											

The following summarises the findings of the data quality review undertaken, with further detail provided in the Data Validation Summary Reports in **Appendix C**.

No QA/QC issues were identified in the field or laboratory datasets that could have a material implication to decision-making on the project, with the following exceptions:

 Relative percentage differences between the primary and triplicate sample were outside of the control limits. The primary and duplicate samples were within control limits therefore the exceedances are likely due to different laboratory methods.



5 CONCLUSIONS

5.1 Hydrogeology

- During drilling onsite groundwater was encountered within volcanic bedrock from a
 depth of 11.0 mbgl to 17 mbgl. Potentiometric water surface ranged from 3.2 mbgl to
 4.9 mbgl during this and previous monitoring events therefore the aquifer is believed
 to be confined.
- Groundwater is expected to flow to the north east and the hydraulic gradient was calculated to be 0.06.
- Field testing of MW02 resulted in a hydraulic conductivity value of 0.07001 m/day.
 Seepage velocity was then calculated to be 5.90m/year.

5.2 Dissolved Phase Impacts

- Concentrations of benzene at MW02 exceeded HSLs protective of commercial users.
- Concentrations at MW01 and MW03 were below all relevant ILs.

5.3 Compliance

The site is considered to be compliant with the Environmental Authorisation requirement for annual groundwater sampling.



6 REFERENCES

AECOM Australia Pty Ltd (AECOM), 2011. Groundwater Monitoring Well Report, Caltex Calwell (22176), Corner Were Street and Webber Crescent, Calwell, ACT (17 November 2011). Document no. 60196918-006-0

Bureau of Mineral Resources, 1992. Geology and Geophysics Australia, Canberra Sheet 8727, 100k series, First edition 1992.

California State Water Resources Control Board (CSWRCB), (2012), Technical Justification for Groundwater Plume Lengths, Indicator Constituents, Concentrations, and Buffer Distances (Separation Distances) to Receptors, California Low-Threat Underground Storage Tank (UST) Closure Policy.

Caltex Australia Petroleum Pty Ltd (Caltex) (2013), Environmental Site Assessment Specification, MKT-OEMS-PROC-003a, February 2013.

CRC for Contamination Assessment and Remediation of the Environment (CARE), 2013. Technical Report no. 23, Petroleum Hydrocarbon Vapour Intrusion assessment: Australian Guidance.

McWhorter & Sunada 1977, Ground-water Hydrology and Hydraulics, Water Resources Publication, 1977.

National Environment Protection (Assessment of Contaminated Land) Measure (NEPM) 1999, National Environment Protection Council Amendment 2013. Schedule B1, Guideline on Investigation Levels for Soil and Groundwater.

Parson Brinckerhoff, 2013. 2013 Round 1 – ACT Groundwater Monitoring Event, Caltex Calwell, Corner Were Street and Webber Crescent, Calwell ACT 2905.



7 LIMITATIONS

URS Australia Pty Ltd (URS) has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of Caltex Australia Petroleum Pty Ltd and only those third parties who have been authorised in writing by URS to rely on this Report.

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Any estimates of potential costs which have been provided are presented as estimates only as at the date of the Report. Any cost estimates that have been provided may therefore vary from actual costs at the time of expenditure.



TABLES

43218537/01/01 - Calwell 22176



Well ID	Top of Casing (mRL)	Depth to Top of Screen (mRL)	Depth to Top of Screen (mbTOC)	Date and Time Gauged	Depth of Well (mbTOC)	Depth to Water (mbTOC)	Groundwater Elevation (mRL)	Depth to LNAPL (mbTOC)	LNAPL Thickness (m)	Well Condition
MW01	99.94	91.94	8.00	31/08/2015	10.26	3.248	96.69	8	+	Good condition.
MW02	99.85	88.85	11.00	31/08/2015	13,94	4.953	94,89	- 9	P	Good condition
MW03	99.78	84.78	15.00	31/08/2015	18.02	4.673	95.11	×	-	Good condition

mRL = metres relative level (Surveyed by AECOM, 2011: Only elevations provided)

mbTOC = metres below top of casing



Table 2: Groundwater Field Quality Parameters
Caltex 22176 - CALWELL Service Station URS Job No. 43218537 Date: 31/08/2015

		PID Well Head Readings	Purge Volume	TO SECURE A SECURITARIZATION A SECURE A SECURITARIZATION A SECURE A SECURITARIZATION A SECURITARIZATION A SECURE A SECURITARIZATION A SECURE A SECURITARIZATION A SECURE A SECURE A SECURITARIZATION A S	Electrical Conductivity (Field Measurement)	Total Dissolved Solids ¹	pH Field Measurement	Redox Field Measurement	Redox Potential ⁶	Temperature Field Measurement	Comments			
					ppm	ı	N.	μ5/cm	mg/l	pH UNITS	πV	mV.	ĕ.C.	
Well/Location ID	Sample	Measurement Date	Start Depth (mbgl)	End Depth (mbgl)										
MW01	22176_MW01_150831	31/08/2015	3.248	- 1	8.8	3	11	1339.5	803.7	7.15	-15.1	1709	19.01	Clear, no odour.
MW02	22176_MW02_150831	31/08/2015	4.953	4.985	3.5	2	4.7	2233	1339,8	6.87	-82	124	18.37	Clear to yellow hue.
EOWM	22176_MW03_150831	31/08/2015	4.673	5,865	0.2	2	2.7	89.6	53.76	7	60.8	266.8	19.63	Clear, no odour.

Legend:

1 Calculated from Electrical Conductivity x 0.6

Redox Potential measured with a platinum electrode and silver / silver childride reference electrode (Er) and converted to Eh by Eh = Er + 208 mV

Units and Abbreviations:

L - Litro

EC = Electrical Conductivity Er = Reference Electrode

Eh = Potential Redox

ppm: Paris per million

µS/cm: Micro Siemens/cm

mV: Milli Volts

*C: Degrees Celcius mg/l:Micro grams/Litro

HC: Hydrocarbon

Table 3: Groundwater Analytical Results Sample Results - TRH, BTEXN, PAH Caltex 22176 - CALWELL Service Station URS JOD NO.43218537

					Tot	al Recove	rable Hy	drocarbo	ns					BTE	XN			-				- 1	Polycy	yelie ar	romati	e Hydr	ocarbo	ов (РАН	Ľ		-	- 3
				6-C10Fraction	S-C10 Fraction minus BIEX (F1)	C10-C16 Fraction	C10-C16 Fraction minus Naphthalene (F2	C16-C14 Fraction	C34-C40 Fraction	C10-C40 Fraction (sum)	Зектовня	bluene	imylbenzene	r & p-Tylene	rtho-Xylens	okal Xytene	lum of BTEX	laphthalene	laphthalene	tonnaphthylann	conspittions	Henarthren	uthraome	quoranthene	yresio	Jorizi, a ja intina ceme	Physicia December of Missen of Phina	Servicial (a) (cyvreine	ndeno(1,23.rd)pywne	Bonzia.hjarithracene	Jerzo(g.h.l)paryiene	ium of Phlycyclic Aromatic Hydrocarbons
			LOR	20	20	100	100	100	100	100	1	2	2	2	2	2	1	1	5	11	111	1	11	1	1	1	1 7	0.5	131	11	1	0.5
			linits	Ngu	lig/I	ug/l	Ngu	ug/l	мул	ug/l	i ig/l	ug/l	Ug/T	Ug/I	ug/l	ug/l	ug/l	ug/l	Ugli	ug# i	ig/ us	yl ug/l	1 ug/l	fig/l	sig/l	ug/l t	igf tur	l ugi	Ug/I	Teu	1gu	Topi
			Action Levels							-																						
			RINKING WATER (2013				150				1	800	300	600	600	500		100	Land .									0.01				
Towns.		NEPM	-HSL WG D SAND II+ M		7000		NL				5000	NL	NL			NL		ML	NL			- 1		100								
Sample Location	Date Sampled	Sample ID	Sample Type											-	/=									-					-			
MWD1	31.08/2015	22176_MW01_150831	N	50	50	< 100	< 100	< 100 J	< 100	< 100	<1	=2	<2	<2	<2	<2	<1	<11	< 5	<1	11 <	1 < 1	<1	< 1	< 1	91 9	1 <1	3 = 05	<1	<.1	<1	< 0.5
MW02	31/08/2015	22176_MW02_190831	-N	9230	< 1000	390	320	< 100 J	< 100	390	7810	88	282	484	< 50	454	8660	35.7	72	<1.	11 <	1 < 1	41	91	×1	×1 ×	1 <	1 = 05	<1	<1		35.7
MW02	31.08/2015	22176 QC100_150831	FD	8640	< 1000	330		< 100 J	< 100		7620	83	275	485	< 50	485	8460	31.0	76	<1 -	1 <	1 <1	<1	<1	41	41 A	1 4	1 < 05	<1	<1	<1.	31.0
MW02	31/08/2015	22176_QC200_150831	FT	17000	6500	390	390		< 100		9700	< 100	290	510	< 100	510	10500	< 100		<1.										41		
MW03	31/08/2015	22176 MW03 150831	N.	< 20	< 20	< 100	< 100	< 100 J	< 100	< 100	<1	< 2	< 2	< 2	<2	<2	<1	<11	4.5	611	11 4	1 < 1	1 69	<1.7	£5.1	= 9 =	1 21	1 < 05	×1.1	<11	433	× 65

Legend:
LCR - Limit of Recording
- foot analysed not calculated
*LDR Excends Guideline Trigger Value
Sample Type: N - Primary, FD - Duplicate, FT - Triplicate

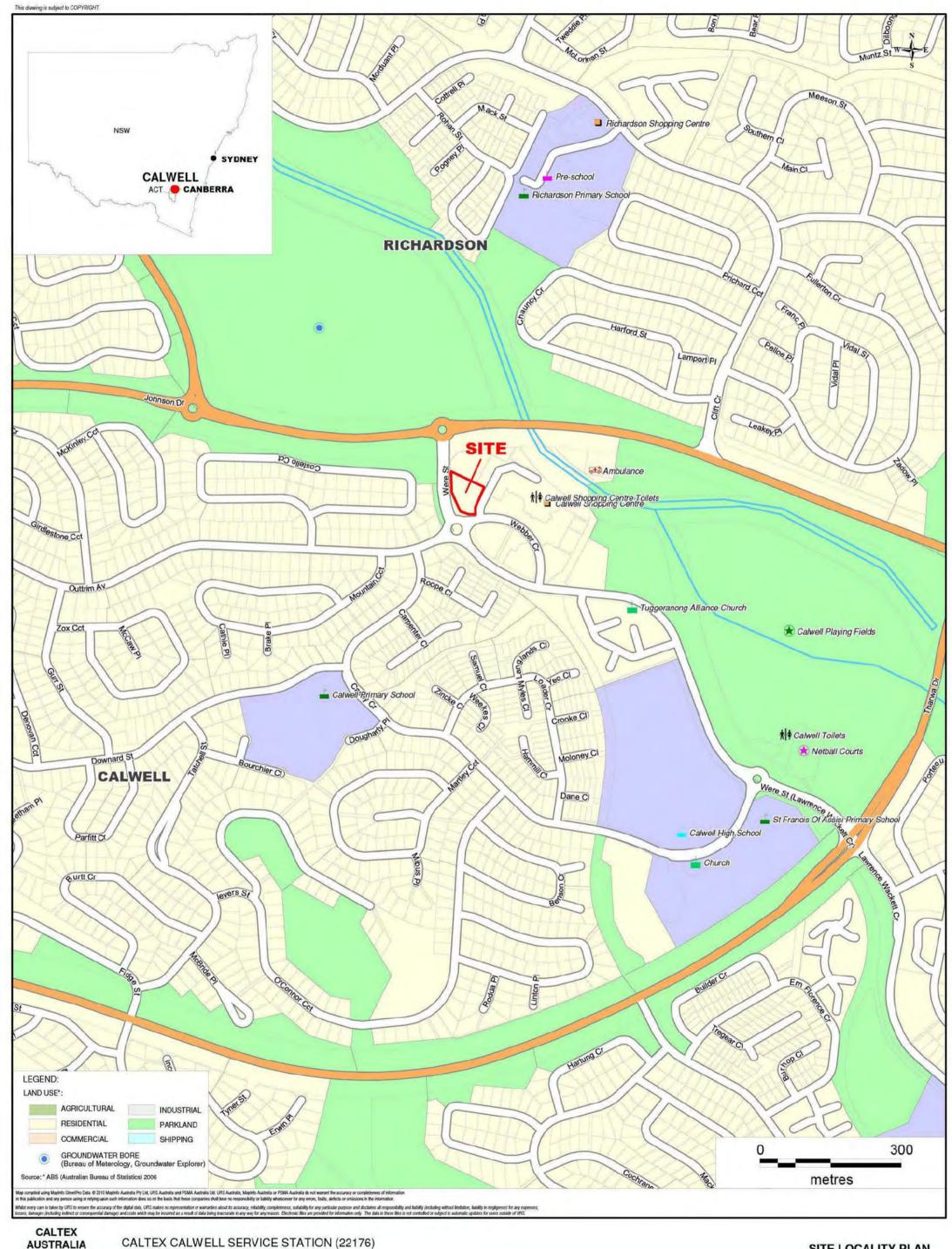
Action Livels:
Exceeds National Environmental Protection Council (NEPC) 2013 Amendment of the Nation
Environmental Protection Measure (NEPM) 1999, Groundwater investigation Level (Gil.)
Drinking Water (2013.
Exceeds National Environmental Protection Council (NEPC) 2013 Amendment of the Nation
Environmental Protection Measure (NEPM) 1999, Groundwater Health Screening Levels 8151.)
D for Vapour Intrusion- Commercial/ Indistrial (sand) 8+ in

Lab Qualifiers: J - Estimated value.



FIGURES

43218537/01/01 - Calwell 22176



AUSTRALIA PETROLEUM PTY LTD

1 WEBBER CRESCENT, CALWELL, ACT

SITE LOCALITY PLAN

URS

GROUNDWATER MONITORING REPORT

Figure:



CALTEX AUSTRALIA PETROLEUM PTY LTD

CALTEX CALWELL SERVICE STATION (22176) 1 WEBBER CRESCENT, CALWELL, ACT

SITE LAYOUT

