Design, Implementation & Operational Method Statement

Proposed Petrol Filling Station
Land south of Broadland Gate, adj.to Postwick Interchange
Postwick
NR13 5NP

Prepared for:

EuroGarages Ltd
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Design, Implementation & Operational Method Statement
Land South of Broadland Gate, Postwick
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Revised sections since Issue 3 (Issued 12/9/2017)

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<tr>
<td>Marcus Bell</td>
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<td>Principal Consultant</td>
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The report has been written, reviewed and authorised by the persons listed above. It has also undergone EPS’ in house quality management inspection. Should you require any further assistance regarding the information provided within the report, please do not hesitate to contact us.
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1 INTRODUCTION

In July 2017, Environmental Protection Strategies Ltd (EPS) was commissioned by Euro Garages Ltd to produce a Design, Implementation & Operational Method Statement for Land south of Broadland Gate, adjacent to Postwick Interchange, Postwick (the 'site'); see Figure 1.

The purpose of this document is to provide an outline of the design, implementation and operational measures which will be undertaken to ensure risks to the water environment are minimised, particularly with regards to the nearby Anglian Water public water abstraction located roughly 210m to the east of the proposed PFS site.

The scheme is currently pending determination through the planning process, whereby proposals currently include the construction of a 7-pump petrol filling station (PFS) with a kiosk/amenity building together with 2 drive-thru restaurants, vehicle access, HGV parking and soft landscaping. It is proposed that there will be three 75,000l fuel storage tanks, containing both petrol and diesel. A proposed development plan is included in Appendix A.

The local planning reference is 20170095 (Broadland District Council), the Environment Agency’s reference is AE/2017/121301/01-L01 and Anglian Water’s reference is 00020573.

1.1 Previous Reports

A Fuel Storage Feasibility Assessment has previously been undertaken for the site by EPS to inform the pre-application planning requirements associated with bulk fuel storage. The findings of this work are provided in the following report, in conjunction with which this report should be read:

- ‘Fuel Storage Feasibility Assessment’ reference UK17.2609; EPS 5th April 2017

1.2 Site Location & Description

The site currently comprises an area of rough grassland with a gravelled area along its western extent which, until recently, formed a Balfour Beatty temporary construction compound. It covers an approximate surface area of 2ha and lies at a topographic elevation of 16-20m Above Ordnance Datum (m AOD).

While the site is recorded to be within a Source Protection Zone III (SPZ III - Total Catchment) for groundwater abstraction, it should actually be in SPZ I (Inner Source), where the travel time for a pollutant within the groundwater is deemed less than 50 days before it impacts on the public water supply. The ground conditions, as described within EPS’ previous report, are permeable and the environmental sensitivity of the site is therefore very high. Although EPS’s previous report did account for the revised SPZ classification, other aspects of the submission did not, both in terms of supporting information to the application as well as initial consultee responses.
1.3 Objectives & Regulatory Liaison

The objective of this method statement is to present information to demonstrate compliance with the Environment Agency’s (EA) suggested planning conditions and by doing so, present further assurance to Anglian Water (AW) that unacceptable risks to their borehole will not exist for the lifetime of the facility.

Reference should therefore be made to the EA’s consultation response dated 8th May 2017 with suggested conditions and also AW’s revised response dated 6th June 2017, which are both included in Appendix B. Mr Stuart Moore of Broadland District Council has also presented an emailed consultation response dated 3rd February 2017 and together with input from his colleague Mr David Humphrey highlighted both the risks to the borehole from the PFS but also specifically the risks from surface water drainage (as soakaways were included within the initial Drainage Strategy).

A first draft version of this report was issued on the 13th July 2017 for comment both from Anglian Water, the Environment Agency, the site operator and drainage engineers. A second draft was then issued on the 17th July. Subsequently a meeting was held on the 21st July where various requirements of the scheme were outlined by Anglian Water and the Environment Agency. A third version of the report was issued on the 12th September 2017 and following a meeting with Anglian Water and the Environment Agency on the 12th October 2017, the need for a fourth Issue was confirmed because the proposed tertiary containment for the tank design was deemed essential. That design is included within this version of the report.
2 STRUCTURE OF METHOD STATEMENT

This method statement is divided into four sections, with the relevant details for each summarised in the following diagram and discussed in further detail in the following sections.

Infrastructure Design
- Interstitial monitoring on fuel dispensing lines.
- Double skin tanks with interstitial monitoring.
- Tank farm to be housed within a Membrane Lined Cell (MLC) to act as tertiary containment.
- Membrane within MLC to be high specification (Ciria 748 compliant) whereby it can be immersed in hydrocarbons and retain integrity, with appropriate geotextile and geocomposite protection.
- Drainage Strategy updated as per Appendix D, soakaways are no longer retained other than for clean canopy run-off.

Implementation Methodology
- Method statement on MLC installation to be provided once contractor appointed and design finalised.
- Construction techniques to be assessed across the site.
- If piling is used (not anticipated), risk of turbidity breakthrough to be assessed and accounted for in Foundation Works Risk Assessment.

Future Operation and Management
- Wet stock management and inventory reconciliation process, run both by operator & independent third party.
- Maintenance / Monitoring Schedule for drainage network (interceptors etc.).

Failure Response Procedures
- Fail Safes
  - Dry Leak Detection
  - Manual & Automatic stock reconciliation
  - Third party independent scrutiny of wet stock

Incident Response
- Response times & procedures presented in detail
- Appointed independent fuel removal company utilised to drain leaking tanks (not drawn down through customer sales)
- Use of monitoring wells within MLC backfill to determine presence of fuel & allow rapid extraction if necessary.
2.1 Infrastructure Design

The level of environmental protection that can be engineered into the design of the PFS from the outset relates to the fuel storage and distribution hardware as well as the drainage.

The nature of fuel storage was risk assessed within EPS’ previous report but that is largely focussed on the fundamental question of feasibility for above or below ground fuel storage at this particularly site and the associated level of environmental protection. Details on the tanks and their conformance to Blue Book & international standards, fittings and fuel lines are included in Appendix C.

The Environment Agency are in agreement with the concept of installing tertiary containment for the underground storage of fuel at Broadland Gate. A proposed site-specific engineering specification is referred to within Appendix C and the membrane to be used in that design would constitute a Ciria 748 complaint high specification membrane. This membrane can retain its integrity even if submerged in challenger compounds, i.e. petroleum.

The design of the tertiary containment needs to be confirmed with the EA (and AW) and earlier iterations of this report included comparable designs, whereas this version contains a site specific proposed design. Although they are not shown on the drawing in Appendix C, monitoring standpipes are to be installed within the pea shingle to be used for both future monitoring and if it were to be necessary, the removal of fuel released from the tank cell. It is acknowledged that the Environment Agency have subsequently raised a preference for a conventional concrete vault over the above-described form of tertiary containment. However, EuroGarages and EPS would be keen demonstrate that the proposed design is at least equal to such a vault in terms of the level of environmental protection it would offer and would demonstrate that position as part of the process of complying with conditions attached to the decision notice.

Both the tanks and fuel lines will have interstitial monitoring, as shown above in Section 2 and in more detail in Section 2.4. This type of monitoring is commonplace on new tanks but is unusual for pipes as well, but the sensitivity of the site warrants it so the necessary infrastructure and management systems will form part of the design.

For the drainage strategy, Topping Engineers have updated their existing strategy to reflect the updated Source Protection Zone, together with providing details of environmental protection (interceptor design) drainage layouts as well as monitoring and maintenance requirements. These details are presented in Appendix D.

2.2 Implementation Methodology

The method of installation of the PFS and the MLC itself is extremely important for its future integrity to be assured. The process will be presented in response to conditions and any input from both the Environment Agency and Anglian Water.

Similar iterations have used a fleece lining/geo-composites to protect integrity of the membrane. In this instance, the proposed membrane is a Visqueen Intimate VOC BLOK which is CBR
puncture tested to 1,640N and welded along all joints, so it would be able to withstand the installation process without the need for fleeces.

For the foundations of the new buildings on site (& the tank farm) information has been sought from Euro Garages and their engineers (Topping Engineers) specifically in relation to whether any piled solution is to be utilised. Although this seems unlikely, if it was a Foundation Works Risk Assessment would need to be presented specifically accounting for both pollution of the underlying aquifer as well as turbidity breakthrough.

### 2.3 Future Operation and Management

Euro Garages employ a high specification third party wet stock management and inventory reconciliation process which compliments their own internal reconciliation process. The third party system is operated by Fairbanks Environmental Ltd.

Monitoring includes taking measurements every second of fuel in/out, levels in tanks and temperature. Any slight discrepancy in the readings triggers an alarm. It has an automated alarm which is triggered immediately once a leak is detected.

A letter summarising Fairbanks’ role and details of EGs Veeder Root are presented in Appendix E, with additional details included in Section 2.4.

Information will also be provided by EG in relation to the PFS’ standard operating procedures, training, minor surface spill responses and associated audit trails in response to conditions when appropriate.

### 2.4 Failure Response Procedures

Euro Garages use three different processes which simultaneously operate to ensure a failsafe.

**1st Process:**

All new to market sites are constructed with a fuel management system which comprises of a Dry Leak Detection System (see image below and information in Appendix E).
The above system is constantly monitored but if an alarm is triggered or a failure is detected it is unlikely that any fuel is lost into the ground. When an alarm is triggered it is due to the failure of the outer skin and the fuel is retained within the tank itself (inner skin). However, if this does happen then the fuel is removed from the tank within 4 hours (vacuum tank on site within 1 hour and 2 hours to clear a fuel tank – as an aside, EG’s tanks are never full as they only fill them up for three days of stock which normally means they are half full to ¾ full).

It will always be the outer skin to fail first as the inner and outer skins are manufactured to be smooth and are coated with a specialist coating to ensure they are smooth. Any dents will create rust which would normally only happen to the outer skin. However, before a tank is installed into the ground they are manually inspected by a Petroleum Inspector for any dents. This is a detailed examination and not a ‘once over’. Once approved, the tank is lowered into the ground. If it fails then the tank will not be allowed into the ground.

Once the fuel is removed then the tank is checked to identify the source. Once identified, rather than repairing (which would create weaknesses) EG would install a new bladder (essentially a new skin) inside of the tank so it is a new 2 skin tank.

The tanks have a life span of 35 years.

2nd Process (running simultaneously)

EG operate a TLS350R Gauge on their tanks (‘R’ stands for reconciliation). Historically a tank would have a ‘dip stick’ which would measure the fuel. However, if this moved around (i.e. when fuel was put into the tank) then it risked rubbing against the sides of the tank causing corrosion. The approach EG use is to insert a gauge into the tank which measures the presence of water, temperature and fuel levels measured against sales. This is constantly measured. If the gauge identifies fuel leaving the tank which is not registered as a sale then an alarm is triggered.
In addition, EG also take a daily manual reconciliation in the back office computer system.

In the unlikely scenario of a leak, the previously described procedure is followed.

**3rd Process (running simultaneously)**

To ensure complete monitoring and to ensure impartiality, EG employ Fairbanks Environmental who monitor the fuel in real time as another ‘pair of eyes’. They are a specialist wetstock monitoring company with an SIR (Statistical Inventory Reconciliation) leak detection system accredited to 9 litres per day.

If any leaks are detected the processes listed previously are implemented.

**If a leak is detected:**

1) A vacuum tank will be on site within 1 hr.
2) All tanks on site are pumped (up to 2 hrs).
3) The standpipes installed within the MLC are monitored and if fuel is found to be present it will be removed as far as practicably possible using the vacuum tanker.
4) Euro Tank (not associated with Euro Garages) investigates the cause.
5) The amount of fuel lost is ascertained
6) EG inform the Env. Agency.
7) If petrol is lost EG inform the Env. Agency and the Petroleum Officer.
8) EG instruct an immediate Site Investigation to identify what is in the ground & develop a Remedial Strategy where necessary.
9) Depending on the outcome / findings of no. 3 and 8 above, EG install a remediation system to extract residual fuel from within the MLC and if necessary from the surrounding ground.
APPENDICES
APPENDIX A

Proposed Development Plan
APPENDIX B

Environment Agency & Anglian Water’s Consultation Responses
Planning Application Report

AW Reference: 00020573
Local Planning Authority: Broadland District
Site: Land South of Broadland Gate, Adjacent to Postwick Interchange, Postwick, Postwick with Witton
Proposal: Full planning application for the proposed development of 1 no. petrol filling station, 2 no. drive through restaurants & 24 space HGV parking, together with various infrastructure & landscaping works
Planning reference: 20170095

Date 06 June 2017

Thank you for the opportunity to comment on the above proposed development. Although Anglian Water is not identified in schedule 4 of the Town and Country Planning (Development Management Procedure) (England) Order 2015 as a statutory consultee, we do seek to comment on development proposals to protect the environment and our existing and future customers. Our comments should be afforded the necessary weight associated with the material planning consideration to which they refer.

If you would like to discuss any of the following comments please do not hesitate to contact the Pre-Development Team on 0345 0265 458 or email planningliaison@anglianwater.co.uk
Introduction
The purpose of this response is to outline Anglian Water’s position relating to groundwater matters relating to the above application following a request for further comments from Broadland District Council. This response should be read in conjunction with the response submitted on 7th April 2017 and Anglian Water’s e-mail dated 1st June 2017.

Background
Anglian Water’s principal interest on this site is the potential impact on groundwater quality due to the vulnerable nature of the underlying aquifer and the proximity of the proposed development to the borehole at Postwick Water Treatment Works. The proposed petrol filling station (PFS) development is located 280m north-west of the public water supply borehole and within the corresponding groundwater source protection zone 1 (SPZ1) as defined by the Environment Agency.


Of particular relevance to this proposal is the statement in GP2017 that “the Environment Agency will oppose any new development involving large-scale above or below ground storage of hazardous substances (as may occur at a chemical works or at a petrol filling station) which is located within SPZ1”. The guidance does, however, in position statement D2 go on to state that “the Environment Agency will normally object to new and increased underground storage of hazardous substances in SPZ1”. It is apparent that the Environment Agency has removed the initial objection to this proposal based on the evidence as submitted by the applicant in the Fuel Storage Feasibility Assessment, and subject to the imposition of planning conditions by the District Council as outlined in their letter dated 8th May 2017.

Within GP2017, the Environment Agency states that “substantial evidence and justification are required for any retention of underground storage of hazardous substances in SPZ1, detailing how risks to groundwater can be adequately mitigated” and it is assumed that similar rigour would be required for any new development. The Environment Agency also states that proposals would “be accompanied by a risk assessment appropriate to the volume and type of pollutants being stored and the hydrogeological situation … more detailed risk assessments and an infrastructure design method statement would be expected for storage with SPZs”.

Anglian Water does not consider that the information presented in the feasibility assessment provides sufficient evidence to meet this requirement we have
contacted the Environment Agency to ask that they clarify their reasoning for reaching their conclusion.

The Postwick groundwater source was developed in 2010 and an abstraction licence was issued in March 2012. The new multi-million pound water treatment works (WTW) was subsequently opened in 2016 to serve a population of 60,761 (26,591 properties) in the Norwich supply zone. The source is licensed to abstract up 7.5 Ml/d (87 l/s) and was developed as a sustainable alternative source to our abstraction point at Strumpshaw which was deemed to be having an unacceptable impact on the environment and was closed in 2008.

The borehole abstracts groundwater from the upper Chalk aquifer. The lithological log is summarised as a thin layer of Boulder clay overlying 16.5m of Crag deposits comprising sands, gravels and clays. The top of the Upper Chalk is found at 17.5m below ground level. The aquifer at site is classified as unconfined in the vicinity of Postwick, becoming confined to the north where the boulder clay cover thickens and forms a more extensive cover. The Environment Agency has modelled the SPZ for this new source, but has not yet published the map.

The treatment processes at Postwick WTW comprises Pre-Chlorination Chlorination (Gas), Pressure Filtration Nitrate Reduction (Ion Exchange), Dechlorination, Ammoniation and Plumbosolvency Control.

These treatment processes would not mitigate the risk of any hydrocarbon pollution that may impact the groundwater quality within the capture zone of the Postwick borehole. Contamination of this source could result in significant disruptions to supply and public health risk.

Anglian Water’s Position
Anglian Water considers that the risk posed by the development of the proposed petrol filling station, with associated underground fuel storage tanks and pipework, within the SPZ1 of the Postwick abstraction is unacceptable. We are of the opinion that the supporting information set out in the applicant’s Fuel Storage Feasibility Statement does not provide the sufficient level of detail to ensure that the proposal can be delivered without causing a detrimental impact on water quality, which could lead to restrictions to the public water supply, implications on public health and the local economy.

Summary
Based upon the available submitted information, Anglian Water strongly objects to the proposed development on the grounds of potential implications for public health and the local economy. Should you wish to discuss the above matters further, please do not hesitate to contact us on the details below.

Anglian Water Services Limited
Pre-Development Services
Thorpe Wood House, Thorpe Wood
Peterborough
PE3 6WT
Dear Mr Rickman

FULL PLANNING APPLICATION FOR THE PROPOSED DEVELOPMENT OF 1 NO. PETROL FILLING STATION, 2 NO. DRIVE THROUGH RESTAURANTS & 24 SPACE HGV PARKING, TOGETHER WITH VARIOUS INFRASTRUCTURE AND LANDSCAPING WORKS LAND SOUTH OF BROADLAND GATE, ADJACENT TO POSTWICK INTERCHANGE, POSTWICK, NR13 5NP

Thank you for your consultation received on 20 April 2017. We have inspected Fuel Storage Feasibility Assessment and Drainage Strategy reports, as submitted. We consider that our previous objection may be removed and planning permission could be granted to the proposed development as submitted if the following planning conditions are included as set out below. Without these conditions, the proposed development on this site poses an unacceptable risk to the environment and we would maintain our objection to the application.

We ask to be consulted on the details submitted for approval to your Authority to discharge these conditions and on any subsequent amendments/alterations.

Environmental setting

The site is underlain by a Secondary A aquifer (Happisburgh Glaciogenic Formation And Lowestoft Formation (Undifferentiated)) followed by a Principal aquifer (Crag Group) then chalk (also a principal aquifer). The site is close to licenced potable groundwater abstractions for a public water supply. A Source Protection Zone 3 already exists but the source protection zone associated with the new abstraction is not yet present. The Source Protection Zone remodelling work that is currently being undertaken will cause this site to be within a Source Protection Zone 1, where any pollution entering groundwater will be modelled to reach the groundwater supply within 50 days. The site is also in an EU Water Framework Directive Drinking Water Protected Area. The environmental sensitivity at the site is therefore considered to be very high. The future use could present potential pollutant linkages to the water environment. Consideration for the risk posed by surface water drainage will also
need to be undertaken.

**Condition 1**

The development hereby permitted shall not be commenced until such time as a scheme to install, monitor and maintain the underground tanks has been submitted to, and approved in writing by, the local planning authority.

The scheme shall include the full structural details of the installation, including details of excavation, the tank(s), tank surround, tertiary containment, associated pipework, monitoring system and maintenance, monitoring & sampling schedule. The scheme shall be fully implemented and the tanks and associated infrastructure subsequently maintained and monitored, in accordance with the scheme, or any changes as may subsequently be agreed, in writing, by the local planning authority.

**Condition 2**

The development hereby permitted shall not be occupied until such time as a validation report has been completed, which includes evidence that the tanks and associated infrastructure have been completed in accordance with the scheme approved under condition 1. The validation report should be submitted to, and approved in writing by, the local planning authority.

**Reason for Conditions 1, 2**


**Condition 3**

If, during development, contamination not previously identified is found to be present at the site then no further development (unless otherwise agreed in writing with the local planning authority) shall be carried out until the developer has submitted a remediation strategy to the local planning authority detailing how this unsuspected contamination shall be dealt with and obtained written approval from the local planning authority. The remediation strategy shall be implemented as approved.

**Reason for Condition 3**

To protect and prevent the pollution of the water environment (particularly the Secondary (undifferentiated) and Principal aquifers, Source Protection Zone 3 and future Source Protection Zone 1, nearby water features and EU Water Framework Directive Drinking Water Protected Area) from potential pollutants associated with current and previous land uses in line with National Planning Policy Framework
Condition 4

No drainage systems for the infiltration of surface water drainage into the ground is permitted other than with the express written consent of the local planning authority, which may be given for those parts of the site where it has been demonstrated that there is no resultant unacceptable risk to the water environment. The development shall be carried out in accordance with the approval details.

Reason for Condition 4

To protect and prevent the pollution of the water environment (particularly the Secondary (undifferentiated) and Principal aquifers, Source Protection Zone 3 and future Source Protection Zone 1, nearby water features and EU Water Framework Directive Drinking Water Protected Area) in line with National Planning Policy Framework (NPPF; paragraphs 109, 121), EU Water Framework Directive, Anglian River Basin Management Plan and Environment Agency Groundwater Protection Position Statements (2017) G1, G9 to G13, N7 and N10. The water environment is potentially vulnerable and there is an increased potential for pollution from inappropriately located and/or designed infiltration sustainable drainage systems (SuDS) such as soakaways, unsealed porous pavement systems or infiltration basins.

Condition 5

Piling or any other foundation designs using penetrative methods shall not be permitted other than with the express written consent of the Local Planning Authority, which may be given for those parts of the site where it has been demonstrated that there is no resultant unacceptable risk to groundwater. The development shall be carried out in accordance with the approved details.


Reason for Condition 5

Piling or other penetrative ground improvement methods can increase the risk to the water environment by introducing preferential pathways for the movement of contamination into the underlying aquifer and/or impacting surface water quality.

For development involving piling or other penetrative ground improvement methods on a site potentially affected by contamination or where groundwater is present at a shallow depth, a suitable Foundation Works Risk Assessment based on the results of the site investigation and any remediation should be undertaken. This assessment should underpin the choice of foundling technique and any mitigation measures employed, to ensure the process does not cause, or create preferential pathways for, the movement of contamination into the underlying aquifer, or impacting surface water quality.
Technical Review

We have reviewed the EPS Fuel Storage Feasibility Assessment of 5 April 2017 (referenced UK17.2609). The discussion in this report is welcome, detailed and relevant. The report concludes that underground storage is the most viable option for the site and acknowledges the high environmental sensitivity of the site. The report acknowledges and addresses Groundwater Protection Position Statements D2 and D3.

The assessment proposes vaulted tertiary containment with hydrocarbon and waterproofing barriers. Following an internal Environment Agency discussion regarding this site at a national level, we agree that this construction method and inclusion of robust vaulted tertiary containment is acceptable for this site under these circumstances but it should be noted that this position will not often apply to other new petrol filling station sites within a Source Protection Zone 1 as each site must be assessed individually.

The vault is proposed to also include monitoring wells. We agree with this inclusion of monitoring wells but also add that these wells should be of a sufficient diameter to allow pumping out of any rainwater that collects in the vault, and any leaks should they occur. These wells would benefit from being at a low point or sump within the vault. In addition, a monitoring programme should be written and approved in due course as part of a future discharge of planning conditions. This monitoring programme should include, as a minimum, scheduled manual dips (perhaps using an oil-water interface probe or equivalent technology) by competent staff on a regular and relatively frequent basis. Groundwater samples should also be taken on a less frequent (than dips) but still regular basis where groundwater collects in the vault, which should be sent off for appropriately accredited laboratory testing for hydrocarbons. The maintenance schedule should be approved and strictly adhered to. It is expected that a maintenance schedule should be provided for the cleaning of oil-water interceptors and other infrastructure on site.

We will require that the detailed design, as well as monitoring, maintenance & sampling schedule is submitted for approval in due course. Once this has been approved, the installation will require verification (with appropriate evidence) in due course.

It should be noted that we welcome ongoing discussion relating to the detailed design for this site and encourage early engagement. For future applications we would appreciate early (pre-application) strategic engagement to discuss the viability of proposed petrol filling stations, and any potential requirements to incorporate into a submitted design when an application is made.

With respect to the proposed drainage strategy, we do not accept the use of soakaways at this location for any runoff other than roof water via a sealed system. The risk of pollution to the public water supply should be considered. Please refer to our SuDS informative advice in the technical appendix below and revise the drainage strategy accordingly.

We trust this advice is useful.
Yours sincerely,

[Signature]

Sustainable Places - Planning Advisor

Direct dial 020 8474 8097
Email planning.ipswich@environment-agency.gov.uk

cc PWA Planning
APPENDIX C

Proposed Site Specific Membrane Lined Cell Design
GENERAL INFORMATION

Overall tank dimensions shown are indicative for a 70,000 litre tank. Actual tank supplier products may vary. These overall dimensions must be adjusted to suit other supplier products for other tank capacities with differing overall dimensions.

BELOW GROUND TANK INSTALLATION

Contractor to comply with the ground investigation report to make necessary allowance for ground water levels and any requirements for pumping during installation.

Tank skids designed for a ground bearing pressure of 100kPa to the satisfaction of the local building inspector.

Should any ground conditions prove a bearing pressure of less than the above the Engineer should be consulted.

Prior to excavation of tank form contractor to confirm with tank manufacturer overall size of tanks.

Lay 200mm wide 15mm thick felt 300mm felt sheeting and 15mm geotextile layer under tank base.

150mm overall 100mm solids per tank.

Tank base to be laid to 150mm thick Grade S19 concrete with reinforcement bar 1.5% mesh top and bottom on VDC Block membranes on 150mm thick Grade S39 substrate forming RC slab on 150mm min. sand bedding.

Tank fillings consist of tank base slab 1.5m strap one every 1.5m3 times or part of.

All strips to comprise of full welding positioned outside each chamber. Each chamber from floor area. Typical area 7.25m" tank strap enclosures for each 1500 litre tank.

TANK CHAMBERS

Tank bottom covers to be ADS Mono Seal 2 mono chamber with integral gasket fabricated from rolled steel plates with prestressed edge entry and exit positions incorporating AAS pipe boot sealed entry system. Chamber system to be welded directly to the tank ensuring tank manufacture and tested to ensure chamber is watertight and leak free. 130mm pea shingle covered to mono chamber.

All chambers to be pressure tested prior to completion.

Tank module covers to be fibre core fibreglass cover and frame.

END OF SECTION 1:50
Wefco Production Facilities and Finished Tanks
Corbel welded and formed as part of the chamber
***NO LEAK PATH***

Pipe entry boot cut to suite pipe diameter

Pipe entry boot not cut used as blank

Height adjustable skirt

Boots fitted both sides of chamber wall

MONO chamber welded direct to tank
***NO LEAK PATH***

DETAIL F
SCALE 2 : 15

REV NO: DATE

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN MM
TOLERANCES: TBA
FRACTIONAL:
ANGULAR: MACH BEND ±
TWO PLACE DECIMAL ±
THREE PLACE DECIMAL ±

INTERPRET GEOMETRIC TOLERANCING PER:

MATERIAL: Material <not specified>

FINISH: -

DRAWN: - JW 09/04/2015

CHECKED:

ENG APPR:

MFG APPR:

Q.A.:

COMMENTS:

DO NOT SCALE DRAWING

TITLE: Pipe entry boot types

SIZE: A

DWG. NO.:

REV:
A

SCALE: 1:15

WEIGHT: 3879451.88
Skirt adjustment from 780mm to 1200mm

Electrical entry positions x 2 on opposite corners

DETAIL A
SCALE 2 : 15

TITLE: Skirt and Boot installs

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN MM
TOLERANCES: Tolerances ±
FRACTIONAL ± ANGULAR: MACH ± BEND ±
TWO PLACE DECIMAL ±
THREE PLACE DECIMAL ±

INTERPRET GEOMETRIC TOLERANCING PER:
MATERIAL Material <not specified>

FINISH

DO NOT SCALE DRAWING

REV NO:  DATE

NAME: JW  DATE: 09/04/2015

DRAWN: -
CHECKED: -
ENG APPR: -
MFG APPR: -
QA: -
COMMENTS: -

SIZE: DWG. NO.  WEIGHT: 3879451.88
SCALE: 1:15  REV A

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF BERRY'S TECHNOLOGIES LTD. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF BERRY'S TECHNOLOGIES LTD IS PROHIBITED.
Flanged gauge riser system

Flanged off set fill assy

ALL TANK LID FITTINGS AND ENTRY BOOTS INSTALLED AT THE TANK MANUFACTURE AND VACUUM TESTED PRE SITE DELIVERY
Fill orientation always longitudinal along tank length

<table>
<thead>
<tr>
<th>REV NO:</th>
<th>DATE</th>
<th>UNLESS OTHERWISE SPECIFIED:</th>
<th>NAME</th>
<th>DATE</th>
</tr>
</thead>
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<td></td>
<td>DIMENSIONS ARE IN MM</td>
<td>-JW</td>
<td>09/04/2015</td>
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<tr>
<td></td>
<td></td>
<td>TOLERANCES: Tolerance: 1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>FRACTIONAL: MACH 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>ANGULAR: MACH 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>BEND ± 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWO PLACE DECIMAL ± 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>THREE PLACE DECIMAL ± 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>INTERPRET GEOMETRIC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TOLERANCING PPR:</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>MATERIAL: Material &lt;not specified&gt;</td>
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<td></td>
<td></td>
<td>FINISH:</td>
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<tr>
<td></td>
<td></td>
<td>DO NOT SCALE DRAWING</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TITLE:** Chamber orientation

**SIZE** A

**DWG. NO.** -

**REV** A

**SCALE:** 1:15

**WEIGHT:** 3879451.88
225mm Fill tee outlet
115mm Suction outlet
Void between height adjustable skirt and MONO turret to be left open to back fill

****Note if the site is a high water table site, contact Berrys technologies and request self levelling resin system and condensation bottle to seal this void ****

Note*** If additional height is required, contact Berrys technologies to order a 300mm extension

### Table

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>PartNo</th>
<th>ITEM NO.</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRP Extension piece-300mm</td>
<td>ALTGEN2EXT01</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Self levelling resin</td>
<td>FSSLRESO1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Condensation bottle/ cage and drain</td>
<td>FSS-CS/BOT</td>
<td>3</td>
<td>1</td>
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### Details

- **REV NO:**
- **DATE:**
- **UNLESS OTHERWISE SPECIFIED:**
- **DREW:**
- **CHECKED:**
- **ENG APPR.:**
- **MFG APPR.:**
- **Q.A.:**
- **COMMENTS:**
- **NAME:**
- **DATE:**

**HEIGHT ADJUSTABLE SKIRT AND EXT**

**SIZE:**

**DWG. NO.:**

**REV:**

**SCALE:**

**WEIGHT:** 3879451.88
Note*** If additional height is required contact Berrys technologies for extension riser pieces.

Note*** The composite frame must be installed between 10-15mm proud of the forecourt level and the concrete ramped away from the frame to at least 300mm.
# Outline Technical Specification

## Underground Double Skinned Fuel Storage Tanks

<table>
<thead>
<tr>
<th><strong>Conformance:</strong></th>
<th>Tanks certified to BS EN 12285 design standard Class A Type D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tank Type:</strong></td>
<td>Horizontal cylindrical double skinned tanks of steel construction.</td>
</tr>
<tr>
<td><strong>Tank Capacity:</strong></td>
<td>Typically per site 75,000 litre tanks</td>
</tr>
<tr>
<td><strong>Dimensions:</strong></td>
<td>2.5m diameter x 16.1m overall length</td>
</tr>
<tr>
<td><strong>Materials:</strong></td>
<td>Certified carbon steel materials to BS EN10 025 S235.</td>
</tr>
</tbody>
</table>
| **Construction Thickness:** | Inner shell: 6mm  
Inner dished ends: 6mm  
Outer skin: 4mm  
Outer dished ends: 5mm |
| **Fabrication:** | Tank manufactured using full penetration submerged arc welding with butt joints internally and externally. |
| **Manways:** | Each compartment would have 1 x manway fitted with cover & connections. |
| **Lower Access Upstands:** | Each manway would have a lower access chamber circular upstand welded to the tank. |
| **Interstitial Space:** | Dry interstitial space factory pressurised with dial gauge fitted. |
**Surface Treatment:**

**External Surfaces**

Shot blasted to SA.2½ followed by one coat of Endoprene Polyurethane coating to 800 microns dry film thickness.

Please note that all weld seams and less accessible areas would be treated with an initial stripe coat, thus ensuring double thickness.

Volt test & micrometer thickness test performed & recorded.

**Internal Surfaces**

Self colour

**Test Procedures:**

Stage testing of tanks is performed at designated points of construction. Each tank is pneumatically pressure tested with supporting certification.

**Spark Test:**

Factory spark / holiday test carried out at our factory recording paint thickness checks and noted on each tanks Certificate of Conformity.

**Tank I.D**

All tanks are fitted with nameplates / serial numbers.

**Marking:**

Capacity & Tank Number clearly stenciled on the side of each tank to aid with on-site installation.

**Transportation:**

Included to site (each tank supported & protected during transit)

Please note: Site offloading is the responsibility of others.

**Data Sheets:**

Site specific data sheets provided.
METHOD STATEMENT FOR TANK INSTALATION

Mechanical equipment –

20T excavator, 10T dumper, compressor, excavation ground support shoring, 100T crane.

Site personnel –

Supervisor, ganger, labourer, excavator and dumper drivers, crane driver and slinger. (All suitably qualified, experienced and trained.)

Protective equipment –

Hard hats, high visibility clothing, safety boots, gloves, ear defenders, face masks and eye protection when appropriate.

Possible hazards –

Deep excavations, collapse, underground services, moving plant and lifting operations.

Precautions to reduce hazards –

Suitable battered excavation sides or shoring equipment. The use of suitable PPE. ‘Find location of services prior to mechanical excavation. Barrier off site to restrict public access. Use certified plant
operators, banksmen and slingers. Test certified lifting plant and equipment. Banksmen to monitor vehicle and plant movements but ideally removal would avoid any risks.

Disposal of surplus excavated material –

By a registered haulier to an appropriate licensed disposal/recycle point.

Work Sequence.

1. Excavate the pit to the level required, including disposal of surplus excavated material.

2. Install shoring equipment.

3. Continue excavation of the pit. Beginning the process from the rear of the site and continuing towards the front. Access to be made from the front by making a ramp into the excavation.

4. Blind the base of the tank pit with concrete as the excavation proceeds.

5. Install mesh and concrete foundation slab, including casting in place the tank lashing straps.

6. Place the tank gravel surround to the level of the underside of the tank.

7. Set up the 100 t crane in the position shown on the berthing plan.

8. Using banksmen to direct the delivery wagons, take delivery of and place tanks in position using the 100t crane and suitable chains and slings, in the excavated pit and secure in position using the tank lashing straps.

9. Fill around the tanks with the specified gravel surround, compacting as the filling operation proceeds.
10. Fill the gravel to the required level and take out shoring equipment as filling proceeds.

11. Fill around suction lines with rounded gravel.

12. On completion of the tank pipe fitting works, return to site and place and compact the MOT type 1 sub-base.

13. Place reinforcement, end shutters, access covers and concrete for the surface slab.

14. Remove shutter and clear site.
APPENDIX D

Drainage Strategy & Maintenance and Monitoring Schedule
PLEASE NOTE:

RWP AND SVP LOCATIONS INDICATIVE ONLY AND SUBJECT TO REVIEW UPON RECEIPT OF ARCHITECTS DRAWINGS.

DRAINAGE ROUTES SHOWN AND PIPE DIAMETERS BASED ON INITIAL ASSESSMENT AND SUBJECT TO DETAILED DESIGN (DRAINAGE AND PROPOSED LEVELS).
### Soakaway

<table>
<thead>
<tr>
<th>Maintenance Schedule</th>
<th>Required Action</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular Maintenance</td>
<td>Inspect and identify areas that are not operating correctly. If required take remedial action.</td>
<td>Monthly for the first 3 months of operation then annually</td>
</tr>
<tr>
<td></td>
<td>Recover debris from catchment surface area where it may cause risk to performance</td>
<td>Monthly</td>
</tr>
<tr>
<td></td>
<td>Remove sediment and debris from pre-tank system</td>
<td>Annually</td>
</tr>
<tr>
<td>Remedial Actions</td>
<td>Repair inlets/outlets/vents/overflows</td>
<td>As necessary</td>
</tr>
<tr>
<td>Monitoring</td>
<td>Inspect all inlets/outlets and upstream drainage system to ensure they are in good condition and operating as designed</td>
<td>Annually</td>
</tr>
<tr>
<td></td>
<td>Survey inside of tank for sediment and build up and remove if necessary</td>
<td>Every 5 years</td>
</tr>
</tbody>
</table>

### Filter Drains

<table>
<thead>
<tr>
<th>Maintenance Schedule</th>
<th>Required Action</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular Maintenance</td>
<td>Remove litter (including leaf litter) and debris from filter drain surface, access chambers and pre-treatment devices</td>
<td>Monthly</td>
</tr>
<tr>
<td></td>
<td>Inspect filter drain surface, inlet and outlet pipework and control system for blockages, clogging, standing water and structural damage</td>
<td>Monthly</td>
</tr>
<tr>
<td>Occasional Maintenance</td>
<td>Remove to control tree roots where they are encroaching to sides of filter drain using recommended methods (NJUG, 2007 or BS 3998:2010)</td>
<td>As necessary</td>
</tr>
<tr>
<td></td>
<td>Clear perforated pipework of blockages</td>
<td>As necessary</td>
</tr>
</tbody>
</table>
## Interceptor

<table>
<thead>
<tr>
<th>Maintenance Schedule</th>
<th>Required Action</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular Maintenance</td>
<td>Desludging</td>
<td>6 monthly or when high level alarm indicates</td>
</tr>
<tr>
<td></td>
<td>Visual inspection for</td>
<td>6 monthly</td>
</tr>
<tr>
<td></td>
<td>performance</td>
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</tbody>
</table>
APPENDIX E

Details of Third Party Wet Stock Monitoring
Fairbanks – Eurogarages process review

Fairbanks Environmental has been monitoring the whole of the Eurogarages network since September 2011 on behalf of Eurogarages.

We are a specialist wetstock monitoring company with and SIR (Statistical Inventory Reconciliation) leak detection system accredited to 9 ltrs per day.

All of the stations that we monitor on behalf of Eurogarages across the United Kingdom have our own in-house designed system installed and this allows us to gather communication information as it is communicated between the electronic gauge and the POS (point of sale) on each site. This information includes the start and end time of every transaction as well as the volume dispensed.

As we poll the gauge/tills every 15 minutes we are able to have up to date information including any relevant alarms that are active on the gauge. We also have a pre-defined suite of thresholds that monitor the data that we retrieve from the sites and send alerts in-house to our team of dedicated analysts.

Fairbanks and Eurogarages work closely to ensure there is a rigid two-way process structure and as a result we work closely with the staff at the individual sites, the relevant Area Managers as well as high level management at the Eurogarages Headquarters in Blackburn.

All deliveries are checked on a daily basis and any anomalies cross referenced with Eurogarages or the fuel supplier and resolved, this is done at both tank and grade level.

On top of this all sales and deliveries are cross-referenced with Eurogarages on a monthly basis and any anomalies investigated and resolved.

Regards

Sam McCracken
Operational Services Manager
Fairbanks Environmental
Tel: +44 (0)1695 51775
Fax: +44 (0)870 242 9890
WN8 8TU

20th June 2017
Leak detection technology
For a clean and protected environment

Overpressure leak detector DL 330 FC
with integrated dry filter control

for the monitoring of double walled tanks. With integrated drying Filter Sensor to avoid condensation and corrosion in the interstitial space. The sensor will indicate an unacceptable level of humidity due to saturated drying material. By this, the notice for changing the dry filter material will be guaranteed and a main important contribution for a long term run of the tank is done.

The leak detector DL 330 FC can monitor several underground tanks or one aboveground tank.

Leaks in one of the walls will be detected and indicated by an optical and audible alarm before any stored product can enter the environment.

A class I – leak detection system with the highest environmental protection level in accordance to the European standard EN 13160.

Liquids:
- Water polluting liquids
- e.g.: petrol/gasoline, diesel, heating oil, lye, acid.

For the monitoring of:
Double walled tanks with a test pressure of the interstitial space of minimum 500 mbar (e.g. in accordance to DIN 6608/2, 6616/2)

Approvals:
Germany: Z - 65.23 - 409

<table>
<thead>
<tr>
<th>Type</th>
<th>Alarm pressure</th>
<th>Operating pressure</th>
<th>Max. Pressure on low point of interstitial space</th>
</tr>
</thead>
<tbody>
<tr>
<td>DL 330 FC</td>
<td>&gt; 330 mbar</td>
<td>&lt; 410 mbar</td>
<td>300 mbar</td>
</tr>
</tbody>
</table>

SGB Sicherungsgerätebau GmbH
Hörsraste 10
post box: 21 07 41
D-57031 Siegen
E-mail: sgb@sgb.de

Tel.: + 49 / (0) 271 / 46954-0
Fax: + 49 / (0) 271 / 46954-8
http://www.sgb.de
Monitoring principle:
The pump in the leak detector creates a fixed operational overpressure in the interstitial space.
In case of a leak, the compressed air will escape through the leak. This prevents product or groundwater entering the interstitial space.
Any minor unavoidable untightness is compensated by the system automatically.
If the volume flow of air escaping from the interstitial space is higher than the limited volume flow of the pressure pump, the pressure will drop to the alarm pressure.
An optical and audible alarm will be released.
The compressed air in the interstitial space is dried by the dry filter mounted to the leak detector. Therefore a condensation of water in the interstitial space is prevented.
An overpressure valve avoids the occurrence of an inadmissible overpressure in the interstitial space.

Installation advice:
The leak detector shall not be installed in hazardous classified areas.
Outside closed and dry rooms, the leak detector has to be installed in a suitable protection box.
Coloured, flexible or rigid tubes are to be used as a connection between leak detector and interstitial space.
Useful fittings on the leak detector guarantee a quick and safe examination of the functions.
Additional alarm signal units can be connected directly to the leak detector. Dry relay contacts for alarm transmitting are available as an option.
When operating, installing and commissioning the leak detector DL 330 FC, the conditions laid down in the approvals for the leak detector, tanks and linings are to be observed.
All works shall be carried out by a qualified person.