

Lisbane Landfill Surface Water Toe Drain and Relocation of SW1 Monitoring Point Construction Quality Assurance Report

CLIENT



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1 Introduction

1.1 General

Taggarts have been commissioned by Blue Sky Resource Recovery Ltd. (BSRR) to prepare a Construction Quality Assurance (CQA) Plan for a discrete package of remedial and ancillary engineering works at the former Lisbane Landfill Site.

The works comprise the clearance of vegetation and accumulated material from around an approximately 50m length of 300mm diameter perforated twin-wall surface water drainage pipe at the toe of the landfill slope and to the rear of the concrete yard; the inspection of the exposed area for evidence of leachate migration beneath the temporary geohess liner; the reinstatement of the drainage run, incorporating a leachate relief and sealing detail should leachate be found to be present; and the installation of a new surface water sample point (SW1) at the Northwestern corner of the concrete yard / bays.

This CQA Plan details the works, materials, testing and record keeping to be undertaken and has been prepared in accordance with NIEA requirements and relevant guidance, including:

- The Landfill Regulations (Northern Ireland) 2003,
- Environment Agency / Landfill Guidance Group Industry Codes of Practice LFE4 / LGG104 (Earthworks in landfill engineering), LFE5 / LGG105 (Using geomembranes in landfill engineering),
- LFE7 / LGG107 (Using non-woven protector geotextiles in landfill engineering),
- LFE9 / LGG109 (Compliance testing earthworks on landfills using nuclear density gauges) and LGG111 (Capping systems).

This Plan should be read in conjunction with the NIEA approved October 2017 CQA Plan and the August 2025 Lisbane Landfill Site Capping Works CQA Plan (Taggarts ref. 15047), the requirements of which continue to apply to the capping system as a whole.

1.2 Location

Lisbane Landfill Site is located on Aughlish Road, approximately 2.5km to the south-east of Tandragee and 1.8km to the north-west of Scarva, Co. Armagh, centred on Irish Grid reference J 04822 344504. The site is accessed via a secured gated access, with the inactive landfill area accessed via internal hard-core roads.

The works that are the subject of this Plan are located along the north-western toe of the landfill slope, adjacent to and to the rear of the upper concrete yard, as shown on the drawings contained in Appendix A.

1.3 Current Site

Lisbane Landfill is a former non-hazardous landfill situated in a former hard rock (greywacke) quarry. The site previously accepted household, commercial and industrial wastes.

The site was temporarily capped in 2014 with a 150mm regulation layer of clay type material overlain by Cover Up 240 geohess panels, anchored around the perimeter of the site by 0.5m high clay bunds. The quarry side wall of the landfill was lined with a GCL overlain by HDPE geomembrane, protection geotextile and geogrid (Tensar 40RE), attached either to a polystyrene faced reinforced earth wall or to a revetment system bolted to the quarry walls.

Although the site no longer accepts waste, leachate and landfill gas continue to be managed. Leachate is extracted at the base of the landfill and tankered off site for treatment at an NI Water Waste Water Treatment Works. Landfill gas is extracted via gas wells across the site and combusted in the on-site gas flare.

The falls of the site direct storm water to the north-western boundary, where an existing 300mm diameter perforated twin-wall HDPE pipe runs along the bottom of the landfill slope adjacent to the upper concrete yard, discharging off site at the existing single outfall location. Vegetation growth and the accumulation of silt, soils and debris along this length may have reduced the effectiveness of the drain, and the potential for leachate to be migrating beneath the temporary geohess liner and pooling in this low-lying area has been identified as requiring investigation.

1.4 Project Description

The works comprise three elements, described in full in Section 4:

- Element 1 – Clearance and inspection. Clearance of vegetation and accumulated material from around an approximately 50m length of the 300mm perforated twin-wall drainage pipe, stripping the area down to the level of the geohess temporary liner, followed by inspection of the exposed liner surface by the CQA Supervisor for evidence of leachate travelling beneath the liner and pooling in this area. Element 1 concludes at a formal Hold Point.
- Element 2 – Reinstatement (clean) or leachate relief and sealing detail. Where the exposed area is found to be clean, the area will be reinstated and the drainage pipe re-laid. Where leachate is found to be pooling, the geohess will be cut back over the affected length, a 1m deep filter drain of 16/32mm crusher run stone will be placed to allow leachate to drain back into the waste mass, the excavation will then be sealed with a strip of 1mm LLDPE geomembrane. 1m of clay will be placed and compacted over the LLDPE liner before the drainage pipe is reinstated above the repair.
- Element 3 – New surface water sample point (SW1). The 300mm drainage pipe will be exposed at the corner of the concrete yard / bays, cut, and a new 1,200mm diameter precast concrete

manhole chamber installed to act as a sample chamber for surface water runoff from the landfill area. The base, surround and pipe penetrations are to be encased in C25/30 concrete.

The repair is designed so that the sealing performance of the permanent capping system over the repaired length is not less than that required elsewhere on the site, namely a barrier providing a maximum permeability of 1×10^{-9} m/s, in accordance with the Landfill Regulations (Northern Ireland) 2003 and the site Permit conditions.

All works will be undertaken by a contractor experienced in landfill engineering works, appointed by Blue Sky Resource Recovery Ltd., and will be supervised by an independent CQA Supervisor.

Table 1.1 Proposed Repair Sequence (Leachate Present)

Layer	Thickness (mm)	Properties	Purpose
Existing clay regulating layer	150	Cohesive clay	Retained where undisturbed; smooth surface beneath geohess
Geohess (cut back locally)	0.4 / 500	1.6×10^{-8} m/s	Retained outside repair footprint; cut back and lapped to the LLDPE at the repair perimeter
Filter drain – 16/32mm crusher run stone	1,000	Permeability $\geq 1 \times 10^{-3}$ m/s	Allows perched leachate to drain back into the waste mass
LLDPE geomembrane strip	1.0	To GRI-GM17 / LFE5	Sealing layer over the filter drain, preventing surface water ingress and landfill gas escape
Compacted clay	1,000	Maximum permeability 1×10^{-9} m/s	Low permeability barrier consistent with the permanent cap
300mm perforated twin-wall pipe, geotextile wrapped, in clean drainage stone	—	Nonwoven geotextile filter wrap	Reinstated surface water collection to the existing outfall

2 Definitions

For clarification, the following definitions are given:

Construction Quality Assurance (CQA) – A planned and systematic pattern of all means and actions designed to provide confidence that items or services meet contractual and regulatory requirements. CQA refers to the means and actions employed to assure conformity of the sealing and drainage system, i.e. its preparation, production and installation, to this CQA Plan, the Contract Drawings and Specifications. CQA is provided by a party independent from production and installation.

Construction Quality Control (CQC) – Actions that provide a means of measure and regulation of the characteristics of an item or service to contractual requirements. CQC refers to those actions taken by Manufacturers, Installers, Contractors or the employer to ensure materials and workmanship meet the requirements of the plans and specifications.

Contractor – means the person or persons, firm, company or other body to whom the Contract has been awarded by the employer, and includes the Contractor's personal representatives or other parties, e.g. Sub-contractors, Manufacturer. The Contractor will undertake the execution of the works under the terms of the Contract.

Hold Point – a defined stage in the works beyond which the Contractor shall not proceed until the CQA Supervisor has inspected the works and issued authorisation to continue.

Leachate – liquid percolating through, or emerging from, the deposited waste, characterised for the purposes of this Plan by elevated ammoniacal nitrogen, chemical oxygen demand, chloride and electrical conductivity relative to clean surface water.

3 Responsibilities

The CQA Project Team will comprise the following:

3.1 Project Manager

The Project Manager will be office based and will:

- Attend all progress or liaison meetings and be the key contact with regulatory officers;
- Review all designs, plans and specifications;
- Review other site-specific documentation, including proposed layout and Contractor's qualifications;
- Administer the CQA programme;
- Determine, in consultation with the CQA Supervisor and BSRR, whether the leachate relief and sealing detail is required following the Element 1 Hold Point; and
- Review all changes to the design, plans and specifications.
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3.2 CQA Supervisor

The CQA Supervisor will be located at the site and will:

- Manage the daily activities of the CQA regime;
- Attend all CQA related meetings (e.g. pre-construction and progress);
- Inspect the exposed geohess liner at the Element 1 Hold Point and record the findings;
- Supervise the ongoing preparation of the as-built drawings;
- Record any relevant observations in the daily report;
- Report any unresolved deviations from this CQA Plan to the Project Manager;
- Provide all logs and relevant data to the Project Manager;
- Assist in the production of the CQA Validation Report; and
- Report to the Project Manager.

3.3 Contractor

The Contractor shall be experienced in landfill engineering works. The Contractor shall carry out and record all CQC activities and shall give the CQA Supervisor reasonable notice of all Hold Points.

4 Description of the Works

4.1 Element 1 – Clearance and Inspection

The works shall be undertaken in the following sequence:

1. A pre-works visual inspection shall be undertaken of the 50m length of drainage run, recording existing pipe invert levels, the crest of the concrete yard and the surrounding ground levels.
2. The existing 300mm perforated twin-wall pipe and its surrounding stone shall be carefully lifted and set aside on a prepared area clear of the works. Pipe lengths in serviceable condition shall be retained for reinstatement; damaged lengths shall be replaced with new pipe of equivalent specification.
3. Vegetation and accumulated soils, silts and debris shall be cleared from the works area and stripped down to the level of the geohess temporary liner. Arisings shall be stockpiled separately within the site pending assessment of their suitability for re-use.
4. Excavation within 300mm of the geohess shall be undertaken using a smooth (toothless) bucket under the direction of a banksman, with the final material removed by hand. Plant shall not track directly on the geohess; a temporary running surface of previously stripped material of not less than 300mm shall be maintained beneath any plant operating over the liner.
5. The exposed geohess shall be swept or lightly washed clean as necessary to allow inspection, taking care not to introduce water into the works area.

4.2 Hold Point 1 – Inspection of the Exposed Liner

The Contractor shall not proceed beyond the exposure of the geohess liner until the CQA Supervisor has inspected the area and issued authorisation. The CQA Supervisor shall inspect the full exposed length and shall record:

- The condition and continuity of the geohess panels and stitched seams, including any tears, displacement, uplift or loss of anchorage;
- The presence, extent and depth of any standing liquid, and whether liquid is emerging from beneath the liner;
- Any staining, iron precipitate, ochreous deposits, biological growth or odour indicative of leachate;
- A photographic record with locations referenced to the pre-works survey.

Where liquid is present, a visual inspection will be completed to determine whether it is leachate or clean surface water. Findings will be recorded in the CQA Validation Report.

The CQA Supervisor shall then determine, in consultation with the Project Manager and BSRR, which of the following applies:

- Area clean – no leachate present. The area shall be reinstated in accordance with Section 4.3.

- Leachate pooling on or beneath the liner. The leachate relief and sealing detail shall be constructed in accordance with Section 4.4.

Where leachate is confirmed, NIEA shall be notified by BSRR in accordance with the site Permit prior to the commencement of the remedial works, and the extent of the works agreed.

4.3 Element 2A – Reinstatement Where the Area is Clean

Where the CQA Supervisor confirms that the exposed area is clean, the following shall be undertaken:

- Any localised damage to the geohess identified during the inspection shall be repaired by the placement of an LLDPE liner over the area.
- The formation shall be regraded to falls towards the existing outfall using clean, stone-free cover material, placed and lightly compacted in layers not exceeding 250mm, to re-establish the levels recorded in the pre-works survey.
- The 300mm perforated twin-wall pipe shall be reinstated to the surveyed line and level, wrapped in nonwoven geotextile and surrounded in clean drainage stone in accordance with Section 4.5.

4.4 Element 2B – Leachate Relief and Sealing Detail

Where leachate is confirmed to be pooling in the area, the following shall be constructed over the affected length, as shown on Drawing 15047-503:

- The geohess shall be cut back over the affected length, and for a minimum of 1m beyond the extent of the observed leachate in each direction. Cutting shall be undertaken with hand tools; no plant shall be used to tear or drag the panels. The cut edge shall be trimmed square, cleaned and temporarily protected.
- A filter drain excavation 1m deep shall be formed into the waste mass beneath the cut-back area, with side slopes no steeper than 1(v):1(h) or as required for stability.
- The excavation shall be filled with clean, washed 16/32mm crusher run stone placed in a single continuous operation to the full 1m depth, lightly compacted only to the extent necessary to avoid subsequent settlement, so that the drainage function of the layer is preserved. The purpose of this layer is to allow perched leachate to drain vertically back into the waste mass.
- The upper surface of the stone shall be trimmed level and free of protruding particles. A nonwoven protector geotextile shall be placed over the stone in accordance with Section 5.5 to protect the overlying geomembrane.
- A strip of 1mm LLDPE geomembrane shall be placed over the protector geotextile and shall extend a minimum of 1m beyond the edge of the filter drain in all directions onto the adjacent competent surface. The LLDPE shall be lapped under the retained geohess by a minimum of 1m.
- A full 4m roll of LLDPE will be laid along the length of the filter drain to prevent the need for welding seams.

- A protector geotextile shall be placed over the LLDPE prior to the placement of the clay layer.
- Clay meeting the requirements of Table 5.1 shall be placed and compacted over the LLDPE to a total compacted thickness of 1m, in accordance with Section 5.3. The first layer placed directly over the protector geotextile shall be placed by low ground pressure plant and shall be free of particles exceeding 40mm.
- The completed repair shall be trimmed to falls towards the existing outfall and the 300mm perforated pipe reinstated above the repair in accordance with Section 4.5.

At no point shall the LLDPE be trafficked directly by plant. Temporary crossing points, where required, shall be formed with a minimum 600mm of protective material over a protector geotextile and shall be agreed with the CQA Supervisor.

4.5 Reinstatement of the 300mm Surface Water Drain

The 300mm perforated twin-wall pipe shall be reinstated above the completed repair, or above the reinstated formation where no repair is required, as follows:

- The pipe shall be laid to the line and level recorded in the pre-works survey, maintaining continuous falls to the existing single outfall location. Pipe joints shall be made in accordance with the manufacturer's recommendations.
- The pipe shall be wrapped in a nonwoven geotextile filter fabric with a minimum 300mm overlap at all joints, secured to prevent displacement during stone placement.
- The wrapped pipe shall be surrounded in clean drainage stone to provide a minimum of 150mm of stone beneath, either side of and over the pipe, placed by hand in the immediate vicinity of the pipe to avoid displacement or damage.
- The completed drainage stone berm shall provide filtration of surface water run-off and shall be maintained and increased in extent if the monthly surface water monitoring at the outfall indicates that further filtration is required.

5 Materials, Placement and Testing

Only material deemed fit for purpose by the CQA Supervisor shall be utilised.

Materials shall be stockpiled in suitable locations within the site and shall be subject to a quality control system.

Given the limited volume of material involved in these works, the minimum test frequencies set out below have been scaled from those applied to the site-wide capping works. In every case a minimum of three tests shall be undertaken on each material source, irrespective of volume.

5.1 Clay Cap Material

The clay placed over the LLDPE liner shall be a minimum of 1m thick and shall provide a maximum permeability of 1×10^{-9} m/s, consistent with the permanent capping system and the requirements of the Landfill Regulations (Northern Ireland) 2003. Testing shall be carried out in accordance with Table 5.1 to determine the material's suitability. The general requirements of materials to be used may vary based on material availability and agreed use with NIEA.

Table 5.1 Clay Conformance Testing

Property	General Requirement	Test Method	Minimum Frequency
Permeability / hydraulic conductivity	$\leq 1 \times 10^{-9}$ m/s	BS 1377:1990 Part 6, Method 6	1 per 250m ³
Remoulded undrained shear strength	≥ 50 kN/m ²	BS 1377:1990 Part 7, Method 8	1 per 250m ³
Plasticity index (Ip)	$10\% \leq I_p \leq 65\%$	BS 1377:1990 Part 2, Methods 4.3 and 5.3	1 per 250m ³
Liquid limit	$\leq 90\%$	BS 1377:1990 Part 2, Method 4.3	1 per 250m ³
Particle size distribution – fines < 0.063mm	$\geq 20\%$	BS 1377:1990 Part 2, Methods 9.2 and 9.5	1 per 250m ³
Particle size distribution – gravel > 5mm	$\leq 30\%$	BS 1377:1990 Part 2, Methods 9.2 and 9.5	1 per 250m ³

Property	General Requirement	Test Method	Minimum Frequency
Maximum particle (stone) size	40mm in the layer placed directly over the protector geotextile; 150mm elsewhere	BS 1377:1990 Part 2, Method 9	Continuous visual, recorded daily
Minimum residual interface friction angle with LLDPE and with geohess	$\geq 19^\circ$	ASTM D6243 / D5321	1 per site

5.2 Field Trials

Before proceeding with the placement of the clay layer, the properties and suitability of the material shall be confirmed by laboratory testing. A field trial of the installed material shall then be conducted to evaluate:

- Material handling and placement requirements;
- Compaction equipment and procedures, including the plant permitted to operate over the protector geotextile and LLDPE;
- The number of passes of equipment necessary to achieve the specified relative compaction; and
- Field testing procedures for compaction.

The installation and testing of trial pads shall be witnessed by the CQA Supervisor on site. Where material from a source already validated and tested under the August 2025 site capping CQA Plan is used, and the CQA Supervisor is satisfied that the material and the placement plant are unchanged, the existing field trial data may be relied upon in place of a new trial, subject to the agreement of NIEA. The basis of any such reliance shall be recorded in the CQA Validation Report.

5.3 Placement, Compaction and In-situ Testing of Clay

The clay shall be placed and compacted in layers until the 1m depth is achieved.

No placement or compaction of the capping material shall take place during inclement weather, including rain, snow and/or freezing conditions. Under no circumstances shall frozen material be employed, whether from stockpile, in-situ or imported, nor shall material be placed upon a frozen subgrade. Any frozen material shall be placed to one side until thawed. If placed material becomes frozen adjacent to a new placement area, then either placement shall be suspended until the existing

material has thawed, or the frozen material shall be removed and replaced. Any laid section which is damaged, including by weather, beyond its suitability for use shall be removed and replaced as necessary.

5.3.1 Permeability Testing

Permeability testing of the clay shall be carried out in-situ as outlined below:

- Scrape a smooth flat surface 50mm below the surface layer to be tested;
- Drive a 100mm internal diameter U100 cutter and tube 15mm into the smoothed area;
- Fill the tube to a depth of 50mm with water, record the time and seal the tube to minimise evaporation;
- After 24 hours remove the cover and measure the depth of any remaining water. The level shall be recorded along with observations of ground conditions around the ring.

If there is no water remaining, the clay is too permeable and the affected area shall be reworked or replaced. Observations and results of all in-situ permeability testing shall be included in the CQA Validation Report.

5.4 1mm LLDPE Geomembrane

A 1.0mm linear low density polyethylene (LLDPE) geomembrane shall be used as the sealing layer over the filter drain. LLDPE has been selected in preference to HDPE because of its greater flexibility and superior performance under the differential settlement anticipated over a waste mass, consistent with the guidance in LGG111 and LFE5 / LGG105.

The material shall be manufactured, delivered, stored, handled, deployed, welded and tested in accordance with LFE5 / LGG105. The CQA Supervisor shall supervise the delivery, unloading and storage of the liner material. Rolls shall be lifted using slings or core bars only and shall under no circumstances be handled with the tines of a forklift, the bucket of an excavator or similar equipment.

Manufacturing quality control certification shall be provided for every roll delivered, demonstrating compliance with the minimum average roll values of GRI-GM17 for smooth LLDPE geomembrane. The conformance requirements are set out in Table 5.2. The declared values of the specific product supplied shall be submitted to and accepted by the CQA Supervisor before delivery, and shall form the pass criteria for the works.

Table 5.3 1mm LLDPE Geomembrane Conformance Requirements

Property	Test Method	Requirement
Nominal thickness	ASTM D5199	1.0mm; no individual reading less than 0.9mm

Property	Test Method	Requirement
Density	ASTM D1505 / D792	≤ 0.939 g/cm ³
Tensile properties (break strength and elongation)	ASTM D6693 Type IV	To meet or exceed the GRI-GM17 minimum average roll values for the declared thickness
Tear resistance	ASTM D1004	To meet or exceed GRI-GM17
Puncture resistance	ASTM D4833	To meet or exceed GRI-GM17
Carbon black content	ASTM D4218	2.0% – 3.0%
Carbon black dispersion	ASTM D5596	To meet GRI-GM17 categories
Oxidative induction time (standard OIT)	ASTM D3895	To meet or exceed GRI-GM17
Axi-symmetric break resistance strain	ASTM D5617	≥ 30%
Effective permeability	ASTM E96 (water vapour transmission)	≤ 1 x 10 ⁻¹³ m/s equivalent; the geomembrane is treated as impermeable for design purposes
Interface friction angle with underlying geotextile and overlying clay	ASTM D6243 / D5321	≥ 19° residual, or as required by the site-specific stability assessment

Conformance testing shall be undertaken on samples taken from the delivered rolls at a frequency of one sample per delivery or one per 5,000m², whichever is the greater number of samples, with a minimum of one sample for these works.

5.5 Protector Geotextile

A nonwoven needle-punched protector geotextile shall be placed both beneath and above the LLDPE geomembrane, selected in accordance with LFE7 / LGG107. The protector shall be demonstrated to be adequate for the loads and the angularity of the adjacent 16/32mm stone.

Rolls shall be stored in their original protective wrapping, off the ground and shielded from ultraviolet light until immediately prior to deployment.

5.6 16/32mm Crusher Run Filter Drain Stone and Drainage Stone

The filter drain shall be constructed using clean, washed 16/32mm crusher run stone. The drainage stone surrounding the reinstated 300mm pipe shall be a clean, single-sized or graded drainage stone compatible with the geotextile filter wrap.

6 Surface Water Sample Point (SW1)

6.1 Description

A new surface water sample point, to be designated SW1, shall be installed to allow representative sampling of surface water runoff from the landfill area prior to its discharge to the existing outfall. The location is shown on Drawing 15047-504.

The 300mm drainage pipe shall be exposed at the corner of the concrete yard / bays. The pipe shall then be cut at this location and a new 1200mm diameter precast concrete manhole ring set into place. The 300mm pipe shall enter the new manhole chamber, which will act as a sample chamber for surface runoff from the landfill area. The base and surround of the manhole and the pipe penetrations shall be surrounded in C25/30 concrete.

6.2 Construction Sequence

- The position of the chamber shall be set out and agreed with the CQA Supervisor. Existing services shall be identified and confirmed by trial hole.
- The excavation shall be formed to a stable profile, dewatered as necessary, and the formation inspected by the CQA Supervisor. Any soft or unsuitable formation material shall be removed and replaced with compacted granular fill or mass concrete.
- A C25/30 concrete base slab a minimum of 200mm thick shall be cast, extending a minimum of 150mm beyond the outside face of the manhole ring on all sides.
- The 300mm pipe shall be cut square using a mechanical cutter, and the cut ends supported and protected pending connection.
- The 1,200mm diameter precast concrete manhole ring shall be set on the base in accordance with BS EN 1917 and BS 5911-3, bedded on mortar.
- The inlet and outlet pipe penetrations shall be formed and the pipes bedded and haunched in C25/30 concrete, providing a watertight seal around the full circumference of each penetration.
- The chamber shall be surrounded in C25/30 concrete to the full depth, and benching formed to direct flow through the chamber, with a shallow sump provided to allow a sample to be taken with a bailer or sampling pot under low flow conditions.
- A precast cover slab, and a ductile iron cover and frame to BS EN 124 of a class appropriate to the anticipated loading (minimum B125), shall be installed and bedded in mortar. Step irons or a ladder shall not be provided; the chamber is a sampling chamber and is not intended for entry.
- The chamber shall be clearly and durably marked SW1 and shall be added to the site drainage and monitoring plans.

6.3 Testing and Acceptance

Table 6.1 Sample Point Testing

Item	Requirement	Test / Frequency
Concrete – strength	C25/30 to BS EN 206 and BS 8500-2	Certification from concrete supplier
Concrete – durability	Design chemical class and exposure class to be confirmed by the Contractor against a ground and groundwater aggressivity assessment for the location, in accordance with BRE Special Digest 1	Mix design submission, reviewed and accepted by the CQA Supervisor prior to any pour
Precast manhole components	BS EN 1917 / BS 5911-3, 1,200mm internal diameter	Manufacturer conformance certification for each unit
Cover and frame	BS EN 124, minimum Class B125	Manufacturer conformance certification
Chamber water tightness	No visible ingress or egress at the pipe penetrations or joints	Visual inspection after 24 hours standing water, witnessed by the CQA Supervisor
Pipe alignment and falls	Continuous falls maintained to the existing outfall	Visual inspection
Sampling functionality	A representative sample can be recovered under low flow conditions without entry to the chamber	Demonstration to the CQA Supervisor on completion

Following commissioning, SW1 shall be sampled and monitored on a monthly basis in accordance with the site Permit, alongside the existing upstream and downstream surface water monitoring locations, to assess the effect of the works and of the ongoing restoration on the receiving watercourse.

7 Construction Quality Assurance

The objective of CQA supervision is to confirm that appropriate procedures are implemented at the site and to provide assurance that only suitable materials and construction methods are used.

The CQA Supervisor shall instruct and train site staff on the procedures and requirements of this CQA Plan, including all record keeping.

The CQA Supervisor shall witness and supervise all conformance testing carried out in accordance with this CQA Plan, and shall record all construction activities and results. The CQA Supervisor reserves the right to request further measurements or tests as necessary to demonstrate that the works have been completed in accordance with this CQA Plan.

If any of the works inspected by the CQA Supervisor do not comply with this CQA Plan, the CQA Supervisor shall record the non-compliance and the Contractor shall make good. Solutions for non-compliance shall be noted and included in the CQA Validation Report.

7.1 Hold Points

The Contractor shall not proceed past the following Hold Points without the authorisation of the CQA Supervisor:

Ref.	Hold Point	Evidence Required
HP1	Inspection of the exposed geohess liner following clearance (Section 4.2)	Inspection record, photographic record
HP2	Inspection of the cut-back geohess and the completed filter drain excavation prior to stone placement	Excavation record, dimensions, photographic record
HP3	Inspection of the trimmed stone surface and protector geotextile prior to LLDPE deployment	Surface inspection record, geotextile conformance certification
HP4	Completion of all LLDPE non-destructive testing	Panel and seam layout, , survey of the LLDPE surface
HP5	Completion of the 1m compacted clay layer prior to reinstatement of the drainage pipe	In-situ test results, permeability results, thickness survey
HP6	Inspection of the SW1 excavation formation prior to casting the base	Formation inspection record

Ref.	Hold Point	Evidence Required
HP7	Completion and water tightness testing of the SW1 chamber prior to backfilling	Concrete test results, water tightness inspection record

7.2 Site Records

The CQA Supervisor shall maintain daily records for the duration of the works, recording as a minimum: weather conditions; plant, personnel and welding operatives on site; work undertaken and locations; materials delivered and conformance documentation received; sampling and testing undertaken, with locations and results; Hold Point inspections and authorisations; non-conformances and remedial actions; visitors, including regulatory officers; and a photographic record.

8 CQA Validation Report

A CQA Validation Report shall be submitted to NIEA upon completion of the works described in this Plan.

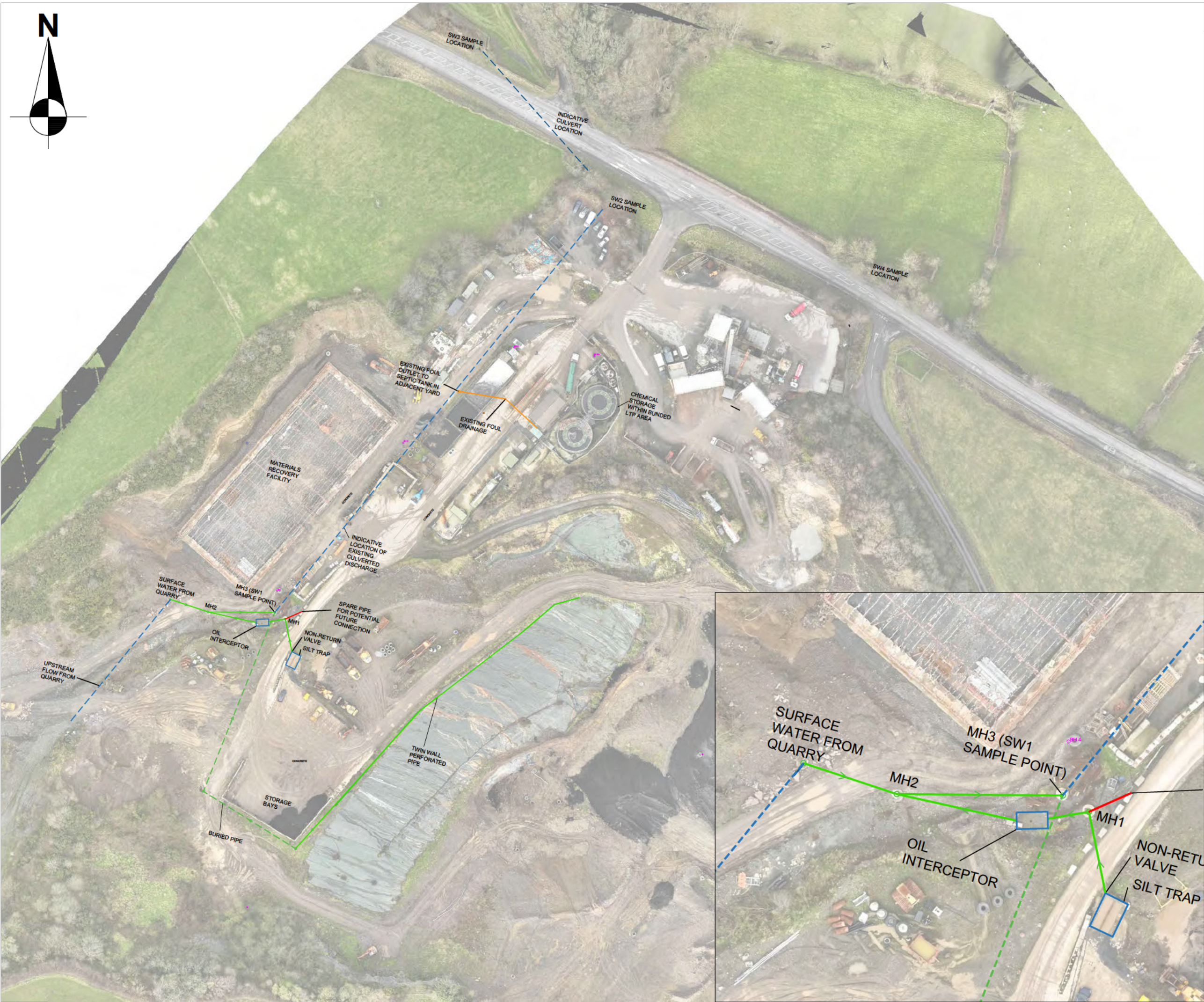
The CQA Validation Report will provide the following information:

- All conformance certificates for materials used, including the LLDPE geomembrane, geotextiles, stone, clay, pipework, precast concrete units and ready-mixed concrete;
- The findings of the Hold Point 1 inspection of the exposed geohess liner, including the photographic record, together with the decision taken and its justification;
- The geomembrane panel layout drawing, non-destructive test results and the repair log;
- Final as-built plans and surveys, including engineering details of the works, the extent of any geohess cut back, the extent and depth of the filter drain, the LLDPE footprint and the finished levels;
- Copies of the CQA Supervisor's daily and weekly records;
- Records of any problems or non-compliance and the solution applied;
- Details of the commissioning of SW1, including the as-built chamber details and its addition to the site monitoring plan;
- An appropriate selection of photographs showing progress, compliance, non-compliance and any remedial actions; and
- Validation that all aspects of the works have been completed in accordance with this CQA Plan unless otherwise agreed in advance with NIEA.

Appendix A

Drawings

Drawing No.	Title
15047-501	Lisbane Landfill Site Layout
15047-502	Toe Drain Repair – Location and Extent of Works
15047-503	Toe Drain Repair – Leachate Relief and Sealing Detail (typical section)
15047-504	Surface Water Sample Point SW1 – Plan and Section



Key

- FOUL PIPEWORK
- CULVERTED DRAIANGE
- STORM WATER DRAINAGE
- DIRECTION OF FLOW
- OIL INTERCEPTOR
- SILT TRAP
- MANHOLE

REVDATE	DESCRIPTION	DRN	CKD

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CONTRACT LISBANE LANDFILL SITE

DRAWING CURRENT SURFACE WATER DRAINAGE LAYOUT

SCALE 1:1,250 @A3	DATE JULY 2026
DRAWN	CHECKED
DRG No. 1504-501	REVISION

Architects
Civil Engineers
Waste & Energy
Project Managers

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w: www.taggarts.uk



Key

- FOUL PIPEWORK
- CULVERTED DRAIANGE
- STORM WATER DRAINAGE
- DIRECTION OF FLOW
- OIL INTERCEPTOR
- SILT TRAP
- MANHOLE

REV	DATE	DESCRIPTION	DRN	CKD

Taggarts

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BLUE SKY RESOURCE RECOVERY LTD.

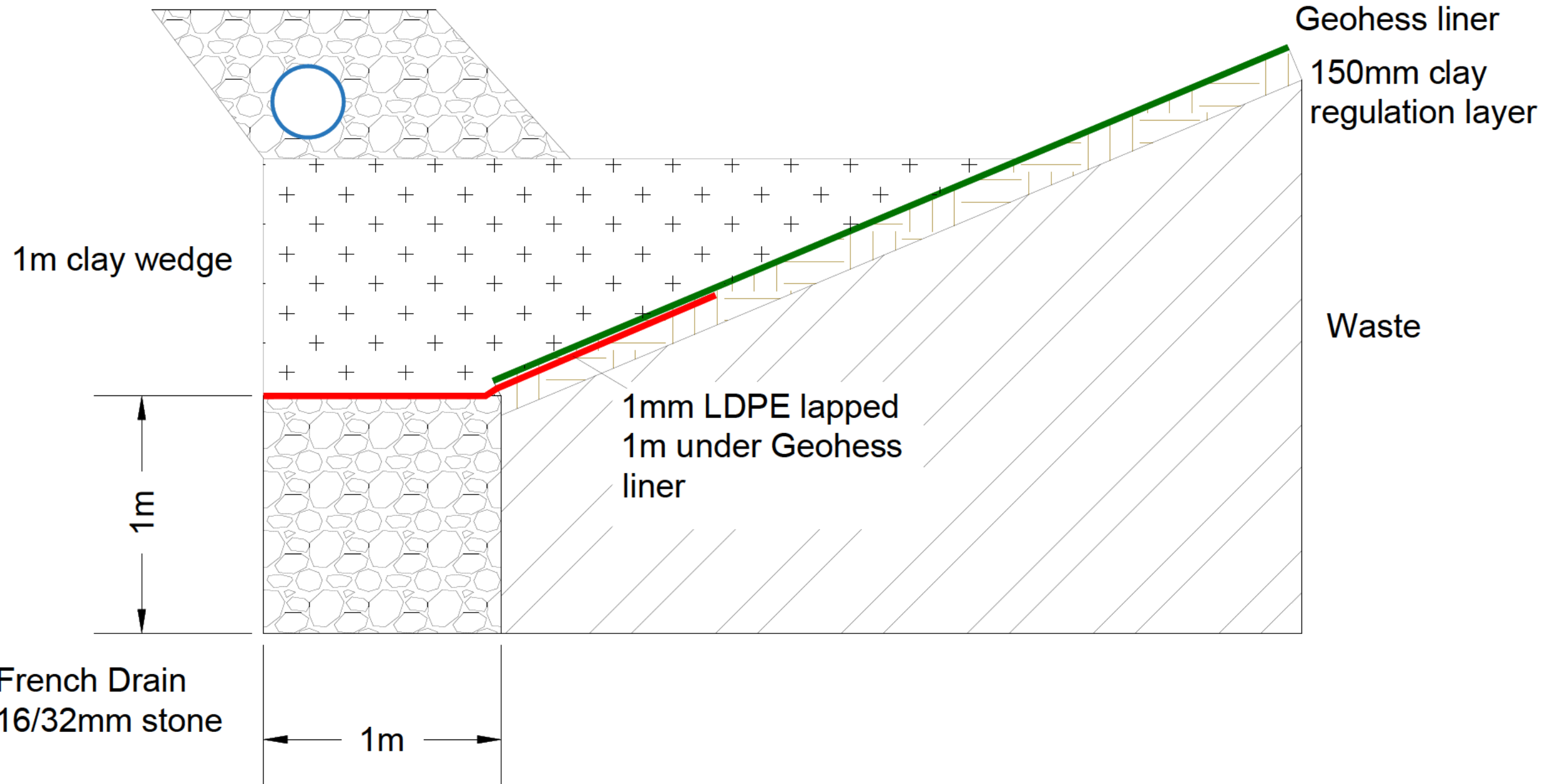
CONTRACT
LISBANE LANDFILL SITE

DRAWING
SW INVESTIGATION WORKS

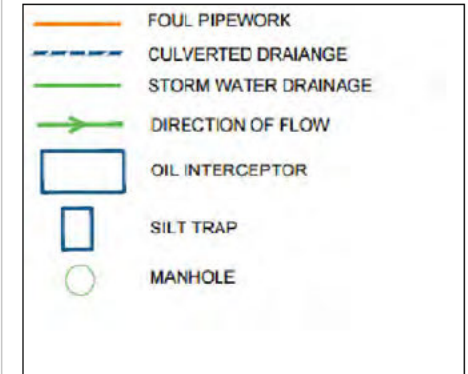
SCALE	1:500 @A3	DATE	JULY 2026
DRAWN	█	CHECKED	█
DRG No.	15047-502	REVISION	

Architects Civil Engineers Waste & Energy Project Managers	23 Bedford Street Belfast BT2 7EJ t: 028 9098 2121 e: info@taggarts.uk w: www.taggarts.uk
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300mm perforated pipe,
wrapped in geotextile,
clean drainage stone
surround



Key



REV	DATE	DESCRIPTION	DRN	CKD
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LTD.

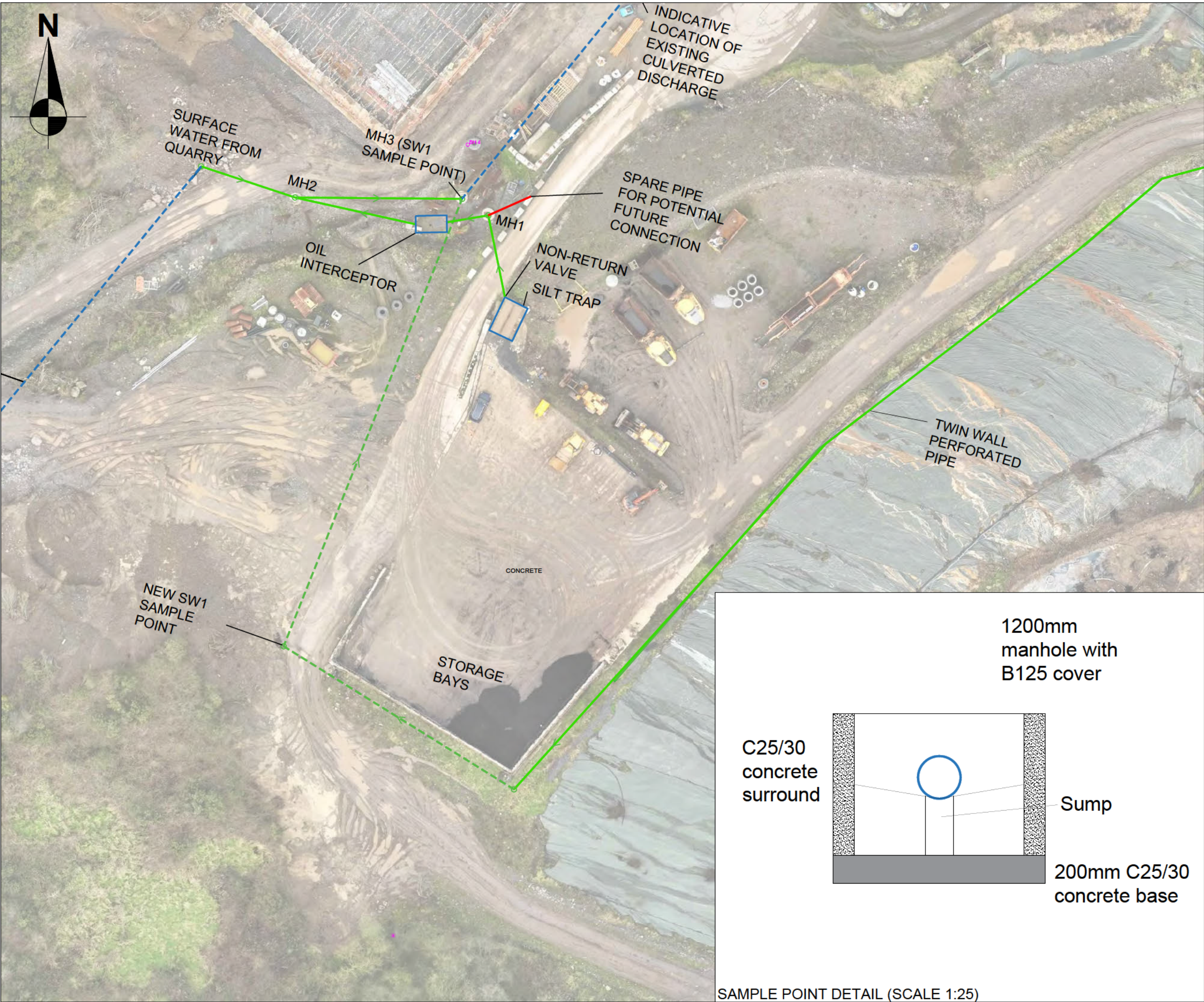
CONTRACT
LISBANE LANDFILL SITE

DRAWING
SURFACE WATER REPAIR DETAIL

SCALE	1:1,20 @A3	DATE	JULY 2026
DRAWN		CHECKED	
DRG No.	15047-503	REVISION	

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Key

- FOUL PIPEWORK
- CULVERTED DRAIANGE
- STORM WATER DRAINAGE
- DIRECTION OF FLOW
- OIL INTERCEPTOR
- SILT TRAP
- MANHOLE

REV	DATE	DESCRIPTION	DRN	CKD
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CONTRACT
LISBANE LANDFILL SITE

DRAWING
RELOCATION OF SW1

SCALE	1:500 @A3	DATE	JULY 2026
DRAWN		CHECKED	
DRG No.	15047-504	REVISION	

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