Verification Statement

AtlanTrap
Registration number: (V-2026-08-02)
Date of issue: (2026-August-31)

Technology type:	Stormwater Gross Pollutant Trap (GPT)
Application:	Stormwater gravitational pretreatment technology to remove sediments, nutrients, and gross pollutants from stormwater runoff
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Verified Performance Claims

The following performance claims for the Atlan Stormwater Pty. Ltd. AtlanTrap were verified in accordance with *ISO 14034:2016 Environmental management — Environmental technology verification (ETV)* and the VerifiGlobal Performance Verification Protocol.[1]

- Total Suspended Solids (TSS) Removal: 45% reduction for treated stormwater flows up to the verified treatment flow rate (TFR) of 25 L/s.
- Total Phosphorus (TP) Removal: 47% reduction at the verified TFR of 25 L/s.
- Total Nitrogen (TN) Removal: 25% reduction at the verified TFR of 25 L/s.
- Gross Pollutant Removal: 100% based on laboratory test results demonstrating complete retention of dosed gross pollutants up to the onset of bypass, which occurred at a flow rate exceeding the verified TFR of 25 L/s.

Basis of Verification

Verification of the AtlanTrap performance claims is based on field monitoring data generated by Drapper Environmental Consultants (DEC) at Griffith University, Parkland Campus in Queensland, Australia following the requirements of the Stormwater Australia[2] Stormwater

[1] VerifiGlobal, *Performance Verification Protocol (Applying ISO 14034:2016)*, VG-2016-002 (rev. 2017-05-04)
[2] Stormwater Australia, January 2019.

Quality Improvement Device Evaluation Protocol (SQIDEP), which requires submission of a Quality Assurance Project Plan (QAPP) prior to testing. The TFR of 25 L/s and the gross pollutant performance were both assessed through supplementary laboratory testing undertaken in accordance with the SQIDEP evaluation process.

Toronto and Region Conservation Authority (TRCA) in Ontario Canada served as the independent technical verification expert (TVE) to review and verify that the performance test results obtained for the AtlanTrap support the technology performance claims in accordance with the requirements of ISO 14034:2016. Pollutant removal performance of stormwater treatment demonstrated statistically significant differences between influent and effluent concentrations for TSS, TP, and TN at the 90% confidence level. The verified performance claims are subject to the test conditions, event qualification criteria, operating conditions, and limitations specified in the approved SQIDEP QAPP and supporting verification documentation.

Technology Company
Operating since 1972, Atlan Stormwater Pty. Ltd. provides full-service solutions including design, manufacturing, installation, and maintenance of quality devices to stop pollution at its source, serving local councils, developers, and engineers. Atlan Stormwater manufactures precast concrete and fibre-reinforced polymer (FRP) products, focused on advanced water quality and quantity solutions, including pollutant traps, hydrodynamic separators, and detention systems. The company also provides proactive maintenance, pipe relining, and cleaning services.

Stormwater technologies designed and developed by the company include the AtlanTrap. The product name AtlanTrap (previously marketed as the ATLAN Stormsack 200) is a registered trademark of Atlan Stormwater, not currently protected by a granted patent. The AtlanTrap is commercially available and already installed at multiple sites. Atlan Stormwater possesses full ownership of the technology which is protected through trademark registration.

Technology Application
The AtlanTrap is an engineered stormwater quality improvement device designed to remove a variety of stormwater pollutants including floatable trash and debris, coarse and fine suspended sediments, and associated particulate-bound pollutants such as nutrients and heavy metals. It is based on established stormwater treatment principles including physical screening, filtration, and sediment capture within a catch basin structure. These treatment mechanisms are well understood and widely applied in stormwater management practice.

The AtlanTrap is deployed directly into the stormwater system to capture contaminants close to the surface. It combines gravitational pre-treatment (sedimentation and floatation) in a single compact structure, offering the advantages of high flow rate, high sediment capacity, and low filtration flux rate. Easily retrofitted into new or existing structures, the AtlanTrap offers a decentralized approach in meeting site specific water quality goals and addressing low impact development (LID) objectives. Catch basins incorporating the AtlanTrap capture pollutants under the grate and are easy to clean out using conventional vacuum suction equipment.

The AtlanTrap does not rely on a dedicated sediment storage chamber or sump as part of its treatment mechanism. Pollutant capture occurs primarily within the filter bag assembly, and manufacturer maintenance guidance is based on the accumulation of material within the bag.

Maintenance can be achieved through the catch basin opening and is recommended when captured material reaches approximately one-half to two-thirds of the bag depth. As a passive treatment device, the AtlanTrap does not generate direct air emissions or process wastewater discharges. Sediments, debris, and other materials captured by the unit must be managed and disposed of in accordance with applicable local regulatory requirements. Installation, operation, and maintenance requirements may vary by jurisdiction.

Technology Description

As shown in Figure 1, the AtlanTrap is a pit basket consisting of a frame and filter bag housed within a precast concrete chamber. The AtlanTrap filter bag is fabricated from a polyethylene fabric with a nominal 200-micron aperture. The bag hangs from the aluminium mounting frame on aluminium carabiners. A HDPE flange is fitted to the aluminium frame to seal against the pit walls and ensure flow enters the AtlanTrap. Larger bags (from 600mm x 600mm upwards) are supported by a polyethylene strap and steel mesh.

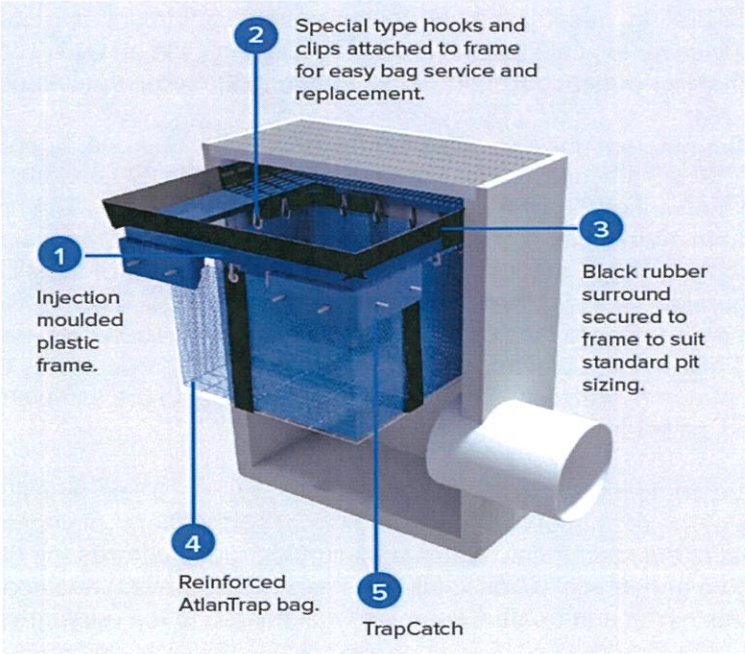

Figure 1 – AtlanTrap Cross-sectional view and features

SQIDEP Field Testing Requirements

Particle size distribution (PSD) must be accurately monitored and submitted for both influent and effluent to establish the performance and removal efficiency of stormwater manufactured treatment devices (MTDs). The SQIDEP standardized field test procedure requires performance testing within a target particle size range, reflecting typical Australian urban stormwater runoff, with a median particle size (d_{50}) of approximately 75 µm and a targeted suspended particle size range between 0 and 500 µm (0.5 mm). The overall distribution generally targets a 0 - 200 µm range as particles larger than 200 µm settle easily. To evaluate

how an MTD handles finer silts and clays (which carry up to 80% of contaminant loads), sampling must be done continuously or via automated aliquots across the storm hydrograph (typically capturing at least 50-60% of the storm).

To align with the SQIDEP Model for Urban Stormwater Improvement Conceptualisation (MUSIC) and accurately reflect total suspended solids (TSS) removal performance, field data must explicitly cover a suspended sediment particle size range between 0 µm and 500 µm with a median particle size (d_{50}) of approximately 75 µm. For MUSIC calibration, coarse sediments (greater than 500 µm up to 1 mm) are generally categorized as gross pollutants or bed load. If individual storm events or field data samples deviate significantly from this standard urban PSD profile, the data must be excluded from the evaluation.

AtlanTrap Field Monitoring Conditions
Field monitoring of the AtlanTrap commenced in September 2022 and continued until January 2024. As the Test Body, DEC was responsible for installing and commissioning the field monitoring equipment at the site; monitoring real-time data and collecting samples after each rain event; and calibrating, maintaining and replacing field equipment as required. DEC also provided performance metric calculations and statistical analyses on each compliant event and prepared a Detailed Performance Report (DPR) following the requirements of SQIDEP.

An AtlanTrap 600 × 600 mm unit served as the representative test unit. Supplementary hydraulic testing indicated bypass commenced at approximately 39 L/s under laboratory conditions, while the verified TFR for the tested configuration is 25 L/s. The unit was installed in a 600 mm x 600 mm grated inlet at the Griffith University, Parkland Campus carpark. The pit was 1800mm deep with a 375 mm diameter pipe draining the invert of the pit. The field monitoring configuration was slightly different than a standard unit, since it was necessary to capture an inlet sample prior to the flow entering the AtlanTrap. Therefore, the HDPE flange was omitted, and a stainless-steel trough was used instead. The trough was designed to capture ~400mL of runoff, sufficient to supply a 200mL aliquot to the samplers and keep ~4m of sample hose filled, without drawing air into the sample hose.

The catchment area draining to the AtlanTrap test unit was ~1,181 m^2 directly connected to the device, with 66% of the area impervious (carpark area) and ~406 m^2 of vegetated Eucalyptus Forest at the crest of the catchment. Catchment surface runoff entered the 600 x 600 mm AtlanTrap through a grated inlet. Gross pollutants (e.g., litter, leaves) and coarse sediment were removed by the AtlanTrap and treated water was discharged to the underground drainage network.

Storm event sampling was initiated following 0.6 mm of rainfall within a rolling 30-minute period. Influent and effluent samplers were triggered simultaneously, and subsequent 200 mL aliquots were collected at a flow-proportional basis. The logger was initially programmed to collect aliquots at approximately 1000 L intervals; however, this interval was reduced during the monitoring program to improve sample collection during smaller runoff events and enhance hydrograph coverage. Aliquots collected during each storm event were composited within the sampler to produce event mean influent and effluent samples for laboratory analysis. A total of 31 storm events were sampled during the monitoring period. The AtlanTrap was inspected at approximately three-month intervals throughout the monitoring program. Maintenance was performed when accumulated sediment and gross pollutants reached the specified maintenance

trigger level of approximately 150 mm depth (50% of bag capacity), with collected material manually removed and disposed of. Additional maintenance activities, where required, were documented throughout the monitoring period.

The AtlanTrap device does not have any significant retention/detention capacity, such that inflow is equal to outflow. Therefore, only outflow was measured recognizing that measuring inflow to a pit basket device, typically in the form of sheet flow, changes the nature of flow into the device, potentially impacting performance.

Water quality testing was undertaken by ALS Global for each rain event, comparing inlet sample concentrations for the AtlanTrap, with maximum and mean inflow concentrations in SQIDEP. All instrumentation and lab analysis followed the requirements of ISO/IEC 17025, ensuring precise, repeatable measurement. These combined technology performance test conditions provide the basis for verified performance claims that are accurate, reproducible, and grounded in conditions that closely simulate the deployment of stormwater MTDs in regulated urban and commercial development contexts.

Supporting Laboratory Test Results
Additional laboratory testing was performed by DEC using a preloaded mix of gross pollutants and sediment as summarized below.

Mass balance removal efficiency[3] **-** The mass balance removal efficiency of the AtlanTrap was determined by lab testing conducted by DEC in February 2024 as indicated in Table 1. These results are consistent with expectations for a pit basket with a nominal 200-micron mesh.

Mass Balance Removal Efficiency				
Test Run	**Particle Size**	**Mass Dosed**	**Mass Captured**	**Mass Removal %**
Test 1 @ 22L/s	530-1000 µm	4 kg	3.751 kg	93.8 %
Test 2 @ 22L/s	260-530 µm	5 kg	3.159 kg	63 %
Test 3 @ 22L/s	<80-260 µm	4 kg	0 kg	0 %

Table 1 - Mass Balance Removal Efficiency

Maximum Treatable Flow Rate and Scaling - The AtlanTrap is designed according to standard pit dimensions and a flow rate of 45.88 L/s/m^2 confirmed through laboratory testing of an AtlanTrap unit filled to 50% capacity, which conservatively assumes the base of the unit is 100% obstructed and the side walls provide flow passage. As shown in Table 2, the scaling relationship estimating the flow rate at which bypass commences is based on the area of the AtlanTrap side walls.

The maximum treatable flow rate for the 600 x 600 AtlanTrap based on February 2024 lab testing (39 L/s) was not observed during the field monitoring period, likely due to local authority guidelines stipulating sizing for 50% blockage factors. Additional lab testing performed in July 2024 at 25 L/s on a 600 x 600 AtlanTrap preloaded with gross pollutants to 20% capacity did not

[3] AtlanTrap Mass Removal Efficiency (MRE) is the same as Concentration Removal Efficiency (CRE).

observe bypass and water levels above 50% capacity. Therefore, the TFR claimed for the 600 x 600 AtlanTrap is 25 L/s (versus the maximum lab-tested flowrate of 39 L/s).

Pit Dimensions			Bag dimensions			Side wall Surface Area	Claimed TFR	Total S.A.	Design TFR
L	W	Min. D	L	W	D	m^2	L/s	m^2	L/s
450	450	600	270	270	260	0.28	10	0.35	20
600	600	600	500	500	305	0.61	25	0.86	39
600	900	600	430	800	305	0.75	32	1.09	50
900	900	600	700	700	305	0.85	39	1.34	61
1200	900	600	1000	700	305	1.04	50	1.74	79
1200	1200	600	1000	1000	305	1.22	65	2.22	101

Table 2 – AtlanTrap scaling relationship

Particle Size Distribution (PSD) - Laser particle sizing was performed on stormwater samples collected at the field test site at both the inlet and outlet. The inlet results are presented in Figure 2 with the SQIDEP MUSIC PSD shown in red. As typically observed in stormwater runoff, there is a wide variation in the inlet PSDs, suggesting that the field test site can be considered representative of a typical commercial/urban residential catchment with a clay-loam soil type. All but two of the inlet sample PSDs have a d_{50} less than 75 microns. Given that the AtlanTrap has a nominal 200-micron aperture, the company has suggested that the behaviour of the fabric and materials captured therein aids the trapping of finer particle diameters.

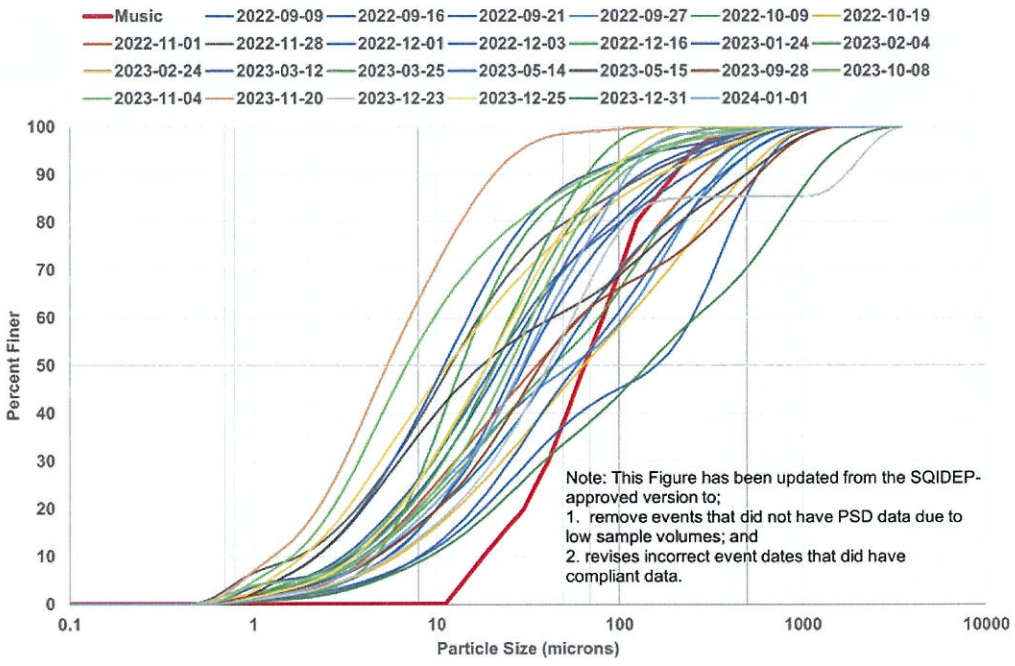

Figure 2 - Inlet Particle Size Distributions compared with SQIDEP MUSIC PSD

Verified Performance Results

TRCA assessed the AtlanTrap test data and supporting documentation against the requirements specified in the Verification Plan and ISO 14034:2016 Environmental management -- Environmental technology. The performance claims were evaluated using the SQIDEP-compliant dataset and supporting documentation, including supplementary laboratory testing undertaken to verify the TFR and to assess gross pollutant retention performance. Based on this assessment completed the performance claims presented in Table 3 are verified for the Atlan Stormwater Pty. Ltd. AtlanTrap under the conditions and limitations documented in the verification records and supporting test reports.

The AtlanTrap performance claims in Table 3 were verified based on paired influent and effluent samples collected during SQIDEP-compliant events. TSS, TP, and TN concentrations were measured at both the influent and effluent locations. Gross pollutant performance was evaluated using a methodology developed through the independent QAPP review process and subsequently refined through supplemental testing, as SQIDEP does not prescribe a standard gross pollutant testing procedure. Laboratory testing demonstrated complete retention of dosed gross pollutants up to the flow rate at which bypass commenced, which exceeded the verified TFR. Accordingly, the gross pollutant removal claim is based on the laboratory testing results.

Parameters	Verified Claims	Accuracy
Total Suspended Solids (TSS) removal	45%	High
Total phosphorous (TP) removal	47%	High
Total Nitrogen (TN) removal	25%	High
Gross pollutants removal	100%	Medium

Table 3 - Verified performance claims

The treatment flow rate presented in Table 4 was verified through supplementary laboratory testing completed following review of the Detailed Performance Report (DPR). The field monitoring program did not provide sufficient compliant high-flow events to substantiate the treatment flow rate claim; therefore, additional laboratory testing was undertaken and accepted through the SQIDEP evaluation process. Based on this testing, a treatment flow rate of 25 L/s was verified.

Parameter	Performance Test Results	Accuracy
Treatment flow rate	25 L/s	High

Table 4 - Additional performance test results reviewed by verifier

The verified performance applies to AtlanTrap units sized and operated at or below the corresponding hydraulic loading rate under the defined test conditions. Performance outside these conditions has not been verified.

As part of the verification process, the SQIDEP requirements were reviewed against the objectives and field monitoring requirements of the Canadian Procedure for Field Testing of Stormwater Filtration Manufactured Treatment Devices Publicly Available Specification (Canadian Filtration PAS). While the Canadian Filtration PAS was developed for filtration manufactured treatment devices and is not directly applicable to catch basin insert technologies, both protocols employ field-based performance evaluations intended to generate independently verifiable environmental performance data. Consideration was given to monitoring requirements and influent water quality conditions used to evaluate TSS, TP, and TN removal. The Verifier concluded that the SQIDEP requirements are broadly consistent with the objectives of the Canadian Filtration PAS in key areas relevant to this verification and provide a suitable basis for independent verification of field performance claims.

In conclusion, the Atlan Stormwater Pty. Ltd. AtlanTrap is a viable stormwater treatment technology that, when appropriately sized, installed, and maintained, can be used to effectively remove TSS, TP, TN, and gross pollutants from stormwater runoff. Although regulatory requirements for stormwater treatment technologies vary by jurisdiction, the verified performance data provide a basis for evaluating the suitability of the technology within applicable regulatory frameworks.

8. Quality Assurance

Quality assurance measures were implemented throughout the verification process to ensure the accuracy and validity of the verification findings. TRCA meets the conformity requirements of ISO/IEC 17020 when conducting ISO 14034 verification.[4] TRCA reviewed the QAPP, DPR, supporting monitoring records, laboratory reports, calibration records, and associated datasets to confirm data quality, traceability, and compliance with the Verification Plan. As described below, additional information was requested and reviewed where necessary to support independent assessment of the performance claims.

Sample collection - QA/QC procedures were implemented throughout sample collection and data generation. These included chain-of-custody procedures, equipment calibration requirements, site audits, event compliance screening, blind replicate laboratory samples (where sufficient sample volume was available), and laboratory QC checks against reference samples. Sampling, handling, and transport procedures were also conducted in accordance with established protocols. Sample collection, preservation, handling, and transport were undertaken in accordance with AS/NZS 5667.1:1998 and the Queensland Department of Environment and Science Monitoring and Sampling Manual (2018), as specified in the QAPP. Sample bottles were chilled prior to transport, and chain-of-custody procedures were maintained through the ALS Compass App. These procedures are considered appropriate for the collection and management of environmental water quality samples. The QAPP specified automated influent and effluent sampling using flow-weighted composite samples consisting of multiple aliquots collected throughout monitored storm events. SQIDEP established minimum requirements for hydrograph coverage and sample collection to ensure representative event sampling, and only events meeting the protocol requirements were included in the final performance assessment.

[4] Peer assessment undertaken by VerifiGlobal confirms that TRCA meets the requirements of ISO/IEC 17020 (Requirements for the operation of various types of bodies performing inspection) when providing verification services in accordance with the ISO 14034:2016 (Environmental Technology Verification). Reference: VerifiGlobal Peer Assessment Certificate #2018004, issued in July 2018.

The sampling methods and locations were appropriate for characterizing influent and effluent stormwater quality and for capturing the temporal variability characteristic of stormwater runoff.

Chemical analyses - Chemical analyses were conducted by ALS using documented analytical methods and laboratory quality assurance procedures. Laboratory reports reviewed by the Verifier confirm that the analyses were performed by an ISO/IEC 17025 accredited laboratory. Analytical methods, Limits of Reporting (LORs), and associated QA/QC requirements were documented and reviewed as part of the verification. Particle size distribution analyses were conducted without chemical dispersion or sonication to preserve naturally occurring particle aggregation and flocculation within the stormwater samples.

Operating conditions - Operating conditions were monitored and documented throughout testing. The QAPP included procedures for recording flow rates, rainfall conditions, hydrograph coverage, sample collection data, and bypass conditions. Time-lapse cameras, flow monitoring equipment, and water level switches were used to document technology operation and identify the occurrence of bypass or scour events. These records were used to assess event compliance, support interpretation of the monitoring data, and evaluate gross pollutant retention performance. Information on operating conditions and monitoring equipment was provided to the Verifier. Calibration records were also provided and reviewed as part of the assessment. The field conditions specified in SQIDEP and the QAPP were evaluated for each monitored event. Events that did not satisfy the required quality assurance or compliance criteria were excluded from the final analysis dataset.

Inspection and maintenance - Performance claims are dependent upon routine inspection and maintenance of the AtlanTrap. During the monitoring program, the device was inspected at three-month intervals. Maintenance was triggered when accumulated sediment and gross pollutants exceeded approximately 50% of the bag capacity (150 mm depth).

Statistical evaluation - Statistical evaluation of the performance claims was completed in accordance with SQIDEP requirements and documented in the DPR. The report presents the raw monitoring data, identifies events included and excluded from the analysis, and documents the statistical methodology used to derive the verified performance claims. The statistical evaluation approach and associated assumptions were reviewed as part of this verification and are considered appropriate. Performance claims are based on statistically validated field monitoring data collected under the range of hydraulic and environmental conditions specified by SQIDEP. The verified claims apply to the tested configuration and, where applicable, to other device sizes included within the verified product family through the approved scaling methodology described in this verification.

Accuracy and precision - A number of QA/QC measures are documented in SQIDEP to ensure results are accurate and precise, and that tests conducted by multiple vendors within the same technology category employ the same test methods. The QA/QC measures include the use of compliance criteria for event selection, certified laboratories, established test methods, calibration of equipment, tolerance limits for result variation, data checks during testing, and stringent documentation requirements.

What is ISO 14034?

The purpose of environmental technology verification is to provide a credible and impartial account of the performance of environmental technologies. Environmental technology verification is based on principles to ensure that verifications are performed and reported accurately, clearly, unambiguously and objectively. The International Organization for Standardization (ISO) standard for environmental technology verification (ETV) is ISO 14034, which was published in November 2016.

Benefits of ETV

ETV contributes to protection and conservation of the environment by promoting and facilitating market uptake of innovative environmental technologies, especially those that perform better than relevant alternatives. ETV is particularly applicable to those environmental technologies whose innovative features or performance cannot be fully assessed using existing standards. Through the provision of objective evidence, ETV provides an independent and impartial confirmation of the performance of an environmental technology based on reliable test data. ETV aims to strengthen the credibility of new, innovative technologies by supporting informed decision-making among interested parties.

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Signed for Atlan Stormwater Andy Hornbuckle, Director & CEO	Signed for VerifiGlobal: Thomas Bruun, Managing Director John Neate, Managing Director

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