

Environmental Protection Act 1994

Environmental Protection Order

This environmental protection order is issued by the administering authority pursuant to section 358 of the Environmental Protection Act 1994.

Northern SEQ Distributor- Retailer Authority T/A Unitywater
33 King Street
CABOOLTURE QLD 4510

Attention: Mr Rhett Duncan, Executive Manager Customer Delivery

Your reference: EPPR00869113

Our reference: C-CPLRC-100084354/ E-100365337/ 101/0005498

17/02/2023

Dear Ms Jackson

Take notice: that under the *Environmental Protection Act 1994* (EP Act) this environmental protection order (EPO) is issued to Northern SEQ Distributor - Retailer Authority T/A Unitywater (Unitywater) (you) by the administering authority. The administering authority is the Chief Executive of the Department of Environment and Science (the department).

The EPO is issued with respect to the activities of Kawana Sewage Treatment Plant (the STP), Main Drive, Bokarina, QLD 4575, on land described as Lot 101 on Plan SP295012 (the premises). You are authorised to undertake Environmentally Relevant Activity (ERA) 63- 1g- sewage treatment >100,000 Equivalent Persons (EP) at the premises under the conditions of the environmental authority EPPR00869113 (the EA).

A. Grounds

This EPO is issued on the following grounds:

1. The department requires you to take reasonable measures to comply with condition WT1 in Part One of the EA dated 12 July 2021 which states:

Other than as permitted within this environmental authority, contaminants must not be released from any site to any **waters** or the bed or banks of any **waters**.

2. The department requires you to take reasonable measures to secure compliance with the General Environmental Duty. The General Environmental Duty is detailed in s319 of the Act which states the following: 'A person must not carry out any activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practical actions to prevent or minimise the harm (the **general environmental duty**).



The facts and circumstances forming the basis for these grounds are:

- 1) On 14 December 2021, the department issued you with a varied environmental evaluation (EE) pursuant to section 326B of the EP Act requiring you to engage an Appropriately Qualified Professional (AQP) to design and commence implementing a Sampling and Analysis Quality Plan (SAQP) to:
 - a) assess the volumes of microplastics (<2mm) released from the STP;
 - b) assess the breakdown rate of the moving bed biofilm reactor (MBBR) media;
 - c) determine if there is an increasing or decreasing trend of media breakdown over time;
 - d) determine the size distribution of the resultant breakdown media;
 - e) determine the current volume of plastic media being released from the STP via release points W1 and W3; and
 - f) provide a report to the department by 30 June 2022.
- 2) On 27 June 2022, you requested an extension to the due date for the submission of the environmental report until Monday 11 July 2022. The department approved the request for an extension on 29 June 2022.
- 3) On 8 July 2022, you submitted an environmental report to the department titled "Kawana Sewage Treatment Plant Environmental Investigation" dated 8 July 2022 (the report) in response to the EE.
- 4) The findings from the report are summarised in paragraphs 5 to 20 below.
- 5) Mechanical degradation has had a noticeable impact on the condition of MBBR carriers within the Kawana STP, with MBBR carriers within the plant visibly worn.
- 6) The degradation and subsequent loss of the MBBR media occurs via two mechanisms: loss due to wear in the bioreactor which is relatively constant; and loss due to breakage, which has increased since the MBBR media was put into service. The loss due to wear is estimated to be 24 kg/day, which is not captured by the effluent screens due to the small particle size of the degraded plastics. The loss of MBBR plastic media due to breakage which is captured in the effluent screens (due to its larger particle size) is currently 4.8 kg/day (~30 L/day).
- 7) The rate of mechanical degradation due to wear is estimated to remain relatively consistent until the structural integrity of the MBBR carriers is compromised and there is breakage.
- 8) Degradation is highest within the anoxic tanks where there is mechanical mixing. There is no evidence that the MBBR carriers used within the Kawana STP are susceptible to degradation from UV exposure or exposure to chemicals typically found in sewage influent.
- 9) The current 2 mm effluent screening system collects most of the broken MBBR plastic media that is greater than 2 mm prior to release. For microplastics in the effluent smaller than 2 mm, most (average of 45.3 particles per survey) were in the size fraction $\leq 63-11 \mu\text{m}$, with <1 particle per survey larger than 500 μm . Black polyethylene particles, that may have originated from the MBBR particles, comprised between 23.9% and 93.3% of the particles.
- 10) Despite there being a greater number of small particles, most of the mass of plastic particles released in the effluent was comprised of large particles.
- 11) The mass of black polyethylene particles released in the effluent after the screens was highly variable, ranging from 0.5 kg to 87.5 kg per day over the monitoring period. On average, 24 kg/day (17,520 kg over 2 years) was estimated to be released in the effluent after the screens, and 3.73 kg/day was estimated to be released in biosolids.

- 12) As no black polyethylene particles were recorded in the 6 influent samples, it is likely that most of the black polyethylene particles released from the STP are from the degradation of MBBR carriers in the plant.
- 13) There was no distinct relationship between STP inflow and the volume of plastic media (macro and microplastic) that accumulated on the screen.
- 14) Large increases in the volume of MBBR plastic media collected on the effluent screens can mostly be attributed to specific events, such as high flows and new mixers. While the amount of breakage of MBBR plastic media has varied over the last 2 years, results from the last 6-months suggest breakage may be increasing over time.
- 15) Alternative MBBR carriers, had a consistently lower rate of wear from mechanical degradation than the Hel-X carriers used at the Kawana STP, with no evidence of breakage for the 70 days of experimentation. This suggests that alternate MBBR carriers may be more appropriate for the conditions experienced within the Kawana STP.
- 16) Prior to this investigation, MBBR plastic media released from the Kawana STP were observed and collected from beaches inshore of the ocean release point. Following retrofitting of the effluent screening system, the beaches inshore of the ocean release were surveyed each month (December 2021 to May 2022), and the Mooloolah River in March 2022. One MBBR plastic media particle was recorded in these surveys, on the beach inshore of the ocean release point.
- 17) The report concludes that there is not a significant impact on the visual recreational amenities of coastal waters or the Mooloolah River from the release of MBBR plastic media particles from the Kawana STP via the Pacific Ocean Outfall or the Mooloolah River Overflow outfall.
- 18) Similarly, few black polyethylene particles (that may include MBBR particles) were found in biota, water or sediment in the receiving environment at locations where dispersion modelling indicated concentrations might be highest.
- 19) Specifically, in samples from the Mooloolah River, there were:
 - a) - no black polyethylene particles (that may include MBBR particles) in surface water or sediment;
 - b) - microplastics particles in surface water, sediment and biota at all sites, with the exception of oysters at the mouth of the estuary; and
 - c) - some black polyethylene particles (that may include MBBR particles) in one oyster and one prawn sample from the mid-estuary.
- 20) In samples from the ocean, there were:
 - a) black polyethylene particles (that may include MBBR particles) in the surface water and bottom water near the diffuser, and in one of the shrimp samples from near the diffuser;
 - b) no black polyethylene particles in the sediment near the diffuser nor inshore of the diffuser on the beach;
 - c) on average, 0.24 plastic microparticles per cubic metre (m³) of seawater; and
 - d) no more than 0.02 particles m³ of black polyethylene (that may include MBBR particles) in surface or bottom water i.e. while black polyethylene particles (that may include MBBR particles) were detected in ocean water, they comprised a small proportion of the total number of plastic microparticles.
- 21) Condition WT1 of the EA prohibits the release of contaminants to waters unless permitted within the EA.
- 22) The micro plastic particles introduced into the sewage from the MBBR are a contaminant and there is no condition in the EA permitting their release to waters.

- 23) The environmental report estimates that on average, 24 kg/day or 17,520 kg over 2 years, of micro plastic particles were estimated to be released into the sewage effluent after the screens and were then released to waters from the STP. This is a contravention of the EA and the department considers that it is reasonable to require you to take measures to comply with the EA.
- 24) Plastics are considered ubiquitous in the environment. In 2019 the Queensland Government released the report titled "Tackling plastic waste- Queensland Plastic Pollution Reduction Plan" (https://www.qld.gov.au/data/assets/pdf_file/0022/113368/plastic-pollution-reduction-plan.pdf) which identifies that microplastics are "difficult to remove and have been found in a wide range of locations across the globe: in groundwater, soil and the deepest part of the ocean, as well as in the atmosphere".
- 25) It is reasonable to conclude that the release of contaminants to waters, namely microplastics from the MBBR treatment process in the STP, is likely to cause environmental harm. The quantities of microplastics being released to waters are significant and the quantities of microplastics released do not demonstrate that all reasonable and practicable measures are being taken to prevent or minimise the environmental harm (which includes potential environmental harm).
- 26) The department considers that it is appropriate to require you to take reasonable measures to comply with the general environmental duty identified above, and to take reasonable steps to investigate how the release of microplastics to waters from the sewage treatment process can be limited or prevented.

B. Requirements

In accordance with this EPO, you are required to do the following:

1. By **5:00 pm on 31 March 2023** you must engage an appropriately qualified person (AQP) to carry out the requirements of the notice and confirm the engagement in writing to sunshinecoast.esr@des.qld.gov.au. The written confirmation of the engagement must include each persons' academic qualifications and suitable experience relevant to the scope of work on the investigation each AQP will undertake.
2. By **5:00 pm on 18 August 2023** the AQP identified in requirement 1 above must investigate at least the following options (or a combination of the following and other options) for their effectiveness in reducing microplastics (less than ~2mm) being released from the premises to waters:
 - (a) implementing a sand filter or other type of suitable technology into the sewage treatment process to separate out microplastics;
 - (b) removing current MBBR media contained in bioreactors and exchanging to an alternative more robust media type to reduce the generation of microplastics; and
 - (c) exchanging the MBBR bioreactor and any required infrastructure to a treatment process that prevents microplastics being generated.
3. By **5:00 pm on 18 August 2023** the AQP engaged in requirement 1 above must undertake a desktop study to investigate all other reasonable and practicable potential options to reduce micro plastic released from the premises to waters as a result of the treatment process.

4. By **5:00 pm on 20 October 2023** you must provide a written report to the department at sunshinecoast.esr@des.qld.gov.au, detailing the following for each option prescribed in requirements 2 and 3 above:

- (a) estimated efficiency of each option and calculated reduction of microplastics being generated and released;
- (b) estimated cost of implementing each stage (if staged implementation necessary) and overall cost of implementation and ongoing operating costs;
- (c) estimated time to implement;
- (d) information clearly demonstrating how each option would be implemented; and
- (e) advantages and disadvantages of each option for effective and efficient sewage treatment suitable for the location of the premises and the receiving environment.

5. After considering the report required by Requirement 4 of this EPO you must make a written recommendation identifying the optimum option to prevent or minimise the release of microplastics to the environment from the premises and include a copy of the recommendation, with justification, with the written report.

C. Obligations

If you propose to dispose of the place or business to which the EPO relates, you **must** advise the buyer of the existence of this EPO.

If you cease to carry out the activity to which this EPO relates, you **must** give written notice of ceasing to carry out the activity to the department within 10 days of ceasing the activity.

Take notice:

- the requirements of this order take effect immediately upon service of the order;
- failure to comply with this order is an offence under the EP Act;
- this order remains in force until further notice from the administering authority.

D. Penalty

It is important that you know the impact to you personally as an individual or as a corporation for not meeting your obligations.

Failure to comply with an EPO is an offence.

- The maximum penalty for wilfully contravening an EPO is 6250 penalty units, totalling \$ 898,437 or five years imprisonment for an individual or \$ 4,492,187 for a corporation.
- The maximum penalty for contravening an EPO is 4500 penalty units, totalling \$ 646,875 for an individual or \$ 3,234,375 for a corporation.

Failure to provide written notice to the buyer of the existence of the order is an offence.

- The maximum penalty is 50 penalty units, totalling \$ 7,178, for an individual or \$ 35,937 for a corporation

Failure to provide written notice to the department within 10 business days of ceasing the activity to which an environmental protection order relates is an offence.

- The maximum penalty is 50 penalty units, totalling \$ 7,178 for an individual or \$ 35,937 for a corporation.

Section 3 of the *Penalties and Sentences Regulation 2015* prescribes the monetary value of a penalty unit.

E. Reviews and appeals

The provisions regarding reviews of decisions and appeals are found in sections 519 to 539 of the EP Act.

A person who is dissatisfied with an original decision made by the Department of Environment and Science (the department) may apply to have that decision internally reviewed.

Information about initiating an appeal in relation to this notice is contained within the [Internal Reviews and Appeals Information Sheet](#) (available at www.qld.gov.au using the publication number ESR /2015/1742 as a search term)

A request for review or appeal is to be made using the approved form '[Application for review of original decision](#)' (available at www.qld.gov.au using the publication number ESR/2015/1573 as a search term.

Applications for reviews are to be sent to Permit and Licence Management, Department of Environment and Science: via email at palm@des.qld.gov.au , or by mail to the following address: GPO. Box 2454, Brisbane, QLD, 4001.

Where an application has been made for a decision to be reviewed, the applicant may also apply to the relevant court for a stay of the decision to secure the effectiveness of the review.

Once the original decision has been reviewed, a person who is dissatisfied with the review decision may be able to appeal against that decision to the relevant court within 22 business days after receiving notice of the review decision.

A person whose interests are or would be adversely affected by a decision of the department may be able to request a statement of reasons for a decision or a statutory order review under the *Judicial Review Act 1991*.

You may have other legal rights or obligations and should seek your own legal advice.

Pursuant to section 540 of the Act, the department is required to maintain a register of certain documents and information authorised under the Act. A copy of this document will be kept on the public register. The register is available for inspection by members of the public who are able take extracts, or copies of the documents from the register. Documents that are required to be kept on the register are published in their entirety, unless alteration is required by the Act. There is no general discretion allowing the department to withhold documents or information required to be kept on the public register. For more information on the department's public register, search 'public register' at www.qld.gov.au. For queries about privacy matters please email privacy@des.qld.gov.au or telephone 13 74 68.

Notice
Environmental Protection Order

Should you have any queries in relation to the notice, please contact Ben Grant on 0460 000 404.



Signature

17/02/2023

Date

Tim Brain

Manager Compliance

Delegate of the Chief Executive

Department of Environment and Science

Environmental Protection Act 1994

Enquiries: Ben Grant

COMPLIANCE CENTRE: **Sunshine Coast**

Ph: (07) 5459 6132

Email: sunshinecoast.esr@des.qld.gov.au

