

SECTION 8

Preliminary Marine Water Monitoring Program



8 Marine Water and Sediment Monitoring Program

A draft Water and Sediment Monitoring Program (WSMP) for East Point has been prepared to support the Proponents commitment to improvements in water quality discharges from its wastewater treatment plants. This section summarise the content of the draft Water and Sediment Monitoring Program, included as **Appendix Q**. PWC propose to implement the draft WSMP prior to commencing construction of the Proposed Development and subsequent construction and operation of the EPO Extension Project.

8.1 Introduction

The draft WSMP details the proposed monitoring at East Point, with the aim of addressing likely requirements for constructing and operating the proposed extended EPO, used to discharge effluent from the Ludmilla WWTP.

The purpose of the current Water and Sediment Quality Monitoring Program is to address potential issues of concern arising from the proposed extension and increased capacity of the EPO. These have been identified by NRETAS as: future and cumulative increases in nutrients, turbidity, fine sediment and heavy metals entering the marine environment of Darwin Harbour causing impacts to fauna and flora.

The draft WSMP for East Point provides:

- A summary of existing monitoring at East Point and licensing conditions guiding this monitoring program
- Historical and current water quality at East Point by the Proponent
- Requirements for monitoring discharge from the Ludmilla WWTP and EPO, with a focus on the proposed extension of the EPO (part of the Larrakeyah Outfall Closure Plan)
- A draft water quality monitoring program, addressing aquatic ecosystem monitoring (physico-chemical parameters and toxicants) and recreational and cultural water quality monitoring
- A draft sediment monitoring program.

Following is a summary of the key elements discussed under the draft WSMP for East Point.

8.2 Water Quality Monitoring Program

The objectives of the aquatic ecosystem water quality monitoring program are as follows:

- To obtain baseline data on the condition of the marine environment in the vicinity of the existing and proposed locations of the EPO
- To monitor impacts on water quality, in particular turbidity and suspended solids, during construction of the upgraded EPO
- To confirm by monitoring the predictions made in the PER as to the distribution and concentration of toxicants and other substances discharged from the outlet within the vicinity of the new outlet and at potential impact locations
- To assess improvement in water quality at the current EPO location following upgrading of the Ludmilla WWTP and relocation of the EPO
- To assesses compliance with the conditions of the Waste Discharge Licence and the designated Beneficial Uses of Darwin Harbour.

It proposes 18 monitoring sites in the vicinity of the existing EPO, sites under consideration for the extended outfall and the East Point Aquatic Life Reserve.

8 Marine Water and Sediment Monitoring Program

The Water Quality Monitoring Program propose a suite of analytes for physico-chemical, biotic parameters, nutrients and toxicants. At some site PWC propose to collect collected water samples from surface, middle and bottom waters and analysed for turbidity and TSS for construction impact assessment purposes.

8.3 Recreational and Cultural Water Quality Monitoring Program

The objective of the recreational and cultural water quality monitoring program is to monitor, using the indicator organisms *E. coli* and/or intestinal enterococci, for the presence of potentially harmful human pathogens (bacteria and viruses) in the vicinity of the outfall and, where appropriate, at recreational areas (beaches) and adjacent locations offshore that are potentially subject to the influence of the EPO. The monitoring programme presented in the draft WSMP is specific to PWC's EPO upgrade and is not intended to replace the routine beach and offshore (Surf Life Saving) monitoring programs undertaken by NT Department of Health and Families.

The locations previously selected by PWC for monitoring of recreational water quality in the vicinity of the EPO have been selected on the basis of the proximity of the site to the outfall, sites under initial consideration for the new outfall location and for assessing the quality of water entering the East Point Aquatic Life Reserve. One distant reference site, SLUEP11, to the north of the existing and proposed outfall locations is also monitored.

In addition, two shallow water sites on the north side of East Point and two sites to the north of Ludmilla Creek, one at the northern end of the bay and one at the southern end, coinciding with the sites selected for sediment monitoring at those locations, will be monitored to obtain pre-operational baseline data on bacterial levels.

The water quality parameters for cultural purposes, including direct contact recreation and harvesting of aquatic life for food are generally addressed under aquatic ecosystems guidelines (ANZECC & ARMCANZ 2000), with the exception of bacteria for which the following guidelines apply:

- Water quality for direct contact recreation (e.g. swimming)
- Water quality for harvesting aquatic life for food.

8.4 Sediment Monitoring Program

The monitoring of sediments at the existing and proposed discharge locations for the EPO, sensitive potential receptors and reference locations provides input to the existing condition, construction and operational assessment of the proposed EPO Extension Project (subject to a separate approval under the EA Act and EPBC Act).

As a monitoring tool, sediments are a more conservative indicator of persistent contaminants than water quality measurements which are subject to short term discharge variability in terms of flow rates and water quality, and also environmental factors, particularly the strong tidal influence which is present in Darwin Harbour.

It should be recognised in proposing to monitor the sediments in the vicinity of the existing intertidal outfall that this represents an atypical, and most likely a worst case scenario for contaminant accumulation, when considering future impacts from a new sub-tidal outfall location. There are a number of reasons for this. Firstly, discharge at an intertidal location means that wastewater at plant discharge concentration is discharged directly onto the sediments at low tide, which may then be further concentrated by evaporation and effectively drawn into the sediments by the falling tide. At a sub-tidal location the plume

8 Marine Water and Sediment Monitoring Program

will be buoyant due to its low salinity when compared with the receiving water and will undergo significant dilution before contacting the sediment, potentially some distance down current of the outfall location.

Monitoring at the existing outfall location is however required for construction impact assessment, and post construction for assessment of operational improvements arising from the change to a sub-tidal outfall.

A practical advantage of monitoring the existing intertidal outfall location is the high degree of certainty that can be held as to the sediments having been subjected to the wastewater discharge on a frequent basis for a long time. Thus an impact, if it has occurred, should, with a high degree of certainty, be detected.

Monitoring of the sediments at the three alternate outfall locations is included, as are additional sites along the pipeline route and potential impact and reference locations in intertidal and sub-tidal locations.