WOODMAN POINT
WASTEWATER TREATMENT PLANT
EMERGENCY OUTFALL TO JERVOISE BAY

Report and Recommendations

of the

Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia

Bulletin 356 September 1988

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SUMMARY

The Water Authority of Western Australia (WAWA) has referred to the Environmental Protection Authority (EPA), a proposal for an emergency wastewater outlet into Jervoise Bay, on the northeast side of Cockburn Sound (Fig. 1). The EPA requested that the proponent (WAWA) prepare a Notice of Intent (NOI) for referral to the EPA for environmental assessment. The EPA examined the NOI and sought additional information on various aspects of the project from the proponent. On receipt of this information, the EPA assessed the environmental impacts of the project.

The environmental impacts of the proposal are relatively minor in terms of the beneficial uses of the receiving environment and preferable to the alternative of overflow of raw sewage into wetlands. The proponent has made a substantial commitment to reporting and monitoring the use of the proposed emergency outfall. In the event of significant problems developing as a consequence of this outlet, the proponent has agreed to conduct additional studies to determine the appropriate length for an extension of the Option A outlet, and then undertake the extension.

RECOMMENDATION 1

The Environmental Protection Authority concludes that the proposed option of an 80 m pipeline into Jervoise Bay is environmentally acceptable and recommends that it could proceed subject to the commitments to reporting and monitoring given in the Notice of Intent including:

- **prompt notification of use;**
- **chlorination of the effluent within one hour of commencement of discharge;**
- **water sampling in the vicinity of the outlet following use; and**
- **formal reviews by the Environmental Protection Authority after the first, third and tenth year of operation.**

INTRODUCTION

The Woodman Point Wastewater Treatment Plant (WWTP) serves the majority of the urban, commercial and industrial development of metropolitan Perth south of the Swan River. The wastewater is treated to remove rags and gross solids (screens), grit (grit removal tanks) and settleable matter (sedimentation tanks) before the effluent is pumped through a 23 km long pressure pipeline to Point Peron where it is discharged to the ocean some 4.3 km offshore (Fig. 1).

As wastewater is produced continuously seven days a week all year round, it is essential to provide a treatment and disposal system which can deal with these flows in the event of an emergency such as a power failure. The current emergency disposal situation operates in the following way. The initial flow discharges by gravity through the Cape Peron outlet. This has a limited capacity, which when reached, results in overflows to the outlet off Woodman Point (Fig. 1). At present these two outlets are capable of dealing with current maximum plant inflow. However, with increasing flows from the catchment from ongoing development, this capacity will be exceeded in the near future. As a result it is necessary to increase the capacity for emergency disposal. However it is emphasised that the proposed emergency outfall will operate as the third stage, only after the capacities of the Point Peron pipeline and the existing pipeline off Woodman Point are exceeded, in the emergency disposal of wastewater.

THE PROPOSAL

Two options for emergency disposal into Jervoise Bay are presented in the NOI: Option A - an 80 m pipeline and Option B - a 750 m pipeline (Fig. 2). The land area behind Jervoise Bay is currently the site of major shipbuilding and fishing industry support services. As such the primary usage of the waters in the immediate vicinity of option A, the option preferred by WAWA, is for industrial purposes and designated Beneficial Use No 16: Navigation and Shipping. The closest area designated Beneficial Use No. 1: Direct Contact Recreation is about 600 m to the northwest of the 80 m pipeline and 500 m north of the 750 m pipeline.

In assessing the NOI the EPA gave particular consideration to the following environmental issues:

(i) The frequency of use, volume and chemical/biological characteristics of the wastewater in relation to the overall problem of eutrophication (nutrient enrichment) in the Cockburn Sound area.

(ii) The discharge of effluent in relation to Beneficial Use zoning of nearby waters.

(iii) The relative impacts of untreated wastewater overflowing into wetlands as opposed to treated effluent discharged into the ocean.

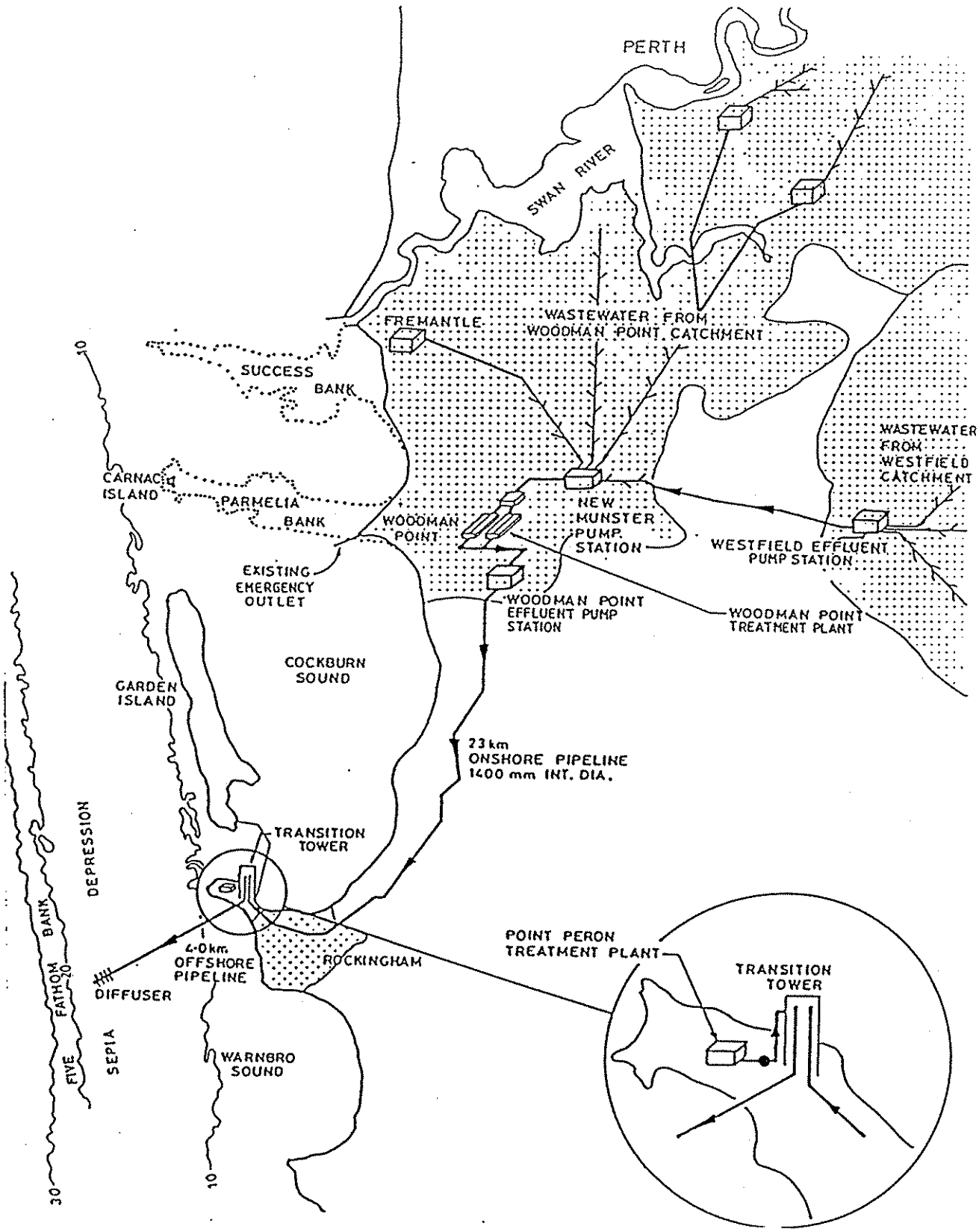

Figure 1. Location map of Cockburn Sound showing existing emergency outfalls.

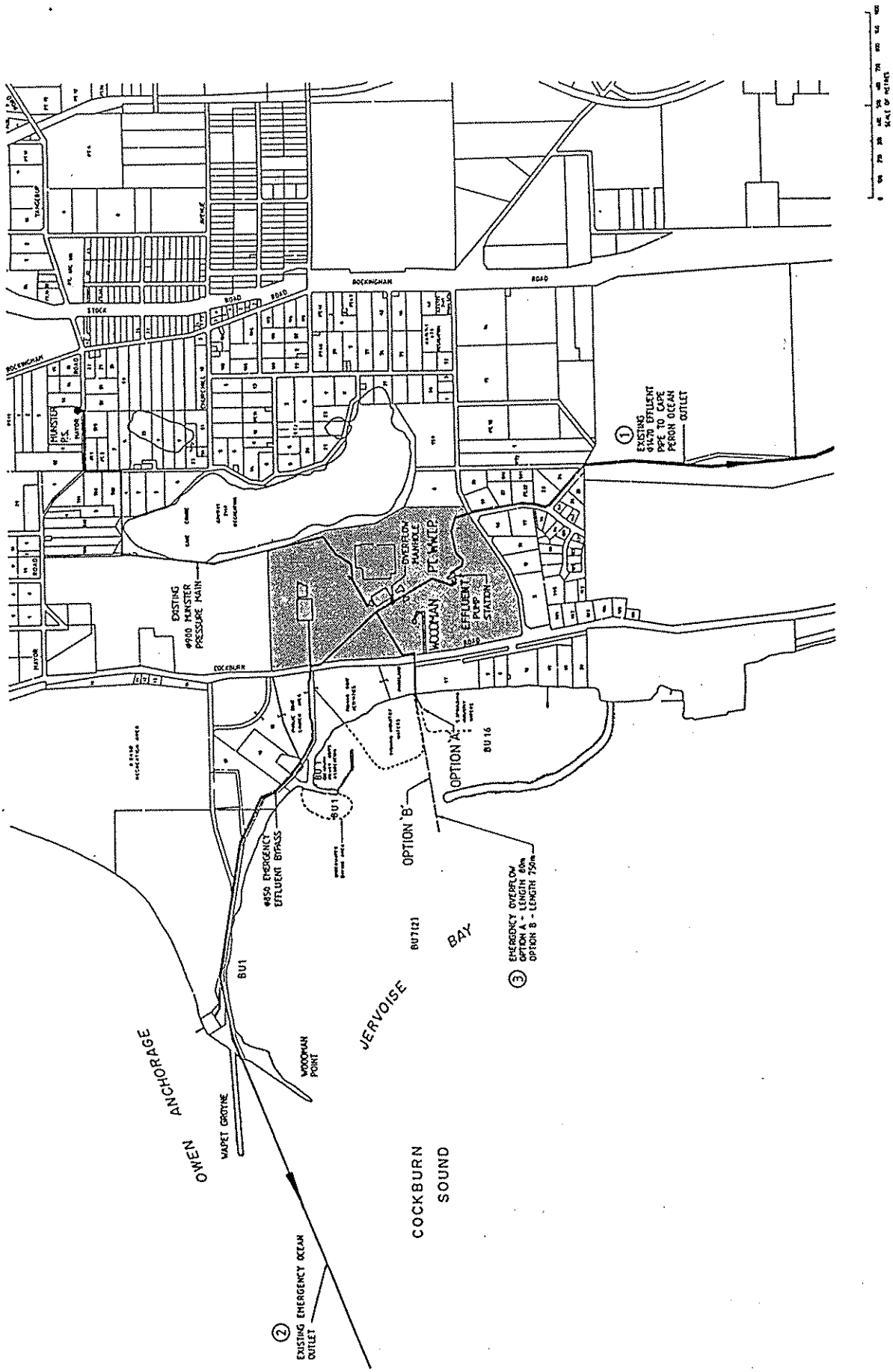

Figure 2. Location map of Jervoise Bay showing existing and options for proposed emergency outfalls.

(iv) The strong commitment the proponent has made to reporting and monitoring of the proposed outfall.

(v) The relative merits of the 80 m (Option A) and 750 m (Option B) pipelines in relation to environmental issues.

These are discussed below.

ENVIRONMENTAL CONSIDERATIONS AND MANAGEMENT

(1) Nutrient Loading to Cockburn Sound

Since commissioning the WWPT in June 1984, there have been seven instances when pumping faults have resulted in overflow of effluent to Cockburn Sound. Of these two were under 40 minutes, 3 were less than 2 hours, 1 equalled 4 hours and the major overflow occurred over a seven day period. The major overflow resulted in 32 000 m^3 of effluent being discharged which represents a total nitrogen loading to Cockburn Sound of 1600 kg if effluent concentation was 50 mg/L as stated in the NOI. In comparison the mean daily total nitrogen loading to Cockburn Sound from the KNC/CSBP outfall during the 1986/87 summer monitoring programme was approximately 1100 kg. Thus even during this major overflow the contribution to nutrient loading of Cockburn Sound is relatively minor.

Major overflows, such as the one described above, are predicted (in the NOI) to occur no more than once every 8 years. Furthermore most overflows are rectified within two hours and a more realistic "worse case" scenario, according to the NOI, is likely to be a power failure at the plant for a period of up to 24 hours with a predicted effluent discharge in the year 2001 of 20 000 m^3 . As stated above, effluent discharged under emergency conditions will have been treated by passing through screens, grit removal tanks and sedimentation tanks and as such would have the same characteristics as the normal effluent discharged through the Cape Peron outlet.

(2) Beneficial Uses

The receiving waters in the immediate vicinity of this proposal are designated Beneficial Use No. 16 and Beneficial Use No. 7. This proposal is compatible with these designations.

The Cockburn Power Boat Association Marina is approximately 600 m to the north of this proposal and the area between this facility and the area up to Woodman Point, including the underwater diving area near the naval jetty, is designated Beneficial Use No. 1: Direct Contact Recreation. This designation requires both health and aesthetic consideration.

The initial dilution and flushing characteristics of the two options suggest that at times elevated levels of faecal coliforms could reach the areas designated Beneficial Use No. 1. However as most emergency overflows occur as a result of power failures during winter storms, and are rectified within two hours, the likelihood of these elevated levels of faecal coliforms posing health risks is small due to low beach usage. Furthermore the stringent requirements to chlorinate the effluent within 1 hour of commencement of discharge and to notify the EPA and users of Jervoise Bay in the advent of chlorination not being achieved within this time period, should provide adequate safeguards even during periods of higher beach usage.

The discharge will consist of effluent which is a grey colour with no visible objects such as plastics, rags and grease. As such, the effluent is unlikely to pose aesthetic problems in the Beneficial Use No. 1 areas to the north of the proposal.

(3) Alternatives

Three emergency overflow options at WWTP are outlined in tne NOI.

(i) storage at Munster Pump Station
(ii) storage at WWTP
(iii) overflow to Cockburn Sound/Jervoise Bay.

The first option would utilise the existing overflow facilities at Munster Pump Station. However this would only provide storage for about 2.5 hours at a design flow rate of 3 000 L/s and involves the overflow of raw wastewater rather than treated effluent. In addition should the effluent pump failure extend beyond this storage capacity, overflow of raw wastewater to Lake Coogee would result. The second option outlined in the NOI involves storage at WWTP. This is also considered to be unacceptable due to the limited space available and the high capital cost of constructing a 50 000 m^3 unsealed storage basin. An additional consideration is

that an unsealed storage basin would almost certainly pollute Lake Coogee. Furthermore, in the unlikely event of the capacity of this basin being exceeded, further contingency plans for emergency disposal are necessary. The third option involves ocean disposal and is the subject of the NOI.
The possible contamination of wetlands by emergency disposal of raw wastewater is less desirable than the intermittent contamination of Cockburn Sound by treated effluent.

(4) Reporting and Monitoring
The proponent has made the following commitments for monitoring and managing the environmental implications of this proposal.

(i) For the first year after commissioning of the Jervoise Bay emergency outlet, all incidents involving use of that outlet or of the existing Woodman Point emergency outlet shall be reported immediately by facsimile transmission to the EPA.

(ii) After this first year of operation, use of the Jervoise Bay emergency outlet is to be reported annually.

(iii) Any use of the Jervoise Bay outlet should initiate a contingency plan to chlorinate the effluent as soon as possible. As an indication, the chlorination procedure should aim to achieve a faecal coliform count at the outlet point of less than 150/100 mL within one hour of commencement of discharge.

(iv) If under clearly exceptional circumstances an acceptable level of chlorination cannot be achieved within one hour, users of Jervoise Bay and the EPA are to be notified immediately.

(v) The Water Authority of Western Australia will make contingency arrangements so that sampling faecal coliforms, total nitrogen, total phosphorus and chlorophyll 'a' is conducted the morning following any use of the outlet exceeding three hours duration, and thereafter at approximately 24-hourly intervals for 3 days after the outflow has ceased. In the event of an outflow exceeding 6 hours, the sampling should continue for 6 days after the outflow has ceased. A copy of all sampling results are to be communicated directly to the EPA by the analytical laboratory (or laboratories) immediately the data are available.

(vi) Use of the emergency outlet will be formally reviewed by EPA and WAWA officers after the first, third and tenth years of operation, and at any other time the EPA subsequently determines is appropriate. If excessive use of this emergency outlet occurs, or if significant environmental problems develop as a consequence of use of this outlet, the Water Authority agrees to conduct additional current monitoring studies to determine the appropriate length for an extension of the Option A outlet, and then undertake the extension.

(vii) As a general indication, use of the outlet on more than 4 occasions in one year, or for a cumulative total of more than 12 hours in one year due to inadequate implementation of the contingency plans, may be regarded as environmentally unacceptable. This would especially apply if overflows occur at times when the Jervoise Bay area is being heavily used by boat traffic and swimmers on nearby beaches. Should an extension be required, it is envisaged that the new outlet will be at least 750 m from shore.

(5) The Preferred Option

The option preferred by WAWA is the $0.9 million 80 m pipeline into Jervoise Bay. The environmental advantages of a 750 m pipeline over the 80 m pipeline appear, on current information, to be minimal and insufficient to justify the $2.55 m cost of the longer pipeline. However if significant environmental problems develop, WAWA will be required to undertake studies to determine an appropriate length for an extension to the 80 m pipeline.

CONCLUSIONS

The above analysis has indicated that the environmental impacts of the proposal are relatively minor in terms of the beneficial uses of the receiving environment and preferable to the alternative of overflow of raw sewage into wetlands. The proponent has made substantial commitments to reporting and monitoring the use of the proposed emergency outfall. These commitments will ensure that the pertinent environmental parameters are monitored. In the event of significant problems developing as a consequence of this outlet, the proponent has agreed to conduct additional studies to determine the appropriate length for an extension of the Option A outlet, and then undertake the extension.

RECOMMENDATION 1

The Environmental Protection Authority concludes that the proposed option of an 80 m pipeline into Jervoise Bay is environmentally acceptable and recommends that it could proceed subject to the commitments to reporting and monitoring given in the Notice of Intent including:

- **prompt notification of use;**
- **chlorination of the effluent within one hour of commencement of discharge;**
- **water sampling in the vicinity of the outlet following use; and**
- **formal reviews by the Environmental Protection Authority after the first, third and tenth year of operation.**