APPENDIX D
BANTRY SEWERAGE SCHEME
EXTRACT FROM ENVIRONMENTAL IMPACT STATEMENT
FEBRUARY 1992
treatment works site and proceed north-northwest along the airstrip road, past the airstrip, and into Bantry Bay. The route of this outfall will not create long-term impacts to the current use of this road because the road will be restored following construction. The outfall pipe will be entrenched into the Narrows channel bed, and a diffuser system will be installed to provide optimum diffusion and dilution of the treated effluent.

The top of the diffusers will be no more than 1 metre from the bay bed, thereby allowing 5.5 metres of shipping clearance. This depth is sufficient to accommodate ship traffic through the area.

Assessment of the predicted biological and bacteriological concentrations at all bathing areas and areas designated as shellfish waters, as found by mathematical model simulations carried out as part of the marine outfall survey, reveals that for the proposed effluent discharge location, the EC guideline limits are more than adequately fulfilled. In addition, an assessment of the predicted concentrations resulting from discharges from the proposed scheme reveals that an improvement in the water-quality in the bay area, sufficient to come within the approved category, will be achieved provided emissions to the bay from other sources are satisfactory.

1.2.2 CONSTRUCTION AND COMMISSIONING

Construction of the proposed wastewater transmission main from the existing pumphouse to the site of the proposed treatment works (approximately 1.8 km) will utilise the open-trench construction procedure. The trench will be excavated using a backhoe machine on tracks. The 250mm pipe will be buried 1 to 2 metres deep, and the trenches will be backfilled and restored to pre-existing topography.

In the upland portions of the route, including along N71 (the Cork Road) and near the airstrip, the entire trench will be excavated. Fine gravel and pea gravel will be imported and used as a bed material on which the pipe will be laid. Restoration will include repairing any affected road macadam and restoring the grade and surface conditions.

In the foreshore portion of the route, from the cemetery to the airstrip, the construction methodology will be altered to limit construction-related impacts (soil erosion, sedimentation, turbidity, etc). The main will be excavated and installed in sections during low tidal periods to limit the flushing of disturbed sediments into Bantry Harbour. A backhoe will be used to excavate only the length of trench in which
the main can be laid in each low-tide period. Sections will be backfilled each day following construction.

It is anticipated that the foreshore portion of the transmission main can be constructed in 20 to 30 metre sections per day and that construction of the entire wastewater transmission main will take approximately one month.

Construction of the submerged portion of the treated effluent outfall pipe will be accomplished by trenching, laying the pipe, and backfilling the trench to pre-existing benthic conditions. Pipe will be fitted and assembled on shore and dragged into place as segments are completed. Completion of this portion of the effluent main is expected to be completed within nine months.

The entire 1.01 hectare treatment works site will be cleared. Minor site-grading may be needed, but this will not affect the general topography of the area. It is anticipated that construction of the treatment works will be completed within a minimum of nine months and will be completed concurrently with the transmission main.

Based on current construction estimates, approximately 15 man-years of employment will be required to construct the proposed sewerage scheme. This figure may approach 20 man-years depending on potential construction-related constraints such as inclement weather, unavailability of materials or machinery as scheduled, or unforeseen complications (i.e. discovery of previously unknown archaeological sites). Measures to ameliorate the impacts of construction activities are discussed in detail in Section 4 (Impact Amelioration) of this EIS.

Construction of the Bantry Sewerage Scheme components will take approximately nine months. Commissioning of the sewerage scheme, including treatment works, is expected within 12 months from the beginning of construction.

1.2.3 OPERATION

Operation of the treatment works (including pumping, treatment, and discharge) will be monitored and controlled by a compact motor control centre (MCC) panel, linked to field sensors/electrodes complete with some manual control actions. It is anticipated that one full-time person will be required to operate the facility.

Operation of the facility will result in the generation
richness of fauna expected to occur. Hedgerows and woodlands are utilised by numerous wildlife species of the region. They provide foraging, nesting, and roosting cover for songbirds, as well as den sites, forage areas, and travel corridors for mammals such as the hedgehog (Erinaceus europaeus), fox (Vulpes vulpes), stoat (Mustela erminea), badger (Meles meles), blue hare (Lepus timidus), and rabbit (Oryctolagus cuniculus).

Early successional areas provide ample food supplies for grazers such as the rabbit and blue hare; insectivores such as the hedgehog, pipistrelle (Pipistrellus pipistrellus), and pygmy shrew (Sorex minutus); and seed-and insect-eating songbirds. They also provide cover and certain habitat requirements for amphibians such as the common newt (Triturus vulgaris), small mammals such as the field mouse and the house mouse (Mus musculus), and ground-nesting birds such as the pheasant (Phasianus colchicus) and sedge warbler (Acrocephalus schoenobaenus).

The diversity of habitat types, the apparent vigour of the vegetative community, and the observation of abundant bird utilisation suggest a potential for healthy faunal populations at the Bantry Bay treatment works site.

Numerous bird species utilise the Bantry Bay coastal zone (see Table 2-1). Certain areas of the bay support important breeding colonies of seabirds, particularly gannets (Sula bassana), cormorants (Phalacrocorax carbo), and terns (Sterna spp). No known breeding colonies are located in the vicinity of the proposed sewage scheme.

Shorebirds and waterfowl utilise the protected intertidal zones of the bay and Bantry Harbour. Species observed in the intertidal fore-shore area to be crossed by the proposed sewage treatment main included gulls (Larus spp), oyster catchers (Haematopus ostralegus), grey heron (Ardea cinerea), sanderling (Calidris alba), turnstone (Arenaria interpres), and hooded crow (Corvus corone).

2.2.2 MARINE ENVIRONMENT

Studies conducted in development of the Water Quality Management Plan for Bantry Bay (Cork County Council 1988) concluded that the present water quality of Bantry Bay is normal for Irish coastal waters. The plan classifies the bay as having unpolluted waters capable of supporting all forms of locally occurring marine flora and fauna. Table 2-1 presents selected common marine flora and fauna of Bantry Bay.
The phytoplankton community of Bantry Bay includes a variety of temperate and boreal species of neritic and littoral origin. Diatom and dinoflagellates dominate and are of substantial trophic importance. Phytoplankton exhibit seasonal abundance patterns in the form of blooms. Generally, diatoms bloom in early fall and late winter, while dinoflagellates bloom in early summer.

Bantry Bay supports a rich assemblage of marine algal flora. At least 166 species, including a variety of red, green, and brown seaweeds, and coralweed have been documented (Guiry 1973). Abundant brown seaweeds, including wracks (*Fucus* spp) and knotted wrack (*Ascophyllum nodosum*), and the green seaweed, sea lettuce (*Ulva lactuca*), were observed along the intertidal foreshore area to be traversed by the proposed wastewater transmission main.

The generally normal levels of chemical parameters measured in Bantry Bay are conducive to the support of normal, balanced pelagic phytoplankton communities. However, portions of the bay, particularly Bantry Harbour, are subject to periodic algal blooms caused by excessive anthropogenic nutrient inputs. Periodic algal blooms of unusual intensity or duration, particularly by species that cause "red tides", have been documented as having extremely deleterious effects on marine organisms in Bantry Bay (Cross and Southgate 1980). Such red tides are particularly damaging to benthic organisms such as shellfish, sea urchins, lugworms, and limpets.

Bantry Bay supports typical marine benthic and pelagic faunal communities for the west coast of Ireland. The rocky intertidal shores of Bantry Bay have received some of the most intensive study in the Republic of Ireland. Depending upon the physiographic characteristics, such intertidal zones are quite biologically rich. The foreshore area to be traversed by the proposed wastewater transmission main was observed to support a rich faunal community dominated by mussels (*Mytilus* spp.), limpets (*Patella* spp.), periwinkle snails (*Littorina* spp.), barnacles (*Balanus* spp), shore crabs (*Carcinus maenas*), and lugworms (*Arenicola marina*). Although the littoral zones around the bay are generally rich, there are localised zones presenting somewhat unnatural community composition. Such areas are caused by frequent red tide occurrences and annual harvesting of immature mussels from the intertidal zone by local mussel farmers (Cork Co. Council 1988).

Little ecological research has been conducted on the deep water benthic faunal communities of Bantry Bay. Due to the generally high quality water conditions, it is expected that normal benthic faunal communities
exist throughout most of the bay. The primary exception to this would be in the inner Bantry Harbour, where entrophication and bacterial contamination is a concern, and in localised areas where benthic communities have been disturbed by shellfish-dredging operations.

Commercially important benthic organisms, particularly mussels, oysters, clams, scallops, and sea urchins, have received more study, and the condition of these resources in the bay is generally well known. The waters of Bantry Bay are highly suitable for shellfish cultivation due to the richness of minerals, nutrients, and plankton (Wall 1991).

Since 1982, mussel-farming has been prevalent in Bantry Bay using both rafts and long lines. The majority of this activity is clustered around the Chapel Islands in the central portion of Bantry Harbour east of Whiddy Island. To-day, the rope-cultured mussel industry in Bantry is the most successful enterprise of its kind in the British Isles (Wall 1990). Although Bantry Bay water quality is generally good, quality in the vicinity of the mussel farming activities falls into the conditional category, meaning depuration of the mussels is required before issuance of a health certificate (Cork County Council 1988).

Oysters and clams are found in various locations around the bay but at populations generally below that required for commercial exploitation. Suitable areas for oyster cultivation are scarce in the bay; thus, it is unlikely that Bantry Bay will become important for mariculture. Native clams are harvested by the local population along various shores, including the foreshore area east of and adjacent to the airstrip.

Scallops are concentrated in various locations around the bay and harvested by dredging. Recent statistics for scallop harvests have indicated a decrease, indicating a possible drop in population levels. Known scallop beds are distributed outside the impact area of the proposed sewerage project.

Sea urchins, including the common brittlestar, the edible urchin, and biolet heart urchin, are located in colonies distributed throughout Bantry Bay. The edible urchin has received considerable harvest pressure, which has apparently depleted stocks. A known colony of the edible urchin is reported to occur in the Narrows portion of Bantry Harbour.

Bantry Bay supports healthy populations of fish typical of the region. Commercial salmon fishing using drift nets in offshore areas is important to the regional economy and comprises 20% of the total driftnet catch in the Cork Fishery District (Cork County Council 1988).
Inshore fishing locations in Bantry Bay are generally less productive for salmon than offshore areas.

Other commercially exploited fisheries resources include herring, prawns, sprat, and lobster.

Noncommercial sea angling is practised in Bantry Bay. Common species caught include plaice, flounder, spotted dogfish, conger, mackerel, pollock, and trout.

2.3 AIR QUALITY AND NOISE

2.3.1 AIR QUALITY

The proposed Bantry Sewerage Scheme is located in a relatively sparsely populated, nonindustrial region of southwestern Ireland. Air pollution sources in the region are generally restricted to automobile and motorized watercraft exhaust and home-heating emissions. Prevailing winds from the west continually circulate generally unpolluted ocean breezes across the region. The combination of low air pollution emissions and constant wind flow and circulation promote good air quality in the Bantry Bay region.

2.3.2 NOISE

The majority of the Bantry Sewerage Scheme components are located in generally rural agricultural areas with low ambient noise levels. Average outdoor day-night sound levels in such areas are typically less than 40 dB(A) (USEPA 1978). An exception to this is the proposed sewerage main component, which will be routed along the Cork Road, where noise levels due to automobile and motorised boat traffic are considerably higher - approximately 60 to 70 dB(A).

2.3.3 ODOURS

Ambient odours in the vicinity of the Bantry Sewerage Scheme are generally negligible and restricted to motorized vehicle exhaust odours, marine organic-matter decomposition odours, and agricultural odours emanating from active pasturelands in the vicinity of the proposed treatment works site.

2.4 LANDSCAPE AND SCENIC RESOURCES

This section describes the existing landscape and scenic resources in the vicinity of the Bantry Sewerage Scheme.

2.4.1 LANDSCAPE

The general landscape of the Bantry area is diverse and ranges from a coastal/marine environment, to gently rolling hills and drumlins, to mountainous terrain further inland. Much of the character and value of
In general, impacts related to the construction and operation of the proposed Bantry Sewerage Scheme will be largely beneficial to the bay, the inner harbour, the local economy (e.g., the shellfish industry), and the public health and enjoyment of water-related resources. Negative impacts and effects will be minor and largely related to construction activities. These short-term and minor adverse impacts will be largely limited to those affecting flora and fauna resources, air quality, noise levels, water quality, and possibly, cultural heritage resources. Appropriate amelioration and mitigation measures to reduce or eliminate these minor impacts are summarised below.

4.1 FLORA AND FAUNA

Impacts to terrestrial flora and fauna will be minor and associated primarily with the treatment works site and the portion of the waste-water transmission main adjacent to the existing airstrip. Construction of the proposed treatment works will result in the conversion of approximately 1.01 hectares of old field-orchard and spruce plantation cover-types to municipal-industrial-type use. Although net loss of vegetative cover will occur, the communities to be affected are of common types and are well-represented in the surrounding area. Impacts will be ameliorated by minimising the area and duration of disturbance and maintaining as much native vegetation as possible in the project area.

Impacts to terrestrial flora associated with the installation of the wastewater treatment main will be short-term and minor. During construction, the existing herbaceous community will be removed from the transmission main right-of-way. Following construction, topsoil will be restored across the disturbed area, and the site will be fertilized and reseeded to an acceptable herbaceous community. Preconstruction uses of the area will be permitted; thus, no long-term impacts will result.

Construction of the proposed treatment works will result in a permanent conversion of fauna habitat, thereby causing localised impacts to fauna populations. This impact is expected to be minimal due to the relatively common types of habitat to be disturbed and the availability of similar habitat adjacent to the proposed site. Impacts to site fauna will be minimised by retaining the maximum amount of vegetative cover possible and completing construction activities in a timely manner. No other special ameliorative actions will be required to minimise impacts to fauna at the treatment works site.

Construction on the foreshore portion of the wastewater transmission main and the submarine portion of the treatment works effluent outfall main will have
short-term minor impacts to avifauna and marine organisms. Impacts to marine flora and fauna can be largely ameliorated by a combination of timing restrictions, minimisation of disturbed area, and implementation of environmentally sound construction practises.

Construction of the proposed facilities that would affect the marine environment should be scheduled to avoid fish and bird migration periods and to coincide with periods of least biological activity in the intertidal zone. To this end, construction would be best implemented during the winter months. (Note: a winter construction schedule would also result in construction activities avoiding the tourist season during the summer months).

Construction in the foreshore area will be conducted only during periods of low tide (3 to 4 hours per day) to minimise disruption of sediments and creation of turbidity plumes. The proposed construction technique will utilise a tracked backacter to dig the pipeline trench. Approximately 20 to 30 metres of trench will be excavated at one time. The pipeline will be installed and the trench backfilled each day before flood tide. Despite this precaution, some turbidity and sedimentation of adjacent areas will occur. However, impacts from suspended solids and sediment on fish, plankton, and benthos are expected to be minor and short-term in duration.

Impacts to flora and fauna in the intertidal zone will also be minimised by reducing the area of disturbance to that essential for safe operation of equipment and stockpiling of trench spoil. Construction access will be limited to specific, well-defined corridors, and construction materials and equipment will be stored outside of the inter-tidal zone. Construction should be completed as promptly as possible and the areas of disturbance restored to original contours.

Pipeline installed within the foreshore area will be aligned as closely as possible (within approximately 4 metres) to the seawall delineating the adjacent uplands. This action will minimise impacts to the rich middle-intertidal-zone community and increase the daily working time, thus increasing the rate of installation.

Potential long-term impacts to marine benthos in the vicinity of the effluent outfall will be ameliorated by the installation of a diffuser structure or structures that will facilitate dispersion and natural assimilation of the effluent.

Some impacts to benthic organisms, including sea urchins, in the vicinity of the treated wastewater
outfall main and outfall site are unavoidable due to the nature of the disturbance required for installation. Impacts to these resources will be minimised to the extent practicable by limiting the area of bottom disturbance and completing installation of the main and outfall structure in a timely manner. Timing restrictions to have construction coincide with the period of least biological activity will also act to minimise impacts.

Localised impacts to marine benthos, and phytoplankton blooms caused by increases in nutrient concentrations resulting from treated wastewater discharge, will be largely ameliorated by the high quality of treatment the wastewater shall receive and by the installation of a diffuser structure at the outfall. The natural assimilative capacity of the generally high-quality Bantry Bay waters will largely ameliorate negative effects of treated effluent discharges.

### 4.2 Air Quality and Noise Levels

The proposed Bantry Sewerage Scheme will have minor impacts on air quality and ambient noise levels in the vicinity of the project.

Construction activities will create temporary increases in air emissions, fugitive dust, and noise levels in the project vicinity. These impacts will be limited to the construction phase. Construction-related noise impacts will be ameliorated by maintaining proper mufflers on construction equipment and undertaking construction activities during normal working hours.

Construction-related air-quality impacts will be minimised by maintaining equipment in efficient operating condition to reduce exhaust emissions. In addition, fugitive dust will be suppressed as needed by watering of dry, dust-producing areas.

Operation of the wastewater treatment works will create a low-level increase in the ambient noise level in the immediate vicinity of the treatment works. This operating noise is not expected to be perceptible at the nearest noise-sensitive areas, which are at least 175 metres distant. Low-level noise emissions will be buffered by natural tree and shrub vegetation surrounding the site. Post-construction noise monitoring will be undertaken to determine noise levels at the nearest noise-sensitive areas. Although not expected to be necessary, additional vegetative buffering or other noise-attenuation structures may be installed to reduce noise levels further.

Operation of the proposed treatment works will result in emission of wastewater-related odours in the