

## 2. RECEIVING ENVIRONMENT

This section identifies and describes the relevant aspects of the existing environment in and around the Bantry area that could potentially be affected by the proposed development.

### 2.1 HUMAN ENVIRONMENT

Impacts to human beings and the human environment from this type of project may typically involve effects on population, land use patterns, agriculture, local economy (including commercial fisheries and tourism), and transportation.

#### 2.1.1. POPULATION

Between the years 1971 and 1981, the population of Bantry Town grew from 2,579 to 2,862 inhabitants, representing an annual increase rate of over 1%. The period between 1979 and 1981 showed an actual decline in population figures, however, and a further decline is evident from the estimated 1984 population of 2,720 inhabitants. The current population of Bantry is estimated at 2,811 (population census 1986), but population in the region is increased by visitors during the peak tourist season.

The present total resident population within the town area is estimated at 2,958 people, based on the 2,811 current population estimate, plus three commercial premises with a total resident population of 147. To allow for future expansion of the town, 80 new houses have been incorporated within the drainage area, bringing the total resident population equivalent to 3,131. This, together with proposed future commercial/industrial demands, brings the total design population equivalent to 6,000, broken down as follows: hotels, 187; industry 1,561; schools 372; hospital 749; future housing 320; and current population 2,811.

As such, the size of the proposed sewage treatment works and pumphouse facility will be determined by the design population figure of 6,000.

#### 2.1.2 LAND USE PATTERNS

Land use patterns in the Bantry area range from relatively densely developed commercial/residential areas in the town centre to the relatively undeveloped areas south of the town. Most of the development in the area consists of ribbon development along roads and around existing commercial areas. Residential and commercial development in the vicinity of the proposed sewerage scheme is primarily situated along the Cork Road (N71). There is little industrial land near the treatment plant site; however, there is a partially

filled industrial estate, owned by the Industrial Development Authority, approximately 1.3 km to the east of the treatment works site.

Land-use patterns in the vicinity of the treatment works site include vacant lands to the east, north, and west, and agricultural lands (grazing) to the south. Scattered residential homesteads are located in the vicinity, with the nearest located approximately 140 m to the east along the airstrip road.

### 2.1.3 AGRICULTURE

In the Bantry area and in the vicinity of the proposed treatment works, the predominant types of agricultural use are pasture land, grazing, and dairy farming. Cows and sheep are the primary livestock raised in the area. Although agricultural uses become more prevalent inland, there is an active pasture/grazing field located within 60m to the south and southwest of the proposed treatment works site. Neither the proposed route of the wastewater transmission main nor the site of the treatment works traverses lands currently in active agricultural or crop production.

### 2.1.4 COMMERCIAL FISHERIES

The primary commercial fishery resource in Bantry Bay is rope-cultured mussels. The sale of mussels totals approximately £1,000,000 per annum (Wall 1991). In addition, approximately 5% of this harvest is processed in the Bantry area, accounting for an additional £2,500,000. The remaining 50% of the mussel harvest is processed elsewhere in Ireland. Approximately 50% of the annual mussel harvest is exported and sold in France and Belgium. As such, the production and sales of these mussels is economically important not only for the Bantry area but for the Republic of Ireland as well.

The commercial mussel industry accounts for approximately 150 full-time, part-time, and seasonal employees. Of this number, 40 are full time, and 110 are part time and seasonal. Total personal income generated by this industry (not including processing) ranges from £500,000 to £1,000,000 per annum (Wall 1991). Nearly all of this income is generated locally.

Other commercially viable fishery resources in Bantry Bay include scallops, oysters, herring, salmon, lobsters, prawns, and sprat.

Although these industries are not as large as the mussel industry, they are commercially viable in the area. In 1986 the drift-net salmon catch totalled 66,467 kg (valued at £175,474); the scallop catch

totalled 39 tonnes (with a value of £68,000); and the herring catch totalled 743 tonnes (with a value of £168,000). Likewise, the lobster catch totalled 3 tonnes (with a value of £25,000); the prawn (Nephrop) catch totalled 199 tonnes (with a value of £404,000); and the sprat catch totalled 178 tonnes (with a value of £20,000) (Cork County Council 1988).

In addition to these commercial fisheries, salmon and sea trout angling area also popular commercial operations during the tourist season.

#### 2.1.5 TOURISM

The Bantry Bay area attracts approximately 250,000 tourists each year, including touring and locally-based visitors, and day trippers. In the past 30 years, the tourism and recreation industry has risen steadily within the Bantry Bay area, with more and more local people providing facilities (i.e. accommodations, entertainment, etc.) that allow them to benefit from the tourism industry. This tourism plays an important role in terms of income generation and employment (Cork Co. Council 1988).

As of 1987, the Bantry Bay area included 46 bed and breakfasts (including 27 in Bantry), 14 hotels, and several other sources of accommodation, including camping and restaurants.

Because of the varied nature of its resources, the Bantry area caters to the needs of a wide range of visitors with its available activities, such as boating, fishing, swimming, hiking, rock-climbing, shopping, or sightseeing. In the immediate vicinity of the project area, tourism-related activities and resources include the Bantry House, bus tours along N71 (Bantry to Cork), and boating. There are no formal tourist activities near the treatment works site.

#### 2.1.6 TRANSPORTATION

The primary route of transportation and traffic in the area of the proposed scheme is along the Cork Road (N71). This road is the major route serving Bantry Town from the south. The portion of this road in the direct vicinity of the proposed scheme is along the wastewater transmission main from the existing pumphouse to the cemetery. In this area, N71 follows the Bantry Harbour coastline. This road has two lanes in either direction and is approximately 10 to 12m wide. Currently, no traffic congestion problems exist along this portion of the route.

Access to the treatment works site occurs via two local roads. The first road proceeds west from N71 near the West Lodge Hotel, past the Ardeevin House, to the

Dromclogh House. The second route proceeds north from this road, past Blue Hill, to an existing airstrip located along Bantry Harbour near the Narrows.

Both of these roads are typical, relatively narrow country roads 10-12m wide lined with stone walls and hedges. Due to limited development in this area, traffic on these two roads is minor and may consist of 10 to 15 cars per hour.

## 2.2 FLORA AND FAUNA

This section addresses the flora and fauna existing in the vicinity of the various components of the proposed Bantry Sewerage Scheme. Included in this section are discussions of both the terrestrial and marine environment.

### 2.2.1 TERRESTRIAL ENVIRONMENT

Construction and operation of the proposed Bantry Sewerage Scheme will result in alterations to native terrestrial flora and fauna. Portions of the project affecting such resources include the wastewater treatment works and the wastewater transmission main.

The site of the proposed treatment works is behind an old farmstead in a rural area west of Bantry Town. The approximately 1.07 hectares site is composed of a mosaic of cover types, including early successional old field, hedgerow, old orchard, and spruce plantation. The majority of the site is an early successional field dominated by a brushy community of nettles (Urtica dioica), brambles (Rubus spp.), and dog rose (Rosa canina). Scattered around the perimeter of this field are several old fruit trees, remnants of an orchard associated with the farmstead. The western third of the tract supports an intermediate-aged Norway spruce plantation, apparently under silvicultural management. The eastern and southern boundaries of the parcel are delineated by a dense hedgerow dominated by hawthorn, Norway maple, and quaking aspen.

The vertical and horizontal interspersions of cover types supply most of the habitat requirements for many of the wildlife species common to the West Cork region of Ireland. Table 2-1 presents animal species likely to occur at the site due to the presence of suitable habitat and documented occurrences in the general vicinity. This table includes a high percentage of the mammal and bird species known to occur in Ireland. Due to the secretive and sometimes nocturnal habits of many species, no mammals were observed during the field surveys. Several of the birds potentially inhabiting the site were observed.

Habitats existing at the site contribute to the

TABLE 2-1

COMMON FLORA AND FAUNA IN VICINITY OF PROPOSED  
BANTRY SEWERAGE SCHEME

| Species                    | Common Name    | Scientific Name                  |                          |
|----------------------------|----------------|----------------------------------|--------------------------|
| <u>TERRESTRIAL SPECIES</u> |                |                                  |                          |
| Flora                      | Common Nettle  | <u>Urtica dioica</u>             |                          |
|                            | Thistle        | <u>Cirsium</u> spp.              |                          |
|                            | Dog Rose       | <u>Rosa Canina</u>               |                          |
|                            | Hawthorn       | <u>Grataegus Monogyna</u>        |                          |
|                            | Quaking Aspen  | <u>Populus Tremula</u>           |                          |
|                            | Norway maple   | <u>Acer Platanoides</u>          |                          |
|                            | Apple          | <u>Malus</u> spp.                |                          |
|                            | Norway spruce  | <u>Picea abies</u>               |                          |
|                            | Amphibians     | Common newt                      | <u>Triturus Vulgaris</u> |
|                            |                | Common frog                      | <u>Rana temporaria</u>   |
| Reptiles                   | Common lizard  | <u>Lacerta vivipara</u>          |                          |
| Mammals                    | Hedgehog       | <u>Erinaceus Europaeus</u>       |                          |
|                            | Pygmy shrew    | <u>Sorex minutus</u>             |                          |
|                            | Long-eared bat | <u>Plecotus Auritus</u>          |                          |
|                            | Pipistrelle    | <u>Pipistrellus pipistrellus</u> |                          |
|                            | Whiskered bat  | <u>Myotis mystacinus</u>         |                          |
|                            | Fox            | <u>Vulpes vulpes</u>             |                          |
|                            | Stoat          | <u>Mustela erminea</u>           |                          |
|                            | Badger         | <u>Meles meles</u>               |                          |
|                            | Blue hare      | <u>Lepus timidus</u>             |                          |
|                            | Rabbit         | <u>Oryctolagus cuniculus</u>     |                          |
|                            | Red Squirrel   | <u>Sciurus vulgaris</u>          |                          |
|                            | Grey Squirrel  | <u>Sciurus carolinensis</u>      |                          |
|                            | Field mouse    | <u>Apogemus sylvaticus</u>       |                          |
|                            | Brown rat      | <u>Rattus norvegicus</u>         |                          |
|                            | house mouse    | <u>Mus musculus</u>              |                          |
|                            | Birds          | House sparrow                    | <u>Passer domesticus</u> |
|                            |                | Red poll                         | <u>Carduelis flammea</u> |
| Reed bunting               |                | <u>Emberiza schoeniclus</u>      |                          |

TABLE 2-1( Cont.)

| Species               | Common Name                | Scientific Name                   |
|-----------------------|----------------------------|-----------------------------------|
| Birds (Cont.)         | Greenfinch                 | <u>Carduelis chloris</u>          |
|                       | Raven                      | <u>Corvus corax</u>               |
|                       | Magpie                     | <u>Pica pica</u>                  |
|                       | Jackdaw                    | <u>Corvus monedula</u>            |
|                       | Rook                       | <u>Corvus frugilegus</u>          |
|                       | Hooded crow                | <u>Corvus corone</u>              |
|                       | Great tit                  | <u>Parus major</u>                |
|                       | Sedge warbler              | <u>Acrocephalus schoenobaenus</u> |
|                       | Willow warbler             | <u>Phylloscopus trochilus</u>     |
|                       | Whitethroat                | <u>Sylvia communis</u>            |
|                       | Robin                      | <u>Erithacus rubecula</u>         |
|                       | Blackbird                  | <u>Turdus merula</u>              |
|                       | Starling                   | <u>Sturnus vulgaris</u>           |
|                       | Song thrush                | <u>Turdus philomelos</u>          |
|                       | Wren                       | <u>Troglodytes troglodytes</u>    |
|                       | Dunnoct                    | <u>Prunella modularis</u>         |
|                       | Swallow                    | <u>Hirundo rustica</u>            |
|                       | Skylark                    | <u>Alauda arvensis</u>            |
|                       | Meadow pipit               | <u>Anthus pratensis</u>           |
|                       | Woodpigeon                 | <u>Columba palumbus</u>           |
| Stock dove            | <u>Columba oenas</u>       |                                   |
| Pheasant              | <u>Phasianus colchicus</u> |                                   |
| Kestrel               | <u>Falco tinnunculus</u>   |                                   |
| <b>MARINE SPECIES</b> |                            |                                   |
| Flora                 | Red Seaweeds               |                                   |
|                       | Green Seaweeds             |                                   |
|                       | Sea Lettuce                | <u>Ulva lactuca</u>               |
|                       | Brown Seaweeds             |                                   |
|                       | Rough-stalked<br>kelp      | <u>Laminaria hyperborea</u>       |
|                       | Furbelows                  | <u>Saccorhiza polyschides</u>     |
|                       | Sea oak                    | <u>Halidrys siliquosa</u>         |
|                       | Peacocks tail              | <u>Padina pavonia</u>             |
|                       | Wracks                     | <u>Fucus spp</u>                  |

Table 2-1 (Cont.)

| Species         | Common Name         | Scientific Name                  |                              |
|-----------------|---------------------|----------------------------------|------------------------------|
| Flora (Cont.)   | Dabberlock          | <u>Alaria esculents</u>          |                              |
|                 | Notted wrack        | <u>Ascophyllum nodosum</u>       |                              |
|                 | Coralweed           | <u>Corallina officinalis</u>     |                              |
| Fauna           | Annelids            |                                  |                              |
|                 | Lugworm             | <u>Arenicola marina</u>          |                              |
|                 | Roundworm           | <u>Capitella capitata</u>        |                              |
|                 | Molluscs            |                                  |                              |
|                 | Perwinkle snails    | <u>Littorina spp</u>             |                              |
|                 | Common dog welk     | <u>Nucella lapillus</u>          |                              |
|                 | Edible mussel       | <u>Mytilus edulis</u>            |                              |
|                 | Mussel              | <u>Mytilus galloprovincialis</u> |                              |
|                 | Common limpet       | <u>Pagella vulgate</u>           |                              |
|                 | Limpet              | <u>Patella aspera</u>            |                              |
|                 | Natine oyster       | <u>Ostrea edulis</u>             |                              |
|                 | Tellins             | <u>Tellina spp</u>               |                              |
|                 | Razor shells        | <u>Ensis spp</u>                 |                              |
|                 | Scallop             | <u>Pecten maximus</u>            |                              |
|                 | Echinoderms         |                                  |                              |
|                 | Common brittlestar  | <u>Ophiothrix fragilis</u>       |                              |
|                 | Edible urchin       | <u>Echinus esculentus</u>        |                              |
|                 | Violet heart urchin | <u>Spatangus purpureus</u>       |                              |
|                 | Crustaceans         | Acorn barnacle                   | <u>Balanus balanoides</u>    |
|                 |                     | Star barnacle                    | <u>Chthamalus stellatus</u>  |
| Darwin barnacle |                     | <u>Eliminius modestus</u>        |                              |
| Shore crab      |                     | <u>Carcinus maenus</u>           |                              |
| Sand shrimp     |                     | <u>Gammarus locusta</u>          |                              |
| Common prawn    |                     | <u>Palaemon serratus</u>         |                              |
| Fish            |                     | Plaice                           | <u>Pleuronectes platessa</u> |
|                 | Flounder            | <u>Platichthys flesus</u>        |                              |
|                 | Spotted dogfish     | <u>Scyliorhinus canicula</u>     |                              |
|                 | Conger              | <u>Conger conger</u>             |                              |

Table 2-1 (Cont.)

| Species         | Common Name               | Scientific Name                  |
|-----------------|---------------------------|----------------------------------|
| Fish (Cont.)    | Mackeral                  | <u>Scomber scambrus</u>          |
|                 | Cuckoo wrasse             | <u>Labrus mixtus</u>             |
|                 | Pollack                   | <u>Pollachius pollachius</u>     |
|                 | Salmon                    | <u>Salmo salar</u>               |
|                 | Trout                     | <u>Salmo trutta</u>              |
| Birds           | Gannet                    | <u>Sula bassana</u>              |
|                 | Cormorant                 | <u>Phalacrocorax carbo</u>       |
|                 | Shag                      | <u>Phalacrocorax aristotelis</u> |
|                 | Fulmor                    | <u>Fulmarus glacialis</u>        |
|                 | Storm Petrol              | <u>Hydrobates pelagicus</u>      |
|                 | Manx spearwater           | <u>Puffinus puffinus</u>         |
|                 | Common gull               | <u>Larus canus</u>               |
|                 | Herring gull              | <u>Larus argentatus</u>          |
|                 | Black-headed gull         | <u>Larus ridibundus</u>          |
|                 | Oyster catcher            | <u>Haematopus ostralegus</u>     |
|                 | Grey heron                | <u>Ardea cinerea</u>             |
| Sanderling      | <u>Calidris alba</u>      |                                  |
| Turnstone       | <u>Arenaria interpres</u> |                                  |
| Hooded crow     | <u>Corvus corone</u>      |                                  |
| AQUATIC MAMMALS | Whales                    | <u>Cetaceae</u>                  |
|                 | Dolphin                   | <u>Delphinus delphis</u>         |
|                 | Porpoise                  | <u>Phocoenoides spp</u>          |
|                 | Grey seal                 | <u>Halichoerus grypus</u>        |
|                 | Sea otter                 | <u>Enhydra lutris</u>            |

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 sewerage 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 sea-weeds, 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 maenus), 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 eutrophication 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

the landscape results from the interaction of the various features (i.e. mountain ridges, coastline, grazing fields), viewing locations (i.e. roadsides, existing development), and views (i.e. particular foreground and horizon opportunities).

Development patterns of the region range from residential and commercial in Bantry Town to agricultural and grazing areas in the uplands. Vegetation ranges from grassy pastures to wooded areas and includes many dense, rich hedgerows.

In a National Heritage map prepared by An Foras Forbartha in 1977, substantial portions of the coastline of Bantry Bay are designated as areas of outstanding landscape. These include Allihies Area, Dursey Island, the area between Garnish Point and Crow Head, White Ball Head and Black Ball Head, Dunboy, Bear Island, Hungry Hill, the Glengarriff District together with Bantry Town and harbour, and the tip of Sheeps Head (Cork County Council 1988).

As with the Bantry area in general, the landscape of the project area consists primarily of a coastal/marine environment, flat to gently rolling topography, and a mixture of vegetation from grassy areas near the airstrip to wooded areas in the vicinity of the treatment works site. A portion of the proposed route of the wastewater treatment main traverses a rocky intertidal zone that includes productive habitat for many marine species. This portion of the route from the pumphouse to the airstrip is relatively level, but inland elevations quickly rise as the route proceeds inland from the airstrip to the treatment works site.

The proposed location of the treatment works is an upland area (elevation 18 metres) near the top of a drumlin. The vegetation of the site consists of old field/orchard surrounded by trees and shrubs. The character of this site is significantly different from that of the foreshore route of the transmission main.

Land use and development patterns in the vicinity of the proposed wastewater transmission main route and treatment works site vary from a somewhat developed commercial area near the existing pumphouse to a sparsely developed residential/agricultural area near the treatment works. Many manmade features and land uses influence the landscape of the project area, including the Bantry House, the Cork Road, an air-strip, and a cemetery.

In the vicinity of the treatment works site, the land use consists of a mixture of residential structures and scattered homesteads along the existing road, vacant land (some of which is used for timber production and

forestry purposes), and agricultural pasture/grazing land. The site itself is located behind an abandoned homestead in a partially wooded setting. The current use of the site can be classified as vacant.

#### 2.4.2 SCENIC RESOURCES

In general, the Bantry Bay area provides extensive and visually impressive scenic resources. Several scenic view sheds of both the bay and inland areas enhance the aesthetic value and tourism potential of the area. Due to the changes in topography, elevation, and vegetation types throughout the area, many scenic vistas are readily available.

In the immediate project area, scenic views and view sheds are predominantly influenced by the terrestrial/marine interface along the rocky coastline. The site of the treatment works, however, is neither located along the shore nor visible from the shoreline. Due to the location of the site on the inland side of a drumlin, there are no direct view opportunities to Bantry Bay. In fact, the trees and shrub vegetation surrounding the site and the abandoned homestead along the airstrip road render the site of the treatment works invisible from the road.

#### 2.5 GEOLOGY AND SOILS

The West Cork region of Ireland is characterised by rolling hills to low mountains underlain by some 30,000 feet of Upper Paleozoic sedimentary rocks consisting of Carboniferous slate and Upper Old Red Sandstone formations (Coe and Selwood 1968). This region is in the Variscan Fold Belt and is characterised by bedrock that is strongly folded, faulted, and cleaved.

Surficial geology in the Bantry Town area consists of Black Slate formation bedrock and areas of slate bedrock overlain by glacial till of variable thickness and composition (Coe and Selwood 1968; Farrington 1936). The site for the proposed treatment works is underlain by glacial till composed of cobbles, gravel, clay and shale.

Portions of southwestern County Cork contain vein mineralisation deposits of copper, barite, manganese, and iron (Reilly 1986). This area, known as the West Carbery Mining District, has been intensely explored since the early 19th. century. The nearest vein mineralisation deposits, consisting of copper and lead deposits, are located several kilometers south of the Bantry Town area.

Coralline sand deposits have been exploited in Bantry Bay for use as fertilizer and for neutralizing acidic soils (Cork County Council 1988). None of the six

known deposits of coralline sands is located in the vicinity of the proposed sewerage scheme.

Soils underlying the site of the proposed wastewater treatment works are formed in glacial till as described above. Field surveys revealed these soils to be well drained and fairly productive, as evidenced by vigorous vegetation growth. Soils in the general vicinity of the site are utilised primarily for livestock pasture and Norway spruce silviculture.

The majority of the remainder of the sewerage scheme components (i.e. wastewater and treated effluent mains) will be aligned along existing roadways or along the foreshore where natural soil is absent or highly disturbed.

## 2.6 HYDROLOGY AND WATER QUALITY

The land-based components of the Bantry Sewerage Scheme will not traverse or otherwise affect any perennial freshwater streams or other freshwater waterbodies, nor will they affect groundwater resources in the area. Therefore, this discussion focuses on the existing hydrology and water quality of Bantry Bay.

In the mid-1980's, the Cork County Council commissioned a series of studies on Bantry Bay, the results of which were to be utilised in the development of a comprehensive water quality management plan for the bay. The Cork County Council's Water Quality Management Plan for Bantry Bay, published in 1988, provides much of the information used in this discussion of existing water quality in Bantry Bay.

The results of the various studies conclude that the water quality of Bantry Bay is, for the most part, normal for Irish coastal waters. Concentration of various chemical parameters, including dissolved oxygen (DO), BOD, suspended solids, orthophosphate, nitrate nitrogen, ammonia nitrogen, and pH were determined to be within normal limits and place the bay in the category of unpolluted waters. Such waters are capable of supporting all forms of locally occurring marine flora and fauna (Cork County Council 1988).

Analysis for selected metals (copper, lead, cadmium, and zinc) considered to be of potential concern to biological organisms was also conducted. Levels of these metals were determined to be at normal seawater background concentrations.

Bacteriological analyses focusing on bacteria of the faecal coliform group were conducted in various locations throughout the bay. The presence of such organisms generally indicates sewage-related pollution

and can imply the presence of other human enteropathogenic microorganisms, including viruses (Slade and Ford 1983). Results of bacteriological analyses indicate that faecal coliform counts are generally low throughout the bay. However, certain areas of the bay have localised high concentrations of sewage-related bacteria. Such areas tend to be located in zones of poor tidal and/or wind-driven water circulations. Of particular concern is Bantry Harbour, which has bacteria levels that potentially affect maricultural operations and recreational activities.

The areas of greatest concern within Bantry Harbour are the rope-cultured mussel operations in the vicinity of the Chapel Islands northwest of Whiddy Island, and the public bathing beach at Reenrou Point.. Another area of concern is a proposed shellfish-producing area outside of Bantry Harbour along the south shore of Bantry Bay southwest of Whiddy Island.

The Water Quality Management Plan for Bantry Bay reports that faecal coliform counts in the vicinity of the main shellfish-producing water northeast of Whiddy Island averaged 23.37 fc/100 ml, which places these waters in the "Conditional" category. Shellfish taken from "Conditional" waters must be purified before they can be certified by the Ireland Department of Health.

Faecal coliform counts at Reenrou Beach are generally under the EC Bathing Water Directive Guidelines of 100 fc/100 ml.

Bacterial concentrations estimated by a particle-tracking model predict faecal coliform concentrations of less than 1 fc.100 ml in the potential shellfish cultivation zones outside Bantry Harbour. This concentration meets the EC criteria for approved shellfish-producing waters as well as for bathing waters.

Despite the generally high quality of Bantry Bay water overall, a substantial amount of anthropogenic pollution is discharged into the bay. The predominant source of pollution entering the bay originates from the existing Bantry Town wastewater discharge. This discharge currently contributes 1.4 million litres per day of raw wastewater into Bantry Harbour. This wastewater contains a total of approximately 360 kg of BOD, 410 kg of suspended solids, 20.5 kg of phosphates, 67 kg of nitrogen, and  $1.4 \times 10^{14}$  faecal coliform bacteria. Additional pollutants come from non-point sewage and stormwater discharges around the bay; accidental spillage of gasoline, motor oil, and marine paint; hydro-carbon discharges contained in bilge water; human waste from commercial ships and pleasure craft; and organic waste from fish processing.

## 2.7 CULTURAL HERITAGE

The landscape of the Bantry area, marked by the gentle slopes adjacent to a well-protected embayment, is well suited to human settlement. A long history of human occupation of the Bantry area is reflected in the numerous documented archaeological/cultural resources in the area. Such cultural resources date back to the Bronze Age (2000 to 500 BC) and represent each of the major chronological periods up to the present (Bronze, Iron, Early Christian, Medieval, and Modern Age).

The present town of Bantry took its name from Beannt, Son of King Cowac Mac Nessa. The town was settled in the early 17th. century and originally consisted of two villages: Ballygobban and Newtown. Settlement increased in the wake of the Cromwellian confiscations, when the land was transferred to English owners.

The Archaeological Survey of Ireland - Sites and Monuments Record reports a number of significant cultural resources in the vicinity of the proposed Bantry Bay Sewerage Scheme. Notable cultural resources within 800m of the various project components include a Bronze Age standing stone in the Townland of Beach; an Early Christian Period (400 to 1200 AD) ringfort on Blue Hill in the Townland of Beach; a Medieval Period (1200 to 1600 AD) garden feature, graveyard, friary, and ironworking site in the Townland of Seafield. Of these sites, the Early Christian Ringfort on Blue Hill is closest to any of the proposed project facilities. This site is estimated to be approximately 175 metres northwest of the proposed treatment works on the high bluff overlooking Bantry Bay.

The proposed treatment works site is located adjacent to the ruins of a farmhouse and associated outbuildings and stone walls dating to the middle of the 19th. century. This site is not included in the County Cork Sites and Monuments Record due to its relatively recent age. Cultural resources of this sort are common in the region and generally not considered of major cultural importance. no known cultural resources will be directly affected by the proposed sewerage scheme.

## 2.8 MATERIAL ASSETS

In general, the identification of specific material assets is open to interpretation, and there is little consensus on components of the environment that may be regarded by society as being of value for production, development, maintenance, recreation, and well-being (Bradley, Walsh and Skehan 1991). For the purpose of the proposed Bantry Bay Sewerage Scheme, significant material assets include existing and potential recreational resources, development potential, and the assimilative capacity of Bantry Bay.

### 2.8.1 RECREATIONAL POTENTIAL

Recreational activities available in the Bantry Bay area are diverse but predominantly water-related. Significant recreational activities available include yachting, wind-surfing, angling, swimming, water-skiing, rowing, and sailing. Each of these activities, particularly those that involve direct water-contact, rely on good water quality for future viability. Land-related recreational activities in the area include tourism-sight-seeing (i.e. the Bantry House), biking, rock-climbing, and walking/hiking along the shoreline. While these activities are important to the local economy, they are not as directly dependent upon water quality as those previously mentioned.

In the vicinity of the proposed wastewater transmission main, recreational activities will involve the land/water interface (i.e. sight-seeing, walking, limited bathing). There are currently no recreational activities available at the site of the proposed treatment works.

Future recreational potential of the Bantry area is fundamental to the continued promotion of this area for tourism purposes as well as for the enjoyment of the local residents. This potential depends on the development and marketing of currently under-utilised or untapped recreational resources, particularly involving water-related activities. Among the factors that influence this potential include water quality, viable and productive sport fisheries (i.e. salmon), marketing of available resources, the ability to fully utilise recreational opportunities without imperiling the health of users or the environment, and public perceptions.

### 2.8.2 DEVELOPMENT POTENTIAL

Due to the large amount of vacant land in the Bantry area suitable for residential, commercial, industrial, or recreational uses, the potential to develop this land is critical to future economic growth. The development potential of this area has been previously studied in the context of fishing and mariculture, industrial development, shipping, recreation, and tourism (Cork County Council 1988). Although a detailed discussion of the future development needs and opportunities in the Bantry Bay area is outside the scope of this EIS, it should be noted that the potential does exist to expand and capitalise on the opportunities available to develop this region. All of the potential sources of development discussed in the Cork Council 1988 study are related to the viability and quality of Bantry Bay.

### 2.8.3 ASSIMILATIVE CAPACITY OF BANTRY BAY

Assimilative capacity in seawater is generally defined as the amount of substance that can be contributed to a water body without producing an unacceptable biological effect (Goldbert 1979). Because "biological effects" vary widely, it is difficult to assign a universal assimilative capacity value for a particular aquatic system (i.e. a water body will have different assimilative capacities depending on the pollutant and the type of organism, population, or community potentially affected).

With regard to municipal wastewater and its common constituents, well-mixed waters have been shown to have a high capacity for absorbing such materials without significant biological effect (Goldbert 1979). The Water Quality Management Plan for Bantry Bay (Cork County Council 1988) has shown that the waters of the bay are generally of high quality and contain normal levels of biological and chemical parameters. The exception to this in certain areas of Bantry Harbour, where poor water circulation and historic raw wastewater discharge have exceeded the capacity of the harbour waters to absorb pollutants without adverse biological effect. This has resulted in the occurrence of frequent algal blooms, or red tides, and the classification of the waters as conditional for shellfish.

The assimilative capacity for wastewater as a material asset has thus been largely expended in the inner Bantry Harbour. However, the relatively clean waters of the main body of Bantry Bay outside of the harbour still retain a high capacity for assimilating wastewater.