

4 IMPACT AMELIORATION

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

immediate vicinity of the plant. Such odours will be kept to a minimum through efficient operation of the new treatment works, which will ensure maximum oxidation of odour-producing organic matter. Odours will be further minimised by ensuring proper landfilling of stabilised sewage sludge on a frequent basis. Sludge will not be stored on site for more than four to five days. Wastewater odours are not expected to be perceptible above background agricultural odours at the nearest residences.

4.3 WATER QUALITY

Impacts to Bantry Bay water quality caused by potential overland storm-water transport of disturbed soil particles will be minimised by employing sound erosion-control and soil-conservation practises during construction. Such practises include installation of silt fencing or haybales around disturbed areas, installation of sediment retention basins, and revegetation with a seed mixture containing a quick cover component.

Water-quality impacts to Bantry Bay resulting from construction activities in the foreshore will be short-term and minor. Such impacts will be minimised by employing actions discussed in Section 3.1 ameliorating impacts to marine flora and fauna.

Potential minor, localised impacts to water quality in the immediate vicinity of the treated-effluent outfall will be minimised by installation of a diffuser to maximise mixing and dilution. Any minor, localised water-quality degradation in the Narrows area will be vastly offset by the overall improvement in the water quality of Bantry Harbour anticipated as a result of the proposed sewerage scheme.

4.4 CULTURAL HERITAGE

The proposed Bantry Sewerage Scheme will not affect known cultural resources either directly or indirectly; however, the potential always exists for inadvertently impacting unknown resources during construction activities. If such resources are encountered, work will be temporarily stopped until additional analysis can be conducted. Unknown cultural resources encountered during the construction phase will be fully evaluated by a qualified archaeologist familiar with the cultural resources of the region. Amelioration of impacts to such presently unknown resources will be implemented as needed based on the recommendation of an archaeological expert.

5. ALTERNATIVES

This section discusses various alternative design schemes and components that were addressed during the project planning phases, including the no-action alternative. Also provided is the rationale for the selection of the preferred design scheme.

5.1 NO-ACTION ALTERNATIVE

The no-action (or nil) alternative involves the continuation of the current method of wastewater treatment and disposal via the existing outfall. This course of action will not result in improved secondary treatment of wastewater and would result in the continued discharge of untreated sewage/wastewater effluent, via the existing outfall at Black Rock, into Bantry Harbour. This alternative is not feasible because it does not satisfy the objective of the proposed action (improved water quality) or the applicable EC Directive that necessitates the action.

5.2 VIABLE PROJECT ALTERNATIVES

In order to identify and evaluate viable project alternatives, a comparative alternatives analysis was conducted by Ecology and Environment, Inc. This analysis examined four sites for the treatment works, three routes for the wastewater transmission main, three routes for the terrestrial portion of the treated effluent outfall main, four routes for the submarine portion of the treated effluent outfall main, and two locations for the discharge point. The purpose of this analysis was to evaluate and compare each of the alternative sites/routes from a purely environmental standpoint.

Based on this alternatives analysis, and upon engineering and cost data, a preferred design scheme was selected.

This preferred scheme is identified and addressed throughout this EIS.

Alternative components, as discussed in the alternatives analysis and highlighted below, are illustrated in Figure 5-1.

TREATMENT WORKS ALTERNATIVES

Treatment Works Alternative Site 1 is located approximately 2km west of Bantry Town on the northwest corner of the intersection of the Dromclogh Road and the airstrip/beach access road; Treatment Works Alternative Site 2 is located approximately 92m north of Alternative Site 1 on the west side of the airstrip/beach access road; Treatment Works Alternative

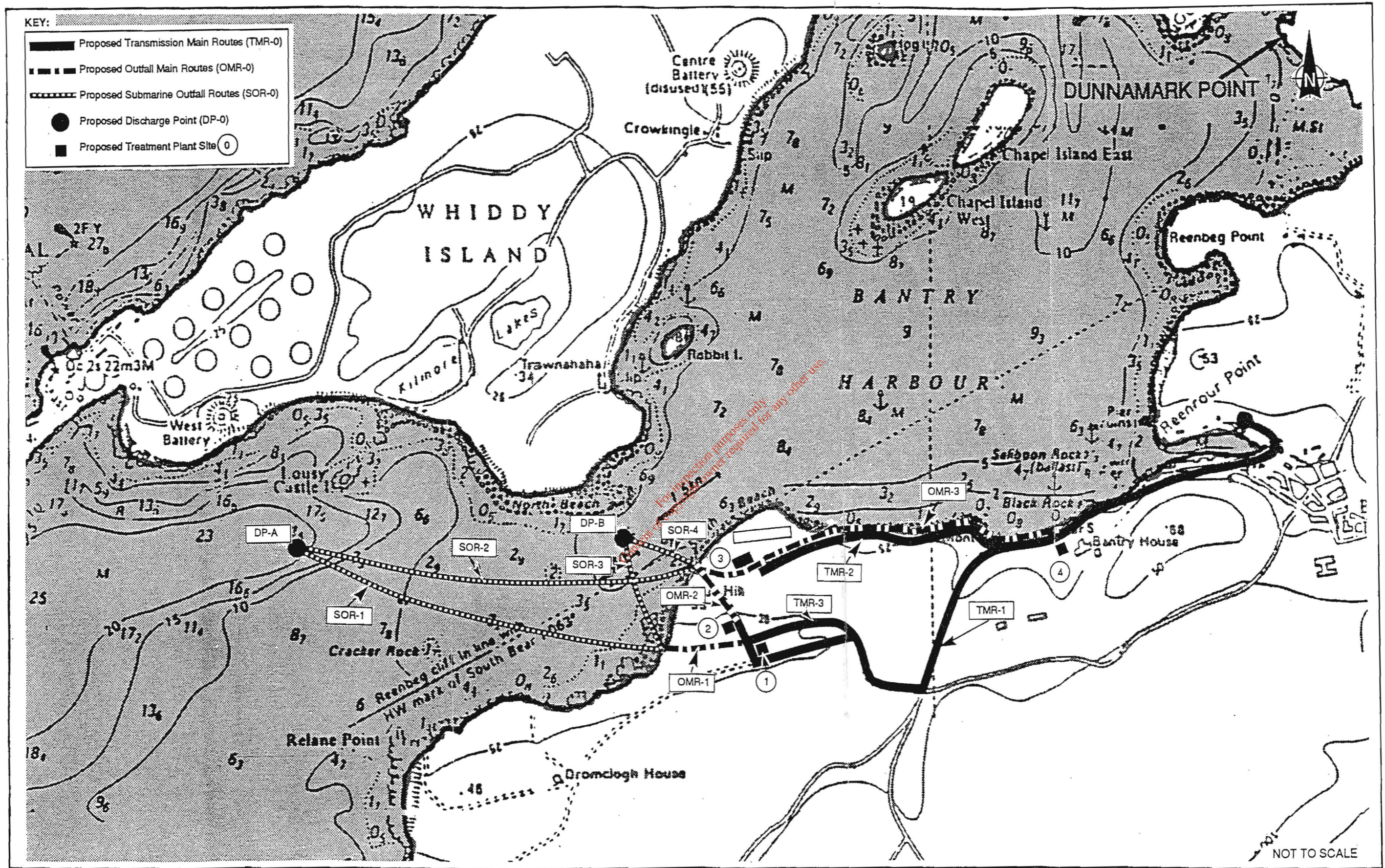


Figure 5-1
 PROPOSED SEWERAGE TREATMENT SCHEME COMPONENTS
 BANTRY SEWERAGE SCHEME

Site 3 is located on a level, grassy area adjacent to the existing airstrip; and Treatment Works Alternative Site 4 is located along N71 about 800m west of Bantry Town (adjacent to the Bantry House).

TRANSMISSION MAIN ALTERNATIVES

Transmission Main Alternative Route 1 extends from the existing pumphouse along Harbourfront Road (Route N71). At approximate 1.5 km point, the road diverges from the waterfront and traverses southeasterly up a gentle grade. At approximate 2.2km point, Route N71 intersects a secondary road oriented in an east-west direction. At this point, Alternative Route 1 turns west on the secondary road and proceeds 0.8km to Treatment Works Alternative Site 1 at the intersection of the Dromclogh Road and the airstrip/beach access road. If Treatment Works Alternative Sites 2 or 3 were to be selected, Transmission Main Alternative 1 would continue north along the airstrip/beach access road to either of the respective sites. If Treatment Works Alternative Site 4 were selected, Transmission Main Alternative Route 1 would extend along Route N71 for about 215m from the existing outfall site to Treatment Works Alternative Site 4.

Transmission Main Alternative 2 begins at the existing pumphouse, extends approximately 1.5 km along Harbourfront Road (Route N71), then diverges slightly north off the road and on to the foreshore area. The transmission main would extend along this area for approximately 1.1km to the edge of the airstrip. To minimise impacts to marine organisms, the pipeline will be installed as high on the shore as possible, preferably above the high-tide line. If Treatment Works Alternative Site 3 were selected, the main transmission line would extend approximately 0.4km across the airstrip property to the site. If Treatment Works Alternative Sites 1 or 2 were to be selected, the alternative transmission main would extend an additional 0.3 and 0.2km respectively, along the airstrip access road.

Transmission Main Alternative 3 is the same as Alternative 1 up to approximately 2.5km. At this point, the proposed pipeline diverges from the road in a northwesterly direction and traverses along a hollow on clear-cut forestry lands.

TREATED EFFLUENT OUTFALL MAIN ALTERNATIVES

Treated Effluent Outfall Main Alternative 1 could be used for both Treatment Works Alternative Sites 1 and 2. The terrestrial portion of the outfall main would utilise an area of open, active farmland that slopes gently down to the west and out to Bantry Bay. This

area appears to be reclaimed salt marsh or mud-flat land that has been segregated from Bantry Bay by construction of a berm at the bay shore. Impacts to farm soils and a freshwater Phragmites marsh in the area would be best minimised by excavating an existing drainage ditch across the site and installing the pipe in the bottom of the ditch. At the end of the land-based portion of the outfall, the pipeline should diverge slightly north to minimise construction through marsh and avoid disturbances to a shallow inter-tidal gravel bar offshore.

Treated Effluent Outfall Main Alternative 2 would transport treated wastewater from either Treatment Works Alternative Site 1 or 2 to the shore of the bay, where it would be conveyed to one of the discharge points. This alternative, which would be installed within the airstrip access road, would not require acquisition of wayleave.

Treatment Effluent Outfall Main Alternative 3 would convey treated sewage from Treatment Works Alternative Site 4 to the submerged outfall point. As illustrated in Figure 5-1, this outfall alternative would essentially follow the same route as Transmission Main Alternative 2 and result in the same types and magnitudes of impacts.

Regarding the submerged portions of the various alternative submerged-outfall pipelines, the primary differences between these alternatives are related to overall length, which will be reflected in engineering and construction costs. Disturbance to the benthic marine ecosystem is also a concern. Submerged Treated Effluent Outfall Main Alternatives 1 or 2 would convey treated wastewater to the deep-water discharge point southwest of Lousy Rocks (Discharge Point A). Submerged outfall pipes for Treated Effluent Outfall Main Alternatives 1 and 2 are each approximately 1.65km in length.

Submerged Treated Effluent Outfall Main Alternative 3 would convey treated sewage from land-based Outfall Main Alternative 1 to Discharge Point B. This alternative is approximately 300m in length. This alternative would result in less disturbance to estuarine sediments than Treated Effluent Outfall Main Alternatives 1 or 2; however, Alternative 3 is oriented perpendicular to the direction of tidal currents in Bantry Bay and may be more subject to erosion and interference with bottom marine-organism migration.

Submerged Treated Effluent Outfall Main Alternative 4 would convey treated wastewater from land-based Outfall Mains 2 or 3 to Discharge Point B in Bantry Bay. This outfall alternative is the shortest of the submarine pipelines (200m) and has similar advantages and

disadvantages to Submerged Treated Effluent Outfall Main Alternative 3.

OUTFALL LOCATIONS

Based on hydrographic studies conducted in Bantry Bay by Hydrographic Surveys Ltd., two alternative discharge points have been identified as potentially suitable. The first of these, Discharge Point A, is located southwest of Lousy Rocks in approximately 40m of water. The second, Discharge Point B, is located in the narrow channel north of the airstrip, in about 6.5m of water. As discussed in the accompanying Preliminary Report, there is more than adequate assimilative capacity for the discharge at both locations. Based on the assessment of the likely implications on the receiving waters and taking into account existing and future conditions, uses and development plans for the bay area, Discharge Point B has been chosen as the optimum location for the treated effluent discharge.

5.3 SELECTION OF PREFERRED ALTERNATIVE

The preferred design scheme as discussed in the Preliminary Report and in this EIS involves Wastewater Transmission Main Route 2 (along the foreshore area), Treatment Works Site 2 (behind the abandoned homestead), Terrestrial Outfall Main Route 2 (along the airstrip road), Submerged Outfall Main 4, and Discharge Point B (in the Narrows).

Although the selection of the transmission main route along the foreshore area will result in greater short-term construction-related impacts to the intertidal area, it was selected as the preferred route because it would avoid traffic flow and congestion problems associated with construction along the Cork Road (N71), involve less temporary access problems along the local roads due to construction activities, and require substantially reduced pumping head to the treatment works site. Compared to Wastewater Transmission Main No. 1 along existing roadways, Transmission Main No. 2 offers reduced pumping head to the lower static head of 18 metres as opposed to 34 metres, and reduced friction head for a given flow due to a shorter length. Thus, this proposed route will result in reduced pumping costs per annum (averaging 34% reduction) and reduced capital costs (due to smaller pumps needed). The shorter length also results in reduced pipeline capital and construction costs.

Treatment Works Site 2 was selected due to its location, its obscurity from surrounding roads and vistas, its ability to provide a gravity flow to

the discharge point, the availability of adequate acreage, and its location near the outfall/discharge point yet distant from populated areas around Bantry Town.

The terrestrial and submerged portions of the treated effluent outfall main were selected as the shortest distance from the treatment works site to the discharge point. In that the terrestrial portion follows an existing road, any environmental impact to undeveloped or undisturbed lands will be minimised.

Discharge Point B was selected because computer modelling indicated that discharge of the treated effluent at this location will satisfy the objectives of lowering the contaminant levels (i.e. faecal coliform) at sensitive mussel cultivation/bathing areas and provide appropriate diffusion and dilution of the treated effluent. Since the depth of water in this area is 6.5 metres, and the diffuser structure or structures will be 1 metre from the substrate, approximately 5.5 metres of clearance will be provided. In that the largest boat to traverse this area will likely be the BAY SKIMMER, with a maximum draft of 3 metres (Wall 1990), adequate depth will be maintained so that the discharge structure will not pose a threat to navigation in the Narrows. In addition, this area is not dredged.

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