6.0 FLORA & FAUNA

6.1 Introduction

The proposal to expand and develop existing stretches of cycle path into a full cycleway and promenade between Sandycove and Sutton has implications with respect to impacts on the flora, fauna and habitats through which it passes. Though the majority of the track would pass through a very heavily urbanized landscape for most of its length, there are very important areas for nature conservation along it where care will have to be taken to avoid direct or indirect negative impacts.

The types of impacts which may occur range from physical disturbance of habitats arising from construction which could result in short- or long term changes, through physical impacts by the cyclists when the track is open, to disturbance of animals, especially birds, both during construction and when the track is being regularly used. The avoidance of negative ecological impacts need not be considered just for purely inspirational or aesthetic reasons; rather there are legal constraints issuing from both national and international legislation for nature conservation, which must be respected.

This study identifies all of the areas for nature conservation where potential constraints could apply as well areas where species diversity is high and disturbance to them could be detrimental. A list of all such areas was first compiled through a preliminary desk study and subsequently by investigation in the field along the length of the proposed cycle track. Where sensitive areas were identified, data on species and habitats were collected with a view also to possible mitigation measures.

All of the significant habitats encountered were classified according to the scheme presented in the Interpretation Manual of European Habitats\(^7\), birds were identified using Mullarney et al\(^7\) and the locations of sites for other vertebrates was recorded.

The legislation, which is relevant to this section of the report, and outlines the obligations under these laws to protect and conserve flora and fauna, are presented as Appendix A - 6.1 of this report.

6.1 Baseline Environment

The baseline ecological environment was defined by professional ecologists who walked the entire route in May 2004, to define the bird life and plant life along the route. Reference was also made to Duchas and Birdwatch Database Information for Dublin Bay.

6.1.1 Formally Designated Conservation Areas in Dublin Bay

Dublin Bay is of international importance for both birds and habitats - in excess of 20,000 wintering wildfowl and at least 1% of the bio-geographical population of Light-bellied Brent Goose, Bar-tailed Godwit, and Redshank are regularly recorded at Dublin Bay. Both these factors render the site internationally important under the European Union Birds Directive and hence the entire coastline and inshore waters from Sutton to Dun Laoghaire west pier has been designated as two SPAs (Special Protection Areas (for birds)) under the EU Birds Directive. These are known as North Bull Island and
Sandymount Strand/Tolka estuary SPAs. The bay is also of national importance for Great Crested Grebe, Shelduck, Teal, Pintail, Shoveler, Red-breasted Merganser, Oystercatcher, Ringed Plover, Golden Plover, Grey Plover, Knot, Sanderling, Black-tailed Godwit, Curlew, and Turnstone. Parts of the bay have also been designated as a Ramsar site (Under the Ramsar Convention), Special Area of Conservation (SAC) (under the EU Habitats Directive), a biosphere reserve, nature reserve, and a wildfowl sanctuary.

The proposed route of the cycle track from Sutton to Sandycove passes through, or lies adjacent to, 5 areas designated for conservation either under International or National regulation/legislation. **Table 1** lists these sites and the reasons for which they have been designated. Maps, indicating the extent of the sites are appended to this report.

**Table 6.1:** List of designated areas in which proposed S2S cycle route lies in (or adjacent to)

<table>
<thead>
<tr>
<th>Site name</th>
<th>Code No</th>
<th>Designation</th>
<th>Reason for designation</th>
<th>Other features</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Bull Island</td>
<td>80000</td>
<td>Special Protection Area/Reserve</td>
<td>Annex 1 birds</td>
<td>Large numbers of wintering waterfowl and waders.</td>
</tr>
<tr>
<td></td>
<td>-4006</td>
<td>Nature Reserve/ Ramsar site</td>
<td>Little tern</td>
<td>Brent geese</td>
</tr>
<tr>
<td></td>
<td></td>
<td>biosphere reserve/wildfowl</td>
<td>Golden plover</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>sanctuary</td>
<td>Bar-tailed godwit</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Ruff</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Short-eared Owl</td>
<td></td>
</tr>
<tr>
<td>Sandymount strand/Tolka Estuary</td>
<td>80000</td>
<td>Special Protection Area</td>
<td>Annex 1 birds</td>
<td>Large numbers of wintering waterfowl and waders.</td>
</tr>
<tr>
<td></td>
<td>-4024</td>
<td></td>
<td>Bar-tailed Godwit</td>
<td>Brent geese</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mediterranean gull</td>
<td>Common tern</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Roseate tern</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Arctic tern</td>
<td></td>
<td></td>
</tr>
<tr>
<td>North Dublin Bay including Bull Isd &amp; co-</td>
<td>80000</td>
<td>Special Area for Conservation/</td>
<td>Annex 1 habitats</td>
<td>7 protected species of flora</td>
</tr>
<tr>
<td>incident with SPA 4006</td>
<td>-0206</td>
<td>Nature Reserve/ Nature Reserve</td>
<td>Fixed dunes</td>
<td>Irish hare</td>
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<td></td>
<td>Marram dunes</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Embryonic dunes</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Dune slack</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Drift lines</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Salicornia mud</td>
<td></td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>Atlantic salt meadows</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mediterranean salt meadows</td>
<td></td>
</tr>
<tr>
<td>South Dublin Bay &amp; co-incident with SPA 4024</td>
<td>80000</td>
<td>Special Area for Conservation</td>
<td>Annex 1 habitat: Tidal mudflats</td>
<td>Eel grass beds</td>
</tr>
<tr>
<td>excluding Tolka Estuary</td>
<td>-0210</td>
<td></td>
<td></td>
<td>Embryonic dunes</td>
</tr>
<tr>
<td>Booterstown marsh</td>
<td>00120</td>
<td>Natural Heritage Area/Reserve</td>
<td>Protected species of flora</td>
<td>Drift lines</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td></td>
<td>Borrer’s saltmarsh grass</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Annex 1 birds</td>
<td>Kingfisher</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Grey Heron</td>
</tr>
</tbody>
</table>
Note: A small, Special Protection Area, Poolbeg Dolphin, (Code 004171) occurs at a derelict mooring near Poolbeg power station. It is not adjacent to the proposed cycle route and it would not be affected by it.

6.1.2 Habitats and Flora

Sutton to North Bull Island Causeway
On the seaward side of this section of the route, lie the designated areas of North Bull Island SPA and North Dublin Bay SAC (See Figures 6.1 and 6.2).

Figure 6.1 Bull Island SPA
In the vicinity of the pump house (at the junction of Kilbarrack Road and the Dublin Road), vegetation on the seaward side of the wall is minimal and consists mainly of the maritime species sea beet (*Beta maritima*) and sea mallow (*Lavatera arborea*). A small amount of sea rocket (*Cakile maritima*) occurs. The rest of the sparse vegetation cover consists of weedy species notably scutch grass (*Elymus repens*), white stonecrop (*Sedum album*), ivy-leaved toadflax (*Cymbalaria muralis*), and Duke of Argyll’s tea-plant (*Lycium barbarum*).

Further on towards the Causeway, (North Lagoon), the area between Clontarf Road and the sea widens and along here stretches of disturbed soil support bastard cabbage (*Rapistrum rugosum*), alexanders (*Smyrnium olusatrum*), and stinging nettle (*Urtica dioica*). Planted lines of Cordylines (*Cordyline australis*) occur on the landward side of the cycle track. A stretch of salt marsh bearing the Annex 1 habitats of *Salicornia mud* and *Atlantic salt meadows* occurs. The adjacent habitat is also Annex 1-listed and is that of *Tidal mudflats*. Small amounts of the first habitat occur in the centre of the salt marsh and consist mainly of glasswort (*Salicornia europaea*) and a small amount of spartina grass (*Spartina anglica*). But, the bulk of the marsh here consists of species typical of the second habitat category with sea purslane (*Halimione portulacoides*), common saltmarsh grass (*Puccinellia maritima*), sea plantain (*Plantago maritima*), sea aster (*Aster tripolium*), sea pink (*Armeria maritima*), and sea milkwort (*Glaux maritima*). Red fescue (*Festuca rubra*) occurs at the top of the marsh. A small amount of rocky substrate occurs on which annual sea blite (*Suaeda maritima*) is found whilst a small amount of sea club rush (*Scirpus maritima*) occurs.
Between here and the Causeway, the existing path is bordered by coarse grassland dominated by three grasses, scutch (*Elymus repens*), cocksfoot (*Dactylis glomerata*), and red fescue (*Festuca rubra*). Herbs in the sward here include red clover (*Trifolium pratense*), ribwort plantain (*Plantago lanceolata*), and bulbous buttercup (*Ranunculus bulbosus*). There are no habitats or plant species of significance.

**North Bull Causeway to Irishtown**

This is the area between the Causeway and Irishtown and it passes the southern sections of the adjacent designated areas of SPA and SAC for Bull Island and North Dublin Bay respectively. The isolated piece of the SPA for Sandy Mount Strand/Tolka Estuary (Code 4024) lies adjacent to the route just east of Fairview (See Figure 6.3).

![Figure 6.3 Sandy Mount Strand/Tolka Estuary SPA](image)

South of the causeway as far as Clontarf Road, a culvert exits into the South Lagoon. Up to this point, there is a wide margin of coarse grassland dominated by the grass cocksfoot (*Dactylis glomerata*) and a weedy flora dominates the area to the inside of the sea wall. There are small sycamores (*Acer pseudoplatanus*) here along with winter heliotrope (*Petasites fragrans*), stinging nettle (*Urtica dioica*), wild cabbage (*Brassica rapa*), curled dock (*Rumex crispus*), burdock (*Arctium lapa*), whilst closer to the shore of the lagoon scutch grass (*Elymus repens*), and sea (*Beta maritima*) occur. This area has been much disturbed. Further to the south, a shingle substrate occurs at the upper edge of the lagoon and where there is some mud accumulation, salt marsh species occur. The main species are sea purslane (*Halimione portulacoides*), sea plantain (*Plantago maritima*), sea aster (*Aster tripolium*), and a small amount of spartina grass (*Spartina anglica*). Stands of common saltmarsh grass (*Puccinellia maritima*) are found together with the sea lavender (*Limonium humile*). The wall itself carries a mixture of wall pellitory (*Parietaria judaica*), sterile brome (*Bromus sterilis*), and robin-run-the-hedge (*Galium aparine*).
Towards the Wooden Bridge (the old Bull Bridge), the substrate is a mixture of rubble, coarse muds and shingle and the main plant cover is of the alga, *Enteromorpha intestinalis*. The sea at this point has its high tide mark at the sea wall and there is no further emergent vegetation along the rest of the lagoon to the old causeway. This is the case for the rest of the length of coastal stretch to Fairview and the Tolka basin.

Across the docks, East Link and as far as the west side of Irishtown Park is urban and/or industrial landscape, which is of no significance for vegetation or species of plants.

![Figure 6.4 South Dublin Bay SAC](image)

**Irishtown to Booterstown**

This stretch of coast runs adjacent to the SPA - Sandymount Strand/Tolka Estuary and the SAC - South Dublin Bay (See Figures 6.3 and 6.4). However, though the small area of dune in the corner between Irishtown Park and Beach Road contains 2 Annex 1 habitats, Drift lines and Embryonic dunes, it is not included within the SAC site description (also called site synopsis) or the site boundary. These habitats have developed since the drawing of the SAC boundary which explains their original exclusion from it. The drift line vegetation has sea rocket (*Cakile maritima*), and the oraches (*Atriplex prostrata* and *A. laciniata*), and some sea sandwort (*Honkenya peploides*). Behind, there is a zone of embryonic dune in which sea couch (*Elymus farctus*) and lyme grass (*Leymus arenarius*) dominate. Scutch grass (*Elymus repens*), occurs at the upper limit of this zone.

The remaining strip of coast, as far as Merrion Gates, has little in the way of marginal vegetation and where it does occur, as on the retaining sea wall in front of the line of houses running northwards from the level crossing, a mixture of weedy species, garden escapes and common maritime species are
found. These are ivy-leaved toadflax (*Cymbalaria muralis*), rosemary and the plantains; buck’s-horn plantain (*Plantago coronopus*), and sea plantain (*Plantago maritima*). The main habitat here is the stretch of **Tidal mudflats**, which is Annex 1-listed. The main species of interest here is a species of eel grass (*Zostera noltii*), which occurs in some abundance on the inter-tidal sands approximately 18 metres away from the sea wall. This species is one of the main food plants for Brent geese, which visit here in the winter.

South of Merrion Gates, the upper part of the shore has been put under grass and is subject to regular management. However, elements of the habitat, **Driftlines**, are apparent with the presence of frosted orache (*Atriplex laciniata*) and sea beet (*Beta maritima*). There has been some disturbance here and a number of weedy species are present in the zone between the High Water Mark and the grassed area. The commonest species are groundsel (*Senecio vulgaris*), shepherd’s purse (*Capsella bursa pastoris*), and creeping thistle (*Cirsium arvense*). A few shore elements are evident in the occurrence of the sea and buckshorn plantains (*Plantago maritima* and *P. coronopus*) and sea sandwort (*Honkenya peploides*).

Further south, the retaining wall contains a number of maritime species typical of sea cliffs, growing in the cracks and fissures, chiefly sea aster (*Aster tripolium*), sea plantain (*Plantago maritima*), sea pink (*Armeria maritima*), rock sea lavender (*Limonium binervosum*), rock samphire (*Crithmum maritimum*), and rock sea spurrey (*Spergularia rupicola*).

A significant area of dune building is occurring south of Merrion gates and just above Booterstown DART station. This has developed over the past 5 years and although it contains three Annex 1 type habitats, **Salicornia muds**, **Driftlines** and **Embryonic dunes**, it is not included within the SAC site synopsis, but is within the SAC boundary. The first occurs in the lee of the developing embryonic dunes and currently has scattered stands of glasswort, *Salicornia* spp. colonizing the muddy/sandy substrate. The Driftlines here consists of sea rocket (*Cakile maritima*), frosted orache (*Atriplex laciniata*), and sea beet (*Beta maritima*) in which annual sea blite (*Suaeda maritima*) is also found. The Embryonic dunes consist chiefly of sea couch (*Elymus farctus*), and lyme grass (*Leymus arenarius*), together with sea mayweed (*Matricaria maritima*) and scurvy grass (*Cochlearia officinalis*). A small amount of marram grass (*Ammophila arenaria*) occurs in the uppermost area adjacent to the sea wall. It should be noted that these plant species are not classed as rare in a National context and occur in sandy/shingle coastal habitats around Ireland. These habitats have not been listed as occurring for the South Dublin Bay SAC, but are of interest as this is the only area for these habitats within the area defined by the SAC boundary.

**Booterstown Marsh**

This marsh, which occurs to the landward side of Booterstown DART station is a Nature Reserve, managed by An Taisce and is a proposed Natural Heritage Area (pNHA). (See Figure 6.5). It is the only brackish marsh between Greystones and Dublin. The marsh was formed when the Dublin to Kingstown Railway cut across a small inlet between Blackrock and Merion in 1834. The marsh was cultivated for allotments during the World Wars the ‘lazy beds’ of which are still visible in the marsh centre. During the 1950s and 60s and area at the south west corner was infilled to form the car park for Booterstown train station.
The marsh remains under the influence of the sea, which gains access to the marsh via a system of sluices. However, there is freshwater coming in at the northern and northwestern sides. Consequently, the vegetation ranges from near marine, through brackish to freshwater. One species of protected flora occurs here, Borrer’s salt marsh grass (*Puccinellia fasciculata*), which is listed in the Irish Red Data Book for plants as declining. Currently, the marsh is too flooded and eutrophic for populations of the grass to survive here except as seeds in the soil.

![Figure 6.5 Booterstown Marsh pNHA](image)

**Booterstown to Salthill**

The stretches of sea wall above Blackrock DART station, have a similar assemblage of maritime species as has been described for the retaining wall south of Merrion Gates. In particular, rock sea lavender (*Limonium binervosum*) is abundant. This flora continues along the landward sides of the wall south of Blackrock station and close to Maretimo pier, sea purslane (*Halimione portulacoides*) is found on rocks.

The area around the pier and the ruins of the viewing point at the Maretimo headland consists of drift material, originally piled here during railway excavation, and it consists, in the lower parts, of maritime grassland with scrub above. The grassland has red fescue (*Festuca rubra*), sea pink (*Armeria maritima*), rest harrow (*Ononis repens*), and birds foot trefoil (*Lotus corniculatus*). There is occasional Danish scurvy grass (*Cochlearia danica*) found here. Coarse grassland, principally of false oat grass (*Arrhenatherum elatius*), is found up the steep slopes whilst a scrub of small leaved elm (*Ulmus minor*) occurs on the upper parts.

The remaining stretches of coast to Brighton Vale consist of sea wall with no emergent vegetation whilst in the area north of the Martello Tower at Seapoint, the coast is rocky to the wall, and the seaweeds (*Ascophyllum* spp.)
and \((\text{Enteromorpha} \text{ spp.})\) are found. There is no vegetation of any significance to be found along the stretch to the beach at Salthill.

**Salthill to Sandycove**

This section encompasses the port facilities of Dun Laoghaire and its adjacent urban landscape and reaches its southern limit at the park in Sandycove. There is no vegetation or flora of any significance along this stretch.

### 6.1.3 Birds

**Sutton to North Bull Island Causeway**

The main high tide roosts in Dublin Bay are on Bull Island and during neap high tides the areas of saltmarsh adjoining the North Bull lagoons remain exposed, and waders roost within the saltmarsh vegetation and along its margins on the upper sand and mudflats. The North lagoon is used mainly by Grey Plover and Ringed Plover for feeding, while Knot and Bar-tailed Godwit are also present.

**North Bull Causeway to Irishtown**

The mudflats along the eastern side of Bull Island between Sutton and North Wall are exposed during all tidal cycles apart from high tide and most species feed here at these tidal cycles. When the mudflats are inundated Oystercatcher, Golden Plover, Black-tailed Godwit, Curlew and Redshank roost in amongst the saltmarsh vegetation on the landward side of the island. Knot, Dunlin, and Bar-tailed Godwit are typically found on the strand at Dollymount on the seaward side of the island at this stage of the tide. Shoveler, Pintail, Wigeon, and Teal tend to roost on the sand spit off Bull Island. Knot and Bar-tailed Godwit use both lagoons but occur in greater numbers in the South Lagoon. On spring high tides the saltmarshes are submerged and the birds roost elsewhere on Bull Island, on the golf courses and in the dune slacks towards the southern end of the island. The South Lagoon typically has higher densities of birds than the North Lagoon.

During a previous survey in this area conducted by Mayes (2002) a strip 17 m wide (proposed width of the rock fill embankment for the cycle path) was marked adjacent to the sea wall extending east over the intertidal area, and a further strip extending 50m wide beyond the 17 m strip was also marked with posts. The second strip represented the area within which birds feeding or roosting would be vulnerable to disturbance by human activity on the proposed cycle route. Counts were then carried out in each of the count areas at high, high-mid, mid, mid-low and low tide over eight dates representing spring, neap, and intermediate tidal ranges. The survey found that no species was recorded in internationally important numbers in the 17m strip, but peak counts for Brent Geese exceeded the international threshold of 1% in the 50m strip. Internationally important numbers of Black-tailed Godwit have also been recorded in the 50m strip. Nationally important numbers of Redshank and Turnstone were recorded in the 17m strip, and nationally important numbers of Knot, Dunlin, Black-tailed Godwit, and Redshank were recorded in the 50m strip. Nationally important numbers of Teal, Shelduck, Knot, Dunlin, Black-tailed Godwit, Redshank, and Turnstone were found using the total area of both the 17m and 50m strips. This use was consistent with the habitats present.
Counts of the South Bull Lagoon carried out as part of the Dublin Bay Project ecological monitoring programme by Mayes have found that Brent geese, Shelduck, Wigeon, Teal, Oystercatcher, Black-tailed Godwit, Redshank and Turnstone make consistent use of the 17m and 50m strips. Knot and Dunlin occur occasionally in nationally significant numbers on the 50m strip.

*Irishtown to Booterstown*
Irishtown Park is used by the Brent Geese, which feed on the amenity grassland. Black tailed godwits have also begun to use this area in the last couple of years.

Merrion Gates is one of the key areas for the Brent Geese, which feed on the *Zostera noltii* beds when they arrive in Dublin Bay in October. These beds come within approximately 18m of the coast line at Merrion Gates. During the winter months, large roosts of Oystercatcher, Bar-tailed Godwit, Redshank, and Black-headed Gull form along the sand between Booterstown and Poolbeg (typically concentrating around Merrion Gates on the embryonic dunes). The vegetation of drift lines also provides rich feeding opportunity for a variety of species as it supports a rich invertebrate population.

Towards the end of the summer (August – September) large numbers of post-breeding terns and their fledged young gather on Sandymount Strand. These birds include Common, Arctic, and Roseate Terns whose breeding origins include colonies that range from areas of eastern Ireland, the North Sea, and the Baltic. Numbers typically range from 2,000 to 5,000 terns but sometimes over 20,000 terns have been recorded. Their use of this section of the bay is principally determined by tidal state at night, but is also significantly influenced by human activity in the evening.

**Booterstown Marsh**
In the late 1970s and 1980s the marsh was a highly productive area for birds and was used as a roost at high tide when Merrion Strand was covered. However following changes to the hydrology of the site following closure of the sluices in the mid 1980s the site became more freshwater than brackish and as a result the diversity and numbers of birds decreased. This was further exacerbated by a pollution incident in 1985 when a large amount of oil flowed into the marsh via one of the streams. Following experimentation with opening of the sluice gates in 1998 the marsh once again became saltwater dominated, and a scouring effect took place resulting in aeration of the mudflats and improvements in feeding opportunity and the bird numbers and diversity began to increase once again. The information provided below on bird numbers and species is based on personal observations and those of Declan F. Murphy presented in the Irish East Coast Bird Report 1999.

During the winter the marsh usually supports a number of wildfowl and waders including Snipe, Teal, Mallard, and Shelduck, while Shoveler and Tufted Duck occur in small numbers when the marsh is flooded. The marsh is used as a high tide roost by a number of species including Oystercatcher, Knot, Dunlin, Bar-tailed Godwit, and Redshank. Redshank and Dunlin often remain to feed in the marsh. 30 – 40 Brent Geese use the marsh regularly whilst up to 100 may be present later in the season.

The marsh is also of significance for both feeding and roosting during the autumn migration when many additional species such as Ruff, Common Sandpiper, Curlew Sandpiper, Little Stint, Ringed Plover, Spotted Redshank,
Greenshank, and White-rumped Sandpiper have been recorded. Grey Herons are present in the marsh throughout the year but do not breed there. Kingfishers are present for most of the year and are found feeding along Nutley Stream. Water Rail (during winter months) and Little Grebe are also recorded. Gull species are usually only recorded in small numbers with flocks of up to 60 Black-headed Gull roosting in the area at high tide and in the evenings. Mediterranean and Little Gull have also been recorded.

Breeding birds in and around the marsh include Moorhen, Mallard, Reed Bunting, Stonechat, Blackbird, Dunnock, and Wren. Yellow Wagtails also attempted to breed during 1988 and 1989. Grey Wagtail, Pied Wagtail, Woodpigeon, Collared Dove, Stock Dove, Hooded Crow, Rook, Jackdaw, Starling are also recorded and the seed heads of Sea Aster (*Aster tripolium*) provide rich feeding for Linnet and Goldfinch at the end of the summer. Meadow Pipit, Brambling, and Black Redstart have all been seen during the winter months. The area of scrubland located to the north of the marsh supports Redpoll, Siskin, Goldfinch, Linnet, Chaffinch, Bullfinch, House Sparrow, and Song Thrush. During spring and summer months mixed flocks of hirundines and Swifts can be seen hawking over the marsh. Sparrowhawk and Kestrel regularly use the marsh for feeding throughout the year while Peregrine Falcon and Merlin have been recorded during the winter months. Long-eared Owl, Short-eared Owl, and Hen Harrier have all been recorded using the marsh.

The presence of over 100 Snipe in some winters rendered the marsh the 4th most important site for Snipe in the country in the mid 1980s, while the presence of Kingfisher (an Annex I species of the Birds Directive) is also of conservation significance. The marsh also provides an important roost site for some of the waterfowl that feed in the bay and as conditions in the marsh improve will no doubt increase in importance as a feeding site.

**Boofterstown to Salthill**

As one of the key undisturbed sections of coastline along the bay, this is understood to be an important roost for many species including Cormorants (28% of the bay population), Dunlin (56% of the bay population), Turnstone (17% of the bay population), and Ringed Plover (30% of the bay population). It provides a refuge for birds to roost often following disturbance elsewhere in the bay such as Sandymount Strand.

**Salthill to Sandy Cove**

The area adjacent to the Dun Laoghaire baths is used as a gull roost by both Black-headed and Mediterranean Gulls, while the West Pier of Dun Laoghaire harbour is used by Dunlin and Turnstone. Occasionally sub-groups of Turnstone, Dunlin, Bar-tailed Godwits, Oystercatchers, terns, gulls and cormorants use this area also for both roosting on the rocks and for feeding. Grey Heron is also frequently recorded here, whilst Brent Goose are occasional. The area around Salthill is mainly used by the Brent Geese but is also used by Oystercatchers and Bar-tailed Godwits.

**6.2 Constraints**

This section identifies the constraints of the proposed S2S with regard to the flora and fauna along the route.
6.2.1 Habitats, vegetation and flora
There are designated areas where negative direct and indirect impacts may occur in the SAC South Dublin Bay, firstly, in the inter-tidal areas just north of Merrion Gates and secondly, on the developing, dune area just north of Booterstown DART station. No Priority Habitats, as designated by the Habitats Directive, will be affected.

For the former, the beds of eel grass, *Zostera noltii* are very important and the tidal mud/sand flats on which they grow are listed on Annex 1 of the Habitats Directive and are the main reason for which this site is listed as an SAC. Direct impacts, arising from construction are unlikely but indirect impacts, such as barge or pontoon use may cause negative effects.

For the stretch of dune carrying the Annex 1 habitats of drift lines and embryonic dunes, it has already been noted that these have arisen subsequent to the process of designating the site as an SAC and so are not listed within the site synopsis as occurring within it. They are still of considerable importance and the National Parks and Wildlife Service should indicate whether or not it intends to include them in the habitat lists for this SAC. Direct impacts will occur from work in this area and mitigation measures are detailed in the Main S2S Report. Consideration of the extent of footprint of S2S in this area, will also be necessary subject to the support of the Wildlife Service to proceed with S2S in this area.

The only other areas where some loss of habitat and species would occur are along the stretches of sea wall north and south of Booterstown station. As indicated above, a community of plants, rich in maritime elements, occurs along here and there would be losses to the flora if no mitigation or restoration measures were proposed. The construction of S2S incorporating a sea wall replicating the current form of construction would be one such mitigation measure.

There are no further negative impacts expected on habitats, vegetation, or flora along any other stretch of the proposed route.

6.2.2 Fauna (Birds)
There are a number of constraints in relation to the possible impacts on birdlife and the designated Special Protection Area as a result of the proposed S2S. Impacts include both direct and indirect impacts and the severity of their impact will vary depending on the final design of S2S and it’s method of construction.

Potential direct impacts may include:

- A permanent loss of feeding habitat due to direct land take of littoral areas,
- Temporal loss of feeding habitat due to construction methodologies,
- Loss of feeding habitats due to changes in water movements in Bull Island lagoons and potential scouring effects on mudflats, sediment loading, etc.
- Loss of currently relatively disturbance free roosts (notably along the Booterstown to Salthill section),
• Disturbance during the construction phase due to the presence of machinery or personnel
• Disturbance to feeding and roosting birds through the increased presence of people, dogs, etc. during the operational phase,

Potential indirect impacts may include:

• Shading effects on food plants and their associated invertebrate fauna and hence a reduction in food resource for herbivorous species such as Brent Geese and Wigeon or invertebrate specialists such as Turnstone,
• A reluctance of waterfowl to feed adjacent to or under a structure (depending on its construction),
• Damage to flora and fauna within the construction strip arising from the use of machinery in the littoral area, potential for spillage of toxic materials such as fuels, oils, or concrete products.
• Light related impacts from lighting along the route on bird species at night.

As this survey was limited in scope and time (being a constraints study conducted over a relatively short period) it was not possible to carry out a more detailed survey to determine and identify the key areas used within Dublin Bay by birds at different aspects of tide, and for different activities.

6.3 Mitigation Measures

The Environmental Management Plan (EMP) discussed in previous sections will be implemented as part of the design, planning, construction and operational stages of S2S. In terms of flora and fauna, the EMP will ensure that any flora and fauna issues are dealt with at an early stage of the development, and the avoidance or mitigation of ecological impacts can be integrated into the overall design of S2S (See Appendix B).

In order to ensure that the flora and fauna described above is not adversely affected by the construction or operation of S2S, this section outlines mitigation measures that should be implemented prior to the final design stage of the route. It has been noted that for a number of areas, insufficient data is available to fully assess the predicted impact on the habitats, vegetation, flora and birds. Therefore, the subsections below outline the proposed studies required to obtain the necessary information.

Mitigation measures integrated into the design, to take account the above potential impacts are listed as follows:
<table>
<thead>
<tr>
<th>Potential Direct Impact</th>
<th>Mitigation Measure to be Integrated into Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent loss of feeding habitat</td>
<td>Extent of foot print of S2S and form of construction to mitigate impact on feeding habitats.</td>
</tr>
<tr>
<td>Temporal loss of feeding habitat during construction</td>
<td>Undertake construction during the season when birds are not feeding along the foreshore areas.</td>
</tr>
<tr>
<td>Loss of feeding habitat due to changes in water movements in Bull Island Lagoons</td>
<td>S2S will be constructed on a wooden pier structure along the Bull Island Lagoon. The foot print of the pier structure will not act as a constriction on the channel and hence there will be no predicted change in water movement through the channel</td>
</tr>
<tr>
<td>Loss of currently disturbance free roosts along Booterstown to Salthill</td>
<td>Dedicated roosting areas will be integrated into the design of the S2S to provide safe replacement roosts along the sea ward side of the new S2S structure</td>
</tr>
<tr>
<td>Disturbance during the construction phase due to the presence of personnel and machinery</td>
<td>Prior to any construction activities taking place, an Environmental Management Plan, with mitigation measures and impact minimization measures to be agreed with NPWS and Birdwatch, will be put in place, to ensure any construction works are undertaken in the most environmentally sensitive and unobtrusive manner</td>
</tr>
<tr>
<td>Disturbance to feeding and roosting birds due to presence of dogs, people, during operational phase</td>
<td>The potential for disturbance will be minimized by design of appropriate roosting sites, which will be integrated into the overall S2S design</td>
</tr>
<tr>
<td>Impact on developing dune system at Merrion gates</td>
<td>The extent of foot print and form of construction of S2S will be considered in detail in this area to mitigate impacts on the dune system and to stabilise and protect the long term development of this system.</td>
</tr>
</tbody>
</table>
### Potential Indirect Impact Mitigation Measure to be Integrated into Design

<table>
<thead>
<tr>
<th>Potential Indirect Impact</th>
<th>Mitigation Measure to be Integrated into Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shading effects on food plants</td>
<td>This issue will be assessed further and if found to be significant designs measures will be taken to minimize shading</td>
</tr>
<tr>
<td>A reluctance of waterfowl to feed adjacent to or under structure</td>
<td>This issue has already been assessed for Bull Island, and where not already addressed, will be assessed further. Waterfowl already feed close to the existing sea wall, and the design of S2S will mirror that of the existing sea wall.</td>
</tr>
<tr>
<td>Damage to flora and fauna during the construction phase by spills of chemicals, oils or concrete</td>
<td>Any potential impacts will be minimized by an agreed methodology, to be included in the EMP, which will ensure that all potentially polluting materials are stored in appropriately sealed and bunded containers and that operatives are fully trained in the use of spill kits and spill control measures. Best practice construction methods for the marine environment will be applied to ensure that the risk of any impact is negligible</td>
</tr>
<tr>
<td>Light related impacts</td>
<td>All lighting on the S2S will be designed to ensure that the light beam is focused downwards and directly onto the pathway, with minimal leakage of light outside the pathway footprint</td>
</tr>
</tbody>
</table>

Construction work in the marine environment may lead to water contamination, which can adversely affect birds and habitats. Mitigation measures outlined in the water and soil sections of this report will ensure that the foreshore area is not polluted as a result of the construction of S2S.

### 6.3 Possible Impacts

The full extent of the possible impacts on the flora and fauna along the S2S route will not be determined until the further studies, which are recommended in the next section are completed. This work would also establish a baseline from which future monitoring can progress.

### 6.4 Recommendations and Further Studies

#### 6.4.1 Habitats, Vegetation and Flora

Baseline data on the vegetation and flora will be needed from a few locations in order to establish a mechanism by which impacts arising from construction and subsequent use of the cycle track can be monitored. In addition, if mitigation measures were required it would be essential to have adequate baseline information to hand, from which these could be assessed and implemented.
The standard methods of vegetation sampling would be used in which permanent plots of 2 to 5 metres square are marked out in appropriate locations and the percentage cover of each plant species present is assessed. This allows for change in species composition and cover percentages to be gauged. The number of samples at any one location depends on the diversity of the site in question; the higher the diversity the greater the sample number.

Proposed locations for sampling are

1. Sea wall above Blackrock station
2. Booterstown Marsh
3. Developing salt marsh and dune just above Booterstown station
4. Zostera beds and inter-tidal areas adjacent to Merrion Gates
5. North lagoon salt marsh Bull Island

6.5.2 Birds

Further bird studies are recommended for the Bay area. The results presented by Mayes (2002) and the methodology used is indicative of the type of survey that will be required in order to assess the potential impacts of the proposed cycle path on birds and a suitable design methodology will need to be drawn up and discussed and agreed with both BirdWatch Ireland and the National Parks and Wildlife Service prior to any further project developments.

Once the usage of the Bay, by birds and people has been determined there will be an opportunity to design S2S and the public access points onto the bay to minimise disturbance levels and direct the public to areas of lower conservation significance.

It is recommended that the baseline survey address the following:

- Usage by wintering birds of habitats along and adjacent to the proposed route in a number of key defined count areas
- Counts to be carried out in each of the count areas over the full tidal cycle at several dates representing spring, neap and intermediate tidal ranges
- Counts to be carried out from August to April inclusive
- Identification of the significance (national or international) of these areas for feeding birds
- Identification of high tide roosts along or adjacent to the route
- Identification of the significance (national or international) of these roosts
- Identification of the likelihood of disturbance impact during the construction phase of project
- Identification of the susceptibility of birds to existing and future levels of disturbance during the operational phase of the project
- Identification of the existing human visitor numbers and human use of the bay
- Identification of the numbers and species of birds moving/changing behaviour in response to a disturbance agent e.g. dogs/people/vehicles etc.
- Identification of the disturbance response type of birds e.g. flying away, stopping feeding etc., and if possible where they move to
- Sampling of the invertebrate fauna along and adjacent to the proposed route to determine the main prey species of the birds and their abundance