Cork County Council

Development of Pedestrian and Cycle Greenway, Glenbrook to Raffeen, Co. Cork

Stage 1 Appropriate Assessment Screening Report

July 2016

ATKINS

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1. Introduction

Scheme Overview

1.1 Cork County Council proposes to extend the existing greenway network within the Cork Harbour Area by developing a section of greenway to extend for some 4.6km from the Glenbrook Cross River Ferry at Glenbrook to Raffeen Bridge. The full route extents of the scheme are illustrated in the accompanying Book of Drawings.

1.2 This section of Greenway was previously included within the "*Passage West to Carrigaline Greenway Feasibility Study: July 2012*". The design of the Greenway seeks develop the route to generally follow the alignment of the disused railway line as outlined in the Feasibility Study.

1.3 This section of greenway will be a key link in the broader walking and cycling infrastructure in the area to the south of Cork City linking:

- The existing Passage West to Rochestown Greenway
- The Cross River Ferry
- The cycle network in Carrigaline and onward to Crosshaven
- The proposed Greenway to Ringaskiddy

1.4 The route will provide improved walking and cycling access to employment and schools thus increasing sustainable travel on the local walking and cycling network. Increased volumes of walking and cycling trips to work and school would result in direct health and environmental benefits.

1.5 The Greenway will serve as a high quality amenity for walkers and cyclists of all ages and would act as a gateway for cycling tourists. The scheme will be of particular benefit to local communities in terms of the health benefits arising from usage of the scheme and social capital gain from increased civic engagement and community ownership of the Greenway. There would also be a direct economic benefit for the local communities from additional spend due to increased footfall and cycling numbers.

1.6 Consistent with the Passage West to Rochestown Greenway the route is to be developed as a shared use walking and cycling facility with a general width of 3.0m. The Greenway will be developed as much as possible along the alignment of the abandoned rail line thus along a relatively flat alignment that will be conducive to walking and cycling. In following the line of the railway the route will be strongly referenced to the rail heritage of the area.

1.7 There are locations along the Greenway where the route will be required to deviate from the rail corridor for varying reasons. At such locations it will be important that the alignment, and in particular the vertical alignment, is developed to be suitable for the anticipated diverse cohort of users including young children, people with disabilities and the elderly.

Part 8 Planning Documentation

1.8 This Part 8 Planning Report has been prepared in accordance with Part 8 of the Planning and Development Regulations, 2001 as amended. The report should be read in conjunction with the following complementary documentation contained under separate report heading: -

- Book of Drawings
  - Drawing 5146417/HW/0000: Cover Sheet
  - Drawing 5146417/HW/0001: Site Location (Sheet 1 of 2)
  - Drawing 5146417/HW/0002: Site Location (Sheet 1 of 2)
  - Drawing 5146417/HW/800: Key Plan
  - Drawing 5146417/HW/801: Site Layout Plan (Sheet 1 of 7)
  - Drawing 5146417/HW/802: Site Layout Plan (Sheet 2 of 7)
  - Drawing 5146417/HW/803: Site Layout Plan (Sheet 3 of 7)
  - Drawing 5146417/HW/804: Site Layout Plan (Sheet 4 of 7)
  - Drawing 5146417/HW/805: Site Layout Plan (Sheet 5 of 7)
  - Drawing 5146417/HW/806: Site Layout Plan (Sheet 6 of 7)
  - Drawing 5146417/HW/807: Site Layout Plan (Sheet 7 of 7)
- Appropriate Assessment Screening Report
- Ecology Report
- Flood Risk Assessment Report
- Outline Construction Environmental Management Plan

Works Extents

1.9 The scheme proposes to provide a new shared pedestrian and cycle path predominantly situated to the eastern and southern side of the existing R610 road over a distance of approximately 4.6km. The shared pedestrian and cycle path predominantly follows the alignment of the R610, situated adjacent to but segregated from the mainline carriageway but also incorporates sections of off road path which generally follows the alignment of the original railway line. The scheme includes ancillary drainage, public lighting, signage and delineation works as well as incorporating a number of structures required to overcome issues such as gradient and areas of soft ground conditions.

Requirement for Appropriate Assessment

1.10 Special Protection Areas for birds (SPAs) and Special Areas of Conservation (SACs) are sites that form part of a network, known as Natura 2000 sites, to be designated across Europe in order to protect biodiversity within the EU. SACs are designated under the EU Habitats Directive (92/43/EEC; and as amended), as transposed into Irish Law by the European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. No. 477 of 2011)); while SPAs are designated under the EU Birds Directive (79/409/EEC, as amended and codified in 2009/147/EC) and further

protected under the EU Habitats Directive as transcribed by the European Communities (Birds and Natural Habitats) Regulations, 2011 (SI No.477 of 2011).

1.11 Article 6(3) of the EU Habitats Directive states that: "Any plan or project not directly connected with or necessary to the management of the [Natura 2000] site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives." Such an assessment is known as an Appropriate Assessment (AA). Further guidance on AA is provided by the European Commission (2000) Managing Natura 2000 sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC and the Department of the Environment, Heritage and Local Government (DEHLG, 2009) Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities.

1.12 Due to the proximity of the proposed works to Cork Harbour SPA (004030) and Great Island Channel SAC (001058), as well as a number of other Natura 2000 sites in the surrounding area, there is a requirement to undertake Appropriate Assessment Screening to ascertain if the proposed project has the potential to have a significant effect on any Natura 2000 site(s) in view of its / their conservation objectives.

1.13 In light of the results of Stage 1 Screening, a Stage 2 Appropriate Assessment may be required and a Natura Impact Statement (NIS) may need to be prepared in order to assess whether there may be significant impacts to the integrity of the Natura 2000 sites which are located within the zone of influence of the proposed works; this is discussed further below.

Statement of Authority

1.14 The appropriate assessment was undertaken by Paul O'Donoghue and John Deasy. P. O'Donoghue has a BSc (Zoology), MSc (Behavioural Ecology) and a PhD in avian ecology and genetics. His is a chartered member of the Society for the Environment (CEnv) and a full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM). Paul is a Principal Ecologist based in Atkins office in Cork; with over 16 years' experience in ecology; including extensive experience in the preparation of Appropriate Assessments under Article 6(3) of the EU Habitats Directive, most notably in assessing impacts from developments such as aquaculture, greenways etc. on waders and wildfowl.

2. Project Description

Project Aims

2.1 The overarching purpose of the scheme is to provide a high quality pedestrian and cycling amenity for the local communities which can also facilitate improved walking and cycling access to schools and employment thus increasing sustainable travel. The development of the scheme will also present an opportunity to connect to the broader walking and cycling infrastructure in the area to the south of Cork City.

Scheme Objectives

2.2 The specific design objectives of the proposed greenway are as listed below: -

- To comply with relevant design standards;
- To mitigate against potential environmental impacts;
- To provide an off road/segregated shared use pedestrian and cyclist greenway path with an effective width of 3.0m;
- To apply appropriate treatment of established entrances and accesses;
- To facilitate the requirements for egress from Raffeen Woods to Raffeen Bridge;
- To provide structures, lighting, fencing and drainage elements where required.

Route Overview

2.3 The Greenway route was assessed as a series of subsections in terms of existing characteristics and route alignment and design options. These sub sections are described in summary below and the Part 8 design drawings are presented in the Book of Drawings. Noting that the greenway is to be developed as an off road facility, the consideration of accommodating cyclists on the R610 road carriageway was considered but precluded on safety grounds in terms of vehicular traffic volumes and available road width.

Section 1: Cross River Ferry to Railway Tunnel, Monkstown ('Cut & Cover')
Proposed Route Starting at the Cross River Ferry terminal the Greenway will cross the entrance to the ferry access apron. The existing traffic entry and exit points and the right turn lane facility into the ferry apron have been maintained and all works to the Greenway would be accommodated outside of the apron. The route will run adjacent the park at the Victoria Baths site and will continue adjacent the R610 along the alignment of the existing footpath. The footpath will require reconstruction and widening to accommodate the Greenway. The footpath will be widened to a desirable width of 4.0m and a minimum width of 3.0m. In order to accommodate the widening of the existing footpath the R610 will be reduced in width to a minimum width of 6.0m. Existing public lighting will provide appropriate lighting for the Greenway. Road drainage will be modified to accommodate the widening of the footpath. New railings will be incorporated where necessary along the harbour wall in order to provide for a minimum railing height of 1.4m.

Plate 2.1: Cross River Ferry at Monkstown.

Plate 2.2: Northbound approach to Cross River Ferry.

Section 2: Railway Tunnel, Monkstown ('Cut and Cover')

Proposed Route

The Greenway will be routed along the original railway alignment through the 'Cut and Cover' section under the R610, north of Monkstown. The Greenway will be accommodated on the existing pathway that will be resurfaced. Lighting will be improved where necessary through this section and existing landscaping will modified and improved to complement the Greenway.

Plate 2.3: Approach to Railway Tunnel, Monkstown (Cut & Cover)

Plate 2.4: Railway Tunnel, Monkstown (Cut & Cover).

Section 3: Monkstown

Proposed Route

Within Monkstown the Greenway will be routed along the existing footpath alignment adjacent the car park, the Sailing Club and the access gangway to Monkstown Marina. The Greenway route has been designed to maintain access to these facilities and to maintain on street parking at key locations. The Greenway will be aligned along the existing footpath which will be widened to 4.0m. The route will be lit via the existing public lighting.

Plate 2.5: Existing path at Monkstown car park.

Plate 2.6: Monkstown Sailing Club.

Section 4: Monkstown to Strawhall

Proposed Route

Similar to Section 1, the Greenway will be aligned along the existing footpath which will be widened and reconstructed to provide a desirable overall 4.0m Greenway path and a minimum path width of 3.0m. A new railing will be required along the harbour wall and new public lighting will be required for the last 450m of this section.

Plate 2.7: Path, grass verge and seawall.

Plate 2.8: Path, grass verge, seating and seawall.

Section 5: Strawhall

Proposed Route

In order to mitigate potential impact on the adjacent Cork Harbour SPA, the Greenway will be aligned adjacent the R610 from Murphs Pub to south of the L2489 road junction. This will be via a combination of at grade path constructed adjacent road way and some 200m of boardwalk structure due west of the disused boat yard. The remainder of the Greenway through this section will be constructed on the railway embankment up to the crossing of the L6473 Shanbally Road. New public lighting will be required along the full extent of the Greenway through this section.

Plate 2.9: Rail alignment adjacent Murphs Pub.

Plate 2.10: Railway Embankment.

Section 6: Raffeen Cottages

Proposed Route

The routing of the Greenway to the rear of the residential properties at Raffeen has been a key consideration in the development of the Greenway design. In order to protect the privacy of the residents, a wall will be constructed to the rear of the properties which will preclude overlooking from the trail and individual rear access will be accommodated via a residents path and service area.. The Greenway will be aligned along the original railway alignment to the rear of the properties. A suitable raised road crossing of the L6473 will be incorporated in the Greenway with additional speed control ramps to be incorporated.

Plate 2.11: View along railway alignment to the back of cottages at Raffeen.

Section 7: Raffeen Woods

Proposed Route

The existing trail along the original railway alignment extends some 700m from Raffeen cottages to the old Raffeen Bridge. The majority of this trail will be incorporated into the Greenway to provide a 3.0m trail incorporating public lighting. The last 230m of the Greenway will incorporate an elevated, sloped boardwalk structure in order for the Greenway to transition across the 6.0m level difference between the railway line and the R610 at the bridge.

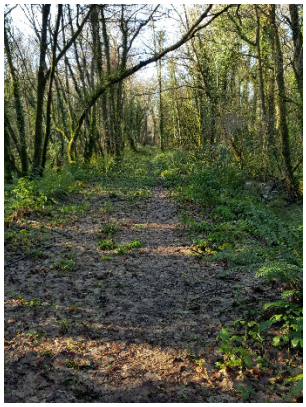


Plate 2.12: Pathway through Raffeen Woods.	**Plate 2.13: Approach to Raffeen Bridge.**

Scheme Description

Link Provision

2.4 The R610, as would be expected for a regional road, experiences 85th percentile speeds within a range of 50-80kph and an AADT of the order of 3,500 vehicles. These characteristics indicate that the most appropriate form of provision is a segregated facility. As such the Greenway design has been developed as an off road shared use pedestrian and cyclist path.

2.5 The greenway width has been designed in accordance with guidance set out within Table 4.1 'Range of Mandatory Widths for Cycle facilities' of TD 300, Rural Cycle Scheme Design. As such the desirable minimum effective width is 3.0m whilst one step below desirable minimum effective width is 2.0m.

2.6 In retrofitting the existing roadway along the R610, the available corridor width has allowed for reduction of the existing road width to 6.0m to allow for widening of adjacent footpath to provide an off road shared pedestrian and cyclist track ranging in width from 3.0m to 4.0m. Where on road parking is located, a minimum road width of 8.0m has been maintained.

2.7 The effective width of a cycle facility is often reduced due to adjacent vertical features, such as the harbour wall, or kerbed edges adjacent a roadway. In both cases cyclists would be assumed to cycle no closer than 500mm to either edge yield an effective width of 2.0m for a 3.0m wide path and 3.0m effective width for a 4.0m wide path.

2.8 The road edge detail will be a 150mm high kerb and a 500mm buffer strip. The buffer strip will be demarked by a continuous white line marking along the shared pedestrian and cycle path which will act as a guide to cyclists. Where the Greenway is located directly adjacent the existing harbour wall a 1.4m high railing will be required. This will incorporate the replacement of existing railings along sections of the route, north of Monkstown, and the provision of new railings along other sections of the route, primarily south of Monkstown.

Route Description

2.9 As the route of the Greenway Scheme predominantly runs adjacent the local road network, the retrofitting of the existing road corridor and the construction of the Greenway as an at-grade pathway has been the adopted as the general design solution in order to provide an appropriate pedestrian and cycle facility.

2.10 The corridor associated with the R610 has allowed for a redistribution of the available width to accommodate the Greenway on an off road track adjacent the roadway. Alternative design solutions were adopted along sections of the route where specific circumstances prevailed. North of Monkstown the Greenway is to be developed as a trail along the existing walking route through the Railway Tunnel, Monkstown ('Cut & Cover'). Adjacent the L2489 at Strawhall a boardwalk structure solution has been adopted adjacent the roadway. Due west of this boardwalk, the Greenway will be constructed as a trail along the original railway embankment up to the L6473 Shanbally Road at Raffeen Cottages.

2.11 To the rear of Raffeen Cottages and onwards into Raffeen Woods the route will continue as a trail along the existing pathway on the original line of the railway. In order to overcome the level difference between the original rail line and the adjacent R610 at Raffeen Bridge a sloping boardwalk structure is proposed which will facilitate users to transition from the trail in the Woods up to road level at the bridge.

Key Ancillary Elements

Accessibility

2.12 The Greenway Scheme has been designed for the requirements of the mobility and visually impaired. Reference in this regard has been made to the National Disability Authority's guidance document "*Building for Everyone*" 2013.

Pavement

2.13 Construction of the shared pedestrian and cycle path shall consist of a bound flexible pavement. The exact pavement construction will be subject to a detailed specification at detailed design stage.

Kerbing

2.14 All road side kerbing provided to be 255mm x 125mm half batter precast concrete kerb to be provided where required. Precast concrete bull nose kerb 150mm x 50mm wide to be installed to provide a pavement edge restraint to the greenway where required. Where the greenway is located directly adjacent the road edge, the edge of the track will be demarked with a continuous white line set back on the track 500mm from the kerb edge.

Vehicular Accesses

2.15 All vehicular accesses shall be stop controlled priority junctions. Kerb radii have been reduced to 4.5m in urban locations and 6.0m in rural locations to reduce vehicle turn speeds and pedestrian crossing distances.

2.16 Crossings to side roads shall be located on raised platforms with priority afforded to pedestrians and cyclists. Stop lines to be located in advance of crossings to encourage two stage stopping traffic exiting the access point.

Gradient

2.17 The desirable maximum gradient is1:33 (3%). Gradients up to an absolute maximum of 1:10 (10%) are to be confined to shorts section of the route.

Drainage and Flooding

2.18 Cycle facilities surfaces shall drain to one side. On bends this shall be to the shorter radius to avoid negative camber and increased skidding risk. Cross falls shall be between 1:40 (2.5%).

2.19 The location of the Greenway Scheme in proximity of Cork Harbour necessitates a Stage 1 Flood Risk Assessment (FRA), contain under separate report heading.

Boardwalk

2.20 The proposed boardwalks will provide a total clear width of 4.0m to allow for an effective width of 3.0m to be achieved. Handrails at 1.40m height will be provided to include intermediate rails. The type of material used will be specified at detailed design. However timber or recycled plastic can be assumed to be the materials to be used in construction.

2.21 It would be envisaged that piling of the support posts would be required if soft ground conditions exist. Suitable plant would be required to undertake this. Should rock be encountered the support posts could be socketed into the rock. A steel support structure will be required.

2.22 A critical factor in the success of a boardwalk and its attractiveness to the end user is ensuring that adequate slip resistance is achieved. It is therefore recommended that upon installation of the structure surface a minimum cross profile Pendulum Test Value (PTV) of 50 should be achieved. A warranty should be agreed with the manufacturer to ensure that the required minimum PTV is maintained for a minimum period of 10 years.

Bus Stops

2.23 All existing bus stops have been retained. Where amendments are required, such as the existing bus stop in Monkstown adjacent the Sailing Club, bus stops have been re positioned as necessary, and the form of layout; i.e. In-Line Bus Stop layout, has been retained. Bus shelters where existing will be retained.

Public Lighting

2.24 Public lighting is an essential part of any pedestrian and cycle scheme. It increases the attractiveness and sense of security of the scheme. Existing public lighting along the R610 is of a sufficient standard to illuminate all road surfaces and the Greenway.

2.25 Within the Railway Tunnel, Monkstown ('Cut & Cover') section it is proposed that lighting be upgraded. Along sections of the R610 where there is currently no public road lighting it is proposed that the new lighting be installed for the purpose of lighting the Greenway only.

2.26 All new public lighting along the Greenway will be subject to further bespoke design at the detailed design stage. This will include options to consider the incorporation of lightning within the handrail details of the boardwalk. The provision of LED lighting is assumed and design will be such as to limit light spillage onto the Glounatouig Stream and onto Raffeen Creek.

2.27 Lighting located beside the shared pedestrian and cycle path and the adjacent road carriageways will be designed to an adequate standard to allow for lighting of both, whilst where the scheme proceeds offline from the road along the disused railway alignment, the lighting will only be required to light the shared pedestrian and cycle path and will be designed as such.

2.28 With particular reference to Raffeen Woods and along the railway embankment at Strawhall the hours of public lighting would be limited between 6:00am and 10:00pm to mitigate impacts on the local bat population.

Parking

2.29 On street parking has been maintained at key locations along the Greenway route, in particular in Monkstown and to the south of Monkstown along the R610 where there is existing kerbside parking to residential properties that directly front the road edge.

2.30 The existing off street car park in Monkstown will serve as a convenient car park for recreational users of the Greenway. An additional off road car park is proposed at Strawhall directly adjacent the Greenway.

Structures and Fencing

2.31 Where the Greenway will be constructed on the original railway embankment, alterations to the existing disused bridge at Strawhall will be required. An initial visual assessment has indicated that the existing abutments are of sound construction and therefore the upgrade will mainly consist of a new short span deck system and bridge guardrails. A bridge inspection will be required at detailed design stage to definitively ascertain suitability of the abutments to support the any proposed deck system.

2.32 Along the same embankment screen fencing will be incorporated on the harbour side of the embankment in order to screen the Greenway from the adjacent Cork Harbour SPA in order to minimise the impact on the adjacent bird population and to prevent dogs accessing the shoreline in this area. The fencing will be of the order of 2m high palisade fence initially screened with appropriate willow fencing. The photo below shows an example of this screening, recently constructed at Harper's Island, Glounthaune. The fencing will be back planted so that, over time, the back planting will replace the willow fencing.

Plate 2.14: Screening Fencing.

2.33 The existing harbour wall from Cross River Ferry to north of Monkstown is a low wall and incorporates an existing railing of varying height along a portion of the route. In order to provide a consistent railing height and consistent quality of railing it is proposed to replace this railing. The existing harbour wall also extends from south of Monkstown to Strawhall, however this section does not incorporate any railing. It is proposed that a new railing system is installed along this section.

2.34 All new railing proposed will ensure that a minimum railing height of 1.4m is maintained along the extents of the harbour wall. All fencing and railing requirements are illustrated on the Part 8 design drawings.

3. Methods

Appropriate Assessment Process

3.1 Special Areas of Conservation (SAC's) and Special Protection Areas for birds (SPA's) form part of a network, known as Natura 2000 sites, to be designated across Europe in order to protect biodiversity within the European Union. SAC's are designated under the EU Habitats Directive (92/43/EEC; and as amended), as transcribed into Irish law by the European Communities (Birds and Natural Habitats) Regulations, 2011, while SPA's are designated under the EU Birds Directive (79/409/EEC, as amended and codified in 2009/147/EC) and further protected under the EU Habitats Directive and the 2011 Regulations.

3.2 Article 6(3) of the EU Habitats Directive (92/43/EEC and as amended) states that: "Any plan or project not directly connected with or necessary to the management of the [Natura 2000] site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives." Such an assessment is known as an Appropriate Assessment (AA). Further guidance on AA is provided in the following documents: -

- European Commission (2000) Managing Natura 2000 sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC
- European Commission (2001) Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Articles 6(3) and (4) of the Habitats Directive 92/43/EEC
- European Commission (2007) Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC: Clarification of the concepts of: Alternative solutions, Imperative reasons of overriding public interest, Compensatory Measures, Overall Coherence, Opinion of the Commission
- Department of the Environmental Heritage and Local Government (2009) Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities.

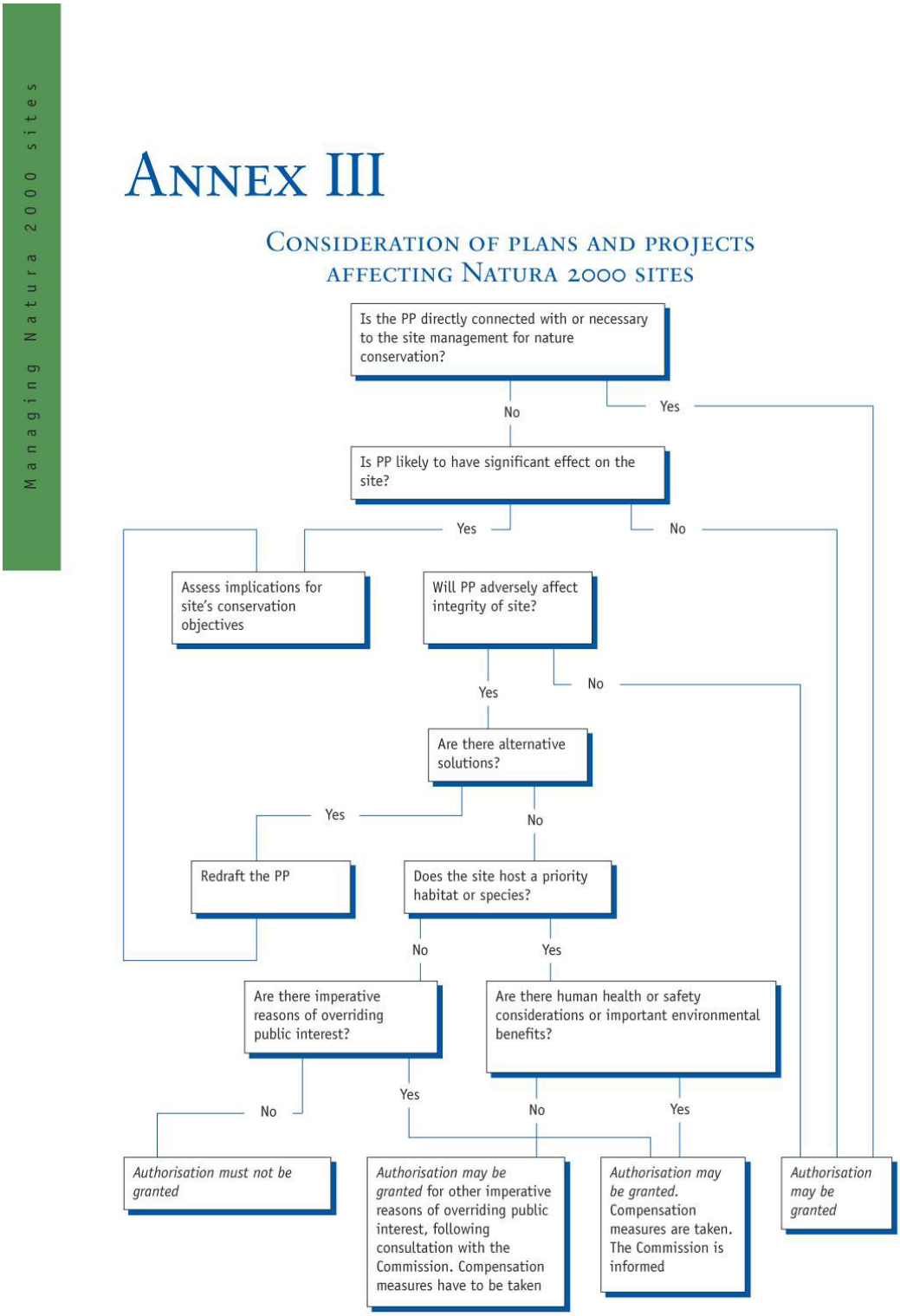
3.3 The Appropriate Assessment process begins with Stage 1 - Screening to determine if a plan or project is likely to have a negative impact on a Natura 2000 site; see Text Figure 3.1 for a summary of the steps involved in completing an Appropriate Assessment.

3.4 The Natura 2000 network is comprised of both Special Areas of Conservation and Special Protection Areas for birds; these sites are designated for the protection of biodiversity across the European Union. SACs are designated under the EU Habitats Directive[1] (92/43/EEC), as transcribed into Irish law by the European Communities (Birds and Natural Habitats) Regulations, 2011, while SPAs are designated under the EU Birds Directive[2] (79/4089/EEC; and as amended 2009/147/EC).

[1] For further information on the Habitats Directive refer to: - http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm

[2] For further information on the Birds Directive refer to: - http://ec.europa.eu/environment/nature/legislation/birdsdirective/index_en.htm

Text Figure 3.1 - Consideration of Plans and projects Affecting Natura 2000 sites from Annex III from Guidance issued by EC (2001).



Stage 1: Screening

3.5 The first stage is to determine if the plan is directly connected with or necessary to the sites management for nature conservation. If the answer is no, it must be determined if the plan is likely to have significant effects on a Natura 2000 and/or Ramsar site(s)[3]. If the answer is yes to the latter, then the assessment advances to Stage 2 (see Text Box 3.1). Stage 1 screening involves the identification of the plan or project objectives, and a review of alternative methods to achieving the objectives where appropriate.

3.6 The AA screening begins with identification of Natura 2000 sites that could potentially be affected by the project; in this instance we have identified all Natura 2000 sites within Cork Harbour and environs to a distance of 15km from the site. This is followed by collation of information relating to these sites. Such information is principally obtained from the National Parks and Wildlife Service (NPWS) of the Department of Arts Heritage and the Gaeltacht (DAHG). The primary source of information on Natura 2000 sites are the: -

a) Conservation Objectives report for the site;

b) Standard Natura 2000 data forms;

c) Site synopses; and

d) Site boundaries.

3.7 All of the above can be obtained from the NPWS, while site boundaries can be viewed on the NPWS webpage (http://npws.ie/mapsanddata/); site boundaries can also be downloaded as shapefiles)[4].

3.8 The above information was supplemented by a number of site visits, consultation with NPWS and other relevant bodies and ongoing liaison with relevant Cork County Council staff in order to fully understand the proposed works and determine how they might impact on Natura 2000 sites.

3.9 This, together with information on the Natura 2000 sites described above, permitted evaluation of the following: -

- Individual elements of the proposed project (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 sites;
- Likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of: -
  - Reduction of habitat area;
  - Disturbance of key species;
  - Habitat or species fragmentation;
  - Reduction in species density; or
  - Changes in key indicators of conservation value.

[3] A Ramsar site is a site designated under the Ramsar Convention (The Convention on Wetlands of International Importance) an international treaty for the conservation and sustainable utilisation of wetlands (adopted in Tehran, 1971).
[4] All site information and associated shapefiles were downloaded from www.npws.ie on 2nd May 2013.

- Likely changes to the Natura 2000 site arising as a result of interference with the key relationships that define the structure and function of the site;
- Indicators of significance as a result of the identification of effects set out above in terms of: -
  - Loss;
  - Fragmentation;
  - Disruption;
  - Disturbance; and
  - Change to key elements of the site.
- Elements of the Plan, or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.

3.10 Where negative impacts on a Natura 2000 site cannot be discounted the Assessment must proceed to Stage 2; while it was not necessary in this case the objectives at Stages 2, 3 and 4 are summarised in Text Box 3.1, below for completeness.

3.11 Scientific names of species mentioned in the text are included in Appendix A.

Stage 2: Appropriate Assessment

3.12 Stage 2 is the Appropriate Assessment proper to determine if the plan is likely to affect the integrity of the Natura 2000 and/or Ramsar site(s). If the Screening process identifies that negative impacts cannot be ruled out the study progresses to Stage 2 at which point a detailed, targeted assessment of the nature and potential significance of direct and indirect impacts arising from the proposed variation must be completed. An assessment of cumulative impacts (both from the project objectives, and other policies, plans and programmes) must be carried out. Mitigation measures must be proposed to eliminate potential impacts, if possible. These mitigation measures must be consulted upon with the relevant agencies and the public and, following receipt of comments, if it can be concluded that no adverse impacts on the integrity of the site are likely, the proposed project can proceed for approval. If not, then the assessment advances to Stage 3.

Text Box 2.2 – Summary of Stages 3 to 4.

Stage 3: Assessment of Alternative Solutions

This Stage involves the identification of alternative solutions following a review of the outcomes of Stage 2. If there are no alternative solutions identified, then the assessment advances to Stage 4.

Stage 4: Assessment where no Alternative Solutions exist and where Adverse Impacts remain

Stage 4 examines whether there are imperative reasons of overriding public interest for the plan or project to go ahead. If the answer is yes, then compensatory measures need to be agreed with the European Commission, before the plan or project can proceed. If not, then the plan or project is rejected.

Consideration of Alternatives & Consultation

3.13 The design considered in this assessment was arrived at following a comprehensive review of engineering and ecological constraints as well as consultation with National Parks and Wildlife Service. A detailed habitat survey of the study was also undertaken; this as well as other ecological considerations (such as otter *Lutra lutra*) are discussed in the accompanying Ecology report (our ref. 3191Dg05) and went to inform the design of the preferred route. A meeting (September 2013) was held with Danny O'Keeffe (local conservation ranger, NPWS), Dr. Jervis Good (Regional Ecologist, NPWS) and Cyril Saich (DCO, NPWS) to discuss the scheme. An onsite meeting was held with Danny O'Keeffe in February 2014. These discussions highlighted the importance to minimising disturbance to birds using the creek and helped to inform the design of the proposed Greenway.

3.14 While consideration was given to using the original railway embankment from Strawhall to Raffeen it is proposed to run the Greenway alongside the R610 roadway in order to minimise impacts on Cork Harbour SPA and associated wintering birds. Where it re-joins the embankment it is proposed to use a willow screen to screen the pathway from disturbance and to prevent dogs accessing the estuary.

4. Description of Natura 2000 sites

Natura 2000 sites

4.1 The Natura 2000 network comprises both Special Areas of Conservation (SACs) and Special Protection Areas for birds (SPAs); (i.e. sites of European Conservation importance). SACs are designated under the EU Habitats Directive (92/43/EEC; and as amended), as transcribed into Irish law by the European Communities (Birds and Natural Habitats) Regulations, 2011, while SPAs are designated under the EU Birds Directive (79/4089/EEC; and as amended 2009/147/EC) and further protected under the EU Habitats Directive and the 2011 Regulations.

4.2 Two Natura 2000 sites are located within Cork Harbour namely: -

- Great Island Channel Special Area of Conservation (site code 001058); and
- Cork Harbour Special Protection Area (site code 004030)

4.3 The Great Island SAC is located 2.3 km to the north of the proposed Greenway at its nearest point; Marino Point (Figure 4.1). Great Island Channel SAC is discussed in detail below.

4.4 Cork Harbour SPA is composed of a number of discrete areas including a number of estuaries within the broader harbour region. The closest part of the Cork Harbour SPA complex to the proposed Greenway is at Monkstown Creek, which adjoins the proposed Greenway to the south. Other nearby portions of Cork Harbour SPA include the Lough Beg which is located ca. 2.2km to the southeast and the Owenboy River estuary which is located ca. 2.1km to the south of the study site (Figure 4.2). Ringabella Creek, to the south of Crosshaven, has recently been added to Cork Harbour SPA. Cork Harbour SPA is discussed in detail below.

4.5 The next nearest Natura 2000 sites in the environs of the site are listed in Table 4.1; qualifying interests are listed in Appendix C. The SACs listed in Table 4.1 are far too remote from the proposed works area to have any risk of negative impacts on the habitats for which they are designated. These sites are therefore screened out and will not be discussed further.

4.6 In the case of other SPAs the qualifying interests were examined to determine if there was any risk to bird species for which these sites have been designated. It was determined that these SPAs are too remote from the proposed Greenway site, or in case of coastal sites do not support the appropriate habitat types, for the proposed works to affect the species for which these sites have been designated. These sites are therefore screened out and will not be discussed further.

Table 4.1 – Natura 2000 sites at >15km from the site.

Site	Number	Distance
Special Areas of Conservation		
Ballymacoda (Clonpriest & Pillmore) SAC	000077	>27km E
River Blackwater (Cork / Waterford) SAC	002170	>33.3km NE & / >19.6km N
Courtmacsherry Estuary SAC	001230	ca. 28km SW
The Gearagh SAC	000108	40.5km NW
Special Protection Area for birds		
Blackwater Callows SPA	004094	32.5km N
Ballycotton Bay SPA	004022	20.6km E
Ballymacoda Bay SPA	004023	28km E
Blackwater Estuary SPA	004028	33km E
Soverign Island SPA	004124	19km SW
Old Head of Kinsale SPA	004021	27.5km SW
Courtmacsherry Bay SPA	004219	29.2km SW
The Gearagh SPA	004109	42.6km NW
Mullaghanish to Musheramore Mountains SPA	004162	45km NW
Seven Heads SPA	004191	39km SW

Great Island Channel SAC

Qualifying Interests

4.7 The qualifying interests for the Great Island Channel SAC for which the site was designated are the following habitats (NPWS, 2014a): -

- Mudflats and sandflats not covered by seawater at low tide (1140)
- Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (1330)

4.8 The aim of the Habitats Directive (92/43/EEC) is to maintain or restore the favourable conservation status of habitats and species of community interest. Favourable conservation status of a habitat is achieved when: -

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

4.9 To achieve favourable conservation status of habitats and species of community interest at a national level, site-specific conservation objectives are defined with the aim to maintain the habitats and species at favourable conservation condition within the site; as a result this will also contribute to the overall maintenance of favourable conservation status across Ireland (NPWS, 2014a).

4.10 Site specific conservation objectives were published in 2014 for Great Island Channel SAC (NPWS, 2014a) and give specific attributes and targets by which the maintenance of favourable conservation condition of qualifying interests within Great Island Channel SAC are measured. These are reproduced in full in Table 4.2 (all references quoted in Table 4.2 are listed in NPWS, 2014a).

Table 4.2 – Conservation Objectives including site-specific attributes and targets for the habitats which are qualifying interests for Great Island Channel SAC (taken from NPWS, 2014a).

Habitat: Mudflats and sandflats not covered by seawater at low tide (1140)			
Attribute	**Measure**	**Target**	**Notes**
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. (See map 3; NPWS, 2014)	Habitat area was estimated using as 723ha using OSi data
Community distribution	Hectares	Conserve the following community type in a natural condition: Mixed sediment to sandy mud with polychaetes and oligochaetes community complex.(See map 4; NPWS, 2014)	Based on intertidal and subtidal surveys undertaken in 2006 (Aquafact, 2007) and 2011 (EcoServe, 2012; MERC, 2012). See marine supporting document for further information.
Habitat: Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (1330)			
Attribute	**Measure**	**Target**	**Notes**
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Bawnard - 0.29ha; Carrigtohill - 1.01ha. (See map 5 in NPWS, 2014)	Based on data from Saltmarsh Monitoring Project (SMP) (McCorry and Ryle, 2009). Two sub-sites that supported Atlantic salt meadow were mapped (1.30ha) and additional areas of potential saltmarsh (17.60ha) were identified from an examination of aerial Photographs, giving a total estimated area of 18.90ha. Saltmarsh habitat has also been recorded at two other sub-sites within the SAC (Curtis and

			Sheehy Skeffington, 1998). NB further unsurveyed areas maybe present within the SAC. See coastal habitats supporting document for further details.
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 5 in NPWS, 2014 for known distribution	Based on data from McCorry and Ryle (2009). Within the sites surveyed by the SMP, estuary type saltmarsh over a mud substrate is most common and ASM is the dominant saltmarsh habitat. NB further unsurveyed areas maybe present within the SAC. See coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions	Based on data from McCorry and Ryle (2009). At Bawnard there is a seawall that was constructed in the 18th-19th centuries. At Carrigatohill the northern and eastern shorelines have been significantly modified by road construction. Part of the saltmarsh has also been infilled. See coastal habitats supporting document for further details
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession	Based on data from McCorry and Ryle (2009). The ASM at Carrigatohil is poorly developed, though some of the larger sections contain salt pans. The smaller sections, however, tend to be quite uniform in topography. The saltmarsh topography at Bawnard is poorly developed with few typical saltmarsh features. See coastal habitats supporting document for further details.
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	Based on data from McCorry and Ryle (2009). At Bawnard, the entire bay empties at low tide to expose soft intertidal mudflats. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from McCorry and Ryle (2009). Zonations to *Salicornia* flats and intertidal mudflats occurs at Carrigatohill. At Bawnard, there is succession from saltmarsh to brackish saltmarsh and wet grassland as well as zonation to intertidal mudflats at the lower saltmarsh boundary. See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on data from McCorry and Ryle (2009). At Carrigatohil, the sward height is quite tall due to lack of grazing. At Bawnard only part of the site is grazed. See coastal habitats supporting document for further details
Vegetation structure: vegetation cover	Percentage cover at a representative number of monitoring stop	Maintain more than 90% area outside creeks vegetated	Based on data from McCorry and Ryle (2009). Some poaching was noted in places at Bawnard. See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stop	Maintain range of sub-communities with typical species listed in SMP (McCorry and Ryle, 2009)	See coastal habitats supporting document for further details
Vegetation structure: negative indicator species - *Spartina anglica*	Hectares	No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1% where it is known to occur	Based on data from McCorry and Ryle (2009). *Spartina* occurs at both sub-sites in this SAC. See coastal habitats supporting document for further details

4.11 In addition to the qualifying interests listed above, the Natura 2000 standard data form also lists Annex I habitats Estuaries (1130) and Spartina swards (1320) as being present in the SAC. These are not qualifying interests for the site.

4.12 As well as habitats listed on Annex I of the Habitats Directive, a number of bird species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC are listed on the Natura 2000 form; these include Pintail, Shoveler, Teal, Wigeon, Mallard, Turnstone, Dunlin,

Ringed Plover, Oystercatcher, Bar-tailed Godwit, Black-tailed Godwit, Red-breasted Merganser[5], Curlew, Cormorant, Golden Plover, Grey Plover, Shelduck, Greenshank, Redshank and Lapwing

4.13 No other plants or animals are listed on the Natura 2000 data form.

4.14 Negative impacts to the Great Island Channel SAC outlined on the Natura 2000 standard data form are presented below (Table 4.3).

Table 4.3 - Negative impacts on the Great Island Channel SAC identified from the Natura 2000 standard data form (NPWS, 2014g).

Rank	Threat/Pressure	Inside or Outside SAC
High	Roads/Motorways	Inside
Medium	Eutrophication (natural)	Inside
High	Urbanised areas, human habitation	Outside
Medium	Grazing	Inside
Medium	Fertilisation	Outside
High	Marine and Freshwater Aquaculture	Inside
Medium	Invasive non-native species	Inside
High	Reclamation of land from sea, estuary or marsh	Inside

4.15 In addition, grazing inside the SAC is listed as a positive impact of medium importance to the habitats inside the Great Island Channel SAC.

4.16 The Great Island Channel SAC site synopsis NPWS (2013) is included in Appendix B.

Conservation condition of Qualifying Interests

4.17 The conservation condition of the qualifying interests for Great Island Channel SAC are outlined in the supporting documentation for the Conservation Objectives as published by NPWS (NPWS, 2014d; NPWS, 2014e). These are presented below.

Table 4.4 – Conservation condition of Annex I Atlantic salt meadow habitat (1330) within the Great Island Channel SAC.

Habitat	Extent	Structure and functions	Future prospects	Overall EU Conservation Status Assessment
Atlantic salt meadows (1330)	Favourable	Unfavourable - Inadequate	Unfavourable - Inadequate	Unfavourable - Inadequate

4.18 The conservation condition for the marine Annex I qualifying interest of Mudflats and Sandflats not covered by seawater at low tide (1140) within the Great Island Channel SAC has not been assessed in the same manner as the Atlantic salt meadows detailed above.

[5] Mistakenly listed as *Mergus merganser*, Goosander, rather than *M. serrator*, Red-breasted Merganser.

4.19 However, a technical clarification has been provided in relation to specific conservation objectives and targets for Annex I Mudflats and Sandflats not covered by seawater at low tide to facilitate the appropriate assessment process. This is described below: -

4.20 To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in Great Island Channel SAC, which is defined by the following list of attributes and targets.

- Target 1 - The permanent habitat area is stable or increasing, subject to natural processes.

4.21 This target refers to activities or operations that propose to permanently remove habitat from a site, thereby reducing the permanent amount of habitat area. It does not refer to long or short term disturbance of the biology of a site. Early consultation or scoping with the Department in advance of formal application is advisable for such proposals.

- Target 2 - Conserve the following community type in a natural condition: Mixed sediment to sandy mud with polychaetes and oligochaetes community complex.

4.22 A semi-quantitative description of this community type has been provided in the NPWS conservation objective supporting document – marine habitats (NPWS, 2014e). An interpolation of its likely distribution in Cork Harbour is provided in Figure 2 of NPWS, 2014e. The estimated area of this community type within the Mudflats and sandflats not covered by seawater at low tide habitat is 723ha. Significant continuous or ongoing disturbance of communities should not exceed an approximate area of 15% of the interpolated area of each community type, at which point an inter-Departmental management review is recommended prior to further licensing of such activities (NPWS, 2014e).

4.23 Proposed activities or operations that cause significant disturbance to communities but may not necessarily represent a continuous or ongoing source of disturbance over time and space may be assessed in a context-specific manner giving due consideration to the proposed nature and scale of activities during the reporting cycle and the particular resilience of the receiving habitat in combination with other activities within the designated site (NPWS, 2014e).

Cork Harbour SPA

Special Conservation Interests (SCIs)

4.24 The Special Conservation Interests (SCIs) of Cork Harbour SPA are non-breeding populations of (NPWS, 2014b): -

- Bar-tailed Godwit (*Limosa lapponica*)
- Black-headed Gull (*Chroicocephalus ridibundus*)
- Black-tailed Godwit (*Limosa limosa*)
- Common Gull (*Larus canus*)
- Cormorant (*Phalacrocorax carbo*)
- Curlew (*Numenius arquata*)
- Dunlin (*Calidris alpina*)
- Golden Plover (*Pluvialis apricaria*)
- Great Crested Grebe (*Podiceps cristatus*)
- Grey Heron (*Ardea cinerea*)
- Grey Plover (*Pluvialis squatarola*)
- Lapwing (*Vanellus vanellus*)
- Lesser Black-backed Gull (*Larus fuscus*)
- Little Grebe (*Tachybaptus ruficollis*)
- Oystercatcher (*Haematopus ostralegus*)
- Pintail (*Anas acuta*)
- Red-breasted Merganser (*Mergus serrator*)
- Redshank (*Tringa totanus*)
- Shelduck (*Tadorna tadorna*)
- Shoveler (*Anas clypeata*)
- Teal (*Anas crecca*)
- Wigeon (*Anas penelope*)
- Breeding populations of Common Tern (*Sterna hirundo*) is also a SCI for Cork Harbour

4.25 In addition, the wetland habitat within Cork Harbour SPA is an additional Special Conservation Interest.

4.26 The aim of the Habitats Directive (92/43/EEC) is to maintain or restore the favourable conservation status of habitats and species of community interest. Favourable conservation status of a species is achieved when: -

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

4.27 To achieve favourable conservation status of habitats and species of community interest at a national level, site-specific conservation objective are defined with the aim to maintain the habitats and species at favourable conservation condition within the site; as a result this will also contribute to the overall maintenance of favourable conservation status across Ireland. (NPWS, 2014b & c).

4.28 Site specific conservation objectives for the SCI species in Cork Harbour SPA were published in 2014 (NPWS, 2014b & c) and give specific attributes and targets by which the maintenance of favourable conservation condition are measured. These are presented in Table 4.5 (all references quoted in Table 4.5 are listed in NPWS, 2014c).

4.29 The recent addition of Ringabella Estuary to Cork Harbour SPA is discussed in DAHG (2015[6]). As part of Case C 418/04 Commission v Ireland "*The Birds Case*", The Court of Justice of the European Union found that Ireland should have designated the inner part of the Tolka Estuary, and that an area of 2.2 ha had been lost due to the Dublin Port Tunnel development. The Commission indicated that Ireland must provide compensatory habitat to cover the loss of this area to redshank, curlew and oystercatcher. All sites with the potential for compensatory designation on the east and south east coasts were considered; a suitable site was eventually found in Ringabella Estuary in Cork and the Cork Harbour SPA (4030) has been extended by 74.14 hectares to include an area of intertidal mudflat that can support a similar waterbird assemblage as the area that was in-filled in Dublin Bay.

4.30 The Cork Harbour SPA site synopsis NPWS (2008) is included in Appendix B. The boundary of Cork Harbour SPA relative to the proposed Greenway in Raffeen Creek is illustrated on Figure 4.4.

[6] http://www.npws.ie/sites/default/files/files/Birds%20Case%20PoM%20(July%202015).pdf

Table 4.5 – Conservation Objectives including site-specific attributes and targets for the species which are Special Conservation Interests for Cork Harbour SPA (taken from NPWS, 2014c).

Species: **All non-breeding SCI species: – Bar-tailed Godwit, Black-headed Gull, Black-tailed Godwit, Common Gull, Cormorant, Curlew, Dunlin, Golden Plover, Great Crested Grebe, Grey Heron, Grey Plover, Lapwing, Lesser Black-backed Gull, Little Grebe, Oystercatcher, Pintail, Red-breasted Merganser, Redshank, Shelduck, Shoveler, Teal and Wigeon**			
Attribute	**Measure**	**Target**	**Notes**
Population trend	Percentage change	Long term population trend stable or increasing	Water bird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by '*the SCI species*', other than that occurring from natural patterns of variation	Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of the conservation objectives supporting document
Species: **Breeding SCI species: – Common Tern**			
Attribute	**Measure**	**Target**	**Notes**
Breeding population abundance: apparently occupied nests (AONs)	Number	No significant decline	Measure based on standard tern survey methods (see Walsh *et al*., 1995). Wilson et al. (2000) provides background summary population information for the Cork Harbour area. In 2012 the total population of common terns that nested within the wider Cork Harbour was between 85 and 95 pairs, a proportion of which now breeds outside the SPA (RPS, 2014)
Productivity rate: fledged young per breeding pair	Mean number	No significant decline	Measure based on standard tern survey methods (see Walsh *et al*., 1995). The Seabird Monitoring Programme (SMP) (JNCC, 2014) provides population data for this species
Distribution: breeding colonies	Number; location; area (hectares)	No significant decline	Common tern breeding colonies can be sited in both coastal and inland areas using a wide variety of habitats including sandy, rocky or well-vegetated islands in estuaries, lakes and rivers. This species can also use artificial substrates (Del Hoyo *et al*., 1996). First recorded nesting in saltmarsh in 1969-70 (Smiddy, 1985), the colony now largely breeds on artificial structures in at least two locations (see Wilson *et al*., 2000 and RPS, 2014)
Prey biomass available	Kilogrammes	No significant decline	Key prey items: Small fish, crustaceans, insects and occasionally squid. Key habitats: common tern forage in/over shallow coastal waters, bays, inlets, shoals, tidal-rips, drift lines, beaches, saltmarsh creeks, lakes, ponds or rivers. Foraging range: max. 37km, mean max. 33.81km, mean 8.67km (Birdlife International Seabird Database (Birdlife International, 2014))
Barriers to connectivity	Number; location; shape; area (hectares)	No significant increase	Seabird species can make extensive use of marine waters adjacent to their breeding colonies. Foraging range: max. 37km, mean max. 33.81km, mean 8.67km (BirdLife International Seabird Database (Birdlife International, 2014))
Disturbance at the breeding site	Level of impact	Human activities should occur at levels that do not adversely affect the breeding common tern population	In the Cork Harbour area, this species largely breeds on artificial structures (see Wilson *et al*., 2000 and RPS, 2014)
Habitat: Wetlands			
Attribute	**Measure**	**Target**	**Notes**
Habitat area	Hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 2,587 hectares, other than that occurring from natural patterns of variation	The wetland habitat area was estimated as 2,587ha using OSi data and relevant orthographs. For further information see part three of the conservation objectives supporting document

4.31 The Natura 2000 standard data form (NPWS, 2014g) lists species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC. This includes but is not limited to the SCI species for Cork Harbour SPA. These species are: - Cormorant, Shelduck, Wigeon, Teal, Mallard (*Anas platyrhynchus*), Pintail, Shoveler, Red-breasted Merganser[7], Oystercatcher, Grey Plover, Lapwing, Dunlin, Black-tailed Godwit, Curlew, Greenshank (*Tringa nebularia*), Redshank, Turnstone (*Arenaria interpres*), Black-headed Gull, Common Gull, Gadwall (*Anas strepera*), Pochard (*Aythya ferina*), Tufted Duck (*Aythya fuligula*), Goldeneye (*Bucephala clangula*), Coot (*Fulica atra*), Ringed Plover (*Charadrius hiaticula*), Knot (*Calidris canutus*), Lesser Black-backed Gull, Spotted Redshank (*Tringa erythropus*) and Green Sandpiper (*Tringa ochropus*).

4.32 In addition, Grey Heron, Mute Swan (*Cygnus olor*) and Little Grebe are listed as other important species of flora and fauna.

4.33 Negative impacts to the Cork Harbour SPA outlined on the Natura 2000 standard data form. These are presented in Table 4.6.

Table 4.6 - Negative impacts on the Cork Harbour SPA identified from the Natura 2000 standard data form (NPWS, 2014g)[8].

Rank	Threat/Pressure	Inside or Outside SPA
Medium	Walking, horse-riding and non-motorised vehicles	Inside
Medium	Shipping lanes	Inside
Medium	Fertilisation	Outside
Medium	Nautical sports	Inside
Low	Dispersed habitation	Outside
High	Urbanised areas, human habitation	Outside
High	Roads, Motorways	Outside
High	Port areas	Outside
High	Industrial or commercial areas	Outside
Medium	Other industrial / commercial area	Inside
High	Marine and Freshwater Aquaculture	Inside

4.34 In addition, a number of positive impacts on Cork Harbour SPA are outlined on the Natura 2000 standard data form. These are presented in Table 4.7.

[7] Mistakenly listed as *Mergus merganser*, Goosander, rather than *M. serrator*, Red-breasted Merganser.
[8] While *Skiing, off-piste* is identified as a risk within the SPA; this is clearly an error.

Table 4.7 - Positive impacts on the Cork Harbour SPA identified from the Natura 2000 standard data form (NPWS, 2014g).

Rank	Threat/Pressure	Inside or Outside SPA
Medium	Shipping lanes	Inside
Low	Dispersed habitation	Outside
Medium	Leisure fishing	Inside
Medium	Nautical sports	Inside
High	Marine and Freshwater Aquaculture	Inside

Conservation condition of Special Conservation Interests (SCIs)

4.35 The conservation condition of the special conservation interests for Cork Harbour SPA are outlined in the supporting documentation for the Conservation Objectives as published by NPWS (NPWS, 2014c). These are presented in Table 4.8.

Table 4.8 – Current conservation condition of SCI species for Cork Harbour SPA (after NPWS, 2014c).

Special Conservation Interests	BoCCI Category [a]	Site Population Trend [b]	Site Conservation Condition	Current all-Ireland Trend [c]	Current International Trend [d]
Shelduck	Amber	- 39	Unfavourable	Stable	Increasing
Wigeon	Red	- 27	Unfavourable	Declining	Stable
Teal	Amber	- 1	(Intermediate) Unfavourable	Stable	Increasing
Pintail	Red	- 65	Highly Unfavourable	Increasing	Increasing
Shoveler	Red	- 75	Highly Unfavourable	Increasing	Increasing
Red-breasted Merganser	Green	- 51	Highly Unfavourable	Stable	n/c
Little Grebe	Amber	+ 16	Favourable	Stable	Increasing
Great Crested Grebe	Amber	- 46	Unfavourable	Declining	Declining?
Cormorant	Amber	- 50	Highly Unfavourable	Stable	Increasing
Grey Heron	Green	- 15	(Intermediate) Unfavourable	Stable	Increasing
Oystercatcher	Amber	- 20	(Intermediate) Unfavourable	Stable	Declining
Golden Plover	Red	+ 21	Favourable	Declining	Declining
Grey Plover	Amber	- 68	Highly Unfavourable	Declining	Declining?
Lapwing	Red	- 68	Highly Unfavourable	Declining	Stable
Dunlin	Red	- 49	Unfavourable	Declining	Stable
Black-tailed Godwit	Amber	+ 16	Favourable	Increasing	Increasing
Bar-tailed Godwit	Amber	+ 41	Favourable	Stable	Increasing
Curlew	Red	-44	Unfavourable	Declining	Declining
Redshank	Red	-29	Unfavourable	Stable	Stable/Increasing?
Black-headed Gull	Red	- 53	Highly Unfavourable	n/c	n/c
Common Gull	Amber	- 89	Highly Unfavourable	n/c	n/c
Lesser Black-backed Gull	Amber	- 83	Highly Unfavourable	n/c	n/c

Notes: [a] - after Colhoun & Cummins, 2013; [b] - Site population trend analysis; see Table 4.3 in NPWS (2014b); [c] - all-Ireland trend - where a species is deemed to be increasing or declining if the annual rate of change is equal to or greater than 1.2% (after Crowe & Holt, 2013); [d] - current international trend after Wetlands International (2012).

? – refers to uncertainty as to current international trend.

4.36 Table 3.8 also shows the relationship between a species' long-term site trend and the current all-Ireland trend for the period 1999/00 to 2010/11. The colour coding used represents the following cases:-

- Grey – un-assessed;
- Green – species whose populations are stable or increasing at both site level and all-Ireland level;
- Beige – species whose populations are declining at both site level and all-Ireland level. Therefore there is a potential for factors at a larger spatial scale to be influencing the observed trend at site level;
- Orange - species whose populations are exhibiting a 1.0 – 24.9% decline at site level but are stable or increasing at all-Ireland level;
- Pink - species whose populations are exhibiting a 25.0 – 49.9% decline at site level but are stable or increasing at all-Ireland level; and
- Red - species whose populations are exhibiting a decline of >50.0% at site level but are stable or increasing at all-Ireland level.

4.37 The pink and red categories shown above show where populations are stable or increasing at all-Ireland level, but where significant declines are observed at a site level within Cork Harbour SPA. Leech *et al.* (2002) suggests that site-based management issues may be responsible for such patterns in the observed declining site population trends.

Sites of national importance

4.38 A summary of proposed Natural Heritage Areas within 15km of the proposed Greenway is presented in Table 4.8. The location of pNHAs in the environs of the proposed Greenway are shown in Figure 4.3. Apart from Monkstown Creek pNHA there are either no links between the site of the proposed works and any of these pNHAs or the pNHAs are located elsewhere within Cork Harbour remote from Monkstown Creek. These sites will not therefore be discussed further.

Table 4.8 – Summary of connectivity with sites of national importance (i.e. proposed Natural Heritage Areas).

Site Name	Site Code	Distance (km)	Comment
Lough Beg pNHA	001066	1.9 km to the southwest	Within Cork Harbour SPA
Owenboy River pNHA	001990	2.0 km to the southwest	Within Cork Harbour SPA
Monkstown Creek pNHA	001979	1.7 km to the northwest	Within Cork Harbour SPA
Fountainstown Swamp pNHA	000371	7.1 km to the south	Wetland site of botanical note; also supports wetland birds
Minane Bridge pNHA	001966	8.0 km to the southwest	Wetland site of botanical note; also supports wetland birds
Templebreedy National School, Crosshaven pNHA	000107	5.3 km to the south	Leisler's Bat roost
Whitegate Bay pNHA	001084	5.5 km to the east	Within Cork Harbour SPA
Cuskinny Marsh pNHA	001987	3.8 km to the northeast	Wetland site of botanical note; also supports wetland birds; BirdWatch Ireland Reserve
Rostellan Lough, Aghada Shore and Poulnabibe Inlet pNHA	001076	7.0 km to the east	Within Cork Harbour SPA
Great Island Channel pNHA	001058	2.3 km to the north	Within Cork Harbour SPA
Rockfarm Quarry, Little Island pNHA	001074	3.5 km to the north	Rich calcareous flora
Douglas River Estuary pNHA	001046	2.4 km to the northwest	Within Cork Harbour SPA
Dunkettle Shore pNHA	001082	5.9 km to the northwest	Within Cork Harbour SPA
Glanmire Wood pNHA	001054	6.8 km to the northwest	Of botanical interest; supports a notable Cormorant roost
Cork Lough pNHA	001081	10.9 km to the northwest	Important for waterbirds; notably Mute Swan, Coot & Shoveler
Carrigacrump Caves pNHA	001408	12.7 km to the east	Cave habitat; calcareous flora
Carrigshane Hill pNHA	001042	13.4 km to the northeast	Calcareous flora
Ballynaclashy House, North of Midleton pNHA	000099	12.7 km to the northeast	Whiskered bat (*Myotis mystacinus*)
Leamlara Wood pNHA	001064	13.6 km to the northeast	Woodland flora

[1] Taken as the shortest distance between the proposed Greenway and designated site in question.

5. Screening Summary

Special Areas of Conservation

5.1 The proposed Greenway is not located within a Special Area of Conservation. The only SAC located within 15km of the proposed development is Great Island Channel SAC. The proposed works site is too distant from Great Island Channel SAC for works to cause any disturbance impacts. Thus, impacts such as reduction in habitat area, disturbance to species / habitats using these site, habitat fragmentation, disturbance / loss of food resources etc. will not result within the Great Island Channel SAC as a result of the proposed works. Therefore impacts on this Natura 2000 site will not be considered any further.

Cork Harbour SPA

5.2 The nearest SPA is Cork Harbour SPA; the nearest elements are as follows (see also Figure 4.4):

- Monkstown Creek[9] (adjoins the study area between Monkstown and Raffeen; Figure 4.2);
- Lough Beg[10] (located between Curraghbinny Wood and Lough Beg, south of Ringaskiddy; Figure 4.2);
- Whitegate Bay[11] (located on the eastern side of the harbour; ca. 5.1 km from the proposed Greenway to the mouth of Whitegate Bay; Figure 4.2).
- Owenaboy River Estuary (located to the 2.0 km south of the proposed Greenway on the eastern margins of Carrigaline; Figure 4.2).

Preliminary Stage 1 Screening

5.3 A summary of the Stage 1 Screening of the Special Conservation Interests of Cork Harbour SPA is presented on Table 5.1. This can be summarised as follows: -

i) Species which do not occur (except very occasionally) in Monkstown Creek;

ii) Species which though they occur, frequent areas / times which results in them not being impacted by either the existing pathway or the proposed new Greenway;

Common Tern

5.4 Common Tern is discussed at length in Appendix B. Common Tern does routinely attempt to breed on a small island in a small lagoon adjoining the northern side of Raffeen Creek (within Pfizer's golf course), but is prone to loss of eggs / young due to flooding. Birds routinely feed within the inner creek during high tide; but, the majority fly out of Monkstown to the open harbour. Common Tern appears unaffected by human activity, regularly feeding close inshore alongside Monkstown / Passage (West Passage), Douglas Estuary etc. (*pers obs*). Continued use of the exiting path and creation of a new path across the inner creek will not disturb the nest site in the lagoon, nor will it displace foraging birds (Nisbet, 2000). Common Tern is therefore screened out.

[9] Also Monkstown Creek pNHA – site code 001979 (see Appendix C).
[10] Also Lough Beg pNHA – site code 001066 (see Appendix C).
[11] Also Whitegate Bay pNHA – site code 001084 (see Appendix C).

Cormorant & Grey Heron

5.5 The data presented above and in O'Donoghue and Gittings (2014) clearly illustrates the importance of Monkstown Creek for both Grey Heron and Cormorant, but especially for Cormorant. However, both species only feed in small numbers within the inner Creek at Raffeen. Monkstown is of most importance for roosting birds; both day-time roosts along the stone breakwater and jetty and as a night-time roost for Cormorant in trees along the southern shoreline. The stone breakwater and jetty also function as important pre-roost gathering locations for Cormorant. A substantial proportion of both the Cork Harbour and indeed the national population use this site.

5.6 Both species routinely feed and roost close to humans. For example, another large Cormorant roost is located at Dunkettle Wood – behind houses in Glanmire village; while Grey Heron nest on an island at Atlantic Pond, within a. 10m of walkers. Furthermore the above roosts range from ca. 300 to >600m from the R610 and existing pathway. Their use seems unaffected by current patterns of human activity; development of a path into the inner creek will be remote from these roosts (>650m) and is not likely to impact upon their use.

5.7 Both species are screened out.

Little Grebe, Great Crested Grebe & Red-breasted Merganser

5.8 Little Grebe and Great Crested Grebe are pursuit divers feeding on small fish and crustaceans. Apart from occasional records, Monkstown Creek is not known to support either species; this is largely to do with the site being dominated by intertidal mudflats, with open water limited to tidal creeks for much of the tidal cycle. A single record of 16 Little Grebe in November 2010 coincides with the harsh winter when many Little Grebe moved from frozen freshwater wetlands. Both species are therefore screened out. This also applies to the fish eating Red-breasted Merganser. Notable sites for Great Crested Grebe and Red-breasted Merganser in Cork Harbour include Lough Mahon, North Channel, Marino Pt – Slatty Water and the east harbour around Rostellan – Whitegate (O'Donoghue and Gittings, 2014). None of these would be impacted by the proposed Greenway; Little Grebe, Great Crested Grebe and Red-breasted Merganser are therefore screened out.

Wigeon, Pintail, Shoveler & Mallard

5.9 Cork Harbour is also designated for a number of dabbling ducks, such as Wigeon, Pintail and Shoveler. Pintail is not recorded from Monkstown Creek; Wigeon and Shoveler occur only occasionally in single figures (O'Donoghue and Gittings, 2014). These species are thus also screened out. The creek is dominated by open mudflat and tidal creek. There is an absence of associated coastal habitats such as saltmarsh, wet grassland or reed / sedge swamp which would support a more diverse dabbling duck community. Equally, there is a lack of permanent subtidal habitat, reef structures or mussel beds which could support a more diverse community of fish, crustacean or mollusc eating diving ducks, or indeed grebes as noted above. Wigeon, Pintail and Shoveler will not be negatively impacted by the proposed Greenway and are therefore screened out.

5.10 Mallard occur in small numbers at Monkstown Creek. However, as for Teal, Mallard occur throughout the harbour in rivers, ditches, ponds and assorted wetland, most of which are not counted by IWeBS. Mallard often occurs in close association with humans, such as at Cork Lough, Atlantic Pond and in Fota Wildlife Park. The proposed Greenway is not expected to negatively impact on Mallard in Cork Harbour.

Golden Plover, Grey Plover & Bar-tailed Godwit

5.11 A number of wading species for which Cork Harbour is designated likewise do not utilise Monkstown Creek; these include Golden Plover, Grey Plover and Bar-tailed Godwit (O'Donoghue and Gittings, 2014). In the case of Bar-tailed Godwit, this species prefers a sandy rather than muddy substrate; the latter dominates in the sheltered conditions of Monkstown Creek. Hence the site is favoured by Black-tailed Godwit rather than Bar-tailed Godwit. Golden Plover, Grey Plover and Bar-tailed Godwit in Cork Harbour will not be negatively impacted by the proposed Greenway and are therefore screened out.

Lapwing

5.12 A number of notable Lapwing counts have been recorded in the past in Monkstown Creek. However, these are invariably associated with the outer part of the estuary and the stonewater berth / jetty. Lapwing also generally tend to use such intertidal sites as day-time roosts; generally feeding on grassland sites. While it is not known where these roosting Lapwing feed, low tide data certainly indicates that there is no evidence of Lapwing feeding in the inner creek near the walk. As with Cormorant and Grey Heron important roost areas are remote from the existing walk and proposed new elements of the Greenway. Lapwing will not be negatively impacted by the proposed Greenway.

Gulls

5.13 Cork Harbour includes a number of gulls as SCIs; Black-headed Gull, Common Gull and Lesser Black-backed Gull. All three species are extremely adaptable, have a varied diet and appear extremely tolerant to human activity. For example at Monkstown a small stream enters the harbour between the public car park and the yacht club; this is used as a roosts / wash area by a large number of both Black-headed Gull and white headed larid gulls. The proposed Greenway in this area will follow the line of the R610 and be screened by the boat yard; screening proposed along the inner reaches of the creek are such that continued use of the inner creek should not be prevented (e.g. dogs will be prevented accessing the shoreline and disturbing roosting birds). These species are thus also screened out.

Table 5.1 – Summary of Stage 1 Screening Assessment.

SCIs	Family Group	Habitat	Food Requirements	Relevant to Monkstown	Finding of 1st & 2nd Screening steps
Little grebe	Podicipedidae (grebes)	Subtidal; flooded intertidal	Fish / Crustacea	Rarely occurs	Screened Out
Great crested grebe	Podicipedidae (grebes)	Subtidal; flooded intertidal	Fish / Crustacea	Rarely occurs	Screened Out
Cormorant	Phalacrocoracidae (cormorants)	Subtidal; flooded intertidal	Fish	Yes; Roosts favoured will not be impacted; occurs in low in estuary.	Screened out
Grey Heron	Ardeidae (herons)	Intertidal; coastal shallows; rivers etc.	Predominantly fish from shallow waters	Yes; Roosts favoured will not be impacted; occurs in low in estuary no's especially along shoreline.	Screened out
Shelduck	Anatidae (shelducks)	Intertidal mudflats	Mainly intertidal molluscs; *Hydrobia*	Yes	Should not be negatively impacted; see below.
Wigeon	Anatidae (dabbling ducks)	Wet grassland; saltmarsh; intertidal & coastal grassland	Grazer	Not recorded	Screened out
Teal	Anatidae (dabbling ducks)	Wet grassland; saltmarsh; freshwater; intertidal & coastal; often along tidal channels	Mainly seeds & invertebrates; but also on algal / bacterial layer on mud surface	Yes	Should not be negatively impacted; see below.
Pintail	Anatidae (dabbling ducks)	Wet grassland; saltmarsh; intertidal & coastal	Mainly seeds & invertebrates	Not recorded	Screened out
Shoveler	Anatidae (dabbling ducks)	Wet grassland; saltmarsh; freshwater; intertidal & coastal;	Mainly Zooplankton, also seeds & invertebrates	Not recorded	Screened out
Red breasted Merganser	Anatidae (seaduck)	Subtidal; flooded intertidal	Fish / Crustacea	Not recorded	Screened out
Oystercatcher	Haematopodidae (wading bird)	Intertidal mud / sand flats; terrestrial fields	Varied; includes bivalves, polychaetes and terrestrial worms	Yes	Should not be negatively impacted; see below.
Golden Plover	Charadriidae (wading bird)	Tends to feed more on wet terrestrial habitats; often roosting on shore	Beetles, worms, terrestrial molluscs etc.; coastal feeders take marine molluscs etc.	Not recorded	Screened out
Grey Plover	Charadriidae (wading bird)	Intertidal mudflat	Predominantly polychaetes & bivalves	Not recorded	Screened out

Table 5.1 – continued.

SCIs	Family Group	Habitat	Food Requirements	Relevant to Monkstown	Finding of 1st Screening (spatial)
Lapwing	Charadriidae (wading bird)	Tends to feed more on wet terrestrial habitats; often roosting on shore	Beetles, worms, terrestrial molluscs etc.; coastal feeders take may take polychaetes and crustaceans	Tends to use estuary to roost; favouring mudflats remote from Greenway & the stone breakwater	Screened out
Dunlin	Scolopacidae (wading bird)	Intertidal sand flats	Predominantly polychaetes & gastropods	**Yes**	Favoured mudflats remote from Greenway; roosts on breakwater; up to 50 recorded in inner creek; See below.
Bar-tailed Godwit	Scolopacidae (wading bird)	Intertidal mud / sand flats; terrestrial fields	Predominantly polychaetes & bivalves	Rarely occurs; favours sand rather than mudflats; suitable habitat absent at Monkstown	Screened Out
Black-tailed Godwit	Scolopacidae (wading bird)	Intertidal mud / sand flats; terrestrial fields	Varied; includes bivalves, polychaetes and terrestrial worms	**Yes**	Should not be negatively impacted; see below.
Curlew	Scolopacidae (wading bird)	Intertidal mud / sand flats; terrestrial fields	Varied; includes bivalves, polychaetes, crabs etc. and terrestrial worms	**Yes**	Favoured mudflats remote from Greenway; see below.
Redshank	Scolopacidae (wading bird)	Intertidal mudflats; including along tidal channels	Predominantly polychaetes & gastropods	**Yes**	Should not be negatively impacted; see below.
Black-headed gull	Laridae (gulls)	Intertidal, Subtidal & Terrestrial	Varied, but can include significant terrestrial component	**Yes**	Should not be negatively impacted; see below.
Common gull	Laridae (gulls)	Intertidal, Subtidal & Terrestrial	Varied, but can include significant terrestrial component	Not present in notable numbers	Screened Out
Lesser black backed gull	Laridae (gulls)	Intertidal, Subtidal & Terrestrial	Varied, but can include significant terrestrial component	Occasional large roost count; otherwise not in notable numbers	Screened Out
Common tern	Sternidae (terns)	Subtidal; flooded intertidal	Fish / Crustacea	**Yes**	Breeding site at Pfizers no impact; tolerant to human presence; see below.

Screening of Remaining Species

5.14 Following initial screening as outlined above we are left with a number of species which occur within Monkstown Creek in notable numbers; these are Shelduck, Teal, Oystercatcher, Black-tailed Godwit, Curlew, Redshank and Dunlin. Table 5.2 presents a summary of percentage of each species which occurs in Monkstown Creek in comparison to recent Cork Harbour total counts (from IWeBS and NPWS low tide survey programme data) in order to establish the relative importance of Monkstown Creek for these species. Recent population trends have been extracted from the recently published Conservation Objectives Supporting Document (NPWS, 2014c).

5.15 As can be seen Oystercatcher and Black-tailed Godwit both appear to be increasing in Cork Harbour and Teal numbers appear Stable. The most notable decline in Cork Harbour is in Dunlin numbers; this is in line with the national trend. Both Shelduck and Curlew are showing recent evidence of declines, though the apparent decline in Curlew may also be partly influenced by field feeding birds being missed during IWeBS counts within the estuary. The trend for Redshank is less clear; while a slight decline is indicated by the data, counts are highly variable and the apparent reduction may in part be due to this rather than indicative of a real decline.

5.16 What is clear from Table 5.2 is that arguably the Monkstown area is of most importance in Cork Harbour for Shelduck, Teal and Oystercatcher (but see comments above on Common Tern; roosting Cormorant, Grey Heron & Lapwing).

Table 5.2 - Remaining Species / Trend Analysis.

Species	Population as % of Cork Harbour			Trend [3]	National Trend [4]
	IWeBS [1]	BWS [2]			
	OL496	OL530	OL530 & OL496		
Shelduck	Variable; 1-10%	5.2%	8.3%	Unfavourable	Stable
Teal	1-5%	3.1%	4.5%	Intermediate (Unfavourable)	Stable
Oystercatcher *	1-5% (one large count of 10.6%)	1.83%	3.5%	Intermediate (Unfavourable)	Stable
Black-tailed Godwit *	Variable; 1-12%	0.5%	1.6%	Favourable	Increasing
Curlew *	1-5%	0.6%	1.8%	Unfavourable	Declining
Redshank	1-5%	0.8%	1.7%	Unfavourable	Stable
Dunlin	Appears to roost outside this subsite and move in at low tide to feed.	1.3%	1.7%	Unfavourable	Declining

Sources: -

[1] IWeBS: data from 2004/05; 2005/06; 2007/08 & 2010/2011 supplied by IWeBS office, BirdWatch Ireland.

[2] BWS; 2010/2011

[3] Trends follow Table 4.4 of NPWS, 2014; Cork Harbour SPA (004030). Conservation Objectives Supporting Documents. Version 1.0. November 2014.

[4] After Crowe & Holt, 2013

* Counts influenced by patterns of field feeding; e.g. Oystercatcher seen flying out to fields to the north at low tide on 8th November 2013. In Cork Harbour

5.17 NPWS Conservation Objectives for Cork Harbour (2014b) indicates that favourable conservation status of a species is achieved when: -

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and

- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

5.18 In other sites where Conservation Objectives supporting documentation has been published these find expression as: -

- Attribute 1 – long term population trends and
- Attribute 2 - Number or range (distribution) of areas used

5.19 The assessment method Atkins has adopted in Appropriate Assessments of the impact of Aquaculture on coastal SPAs can be summarised as follows. Impacts have been assessed as potentially having a significant negative impact on attribute 1 of the conservation objectives (the species' long-term population trend), if they are predicted to cause: -

- Displacement of 25% or more of the Cork Harbour total; or
- Significant displacement levels (i.e., 5% or greater) that combined with current long-term population trends, could result in a long-term population decline of 25%; or
- Significant displacement levels (i.e., 5% or greater) where the current long-term population trends is already equal to or greater than 25%.

5.20 Impacts that will cause displacement of 5% or more of the total Cork Harbour population of a SCI species have been assessed as potentially having a significant negative impact on attribute 2 of the conservation objectives (the species' distribution within Cork Harbour). The rationale for choosing 5% is as follows. The minimum error level in large-scale waterbird monitoring is considered to be around 5% (Hale, 1974; Prater, 1979; Rappoldt, 1985). Therefore, any population decrease of less than 5% is unlikely to be detectable and, for the purposes of this assessment, 5% has been taken to be the threshold value below which displacement effects are not considered to be significant. This is a conservative threshold, as error levels combined with natural variation are likely to, in many cases; prevent detectability of higher levels of change.

Teal

5.21 Teal are omnivorous and can feed on plants, seeds and invertebrates. They are described by Cramp and Simmons (2004) as "basically seed-eater in autumn and winter"; eating seeds of 1-2.6mm, rarely taking larger seeds such as grains. Seeds of aquatics, bulrushes, sedges and some grasses are hence its predominant food source during winter. Birds in Monkstown, as at many other sites in Cork Harbour (e.g. Saleen), also actively feed on the open mudflat; they are either filtering out small animals such as *Hydrobia* or are targeting biofilm (i.e. organic layer of bacteria, protozoa and microscopic algae growing on the mud surface). Teal can also be seen feeding along the tidal creeks such as that adjoining the existing path near Strawhall; as is the case at Saleen Creek (eastern side of the Harbour), near Slatty Bridge and in Douglas Estuary. It should also be noted that feeding in Teal is closely linked to the tidal cycle and that Teal can feed extensively by night.

5.22 At a national level the Teal population has been increasing throughout the course of IWeBS (Boland and Crowe, 2012). Table 5.2 indicates that ca. 5% of the Cork Harbour population occurs in Monkstown Creek (though IWeBS counts are likely to underestimate the true numbers in the harbour). While Teal are widely distributed throughout Cork Harbour, the most important areas for this species are Glounthaune Estuary / Slatty Water, North Channel-Ballitubrid, Rathcoursey and

Saleen – and to a lesser extent Rostellan, Lough Beg and Douglas Estuary. These areas will not be impacted by the proposed development (refer to Table 5.3 and Figure 5.7 of O'Donoghue and Gittings, 2014).

5.23 Birds using the outer creek and mudflats are used to existing patterns of activity on the pathway to Strawhall; at the Pfizers golf club and at the boat yard. Numbers of Teal in the very inner reaches of the creek are likely to be lower (perhaps <25 birds) due to the ever diminishing size of the estuary and increase in vegetation which can hide predators. As noted from Strawhall to west of the L2489 the Greenway will follow the R610 and will be screened from favoured areas of tidal creek behind the boatyard. Where it re-joins the railway line the Greenway will be screened by a willow fence. While complete removal of disturbance is unlikely there is ample habitat and screened areas of creek to accommodate this species. Also Teal are known to forage by night; given the observed preference to feed on the mudflat Teal in Monkstown Creek are more likely to be influenced by tidal patterns of exposure of mudflats. The proposed Greenway as it crosses the inner creek should not negatively impact on the viability of the Cork Harbour Teal population. **[Screened Out]**

Shelduck

5.24 Shelduck feed mainly on invertebrates; particularly molluscs, insects, and crustaceans and can also take plant materials. They can feed in both the benthic and pelagic zones, mainly by wading in shallow water or on wet mud, less often on drier inland areas (Cramp and Simmons, 2004). However, in north and west Europe, small molluscans predominate in the diet, particularly *Hydrobia ulva*, though also it can also include *Cardium* sp., *Macoma* sp., *Mytilus* sp., *Littorina* sp., etc. (see also Buxton *et al*., 1981; Viain *et al*., 2011; quoted by Cramp and Simmons, 2004). Plant material consumed, is generally green seaweed *Enteromorpha* sp., or on occasion, V*aucheria*; club-rush *Scirpus maritimus* seeds and herbaceous seablite *Suaeda maritima*.

5.25 Shelduck primarily feed by surface digging, dabbling, head dipping in water, and up ending in deeper water (Olney, 1965; Swennen and van der Baan, 1959; Bryant and Leng 1975; quoted by Cramp and Simmons, 2004). Their flock distributions and feeding methods used are heavily dependent on the behaviour of their main prey item *Hydrobia ulvae* in relation to water depth (Bryant and Leng 1975, quoted by Cramp and Simmons 2004).

5.26 In Monkstown Shelduck feed out on the open mudflat – close to the existing pathway the tidal creek separates the main mudflat from the walk and Shelduck using these areas are some distance from the walk and appear tolerant of / habituated to the current proximity of walkers. As noted it should also be borne in mind that the walk backs onto the busy R610 roadway. The location and screened character of the proposed Greenway relative to the areas known to support Shelduck are such that this species is not likely to be impacted by the proposed development. **[Screened Out]**

Black-tailed Godwit

5.27 Black-tailed Godwit feed primarily on invertebrates, but can also take some plant material. The diet of wintering birds in England was shown to consist chiefly of worms, generally *Arenicola marina* and *Nereis* sp. though a range of coastal molluscs are also taken (Cramp and Simmons, 2004). In Cork Harbour field feeding is especially important (Hayhow, 2009). The population in Cork Harbour, as elsewhere along the south coast, is steadily increasing. Black-tailed Godwit feed throughout the inner creek – often in closely knit flocks. Black-tailed Godwit feeding at Commoge Marsh, Kinsale, however, continue to actively feed within the lagoon close to the new pedestrian path (per obs). Small numbers extend well into the narrow areas at the back of the creek. As noted above the proposed Greenway has been designed to incorporate measures to screen these inner reaches not frequented to date by walkers – these include measures to keep

walkers, and especially dogs, off the shore, and in some areas the use of willow screens will screen the Greenway from the estuary. Given these measures, the availability of abundant alternative feeding areas and the continuing growth of the Cork Harbour Black-tailed Godwit population this species is not likely to be impacted by the proposed development (O'Donoghue and Gittings, 2014). **[Screened Out]**

Oystercatcher, Dunlin, Curlew & Redshank

5.28 In general, non-breeding populations of these waders typically feed on benthic invertebrates in intertidal habitats, with Oystercatcher tending to favour bivalves; Curlew favour polychaetes and crabs; while Redshank and Dunlin both favour very small prey items – usually small polychaetes and molluscs, but with *Corophium* etc. also taken. Redshank feed on quiet small prey items relative to their size, requiring them to be active feeders and putting them at risk of not being able to achieve their energetic requirements if prone to excessive disturbance or during very cold weather. Both Oystercatcher and Curlew feed extensively on fields in Cork Harbour. On the 8th November 2013 a small flock of Oystercatcher were observed to fly out of Monkstown Creek at low tide to feed on neighbouring fields.

5.29 While Oystercatcher are seen feeding on the open mudflat they also use the mixed sediment shores on the outer reaches of Monkstown Creek. NPWS's baseline bird survey data shows that they currently use the estuary in sector 7 (see Appendix D) – adjoining the existing walkway. Oystercatcher are known to habituate to consistent patterns of activity. Given that the proposed Greenway uses an existing pathway; follows the R610 from Strawhall to the L2489, and given proposed measures to screen the pathway in the inner creek, the availability of abundant alternative feeding areas and the continuing growth of the Cork Harbour Oystercatcher population this species is not likely to be impacted by the proposed development. **[Screened Out]**

5.30 Like Oystercatcher, Curlew also feed extensively on fields – a resource which does not appear limiting in the local area. Within the estuary foraging Curlew favour the outer reaches of the estuary on the southern shore of the creek outwards towards the breakwater /jetty; these areas are distant from the existing path. Numbers within the inner creek are low. Given that the proposed Greenway uses an existing pathway; follows the R610 from Strawhall to the L2489, and given proposed measures to screen the pathway in the inner creek, the availability of abundant alternative feeding areas and the limited numbers using the inner creek the Curlew population in Cork Harbour is not likely to be impacted by the proposed development. **[Screened Out]**

5.31 The most notable numbers of Dunlin are, like Lapwing, recorded roosting on the breakwater /jetty (e.g. 350). Small flocks do use the inner creek to feed (up to 100); low tide data indicates that these even use areas immediately adjoining the existing pathway. This would indicate a reasonable degree of tolerance to disturbance – note that many of the recent reviews of disturbance discuss activity on the foreshore rather than that which is consistently behind a seawall such as at Monkstown (to which shorebirds may readily habituate). As noted Dunlin numbers within Cork Harbour and nationally have declined significantly. Hence, the relocation of the path from Strawhall to the L2489 to along the R610; the importance of the screening proposed in the inner creek in order to prevent disturbance to such flocks if they move into the inner creek. This is integral to the proposed Greenway and should prevent negative / disturbance impacts with the result that the Cork Harbour Dunlin population is not likely to be impacted by the proposed development. **[Screened Out]**

5.32 The final species for which Monkstown Creek is notable is Redshank. This species will feed right into the inner creek and over the open mudflats. As noted, Redshank status in Cork Harbour is recorded by NPWS (2014) as Unfavourable; however, a decline indicated by the trend analysis is thought to be an artefact of highly variable counts. While the numbers of birds in the inner parts of the creek are small, the proposed design effectively screens these inner areas; allowing species

such as Redshank to continue to effectively use them. Given that the proposed Greenway uses an existing pathway; follows the R610 from Strawhall to the L2489, and given proposed measures to screen the pathway in the inner creek, the availability of abundant feeding areas this species is not likely to be impacted by the proposed development. **[Screened Out]**

5.33 It can also be seen from O'Donoghue and Gittings (2014) that Monkstown is not amongst the key sites for Oystercatcher, Dunlin, Curlew and Redshank; this is particularly so in the case of Dunlin.

5.34 Therefore, Oystercatcher, Dunlin, Curlew and Redshank, are all also screened out.

Conclusion

5.35 In conclusion the proposed Greenway is not predicted to impact negatively on the conservation objectives of either Great Island Channel SAC (001058) or Cork Harbour SPA (004030). It screens out at Stage 1; it is not therefore necessary to progress to Stage 2 Appropriate Assessment. A full Screening Matrix is presented in Chapter 6.0 for completeness.

6. Appropriate Assessment Screening Matrix

Matrix

1. Description of the project or plan	
Location	Cork Lower Harbour; Glenbrook to Raffeen
Distance from designated site	2.3km from the southern end of Great Island Channel SAC (IE001058) at Marino Point (Figure 4.1); Adjoins Cork Harbour SPA (IE004030) at Monkstown (Figure 4.2)
Brief Description of the project or plan	Cork County Council (CCC) propose to extend the existing greenway network within the Cork Harbour Area by developing a section of greenway which extends for some 4.6km from the Glenbrook Cross River Ferry at Glenbrook to Raffeen Bridge. The full route extents of the scheme is illustrated on drawing 5146417/HW/301 - 307 (accompanying the Part 8 planning application). It is described in full in Chapter 2.0.
Is the plan directly connected with or necessary to the site management for nature conservation?	No

2. Brief Description of the Natura 2000 site(s)	
Name	Great Island Channel SAC (IE001058) Cork Harbour SPA (IE004030)
Site designation status	SAC & SPA, respectively.
Qualifying interests	Refer to Chapter 4.0 of this assessment.
Unit size	Great Island Channel SAC - 1443.22ha Cork Harbour SPA - 2587.25h (excluding recent addition of Ringabella Creek).

3. Assessment Criteria	
Other plans or projects which may have a cumulative impact	Cork Harbour, Cork City and environs are subject to ongoing development as encapsulated in the County & City Development Plans, Local Area Plans and a variety of strategic plans and projects. Some of the larger scale projects in the Lower Harbour include e.g.: - - CFRAMS – http://www.opw.ie/en/leecframs/; - Lower Lee (Cork City) Flood Relief Scheme - http://www.lowerleefrs.ie/ - Port of Cork Strategic Development plan - http://www.portofcork.ie/index.cfm/page/strategicdevelopmentplan20101 - M28 Ringaskiddy Road Scheme - http://www.n28cork-ringaskiddy.com/ - Cork Docklands Development Strategy - http://www.corkcity.ie/services/docklands/planning/corkdocklandsdevelopmentstrategy2001/ - Marina Park masterplan http://www.corkcity.ie/services/recreationsport/marinaparkmasterplan/marinaparkmasterplan.pdf - Tramore Valley Park - http://www.corkcity.ie/services/environmentrecreation/tramorevalleypark

3. Assessment Criteria	
	masterplan/5890_Tramore_Valley_Park_Masterplan%20final_opt1.pdf - Ongoing re-development of sites such as Spike Island; Fort Cambden etc.
Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 sites.	The full route extent of the scheme is illustrated on drawing 5146417/HW/301 - 307 (accompanying the Part 8 planning application). It is described in full in Chapter 2.0.
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of: - *Size and scale* - *Land-take* - *Distance from Natura 2000 site or key features of the site* - *Resource requirements* - *Emissions* - *Excavation requirements* - *Transportation requirements* - *Duration of construction, operation etc.* - *Others*	The full route extent of the scheme is illustrated on drawing 5146417/HW/301 - 307 (accompanying the Part 8 planning application). It is described in full in Chapter 2.0. There is no direct overlap with Great Island Channel SAC or with Cork Harbour SPA. Land-take: There will be no land-take within the SAC or SPA. There are no likely direct impacts to the SAC / SPA as a result of the proposed development due to the fact that all works are to be undertaken outside both the SAC & SPA. Furthermore, strict implementation of best practice construction methods when working close to sensitive ecological sites will be a requirement of works contract (refer to the accompanying Construction & Environmental Management Plan). Duration of Work: Due to the changing character of the route it is not known at this time how works will be awarded or the duration of said works; however, refer to the accompanying Construction & Environmental Management Plan for details of restrictions on timing of works to prevent negative impacts on birds for which Cork Harbour SPA is designated. Emissions: As the proposed works are all located along an existing active road network no alteration to emissions is predicted; the proposals aim to improve road safety for drivers, pedestrian and cyclists along an existing road corridor. Increased volumes of road traffic, with associated impacts on emissions, are not anticipated. It will be a requirement to damp down dust in order to prevent dust escapement from site to neighbouring sensitive receptors. With respect to emissions to surface waters, strict implementation of best practice construction methods when working close to sensitive receiving waters (e.g. Glounatouig Stream in the Raffeen Woods) will be a requirement of works contract (refer to the accompanying Construction & Environmental Management Plan). Excavations: apart from nominal depth construction, no deep excavations are anticipated. West of L2489 the pathway will run along inside the wall bounding the R610; this is an area of intertidal creek separated from the estuary by the old railway line. Construction methods for erecting the proposed boardwalk (most likely piling will be required) are not available at this time; the appointed Contractor will be required to update the CEMP to indicate how such works will be done and what pollution control measures are to be put in place. As the works are screened from the estuary seasonal constraints on works are not deemed necessary. Site Compound: The location of the site compound is not known at this time. Should refuelling take place within the site compound, this must occur on a concrete pad; the fuelling nozzle will be equipped with an automatic shutoff; all fuel, or indeed any other chemicals required during works, must be stored in appropriately bunded areas; furthermore an emergency spill kit is to be located on site. Such areas are not be located close to the Glounatouig Stream. Invasive Species: Japanese knotweed was recorded along the proposed Greenway. It is a requirement of the CEMP that the appointed contractor prepare a plan to address invasive species;

3. Assessment Criteria	
	though we note that Cork County Council have commenced treatment of Japanese knotweed along the route (see Figure 2.2 of the accompanying Ecology report for locations). Drainage: The bulk of the route along existing roads / pathways has an existing drainage network on place. Elsewhere, including e.g. along the old railway line and through Raffeen Woods over the edge drainage is to be used.
Describe any likely changes to the site arising as a result of: - *Reduction of habitat area* - *Disturbance of key species* - *Habitat or species fragmentation* - *Reduction in species density* - *Changes in key indicators of conservation value* - *Climate change*	There are no likely changes arising to Great Island Channel SAC (IE001058) or Cork Harbour SPA (IE004030) as a result of the proposed development. There will be no habitat loss; habitat or species fragmentation; reduction in species density and / or impacts on key indicator species within these Natura 2000 sites.
Describe any likely impacts on the Natura 2000 site as a whole in terms of: - *Interference with the key relationships that define the structure of the site* - *Interference with key relationships that define the function of the site.*	There are no likely changes to or interference with the key relationships that define structure and function of Great Island Channel SAC (IE001058) or Cork Harbour SPA (IE004030) arising as a result of the proposed development.
Provide indicators of significance as a result of the identification of effects set out above in terms of: - *Loss* - *Fragmentation* - *Disruption* - *Disturbance* - *Change to key elements of the site*	Habitats - Not applicable, as no effects have been identified. Birds / Disturbance - Monitor bird usage of Raffeen Creek to ensure screening is functioning properly and alter as appropriate.
Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.	There are no likely significant direct or indirect impacts arising from the proposed development due to the nature, scale and duration of works; the distance of such works from Great Island Channel SAC (IE001058) or Cork Harbour SPA (IE004030) & the requirement for strict implementation of best practice construction methods, which will form a part of the works contract

Data collected to carry out the assessment			
Who carried out the assessment	*Sources of data*	*Level of assessment completed*	*Where can the full results of the assessments be accessed and viewed?*
Atkins Unit 2B 2200 Cork Airport Business Park, Cork	Desktop Research NPWS Data Request; site map from Sites & Designations office Natura 2000 conservation objectives; Natura forms & site synopses - downloaded Design details & Plate audit from Atkins engineering Online data from nbdc.ie; online mapping from OSI.ie; Google; Bing etc. Extensive review of available data, reports and published literature (refer to bibliography & report). Consultation with NPWS	Screening	Atkins, Unit 2B 2200 Cork Airport Business Park, Cork

Finding of No Significant Effects

Name and location of Natura site(s)	Great Island Channel SAC (IE001058) Cork Harbour SPA (IE004030)
Brief description of the project or plan	Cork County Council (CCC) propose to extend the existing greenway network within the Cork Harbour Area by developing a section of greenway which extends for some 4.6km from the Glenbrook Cross River Ferry at Glenbrook to Raffeen Bridge. The full route extent of the scheme is illustrated on drawing 5146417/HW/301 - 307 (accompanying the Part 8 planning application). It is described in full in Chapter 2.0.
Is the project or plan directly connected with or necessary to the site management for nature conservation?	No
Are there other projects or plans that together with the project or plan being assessed could affect the site?	Cork Harbour, Cork City and environs are subject to ongoing development as encapsulated in the County & City Development Plans, Local Area Plans and a variety of strategic plans and projects. Some of the larger scale projects in the Lower Harbour include e.g.: - - CFRAMS – http://www.opw.ie/en/leecframs/; - Lower Lee (Cork City) Flood Relief Scheme - http://www.lowerleefrs.ie/ - Port of Cork Strategic Development plan - http://www.portofcork.ie/index.cfm/page/strategicdevelopmentplan20101 - M28 Ringaskiddy Road Scheme - http://www.n28cork-ringaskiddy.com/ - Cork Docklands Development Strategy - http://www.corkcity.ie/services/docklands/planning/corkdocklandsdevelopmentstrategy2001/ - Marina Park masterplan http://www.corkcity.ie/services/recreationsport/marinaparkmasterplan/marinaparkmasterplan.pdf - Tramore Valley Park - http://www.corkcity.ie/services/environmentrecreation/tramorevalleyparkmasterplan/5890_Tramore_Valley_Park_Masterplan%20final_opt1.pdf Ongoing re-development of sites such as Spike Island; Fort Cambden etc.

Assessment of significance of effects	
Describe how the project (either alone or in combination with other plans or projects) is likely to affect the Natura 2000 site.	There are no likely significant direct or indirect impacts arising from the proposed development due to the nature, scale and duration of works; the distance of such works from Great Island Channel SAC (IE001058) or Cork Harbour SPA (IE004030) & the requirement for strict implementation of best practice construction methods, which will form a part of the works contract
Explain why the effects are not considered significant	See Chapter 4.0 – 6.0 above.
List the Agencies consulted	Cork County Council National Parks & Wildlife Service
Response to Consultation	Summarised in main report above.

Conclusion

6.1 In conclusion the proposed Greenway is not predicted to impact negatively on the conservation objectives of either Great Island Channel SAC (001058) or Cork Harbour SPA (004030). It screens out at Stage 1; it is not therefore necessary to progress to Stage 2 Appropriate Assessment.

7. References

[Including references quoted in Appendix D]

Balmer, D., Gillings, S., Caffrey, B., Swann, B., Downie, I. and Fuller, R. (2013). *Bird Atlas 2007-11: The Breeding and Wintering Birds of Britain and Ireland*. British Trust for Ornithology, BirdWatch Ireland and Scottish Ornithologists Club.

Boland, H. and Crowe, O. (2012). *Irish Wetland Bird Survey: waterbird status and distribution 2001/02 - 2008/09*. BirdWatch Ireland, Kilcoole, Co. Wicklow

Department of Arts, Heritage and the Gaeltacht (2015). Judgement of the Court of Justice of the European Union in Case C 418/04 Commission v Ireland "The Birds Case". A Programme of measures by Ireland to ensure full compliance with the Judgement of the Court of Justice of the European Union. Update – July 2015. [Appendix 3 – Ringabella Estuary, Co. Cork and its potential inclusion into the SPA network].

Department of the Environmental Heritage and Local Government (2009). Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities. DEHLG, Dublin.

Colhoun, K. and Cummins, S. (2013). Birds of Conservation Concern in Ireland 2014-2019. *Irish Birds* 9(4): 523-544.

Cramp, S. & Simmons, K.E.L. (2004). *Birds of the Western Palaearctic interactive* (DVD-ROM).

Crowe, O. (2005). *Ireland's Wetlands and their Waterbirds: Status and Distribution*. BirdWatch Ireland, Rockingham, Co. Wicklow.

Crowe, O., Austin, G.E., Colhoun, K., Cranswick, P.A., Kershaw, M. and Musgrove, A.J. (2008). Estimates and trends of waterbirds numbers wintering in Ireland, 1994/95 to 2003/04. *Bird Study* 55: 66-77.

Crowe, O. and Holt, C. (2013). Estimates of waterbird numbers wintering in Ireland 2006/07 – 2010/11. *Irish Birds* 9, 545-552.

DePuy (Ireland) (2011). *Wind Energy Project. Environmental Impact Statement*. Prepared by Arup on behalf of DePuy (Ireland).

European Commission (2000). Managing Natura 2000 Sites: the Provisions of Article 6 of the 'Habitats' Directive 92/43/EEC. European Communities, Luxembourg.

European Commission (2001). Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Articles 6(3) and 6(4) of the Habitats Directive 92/43/EEC. European Communities, Luxembourg.

European Commission (2007). Guidance document on Article 6(4) of the Habitats Directive 92/43/EEC; clarification of the concepts of: Alternative solutions, Imperative reasons of overriding public interest, Compensatory measures, Overall Coherence, and Opinion of the Commission. European Communities, Luxembourg.

FERA (2011). *Cork Lower Harbour Wind Turbine Development Bird Radar Monitoring*. Commissioned by Arup Ltd and CLHEG Food and Environment Research Agency York, UK

Fossitt, J. (2000). A Guide to Habitats in Ireland. Heritage Council, Kilkenny. [2007 reprint]

Hale, W.G. (1974). Aerial counting of waders. *Ibis*, 116, 412.

Hannon, C., Berrow, S.D. and Newton S.F. (1997). The status and distribution of breeding Sandwich *Sterna sandvicensis*, Roseate *S. dougallii*, Common *S. hirundo*, Arctic *S. paradisaea* and Little Terns *S. albifrons* in Ireland in 1995. *Irish Birds* 6: 1-22.

Leech, D.I., Rehfisch, M.M. and Atkinson, P.W. (2002). *A Guide to Waterbird Alerts*. BTO Research Report No. 281.

National Parks and Wildlife Service (2008). Site Synopsis of Cork Harbour SPA. National Parks and Wildlife Service, Dublin.

National Parks and Wildlife Service (2013). Site Synopsis of Great Island Channel SAC. National Parks and Wildlife Service, Dublin.

National Parks and Wildlife Service (2014a). Conservation objectives for Great Island Channel SAC [001058]. Generic Version 3.0. Department of Arts, Heritage & the Gaeltacht.

National Parks and Wildlife Service (2014b). Conservation objectives for Cork harbour SPA [004030]. Generic Version 3.0. Department of Arts, Heritage & the Gaeltacht.

National Parks and Wildlife Service (2014c). Cork Harbour Special Protection Area (Site code 004030). Conservation objectives Supporting Document Version 1.0. Department of Arts, Heritage & the Gaeltacht.

National Parks and Wildlife Service (2014d). Great Island Channel Special Area of Conservation (Site code 001058). Conservation objectives Supporting Document – Coastal Habitats Version 1.0. Department of Arts, Heritage & the Gaeltacht.

National Parks and Wildlife Service (2014e). Great Island Channel Special Area of Conservation (Site code 001058). Conservation objectives Supporting Document – Marine Habitats Version 1.0. Department of Arts, Heritage & the Gaeltacht.

National Parks and Wildlife Service (2014f). Natura 2000 Standard Data Form for Great Island Channel SAC [001058]. Department of Arts, Heritage & the Gaeltacht.

National Parks and Wildlife Service (2014g). Natura 2000 Standard Data Form for Cork Harbour SPA [004030]. Department of Arts, Heritage & the Gaeltacht.

Nisbet, I.C.T. (2000). Disturbance, Habituation, and Management of Waterbird Colonies. Waterbirds 23(2): 312-332.

O'Donoghue, P.D. and Gittings, T. (2014). *Presentation of geospatial data relating to the use of Cork Harbour by wintering waterbirds & a literature review of published data relating to waterbirds and disturbance*. Unpublished Report prepared for Cork County Council.

Hutchinson, C.D. and O'Halloran, J. (1984). The waterfowl of Cork Harbour. *Irish Birds*, 2, 445-456.

Prater, A.J. (1979). Trends in accuracy of counting birds. *Bird Study*, 26, 198–200.

Rappoldt, C., Kersten, M. & Smit, C. (1985). Errors in large-scale shorebird counts. *Ardea*, 73, 13–24.

RPS Group (2012). *Port of Cork Bird Surveys. Report on 2011 Breeding Season Bird Surveys at Ringaskiddy / Monkstown Creek*. Unpublished Report for Port of Cork.

RPS (2013). *East Tip Remediation Project. Environmental Impact Statement*. Report for Cork County Council.

RPS Group (2015). *Re-profiling of the Martello Tower Site. Preferred Option Report*. Report prepared for Cork County Council.

RPS Group (na). *Recommendations on Common Tern* Sterna hirundo*. Nesting Habitat Improvement Measures in Cork Harbour*. Report prepared for Port of Cork.

Sheppard, R. (1993). Ireland's Wetland Wealth. Irish Wildbird Conservancy.

Smiddy, P., O'Halloran, J., Coveney, J.A., Leonard, P.G., & Shorten, M. (1995). Winter waterfowl populations of Cork Harbour: an update. *Irish Birds*, 5, 285-294.

Wetlands International (2012). *Waterfowl Population Estimates – Fifth Edition*. Wetlands International, Wageningen, The Netherlands.

Wilson, J., O'Mahony, B., Smiddy, P. (2000). Common Terns *Sterna hirundo* breeding in Cork Harbour. *Irish Birds* 6: 597-599.

Appendix A

Scientific Names of Species

Species Name	Scientific Name
Bar-tailed Godwit	*Limosa lapponica*
Black-headed Gull	*Chroicocephalus ridibundus*
Black-tailed Godwit	*Limosa limosa*
Common Gull	*Larus canus*
Common Tern	*Sterna hirundo*
Coot	*Fulica atra*
Cormorant	*Phalacrocorax carbo*
Curlew	*Numenius arquata*
Dunlin	*Calidris alpina*
Gadwall	*Anas strepera*
Goldeneye	*Bucephala clangula*
Golden plover	*Pluvialis apricaria*
Goosander	*Mergus merganser*
Great Black-backed Gull	*Larus marinus*
Great crested Grebe	*Podiceps cristatus*
Great Northern Diver	*Gavia immer*
Greenshank	*Tringa nebularia*
Grey Heron	*Ardea cinerea*
Grey Plover	*Pluvialis squatarola*
Grey Wagtail	*Motacilla cinerea*
Herring Gull	*Larus argentatus*
Kingfisher	*Alcedo atthis*
Knot	*Calidris canutus*
Lapwing	*Vanellus vanellus*
Lesser black-backed Gull	*Larus fuscus*
Light-bellied brent goose	*Branta bernicla hrota*
Little grebe	*Tachybaptus ruficollis*
Little egret	*Egretta garzetta*
Mallard	*Anas platyrhynchus*
Mediterranean gull	*Larus melanocephalus*
Moorhen	*Gallinula chloropus*
Mute swan	*Cygnus olor*
Oystercatcher	*Haematopus ostralegus*
Pintail	*Anas acuta*
Pochard	*Aythya ferina*
Redshank	*Tringa tetanus*
Red-breasted Merganser	*Mergus serrator*
Ring billed gull	*Larus delawarensis*
Ringed Plover	*Charadrius hiaticula*
Ruff	*Philomachus pugnax*
Sanderling	*Calidris alba*
Sandwich Tern	*Sterna sandvicensis*
Scaup	*Aythya marila*
Shag	*Phalacrocorax aristotelis*
Shelduck	*Tadorna tadorna*
Shoveler	*Anas clypeata*
Slavonian Grebe	*Podiceps auritus*
Snipe	*Gallinago gallinago*
Spotted Redshank	*Tringa erythropus*
Teal	*Anas crecca*
Tufted Duck	*Aythya fuligula*

Species Name	Scientific Name
Turnstone	*Arenaria interpres*
Water rail	*Rallus aquaticus*
Whimbrel	*Numenius phaeopus*
Wigeon	*Anas penelope*
Whooper Swan	*Cygnus cygnus*

Appendix B
Natura 2000 Site Synopses

SITE SYNOPSIS

Site Name: Great Island Channel SAC

Site Code: 001058

The Great Island Channel stretches from Little Island to Midleton, with its southern boundary being formed by Great Island. It is an integral part of Cork Harbour which contains several other sites of conservation interest. Geologically, Cork Harbour consists of two large areas of open water in a limestone basin, separated from each other and the open sea by ridges of Old Red Sandstone. Within this system, Great Island Channel forms the eastern stretch of the river basin and, compared to the rest of Cork Harbour, is relatively undisturbed. Within the site is the estuary of the Owennacurra and Dungourney Rivers. These rivers, which flow through Midleton, provide the main source of freshwater to the North Channel.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1140] Tidal Mudflats and Sandflats
[1330] Atlantic Salt Meadows

The main habitats of conservation interest in Great Island Channel SAC are the sheltered tidal sand and mudflats and the Atlantic salt meadows. Owing to the sheltered conditions, the intertidal flats are composed mainly of soft muds. These muds support a range of macro-invertebrates, notably *Macoma balthica*, *Scrobicularia plana*, *Hydrobia ulvae*, *Nepthys hombergi, Nereis diversicolor* and *Corophium volutator*. Green algal species occur on the flats, especially *Ulva lactua* and *Enteromorpha* spp. Cordgrass (*Spartina* spp.) has colonised the intertidal flats in places, especially at Rossleague and Belvelly.

The saltmarshes are scattered through the site and are all of the estuarine type on mud substrate. Species present include Sea Purslane (*Halimione portulacoides*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Common Saltmarsh-grass (*Puccinellia maritima*), Sea Plantain (*Plantago maritima*), Greater Sea-spurrey (*Spergularia media*), Lax-flowered Sea-lavender (*Limonium humile*), Sea Arrowgrass (*Triglochin maritimum*), Sea Mayweed (*Matricaria maritima*) and Red Fescue (*Festuca rubra*).

The site is extremely important for wintering waterfowl and is considered to contain three of the top five areas within Cork Harbour, namely North Channel, Harper's Island and Belvelly-Marino Point. Shelduck is the most frequent duck species with 800-1,000 birds centred on the Fota/Marino Point area. There are also large flocks of Teal and Wigeon, especially at the eastern end. Waders occur in the greatest density

north of Rosslare, with Dunlin, Godwit, Curlew and Golden Plover the commonest species. A population of about 80 Grey Plover is a notable feature of the area. All the mudflats support feeding birds; the main roost sites are at Weir Island and Brown Island, and to the north of Fota at Killacloyne and Harper's Island. Ahanesk supports a roost also but is subject to disturbance. The numbers of Grey Plover and Shelduck, as given above, are of national importance.

The site is an integral part of Cork Harbour which is a wetland of international importance for the birds it supports. Overall, Cork Harbour regularly holds over 20,000 waterfowl and contains internationally important numbers of Black-tailed Godwit (1,181) and Redshank (1,896), along with nationally important numbers of nineteen other species. Furthermore, it contains large Dunlin (12,019) and Lapwing (12,528) flocks. All counts are average peaks, 1994/95 – 1996/97. Much of the site falls within Cork Harbour Special Protection Area, an important bird area designated under the E.U. Birds Directive.

While the main land use within the site is aquaculture (oyster farming), the greatest threats to its conservation significance come from road works, infilling, sewage outflows and possible marina developments.

The site is of major importance for the two habitats listed on Annex I of the E.U. Habitats Directive, as well as for its important numbers of wintering waders and wildfowl. It also supports a good invertebrate fauna.

SITE SYNOPSIS

SITE NAME: CORK HARBOUR SPA

SITE CODE: 004030

Cork Harbour is a large, sheltered bay system, with several river estuaries - principally those of the Rivers Lee, Douglas, Owenboy and Owennacurra. The SPA site comprises most of the main intertidal areas of Cork Harbour, including all of the North Channel, the Douglas River Estuary, inner Lough Mahon, Monkstown Creek, Lough Beg, the Owenboy River Estuary, Whitegate Bay and the Rostellan and Poulnabibe inlets.

Owing to the sheltered conditions, the intertidal flats are often muddy in character. These muds support a range of macro-invertebrates, notably *Macoma balthica*, *Scrobicularia plana*, *Hydrobia ulvae*, *Nepthys hombergi*, *Nereis diversicolor* and *Corophium volutator*. Green algae species occur on the flats, especially *Ulva lactua* and *Enteromorpha* spp. Cordgrass (*Spartina* spp.) has colonised the intertidal flats in places, especially where good shelter exists, such as at Rossleague and Belvelly in the North Channel. Salt marshes are scattered through the site and these provide high tide roosts for the birds. Salt marsh species present include Sea Purslane (*Halimione portulacoides*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Common Saltmarsh-grass (*Puccinellia maritima*), Sea Plantain (*Plantago maritima*), Lax-flowered Sea-lavender (*Limonium humile*) and Sea Arrowgrass (*Triglochin maritima*). Some shallow bay water is included in the site. Cork Harbour is adjacent to a major urban centre and a major industrial centre. Rostellan Lake is a small brackish lake that is used by swans throughout the winter. The site also includes some marginal wet grassland areas used by feeding and roosting birds.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Little Grebe, Great Crested Grebe, Cormorant, Grey Heron, Shelduck, Wigeon, Teal, Pintail, Shoveler, Red-breasted Merganser, Oystercatcher, Golden Plover, Grey Plover, Lapwing, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank, Black-headed Gull, Common Gull, Lesser Black-backed Gull and Common Tern. The site is also of special conservation interest for holding an assemblage of over 20,000 wintering waterbirds. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Cork Harbour is an internationally important wetland site, regularly supporting in excess of 20,000 wintering waterfowl, for which it is amongst the top five sites in the country. The two-year mean of summed annual peaks for the entire harbour complex was 55,401 for the period 1995/96 and 1996/97. Of particular note is that the site supports internationally important populations of Black-tailed Godwit (905) and Redshank (1,782) - all figures given are average winter means for the two winters 1995/96 and 1996/97. At least 18 other species have populations of

national importance, as follows: Little Grebe (51), Great Crested Grebe (204), Cormorant (705), Grey Heron (63), Shelduck (2,093), Wigeon (1,852), Teal (922), Pintail (66), Shoveler (57), Red-breasted Merganser (88), Oystercatcher (1,404), Golden Plover (3,653), Grey Plover (84), Lapwing (7,688), Dunlin (10,373), Bar-tailed Godwit (417), Curlew (1,325) and Greenshank (26). The Shelduck population is the largest in the country (over 10% of national total). The site has regionally or locally important populations of a range of other species, including Whooper Swan (10), Pochard (145) and Turnstone (79). Other species using the site include Gadwall (13), Mallard (456), Tufted Duck (113), Goldeneye (31), Coot (53), Mute Swan (38), Ringed Plover (34) and Knot (38). Cork Harbour is a nationally important site for gulls in winter and autumn, especially Black-headed Gull (4,704), Common Gull (3,180) and Lesser Black-backed Gull (1,440).

A range of passage waders occurs regularly in autumn, including such species as Ruff (5-10), Spotted Redshank (1-5) and Green Sandpiper (1-5). Numbers vary between years and usually a few of each of these species over-winter.

The wintering birds in Cork Harbour have been monitored since the 1970s and are counted annually as part of the I-WeBS scheme.

Cork Harbour has a nationally important breeding colony of Common Tern (3-year mean of 69 pairs for the period 1998-2000, with a maximum of 102 pairs in 1995). The birds have nested in Cork Harbour since about 1970, and since 1983 on various artificial structures, notably derelict steel barges and the roof of a Martello Tower. The birds are monitored annually and the chicks are ringed.

Extensive areas of estuarine habitat have been reclaimed since about the 1950s for industrial, port-related and road projects, and further reclamation remains a threat. As Cork Harbour is adjacent to a major urban centre and a major industrial centre, water quality is variable, with the estuary of the River Lee and parts of the Inner Harbour being somewhat eutrophic. However, the polluted conditions may not be having significant impacts on the bird populations. Oil pollution from shipping in Cork Harbour is a general threat. Recreational activities are high in some areas of the harbour, including jet skiing which causes disturbance to roosting birds.

Cork Harbour is of major ornithological significance, being of international importance both for the total numbers of wintering birds (i.e. > 20,000) and also for its populations of Black-tailed Godwit and Redshank. In addition, there are at least 18 wintering species that have populations of national importance, as well as a nationally important breeding colony of Common Tern. Several of the species which occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Golden Plover, Bar-tailed Godwit, Ruff and Common Tern. The site provides both feeding and roosting sites for the various bird species that use it.

Appendix C

Qualifying Interests of more distant Natura 2000 sites

Site	Number	Qualifying Interests
Blackwater Callows SPA	004094	Whooper Swan (*Cygnus cygnus*) [A038] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Black-tailed Godwit (*Limosa limosa*) [A156] Wetland and Waterbirds [A999]
Ballycotton Bay SPA	004022	Teal (*Anas crecca*) [A052] Ringed Plover (*Charadrius hiaticula*) [A137] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Turnstone (*Arenaria interpres*) [A169] Common Gull (*Larus canus*) [A182] Lesser Black-backed Gull (*Larus fuscus*) [A183] Wetland and Waterbirds [A999]
Ballymacoda Bay SPA	004023	Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Ringed Plover (*Charadrius hiaticula*) [A137] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Sanderling (*Calidris alba*) [A144] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162] Turnstone (*Arenaria interpres*) [A169] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Common Gull (*Larus canus*) [A182] Lesser Black-backed Gull (*Larus fuscus*) [A183] Wetland and Waterbirds [A999]
Blackwater Estuary SPA	004028	Wigeon (*Anas penelope*) [A050] Golden Plover (*Pluvialis apricaria*) [A140] Lapwing (*Vanellus vanellus*) [A142] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162] Wetland and Waterbirds [A999]
Soverign Island SPA	004124	Cormorant (*Phalacrocorax carbo*) [A017]
Old Head of Kinsale SPA	004021	Kittiwake (*Rissa tridactyla*) [A188] Guillemot (*Uria aalge*) [A199]
Courtmacsherry Bay SPA	004219	Great Northern Diver (*Gavia immer*) [A003] Shelduck (*Tadorna tadorna*) [A048] Wigeon (*Anas penelope*) [A050] Red-breasted Merganser (*Mergus serrator*) [A069] Golden Plover (*Pluvialis apricaria*) [A140] Lapwing (*Vanellus vanellus*) [A142]

		Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Common Gull (*Larus canus*) [A182] Wetland and Waterbirds [A999]
The Gearagh SPA	004109	Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Mallard (*Anas platyrhynchos*) [A053] Coot (*Fulica atra*) [A125] Wetland and Waterbirds [A999]
Mullaghanish to Musheramore Mountains SPA	004162	Hen Harrier (*Circus cyaneus*) [A082]
Seven Heads SPA	004191	Chough (*Pyrrhocorax pyrrhocorax*) [A346]

Appendix D
Birds of Monkstown Creek

D.1 Introduction

D.1.1 There is a substantial amount of recent data available on the birds of Monkstown Creek and environs. This includes: -

- Irish Wetland Birds Survey annual winter count data (BirdWatch Ireland; high tide);
- NPWS low tide waterbird survey programme (NPWS / BWI; low tide and high tide);
- Summer, winter and targeted Cormorant roost studies undertaken by RPS on behalf of Port of Cork;
- Summer & winter surveys undertaken by Natura Environmental Consultants on behalf of DePuy (Ireland).

D.1.2 This was supplemented by desktop research, consultation and local knowledge of the site. Each data set is presented in turn; in each case we have attempted to relate study areas for ease of comparison. Following this a summary of the key species identified is presented.

Irish Wetland Bird Survey

D.1.3 The Irish Wetland Bird Survey (IWeBS) is a national scheme which monitors wintering waterbirds in wetlands throughout Ireland. Counts are undertaken once a month from September to March by experienced volunteer counters as well as by professional counters from BirdWatch Ireland and National Parks & Wildlife Service (Crowe, 2005). Survey results are regularly summarised in published reports and peer reviewed papers prepared by the IWeBS Office, BirdWatch Ireland (e.g. Boland and Crowe, 2012).

D.1.4 Cork Harbour (site code OL403) is counted by a team of counters; with attempts made in recent years to co-ordinate counts between closely (and functionally) associated areas of the harbour. A number of reviews of waterbirds in Cork Harbour have been undertaken, such as Hutchinson and O'Halloran (1984) and Smiddy *et al*. 1995; with the site also described in e.g. Sheppard (1993) and Crowe (2005). More recently Gittings (2006) undertook a review of waterbird monitoring (i.e. IWeBS monitoring) of Cork Harbour between 1994/95 and 2002/03. As noted above both the Cork Harbour count co-ordinator (Dr. Tom Gittings) and Monkstown counter (Dr. Tom Kelly) were consulted as part of this study; as was the local conservation range (NPWS), who also knows the site.

D.1.5 IWeBS data were kindly provided by the IWeBS Office, BirdWatch Ireland to Cork County Council and are included this assessment in order to examine the importance of Monkstown Creek in the context of Cork Harbour as a whole. Data is presented in the tables below for Monkstown Creek for each month in any given year in which an IWeBS count was undertaken. For comparative purposes the following figures are also presented: - annual peak count at Monkstown Creek; species count for the entire Cork Harbour site (OL403); % of the Cork Harbour count present in Monkstown Creek in that year (based on peak count for Monkstown); 1% national threshold and 1% international threshold. It should be noted that the counting of gulls and terns is optional and not all subsite counters would routinely count these species. Species totals for Cork harbour for gulls and terns are not therefore accurate.

D.1.6 Cork Harbour has long been recognised as being an internationally important site for wintering waders and wildfowl as it regularly supports in excess of 20,000 wintering waterfowl. A large part of the harbour is now designated as Cork Harbour Special Protection Area for Birds (SPA; site code IE0004030) under Article 4 of the EU Birds Directive (79/409/EEC; 2009/147/EC) (Figure

4.2). Cork Harbour also supports a nationally important breeding colony of Common Tern (3 year average of 69 pairs for 1998-2000, with a maximum of 102 pairs in 1995 (NPWS, 2008). Summary conservation objectives, site synopsis and Natura 2000 data form can all be downloaded from the NPWS webpage[12]. Cork Harbour is also designated as an Important Bird Area by Birdlife International (IBA; site code IE088[13]) (Hunt *et al*. 2000) and as a Ramsar site (0837; source: http://www.irishwetlands.ie/Maps.html).

D.1.7 Crowe (2005) summarised IWeBS count data from 1994/95 to 2000/2001. At that time Cork Harbour supported two species in Internationally important numbers; namely Black-tailed Godwit and Redshank and 18 species in Nationally important numbers; namely Little Grebe, Great Crested Grebe, Cormorant, Shelduck, Wigeon, Teal, Pintail, Shoveler, Red-breasted Merganser, Moorhen, Oystercatcher, Golden Plover, Grey Plover, Lapwing, Dunlin, Bar-tailed Godwit, Curlew and Greenshank. Other species which occurred in notable numbers were Black-headed Gull, Common Gull and Lesser Black-backed Gull.

D.1.8 With respect to Monkstown Creek, Crowe (2005) notes that the Creek provides a secure winter refuge for several species of waterbird, with Shelduck, Teal, Redshank and Dunlin the most abundant; also at times, nationally important numbers of Cormorant have been recorded using the jetty as a roost.

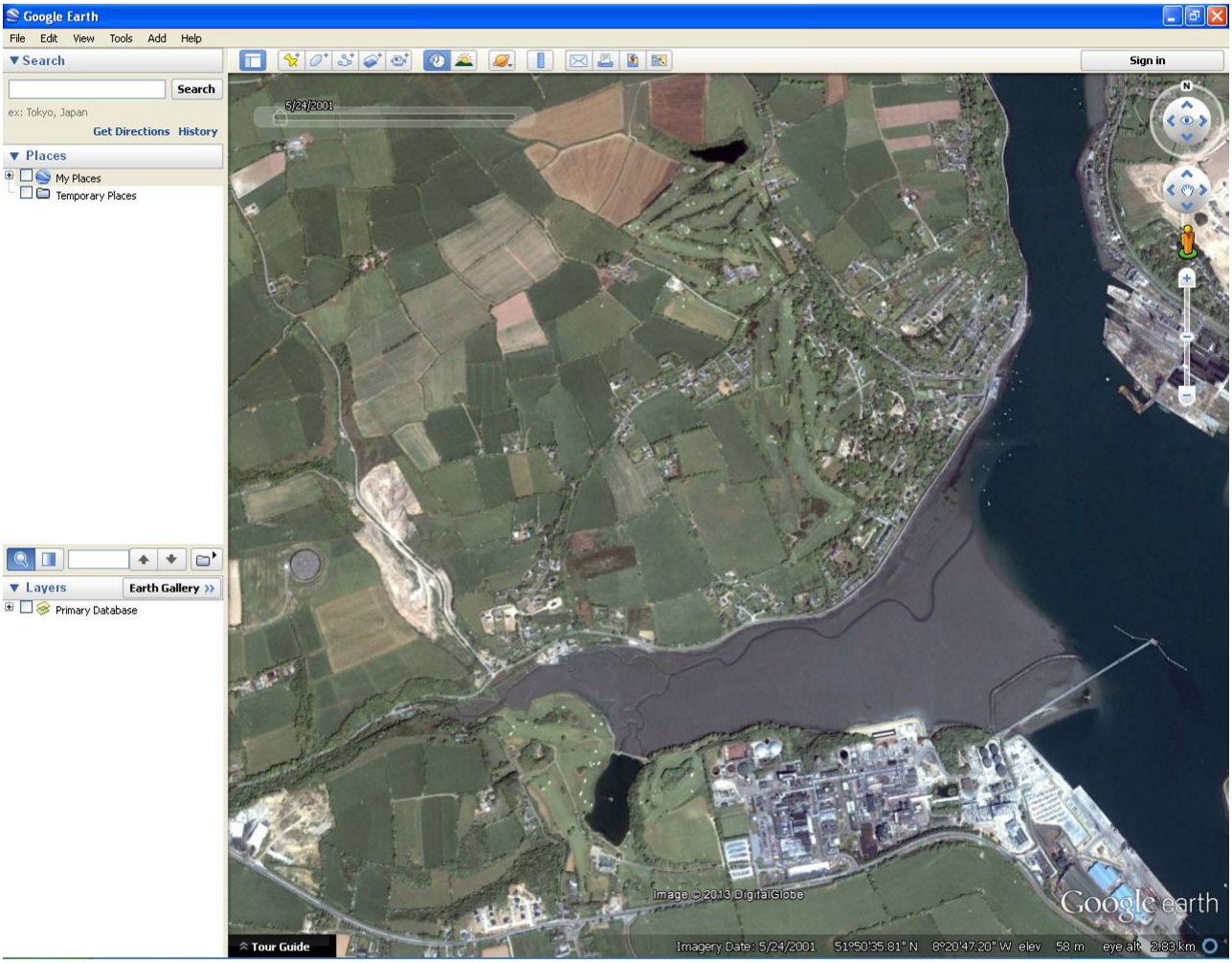
D.1.9 For IWeBS the Monkstown / Raffeen Creek area is counted as a single subsite (OL496); it is equivalent to the boundaries of the Monkstown Creek area of Cork Harbour SPA (see Text Figure D1.1 & D1.2). The area from Glenbrook to south of Monkstown is not counted by IWeBS as it is not known to support notable numbers of wintering waterfowl. Text Figure D1.1 illustrates the outward extent of intertidal habitat within Monkstown / Raffeen Creek (OL496); the outward edge extends into more subtidal waters. The NPWS site synopsis describes the estuary as follows: - "*Owing to the sheltered conditions, the intertidal flats are often muddy in character. These muds support a range of macro-invertebrates, notably* Macoma balthica*,* Scrobicularia plana*,* Hydrobia ulvae*,* Nepthys hombergi*,* Nereis diversicolor *and* Corophium volutator*. Green algae species occur on the flats, especially* Ulva lactua *and* Enteromorpha *spp.*".

D.1.10 The following series of tables present IWeBS counts for Monkstown Creek in the context of the total counts for those species recorded for Cork Harbour as a whole; 2004/2005 (Table D1.1); 2005/2006 (Table D1.2); 2007/2008 (Table D1.3); and 2010/2011 (Table D1.4).

D.1.11 Full IWeBS data for the period 2007/2008 to 2011/2012 is presented in Table D1.5.

D.1.12 Key species recorded by IWeBS within Monkstown / Raffeen Creek include: Shelduck, Teal, Cormorant, Grey Heron, Oystercatcher, Lapwing, Black-tailed Godwit, Curlew, Redshank, Black-headed Gull and Common Gull. The way in which these species are distributed spatially will be returned to below. A large number (23) of Turnstone were also noted in the winter of 2007/2008. Turnstone frequents the rocky / gravel shoreline adjoining the existing path northwards to Monkstown (pers obs).

[12] http://www.npws.ie/protectedsites/specialprotectionareasspa/corkharbourspa/
[13] See also http://www.birdwatchireland.ie/Ourwork/SpeciesHabitatConservationinIreland/ImportantBirdAreas/tabid/204/Default.aspx



Text Figure D1.1 – GoogleEarth Image illustrating the outward extent of intertidal habitats.

Text Figure D1.2 - IWeBS count zones.

Table D1.1 – Monkstown Creek – IWeBS data 2004/2005.

Species	Sep	Oct	Nov	Dec	Jan	Feb	Annual Peak	Cork Harbour Count	%	1% Annual	1% Internat'l
Mute Swan						1	1	71	1.41%	110	
Shelduck			39	73		70	73	1391	5.25%	150	3000
Teal		23				34	34	1169	2.91%	450	5000
Mallard	24	20	1	4		8	24	628	3.82%	380	20000
Cormorant	49	58	64	32		43	64	370	17.30%	140	1200
Little Egret	1	1				1	1	166	0.60%		1300
Grey Heron		36	16				36	135	26.67%	30	2700
Oystercatcher	71	73				21	73	1857	3.93%	680	10200
Lapwing		4	29	423			423	4133	10.23%	2100	20000
Black-tailed Godwit	4	5					5	2937	0.17%	140	470
Bar-tailed Godwit		1					1	298	0.34%	160	1200
Curlew	55			4		10	55	2317	2.37%	550	8500
Greenshank		2				1	2	83	2.41%	20	2300
Redshank	2	82				5	82	2295	3.57%	310	3900
Turnstone		8					8	161	4.97%	120	1500
Black-headed Gull		2	2	91		6	91				20000
Common Gull		1		49		1	49				16000
Herring Gull						1	1				13000
Great Black-backed Gull		1	1			4	4				4800

Table D1.2 – Monkstown Creek – IWeBS data 2005/2006.

Species	Sep	Oct	Nov	Dec	Jan	Feb	Annual Peak	Cork Harbour Count	%	1% Annual	1% Internat'l
Mute Swan						1	1	54	1.85%	110	
Shelduck			38	122	80	103	122	1350	9.04%	150	3000
Teal			44	65	47	28	65	1302	4.99%	450	5000
Mallard			12	3	8	8	12	406	2.96%	380	20000
Great Crested Grebe			1				1	137	0.73%	55	3600
Cormorant	101		99	53	39	17	101	308	32.79%	140	1200
Little Egret						1	1	126	0.79%		1300
Grey Heron	4		4	19	31	7	31	76	40.79%	30	2700
Oystercatcher	112			14	48		112	2076	5.39%	680	10200
Lapwing				57	0		57	4096	1.39%	2100	20000
Black-tailed Godwit					416		416	3337	12.47%	140	470
Curlew	5			27	21	2	27	1809	1.49%	550	8500
Common Sandpiper					1		1	2	50.00%		
Redshank				1	41	6	41	1543	2.66%	310	3900
Black-headed Gull	149			65	70	26	149				20000
Common Gull	12			6	0		12				16000
Lesser Black-backed Gull				2	1		2				4500
Herring Gull	4			1	2		4				13000
Great Black-backed Gull	26			4	1		26				4800
Sandwich Tern	72						72				
Common Tern	1						1				

Table D1.3 – Monkstown Creek – IWeBS data 2007/2008.

Species	Nov	Cork Harbour Count	%	1% Annual	1% Internat'l
Shelduck	35	823	4.25%	150	3000
Teal	31	644	4.81%	450	5000
Mallard	5	484	1.03%	380	20000
Red-breasted Merganser	5	72	6.94%	35	1700
Little Grebe	1	65	1.54%	25	4000
Cormorant	64	285	22.46%	140	1200
Little Egret	1	151	0.66%		1300
Oystercatcher	35	1590	2.20%	680	10200
Black-tailed Godwit	70	2823	2.48%	140	470
Curlew	27	1607	1.68%	550	8500
Redshank	48	1725	2.78%	310	3900
Turnstone	23	214	10.75%	120	1500

Table D1.4 – Monkstown Creek – IWeBS data 2010/2011.

Species	Sept	Oct	Nov	Annual Peak	Cork Harbour Count	%	1% Annual	1% Internat'l
Shelduck			18	18	1223	1.47	150	3000
Teal			1	1	1026	0.10	450	5000
Mallard	15		8	15	404	3.71	380	20000
Little Grebe			16	16	64	25.0	25	4000
Great Crested Grebe			1	1	110	0.91	55	3600
Cormorant	93		40	93	227	40.1	140	1200
Little Egret			1	1	112	0.89		1300
Grey Heron	2		3	3	68	4.41	30	2700
Oystercatcher	117		49	117	1099	10.65	680	10200
Curlew	1		17	17	1315	1.29	550	8500
Redshank	4		10	10	1450	0.69	310	3900
Black-headed Gull			53	53				20000

Table D1.5 – Monkstown Creek – IWeBS data 2007/08 to 2011/2012.

Species	1% Nat'l	1% Int'l	07/08	08/09	09/10	10/11	11/12	Peak	Mean
Kittiwake				3				3	1
Mute Swan	110		68	42	70	51	45	70	55
Whooper Swan	130	270	3	1	1			3	1
Greylag Goose	50	980	6			1		6	1
Canada Goose			22	5	9	14	14	22	13
Light-bellied Brent Goose		400	65	30	24	19	58	65	39
Black Brant					1			1	0
Feral/hybrid Goose			5					5	1
Ruddy Shelduck							2	2	0
Shelduck	150	3,000	911	1,303	952	1,223	1,140	1,303	1,106
Wigeon	820	15,000	1,479	1,313	1,236	1,296	1,468	1,479	1,358
Gadwall	20	600	8	6	8	13	22	22	11
Teal	450	5,000	748	1,005	753	1,026	929	1,026	892
Mallard	380	20,000	531	344	285	404	416	531	396
Pintail	20	600		22	27	12	31	31	18
Garganey					1			1	0
Shoveler	25	400	51	37	25	12	33	51	32
Pochard	380	3,000	3	2	4		1	4	2
Tufted Duck	370	12,000	16	22	36	16	26	36	23
Scaup	45	3,100		1		1		1	0
Eider	30	14,840			1		1	1	0
Common Scoter	230	5,500	1	1			4	4	1
Surf Scoter							1	1	0
Velvet Scoter			3					3	1
Goldeneye	95	11,500	14	17		2	20	20	11
Red-breasted Merganser	35	1,700	72	53	63	61	71	72	64
Goosander						1		1	0
Black-throated Diver		3,750		1				1	0
Great Northern Diver		50	4	2	16	1		16	5
Little Grebe	25	4,000	65	60	56	64	88	88	67
Great Crested Grebe	55	3,500	107	81	183	110	165	183	129
rail Grebe		55	3		1			3	1
Black-necked Grebe					1	2		2	1
Cormorant	140	1,200	380	168	170	227	317	380	252
Shag		2,000	10	3	1	1	4	10	4
Little Egret		1,300	168	138	184	112	67	184	134
Cattle Egret				3	1			3	1
Grey Heron	30	2,700	170	87	59	68	70	170	91
Great White Egret					1			1	0
Spoonbill			1					1	0
Water Rail			2	2		3		3	1
Moorhen	20	20,000	25	25	22	37	21	37	26

Species	1% Nat'l	1% Int'l	07/08	08/09	09/10	10/11	11/12	Peak	Mean
Coot	330	17,500	11	4	4	9	9	11	7
Oystercatcher	680	8,200	1,810	1,241	1,190	1,099	1,939	1,939	1,456
Ringed Plover	150	730	27	38	34	21	29	38	30
Golden Plover	1,700	9,300	5,232	248	4,500	3,356	5,211	5,232	3,709
Grey Plover	65	2,500	39	17	10	20	35	39	24
Lapwing	2,100	20,000	3,321	3,219	1,974	2,713	2,217	3,321	2,689
Knot	190	4,500	111	119	58	250	178	250	143
Sanderling	65	1,200						0	0
Dunlin	880	13,300	3,579	5,091	2,632	4,887	5,068	5,091	4,251
Ruff		12,200	4	2		1		4	1
Snipe		20,000	75	17	72	53	34	75	50
Black-tailed Godwit	140	610	2,936	1,490	1,339	2,332	2,955	2,955	2,210
Bar-tailed Godwit	160	1,200	257	281	396	301	312	396	309
Whimbrel		6,700	1	1		11	2	11	3
Curlew	550	8,400	1,719	943	992	1,315	1,662	1,719	1,326
Common Sandpiper			4	3				4	1
Green Sandpiper		15,500					1	1	0
Spotted Redshank		900	2	1		2	7	7	2
Greenshank	20	2,300	95	76	79	81	88	95	84
Redshank	310	3,900	1,748	1,471	1,365	1,450	1,354	1,748	1,478
Turnstone	120	1,400	233	115	136	147	207	233	168
Wilson's Phalarope							1	1	0
Mediterranean Gull		770	48	65	21	3	8	65	29
Little Gull		1,100					1	1	0
Black-headed Gull		20,000	2,392	814	466	1,333	3,417	3,417	1,684
Ring-billed Gull		20,000				1	2	2	1
Common Gull		16,400	224	93	193	113	131	224	151
Lesser Black-backed Gull		5,500	72	192	60	163	72	192	112
Herring Gull		10,200	65	49	90	40	74	90	64
Iceland Gull		1,600		1				1	0
Glaucous Gull		2,200	1					1	0
Great Black-backed Gull		4,200	126	54	17	16	149	149	72
Sandwich Tern			35	19		260	104	260	84
Common Tern			1					1	0
Arctic Tern			1					1	0
Unidentified Tern			1	1				1	0
Kingfisher			2	3	2	2	3	3	2

NPWS low tide waterbird survey programme

D.1.13 Irish Wetland Bird Survey counts are primarily conducted at or near to high tide when birds are concentrated at high tide roosts or closer to the shoreline. Data are collected to determine the number of birds using a site. However, it is also important to consider spatial utilisation of an estuary at low tide. BirdWatch Ireland was commissioned by National Parks & Wildlife Service to undertake a series of baseline low tide waterbird surveys at Special Protection Areas around the Irish coastline to compliment the ongoing programme of annual IWeBS counts (Cummins and Crowe, 2011) – known as the NPWS low tide waterbird survey programme. Cork Harbour was counted in 2010/11 between October 2010 and March 2011. Results for Cork Harbour as a whole are presented in Table D1.10. Four low tide counts and one high tide count were undertaken. The Glenbrook to Monkstown Creek part of the proposed Greenway coincides with three of the NPWS low tide waterbird survey programme count zones, namely: -

- OL532 Glenbrook (Table D1.6)
- OL496 Monkstown Creek (Table D1.7) (i.e. outer Monkstown Creek)
- OL530 Raffeen Creek (Table D1.8) (i.e. inner Monkstown Creek)

D.1.14 As noted the section from Glenbrook south to Monkstown is not counted by IWeBS. In the NPWS low tide waterbird survey programme of 2010/2011 no notable aggregations of wintering waterbirds were recorded along the western side of the Glenbrook (OL532) subsite (i.e. adjoining the proposed pathway) either roosting or during low tide counts; this appears to be largely due to the nature of the shoreline and the character of the adjoining deep water navigational channel. On the other hand, areas of intertidal mudflat north of Carrigaloe and at Ballynoe on the eastern side appear to support most birds in this area (these areas are outside the Glenbrook to Raffeen study area). Species recorded along the channel at Glenbrook include small numbers of Oystercatcher, Redshank, Cormorant, Mute Swan, Black-headed Gull, Great Black-backed Gull, Lesser Black-backed Gull and Herring Gull. Common Tern can also be seen feeding in this area during the summer (pers obs).

D.1.15 Table D1.9 presents a combined BWS OL530 / Raffeen Creek & OL496 / Monkstown Creek for comparison with IWeBS data as these two subsites equate to the Monkstown IWeBS count sector and the Monkstown section of Cork Harbour SPA. It is Raffeen Creek (or inner Monkstown Creek) where the potential impacts of the new section of proposed Greenway are of greater relevance. Monkstown Creek (or outer Monkstown Creek) is where the estuary broadens out in the harbour proper (i.e. in the environs of the Pfizer jetty and stone breakwater); there is an existing footpath along the northern shore of the estuary in this area.

D.1.16 A total of 58 waterbird species were recorded by the BWS in Cork Harbour in the winter of 2010 / 2011. Cork Harbour supported internationally important numbers of Black-tailed Godwit and nationally important numbers of a further 20 waterbird species during these counts (see Table D1.10 for a summary of the full Cork Harbour Count). With respect to Monkstown Creek Grey Heron is the only species specifically mentioned by Cummins and Crowe (2011); a total of 31 birds were recorded in Monkstown Creek (OL496) during the high tide count in January. While Cormorant was not noted for Monkstown / Raffeen, this may be a timing issue as the roost is largely a nocturnal roost (see below for further discussion of Cormorant).

D.1.17 When compared to count data from 1994/95 to 2000/01 presented in Crowe (2005) there are a number of changes evident. Only Black-tailed godwit occurred in the winter of 2010/11 in internationally important numbers. Redshank numbers have dropped to nationally important. Moorhen no longer occur in nationally important numbers; while Grey Heron and Turnstone were

present in the winter of 2010/11 in nationally important numbers. Of these Moorhen behaviour s such that numbers are likely to be underestimated by both IWeBS / BWS counts; e.g. the wetland complex at Fota Wildlife Park supports large numbers of Moorhen than normally counted by IWeBS (per sobs); this species certainly far exceeds national levels in Cork Harbour.

D.1.18 Species recorded in reasonable numbers at Raffeen Creek (Table D1.8) (i.e. inner Monkstown Creek) include Black-headed Gull, Dunlin, Mallard, Oystercatcher, Redshank, Shelduck and Teal.

D.1.19 Species recorded in reasonable numbers at Monkstown Creek (Table D1.7) (i.e. outer Monkstown Creek) include Black-headed Gull, Black-tailed Godwit, Cormorant, Grey Heron, Lapwing, Oystercatcher, Redshank, Shelduck and Teal (and to a lesser extent Curlew, Herring Gull).

D.1.20 Taken as a whole the site (Monkstown Creek) can be viewed as being important for Black-headed Gull, Black-tailed Godwit, Cormorant, Dunlin, Grey Heron, Lapwing, Oystercatcher, Redshank, Shelduck and Teal; though as noted there are some differences in usage of the inner and outer Creek (this will be returned to below).

D.1.21 No roosts were identified along the northern shoreline along which the proposed Greenway would run.

Text Figure D1.3 – NPWS low tide waterbird survey programme count zones.

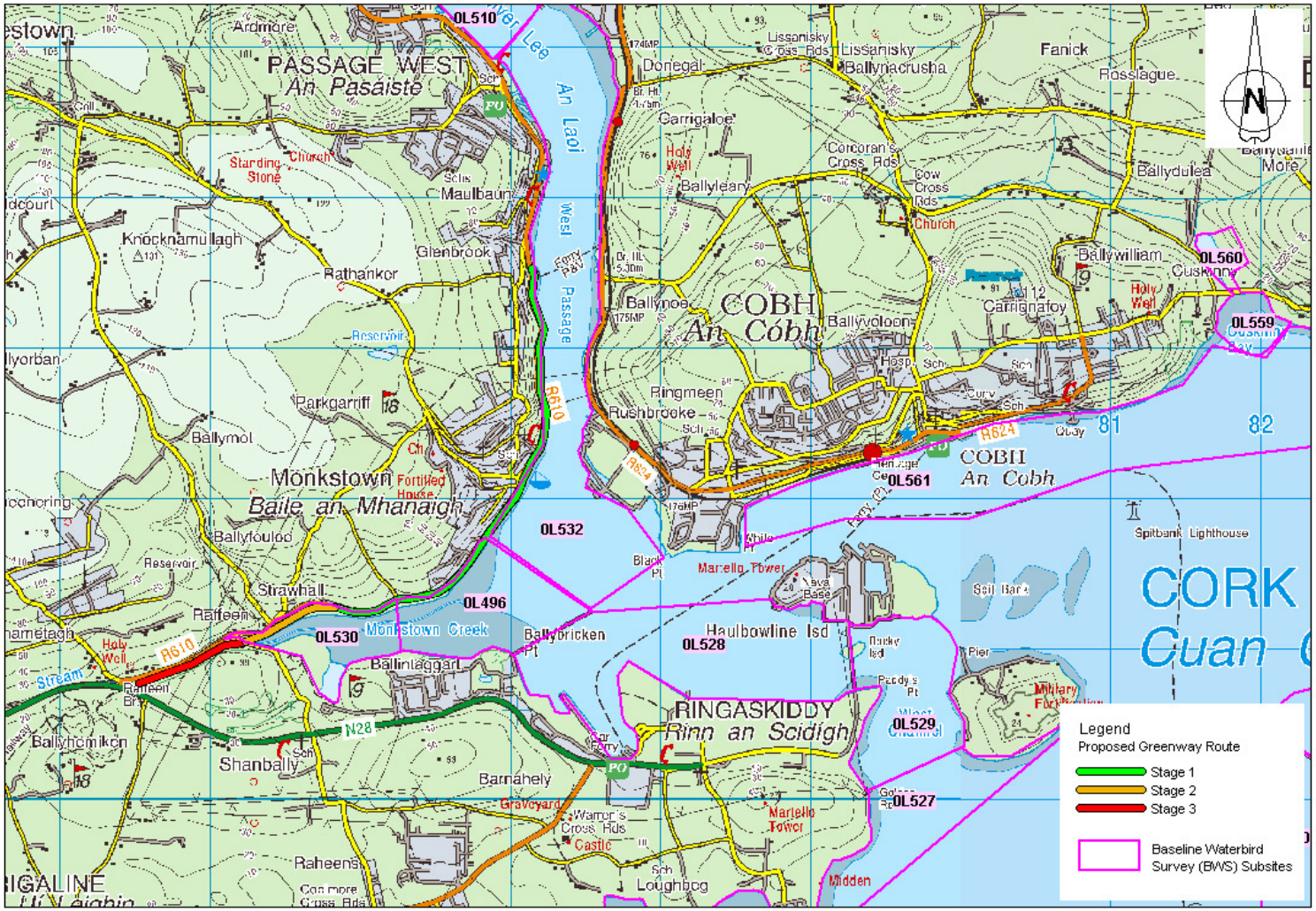


Table D1.6 – NPWS low tide survey programme count data for Glenbrook (2010-2011) – OL532

Species	1% National	1% International	LT1	LT2	LT3	LT4	HT1
Black-headed Gull		20000	59	58	119	79	67
Cormorant	140	1200	4	5	5	4	3
Common Gull		16000			12	12	12
Great Black-backed Gull		4800	3	2	2	2	3
Grey Heron	30	2700		1	1	1	1
Herring Gull		13000	44	35	25	17	8
Lesser Black-backed Gull		4500	16	18	7	5	4
Mute Swan	110	110	2	2	6	4	2
Oystercatcher	680	10200	16	13	13	16	7
Pied-billed Grebe						1	
Redshank	310	3900	1	3			

Table D1.7 - NPWS low tide survey programme count data for Monkstown Creek outer (2010-2011) – OL496

Species	1% National	1% International	LT1	LT2	LT3	LT4	HT1
Black-headed Gull		20000	26	26	86	90	15
Black-tailed Godwit	140	470	2	24	6	38	
Cormorant	140	1200	3	3	15	15	15
Curlew	550	8500	24	16	15	11	4
Dunlin	880	13300		15	35		
Great Black-backed Gull		4800	8	4			
Greenshank	20	2300	1	1	1	1	1
Grey Heron	30	2700	1	1	1	23	31
Herring Gull		13000	10	6	19	15	19
Lapwing	2100	20000					110
Lesser Black-backed Gull		4500			3	4	2
Mallard	380	20000	2	10	9	9	2
Oystercatcher	680	10200	32	32	44	33	14
Redshank	310	3900	11	11	17	18	21
Shelduck	150	3000		16	66	66	46
Teal	450	5000	2	2	23	27	14
Wigeon	820	15000				4	

Table D1.8 – NPWS low tide survey programme count data for Monkstown Creek inner (Raffeen) (2010-2011) – OL530

Species	1% National	1% International	LT1	LT2	LT3	LT4	HT1
Black-headed Gull		20000	44	18	82	29	24
Black-tailed Godwit	140	470	2	2	12	16	
Cormorant	140	1200	1	1			
Curlew	550	8500	6	8	10	11	
Dunlin	880	13300			104	31	
Little Egret		1300	1	1			
Greenshank	20	2300	1				
Grey Heron	30	2700	2	2	2	2	2
Herring Gull		13000	3	2	4	5	4
Lesser Black-backed Gull		4500		2	2		1
Little Grebe	25	4000		6	5	6	9
Mallard	380	20000	4	2	18	15	7
Oystercatcher	680	10200	9	13	18	21	32
Redshank	310	3900	10	11	13	13	18
Snipe		20000			1	2	1
Shelduck	150	3000		7	12	4	77
Teal	450	5000	2	14	52	41	36

Table D1.9 – NPWS low tide survey programme combined counts for Raffeen Creek (OL530) & Monkstown Creek (OL496), 2010/2011 (equivalent to IWeBS Monkstown Creek subsite).

Species	1% National	1% International	LT1	LT2	LT3	LT4	HT1
Black-headed Gull	0	20000	70	44	168	119	39
Black-tailed Godwit	140	470	4	26	18	54	0
Cormorant	140	1200	4	4	15	15	15
Curlew	550	8500	30	24	25	22	4
Dunlin	880	13300	0	15	139	31	0
Great Black-backed Gull	0	4800	8	4	0	0	0
Greenshank	20	2300	2	1	1	1	1
Grey Heron	30	2700	3	3	3	25	33
Herring Gull	0	13000	13	8	23	20	23
Lapwing	2100	20000	0	0	0	0	110
Lesser Black-backed Gull	0	4500	0	2	5	4	3
Little Egret	0	1300	1	1	0	0	0
Little Grebe	25	4000	0	6	5	6	9
Mallard	380	20000	6	12	27	24	9
Oystercatcher	680	10200	41	45	62	54	46
Redshank	310	3900	21	22	30	31	39
Shelduck	150	3000	0	23	78	70	123
Snipe	0	20000	0	0	1	2	1
Teal	450	5000	4	16	75	68	50
Wigeon	820	15000	0	0	0	4	0

Table D1.10 - NPWS low tide survey programme count data for Cork Harbour (2010-2011).

Species	1% National	1% International	Peak Low Tide	Peak High Tide	Peak Overall	Status 1994/95 to 2000/01
Mute Swan	110	110	84	55	84	
Greylag Goose	50	870	2	0	2	
Canada Goose			10	7	10	
Light-bellied Brent Goose	260	260	79	41	79	
Ruddy Shelduck			2	0	2	
Shelduck	150	3000	1476	1250	1476	N
Wigeon	820	15000	2129	1629	2129	N
Gadwall	20	600	15	9	15	
Teal	450	5000	1662	1360	1662	N
Mallard	380	20000	565	576	576	N
Pintail	20	600	11	12	12	
Shoveler	25	400	28	35	35	N
Tufted Duck	370	12000	26	18	26	
Scaup	45	3100	1	0	1	
Common Scoter	230	16000	5	0	5	
Goldeneye	95	11500	11	5	11	
Red-breasted Merganser	35	1700	82	79	82	N
Goosander			3	4	3	
Great Northern Diver		50	9	14	14	
Pied-billed Grebe			1	0	1	
Little Grebe	25	4000	159	72	159	N
Great Crested Grebe	55	3600	150	128	150	N
Slavonian Grebe		55	3	0	3	
Cormorant	140	1200	273	279	279	N
Shag			12	12	12	
Little Egret		1300	142	11	142	
Grey Heron	30	2700	91	61	91	
Water Rail			2	0	2	
Moorhen	20		19	13	19	N
Coot	330	17500	21	28	28	
Oystercatcher	680	10200	1753	1245	1753	N
Ringed Plover	150	730	116	32	116	
Golden Plover	1700	9300	2932	12	2932	N
Grey Plover	65	2500	69	45	69	N
Lapwing	2100	20000	1831	3961	3961	N
Knot	190	4500	187	152	187	
Curlew Sandpiper			1	0	1	
Dunlin	880	13300	8020	5786	8020	N
Snipe		20000	27	69	69	
Black-tailed Godwit	140	470	3346	1675	3348	I
Bar-tailed Godwit	160	1200	222	255	255	N

Table D1.10 – continued.

Species	1% National	1% International	Peak Low Tide	Peak High Tide	Peak Overall	Status 1994/95 to 2000/01
Whimbrel		2000	3	1	3	
Curlew	550	8500	1698	946	1698	**N**
Common Sandpiper			2	0	2	
Spotted Redshank		900	0	1	1	
Greenshank	20	2300	66	52	66	**N**
Redshank	310	3900	2275	1302	2275	**I**
Turnstone	120	1500	150	171	171	
Mediterranean Gull			45	52	52	
Sabine's Gull			1	0	1	
Black-headed Gull		20000	5279	3254	5279	
Common Gull		16000	896	793	896	
Lesser Black-backed Gull		4500	299	110	299	
Herring Gull		13000	387	86	387	
Iceland Gull			0	1	1	
Great Black-backed Gull		4800	349	47	349	
Unidentified Gull			7	0	7	
Kingfisher			4	1	4	

Note 1: Yellow – Nationally important number; Amber – Internationally important numbers.

Note 1: 1994/95 to 2000/01; from Crowe, 2005.

Port of Cork Bird Data

D.1.22 A series of bird counts / surveys were also undertaken by RPS on behalf of Port of Cork in 2011 / 2012 at Ringaskiddy / Monsktown Creek. These include: -

- RPS (2012a). Report on 2011 Breeding Season Bird Surveys at Ringaskiddy / Monkstown Creek. Unpublished report for Port of Cork;
- RPS (2012b). Report on the Winter 2011 / 2012 Bird Survey at Ringaskiddy / Monkstown Creek. Unpublished report for Port of Cork; and
- RPS (2012c). Night-roosting Cormorants at Monkstown Creek, Cork Harbour – 2011/ 2012. Unpublished report for Port of Cork.

Breeding Season

D.1.23 Common Tern is the only qualifying interest for Cork Harbour SPA identified for its breeding rather than non-breeding populations. Historically Common Tern nested primarily on old barges anchored near Marino Point; following their deterioration terns nested at a number of locations in Cork Harbour. In 2011 they nested at the Deep Water Berth, Ringaskiddy; on the roof of the Martello Tower adjoining the Cork to Cobh railway line (south of Fota Island) and on a small island in the lagoon at Pfizer's Golf Course, Shanbally (on the southern shore of Raffeen Creek). The latter site is prone to breeding losses through flooding of the island (P. Smiddy, pers comm.).

D.1.24 As part of their breeding season surveys for Port of Cork, RPS (2012a) monitored Common Tern foraging activity from outer Monkstown Creek to Ringaskiddy. While Common Tern does routinely feed in Monkstown Creek in small numbers (pers obs), the outer part of Monkstown Creek supported the lowest level of foraging activity in the RPS study (they did not survey the inner intertidal areas). It should be noted, however, that as inner Monkstown Creek is dominated by intertidal mudflat, suitable foraging habitat for Common tern is dependant on the state of the tide thus limiting the importance of the inner creek to Common Tern. Most observed activity in the RPS study focused on subtidal areas further east; however, numbers of birds observed relative to colony counts suggests that birds were also foraging further afield within Cork Harbour (RPS, 2012a).

D.1.25 Common Tern breeding in 2012 was as follows (from RPS, 2012a): -

- 13-18 pairs nested on dolphins at the Deep Water Berth;
- While birds were in attendance at a small rocky island in Lough Beg during the breeding season no breeding was proven;
- At Pfizer's 16 nests were recorded in May, but breeding is thought to have failed due to flooding of the island; an attempt to breed later in the season also failed);
- 20-30 pairs nested at the Martello Tower site in 2012 (a similar number to 2010 and 2011).

D.1.26 At its peak Cork Harbour supported ca. 100 breeding pairs of Common Tern.

D.1.27 Numbers of waders recorded from outer Monkstown Creek during the summer months (2011) were generally low as is typical during the summer months; species noted included Black-tailed Godwit (105), Curlew (84), Oystercatcher (29), Redshank (34), Whimbrel (3), Greenshank (3) and Turnstone (1); figures in brackets represent peak counts; 22nd June for Black-tailed Godwit and 2nd August for all other species (RPS, 2012a). The June peak for Black-tailed Godwit is somewhat late for normal spring passage and may instead represent birds over-summering in Cork Harbour.

D.1.28 Feeding and roosting Shelduck were recorded from outer Monkstown Creek throughout the summer survey period (May to August, 2011; max. count of 42, but largely 10-20 birds in the creek and neighbouring mudflats). RPS (2012a) suggests that these are mainly non-breeding birds which spend the summer in the harbour before leaving from July onwards to their communal moulting ground. The 2007-2011 Bird Atlas does, however, record evidence of breeding from within 10km grid square IW76 within which Monkstown Creek is located. With respect to Cork Harbour SPA non-breeding (rather than breeding) Shelduck is a qualifying interest for Cork Harbour SPA. Shelduck nest in rabbit holes, holes in tree roots etc. – such habitat is located along the northern side of the creek adjoining Pfizer's; this area very likely supports a small number of breeding pairs.

D.1.29 Grey Heron breed in small numbers at Black Point on the south western corner of Great Island. Peak high tide roost counts in Monkstown Creek were 21 on the 29th July and 28 on the 23rd August (roosting on the stone breakwater on the eastern outer end of Monkstown Creek). Otherwise, Grey Heron feed throughout this part of the harbour.

D.1.30 Peak counts of high tide roosting Cormorant (in the RPS studies) on the stone breakwater in the summer of 2011 were 41 (22nd June); 53 (29th July), 47 (2nd August) and 75 (9th August). On the adjoining metal pier counts were 16 (22nd June), 20 (9th August) and 27 (22nd August). [See below for details of night-time tree roost].

D.1.31 Little Egret, listed on Annex I of the EU Birds Directive, breed in Cork Harbour, but not in the immediate vicinity of Monkstown Creek; the nearest colony is at Currabinny Wood, Crosshaven (pers obs).

Non-breeding Birds

D.1.32 Counts were conducted between 20th October 2011 and 30th March 2012. In all 14 counts (7 low tide and 7 high tide) were undertaken. Count sectors 1-7 largely correspond with IWeBS count sector OL496-Monkstown Creek; they differ in that the Port of Cork survey did not extend into the inner sections of the estuary west of the lagoon (see Text Figure D1.4). With respect to the BWS count they correspond to OL496 and the eastern half of OL530 (BWS count zone OL530 therefore presents the most relevant spatial data to the inner section of walk). Count data from sectors 1-7 is presented in Table D1.11.

D.1.33 The count areas which most closely match Monkstown Creek are sectors 5, 6 & 7 (i.e. from the breakwater westwards into the inner Creek;); see Table D1.11 (peak low tide) and Table D1.12 (peak high tide); extracted from Appendix A of RPS (2012b).

Text Figure D1.4 - Port of Cork count zones.

Table D1.11 – Peak Low-tide counts from RPS (2012b) – Sectors 1-7 (i.e. out to outer edge of all intertidal areas in Monkstown Creek).

Species	1	2	3	4	5	6	7	Total 1 - 7
Black-headed Gull	125	0	12	35	26	0	22	220
Black-tailed Godwit	4	0	2	61	15	18	30	130
Light-bellied Brent Goose	0	2	0	3	0	0	8	13
Common Gull	8	0	8	4	0	0	1	21
Cormorant	2	27	14	4	0	0	1	48
Curlew	3	1	15	23	11	4	9	66
Dunlin	120	0	7	64	0	0	35	226
Great Black-backed Gull	14	3	1	2	2	1	2	25
Great Crested Grebe	1	0	0	0	0	0	0	1
Greenshank	0	0	0	0	1	0	2	3
Grey Heron	1	18	1	1	3	9	2	35
Herring Gull	8	1	2	1	1	0	3	16
Lapwing	380 *	270	190	0	0	0	2	462
Lesser Black-backed Gull	1	0	2	1	4	4	3	15
Mallard	0	1	8	0	12	0	38	59
Mute Swan	0	0	0	0	2	0	2	4
Oystercatcher	19	4	7	4	11	3	38	86
Red-breasted Merganser	0	0	0	1	0	0	0	1
Redshank	4	0	4	17	17	1	36	79
Shag	0	5	1	0	0	0	0	6
Shelduck	3	0	15	10	73	24	11	136
Snipe	8	3	0	0	0	0	0	11
Teal	0	0	0	0	7	0	51	58
Turnstone	4	1	0	0	0	0	13	18
Whimbrel	0	0	0	0	0	0	1	1

D.1.34 Peak low tide counts indicate that Monkstown Creek supports good numbers of Black-headed Gull, Black-tailed Godwit, Cormorant, Dunlin, Curlew, Grey Heron, Lapwing, Mallard, Oystercatcher, Redshank, Shelduck and Teal; a small flock of Turnstone is also present. This is very much in line with IWeBS and BWS count data.

D.1.35 The spatial data from the survey does allow us, however, to comment more specifically on the inner creek adjoining the proposed Greenway – the inner parts of count sectors 5 & 7 most closely aligns with the proposed Greenway through Raffeen Creek. This area routinely supports small flocks of Black-tailed Godwit, Dunlin, Oystercatcher, Redshank as well as Mallard and Teal. Shelduck seem to be more abundant on the larger mudflat to the south of the river channel (sector 5) and in the outer creek. Small numbers of Greenshank and Grey heron also use the inner Creek. Gull species seem to be attracted to the freshwater creek running out into the estuary. In line with recent increases in Light-bellied Brent Geese along the south coast this species in now also recorded in Lough Beg and on occasion in Monkstown Creek.

D.1.36 Teal in particular are notable as they only occur in large numbers in this area in Monkstown Creek (Sectors 5 and 7); and especially in the innermost areas of the creek (i.e. Raffeen Creek).

D.1.37 The intertidal mudflats outside the stone breakwater (1-4) are of importance for Black-tailed Godwit and Lapwing; these are at the outer edge of Monkstown Creek remote from the inner areas where crossing of the creek is being considered. Sectors 1 and 2, which are centred on the breakwater and jetty, support large numbers of roosting birds; most notably Cormorant and Grey Heron.

D.1.38 Table D1.12 present high tide count data from Sectors 1 to 7.

Table D1.12 – Peak High-tide counts from RPS (2012b) – Sectors 1-7 (i.e. out to outer edge of all intertidal areas in Monkstown Creek).

Species	1	2	3	4	5	6	7	Total 1 - 7
Bar-tailed Godwit	0	1	0	0	0	0	0	1
Black-headed Gull	0	16	0	1	17	10	4	48
Black-tailed Godwit	0	38	0	0	3	1	0	42
Brent Goose	0	1	0	0	0	0	0	1
Cormorant	1	37	0	0	0	0	1	39
Curlew	0	1	0	0	7	42	1	51
Dunlin	0	350	0	0	0	0	0	350
Great Black-backed Gull	1	2	0	0	1	0	0	4
Great Crested Grebe	0	0	0	0	1	1	0	2
Greenshank	0	04	0	0	2	1	0	7
Grey Heron	0	21	0	0	0	20	0	41
Lapwing	0	600	0	0	0	0	0	600
Lesser Black-backed Gull	1	0	0	2	1	0	0	4
Little Egret	0	0	0	0	1	0	0	1
Mallard	0	0	0	0	23	12	3	38
Oystercatcher	0	88	0	0	5	12	33	138
Redshank	0	61	0	0	5	21	2	89
Shag	0	6	0	0	0	0	0	6
Shelduck	2	18	2	0	77	34	0	133
Teal	0	0	0	0	80	10	2	92
Turnstone	0	0	0	0	26	0	9	35

D.1.39 Notable roosts of Dunlin (350), Lapwing (600), Oystercatcher (88) and Redshank (61) have been recorded on the stone breakwater (count sector 2) well away from the proposed Greenway; as would be expected for an estuary such as Monkstown smaller numbers are recorded throughout. Evidence from IWeBS, BWS and consultation indicates that these are on the opposite, southern, shoreline to the proposed Greenway. Shelduck will roost along the shore or on water when the tide is full and hence are recorded from count sectors further into the creek also at high tide.

Night-time Roost Survey

D.1.40 RPS undertook a study of the night-time Cormorant tree roost at Monkstown Creek between June 2011 and March 2012 (RPS, 2012c). Roost sites used by Cormorant include the metal pier and breakwater east of Pfizer (see Text Figure D1.4). With respect to the tree roost this can be considered as four discrete areas running from just east of Pfizer (A) to three further areas in mature trees lining the shore from Pfizer to the lagoon within the golf course (B-D). Total number of roosting birds ranged from 72 – 259 birds (A, 11-57; B, 8-28; C, 13-58 and D, 40-116). The number of birds roosting increased steadily from 72 in late June to a peak of 259 in late October. Numbers decline through November and December before rising again slightly in January and February. RPS (2012c) noted that this represents nearly 1.9% of the total Irish Cormorant population of 13,710 (Crowe *et al*., 2008).

D.1.41 The peak Cormorant count in the 2010/2011 BWS study was 279 for Cork Harbour; while the peak IWeBS count was 370 in 2004/2005 (mean 2004-2008 was 321; peak 2004-2008 was 370, with the peak count being in November) (Boland and Crowe, 2012). A large Cormorant roost is also located at Dunkettle Wood, Glanmire (Glashaboy Estuary) (39 on 09/03/2010, T. Gittings pers. comm.) and historically birds also roosted on the northern side of Fota Island (current status unknown).

D.1.42 It appears that while the breakwater can be used as a day-time high tide roost, it also functions as a pre-roost area for some birds using the night-time tree roost (later arrivals tend to fly straight to the tree roost) (RPS, 2012c). The largest single count of Cormorant on the breakwater was 99 birds present 90 minutes before dark on the 27th October 2011 (38% of the 259 roosting that night). RPS also considered the potential for operational disturbance associated with their project and concluded that Cormorant using these roosts appear to be highly habituated to noise, light and movement in the vicinity of the trees. This is similar to the birds at Glanmire with roost in mature trees immediately behind a terrace of residential houses.

DePuy Bird Data

D.1.43 As part of a proposal to erect a number of wind turbines in Lower Cork Harbour a series of bird surveys were co-ordinated by Natura Environmental Consultants on behalf of DePuy from November 2009 to October 2010 (DePuy (Ireland) Wind Energy Project EIS, 2011).

D.1.44 Counts were undertaken in both Lough Beg and Monkstown Creek. Data for Monkstown are in line with the findings presented above. Peak counts for notable species were as follows: - Cormorant (162); Grey Heron (32); Shelduck (126); Teal (94); Mallard (30); Oystercatcher (97); Lapwing (320); Black-tailed Godwit (74); Curlew (85) and Redshank (84). All Dunlin counts were <5 birds.

D.1.45 A radar study was also undertaken to allow for a more accurate assessment of bird species movements, specifically during night; this work was commissioned by Cork Lower Harbour Energy Group and was undertaken by the Food & Environment Research Agency (FERA). Work reported in (DePuy (Ireland), 2011) covered radar surveys on 12th – 22nd November 2010 and 7th – 17th December 2010 (totalling 233 hrs in November and 238 hrs in December). Based on these early data there was no evidence of significant tide related movements of birds (presumably shorebirds) between Monkstown and Lough Beg or the Owenboy River.

Figures

Client: Cork County Council

Project: Cork Lower Harbour Greenway

Title: Site Location

Designed/Drawn: DK	Checked: POD	Authorised: POD
Date: 8-6-2016	Date: 8-6-2016	Date: 8-6-2016

Figure 1.1 Rev: 0

ATKINS
Dublin - Tel: 353 - 1 - 810 8000
Cork - Tel: 353 - 21 - 429 0300
Galway - Tel: 353 - 91 786050

N

15km Buffer

Specia Area of Conservation

Great Island Channel

Cork Lower Harbour Greenway

Client: Cork County Council		
Project: Cork Lower Harbour Greenway		
Title: Special Areas of Conservation		
Designed/Drawn: DK	Checked: POD	Authorised: POD
Date: 8-6-2016	Date: 8-6-2016	Date: 8-6-2016
Figure 4.1		Rev: 0

ATKINS
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Galway - Tel: 353 - 91 786050

Client: Cork County Council

Project: Cork Lower Harbour Greenway

Title: Cork Harbour SPA

Designed/Drawn: DK	Checked: POD	Authorised: POD
Date: 8-6-2016	Date: 8-6-2016	Date: 8-6-2016

Figure 4.2 Rev: 0

ATKINS
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N

Cork Lower Harbour Greenway

proposed Natural Heritage Areas

Client: Cork County Council	
Project: Cork Lower Harbour Greenway	
Title: proposed Natural Heritage Areas	
Designed/Drawn: DK	Checked: POD / Date: 8-6-2016
Authorised: POD / Date: 8-6-2016	
Figure 4.3	Rev: 0

ATKINS
Dublin - Tel: 353 - 1 - 810 8000
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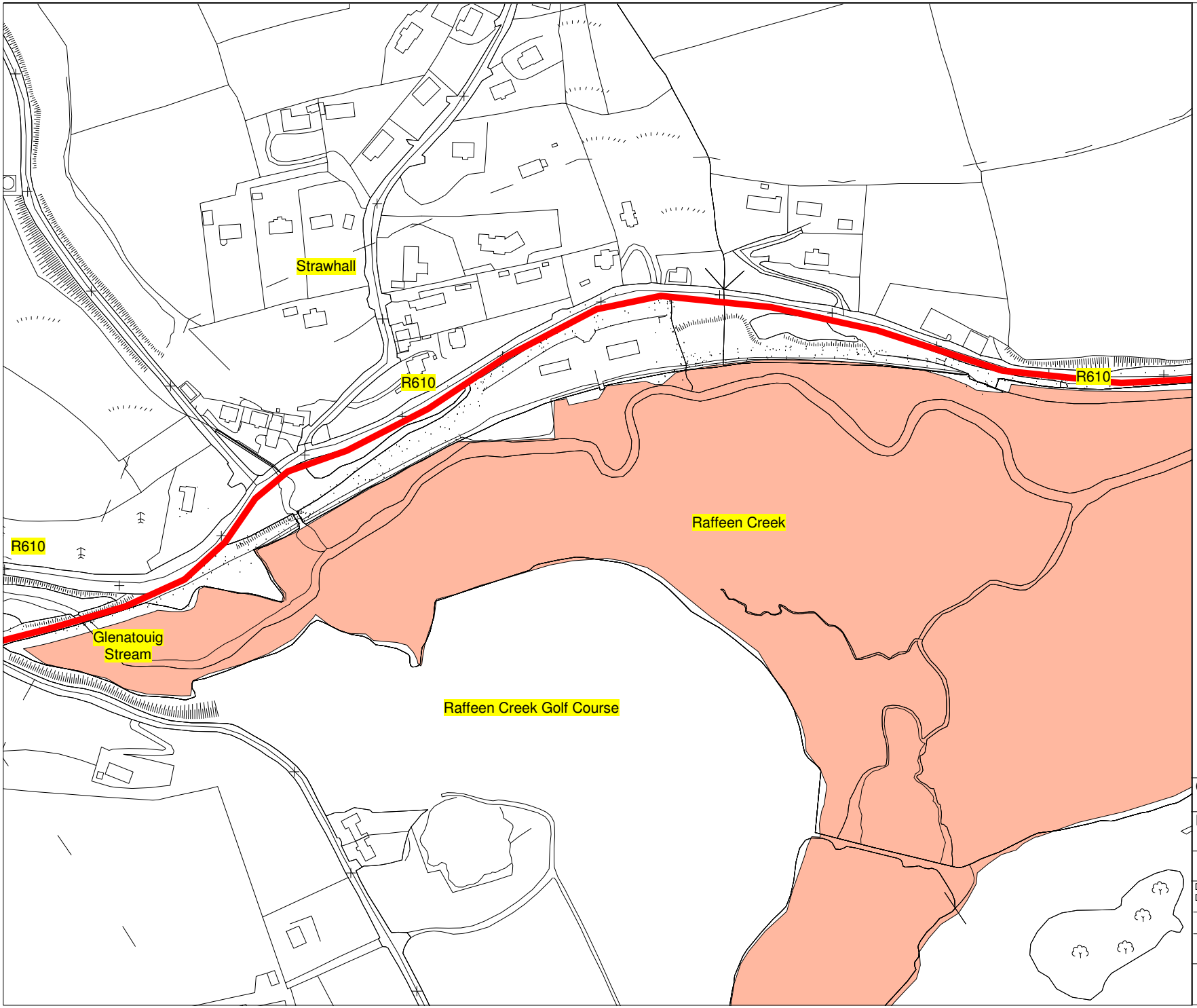

N

Proposed Greenway

(see Planning Drawings)

Proposed Greenway

Cork Harbour SPA

Client: Cork County Council		
Project: Cork Lower Harbour Greenway		
Title: SPA boundaries; Raffeen Creek		
Designed/Drawn: DK	Checked: POD	Authorised: POD
Date: 8-6-2016	Date: 8-6-2016	Date: 8-6-2016
Figure 4.4		Rev: 0

ATKINS
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Cork - Tel: 353 - 21 - 429 0300
Galway - Tel: 353 - 91 786050

Design Drawings

Cork
County Council
Comhairle Contae Chorcaí

PART 8 DESIGN DRAWINGS

Sheet List Table		
DRAWING No.	TITLE	REVISION
5146417 / HW / 0000	COVER SHEET	A
5146417 / HW / 0001	PART 8 SITE LOCATION MAP – SHEET 1 OF 2	–
5146417 / HW / 0002	PART 8 SITE LOCATION MAP – SHEET 2 OF 2	–
5146417 / HW / 800	PART 8 KEY PLAN – SHEET 1 OF 1	A
5146417 / HW / 801	PART 8 SITE LAYOUT PLAN – 1 OF 7	A
5146417 / HW / 802	PART 8 SITE LAYOUT PLAN – 2 OF 7	A
5146417 / HW / 803	PART 8 SITE LAYOUT PLAN – 3 OF 7	A
5146417 / HW / 804	PART 8 SITE LAYOUT PLAN – 4 OF 7	A
5146417 / HW / 805	PART 8 SITE LAYOUT PLAN – 5 OF 7	A
5146417 / HW / 806	PART 8 SITE LAYOUT PLAN – 6 OF 7	A
5146417 / HW / 807	PART 8 SITE LAYOUT PLAN – 7 OF 7	A

DEVELOPMENT OF PEDESTRIAN AND CYCLE GREENWAY GLENBROOK TO RAFFEEN, CO. CORK

ATKINS

Rev -

Drawing Number 5146417 / HW / 0001

DO NOT SCALE

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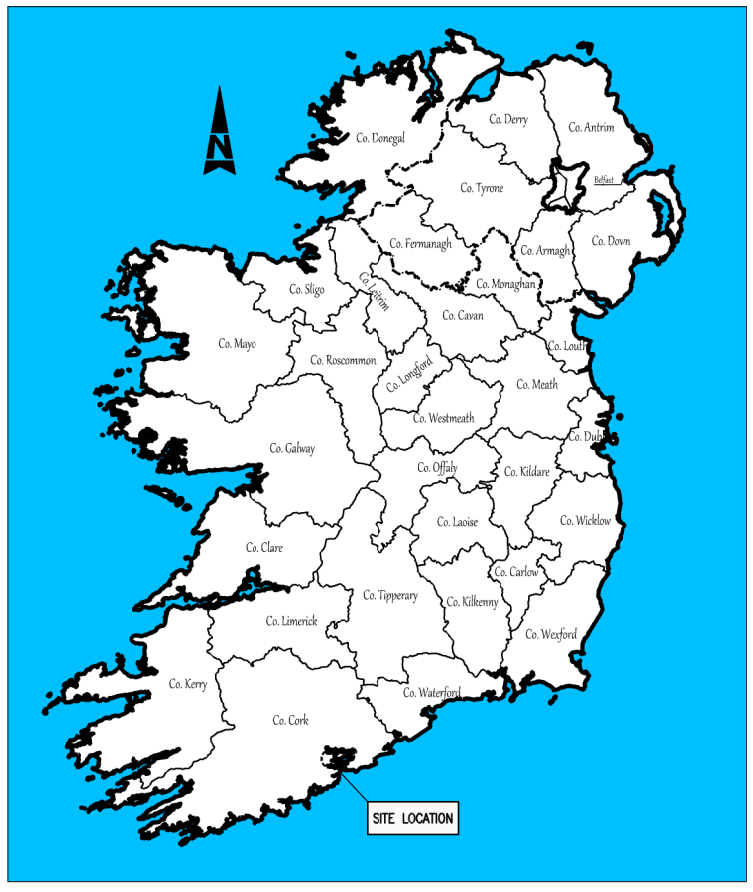

IRELAND LOCATION MAP
SCALE: 1/200,000 at A1
1/400,000 at A3

SITE PLAN
SCALE: 1/25,000 at A1
1/50,000 at A3

Cork County Council
Comhairle Contae Chorcaí

Rev	Description	By	Date	Chk'd	Auth
-	PART 8 PLANNING	CMK	01.07.16	CF	KB

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Client: CORK COUNTY COUNCIL

Project: DEVELOPMENT OF PEDESTRIAN AND CYCLE GREENWAY GLENBROOK TO RAFFEEN, CO. CORK

Title: PART 8 SITE LOCATION MAP SHEET 1 OF 2

Original Scale	Designed/Drawn	Checked	Authorised
AS SHOWN	CMK	CF	KB
	Date 01.07.16	Date 01.07.16	Date 01.07.16

Status: PD
Drawing Number: 5146417 / HW / 0001
Rev: -

File: 5146417_HW_0001.dwg
Date: Jul 01, 2016 - 3:34pm
Plotted by: CMcKeever

Z:\5146417 Cork Harbour Greenway\6 Dwgs-Graphics\61 AutoCad\5146417_HW_0001.dwg

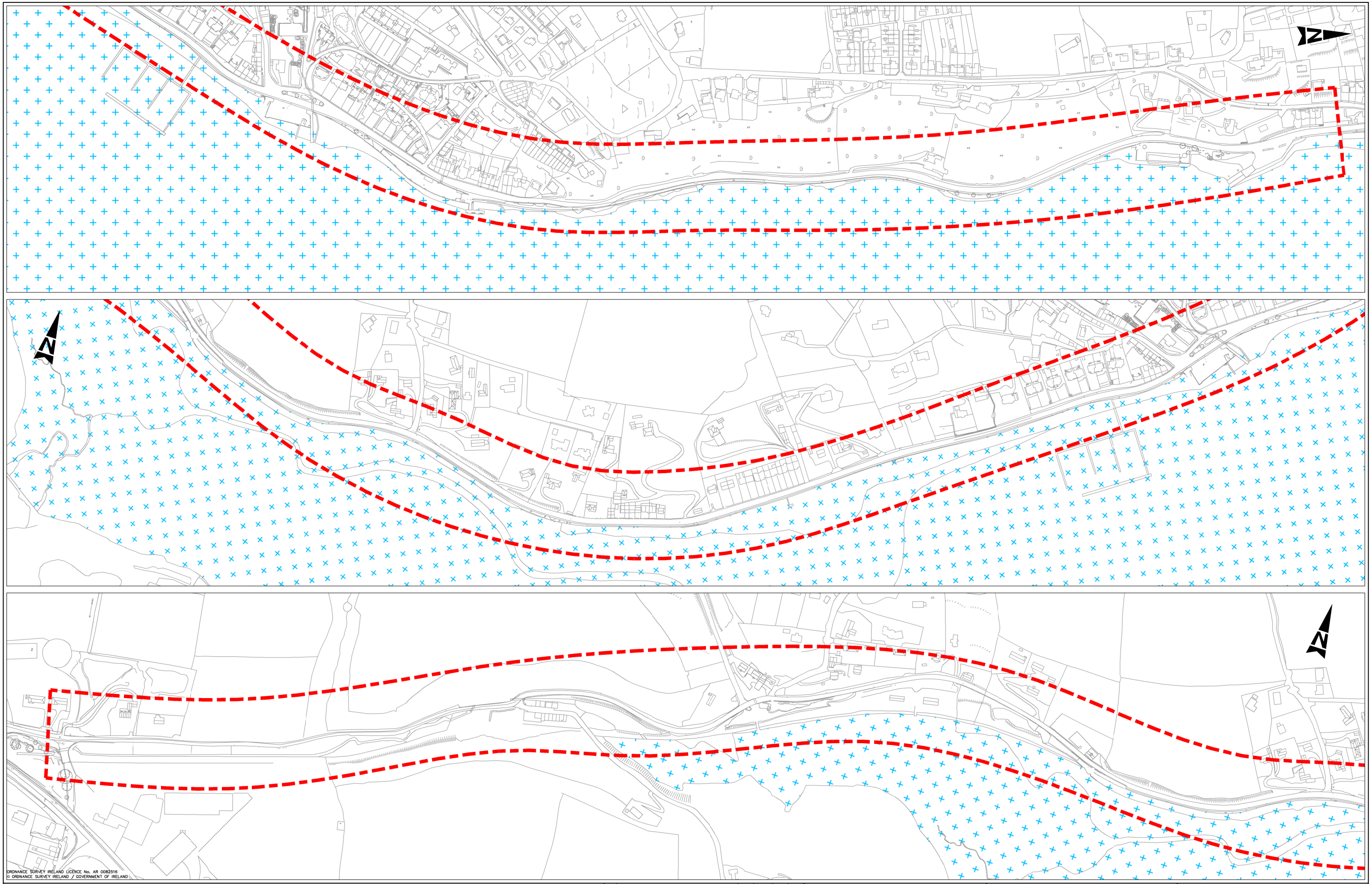
Rev -

Drawing Number 5146417 / HW / 0002

DO NOT SCALE

A1

0 10 100



File: 5146417_HW_0002.dwg
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Client: CORK COUNTY COUNCIL

Project: DEVELOPMENT OF PEDESTRIAN AND CYCLE GREENWAY GLENBRCOK TO RAFFEEN, CO. CORK

Title: PART 8 SITE LOCATION MAP SHEET 2 OF 2

Original Scale	Designed/Drawn	Checked	Authorised
1:2500 at A1	CMK	CF	KB
	Date 01.07.16	Date 01.07.16	Date 01.07.16

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Drawing Number: 5146417 / HW / 0002
Rev: -

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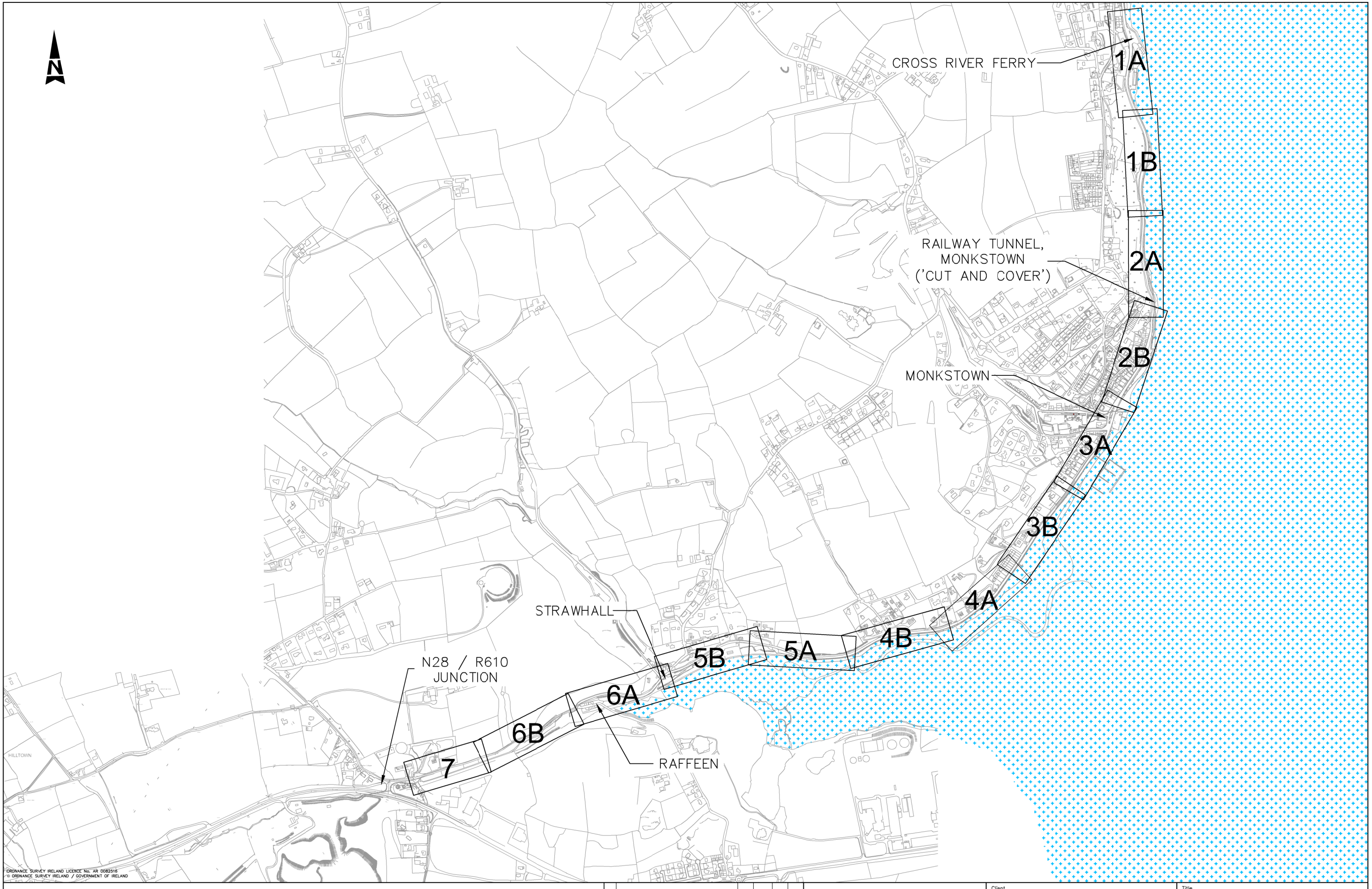
Rev A

Drawing Number 5146417 / HW / 800

DO NOT SCALE

A1 0 10 100

File: 5146417_HW_800.dwg Date: Jul 01, 2016 - 3:35pm Plotted by: CMcKeever



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Client: CORK COUNTY COUNCIL

Project: DEVELOPMENT OF PEDESTRIAN AND CYCLE GREENWAY GLENBROOK TO RAFFEEN, CO. CORK

Title: PART 8 KEY PLAN SHEET 1 OF 1

Original Scale	Designed/Drawn	Checked	Authorised
NTS	CMK Date 10.06.16	CF Date 10.06.16	KB Date 10.06.16

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Rev: A

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Rev A

Drawing Number 5146417 / HW / 801

DO NOT SCALE

100 0 10

A1

3.5m WIDE GREENWAY ON WIDENED PATH

ROADWAY NARROWED TO 6.0m WIDE

4.0m WIDE GREENWAY ON WIDENED PATH

ROADWAY NARROWED TO 6.0m WIDE

NEW 4.0m WIDE GREENWAY PATH AT EXISTING FERRY TERMINAL

MATCH 801 B 801 A LINE

R610

GREENWAY ALIGNED BETWEEN PARK WALL AND ROADWAY

EXISTING PARK WALL TO BE MAINTAINED

POTENTIAL REST/PICNIC POINT SUBJECT TO LANDSCAPE DESIGN AT FUTURE DESIGN STAGE

RIGHT TURN LANE TO BE MAINTAINED

ONWARD CONNECTION TO/FROM PASSAGE WEST

REPLACE EXISTING RAILING ON TOP OF EXISTING WALL WITH NEW RAILING SO THAT TOP OF RAILING IS 1.4m ABOVE PATH LEVEL

SLIPWAY AND ACCESS RETAINED

PUMP STATION

BUS STOP AND SHELTER RETAINED

CROSS RIVER FERRY

FERRY SLIPWAY

GREENWAY TO BE ACCOMMODATED AT FOOTPATH LEVEL ACROSS EXISTING VEHICLE ENTRANCE AND EXITS FROM FERRY APRON

FOR TYPICAL SECTION REFER TO FIGURE 1.1

FERRY APRON TO BE MAINTAINED IN ITS CURRENT LAYOUT

FIGURE 1.1 SCALE 1:100

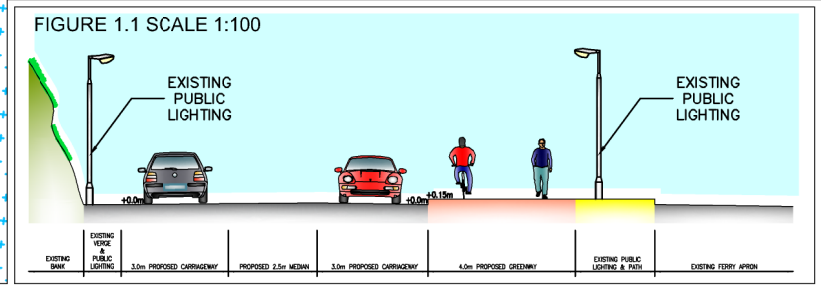

PLATE 1A

MINIMUM 3.0m WIDE GREENWAY ON WIDENED PATH

ROADWAY NARROWED TO 6.0m WIDE

4.0m WIDE GREENWAY ON WIDENED PATH

ROADWAY NARROWED TO 6.0m WIDE

MATCH 802 A 801 B LINE

MATCH 801 B 801 A LINE

R610

FOR TYPICAL SECTION REFER TO FIGURE 1.2

LANDSCAPED AREA TO BE UPGRADED

KERBSIDE RAILING TO BE REMOVED

REPLACE EXISTING RAILING ON TOP OF EXISTING WALL WITH NEW RAILING SO THAT TOP OF RAILING IS 1.4m ABOVE PATH LEVEL

FIGURE 1.2 SCALE 1:100

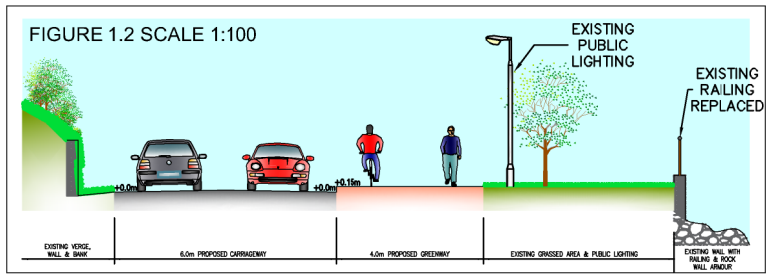

PLATE 1B

LEGEND

- CARRIAGEWAY
- NARROWED CARRIAGEWAY
- EXISTING FOOTPATHS
- PROPOSED GREENWAY PATH
- PROPOSED GREENWAY PATH (BOARDWALK)
- EXISTING SOFT LANDSCAPING
- PROPOSED / MODIFIED SOFT LANDSCAPING
- RAISED TABLE
- EXPL● EXISTING PUBLIC LIGHTING
- BUS● EXISTING BUS STOP
- NEW PL● NEW PUBLIC LIGHTING

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Rev	Description	By	Date	Chk'd	Auth
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Client: CORK COUNTY COUNCIL

Project: DEVELOPMENT OF PEDESTRIAN AND CYCLE GREENWAY GLENBRCOOK TO RAFFEEN, CO. CORK

Title: PART 8 SITE LAYOUT PLAN SHEET 1 OF 7

Original Scale	Designed/Drawn	Checked	Authorised
1:500 at A1	CMK Date 10.06.16	CF Date 10.06.16	KB Date 10.06.16

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Drawing Number: 5146417 / HW / 801

Rev: A

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Rev A

Drawing Number 5146417 / HW / 802

DO NOT SCALE

A1

0 10 100

File: 5146417_HW_802.dwg
Date: Jul 01, 2016 - 3:35pm
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GREENWAY ON EXISTING PATHWAY VIA RAILWAY TUNNEL, MONKSTOWN ('CUT AND COVER')

PATH WIDTH VARIES FROM 2.5m MINIMUM WIDTH
EXISTING PATHWAY TO BE RESURFACED OVER FULL WIDTH
PUBLIC LIGHTING TO BE UPGRADED

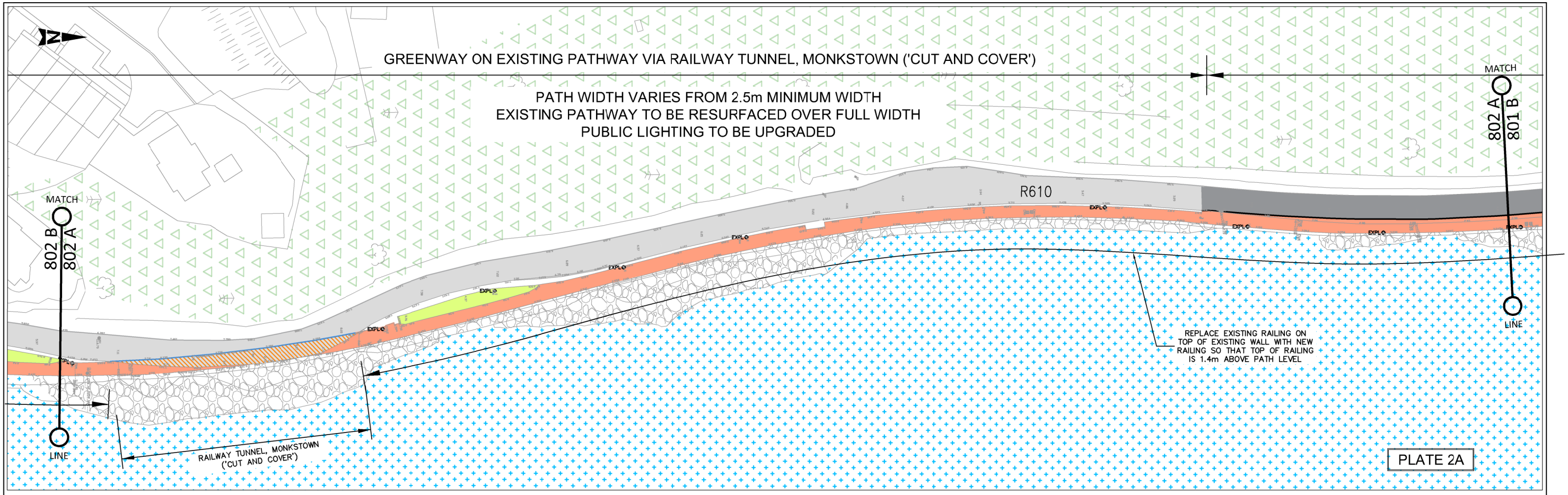

PLATE 2A

4.0m WIDE GREENWAY ON WIDENED PATHWAY

ROADWAY NARROWED TO MINIMUM 6.0m WIDTH

GREENWAY ON EXISTING PATHWAY VIA RAILWAY TUNNEL, MONKSTOWN ('CUT AND COVER')

PATH WIDTH VARIES FROM 2.5m MINIMUM WIDTH
EXISTING PATHWAY TO BE RESURFACED OVER FULL WIDTH
PUBLIC LIGHTING TO BE UPGRADED

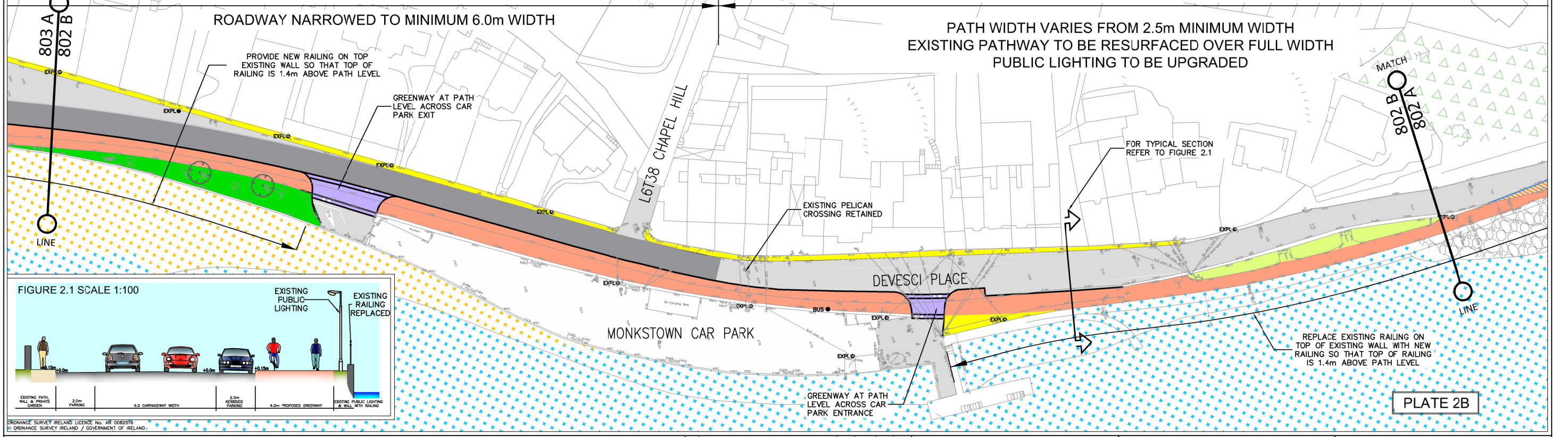

FIGURE 2.1 SCALE 1:100

LEGEND

- CARRIAGEWAY
- NARROWED CARRIAGEWAY
- EXISTING FOOTPATHS
- PROPOSED GREENWAY PATH
- PROPOSED GREENWAY PATH (BOARDWALK)
- EXISTING SOFT LANDSCAPING
- PROPOSED / MODIFIED SOFT LANDSCAPING
- RAISED TABLE
- EXPL● EXISTING PUBLIC LIGHTING
- BUS● EXISTING BUS STOP
- NEW PL● NEW PUBLIC LIGHTING

Cork County Council
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Project: DEVELOPMENT OF PEDESTRIAN AND CYCLE GREENWAY GLENBROOK TO RAFFEEN, CO. CORK

Title: PART 8 SITE LAYOUT PLAN SHEET 2 OF 7

Original Scale	Designed/Drawn	Checked	Authorised
1:500 at A1	CMK Date 10.06.16	CF Date 10.06.16	KB Date 10.06.16

Status	Drawing Number	Rev
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Rev A

Drawing Number 5146417 / HW / 803

DO NOT SCALE

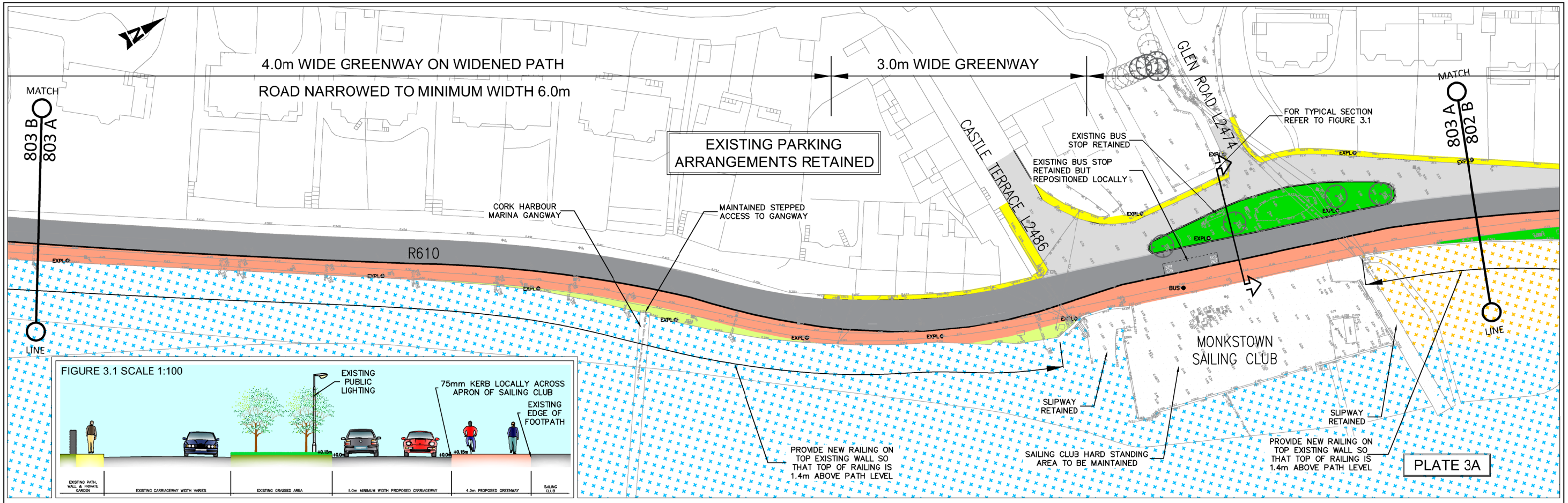
0 10 100

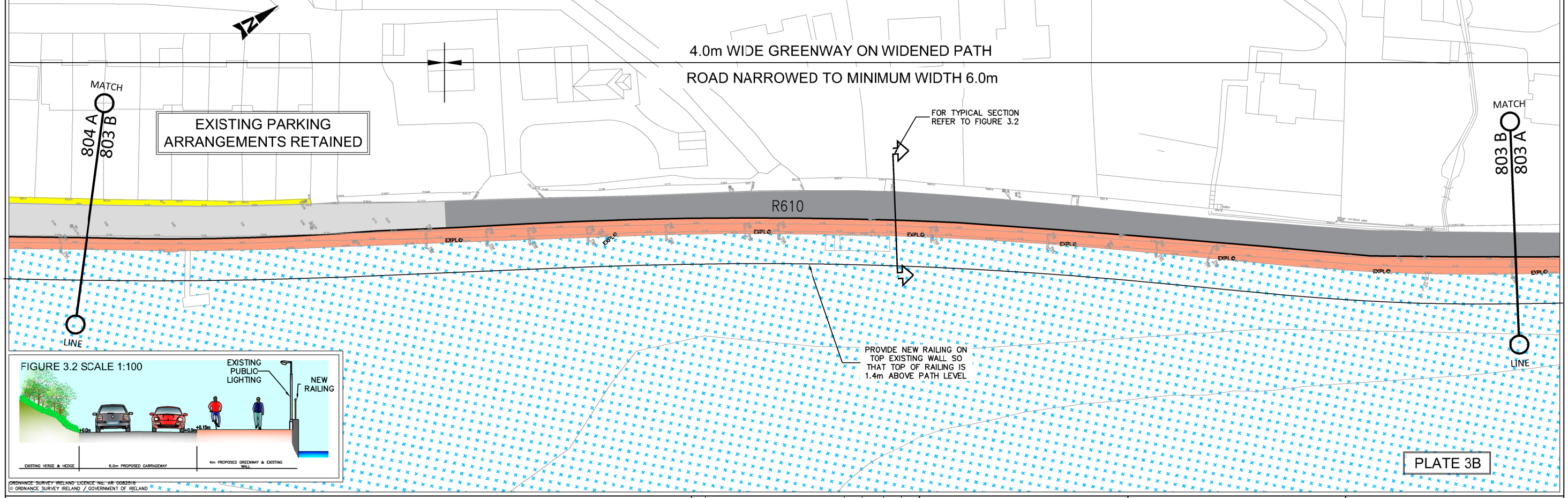
A1

Plotted by: CMcKeever

Date: Jul 01, 2016 - 3:36pm

File: 5146417_HW_803.dwg





LEGEND

- CARRIAGEWAY
- NARROWED CARRIAGEWAY
- EXISTING FOOTPATHS
- PROPOSED GREENWAY PATH
- PROPOSED GREENWAY PATH (BOARDWALK)
- EXISTING SOFT LANDSCAPING
- PROPOSED / MODIFIED SOFT LANDSCAPING
- RAISED TABLE
- EXPL● EXISTING PUBLIC LIGHTING
- BUS● EXISTING BUS STOP
- NEW PL● NEW PUBLIC LIGHTING

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Client: CORK COUNTY COUNCIL

Project: DEVELOPMENT OF PEDESTRIAN AND CYCLE GREENWAY GLENBROOK TO RAFFEEN, CO. CORK

Title: PART 8 SITE LAYOUT PLAN SHEET 3 OF 7

Original Scale	Designed/Drawn	Checked	Authorised
1:500 at A1	CMK Date 10.06.16	CF Date 10.06.16	KB Date 10.06.16

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PD	5146417 / HW / 803	A

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Rev A

Drawing Number 5146417 / HW / 804

DO NOT SCALE

A1

3.0m WIDE GREENWAY ON WIDENED PATH

ROAD WIDTH 8.0M MINIMUM

MATCH 804 B 804 A

LINE

EXISTING PARKING ARRANGEMENTS RETAINED

FOR TYPICAL SECTION REFER TO FIGURE 4.1

STRAND ROAD R610

MATCH 804 A 803 B

LINE

LANDSCAPE TO BE UPGRADED

PROVIDE NEW RAILING ON TOP EXISTING WALL SO THAT TOP OF RAILING IS 1.4m ABOVE PATH LEVEL

FIGURE 4.1 SCALE 1:100

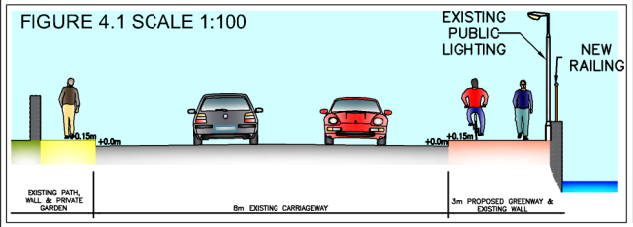

PLATE 4A

3.0 MINIMUM WIDTH GREENWAY ON WIDENED PATH

ROADWAY NARROWED TO MINIMUM 6.0m WIDTH

4.0m WIDE GREENWAY ON WIDENED PATH

ROADWAY NARROWS TO MINIMUM 6.0m WIDTH

HAYES LN

MATCH 805 A 804 B

LINE

FOR TYPICAL SECTION REFER TO FIGURE 4.2

R610

LANDSCAPE TO BE UPGRADED

ALL NEW PUBLIC LIGHTING ADJACENT ROADWAY TO BE DESIGNED TO LIGHT BOTH SHARED CYCLE & PEDESTRIAN PATH AND ROAD CARRIAGEWAY

PROVIDE NEW RAILING ON TOP OF EXISTING WALL SO THAT TOP OF RAILING IS 1.4m ABOVE PATH LEVEL

MATCH 804 B 804 A

LINE

FIGURE 4.2 SCALE 1:100

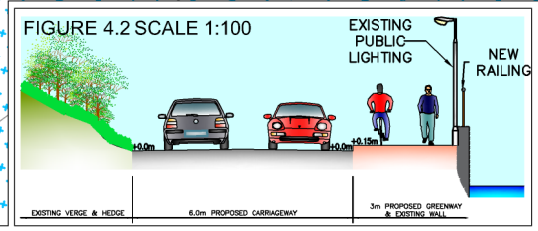

PLATE 4B

LEGEND

- CARRIAGEWAY
- NARROWED CARRIAGEWAY
- EXISTING FOOTPATHS
- PROPOSED GREENWAY PATH
- PROPOSED GREENWAY PATH (BOARDWALK)
- EXISTING SOFT LANDSCAPING
- PROPOSED / MODIFIED SOFT LANDSCAPING
- RAISED TABLE
- EXPL● EXISTING PUBLIC LIGHTING
- BUS● EXISTING BUS STOP
- NEW PL● NEW PUBLIC LIGHTING

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Client: CORK COUNTY COUNCIL

Project: DEVELOPMENT OF PEDESTRIAN AND CYCLE GREENWAY GLENBRCOK TO RAFFEEN, CO. CORK

Title: PART 8 SITE LAYOUT PLAN SHEET 4 OF 7

Original Scale	Designed/Drawn	Checked	Authorised
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Rev A

Drawing Number 5146417 / HW / 805

DO NOT SCALE

A1

PLATE 5A

4.0m WIDE GREENWAY WITH MINIMUM
1.0m WIDE GRASSED VERGE ADJACENT
EXISTING ROADWAY

4.0m WIDE GREENWAY
CONSTRUCTED TO REAR OF
EXISTING ROADSIDE EDGE
STONE WALL

MATCH
805 B
805 A
LINE

MURPH'S PUBLIC
HOUSE

ALL NEW PUBLIC LIGHTING
ADJACENT ROADWAY TO BE
DESIGNED TO LIGHT BOTH
SHARED CYCLE & PEDESTRIAN
PATH AND ROAD CARRIAGEWAY

FOR TYPICAL SECTION
REFER TO FIGURE 5.2

STONE WALL

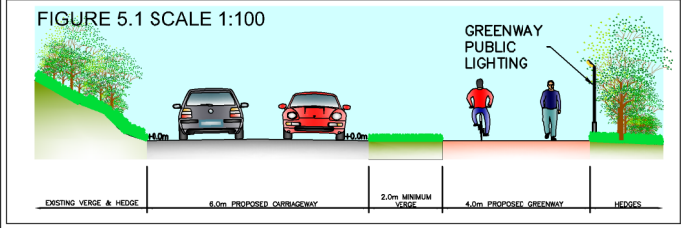
R610

MATCH
805 A
804 B
LINE

PROVIDE NEW 1.4m
HIGH RAILING

PROVIDE NEW RAILING ON
TOP EXISTING WALL SO
THAT TOP OF RAILING IS
1.4m ABOVE PATH LEVEL

FIGURE 5.1 SCALE 1:100



4.0m WIDE GREENWAY ON BOARDWALK
CONSTRUCTED TO REAR OF EXISTING ROADSIDE STONE WALL

4.0m WIDE GREENWAY WITH MINIMUM
1.0m WIDE GRASSED VERGE ADJACENT
EXISTING ROADWAY

L6470

MATCH
806 A
805 B
LINE

STONE WALL

FOR TYPICAL SECTION
REFER TO FIGURE 5.3

ALL NEW PUBLIC LIGHTING
ADJACENT ROADWAY TO BE
DESIGNED TO LIGHT BOTH
SHARED CYCLE & PEDESTRIAN
PATH AND ROAD CARRIAGEWAY

PRIVATE PROPERTY
(DISUSED BOAT YARD)

NEW CULVERT
OVER STREAM

PROPOSED NEW
PARKING LAYOUT

APPROPRIATE SIGHTLINES IN
ACCORDANCE WITH TII STANDARDS

MATCH
805 B
805 A
LINE

FIGURE 5.2 SCALE 1:100

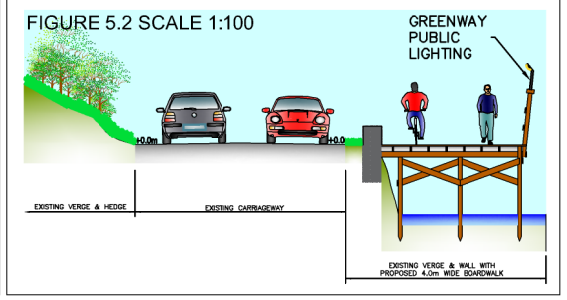


PLATE 5B

LEGEND

- CARRIAGEWAY
- NARROWED CARRIAGEWAY
- EXISTING FOOTPATHS
- PROPOSED GREENWAY PATH
- PROPOSED GREENWAY PATH (BOARDWALK)
- EXISTING SOFT LANDSCAPING
- PROPOSED / MODIFIED SOFT LANDSCAPING
- RAISED TABLE
- EXPL● EXISTING PUBLIC LIGHTING
- BUS● EXISTING BUS STOP
- NEW PL● NEW PUBLIC LIGHTING

Cork County Council
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Title: PART 8 SITE LAYOUT PLAN SHEET 5 OF 7

Original Scale	Designed/Drawn	Checked	Authorised
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Rev A

Drawing Number 5146417 / HW / 806

DO NOT SCALE

A1

4.0m WIDE GREENWAY TO REAR OF RAFFEEN COTTAGES

4.0m WIDE GREENWAY ON RAILWAY EMBANKMENT FENCING BOTH SIDES

4.0m WIDE GREENWAY WITH MINIMUM 1.0m WIDE GRASSED VERGE ADJACENT EXISTING ROADWAY

MATCH 806 B 806 A LINE

R610

L6473 RAFFEEN COTTAGES

L2489

MATCH 806 A 806 B LINE

PROPOSED FENCE

LANDSCAPED AREA

PROPOSED WALL

PROPOSED SPEED RAMP

EXISTING WALL TO BE REMOVED

GREENWAY ROAD CROSSING OF L6473 PER DESIGN GUIDANCE NRA TD 300

STAGGERED GATE (TD 300 DETAIL)

PROVIDE NEW RAILING ON TOP OF EXISTING WALL SO THAT TOP OF RAILING IS 1.4m ABOVE PATH LEVEL

FOR TYPICAL SECTION REFER TO FIGURE 6.1

ALL NEW PUBLIC LIGHTING ADJACENT ROADWAY TO BE DESIGNED TO LIGHT BOTH SHARED CYCLE & PEDESTRIAN PATH AND ROAD CARRIAGEWAY

PROPOSED SPEED RAMP

FENCING

PROPOSED WALL

HARD STANDING AREA

STAGGERED GATE (TD 300 DETAIL)

PROPOSED SPEED RAMP

FOR TYPICAL SECTION REFER TO FIGURE 6.2

PROPOSED NEW BRIDGE DECK AND GUARDRAILS ON EXISTING ABUTMENTS. GREENWAY WIDTH TO BE 2.5m WIDE

2.0m HIGH PALISADE SCREENING FENCE WITH WILLOW SCREENING

NEW PLG

FIGURE 6.2 SCALE 1:100

FIGURE 6.1 SCALE 1:100

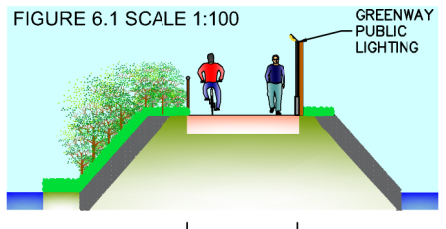

PLATE 6A

3.0m WIDE GREENWAY ON EXISTING TRAIL AT RAFFEEN WOODS

MATCH 807 A 806 B LINE

MATCH 806 B 806 A LINE

R610

FENCING

FOR TYPICAL SECTION REFER TO FIGURE 6.3

NEW PLG

FIGURE 6.3 SCALE 1:100

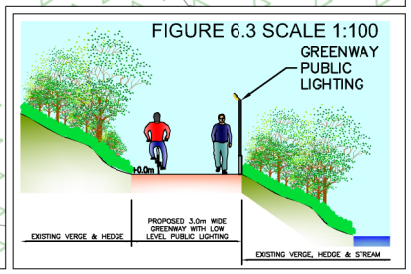

PLATE6B

LEGEND

- CARRIAGEWAY
- NARROWED CARRIAGEWAY
- EXISTING FOOTPATHS
- PROPOSED GREENWAY PATH
- PROPOSED GREENWAY PATH (BOARDWALK)
- EXISTING SOFT LANDSCAPING
- PROPOSED / MODIFIED SOFT LANDSCAPING
- RAISED TABLE
- EXPL● EXISTING PUBLIC LIGHTING
- BUS● EXISTING BUS STOP
- NEW PL● NEW PUBLIC LIGHTING

Cork County Council
Comhairle Contae Chorcaí

Rev	Description	By	Date	Chk'd	Auth
A	PART 8 PLANNING	CMK	01.07.16	CF	KB
-	DRAFT FOR INFORMATION	CMK	01.07.16	CF	KB

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Client: CORK COUNTY COUNCIL

Project: DEVELOPMENT OF PEDESTRIAN AND CYCLE GREENWAY GLENBROOK TO RAFFEEN, CO. CORK

Title: PART 8 SITE LAYOUT PLAN SHEET 6 OF 7

Original Scale	Designed/Drawn	Checked	Authorised
1:500 at A1	CMK Date 10.06.16	CF Date 10.06.16	KB Date 10.06.16

Status	Drawing Number	Rev
PD	5146417 / HW / 806	A

File: 5146417_HW_805.dwg
Date: Jul 01, 2016 - 3:37pm
Plotted by: CMcKeever

Z:\5146417 Cork Harbour Greenway\6 Dwgs-Graphics\61 AutoCad\5146417_HW_805.dwg

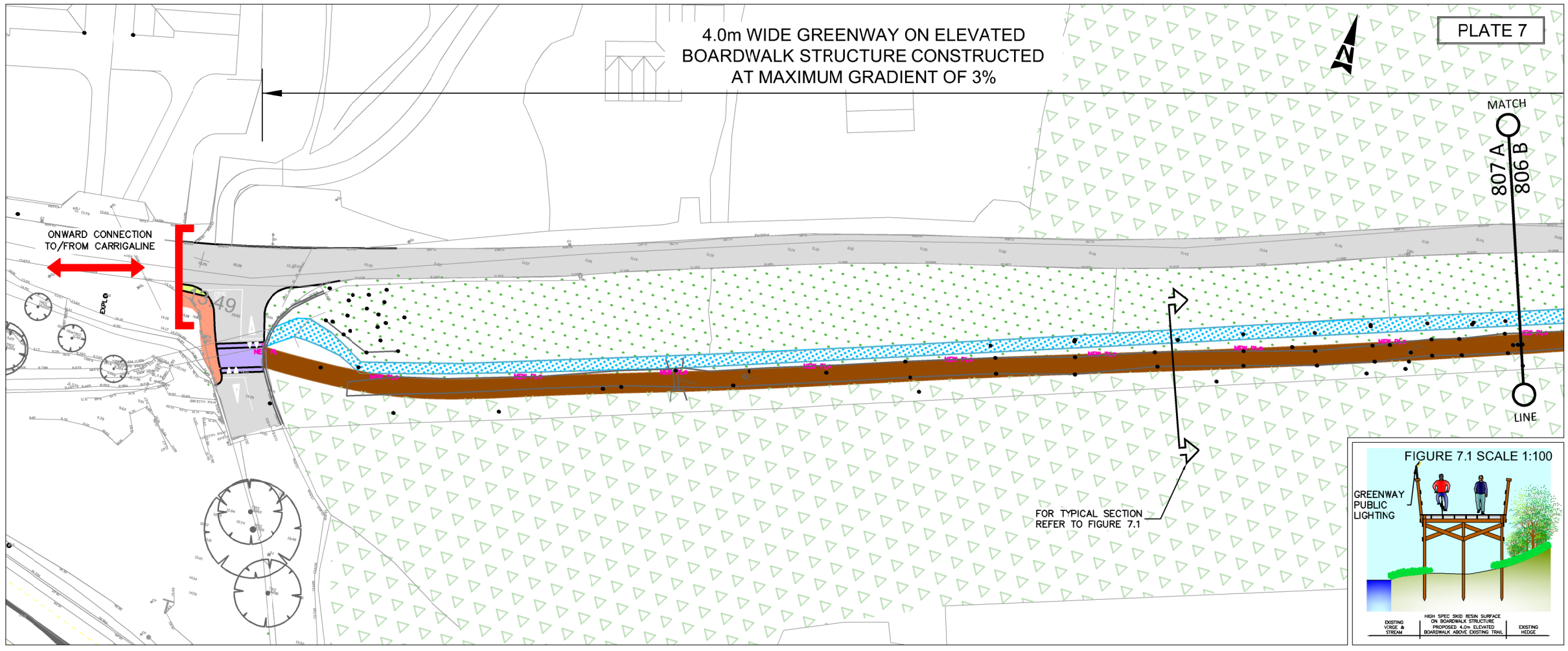
Rev A

Drawing Number 5146417 / HW / 807

DO NOT SCALE

A1

0 10 100



LEGEND

- CARRIAGEWAY
- NARROWED CARRIAGEWAY
- EXISTING FOOTPATHS
- PROPOSED GREENWAY PATH
- PROPOSED GREENWAY PATH (BOARDWALK)
- EXISTING SOFT LANDSCAPING
- PROPOSED / MODIFIED SOFT LANDSCAPING
- RAISED TABLE
- EXPL● EXISTING PUBLIC LIGHTING
- BUS● EXISTING BUS STOP
- NEW PL● NEW PUBLIC LIGHTING

Cork County Council
Comhairle Contae Chorcaí

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Client: CORK COUNTY COUNCIL

Project: DEVELOPMENT OF PEDESTRIAN AND CYCLE GREENWAY GLENBROOK TO RAFFEEN, CO. CORK

Title: PART 8 SITE LAYOUT PLAN SHEET 7 OF 7

Original Scale	Designed/Drawn	Checked	Authorised
1:500 at A1	CMK Date 10.06.16	CF Date 10.06.16	KB Date 10.06.16

Status	Drawing Number	Rev
PD	5146417 / HW / 807	A

File: 5146417_HW_807.dwg Date: Jul 01, 2016 - 3:38pm Plotted by: CMcKeever

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- Water
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