Appendix C

Winter Bird Survey Report

Appendix C Winter Bird Survey

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1. Introduction

Dixon.Brosnan were commissioned by Arup to carry out an appraisal of the potential impacts of the proposed development of the Aghada/Whitegate Collection and Treatment System at the villages of Whitegate, Upper Aghada, Lower Aghada and Rostellan in County Cork, on birds utilising the development site and the coastal areas adjacent to it. The information in this report was used to help determine the impacts on bird populations and also informed the conclusions of the NIS which specifically addresses impacts on designated Natura 2000 sites including the Cork Harbour SPA.

Special attention was paid to four locations within the study area (**see Figure 1**), which are likely to be of particular relevance to the proposed development, as follows:

- The proposed Rostellan terminal pumping station location, which falls within the Cork Harbour SPA boundary lines;
- Elevated ground along the western side of Lower Aghada Pier, adjacent to a section of the Cork Harbour SPA, in which it is proposed to construct the Lower Aghada terminal pumping station;
- The proposed Whitegate terminal pumping station which lays in close proximity to a large area of mudflat habitat within the Cork Harbour SPA
- The coastal waters and beach at White Bay where it is proposed to construct the treated effluent outfall (outside SPA boundaries).

Results from these locations are discussed in the context of the study area as a whole and in the context of Cork Harbour SPA.

2. Methodology

2.1 Desktop Review

A desktop review was carried out to identify designated SPAs in the surrounding landscape. From the information provided in the desktop review and a site inspection, it was concluded that winter bird counts would be required to accurately assess any potential ecological impacts on birds which might accrue from the proposed development.

2.2 NPWS Winter bird survey

During 2010/2011 a waterbird survey programme was conducted by the NPWS within Cork Harbour. This waterbird survey programme was designed to investigate how waterbirds are distributed across coastal wetland sites during the low tide period. The surveys ran alongside and were complementary to the Irish Wetland Bird Survey (I-WeBS). This survey consisted of four low tide counts (October, November and December 2010 and February 2011) and one high tide count (January 2011), where waterbirds were counted within a series of 73 count subsites within the SPA. The behaviour of waterbirds during counts was attributed to one of two categories (foraging or roosting/other) while the position of birds was recorded in relation to one of four broad habitat types; Intertidal (area between mean high water and mean low water), Subtidal (area that lies below mean low water), Supratidal and Terrestrial. In addition to the main survey programme described above, a high tide roost survey was undertaken on the 29th and 30th November 2010.

A total of 58 waterbird species were recorded during the 2010/11 survey programme at Cork Harbour, which includes all species listed as conservation interests for the Cork Harbour SPA. Of the species listed as special conservation interests for the Cork Harbour SPA, 18 were recorded in the estuary in the vicinity of the wastewater collection network of the Whitegate-

Aghada agglomeration proposed works, namely; Curlew, Lapwing, Black-tailed Godwit, Redshank, Wigeon, Dunlin, Teal, Little Grebe, Cormorant, Grey Heron, Black-headed Gull, Common Gull, Great Crested Grebe, Oystercatcher, Shelduck, Shoveler, Red-breasted Merganser and Lesser black-backed Gull. In addition, Pintail was once common in the area but has seen a dramatic decline in numbers recorded over the last decade.

2.2.1 Curlew (*Numenius arquata*)

Curlew has a widespread breeding range across temperate latitudes of the Palearctic region, occurring across Europe and Asia from Ireland in the west to northern China in the east (Delaney et al. 2009). The nominate subspecies breeds across Europe and winters in Europe. Ireland supports a small and declining population of breeding Curlew. Irish breeding Curlew are thought to make only short migrations and be mainly resident during winter. Wintering numbers are enhanced by birds moving in from breeding grounds in Fennoscandia, the Baltic and northwest Russia (Delaney et al. 2009) and Britain (Wernham et al. 2002).

Curlews are the largest intertidal wader to spend the non-breeding season within Ireland. Within intertidal areas they seek out larger prey items such as crabs, large worms and bivalves. Their de-curved bill is ideally suited to extracting deep-living worms such as Lugworms (*Arenicola marina*). Curlews are also known to heavily utilise agricultural grassland as foraging sites especially during periods of high tide. Curlews rely on large prey that takes more time to handle in contrast to many other wader species that swallow prey relatively quickly upon finding it. As a consequence, Curlews are territorial foragers and tend to occur widely spaced from each other to avoid competitive conflicts.

Curlew are usually well dispersed across the estuary while feeding, but generally roost communally, usually along salt marshes and sand banks. Curlew was recorded both roosting and foraging within the estuary in the vicinity of the proposed work sites. They were also recorded terrestrial foraging within agricultural grassland (outside of the SPA boundary) in the vicinity of the proposed sites.

2.2.2 Black-tailed Godwit (*Limosa limosa*)

Black-tailed Godwits have a widespread Palearctic breeding distribution. Four populations are recognised – three populations of the nominate *L. l. limosa* and one *L. l. islandica*, the latter of which breeds almost exclusively in Iceland and winters in Britain, Ireland, Spain, Portugal and Morocco (Delaney et al. 1999).

Black-tailed Godwits are relatively large long-billed wading birds that forage within intertidal flats for their preferred prey of bivalves such as *Macoma balthica*, *Scrobicularia plana* and *Mya arenaria*. At some sites, polychaete worms form a larger proportion of the diet and the species is relatively adaptable, utilising other habitats for foraging where available, such as terrestrial grassland, coastal marshes or freshwater callows.

Black-tailed Godwit was recorded in half of subsites in proximity to the proposed development. Black-tailed Godwit was recorded terrestrial roosting in the vicinity of the proposed WwPS (Rostellan) site. Terrestrial foraging within agricultural grassland (outside of the SPA boundary) was also recorded, this is likely to occur regularly within other suitable grassland areas that are outside the SPA boundary.

2.2.3 Wigeon (*Anas Penelope*)

Wigeon have a widespread breeding distribution across northern Europe and Asia, from Iceland and northern Britain across Scandinavia, and northern Russia to the Bering Sea coast (Wernham et al. 2002). The species is highly migratory. Five main wintering groups are known;

birds breeding in northwest and northeast Europe and west Siberia spend winter in northwest Europe.

The Wigeon diet is almost entirely vegetarian and a major part of the diet comprises seagrass and algae species which are taken by grazing or dabbling in shallow water. Wigeon also forage within grasslands and agricultural crops for seeds, stems and rhizomes. A gregarious bird, they are rarely seen far from water.

Wigeon were recorded both foraging and roosting within sections of the estuary in proximity to the proposed development site.

2.2.4 Lapwing (*Vanellus vanellus*)

Lapwing is a monotypic species and has a wide Palearctic breeding distribution from Britain and Ireland in the west to Eastern and southern Siberia in the east with a southern limit extending into Spain (Delaney et al. 2009). Birds breeding in Britain and Ireland are partial migrants with some residing over winter and some migrating south. The wintering population is enhanced by Lapwings moving in from continental Europe and northern and western Britain (Wernham et al. 2002). Cold weather movements can see a greater flux of birds to Ireland's estuaries.

Lapwings are traditionally 'inland' waders. During winter they can be observed across a wide variety of habitats, principally using lowland farmland and freshwater wetlands (e.g. turloughs and callows) but also coastal wetlands where they feed on a variety of soil and surface living invertebrates. They are opportunistic and mobile birds and will readily exploit temporary food sources such as newly-ploughed fields. Estuaries are typically used as roosting areas where large flocks may be observed roosting upon the tidal flats but coastal areas will also be used to a greater degree during cold weather events when farmland and freshwater habitats freeze over. There is evidence in the UK that utilisation of coastal habitats has increased, coupled with an increase in intertidal feeding (Gillings et al. 2006).

Lapwing were recorded both foraging and roosting in the surrounding estuary in proximity to the proposed development area. A flock of 235 roosted near the quay within the proposed development area. They were also recorded foraging in the surrounding landscape.

2.2.5 Redshank (*Tringa tetanus*)

Redshank (*Tringa tetanus*) breeds widely across the Palearctic in a band that extends both into the low arctic and Mediterranean zones, from Iceland through continental Europe and Russia to eastern Siberia, China and Mongolia. The taxonomy of the species has proved complex but five populations are currently recognised including *T. t. britannica*, a small and declining population that breeds in Britain and Ireland, and T*. t. robusta* that breeds in Iceland and the Faeroes and winters in Britain, Ireland and the North Sea area (Delaney et al. 2009).

Redshanks forage mainly by pecking at the surface or probing within intertidal mudflats; generally favouring the muddier sections of sites where they prey upon species such as the Ragworm (*Hediste diversicolor*) and Mud Snail (*Hydrobia ulvae*). A particularly favoured prey is the burrowing amphipod *Corophium volutator*.

Redshank was recorded foraging and roosting within the estuary in close proximity to the development area.

2.2.6 Shelduck (*Tadorna tadorna*)

Shelduck has five known populations which breed across temperate Eurasia. The northwest Europe population breeds and winters along coasts of Britain, Ireland, Scandinavia, the Baltic

and continental Europe. Although a breeding species in Ireland, Shelducks undertake a moult migration each autumn. Large moult gatherings occur along traditionally used areas of the north German coast of the Wadden Sea although several sites in Britain have also become recognised as important moulting areas such as Bridgewater Bay (Severn Estuary), the Humber Estuary, the Wash, and the Firth of Forth. Following the moult, the ducks then migrate to wintering areas.

Shelducks can forage in a variety of ways from scything their bill through wet mud on exposed tidal flats, to dabbling and scything in shallow water and up-ending in deeper waters. They can therefore forage throughout the tidal cycle.

Shelduck was recorded foraging and roosting within the estuary in close proximity to the proposed development area. The subsite Whitegate Bay which lays in proximity to the development site was ranked in the top ten peak low tide intertidal foraging densities survey sites for Shelduck.

2.2.7 Teal (*Anas crecca*)

Teal has five breeding subspecies that occur across north and northwest Europe, Siberia and into Asia (Wetlands International, 2006). Teal are largely migratory, moving south of their breeding range during winter. Being highly responsive to cold spells they can show rapid and extensive movement during these periods. Teal breeding in Britain and Ireland are supplemented during winter by birds from a range extending from Iceland, through Scandinavia to northwest Siberia (Wernham et al. 2002).

Non-breeding Teal are widely distributed throughout Ireland, favouring areas of shallow water on estuarine coastal lagoons, coastal and inland marshes, and flooded pastures and ponds. Teal are omnivores and have a variety of foraging methods (e.g. dabbling and upending) within differing habitats and water depths.

Teal were recorded in close proximity to the proposed development area.

2.2.8 Shoveler (*Anas clypeata*)

Shoveler has a widespread breeding distribution across north America, Canada, north and eastern Europe, Siberia to central Asia (Wetlands International, 2006). The small numbers of Shoveler breeding in Ireland are largely sedentary or dispersive and are supplemented during winter by migratory birds from northwest and central Europe. The wintering population is relatively small (c.2,770 individuals) (Crowe & Holt, 2013).

Shovelers are omnivorous, taking a range of items from planktonic crustaceans and small molluscs, to insects, larvae, plant material and seeds. A true dabbling duck, Shovelers feed by surface-feeding, swimming with head and neck immersed, up-ending, and less often, by shallow dives.

Shovelers was recorded foraging and roosting within the estuary in close proximity to the proposed development area. The subsite Whitegate Bay which lays in proximity to the development site was ranked in the top ten peak low tide intertidal foraging densities survey sites for Shovelers.

2.2.9 Red-breasted Merganser (*Mergus serrator*)

Red-breasted Mergansers have a wide breeding range which spans northern Europe, Russia, Siberia and North America. The Irish breeding population is thought to be sedentary. Large flocks of moulting birds congregate at several sites in Ireland and numbers remain relatively stable throughout the wintering season apart from some peaks possibly reflecting passage

populations or cold weather movements (Crowe, 2005). The wintering population is thought to be increased to some extent by the addition of birds from central Europe, eastern Greenland (Robinson, 1999) and Iceland (Scott & Rose, 1996).

Red-breasted Mergansers are sea ducks that feed on fish, obtained by frequent dives from the surface. They prefer shallow waters (range 3 – 6m) (BWPi, 2004).

Red-breasted Mergansers was recorded foraging and roosting within the estuary in close proximity to the proposed development area. Both the Agahda Lower and Whitegate Bay subsites were noted to contain peak numbers of Red-breasted Mergansers for Cork Harbour.

2.2.10 Little Grebe (*Tachybaptus ruficollis*)

Little Grebes are a widespread breeding species. The nominate race breeds throughout temperate Europe, northwest Africa, Turkey and Israel. Breeding on shallow freshwaters, the nominate race is thought to move to wintering areas in a westwards or southwest direction. In Ireland some individuals move to coastal estuaries and bays during winter although many stay on inland waterbodies. Movements to coastal sites increase during period of cold (freezing) weather. The true nature of movements and migrations are still relatively unknown for this species (Wernham et al. 2002).

Rostellan Lake was noted to contain one of the highest densities of the species during the four low tide survey periods.

2.2.11 Great Crested Grebe (*Podiceps cristatus*)

Great Crested Grebes are a widespread breeding species; one population of the nominate subspecies breeds and winters in north and west Europe (Wetlands International, 2006). It is thought likely that the majority that breed within Ireland are resident, with individuals breeding at inland wetlands (lakes) moving to coastal sites for the winter period. Some immigration of individuals due to cold weather movements is likely (Crowe, 2005) but the true nature of this species' movements is poorly known (Wernham et al. 2002).

Great Crested Grebes are largely piscivorous and make short dives for their prey in the depth range of 2-4m.

Great Crested Grebes was recorded foraging and roosting within the estuary in close proximity to the proposed development area. The subsite Whitegate Bay held peak numbers of this species both during the four low tide surveys and during the high tide survey.

2.2.12 Cormorant (*Phalacrocorax carbo*)

The nominate race of *Phalacrocorax carbo* breeds along the coasts of the North Atlantic from eastern Canada and the Norwegian coast in the north, to northwest France in the south. The species is only partially migratory or dispersive (Wernham et al. 2002). Most Cormorants in Ireland are of the nominate race and breed primarily on rocky cliffs and offshore islands. Although wintering historically along the coast, since the 1960s there has been a gradual shift towards the use of inland freshwater sites (Mitchell et al. 2004). Cormorants are piscivorous (fish-eating) seabirds.

Cormorants were recorded both foraging and roosting in close proximity to the proposed works areas.

2.2.13 Grey Heron (*Ardea cinerea*)

Grey Herons occur throughout much of the Palearctic, Africa and south Asia. Although migratory, the species is largely resident in Ireland. Some immigration is thought to occur.

Grey Herons feed predominantly upon fish. The species is typically a solitary feeder but at abundant temporary food sources, or where available feeding areas are restricted, congregations can occur (Kushlan and Hancock 2005).

Grey Heron was recorded both foraging and roosting in close proximity to the proposed works areas.

2.2.14 Oystercatcher (*Haematopus ostralegus*)

Haematopus ostralegus is polytypic; four subspecies are recognised of which only two occur within western Europe and Africa (Delaney et al. 2009). The nominate race breeds in western and northern Europe as far as Iceland, Norway and Finland and includes those birds that breed within Ireland. Irish-breeding birds are partial migrants, some moving south during winter while others remain on the Irish coast. Wintering birds are supplemented by breeding birds from Iceland and the Faeroe Islands (Wernham et al. 2002).

Oystercatchers are large wading birds that forage primarily on tidal flats although the species can be found foraging along non-estuarine coastline or terrestrially for earthworms. On tidal flats their food consists of Cockles (*Cerastoderma edule*), Blue Mussels (*Mytilus edulis*) and to a lesser degree other bivalve molluscs such as *Macoma balthica*, *Scrobicularia plana* and *Mya arenaria* as well as larger polychaetes such as *Arenicola marina* and *Hediste diversicolor*. Cockles and Mussels are favoured prey items and 'universally important during winter' (Zwarts et al. 1996) because these bivalves live in the upper sediment and are nearly always accessible, although it is now known that individual birds may be specialised by way of morphology with regards choosing one or the other of these prey items and their methods of handling them.

Oystercatchers were recorded both foraging, including terrestrial foraging, and roosting in close proximity to the proposed works areas. Both Whitegate Bay and Agahda Lower supported high numbers of this species during all four low tide surveys. Whitegate Bay was also noted to hold peak numbers, up to 111 individuals, during the high tide survey.

2.2.15 Dunlin (*Calidris alpina*)

The Dunlin is a Holarctic and highly migratory wader, breeding widely in Arctic zones across Europe, Asia and North America. The nominate form alpina breeds from northern Scandinavia eastwards across European Russia and western Siberia to 850 E (Delaney et al. 2009). This race migrates southwest to winter along the coasts of Western Europe, south to Iberia, western Mediterranean and beyond. The majority of Dunlin wintering in Ireland are C. a. alpina that originate from the western part of their breeding range and moult mainly in the Wadden Sea before starting to arrive in Ireland during October (Crowe, 2005). Ireland has a small and declining breeding population of Calidris alpina schinzii which are believed to winter mainly in west Africa (Delaney et al. 2009).

The Dunlin diet is relatively wide and although this versatile species often shows a preference for muddier areas within sites (e.g. Hill et al. 1993; Santos et al. 2005), their distribution can often be widespread with no clear patterns.

Dunlin was recorded at a sporadic distribution in proximity to the proposed development area.

2.2.16 Black-headed Gull (*Chroicocephalus ridibundus*)

Black-headed Gulls breed widely throughout the middle latitudes of the Palearctic and in north-eastern North America (Mitchell et al. 2004). It is the most widespread breeding seabird within Ireland, breeding both inland and on the coast. Winter numbers are boosted by birds arriving from northern and eastern Europe (Wernham et al. 2004). There is some evidence that gulls from Iceland also move into Ireland for the winter (BWPi, 2004).

Black-headed Gulls were recorded both foraging and roosting in close proximity to the proposed development area. Terrestrial foraging and roosting was also recorded. A peak subsite count of 790 Black-headed Gulls was recorded at Whitegate Bay during the February survey. Agahda Lower was notable for supporting numbers ranked as 'high' in all four low tide surveys.

2.2.17 Common Gull (*Larus canus*)

The Common Gull breeds widely across the Palearctic and in North America (Mitchell et al. 2004). In Ireland, the species is most widely seen during winter when wintering birds arrive from Scotland and continental Europe (Wernham et al. 2004).

Common Gull was recorded both foraging and roosting, including terrestrial roosting, in close proximity to the proposed works areas. Both subsites Agahda and Agahda Lower contained high numbers of the species foraging sub tidally.

2.2.18 Lesser Black-backed Gull (*Larus fuscus*)

Lesser Black-backed Gulls that occur as breeding and wintering birds in Britain and Ireland belong to the race *graellsi*i, which also breeds across western Europe, Iceland, the Faeroes and Greenland. Smaller numbers of the race intermedius also occur at times and numbers during winter are increased by gulls from the Netherlands and Germany, thought to be an intergrade between *graellsii* and *intermedius* (Wernham et al. 2002).

Lesser Black-backed Gull has been recorded and is likely to occur in close proximity to the proposed works areas.

2.2.19 Pintail (*Anas acuta*)

The Pintail has a Holarctic distribution breeding widely over northern temperate and arctic zones. Although there is a small population breeding within Ireland, the main numbers that winter in Ireland come from breeding grounds from Iceland eastwards through Fennoscandia to western Russia (Wernham et al. 2002). Although breeding within terrestrial wetlands, wintering takes places primarily within estuaries or coastal brackish lagoons.

Pintail has mainly been recorded at the subsite Rostellan Lake, which lays in close proximity to the proposed network WwPS (Rostellan) site. Rostellan Lake once held high numbers of Pintail in the mid to late 1990's with peak numbers of 61 individuals (1995/96: I-WeBS). The subsite now supports very few Pintail (maximum number in last decade was four individuals).

2.2.20 NPWS data - conclusions

Based on the NPWS data it can be concluded that the proposed development areas around Whitegate, Rostellan and Lower Aghada have the potential to support a range of important bird species due to the presence of high value mudflat habitat. White Bay has the potential to support piscivorous species associated with the Cork Harbour SPA as they forage within the coastal waters within the overall Harbour.

2.3 Winter bird survey - methodology

A winter bird survey was undertaken on three separate occasions; 25th of January and the 1st & 6th of February 2018. The survey methodology was based on that used by the British Trust for Ornithology (BTO), Wetland Bird Survey (WeBS) and also that for the Irish Wetland Bird Survey (I-WeBS), as outlined in Gilbert et al. (1998). The winter bird survey was undertaken using 8.5×45 binoculars and a 20-60 X 80 spotting scope. Ninety-minute counts were undertaken at each survey location at either high tide, mid tide and low tide.

The vantage point location for the winter bird counts are shown in **Figure 1**. The survey locations were based on information gathered during the original site walkover and the location of the proposed development works in relation to the Cork Harbour SPA. Boundaries of the count areas were selected primarily to delineate patches of relatively homogenous habitat within the study area in order to compare bird usage of these habitats and spatial areas; but were also selected to be easily perceived by the observer. This was done by use of sight-lines to prominent landmarks such as permanent marker buoys, coastal features and features on the horizon.

Where possible the survey covered a radius of approximately 300m from the proposed construction site, with particular emphasis on areas designated under European legislation i.e. Cork Harbour SPA. A radius of 300m was used based information gathered by Borgmann (2011) stating that establishing set-back distances of 250 m from waterfowl, diving ducks, wading birds, and shorebirds may lessen the impacts to the most sensitive species. In addition, in most instances a visual stimulus will create a disturbance effect before any associated noise starts to have an effect e.g. a flight response might be expected by many species if approached to within c. 100-150m across a mudflat (Cutts et. Al, 2013).

All waterbirds present within the count areas other than passerines, doves and pigeons were identified to species and their behaviour was also noted. Waterbirds are defined as ‘‘birds that are ecologically dependent on wetlands’’ (Ramsar Convention, 1971) which are a diverse group that includes divers, grebes, swans, geese and ducks, gulls, terns and wading birds. Birds flying over the count area but not utilising the resources within it, were not included in the counts, however notes were made on any substantial movements of birds that were observed. Birds re-locating within a site were not counted twice.

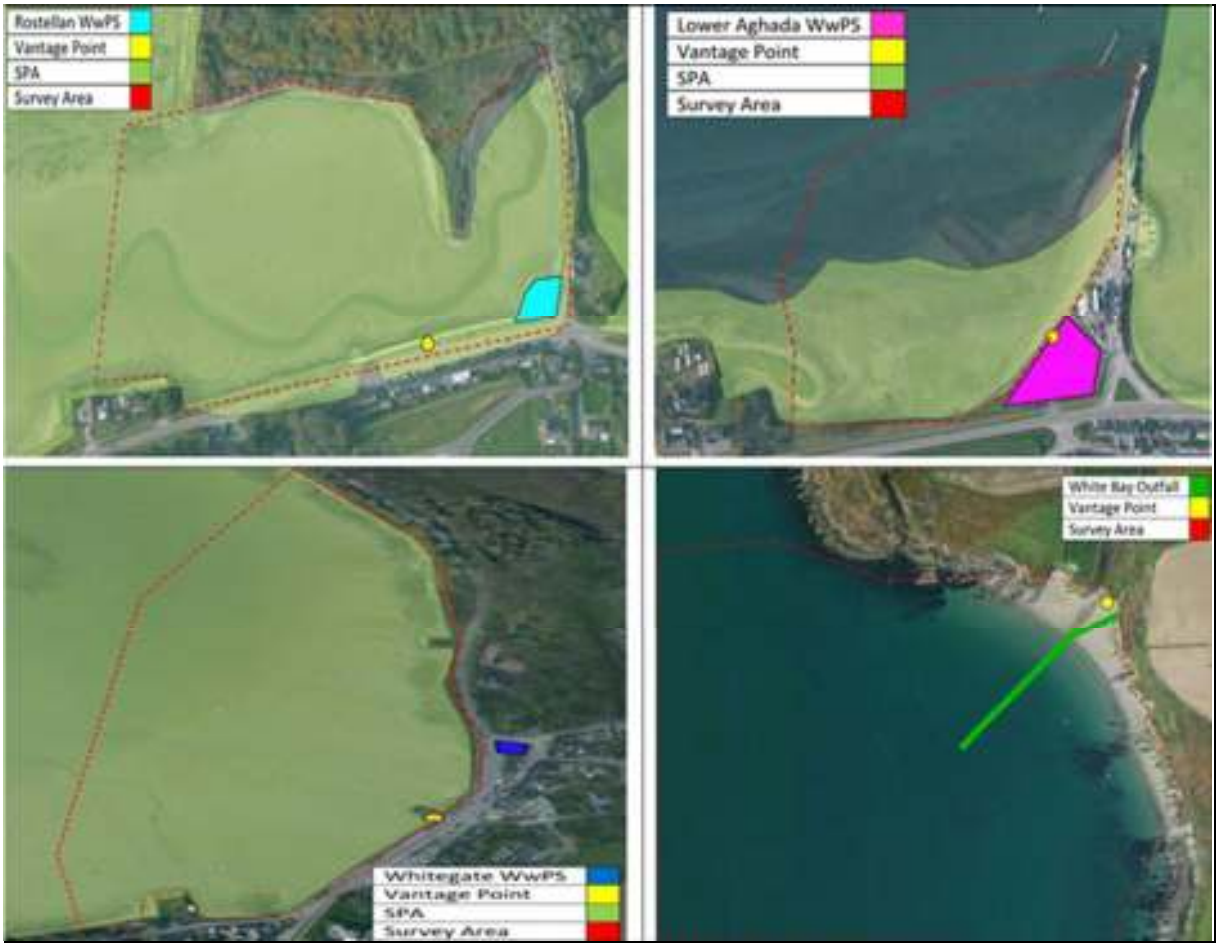

Figure 1: vantage point location for the winter bird count in relation to specific construction areas.

3. Designated sites.

Ireland is required under the terms of the EU Birds Directive (2009/147/EC) to designate Special Protection Areas (SPAs) for the protection of endangered species of wild birds. Sites that meet any of the following criteria may be selected as SPAs:

- A site regularly supporting 20,000 waterbirds or 10,000 pairs of seabirds;
- A site regularly supporting 1% or more of the all-Ireland population of an Annex I species;
- A site regularly supporting 1% or more of the biogeographical population of a migratory species;
- A site that is one of the 'n' most suitable sites in Ireland for an Annex I species or a migratory species (where 'n' is a variable which is related to the proportion of the total biogeographic population of a species held by Ireland).

In Ireland a programme to identify and designate these SPA sites has been in place since 1985. It is our typical mild and wet winters that make the wetlands of Ireland such an important resource for over three-quarters of a million of these waterbirds each year. Over 50 species of waterbird migrate here either on passage to more southerly resorts or to spend the entire winter here. They seek out the relatively undisturbed wetland areas for ice-free feeding conditions and for safe roosting opportunities. In some cases, significant proportions of the

biogeographic populations of waterbird overwinter here (e.g. Light-bellied Brent Goose, Black-tailed Godwit, Whooper Swan, Greenland White-fronted Goose and Ringed Plover).

Ireland's SPA Network encompasses over 570,000 hectares of marine and terrestrial habitats. The marine areas include some of the productive intertidal zones of our bays and estuaries that provide vital food resources for several wintering wader species including Dunlin, Knot and Bar-tailed Godwit. Marine waters adjacent to the breeding seabird colonies and other important areas for sea ducks, divers and grebes are also included in the network.

The majority of the breeding seabirds and wintering waterbirds are considered to be regularly occurring migratory birds; over 60% of 25 Annex I listed species that now occur in Ireland on a regular basis belong to the breeding seabird and wintering waterbird groups. This has in part led to the situation that the majority (> 80%) of Ireland's SPAs are designated for these two bird groups (NPWS, Special Protection Areas (SPA)).

The closest Special Protection Area for birds is the Cork Harbour SPA (Site code 004030) which is located both within and adjacent to a number of the proposed development sites, which form part of the proposed project. Cork Harbour is a large, sheltered bay system, with several river estuaries, with the SPA spanning 2661.4 hectares. Large areas of Cork Harbour have received formal designations, primarily on the basis of important bird populations and habitats. These areas are interrelated, with bird populations moving between different areas at different times.

A large proportion of Cork Harbour is of major ecological importance for the range of good intertidal mudflats which occur. These muds support a range of prey macro-invertebrate species, notably *Macoma balthica, Scrobicularia plana, Hydrobia ulvae, Nepthys hombergi, Nereis diversicolor* and *Corophium volutator*. Green algae species also occur on the flats, especially *Ulva spp*. Salt marshes are scattered through the site and these provide high tide roosts for the birds. The site also includes some marginal wet grassland areas used by feeding and roosting birds.

Table 1 below lists the Special Conservation Interests for the Cork Harbour SPA.

Table 1: Features of Interest for the Cork Harbour SPA

Species code	Species	Scientific name	Conservation objective
A004	Little Grebe	*Tachybaptus ruficollis*	Maintain
A005	Great Crested Grebe	*Podiceps cristatus*	Maintain
A017	Cormorant	*Phalacrocorax carbo*	Maintain
A028	Grey Heron	*Ardea cinerea*	Maintain
A048	Shelduck	*Tadorna tadorna*	Maintain
A050	Wigeon	*Anas penelope*	Maintain
A052	Teal	*Anas crecca*	Maintain
A054	Pintail	*Anas acuta*	Maintain
A056	Shoveler	*Anas clypeata*	Maintain
A069	Red-breasted Merganser	*Mergus serrator*	Maintain
A130	Oystercatcher	*Haematopus ostralegus*	Maintain
A140	Golden Plover	*Pluvialis apricaria*	Maintain
A141	Grey Plover	*Pluvialis squatarola*	Maintain
A142	Lapwing	*Vanellus vanellus*	Maintain
A149	Dunlin	*Calidris alpina*	Maintain
A156	Black-tailed Godwit	*Limosa limosa*	Maintain
A157	Bar-tailed Godwit	*Limosa lapponica*	Maintain

A160	Curlew	*Numenius arquata*	Maintain
A162	Redshank	*Tringa totanus*	Maintain
A179	Black-headed Gull	*Chroicocephalus ridibundus*	Maintain
A182	Common Gull	*Larus canus*	Maintain
A183	Lesser Black-backed Gull	*Larus fuscus*	Maintain
A193	Common Tern	*Sterna hirundo*	Maintain
A999	Wetland and Waterbirds		Maintain

Restore = Restore favourable conservation condition, Maintain = Restore favourable conservation condition

The species listed as Special Conservation Interests for the Cork Harbour SPA (**Table 1** above) is based on the following;

- During winter the site regularly supports 1% or more of the all-Ireland population of Shelduck (*Tadorna tadorna*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 2,009 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Wigeon (*Anas penelope*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 1,791 individuals.
- During winter the site regularly supports 1
- % or more of the all-Ireland population of Teal (*Anas crecca*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 1,065 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Pintail (*Anas acuta*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 57 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Shoveler (*Anas clypeata*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 103 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Red-breasted Merganser (*Mergus serrator*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 121 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Little Grebe (*Tachybaptus ruficollis*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 57 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Great Crested Grebe (*Podiceps cristatus*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 253 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Cormorant (*Phalacrocorax carbo*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 521 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Grey Heron (*Ardea cinerea*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 80 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Oystercatcher (*Haematopus ostralegus*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 1,809 individuals.
- During winter the site regularly supports 1% or more of the biogeographic population of the Annex I species Golden Plover (*Pluvialis apricaria*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 3,342 individuals.

- During winter the site regularly supports 1% or more of the all-Ireland population of Grey Plover (*Pluvialis squatarola*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 95 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Lapwing (*Vanellus vanellus*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 7,569 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Dunlin (*Calidris alpina*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 9,621 individuals.
- During winter the site regularly supports 1% or more of the biogeographical population of Black-tailed Godwit (*Limosa limosa*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 1,896 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of the Annex I species Bar-tailed Godwit (*Limosa lapponica*). The mean peak number within the SPA during the baseline period (1995/96 – 1999/00) was 233 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Curlew (*Numenius arquata*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 2,237 individuals.
- During winter the site regularly supports 1% or more of the biogeographical population of Redshank (*Tringa totanus*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 2,149 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Black-headed Gull (*Chroicocephalus ridibundus*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 3,640 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Common Gull (*Larus canus*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 1,562 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Lesser Black-backed Gull (*Larus fuscus*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 783 individuals.
- The site is selected for the breeding Annex I species Common Tern (*Sterna hirundo*). In 1995, 102 pairs were breeding at this site. This exceeds the All-Ireland 1% threshold for this species. 6
- The wetland habitats contained within Cork Harbour SPA are identified of conservation importance for non-breeding (wintering) migratory waterbirds. Therefore, the wetland habitats are considered to be an additional Special Conservation Interest.

To acknowledge the importance of Ireland's wetlands to wintering waterbirds, “Wetland and Waterbirds” may be included as a Special Conservation Interest for some SPAs that have been designated for wintering waterbirds and that contain a wetland site of significant importance to one or more of the species of Special Conservation Interest. Thus, a further objective is to maintain or restore the favourable conservation condition of the wetland habitat within the Cork Harbour SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

3.1 Wading Birds, Wildfowl & Gulls

Cork Harbour is of major ornithological significance, being of international importance both for the total numbers of wintering birds (i.e. > 20,000, for which it is amongst the top five sites in

the country) and also for its populations of Black-tailed Godwit and Redshank. In addition, it supports nationally important wintering populations of 22 species, as well as a nationally important breeding colony of Common Tern. It is an important site for gulls in winter and autumn, especially Common Gull and Lesser Black-backed Gull.

Several of the species which occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Little Egret, Golden Plover, Bar-tailed Godwit, Ruff, Mediterranean Gull and Common Tern. The site provides both feeding and roosting sites for the various bird species that use it. Cork Harbour is also a Ramsar Convention site and part of Cork Harbour SPA is a Wildfowl Sanctuary.

3.2 Ramsar Site

The Convention on Wetlands, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. A key commitment of Ramsar Contracting Parties is to identify and place suitable wetlands onto the List of Wetlands of International Importance. Cork Harbour is listed as a Ramsar site, which is a non-statutory designation.

3.3 Important Bird Areas

Cork Harbour has also been selected as an IBA. Important Bird and Biodiversity Areas (IBAs) are sites selected as important for bird conservation because they regularly hold significant populations of one or more globally or regionally threatened, endemic or congregator bird species or highly representative bird assemblages. The European IBA programme aims to identify, monitor and protect key sites for birds all over the continent. It aims to ensure that the conservation value of IBAs in Europe (now numbering more than 5,000 sites or about 40% of all IBAs identified globally to date) is maintained, and where possible enhanced. The programme aims to guide the implementation of national conservation strategies, through the promotion and development of national protected-area programmes. Through their designation they aim to form a network of sites ensuring that migratory species find suitable breeding, stop-over and wintering places along their respective flyways.

The function of the Important Bird Area (IBA) Programme is to identify, protect and manage a network of sites that are important for the long-term viability of naturally occurring bird populations, across the geographical range of those bird species for which a site-based approach is appropriate.

The proposed redevelopment site lies in close proximity to the Cork Harbour IBA (Site Code: IE088). The site qualifies for designation under the following IBA Criteria (2000):

- A4iii - The site is known or thought to hold, on a regular basis, ≥ 20,000 waterbirds or ≥ 10,000 pairs of seabird of one or more species.
- B1i - The site is known or thought to hold ≥ 1% of a flyway or other distinct population of a waterbird species
- B2 - The site is one of the most important in the country for a species with an unfavourable conservation status in Europe and for which the site-protection approach is thought to be appropriate.
- C3 - The site is known to regularly hold at least 1% of a flyway population or of the EU population of a species threatened at the EU level (not listed on Annex 1 of The Birds Directive).
- C4 - The site is known to regularly hold at least 20,000 migratory waterbirds and/or 10,000 pairs of migratory species of one or more species.

- C6 - The site is one of the five most important in the European region in question for a species or subspecies considered threatened in the European Union.

Table 2: Provides a summary of the Cork Harbour IBA trigger species.

Species	Current IUCN Red List Category	Season	Year(s) of estimate	Population estimate	IBA Criteria Triggered
Eurasian Curlew (*Numenius arquata*)	NT	winter	1995	1,669 individuals	B2
Bar-tailed Godwit (*Limosa lapponica*)	NT	winter	1996	456 individuals	B2
Black-tailed Godwit (*Limosa limosa*)	NT	winter	1996	1,399 individuals	B1i, C3
Dunlin (*Calidris alpine*)	LC	winter	1995	12,050 individuals	B1i, B2, C3
Common Redshank (*Tringa tetanus*)	LC	winter	1996	1,344 individuals	B1i, C3
Common Tern (*Sterna hirundo*)	LC	breeding	1995	102 breeding pairs	C6
A4iii Species group - waterbirds	n/a	winter	-	20,000 individuals	A4iii, C4

4. Results

Vantage point count locations were utilised for the winter bird survey as shown in **Figure 1**. Conditions experienced during the survey along with survey notes are recorded in **Table 3.** It is important to note that waterbird counts represent a 'snapshot' of bird numbers during a count session, so in general and taking into account all potential sources of error, resulting data are regarded to be underestimates of population size.

Table 3. Survey conditions and notes

Rostellan WwPS	
Date: 25/01/2018	**Tides & Weather** Tide for general area: High – 10.56 (3.7m) & Low – 17.26 (1.1m). General Conditions: Mostly cloudy with moderate breezes of 20-28kph. Rain scattered. Temperatures of 5-6 Degrees Celsius. State of water – slight waves. Visibility ok
Notes: • Vantage point within Thomas Kent Park. • Survey conducted at 8.50am, tide state – high. • Moderate levels of foot traffic along the adjoining 'Peoples Path' walkway. • All gull species noted loafing/roosting on water top or along southern and eastern estuary walls. Foot traffic causes some displacement of gulls on walls, however return within a matter of seconds to resume original behaviour.	

- Lapwing and Curlew flocks noted loafing/roosting on rocky outcrop at north-western corner of survey area.
- Grebes and duck species noted to be foraging.
- Shanks showed interchangeable behaviour between foraging and loafing/roosting.

Date: 01/02/2018	**Tides & Weather** Tide for general area: High – 05.39 & 17.52 (approx. 4.1m) & Low – 12.19 (0.8m). General Conditions: Scattered clouds with moderate breezes of 20-28kph. Rain scattered. Temperatures of 3 Degrees Celsius. State of water – smooth. Visibility good.

Notes:

- Vantage point changed from Thomas Kent Park to area along 'Peoples Path' to increase survey accuracy.
- Survey conducted at 9.15am, tide state – Mid to Low.
- Moderate levels of foot traffic along the adjoining 'Peoples Path' walkway.
- Tide level very low within 45mins of survey resulting in narrow water channel dissecting the site in an east to west direction.
- Construction works (Machinery & hand tools) being carried out on collapsed section of coastal wall/walkway wall towards the southwestern corner of the survey area. No identifiable impact on birds present within the survey area.
- Duck species, Curlew and Gull species mostly loafing/roosting.
- Shanks and Oystercatchers foraging within site.

Date: 06/02/2018	**Tides & Weather** Tide for general area: High – 08.41 (3.8m) & Low – 14.55 (1.1m). General Conditions: Scattered clouds with moderate to fresh breezes of 20-38kph. Dry conditions. Temperatures of 2 Degrees Celsius. State of water – slight wave. Visibility good.

Notes:

- Vantage point from area along 'Peoples Path' to increase survey accuracy.
- Survey conducted at 9.30am, tide state – High.
- Moderate levels of foot traffic along the adjoining 'Peoples Path' walkway.
- High tide roost of 11 Grey Herons & 3 Cormorants recorded to the northeast of the proposed development site within Thomas Kent Park. Roost located along northern periphery of Rostellan Lake, within large coniferous trees at edge of a woodland, just 50m east of a small public car park. Roost visually screened from Thomas Kent Park by a treeline and private dwelling along the local road L7660.
- All gull species noted loafing/roosting on water top or along southern and eastern estuary walls. Foot traffic causes some displacement of gulls on walls, however return within a matter of seconds to resume original behaviour.
- Waders largely noted loafing/roosting on rocky shore and outcrop at north-western corner of survey area.
- Landscaper present (hedge cutting & strimming) to east of survey site – outside survey area.
- 55 minutes into survey, local resident begins feeding gulls and swans from walkway near Thomas Kent Park.

Lower Aghada WwPS

Date: 25/01/2018	**Tides & Weather**

	Tide for general area: High – 10.56 (3.7m) & Low – 17.26 (1.1m). General Conditions: Cloudy with moderate breezes of 20-28kph. No Rain. Temperatures of 6 Degrees Celsius. State of water – slight waves. Visibility ok
Notes: • Vantage point from northern side of control building within proposed development site at western side of pier. • Survey conducted at 10.25am, tide state – High. • Shore 1-1.5m below level of development area, provides some level of screening to eastern and section of upper shore. • Wigeon mostly loafing/roosting on bank to southwest corner of survey area. • Plover & Dunlin loafing/roosting within shingle area along eastern shoreline of survey area. • Turnstone both foraging and loafing/roosting along eastern shoreline. • Large flock of Knot and smaller flock of Snipe flying through site, potentially due to Buzzard hunting in the area. • Turnstone, Plover & Dunlin only within site and survey area for small proportion of survey period, i.e. up to 15mins.	
Date: 01/02/2018	**Tides & Weather** Tide for general area: High – 05.39 & 17.52 (approx. 4.1m) & Low – 12.19 (0.8m). General Conditions: Scattered clouds with fresh to strong breezes of 29-49kph. No Rain. Temperatures of 3 Degrees Celsius. State of water – slight wave. Visibility good.
Notes: • Vantage point from northern side of control building within proposed development site at western side of pier. • Survey conducted at 10.50am, tide state – Low. • Shore 1-1.5m below level of development area, provides some level of screening to eastern and section of upper shore. • Majority of birds recorded foraging within exposed mix sediment shore and small areas of mud flats near the water's edge. • Plover loafing/roosting within shingle area along eastern shoreline of survey area. • 3 foragers on far shore within and just outside survey area, 45 minutes into survey period. Limited displacement of birds to outside survey area, movement of birds within the survey site. Foragers present for duration of survey. Little to no impact on birds in eastern half of survey site.	
Date: 06/02/2018	**Tides & Weather** Tide for general area: High – 08.41 (3.8m) & Low – 14.55 (1.1m). General Conditions: Scattered clouds with moderate to fresh breezes of 20-38kph. Dry conditions. Temperatures of 2 Degrees Celsius. State of water – moderate waves. Visibility good.
Notes: • Vantage point from northern side of control building within proposed development site at western side of pier.	

- Survey conducted at 11.05am, tide state – High.
- Shore 1-1.5m below level of development area, provides some level of screening to eastern and section of upper shore.
- 2 tractors present within development site at being of survey, present for 25mins. Onsite due to blockage in TITAN package plant. Limited impact on birds, some displacement within site, however original behaviour resumed immediately.
- Dunlin & Plover predominately loafing/roosting of eastern shoreline, some foraging.
- Other wading bird species foraging on western shoreline.
- Wigeon foraging, following water's edge as tide recedes.
- Turnstone foraging within seaweed on shingle area of shore on the eastern side of the survey area.

Whitegate WwPS	
Date: 25/01/2018	**Tides & Weather** Tide for general area: High – 10.56 (3.7m) & Low – 17.26 (1.1m). General Conditions: Mostly cloudy with moderate breezes of 20-28kph. Scattered rain. Temperatures of 6 Degrees Celsius. State of water – slight waves. Visibility ok
Notes: • Vantage point from public footpath approximately 100m south from development area to get better unobstructed views of survey site. • Survey conducted at 12.00pm, tide state – High. • Large numbers on gulls on water, difficult to determine exact numbers present. Mostly Black-headed Gulls.	
Date: 01/02/2018	**Tides & Weather** Tide for general area: High – 05.39 & 17.52 (approx. 4.1m) & Low – 12.19 (0.8m). General Conditions: Mostly cloudy with moderate breezes of 20-28kph. No Rain. Temperatures of 5 Degrees Celsius. State of water – N/A. Visibility good.
Notes: • Vantage point from public footpath approximately 100m south from development area to get better unobstructed views of survey site. • Survey conducted at 12.30pm, tide state – Low. • Vast mudflat habitat exposed, making up majority of survey area. Some rocky shore present. • Wading bird species mostly foraging within mudflat habitat. • Gulls - loafing/roosting.	
Date: 06/02/2018	**Tides & Weather** Tide for general area: High – 08.41 (3.8m) & Low – 14.55 (1.1m). General Conditions: Partly cloudy with moderate to fresh breezes of 20-38kph. Dry conditions. Temperatures of 3 Degrees Celsius. State of water – slight waves. Visibility good.
Notes: • Vantage point from public footpath approximately 100m south from development area to get better unobstructed views of survey site.	

- Survey conducted at 12.50pm, tide state – High to Mid.
- Tide receding during survey period. Birds mostly concentrated along exposing mudflat habitat towards top of the bay.
- All species with the exception of gull species foraging on exposing mudflat habitat throughout survey.
- By survey end, 90% of survey area contains exposed mudflat habitat.
- Large number of small wading birds present i.e. Dunlin, foraging as tide recedes.

White Bay Outfall

Date: 25/01/2018	**Tides & Weather** Tide for general area: High – 10.56 (3.7m) & Low – 17.26 (1.1m). General Conditions: Mostly cloudy with moderate breezes of 20-28kph. No rain. Temperatures of 6 Degrees Celsius. State of water – slight waves. Visibility ok

Notes:
- Vantage point set back on White Bay Beach, towards area dominated by scrub habitat.
- Survey conducted at 13.45pm, tide state – Mid.
- White Bay Beach open to general public.
- Dog walker present on the beach at beginning of the survey period for 15 minutes.
- Cormorant & Shag foraging within coastal waters.
- Large amounts of piscivorous birds i.e. cormorant present outside survey area, within coastal waters presumably gorging on large fish shoal.

Date: 01/02/2018	**Tides & Weather** Tide for general area: High – 05.39 & 17.52 (approx. 4.1m) & Low – 12.19 (0.8m). General Conditions: Scattered clouds with fresh breeze of 29-38kph. No Rain. Temperatures of 6 Degrees Celsius. State of water – slight waves. Visibility good.

Notes:
- Vantage point set back on White Bay Beach, towards area dominated by scrub habitat.
- Survey conducted at 14.15pm, tide state – Low.
- White Bay Beach open to general public.
- Visibility generally good but glare/reflection from sun on water surfaces obscuring small section of survey site.
- Cormorant foraging within coastal waters.
- Dog walker present on the beach at beginning of the survey period for 5 minutes and dog walker on the beach for the last 20 minutes of the survey.
- Family of 4 present on the beach for the last 20 minutes of the survey.

Date: 06/02/2018	**Tides & Weather** Tide for general area: High – 08.41 (3.8m) & Low – 14.55 (1.1m). General Conditions: Partly cloudy with gentle breeze of 12-19kph. Dry conditions. Temperatures of 4 Degrees Celsius. State of water – smooth. Visibility good.

Notes:
- Vantage point set back on White Bay Beach, towards area dominated by scrub habitat.
- Survey conducted at 14.30pm, tide state – Low.

- White Bay Beach open to general public.
- Visibility generally good but glare/reflection from sun on water surfaces obscuring small section of survey site.
- Oystercatchers foraging along beach.
- Gulls - loafing/roosting.
- Cormorant foraging within coastal waters.
- 1 hour into survey dog walker with 3 dogs present on beach, stayed for the duration of the survey period. Oystercatchers and gulls displaced from survey area.

Species recorded during the surveys, along with abundance are summarised in **Table 4** below.

Table 4	Rostellan WwPS		Lower Aghada WwPS		Whitegate WwPS		White Bay Outfall	
Species	**Peak no's - LT surveys**	**Peak no's - HT surveys**	**Peak no's - LT surveys**	**Peak no's - HT surveys**	**Peak no's - LT surveys**	**Peak no's - HT surveys**	**Peak no's - LT surveys**	**Peak no's - HT surveys**
Black-headed Gull	230	212	11	2	281	401	1	1
Common Gull	16	27	16	3	15	47		
Lesser Black-backed Gull	1	2			3	1		
Herring Gull	4	10	4	5	9	21	8	
Great Black-backed Gull	1						1	1
Mediterranean Gull	6	4	42		9	55		
Ring-billed Gull		1						
Little Egret		1			1			
Cormorant	2	2		2			1	3
Shag							1	
Mute Swan		12	5					
Curlew	17	39	1	1	12	7*		
Oystercatcher	2		10	7	2	13*	2	1
Black-tailed Godwit	11	20			5	22*		
Lapwing	130	63						
Greenshank	1	5	2	1		1*		
Redshank	3	7	3	2		70*		
Snipe		2	11	1				
Turnstone			10	15	1			
Dunlin			42	77	326	573*		
Ringed Plover			24	22				
Shelduck	1	1			13	7*		
Wigeon	23	15		34		17*		
Teal		4						
Mallard	26	34		2	2	2*		
Shoveler		1				6*		
Great Crested Grebe		3		1				
Little Grebe		1						
Brent Goose			3		1			
Great Northern Diver								1
Notes	* Tide receding during survey period, exposing mudflat habitat in which waterbirds forage.							

5. Discussion of results

5.1 Birds considered of conservation value.

Thirty species in total were recorded within the survey area during the site survey (24 species – Rostellan WwPs survey site, 18 species – Lower Aghada WwPs survey site, 18 species – Whitegate WwPs survey site, 7 species – White Bay Outfall). Certain bird species are listed by BirdWatch Ireland as Birds of Conservation Concern in Ireland (BOCCI). These are bird species suffering declines in population size. BirdWatch Ireland and the Royal Society for the Protection of Birds have identified and classified these species by the rate of decline into Red and Amber lists. Red List bird species are of high conservation concern and the Amber List species are of medium conservation. Green listed species are regularly occurring bird species whose conservation status is currently considered favourable. Birds species listed in Annex I of the Birds Directive (2009/147/EC) are considered a conservation priority. Species recorded during the surveys are shown in **Table 5** along with their conservation status.

Table 5: Species recorded along with their conservation status.

Species		**Birds Directive Annex**			**BOCCI**	
		I	**II**	**III**	**Red List**	**Amber List**
Phalacrocorax carbo	Cormorant					X
Numenius arquata	Curlew		X		X	
Limosa limosa	Black-tailed Godwit					X
Tringatotanus	Redshank				X	
Egrettagarzetta	Little Egret	X				
Anas penelope	Wigeon		X	X	X	
Anas crecca	Teal		X	X		X
Anas platyrhynchos	Mallard		X	X		
Tachybaptus ruficollis	Little Grebe					X
Cygnus olor	Mute Swan					X
Branta bernicla	Brent Goose					X
Gallinago gallinago	Snipe		X	X		X
Larus ridibundus	Black-headed Gull				X	
Larus canus	Common Gull					X
Larus marinus	Great black-backed Gull					X
Larus fuscus	Lesser black-backed Gull					X
Larus argentatus	Herring Gull				X	
Vanellus vanellus	Lapwing		X		X	
Haematopus ostralegus	Oystercatcher					X
Tadorna tadorna	Shelduck					X
Podiceps cristatus	Great Crested Grebe					X
Anas cylpeata	Shoveler		X	X	X	
Calidris alpina	Dunlin	X			X	
Arenaria interpres	Turnstone					
Larus melanocephalus	Mediterranean Gull	X				X
Tringa nebularia	Greenshank					
Gavia immer	Great Northern Diver	X				X
Larus delawarensis	Ring-billed Gull					
Charadrius hiaticula	Ringed Plover					
Phalocrocorax aristotelis	Shag					X
Symbol	**Description**					

I	**Annex 1**: species and sub-species are particularly threatened. Member States must designate Special Protection Areas (SPAs) for their survival and all migratory bird species.
II	**Annex 2**: bird species can be hunted. However, the hunting periods are limited and hunting is forbidden when birds are at their most vulnerable: during their return migration to nesting areas, reproduction and the raising of their chicks.
III	**Annex 3**: overall, activities that directly threaten birds, such as their deliberate killing, capture or trade, or the destruction of their nests, are banned. With certain restrictions, Member States can allow some of these activities for species listed here.

5.2 Results in relation to designated sites

Only one Special Protection Area (Cork Harbour SPA, Site Code 004030) is deemed relevant to the proposed works. The location of this SPA, in relation to the proposed works sites, is shown in **Figure 1**. The qualifying interests for Cork Harbour SPA are shown in **Table 1** together with the conservation objectives for each species. A total of sixteen species listed as qualifying interests for the Cork Harbour SPA were recorded, namely, Cormorant, Oystercatcher, Dunlin, Curlew, Redshank, Black-tailed Godwit, Lapwing, Shelduck, Wigeon, Teal, Shoveler**,** Great Crested Grebe, Little Grebe, Black-headed Gull, Common Gull and Lesser Black-backed Gull.

5.3 Results in the context of Cork Harbour as a whole

Table 6 below presents the peak counts (High or Low tide) of each species recorded during the survey, in the study area as a whole; and five season means (2008/09 to 2017/2018) for each species for Cork Harbour recorded during Irish Wetland bird survey (IWeBS) counts.

Table 7 shows the max peak count of each species as a percentage, in relation to the mean values obtained for Cork harbour over a 5-season period between 2008/09 to 2017/2018.

Table 6	1% National	1% International	IWeBS 5-season mean (2008-2018) Cork Harbour	Rostellan WwPS	Lower Aghada WwPS	Whitegate WwPS	White Bay Outfall
Species				**Peak No's High/Low Tide**	**Peak No's High/Low Tide**	**Peak No's High/Low Tide**	**Peak No's High/Low Tide**
Black-headed Gull		20000	3661	230 (LT)	11 (LT)	401 (HT)	1 (LT & HT)
Common Gull		16400	369	27 (HT)	16 (LT)	47 (HT)	
Lesser Black-backed Gull		5500	168	2 (HT)		3 (LT)	
Herring Gull		10200	137	10 (HT)	5 (HT)	21 (HT)	8 (LT)
Great Black-backed Gull		4200	163	1 (LT)			1 (LT & HT)
Mediterranean Gull		770	99	6 (LT)	42 (LT)	55 (HT)	
Ring-billed Gull		20000	1	1 (HT)			
Little Egret	20	1300	131	1 (HT)		1 (LT)	
Cormorant	120	1200	352	2 (LT & HT)	2 (HT)		3 (HT)
Shag		2000	9				1 (LT)
Mute Swan	90		51	12 (HT)	5 (LT)		
Curlew	350	8400	1412	39 (HT)	1 (LT & HT)	12 (LT)	
Oystercatcher	690	8200	1587	2 (LT)	10 (LT)	13 (HT*)	2 (LT)
Black-tailed Godwit	190	610	3088	20 (HT)		22 (HT*)	
Lapwing	1100	20000	1614	130 (LT)			
Greenshank	20	2300	112	5 (HT)	2 (LT)	1 (HT*)	
Redshank	300	3900	1636	7 (HT)	3 (LT)	70 (HT*)	
Snipe		20000	59	2 (HT)	11 (LT)		
Turnstone	95	1400	95		15 (HT)	1 (LT)	
Dunlin	570	13300	2829		77 (HT)	573 (N) (HT*)	
Ringed Plover	100	730	33		24 (LT)		
Shelduck	120	3000	1003	1 (LT & HT)		13 (LT)	
Wigeon	630	15000	1556	23 (LT)	34 (HT)	17 (HT*)	
Teal	340	5000	1309	4 (HT)			
Mallard	290	20000	372	34 (HT)	2 (HT)	2 (LT & HT*)	
Shoveler	30	400	22	1 (HT)		6 (HT*)	
Great Crested Grebe	40	3500	119	3 (HT)	1 (HT)		
Little Grebe	20	4000	85	1 (HT)			
Brent Goose	360	400	56		3 (LT)	1 (LT)	
Great Northern Diver	20	50	7				1 (HT)
Notes	* Tide receding during survey period, exposing mudflat habitat in which waterbirds forage. N - denotes nationally important recording. HT - denotes high tide. LT - denotes low tide.						

Table 7: Peak Counts of Species for each of the Study Areas I relation to the I-WeBS Five-Season-Means for Cork Harbour as a Whole.

Species	Peak Count in Study Area as percentage of Cork Harbour 5-season mean			
	Rostellan WwPS (%)	Lower Aghada WwPS (%)	Whitegate WwPS (%)	White Bay Outfall(%)
Black-headed Gull	6.28	0.30	10.95	0.03
Common Gull	7.32	4.34	12.74	0.00
Lesser Black-backed Gull	1.19	0.00	1.79	0.00
Herring Gull	7.30	3.65	15.33	5.84
Great Black-backed Gull	0.61	0.00	0.00	0.61
Mediterranean Gull	6.06	42.42	55.56	0.00
Ring-billed Gull	100.00	0.00	0.00	0.00
Little Egret	0.76	0.00	0.76	0.00
Cormorant	0.57	0.57	0.00	0.85
Shag	0.00	0.00	0.00	11.11
Mute Swan	23.53	9.80	0.00	0.00
Curlew	2.76	0.07	0.85	0.00
Oystercatcher	0.13	0.63	0.82	0.13
Black-tailed Godwit	0.65	0.00	0.71	0.00
Lapwing	8.05	0.00	0.00	0.00
Greenshank	4.46	1.79	0.89	0.00
Redshank	0.43	0.18	4.28	0.00
Snipe	3.39	18.64	0.00	0.00
Turnstone	0.00	15.79	1.05	0.00
Dunlin	0.00	2.72	20.25	0.00
Ringed Plover	0.00	72.73	0.00	0.00
Shelduck	0.10	0.00	1.30	0.00
Wigeon	1.48	2.19	1.09	0.00
Teal	0.31	0.00	0.00	0.00
Mallard	9.14	0.54	0.54	0.00
Shoveler	4.55	0.00	27.27	0.00
Great Crested Grebe	2.52	0.84	0.00	0.00
Little Grebe	1.18	0.00	0.00	0.00
Brent Goose	0.00	5.36	1.79	0.00
Great Northern Diver	0.00	0.00	0.00	14.29

Figures presented in **Tables 6 & 7** indicate that the study areas while generally supporting an array of species, with the exception of White Bay, only support a small percentage of the total Cork Harbour population of most species. However, on occasions, each study area can support a substantial proportion of the harbour's total populations of particular species.

The Rostellan WwPS survey site was noted to contain up to 24 different species of waterbirds, the greatest diversity of all the survey sites. Of these Mute Swan and Ring-billed gull were recorded at a highest percentage in relation to the five-season mean values obtained during the I-WeBS counts for the whole of Cork Harbour. The number of Mute Swan recorded at Rostellan WwTP represented 23.53% of the I-WeBS 5-season mean for Cork Harbour (2008/2009 to 2017/2018). Only small numbers of Ring-billed Gull were recorded by I-Webs counts, with the highest recording of 2 individuals recorded during the 2011/2012 season. This

is a North American species and an occasional rare winter visitor to Ireland with around 10 to 15 individuals noted annually.

The Lower Aghada WwPS survey site recorded 18 different species of waterbird. Of these species only Snipe, Ringed Plover and Mediterranean Gull were recorded at moderate numbers in with respect to the 2008/09 to 2017/2018 I-Webs counts. All three species peak counts were taken during the low tide survey. None of these three species are classified as species of conservation interest for Cork Harbour SPA, however, Mediterranean Gull is listed on Annex I of the Birds Directive.

The Whitegate survey recorded 18 different species of waterbird. Mediterranean Gull was recorded at a higher percentage in relation to the five-season mean values obtained during the I- counts for the whole of Cork Harbour. While the peak numbers of Dunlin were noted to only be of a small percentage (20.25%) of the numbers recorded for Cork Harbour during the 2008/09 to 2017/2018 I-WeBS surveys, the peak numbers noted during one of the high tide surveys (573) represent nationally important numbers of the species. Dunlin is listed on Annex I of the Birds Directive and is also listed as a conservation interest for the Cork Harbour SPA.

The White Bay Outfall survey site, which is not proximate to the Cork Harbour SPA, had the lowest species diversity and abundance of individual birds recorded of any of the vantage point count sites. A single Great Northern Diver was recorded foraging within the coastal waters during a high tide survey. Great Northern Divers are listed Annex I of the Bird Directive. Cormorant, Oystercatcher and Black-headed Gull, which are listed as conservation interests for the Cork Harbour Spa, were also recorded within the survey site. However, they were recorded in very low numbers.

6. Summary

A total of 3,243 birds from 30 species were recorded from the site visits during the winter bird survey.

Four Annex I bird species were recorded (Mediterranean Gull, Dunlin, Little Egret and Great Northern Diver). Eight Red Listed species were recorded, namely Black-headed Gull, Herring Gull, Redshank, Curlew, Wigeon, Lapwing, Shoveler and Dunlin.

A total of sixteen species listed as qualifying interests for the Cork Harbour SPA were recorded, namely, Cormorant, Oystercatcher, Dunlin, Curlew, Redshank, Black-tailed Godwit, Lapwing, Shelduck, Wigeon, Teal, Shoveler**,** Great Crested Grebe, Little Grebe, Black-headed Gull, Common Gull and Lesser Black-backed Gull.

A high tide roost of 11 Grey Herons & 3 Cormorants was recorded to the northeast of the proposed development site within Thomas Kent Park. The roost is visually screened from Thomas Kent Park (Rostellan WwPS Site) by a treeline and private dwelling along the local road L7660.

With the exception of Dunlin at Whitegate during a high tide event, none of the wintering birds, were recorded in numbers which would be considered nationally significant (i.e. 1% or more of the all-Ireland population of an Annex I species or 1% or more of the bio-geographical population of a migratory species).

7. Conclusion

Based on the NPWS data it can be concluded that the proposed development areas around Whitegate, Rostellan and Lower Aghada have the potential to support a range of important bird species due to the presence of high value mudflat habitat. White Bay has the potential to

support piscivorous species associated with the Cork Harbour SPA as they forage within the overall Harbour.

A total of 30 bird species were recorded during the winter bird surveys. Some species that are considered of high conservation value (Annex I of the Birds Directive, qualifying species for the Cork Harbour SPA and Red List species) were recorded. It is noted that the surveys covered a radius of approximately 300m from each vantage point.

The habitats in close proximity to the Rostellan WwPs site, Lower Aghada WwPS site and the Whitegate WwPS site have the potential to support some of the species listed as conservation interest of the Cork Harbour SPA. Different habitats will vary in their sensitivity periods based around function e.g. mudflats are most important during the winter for wintering waterbirds.

While results indicate that the species recorded in close proximity to the vantage point locations, within or adjacent to the Cork Harbour SPA (i.e. Rostellan WwPs site, Lower Aghada WwPS site and Whitegate WwPS) are similar to those recorded during the survey conducted by the NPWS in 2010/2011, a number of differences are noted. For example, both the Agahda Lower and Whitegate Bay subsites were noted to contain peak numbers of Red-breasted Mergansers for Cork Harbour during the NPWS surveys, however, Red-breasted Mergansers was one of two species (other being Pintail), that was not recorded at any of the four vantage point sites during the entire survey period. The NPWS also recorded high numbers of Oystercatchers at Whitegate Bay and Aghada Lower during all four low tide surveys, along with peak numbers, up to 111 individuals, during the high tide survey at Whitegate Bay. However, during the recent study the peak numbers of Oystercatcher noted during low tide surveys at Whitegate Bay topped at 2 individuals, while 13 individuals were noted during the recent high tide survey, which represents only 12% of the peak numbers recorded during the NPWS high tide survey. It must be noted that the dimensions of the recent survey area do not correspond fully to those of the NPWS.

Some of the proposed works at these sites may take place within the winter period when impacts on wading birds listed as qualifying interests for the Cork Harbour SPA could theoretically occur. However, timing of works has the potential to reduce impact levels substantially, including the reduction in disturbance effects. It is noted though that the efficacy of timing in achieving this will depend on the species (and associated habitats) in proximity to the planned works.

Most disturbances to waterbirds result in an interruption to normal activity and the displacement of birds over variable distances, often into sub-optimal habitats. This can be critical during severe winters and can lead to a reduction in the carrying capacities of important wintering wetland sites. However, in general studies show that most bird species have the ability to habituate to regular and continual sources of noise and visual disturbances providing there is no large 'startling' component. It is noted that the areas in which it is proposed to develop, are already subject to levels of disturbance by dog-walkers, foragers, traffic and people generally using the beaches and other areas of shoreline for various reasons. While there may be some temporary displacement of species it is considered highly unlikely to have a negative effect on their overall survival rate due to the close proximity of identical habitat, roosting and foraging resources i.e. high value mudflats with high densities of macro-invertebrates.

Cork Harbour is of high value for birds and mudflat habitat supports high numbers of wintering birds. Based on the desktop review of data and the results of the bird counts it is concluded that the habitats in proximity to the proposed areas are of moderate to high value for birds and works during the winter period should be avoided during the winter period.

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