
Revised Natura Impact Statement
River Poddle Flood Alleviation Scheme
Request for Further Information
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Executive Summary

This *Revised Natura Impact Statement* (NIS) has been prepared by NM Ecology Ltd. on behalf of South Dublin County Council and Dublin City Council, as part of a planning application for the River Poddle Flood Alleviation Scheme. This NIS provides the information necessary for the Competent Authority (in this case, An Bord Pleanála), to undertake an Appropriate Assessment of the proposed development. The proposed development consists of flood alleviation works along and adjacent to the River Poddle on sites totalling 12 ha, along with associated ancillary and temporary works. An Environmental Impact Assessment Report (EIAR) has also been prepared as part of the planning application.

The River Poddle is a tributary of the River Liffey, which provides a potential hydrological connection to a number of European sites in Dublin Bay (*e.g.* South Dublin Bay SAC, North Dublin Bay SAC North Bull Island SPA, South Dublin Bay and River Tolka Estuary SPA). This document provides supporting information to assist the competent authority with an Appropriate Assessment, including: a description of the proposed development, an outline of its environmental setting, details of European sites within the zone of impact, an appraisal of potential pathways for indirect effects, and an assessment of whether there will be adverse effects on the integrity of European sites.

Screening for Appropriate Assessment was carried out at an early stage in the design process. As per case C-323/17 (CJEU), no mitigation measures could be taken into account when undertaking this screening. It could not be excluded, on the basis of objective information, that the proposed development, individually or in combination with other plans or projects, would have a significant effect on a European site. Therefore, the development proceeded to, and was considered, under Stage 2 of the Appropriate Assessment process.

The hydrological pathway between the River Poddle and the European sites in Dublin Bay rather tenuous, because any pollutants would be diluted by approx. 10 - 15 km of intervening river and coastal waters. It is considered highly unlikely that any pollutants generated by construction works (suspended sediments, concrete waters, hydrocarbons, *etc.*) could reach Dublin Bay at high-enough concentrations to cause adverse effects on the qualifying interests of the European sites. However, in accordance with the precautionary principle, a range of pollution-prevention measures have been identified which will be implemented during construction works.

The incorporation of these measures in full and their subsequent implementation on site will remove any residual risk of significant effects on the River Poddle or downstream European sites, beyond reasonable scientific doubt. It is therefore the considered opinion of NM Ecology Ltd, as the author of this NIS, that, in making its AA in respect of the

proposed development, An Bord Pleanála, as the Competent Authority in this case, should determine that, given the full and proper implementation of the mitigation prescribed in this NIS, the proposed development, either individually or in combination with other plans or projects, will not adversely affect the integrity of the South Dublin Bay and River Tolka Estuary SPA, South Dublin Bay SAC, North Bull Island SPA and North Dublin Bay SAC or any other European site.

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1 Introduction

1.1 Background to Appropriate Assessment

Approximately 10% of the land area of Ireland is included in the European Network of Natura 2000 sites (hereafter referred to as European sites), which includes Special Protection Areas (SPAs) to protect important areas for birds, and Special Areas of Conservation (SACs) to protect habitats and non-avian fauna. Legislative protection for these sites is provided by the *European Council Birds Directive* (79/409/EEC) and *E.C. Habitats Directive* (92/43/EEC, as amended), which are transposed into Irish law by the *European Communities (Birds and Natural Habitats) Regulations 2011* (SI 477/2011).

In accordance with Article 42 of the national regulations, planning authorities must consider the potential impacts of any development on the integrity of the Natura 2000 network. The first stage of this process is a simple screening exercise to determine whether the development has potential to affect any European sites. If there is any risk of impact (adopting a precautionary approach), the development should proceed to the second stage of the process, which is known as ‘Appropriate Assessment’ (AA). In Section 3.1 of *Appropriate Assessment of Plans and Projects in Ireland, Guidance for Planning Authorities* (2009), the second stage of the AA process is described as follows:

“This stage considers whether the plan or project, alone or in combination with other projects or plans, will have adverse effects on the integrity of a Natura 2000 site, and includes any mitigation measures necessary to avoid, reduce or offset negative effects. The proponent of the plan or project will be required to submit a Natura Impact Statement [...] to identify and characterise any possible implications for the site in view of the site’s conservation objectives, taking account of in-combination effects. This should provide information to enable the competent authority to carry out the appropriate assessment. If the assessment is negative, i.e. adverse effects on the integrity of a site cannot be excluded, then the process must proceed to Stage 4, or the plan or project should be abandoned. The AA is carried out by the competent authority, and is supported by the NIS.”

Screening for AA was carried out at an early stage in the design process, and adopting a precautionary approach, it was determined that Appropriate Assessment was required. Therefore, this document is a (Revised) Natura Impact Statement (hereafter referred to as NIS), which provides supporting information to assist the competent authority (in this case An Bord Pleanála) with an AA, and includes the following sections: a description of the proposed development, details of its environmental setting, details of European sites within the zone of impact, an appraisal of potential pathways for indirect effects, and an assessment of whether there will be adverse effects on the integrity of European sites.

1.2 Previous Appropriate Assessments of related developments

A Natura Impact Statement was prepared by RPS Group Ireland in 2016 for the ‘*Camac and Poddle Prioritised Works*’ project, which informed the design of the River Poddle Flood Alleviation Scheme. The NIS for that project proceeded to Stage 2: Appropriate Assessment, but following a review of potential impacts, it was concluded that there was no risk of likely significant impacts. The following conclusion is provided at the end of the RPS report:

“The likely impacts to the integrity of the Natura 2000 network that could arise from implementation of any of the options identified in relation to the Poddle and Camac catchments have been examined. The implementation of the options will not have any significant adverse effects upon the integrity of any Natura 2000 site. There are no direct impacts on Natura 2000 sites associated with the options.

Any impacts associated with the options would be mainly limited to construction works as well as one-off or intermittent maintenance activities, such as water quality impacts e.g. sedimentation. The distance of the works from downstream Natura 2000 sites is significant and likely to ensure that if there are emissions arising during the works phase or maintenance activities, they will not reach the Natura 2000 sites and will not impact on the sites’ qualifying interests. Any changes to hydrological and morphological regimes will be limited to the catchment and will not affect Natura 2000 sites in downstream marine water bodies.”

1.3 Statement of authority

All surveying and reporting was carried out by Nick Marchant MCIEEM MSc, a qualified and experienced consultant. He has twelve years of professional experience, including nine years as an ecological consultant, one year as a local authority biodiversity officer, and two years managing an NGO in Indonesia. He provides Appropriate Assessments and other ecological services for developments throughout Ireland and Northern Ireland, particularly for renewable energy developments, infrastructural projects (roads, water mains, etc), and residential developments.

He holds an MSc in Ecosystem Conservation and Landscape Management from NUI Galway and a BSc in Environmental Science from Queens University Belfast. He is a member of the Chartered Institute of Ecology and Environmental Management and operates in accordance with their code of professional conduct.

1.4 Methods

These following guidelines were considered as part of this assessment:

- *Appropriate Assessment of Plans and Projects in Ireland, Guidance for Planning Authorities* (Department of the Environment, Heritage and Local Government, 2009)
- *Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4)*, (European Commission, 2002).
- *Guidelines for Ecological Impact Assessment in the UK and Ireland* (Chartered Institute of Ecology and Environmental Management, Version 1.1 – Updated September 2019)

A desk-based study was carried out using data from the following sources:

- Plans and specifications for the proposed development
- Qualifying interests / conservation objectives of European sites from www.npws.ie
- Bedrock, soil, subsoil, surface water and ground water maps from the Geological Survey of Ireland webmapping service (www.gsi.ie/mapping.htm), the National Biodiversity Data Centre (<http://maps.biodiversityireland.ie/>), and the Environmental Protection Agency web viewer (<http://gis.epa.ie/Envision/>)
- The South Dublin County Development Plan 2016 - 2022 and Dublin City Development Plan 2016 - 2022, and details of permitted or proposed developments from the local authorities' online planning records
- A Winter Habitat Study of Tymon and Bancroft Parks (Roughan & O'Donovan Consulting Engineers, 2018), which is provided in Appendix B of the NIS
- Appropriate Assessments of the Eastern CFRAM Study (RPS Group Ireland, 2016) and of the Camac and Poddle Prioritised Works (RPS Group Ireland, 2014)

All desktop and field data was collected between September 2018 and September 2020. The results of the 2018 field surveys are presented in full in **EIAR, Volume 2, Part II, Chapter 7**, and the results of the August 2020 electrofishing and Q sampling surveys are appended to Appendix 6 of the response to An Bord Pleanála's Request for Further Information (RFI). Extracts from these reports are not reproduced here in full, except where relevant to the Appropriate Assessment process.

2 Description of the Project

2.1 Environmental setting

The River Poddle is a highly-modified urban watercourse that arises in Cookstown / Tallaght and flows in a north-easterly direction through Dublin city to meet the River Liffey at Wellington Quay. The proposed working area covers a section of the watercourse between Tymon North in Tallaght and Saint Teresa's Gardens in Merchant's Quay, Dublin.

The underlying bedrock is dark limestone and shale of the Calp formation, which is a locally-important aquifer (moderately productive in local zones). Subsoils are limestone till and localised pockets of limestone gravels, while soils are gravels and alluvium along the original course, with made ground and brown earths along re-aligned sections.

Description of the River Poddle

The river was part of the original settlement of Dublin city in the 9th century, forming the Dubh Linn (dark lake) after which it is named. However, as the city expanded the river was extensively modified, including culverting under roads and residential areas, and realignment along property boundaries. The most significant change was the enclosure of the lower section of the river under Dublin city centre, comprising approx. 2 – 2.5 km of culvert between Harold's Cross and Wellington Quay. Five other sections of the river have been culverted under residential developments, each of between 100 and 500 m length. The most extensive re-alignments are at the source of the river in Tallaght, where it has been aligned along boundaries in an industrial estate, and in Tymon Park, where it has been widened to form a series of ponds and lakes.

The extensive modification of the river has significantly reduced its ecological value. It is understood that the river has no populations of salmonids or any other fisheries interests (*pers. comm.* Inland Fisheries Ireland Environmental Officer), and that the culvert in the lower section of the river is impassable to migratory species (*e.g.* Atlantic salmon or sea trout).

Water Quality

The River Poddle is not monitored under the Water Framework Directive Status Assessments 2013 - 2018. However, considering the extensive hydro-morphological changes to the river, it is likely that it would have a classification of 'poor' or 'bad' status under the WFD monitoring scheme.

Some water quality data obtained from South Dublin County Council is presented in the Planning Report for the Integrated Constructed Wetland (Vesi Environmental Ltd, 2019) that is contained in Volume 4 of the EIAR. The levels of both nitrates and phosphorous exceeded the limits for "Good" water status as defined in the Surface Water Regulation (S.I. 272/2009,

as amended). Water quality monitoring was undertaken at four locations along the River Poddle (Tymon North, Tymon Park, Whitehall and Ravensdale Park) in 2020, and a Q-value of 3 was recorded at all locations, which is defined as ‘moderately polluted’. In summary, water quality in the River Poddle is currently considered to be relatively poor, due to elevated levels of nutrients, and to extensive modification of the watercourse.

Further downstream, the transitional / estuarine waters of the River Liffey are of moderate status, and coastal waters in Dublin Bay are of good status (Water Framework Directive Status Assessments 2010-2015).

2.2 Description of the proposed development

The proposed works extend from the upper reaches of the River Poddle at Tymon North in Tallaght to Saint Teresa’s Gardens in Merchant’s Quay, Dublin. An outline of the proposed works is provided below:

- **Raised earthen flood embankments** along the upper reach of the River in Tymon North (west of the M50) and Tymon Park (east of the M50) to provide flood protection. The embankment at Tymon Lake in Tymon Park will be constructed to provide the main flood storage in the Scheme and a **flow control structure** at Tymon Lake will control flows downstream in a flood event.
 - An **integrated constructed wetland** in Tymon Park to improve water quality.
 - New, replacement or reinforced **flood walls** to provide flood protection in residential areas in the middle reach of the River at Whitehall, Kimmage and Perrystown; at Wainsfort Manor Crescent, Terenure; to the rear of properties on Fortfield Road south of Kimmage Crossroads, Kimmage; at the end of St. Martin’s Drive in Kimmage; and at Mount Argus Close in Harold’s Cross.
 - **Channel realignment and regrading** in Whitehall Park to provide clearance between the River and adjacent properties for flood protection.
 - **Providing sealed manholes** in the vicinity of Poddle Park and Ravensdale Park, Kimmage, and in St. Teresa’s Gardens and Donore Avenue, and at the National Stadium in Merchant’s Quay, Dublin.
 - **Ancillary works and associated development** including drainage channel clearance and removal of trees where required for the works; rehabilitating or installing culvert screens in locations as required; installing flap valves in all culverts draining to the River; biodiversity enhancements including installation of floating nesting platforms in Tymon Lake, Tymon Park, Tallaght; and landscape mitigation and restoration at Tymon Park, Tallaght, Whitehall Park, Terenure, and Ravensdale Park and St. Martin’s Drive, Kimmage including public realm improvements, replacement footbridges, biodiversity enhancements, tree planting and landscaping.
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- **Temporary works** include a main construction compound in Tymon Park with access off Limekiln Road, which will be in operation for the entire duration of the works. Additional temporary works/ set down areas at Wainsfort Manor Crescent, St. Martin's Drive and Ravensdale Park, which will be in use for the duration of the works to be carried out in these locations. Other temporary works include temporary stockpiling of excavated earth in Tymon Park; temporary channel crossings at Tymon Park (west and east of the M50) in Tallaght, and channel diversions at Tymon Park, Tallaght and Whitehall Park, Templeogue to enable the works along the River channel to be carried out.

A detailed description of the proposed works is contained in **EIAR, Volume 2, Part I, Chapter 5** and illustrated in **EIAR, Volume 3**. Key sections of the Chapter 5 are reproduced below (unedited), but in the interests of brevity it is not considered necessary to reproduce all sections.

It is noted that **Section 5.12 Best Practice Construction Measures** has not been reproduced here, in order to avoid any ambiguity regarding the inclusion of mitigation measures at the screening stage of a development. Best-practice construction measures will only be considered in **Section 5: Proposed Mitigation Strategy** of this Natura Impact Statement.

2.2.1 Construction of the Proposed Scheme

A brief description of how the main elements of the works will be constructed is provided below. Further detail can be found in the **Outline CEMP** contained in **EIAR Volume 4, Appendix 5.1** and planning drawings submitted as **Part 2** of the planning application documentation.

Site Access

For the most part, works areas will be accessed from public property or public roads. Access to private property may be required in locations where walls have to be replaced. The preference is to undertake these works from the bank opposite where there is sufficient space and where workers can operate machinery safely.

Temporary Works Compounds

The primary construction compound will be located within Tymon Park with an entrance off Limekiln Road (**Drawing No. 08140** of the planning drawings) which will be in place for the entire duration of the works (24 months). The entrance to the works compound off Limekiln Road will be created by removing a section of the block wall and fence. Some trees will be required to be removed for the compound. The main works compound will have a surface created by stripping topsoil and subsoil, laying down geotextile material and then laying a working surface of crushed stone. The excavated soils will be stored at the site for

subsequent use in reinstatement. The compound will have site offices, welfare facilities and car parking. It will be fenced with a 2.4m high chainlink fence and hoarding.

Only materials and plant necessary for the works will be stored there. Oils, lubricants, solvents, fuel, *etc* may be stored in bunded areas on site.

Works / set down areas will be established at Wainsfort Manor Crescent, Ravensdale Park and St. Martin's Drive as above. These will be fenced, temporary compounds without offices to securely store machinery and some materials.

Temporary Access Tracks

Temporary access tracks through Tymon North and Tymon Park have been carefully designed to avoid sensitive habitats and ecological features. In some cases, these routes make use of existing pedestrian and vehicular accesses which will be widened and constructed as necessary making a firm base as with the works compounds.

Before construction commences any works areas that overlap with public roads and pedestrian footpaths will be isolated with security fencing and construction hoarding. Every effort will be made to ensure the public can continue to enjoy public areas, considering health and safety of the workers and public.

Temporary River Crossings

The works to create the embankments in Tymon North and Tymon Park will require river crossings at strategic locations of a width of 4m to 6m. The riverbank will be partially graded back to an angle of approximately 45 degrees over a 6m length of both banks. A layer of geotextile membrane will be placed along the regraded bank profile, and a 6 to 8m length of precast concrete pipe (750 to 900mm diameter) will then be placed in the channel and backfilled using crushed virgin rock up to a level of just below top of bank. When works are complete the backfill and pipe will be removed from river and the banks will be reconstructed by compacting.

Material Stockpiling

The top layer of soil (approximately 200mm depth) contains valuable ecological material that will be saved separately from subsoils and will be used to reinstate excavated areas and allow for natural restoration and establishment of plants. Stockpiles of this material are to be stored in banks no more than 1m high.

All materials excavated from the works areas will be stockpiled as close to the area where they are to be re used in landscape restoration in order to minimise on-site haulage and double handling. Areas for material storage in Tymon Park have been chosen with consideration of sensitive habitats and ecological features and use of the green spaces in the Scheme. These are shown on **Drawing No. 08148** of the planning drawings.

Stockpiles of other material will be formed no more than 2m in height and will be sealed using the back of an excavator bucket or tracked upon by a tracked excavator to ensure the stockpile does not become saturated and therefore difficult to handle when being reinstated into the works. All stockpiles will be clearly defined, fenced and signed to ensure no cross contamination of other materials to be stockpiled. It is estimated that approximately 3,000m³ will be temporarily stockpiled at Tymon Park for re-use.

An estimated 5,000m³ of material is to be excavated and reused elsewhere on site or locally. The excess material from the excavation works will be used as bulk fill, embankments or landscaping where possible. It is estimated that 50% of the material will be required for the embankments and landscaping and the remainder will be taken off site for disposal at an agreed licensed area. All material removed from site will be disposed of in accordance with relevant waste management legislation. Where material cannot be reused on site, it will be exported to co-ordinate deliveries of imported fill with a load of unsuitable material requiring removal from site in order to minimise traffic movements.

Tree Removal

Individual trees and tree groups which are impacted by the proposed development have been identified through a specially commissioned tree survey. The findings of the tree survey are illustrated in the tree classification, tree constraints and tree removal and protection areas drawings, along with records of the number and species of trees affected by the Scheme in the surveyed areas. The findings of the tree survey are reported in the **Tree Survey and Arboriculture Impact Assessment Report** contained in **EIAR Volume 4, Appendix 5.2**. The drawings to accompany the tree survey are contained in **EIAR Volume 3**. This Report has updated following a RFI from An Bord Pleanála on the planning application for the River Poddle Flood Alleviation Scheme and is included in Appendix 4 of the response to the RFI.

Trees will be removed in advance of the works in accordance with the approved Construction and Environmental Management Plan. Any trees that have to be removed during nesting periods will be done under the supervision of the Ecological Clerk of Works.

The proposed development of the Flood Alleviation Scheme will require the removal of a number of trees to facilitate both the Scheme itself and the construction process. The majority of trees lost are of moderate value. New semi mature tree planting is proposed as an integral part of the Scheme, which will assist in mitigating the proposed tree removals.

The report concludes with recommendations for protection measures to ensure the conservation of those trees to be retained during the construction process.

Earthen Embankments

The proposed works to construct the embankments will require removal of trees in Tymon North and Tymon Park for access by machinery and personnel.

Topsoil will be stripped from the footprint of the embankment before the construction starts. This will help to key the embankment to its foundation and to reduce settlement. The material will be stored for reuse in landscape restoration in accordance with the landscape mitigation plan in **EIAR Volume 3**.

Approximately 3,000m³ of preferably clayey material will be required to be brought on to site to construct the embankment at Tymon Lake. Wherever possible uncontaminated, locally sourced material will be used. The required strength will be achieved by constructing the embankment in layers and compacting each layer using the appropriate mechanical plant.

If the construction material is highly permeable, prevention measures must be in place to avoid seepage through the foundation. Sheet piles can be driven deep enough into the core of the embankment to provide an effective cut off.

After construction of the embankments the works areas will be reinstated. Any remaining material after the construction is complete will be removed from the site and disposed of in accordance with relevant waste management legislation.

Activities such as final landscaping and grass seeding will take place after the construction is complete in accordance with an agreed landscaping plan.

Flow Control Structure

Construction of the flow control structure at the embankment at Tymon Lake will follow after the piles are installed. Sheet piles will be used to hold the stream flow. An excavator will be used to dig a trench and install a pre-cast 900mm concrete pipe which will be backfilled to provide a temporary bypass of the River while the flow control structure is being constructed. The sheet pile will then be removed to allow the flow to pass through the temporary culvert. A sheet pile cofferdam will be constructed around the footprint of the flow control structure. This will be below the level of the embankment to permit the Poddle River to flow during possible extreme events. Whilst the flow control structure is being formed, a pump will remove water with silt controls including a silt bag and a settlement tank. The structure will be formed of concrete and poured in sections. Pumping operations will be discontinued when concrete is being placed adjacent to groundwater. After the structure is completed, the sheet piles and the temporary bypass pipe will be removed by an excavator. The embankments will be constructed around the flow control structure in the method described above.

Integrated Constructed Wetland

The main earthworks activities involved in the development of the Integrated Constructed Wetland (ICW) in Tymon Park are levelling, excavation, and placement of soils for integration with existing topography. An estimated 5,000m³ of material is to be excavated and reused

elsewhere on site or locally. The excess material from the excavation works will be used as bulk fill, embankments or landscaping where possible. It is estimated that 50% of the material will be required for the embankments and landscaping and the remainder will be taken off site for disposal at an agreed licensed area. All material removed from site will be disposed of in accordance with relevant waste management legislation. The main construction works are briefly summarised below, and more detail can be found in **EIAR Volume 4, Appendix 5.3** with accompanying maps displayed in **EIAR Volume 3**.

A temporary river water management system will need to be established during the earthworks. To reduce the impact of construction works on the river flow the ICW will first be constructed outside of the river channel and erecting temporary bunds along the existing river route to contain and maintain river flows.

The stone baffles and stone weir and are to be installed at the inlet point and outlet points respectively from material acquired from site where suitable and available, otherwise locally sourced natural stone can be used.

On completion of construction and planting, the river will be diverted into the ICW and temporary bunds removed. The ICW can then be finished off with remaining levelling and planting where required. Careful timing with regards to weather conditions and silt mitigation methods will need consideration prior to construction stage scheduling. All instream works should ideally be carried out in low flow periods (i.e. between July to September), unless otherwise agreed.

There should be no requirement to import or export material to or from the site for construction of the ICW, however this will need to be confirmed during site investigation. Indicative levels are provided in the ICW layout **Drawing No. 08146** of the planning drawings.

The base of the ICW cell will be completely level to promote dispersal across the entire treatment area. The slope gradient will vary depending on landscaping requirements but will be at 4:1 minimum. There may be slight variations to the layout and level of the ICW during construction, as required, so as to work within the confines of the site conditions and to utilise the characteristics of the site.

Appropriate access will be provided around the ICW site to allow for future monitoring and maintenance works. Access to the site will be via existing park paths.

Channel Re-Alignment

At Whitehall Park the channel will be re-aligned to take it away from the adjacent properties, and a meander introduced along with other measures to encourage channel naturalisation. The channel re-alignment will be achieved with the temporary diversion of flows through the use of sheet piles in the same method as the flow control structure in Tymon Lake.

Flood Defence Walls

Flood defence walls are proposed for areas to prevent the River overflowing its banks in the middle reaches. This will involve reinforcing existing walls, constructing new walls in places where there currently are none, and replacing existing walls. The flood defence walls will be constructed by the methods briefly described below. Selection of this method will depend on the condition of the existing foundation and wall, ground conditions, the height of the wall, and proximity of structures to the wall.

The construction of walls, whether reinforced or new walls, will require vegetation clearance on both banks.

Prior to construction the route of the proposed flood protection walls will be surveyed and set out. Any works areas that overlap with public roads and pedestrian areas will be isolated.

The construction of the walls will require some movement of materials to and from the site. Most of the materials leaving the site will consist of spoil from the excavation works and some demolition rubble. The excess material from excavation works that is not used as bulk fill, embankments or in landscaping will be removed from the site and disposed of in accordance with relevant waste management legislation.

Once the walls are constructed the area will be backfilled and reinstated. The walls will be finished in stone cladding or pointed with concrete capping beam on top. Reinstatement of lands and finishes will be to a specification agreed with the construction management team, SDCC and OPW.

Reinforcing walls

In cases where an existing wall is not structurally sound to withstand a flood it may be necessary to construct a scour protection beam. The advantage of this method is that it will avoid working in the rear gardens of properties, and the walls can be accessed from the opposite bank using an excavator. Culverts approximately 600mm will be installed in the channel to allow works to be undertaken by personnel. Channel flows will be temporarily diverted using 600mm pipes and a pump sump will be installed to direct the flow through a baffled settlement tank and discharged through a silt bag. A trench will be excavated alongside the existing wall foundation. The wall will be shuttered, then a reinforcing cage will be placed in the trench. The cage will then be filled with concrete and following this the pump would be switched off. Depending on the mix and ambient conditions the shutter would be struck in 24 to 48hrs and the process repeated. Once at the end of a 20m run, the haul road stone, pumping system, etc. would be moved along and the same process repeated until the scour beam is complete.

In certain situations, it may be necessary to retain the existing boundary wall and construct a new wall adjacent to or up against it. A possible solution will be to underpin the existing

foundation and construct a new wall up against the underpin and extend this up to the required design level. The underpinning process is similar to that described for the scour protection beam with the exception that each underpin will only be in the order of 1m at a time when measuring along channel chainage so as to minimise the amount of unsupported foundation. Therefore, this process is considerably slower than that of the scour beam works.

New or replacement walls

Walls will have a precast base and will be constructed in situ. The walls will have to be underpinned as above, and a stone platform will be constructed, and the flow diverted through silt controls as above. It may be beneficial to precast (at a precasting yard) the bases of these units in lengths of 2m keeping the weight down avoid the use of very large excavators/cranes. Precasting would also minimise the need for pumping during the construction of the bases. It would be necessary to dig out and bed the bases at the required level and place them in units of 10m at a time. The bases will then be shuttered and poured. These works will be undertaken from the opposite (right) side of the bank using an excavator for digging and lifting operations.

Footbridge Replacements

The replacement of the footbridge in Ravensdale Park will involve the demolition of the existing bridge, excavation of foundations for the proposed bridge, craning in a precast concrete bridge and reinstatement of the area impacted by the works. The existing footbridge at Tymon Lake will be replaced with a new structure along the embankment using a similar method.

It is expected that any utility diversions required for the replacement of the bridge at Ravensdale will be completed prior to the demolition of the existing bridge.

Manhole Works

The work on manholes will be either to rehabilitate or replace manholes to seal them. The manhole at the rear car park of the National Stadium is required to be rehabilitated to improve access for maintenance. The manhole rehabilitation works will consist of reinforcing the manhole chamber with concrete and anchoring the chamber to the concrete with an "L" bar, then replacing the cover and frame with a sealed unit or by replacing the covers with a sealed frame/cover solution.

With the exception of the manhole at the rear car park at the National Stadium, the manholes works will take place within the public roads. Works areas will be fenced off and a traffic management system will be put in place whilst manhole works are ongoing.

2.2.2 Duration and Sequencing of Construction

It is envisaged that, subject to approval by the Board, construction will commence before March 2021 and will take 24 months to complete. There will be six main works areas, namely Tymon North and Tymon Park; Whitehall Park and Wainsfort Manor Crescent; Fortfield Road; Ravensdale Park and Poddle Park; St. Martin's Drive and Mount Argus, and St. Teresa's Gardens / Donore Avenue / National Stadium. The expected construction duration for each area is given in Table 1.

After establishing the main works compound in Tymon Park, access tracks and setting out works areas, works will begin in Tymon North and generally move downstream, however the sequencing and duration of works will be dependent on weather and ground conditions. There is a priority to carry out work on the embankment at Tymon Lake and in-stream or adjacent to stream works during low flow periods of May to September.

Table 1: Estimated construction programme

Location	Main Flood Alleviation Scheme works	Estimated maximum construction period (cumulative months)
Tymon North and Tymon Park	Establish & maintain main contractor's compound for Scheme duration	24 months
	Tree removal, excavations, demolition of flow control structure, stockpiling earth material, removal and import of earth material, formation of embankments, removal and replacement of flow control structure incorporating footbridge, ICW, site restoration, landscape mitigation/replacement tree planting, and biodiversity enhancements	6 months
Whitehall Park / Wainsfort Manor Crescent	Establish temporary works/set down area, excavations, removal and import of earth material, channel re-alignment and re-grading, construction/installation of flood protection walls, channel naturalisation, site restoration, biodiversity enhancements and replacement tree planting	5 months
Fortfield Road & Ravensdale Park	Establish temporary works / set down area, tree removal, demolition and replacement of footbridge, construction/installation of flood protection walls, site restoration, landscape mitigation/public realm improvements and replacement tree planting.	7 months

St. Martin's Drive and Mount Argus	Establish temporary works / set down area, tree removal, construction/installation of flood protection walls, channel naturalisation, replacement tree planting and landscaping	4 months
Poddle Park / St Teresa's Gardens / Donore Avenue / National Stadium	Establishing temporary works area, traffic management, road works to rehabilitate or replace existing manholes	2 months

2.2.3 Construction Management

The Contractor will be obliged to prepare a Project Controls Procedures Manual (PCPM) prior to commencement of the works. The purpose of the PCPM is to define the contract specific strategy for the management and control of the Project and to describe the procedures and policies for its successful completion.

The Contractor will also be obliged to prepare a Construction Environmental Management Plan (CEMP) which will set out proposed measures to mitigate against environmental impacts during the construction and operational stages including the mitigation measures set out in the EIAR.

An outline CEMP has been prepared by Nicholas O' Dwyer Ltd. and is contained in **EIAR Volume 4, Appendix 5.1**. A Surface Water Management Plan (SWMP) has been provided in response to the RFI. This plan is appended to this NIS.

The outline CEMP and SWMP will be referred to by the appointed Contractor. The Contractor will take account of all recommendations contained within the outline CEMP and SWMP, and expand, as appropriate.

Throughout the progress of the works, the Contractor shall also take account of relevant legislation and best practice UK CIRIA guidance including but not limited to the following:

- C532 Control of water pollution from construction sites: guidance for consultants and contractors;
- SP156 Control of water pollution from construction sites – guide to good practice.

The Contractor's construction method statements shall also indicate how management, monitoring, interception, removal and/or treatment of silt run-off shall prevent contamination of ground or surface waters by mobilisation of soil particles. Fail-safe site drainage shall be provided to prevent discharge of chemical spillage from the construction site. All road and hardstanding areas with potential for contamination shall be drained to a suitable receptor where they can be stored for removal and disposal off-site. The Contractor will be obliged to comply with the mitigation measures which are compiled and set out in **Chapter 17 Summary of Mitigation Measures & Residual Impacts**.

In respect of noise control during the construction works, the Contactor will be obliged to comply with the mitigation measures set out in **Chapter 12 Noise and Vibration** of the EIAR. In respect of dust and air pollution, the Contractor shall be obliged to comply with the mitigation measures set out in **Chapter 13 Air Quality and Climate** of the EIAR.

Mitigation measures identified within each subject area and agreed with the planning authority will be written into the Contract Documents.

In respect of the above, it is noted that the construction will be monitored by a resident engineer and Ecological Clerk of Works (ECoW) to ensure compliance with the Contract Documents and the environmental mitigation measures set out herein.

It is noted that the CEMP, SWMP and other construction-phase measures outlined in Section 2.2 of the NIS would be considered '*mitigation measures*' in the context of Appropriate Assessment, as per CJEU case C-323/17. For the avoidance of doubt, these measures are presented here to provide a comprehensive description of the proposed development, but they do not yet form part of the Appropriate Assessment process. The implementation of these measures is only considered as part of the proposed mitigation strategy outlined in Section 5 of the NIS.

2.2.4 Construction Materials

An estimated schedule of principal materials and quantities is presented in **Table 2**. In so far as possible, construction materials will be from local sources. All imported material that will be used on site will be procured from approved sources and biosecurity measures will be adhered to.

Table 2: Schedule of Principal Materials and Quantities

Description	Tonnes
Concrete	2,700m ³
Reinforcement	300T
Earth material	8,200m ³

All construction products will be required to be subject to the European Union (Construction Products) Regulations 2013 and carry the CE marking. The Construction Products Regulations aim to ensure that reliable performance-related data is made available, by means of Declarations of Performance, in relation to construction products being placed on the European market.

It is envisaged that deliveries of materials will occur on a 'just in time' basis to reduce the requirement for storage on site. Temporary hard standing areas with drainage to a

hydrocarbon interceptor will be constructed before refuelling/servicing activities will be allowed onsite. These areas will be bunded. Temporary bunded and suitably equipped areas will also be in place before any potentially polluting materials (oils, lubricants, solvents, fuel, *etc.*) can be stored on-site. Temporary stockpiling and storage of construction materials will only be allowed in designated areas.

2.2.5 *Waste Management*

The wastes expected to arise as a result of construction would be mostly earth from excavations. The project will aim to reuse as much excavated material in the Flood Alleviation project. Any earth material that is removed from the sites will be done in strict accordance with the relevant waste management legislation. For all works, any waste generated during the construction phase will be adequately segregated and stored prior to transfer to an authorised facility for recovery/recycling/disposal.

During the construction phase both solid and liquid waste will be produced at the site. All domestic effluent generated on site will discharge to temporary sewage containment facilities prior to transport and treatment off-site by an authorised contractor. Waste oils and solvents will be stored in a temporary bunded area prior to transport off-site by a licensed contractor.

2.2.6 *Risk of Major Accidents and/or Disasters*

In carrying out this EIA, the project team have considered scenarios of accidents and / or disasters that could occur during the construction and operational phases of the project.

Every effort has been taken in the design of the Flood Alleviation Scheme, and best practice mitigation measures will be instituted by the Contractor, to ensure protection of the environment during construction and operation of the Scheme in order to reduce or prevent the risk of major accidents and/or disasters.

Failure of the Flood Storage Embankment at Tymon Lake

Although the flood storage embankment is designed following rigorous reservoir analysis and testing, according to best international practices and standards under the supervision of a UK All Reservoirs Panel Engineer, the scenario of a failure of the flood storage embankment at Tymon Lake has been assessed qualitatively for its potential impacts. In the event of a structural failure, the volume stored behind the embankment would be released and flood the neighbourhoods immediately downstream of Tymon Park. The flow control structure is likely to still be functioning in that event, but a sudden release of water would result in severe flooding of the residential properties in the path of the released flood waters. The additional flood storage at Whitehall Park and Ravensdale Park would provide a degree

of attenuation and help in alleviating the effects of a sudden surge of water further downstream in such an extreme and unlikely event.

Overtopping the Flood Defence Structures

The proposed Flood Alleviation Scheme is designed for a 1% AEP event. The flood storage embankment will act as a spillway in events exceeding the 1% AEP event, controlling the release of excess water above the 1% AEP volume from the storage area and ensuring the embankment does not fail up to and including the Probable Maximum Flood event. Any water released over the spillway in events exceeding the 1% AEP event would cause localised flooding in Tymon Park extending towards the Osprey and Willington estates. However, this flooding would be much less than that which would occur in the absence of the storage area, and it is only the exceedance volume above the 1% AEP volume which would be released.

Release of excess volume over the spillway in events of greater magnitude than the design 1% AEP event is not a failure of the Scheme.

Failure of the Flood Walls

Another scenario is that the flood protection walls that are constructed or replaced in the Scheme fail by collapse or undermining, thereby causing flooding in adjacent properties. Existing walls along the River have been structurally assessed for their flood protection capability, and the walls to be replaced have been identified in this Scheme. To overcome this potential, a robust programme of maintenance will be instituted to check the walls periodically and carry out any remedial works.

Risk of large-scale pollution events

The construction of the proposed development will involve working with a range of pollutants, including suspended sediments, concrete / cement products, and hydrocarbons (oil, petrol, diesel, etc). Under normal working conditions these products would be kept within the working area and would not reach any waterbodies. However, there is a risk of accidental pollution events, for example:

- The collapse of a section of river bank or sediment stockpile could release sediment into the watercourse
- When pouring concrete for a flood defence wall, shuttering could fail, releasing liquid concrete into the watercourse
- A major fuel spill during the re-fuelling of a construction vehicle could release hydrocarbons into the watercourse

The scale of such events could vary substantially, ranging from a small quantity of material that could have a localised effect on the watercourse, to a large quantity of material that could have a significant effect on the watercourse and downstream waters. It is important to note that pollution events are unlikely, and that large-scale events would be highly

unlikely. However, for the purposes of Appropriate Assessment it is necessary to consider a worst-case scenario, in accordance with the precautionary principle.

2.3 Operation of the Proposed Scheme

In flood conditions, the flow control structure in Tymon Park will restrict flow from Tymon Park lakes to a maximum of 748 l/s which is the equivalent of the 2-year return period flow. In storm events of greater magnitude than a 2-year return period the excess volume of floodwater will fill the storage area in Tymon Park lakes and be contained by the flood storage embankment. A storage volume of 66,000m³ will be provided, which is sufficient to accommodate the attenuated volume in excess of the 100-year return period event.

Downstream of Tymon Park, the River will be contained in channel by the proposed flood walls. In Ravensdale Park, once the capacity of the culvert at the downstream end of the Park has been exceeded, excess volume in the region of 800m³ will be stored within the Park and will begin re-entering the culvert once the flood levels recede.

The Scheme also includes an ICW, which purpose is to improve water quality in the River.

The ICW is a biological system designed to take the water from the River at a flow rate of 15l/s through the baffles, then through dense vegetation where it is exposed to biological, chemical, and physical processes that reduce the concentrations of pollutants. These pollutants remain within the wetland area where many are broken down to become a source of nutrients to the resident biological communities. Other dissolved contaminants such as heavy metals which are not utilised become embedded in the underlying sediment by adsorption processes and thus do not enter river water. Water leaving the ICW at the downstream end will be of a higher quality characterised by a lower pollutant profile and increased oxygen levels.

An important element of the operation of the Scheme is its ongoing maintenance. The section following describes the existing maintenance regimen in operation by each Council, and the proposed measures which will be instituted as part of the Flood Alleviation Scheme.

2.4 Maintenance of the Scheme

Existing measures

Following the flood of October 2011 level alarms and CCTV were installed at the Lakelands overflow weir, Wainsfort Manor culvert, and Gandon Close. These alarms notify SDCC/DCC Drainage Departments when water levels rise to a certain point which might indicate a blockage or obstruction at the culvert inlet screen. It was noted in the post flood review after the 2011 event that better co-ordination was required between SDCC and DCC Drainage Departments in providing quick organised responses to flood events.

In addition to responding to potential flood events, the issue of channel maintenance and cleaning is a critical factor in reducing flood risk. Tree and garden cuttings, fly-tipping and general dumping of discarded furniture and white goods into the river channel is unfortunately a common occurrence in the River Poddle and is well highlighted from discussions with local residents and also from some local community groups such as the Crumlin Cleanup Committee. In addition to the flood risk, this poses both ecological risk to the riverine habitats from pollution but also a health and safety risk for those tasked with their removal.

The current maintenance programme for both local authorities is described below.

SDCC

- Once a year at the end of August the river channel it is completely unchoked by hand. Crews walk the stretch from Tymon Lakes to the screen at Kimmage Manor. Water level monitors which are linked to automatic alarms to SDCC personnel in addition to cameras (CCTV) was also installed at this location and at Lakelands overflow weir.
- The inspectors check the screens along this section once a week, if there is material on them it is removed.
- There was a pre-screen added in 2015 at the green space adjacent to Templeville Road.

DCC

- All existing screens are cleaned on Monday and Friday every week or before forecasted heavy rain.
- Any other observed large debris such as cars, trees or tree branches, etc is removed from the river. Any reports of large debris in the river or fly tipping are investigated.
- The screen in Gandon Close was modified after the flood of 2011 and a second debris screen was installed upstream. The upstream screen has water level monitors upstream and downstream which are linked to automatic alarms to DCC personnel. A camera (CCTV) was also installed at this location

Proposed Measures

When the Flood Alleviation Scheme is complete a robust programme of maintenance will be instituted by each Council to ensure that culvert screens and channels are kept clear of debris and the Flood Alleviation Scheme functions properly during a storm event. The maintenance works include carrying out repair works on existing walls and clearing vegetation and debris that has accumulated in the channel. A register of the flood defence assets in SDCC and DCC areas will be compiled as part of the Scheme to ensure that no subsequent developments remove or alter the flood defence asset without SDCC/DCC review. Flood defences will be incorporated into the development plans for both authorities

to ensure that defences that are erected will not be removed as part of any future development either by a local resident or as part of a planning submission.

In addition to routine planned maintenance, greater public awareness is required to educate and inform local communities of the risks and consequences of illegal dumping and to provide contact details to alert the local authorities when this has occurred. The duty of the local authority in this regard is to respond adequately in a timely fashion

2.5 Other nearby developments (potential in-combination effects)

The proposed working area is in an urban / suburban setting in the south-west of Dublin City. It passes through several zones of the *South Dublin County Development Plan 2016 – 2022* and the *Dublin City Development Plan 2016 - 2022*, including areas zoned for industrial, residential and recreational uses. The catchment is fully urbanised, and given the demand for housing in Dublin, the main pressures are from intensification of urban development through infill or redevelopment of sites.

Live and recently approved planning applications in the vicinity of the River Poddle were reviewed on the online planning registers of South Dublin County Council (SDCC) and Dublin City Council (DCC). The following applications were considered to be relevant to the proposed development:

- A Part VIII Application was made in 2016 for the construction of a new library beside Castletymon Road (planning reference SD168/0003) adjacent to the River Poddle. An Appropriate Assessment screening report was included in the documentation, and it was concluded that there was no risk of likely significant impacts on any European sites. Construction of this project commenced in January 2019 and was completed in January 2020, prior to the commencement of the proposed development;
 - Permission was granted in 2019 for a single storey temporary prefab classroom adjacent to the southeast boundary of the site and associated site works (SD19A/0289). These works will be relatively small in scale, and are likely to be completed prior to the commencement of the proposed development;
 - A large residential development has been under construction for several years in the grounds of Mount Argus church on Kimmage Road Lower and may continue into 2020/21. It is in close proximity to the River Poddle;
 - Permission was granted in 2019 for the demolition of an office building and development of a 12 no. units apartment building at a site located at Unit 1, KCR Estate in Ravensdale Park (3193/19). Construction of this development has commenced;
 - There is a site on the Vacant Sites Register of Dublin City Council in close proximity to the River Poddle located at the side of Riverpark House, in Poddle Park, Kimmage (VS-0751). Being on the Vacant Sites Register, this site is likely to be brought forward for
-

residential development. There are no sites in proximity to the River Poddle on the Vacant Site Register of South Dublin County Council; and

- An application for 7 no. houses was submitted at the Terenure Badminton Club on Whitehall Rd. in 2018 (planning reference SD18A/0360) but was 'deemed withdrawn' by SDCC following the expiration of a request for further information. An application was subsequently granted at this site for the temporary use of a function room as a Montessori school (SD19A/0314), but this application involved no external works.

It is noted that all of these developments are outside the proposed working areas of the River Poddle Flood Alleviation Scheme, but if multiple sites were constructed concurrently, it is possible that they could lead to cumulative impacts on water quality in the River Poddle, and thus on downstream European sites. This is addressed in the impact assessment in **Section 7.5.3, Chapter 7** of the **EIAR** (Part 3, Volume 2, Part II of the Planning Documentation).

All other planning applications in the surrounding area were for small-scale works such as residential extensions. There is no risk that any of these minor developments would cause in-combination impacts with the proposed development.

3 Description of European sites

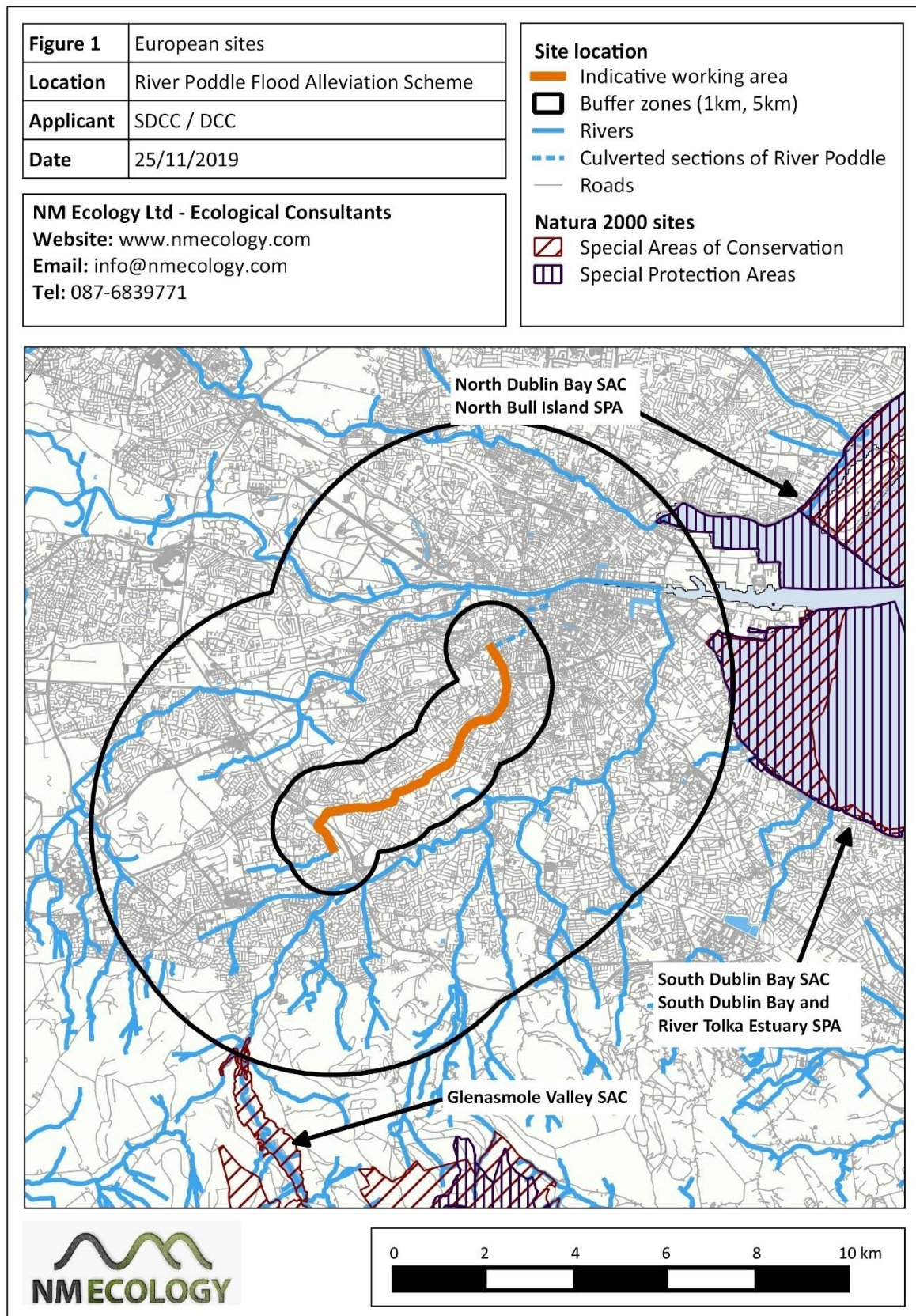
3.1 European sites within the zone of influence

The proposed development site is not located within or adjacent to any European sites, so there is no risk of direct impacts (*e.g.* habitat loss or fragmentation) on any sites. Potential indirect impacts on distant sites were considered within a zone of influence of 5km, and downstream along associated watercourses. The relative locations of European sites are shown in Figure 1, and details of each site are provided in Table 3.

Table 3: European sites of relevance to the proposed development site

Site Name	Distance ¹	Qualifying Interests
Glenasmole Valley SAC (1209)	4.5 km south	Annex I habitats: semi-natural dry grasslands and scrubland facies on calcareous substrates, <i>Molinia</i> meadows, petrifying springs with tufa formation (Cratoneurion) Annex II species: none
South Dublin Bay and River Tolka Estuary SPA (site code 4024)	10 km *	Habitats: coastal wetlands Special conservation interests: light-bellied brent goose, oystercatcher, ringed plover, grey plover, knot, sanderling, dunlin, bar-tailed godwit, redshank, black-headed gull, arctic tern, roseate tern, and common tern
South Dublin Bay SAC (210)	10 km *	Annex I habitats: inter-tidal mudflats / sandflats (including patches of <i>Salicornia</i> and other annuals), annual vegetation of drift lines, embryonic shifting dunes Annex II species: none
North Dublin Bay SAC (206)	10 km *	Annex I habitats: inter-tidal mudflats / sandflats (including patches of <i>Salicornia</i> and other annuals), <i>Spartina</i> swards, salt marshes, annual vegetation of drift lines, embryonic shifting dunes, white dunes, grey dunes, dune slacks Annex II species: petalwort <i>Petalophyllum ralfsii</i>
North Bull Island SPA (4006)	10 km *	Habitats: coastal wetlands Special conservation interests: wintering populations of light-bellied brent goose, shelduck, teal, pintail, shoveler, oystercatcher, golden plover, knot, sanderling, dunlin, black-tailed godwit, bar-tailed godwit, curlew, redshank, turnstone, black-headed gull

¹ Where there are hydrological connections to European sites, distances are measured along the length of connecting waterways, rather than to the nearest point. This is indicated with an asterisk.



3.2 Identification of potential impact pathways

Indirect impacts on designated sites can occur if there is a viable pathway between the source (the proposed development site) and the receptor (the habitats and species for which a site has been designated). The most common pathway for impacts is surface water, for example if a pollutant is washed into a river and carried downstream into a designated site in coastal areas. Other potential pathways are groundwater, air (e.g. sound waves or airborne dust), or land (e.g. flow of liquids, vibration). The zone of effect for hydrological impacts can be several kilometres, but for air and land it is rarely more than one hundred metres. The magnitude of impacts (e.g. the concentration of pollutants) usually decreases as the distance between source and receptor increases. An appraisal of potential pathways between the proposed development and the designated sites listed in Table 1 is provided below.

The *Glenasmole Valley* SAC is located in a separate river catchment (the River Dodder), so surface water is not a potential pathway for indirect impacts. It is located several kilometres from the proposed development, and is at a higher elevation, so groundwater would not provide a viable pathway. The distances involved are also too great for impacts via air or land pathways. Therefore, all potential pathways to this SAC can be screened out.

There is a distant hydrological connection to four European sites in Dublin Bay via the River Poddle and River Liffey. The connection is considered to be rather tenuous, because the nearest European site – the *South Dublin Bay and River Tolka Estuary* SPA – is more than 10 km downstream of the proposed development site. Nonetheless, it does provide a potential hydrological pathway for impacts, and will be discussed further in Section 4 of this report. All other potential pathways can be screened out, because the distances involved are too great for impacts via groundwater, air or land pathways.

In summary, potential *source-pathway-receptor* links were identified between the proposed development and four European sites:

- *South Dublin Bay and River Tolka Estuary* SPA
- *South Dublin Bay* SAC
- *North Bull Island* SPA
- *North Dublin Bay* SAC

To inform the impact assessment, further information on the qualifying interests of these sites, and their conservation objectives, conservation status and threats, are provided below.

3.3 Further details of relevant SACs

The *South Dublin Bay SAC* has four qualifying interests: mudflats / sandflats, annual vegetation of drift lines, *Salicornia* and other annuals colonising mud and sand, and embryonic shifting dunes. The *North Dublin Bay SAC* has similar areas of sandflat, and more highly developed mudflat, saltmarsh and dune habitats, particularly around Bull Island. The SAC also supports some dune slack habitats and the Annex II species petalwort *Petalophyllum ralfsii*. However, as the latter features are exclusively terrestrial and are located more than 5 km from the proposed development site, they are not considered to be at risk of impacts.

Overall, the only qualifying interest of the SACs that is considered to be at risk of potential impacts from the proposed development is mudflat / sandflat habitat. The conservation objective for this habitat within the SAC is outlined below, along with some information on its current conservation status in Ireland.

Conservation objectives

Sandflat (and to a lesser extent mudflat) is widespread in the SACs, and is also the habitat of greatest importance to the bird species that inhabit the SPAs. The following conservation objective applies to both sites:

“To maintain the favourable conservation condition of mudflats and sandflats not covered by seawater at low tide in the SAC, which is defined by the following list of attributes and targets:

- The permanent habitat area is stable or increasing, subject to natural processes
- Maintain the extent of the *Zostera*-dominated community, subject to natural processes
- Conserve the high quality of the *Zostera*-dominated community, subject to natural processes
- Conserve the following community type in a natural condition: fine sands with *Angulus tenuis* community complex”

Conservation status

Inter-tidal mudflats / sandflats are currently considered to be of ‘inadequate’ conservation status in Ireland due to long-term problems with water quality and aquaculture (NPWS 2019), and the trend is deteriorating. The main threats to their conservation status are:

- High importance: residential or recreational activities and structures generating marine pollution, agricultural activities generating marine pollution, marine aquaculture generating marine pollution
-

3.4 Further details of relevant SPAs

The *South Dublin Bay and River Tolka Estuary* SPA is a large site that covers the following features: sandflat / mudflat habitat to the south of the River Liffey, the Tolka Estuary to the north of Dublin Port, Booterstown Marsh, a man-made mooring structure in the Dublin docks (which is used by breeding terns), and a small patch of grassland to the south of the Ringsend Waste Water Treatment Works. The *North Bull Island* SPA covers all other intertidal areas around Bull Island and in the north of Dublin Bay. The SPAs have been designated to protect a range of over-wintering birds (notably Light-bellied Brent Geese), breeding terns, and staging / passage populations of terns.

At low tide overwintering birds spread across the extensive sandflats and mudflats of Dublin Bay to feed on algae and invertebrates, and at high tide most of the birds roost in open areas along the coast. Birds move freely between the *South Dublin Bay and River Tolka Estuary* SPA, the *North Bull Island* SPA and other coastal SPAs in the Dublin region. Brent Geese and some other species also fly inland to feed on amenity grasslands in parks and sports fields around Dublin city. These areas are not included within the SPAs, but are important 'secondary habitats'.

Further information on the conservation objectives of the two SPAs in Dublin Bay are outlined below, along with the conservation status of their key species.

Conservation objectives: wetland habitat

This objective applies to all intertidal habitats within each SPA, which have a total area of 2,192ha in the *South Dublin Bay and River Tolka Estuary* SPA and 1,713ha in the *North Bull Island* SPA.

"To maintain the favourable conservation condition of the wetland habitat in the SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target: the permanent area occupied by the wetland habitat should be stable and not significantly less than the [existing area of each site], other than that occurring from natural patterns of variation".

Conservation objectives: overwintering birds

This objective applies to overwintering species that use the SPAs: light-bellied brent geese, shelduck, teal, pintail, ringed plover, grey plover, shoveler, oystercatcher, golden plover, knot, sanderling, dunlin, black-tailed godwit, bar-tailed godwit, curlew, redshank, turnstone and black-headed gull. Most of these species are winter migrants, which spend the non-breeding / winter season (usually between October and April) in Ireland / western Europe, and migrate to Arctic / sub-Arctic regions during the breeding season. Some species are present year-round, but the populations of all species are highest during the winter.

At low tide, waterfowl (e.g. brent geese) feed on green algae and eel-grasses, and waders feed on sediment-dwelling macro-invertebrates, primarily within the intertidal sandflat and mudflat habitats. At high tide most species roost on the water's edge or fly inland to terrestrial roosting / feeding sites.

The conservation objective for these species is:

"To maintain the favourable conservation condition of [over-wintering waterfowl], which is defined by the following list of attributes and targets:

- Long term population trend stable or increasing
- No significant decrease in the range, timing or intensity of use of areas by [over-wintering waterfowl], other than that occurring from natural patterns of variation"

Of the 18 over-wintering species for which the sites were designated, four (shoveller, grey plover, golden plover and black-headed gull) have a long-term declining population trend of between 25.0 and 49.9% in Ireland and are considered to be of unfavourable conservation status, while two species (shelduck and pintail) have long-term declines of between 1 and 24.9% and are considered to be of intermediate unfavourable conservation status. The remaining 12 species (including Brent Geese) have stable or increasing populations.

Conservation objectives: breeding tern species

Common terns *Sterna hirundo* and Arctic terns *Sterna paradisaea* breed annually in the Dublin Docks on a man-made mooring structure known as the 'E.S.B. dolphin' pontoon, which is also included within the *South Dublin Bay and River Tolka Estuary* SPA. Although only the common tern is listed as a breeding species for this SPA, the following conservation objective would apply to any breeding terns in the SPA:

"To maintain the favourable conservation condition of [tern species] in the South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and targets:

- No significant decline in:
 - Breeding population abundance: apparently occupied nests
 - Productivity rate: fledged young per breeding pair
- Distribution: breeding colonies
- Disturbance at breeding site: human activities should occur at levels that do not adversely affect the breeding tern populations"

Conservation objectives: passage migrants

The common tern, Arctic tern and roseate tern *Sterna dougallii* are listed as passage migrants in the *South Dublin Bay and River Tolka Estuary* SPA, as the site is used as a staging point by significant numbers of birds before their autumn migration. The following conservation objective is assumed to apply to these and any other terns in the SPA:

“To maintain the favourable conservation condition of [tern species] in the South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and targets:

- No significant decline in:
 - Passage population: individuals
 - Distribution: roosting areas
 - Prey biomass available
- No significant increase in barriers to connectivity
- Disturbance at roosting site: human activities should occur at levels that do not adversely affect the post-breeding aggregation of [tern species]”

Key threats to waterfowl

In the *Action plan for shore and lagoon birds in Ireland 2011-2020* (Birdwatch Ireland 2011), the following threats are listed for coastal birds:

- Recreation and disturbance
- Habitat loss, degradation and fragmentation
- Coastal developments
- Pollution and oil spills
- Climate change
- Alien invasive species and predation
- Mineral and resource use
- A general lack of awareness of the importance of nature and biodiversity.

3.5 Records of SPA bird species in the vicinity of the proposed development site

The *South Dublin Bay and River Tolka Estuary SPA* and the *North Bull Island SPA* support a range of over-wintering bird species. The main habitats of these birds are the coastal mudflats, sandflats and saltmarshes of Dublin Bay. However, some of these species also fly inland to feed on parks and playing fields in Dublin city, including brent geese that feed on grass, and waders (e.g. curlew) that feed on earthworms and other soil invertebrates. These species are relatively large and require some time to take flight, so they avoid areas with high levels of human disturbance, and are particularly wary of dogs. Therefore, the inland sites with highest levels of bird activity are typically large, open and have relatively low levels of human activity.

Records of SPA birds in the vicinity of the proposed development are discussed below. The text has been reproduced from Section 7.4.2 of the EIAR, and from the RFI response document (RFI no. 18).

Brent geese

Tymon Park has previously been used by light-bellied brent geese *Branta bernicla hrota* as a feeding area. This species spends the winter in Ireland (typically between September / October and March / April), and then migrates to the high Arctic during summer months to breed. Dublin Bay and the surrounding area supports several thousand brent geese in winter months. They feed in coastal areas at low tide, but at high tide they often fly inland to feed on grasslands. There are a number of urban parks and sports fields in Dublin city that are used by geese, but Tymon Park has previously been used in significant numbers. There are anecdotal records of 1,200 brent geese in the park in 2008, and 700 geese in 2009.

Weekly surveys of over-wintering birds were carried out in Tymon Park between January and mid-April 2018 by ecologists of Roughan & O'Donovan Consulting Engineers, comprising 14 surveys in total. Brent geese were a particular focus of the survey, and the traditional feeding areas for this species in the north-west of the park were included in the survey area. Brent geese were observed flying over the park (but not landing) during one of the surveys in January and are believed to have landed in Greenhills Park to the north of the site. However, brent geese were not observed during any of the other 13 surveys. The ecologists made some notes about sources of disturbance in the park, as follows: "*Brent Geese have not used Tymon Park in recent years as a result of constant disturbance by dogs. In addition, a dog park was built next to the area that was used by Brent Geese in the fields at the north end of Tymon Park East.*" Therefore, it was concluded that Tymon Park was not used as a feeding area for Brent Geese between January and mid-April 2019.

A flock of brent geese was observed by the SDCC Heritage Officer on the 4th of February 2019 (*pers. comm.*) on playing fields in the north-west of the park. The playing fields were subsequently surveyed by NM Ecology Ltd. in early March 2019 to search for goose droppings or other signs of activity, but no evidence was found.

In summary, Tymon Park was an important feeding area for brent geese approximately ten years ago, but it now appears to be used very infrequently. This is almost certainly due to disturbance from dogs (*e.g.* in the dog enclosure in the north-west of the park), which typically causes geese to take flight, even at distances of several hundred metres. Therefore, Tymon Park is no longer considered to be an important feeding area for brent geese.

All other areas of grassland along the River Poddle (*e.g.* Ravensdale Park) are considered to be of negligible value for brent geese, because they are small in size, surrounded by dense vegetation, have trees overhead (thus obstructing flight paths for geese), and are frequented by dog walkers.

Appraisal of brent geese feeding activity in Tymon Park

We note a submission from An Taisce dated 11th June 2020 that discusses potential discrepancies in the EIAR regarding brent geese in Tymon Park, as follows: "... while

anecdotal evidence and a limited number of bird surveys would indicate that the park is no longer used by Brent Geese, both DCHG and the SDCC Heritage Officer present evidence to the contrary. This discrepancy is not addressed in the EIAR, and An Taisce would highlight that an unresolved question remains regarding the use of the park by Brent Geese."

The discussion of brent geese makes reference both to systematic survey data and anecdotal records. The survey data was from the 14 winter bird surveys that were carried out in Tymon Park in 2018 (as appended to **Appendix 7-1 of the EIAR** and also appended to this NIS - **Appendix B**), in which no geese were reported landing in the park. This is the key baseline information for the assessment. The survey data is supplemented by some anecdotal records that provide further context on the site, e.g. the highest number of geese recorded, and additional records of geese from outside the survey period.

For the avoidance of doubt, our conclusion is that the park is used *infrequently* by brent geese, not that the park is *no longer* used by geese. Nonetheless, as brent geese are a qualifying interest of SPAs in Dublin Bay, we have assumed under the precautionary principle that geese may use Tymon Park on an occasional basis during the construction of the proposed development.

Other over-wintering waterfowl

A total of 19 bird species were recorded during the winter bird surveys by ecologists of Roughan & O'Donovan Consulting Engineers between January and April 2018. Mallard, wigeon, teal, northern shoveller, tufted duck, little grebe, coot, moorhen, mute swan, grey heron and little egret were all recorded at the ponds. Large numbers of gulls (notably black-headed gulls and common gulls) were recorded in other parks, including the playing fields, Castletymon car park, and the ponds. Peak counts for all species are provided in **Table 4**, which is reproduced from the report by Roughan & O'Donovan Engineers in 2018.

In summary, the ponds in Tymon Park are used by a number of waterbirds, including several winter migrants. Four species are associated with the European sites in Dublin Bay: brent geese, teal, shoveller, and black-headed gull. There are relatively few ponds of comparable size in the south-west of Dublin city, so the site is considered to be of local importance for breeding waterfowl.

Other sections of the River Poddle are considered to be of little importance for over-wintering birds, because the river corridor is relatively narrow and subject to frequent disturbance. Therefore, all other areas are considered to be of negligible importance for wintering birds.

Table 4: Peak counts of birds recorded in Tymon Park in Jan – Apr 2018

Common Name	Scientific Name	Peak Count
Mute Swan	<i>Cygnus olor</i>	17
Brent Goose (w)	<i>Branta bernicula</i>	10
Wigeon (w)	<i>Anas Penelope</i>	23
Teal (w)	<i>Anas crecca</i>	5
Mallard	<i>Anas platyrhynchos</i>	126
Tufted Duck	<i>Aythya marila</i>	15
Northern Shoveler (w)	<i>Anas clypeata</i>	9
Little Grebe	<i>Tachybaptus ruficollis</i>	9
Grey Heron	<i>Ardea cinerea</i>	8
Little Egret	<i>Egretta garzetta</i>	1
Coot	<i>Fulica atra</i>	60
Moorhen	<i>Gallinula chloropus</i>	39
Black-headed Gull	<i>Chroicocephalus ridibundus</i>	356
Common Gull	<i>Larus canus</i>	234
Feral goose	<i>Anser sp.</i>	3
Feral duck	<i>Anas sp.</i>	6
Herring Gull	<i>Larus argentatus</i>	79
Lesser Black-backed Gull	<i>Larus fuscus</i>	3
Snipe (w)	<i>Gallinago gallinago</i>	1

4 Assessment of Potential Impacts

4.1 Direct impacts

The proposed development site is not located within or adjacent to any European sites, so there is no risk of habitat loss, fragmentation or any other direct impacts.

4.2 Indirect impacts

Potential changes in water quality (construction phase)

The proposed development will involve: the construction of earth embankments and concrete walls, the creation of a flood storage pond with a flow control structure, the creation of an integrated constructed wetland, the re-alignment of a small section of river,

and a range of associated works. These activities have potential to generate pollutants, including:

- Suspended silt or other sediments, which can reduce water quality, harm aquatic fauna, and/or alter the flow of watercourses
- Concrete and cement, which are composed of highly alkaline, corrosive fine sediments that are very harmful to birds and aquatic fauna
- Hydrocarbons (oil, petrol, diesel, etc), solvents and other chemicals, which are toxic to birds and aquatic fauna

If any of these pollutants reached the River Poddle, they could be carried downstream into the River Liffey, and subsequently to the SACs and SPAs in Dublin Bay. A hypothetical impact assessment of potential pollution incidents is difficult, as any potential impacts would vary depending on: the type of pollutant, the quantity of material entering the river, the rate at which it would occur, the time of year, and/or any potential 'in-combination' effects from other proposed developments along the River Poddle.

It is important to note that there is a considerable distance between the proposed development site and the nearest downstream European site (the *South Dublin Bay and River Tolka Estuary* SPA). When measured along intervening watercourse, there is approx. 10 km of intervening watercourse at the nearest point of the proposed development (at Teresa's Gardens in Merchant Quay) and approx. 15 km at the farthest point (Tymon North). Considering the dilution effect of the intervening rivers and coastal waters, it is considered highly unlikely that any pollutants generated by the proposed development could reach the European sites in high-enough concentrations to affect the qualifying interests of any site.

However, in accordance with the precautionary principle (which is implicit in the EU Habitats Directive and confirmed by European Court judgments), it is possible in a worst-case scenario that a large-scale pollution event (*e.g.* an accidental spill of hydrocarbons) could cause adverse effects on the conservation status of the qualifying interests of these European sites. Surface water pollution is listed as a threat to many of the conservation interests of the SACs and SPAs (refer to Sections 3.3 and 3.4). Therefore, in accordance with best practice, it is recommended that appropriate mitigation measures are employed during construction in order to avoid or reduce the potential impacts of pollution incidents.

Potential changes in water quality (operational phase)

When construction is complete, no further pollutants will be generated. The new structures are designed to be resistant to erosion, so building materials and sediment will not be damaged by the river, even during flood events. Therefore, the operation of the development would not cause any significant adverse impacts on water quality in any European sites.

Disturbance of overwintering birds (construction phase)

Some playing fields in Tymon Park are used as a feeding area by flocks of brent geese and some other over-wintering species (refer to Section 3.5), although in recent years their use of the site has been very infrequent, due mainly to disturbance by domestic dogs. Some aspects of the proposed development will be approx. 200 – 400 m from the brent geese feeding area, so the potential for disturbance of these areas is discussed below.

Construction works can cause ex-situ disturbance of birds due to noise (e.g. the operation of heavy construction vehicles), vibration (e.g. rock breaking), or visual disturbance (e.g. rapid movements). Works at Tymon Park will include the construction of a raised earth embankment on the eastern side of Tymon Lake, the construction of two small embankments to the north-west of Tymon Lake, the installation of a flow control structure at Tymon Lake, the construction of an Integrated Constructed Wetland. A temporary construction compound and some temporary storage areas will be created in the north of the park.

The brent geese feeding area in Tymon Park is located in a playing field adjacent to Keaden Avenue / Lugnaquilla Road / Kippure Avenue. Figure 2 shows the distances between the feeding area and various components of the proposed development. The linear distance between the main construction compound in Tymon Park and the feeding area is approx. 420 m. Other construction work in the area includes an embankment to the north-west of the Tymon Lakes (approx. 310 m from the feeding area) and a storage area to the west of the Tymon Lakes (240 m from the feeding area). All of these working areas will be separated from the brent geese feeding area by dense woodland and / or housing estates, which will block visual disturbance, and buffer any noise or vibration.

The timing of works will also be relevant to ex-situ disturbance, particularly for construction works around Tymon Lake. Brent geese are only present in Ireland in significant numbers between September / October and March / April, and they migrate to the high-Arctic for the remainder of the year. Most of the construction work around Tymon Lake will take place in summer months, because the construction of the embankment will be most practical during dry weather, and because in-stream and near-stream works are typically undertaken in the summer low-flow period of July and August. Some preparatory works will take place in winter months (e.g. vegetation clearance), and the temporary construction compound will be active throughout the year. However, it is important to note that the extent and duration of construction works in Tymon Park will be substantially lower in winter months, when brent geese could be present.

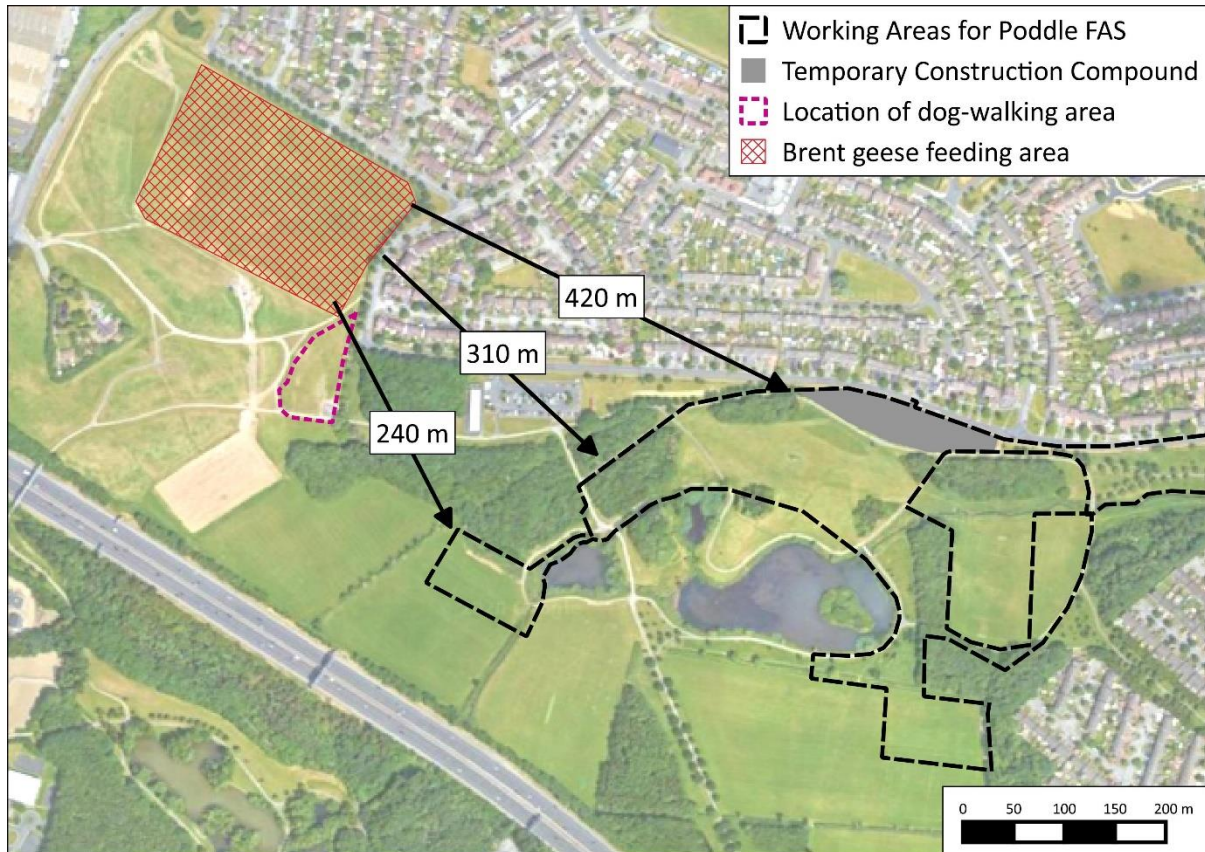


Figure 2: Location of former Brent Geese feeding area relative to the development

In summary, the main construction compound in Tymon Park is not considered to pose any risk of ex-situ disturbance to brent geese. As discussed herein, this is for a number of reasons, as follows:

- The construction compound is located more than 400 m from the brent geese feeding area, and other aspects of the proposed development are more than 200 m from the feeding area
- There are hard and soft barriers between the proposed development and the feeding area, which will block visual disturbance, and buffer any noise or vibration
- Most work around Tymon Lake will take place in summer months, when brent geese will not be present
- Brent geese only use the park on an infrequent basis, due primarily to disturbance from domestic dogs, particularly around the dog walking park

On this basis, there is no risk of disturbance or displacement of brent geese or any other over-wintering birds associated with the *South Dublin Bay and River Tolka Estuary* SPA or the *North Bull Island* SPA.

4.3 Potential in-combination effects

Two moderate to large-scale developments were identified along the River Poddle that could potentially cause in-combination impacts: the ongoing construction of a residential development at Mount Argus, and a residential development at Unit 1, KCR Estate, Ravensdale Park that is currently in construction. Neither development is within or adjacent to the proposed working areas for the River Poddle Flood Alleviation Scheme. The development at Mount Argus involved some re-alignment and culverting of the River Poddle, but all works are now complete. The development at KCR Estate is located more than 50 m from the River Poddle, and will not have any direct effect on the watercourse.

Two of the other developments listed in Section 2.3 - the library at Castletymon and a prefabricated classroom at Scoil Aonghusa Senior National School - will be complete by the time the proposed development commences. No other live or recently approved planning applications were identified in the vicinity of the proposed development.

Therefore, as none of these developments are within or adjacent to the proposed working areas, and none will involve further modification of the watercourse, there is not considered to be a risk of in-combination effects with these other plans or projects.

5 Proposed Mitigation Strategy

As noted in Section 4.2 of this report, it is possible in a worst-case scenario that a large-scale pollution event (e.g. an accidental spill of hydrocarbons) could cause adverse effects on the conservation status of the qualifying interests of these European sites. However, it is important to note that the risk of impacts is very low, because large-scale, accidental pollution events are highly unlikely to occur, and because it is highly unlikely that any pollutants could reach the downstream European sites in any perceptible concentration after passing through 10 – 15 km of intervening watercourses. Nonetheless, in accordance with the precautionary principle, the possibility of impacts must be considered, and appropriate mitigation measures must be employed during construction in order to avoid or minimise the potential impacts of pollution incidents.

A series of pollution-prevention measures for the construction phase of the project are outlined in the following sections. The measures in Section 5.1 are reproduced from Chapter 7: Biodiversity of the EIAR, and the measures in Section 5.2 are reproduced from the Surface Water Management Plan for the development. Readers should refer to the CEMP and SWMP for further context of construction methods and environmental management measures.

Regarding timing, all of these measures will apply for the duration of construction works. Pollution-prevention measures will be put in place prior to the commencement of any other construction works at any given location and will remain in place until work is complete.

5.1 Ecological Clerk of Works

The contractor will employ an Ecological Clerk of Works (ECoW) to oversee the implementation of the mitigation measures outlined below. The ECoW will be required to provide reports and written correspondence to the Employers' Representative as requested, in order to demonstrate compliance with the measures outlined in this report. The ECoW will liaise with the contractor's Environmental Manager to assist with preparing a detailed CEMP and its implementation, and to advise on all works in close proximity to the river.

5.2 Environmental management measures for hydrology / hydromorphology

The measures below are taken from the Surface Water Management Plan (SWMP, AWN Consulting, 2020). The mitigation and monitoring sections of the SWMP are reproduced in full below, and the full document is included as an Appendix to the NIS.

Surface water mitigation measures

In general, all works on the riverbank will be subject to a specific method statement agreed in advance with the statutory authority. The method statement will be specific to each construction area but will incorporate the following points:

- To avoid excessive silt runoff, site clearance is not to be undertaken during wet conditions, when rainfall of more than 0.5 mm/hour is forecast within the next 24 hours or rainfall of more than 3mm/hour is forecast within the next five days in the River Poddle catchment.
 - At the riverbank works locations, siltfencing will be installed along the river bank to retain eroded sediments. Catch nets may be used where relevant.
 - Soil cleared from the site and all materials associated with the building process are to be stored outside the flood zone in designated storage areas. The flood zone will be delineated on the works areas. No soil storing will be allowed within 30 m of the open water, which is in line with the Inland Fisheries Ireland guidelines.
 - Raw or uncured waste concrete is not to be disposed of within 30m of the river. No washing out of concrete tankers to be allowed on any of the construction areas.
 - Fuels, lubricants and hydraulic fluids for equipment used on the construction site, as well as any solvents and oils etc. are to be carefully handled to avoid spillage. properly secured against unauthorised access or vandalism, and provided with spill containment. All staff to be trained in management of chemicals and spill response.
 - Fuelling and lubrication of equipment is not to be carried out within 100 m to the open water. Fueling should only be undertaken in designated areas with spill control measures in place. All fuel storage should be within containers with 110 % containment and located on hardstand. This measures are in line with the Inland Fisheries Ireland guidelines.
 - Weedkillers not be used within 100m of the open water.
-

- Any spillage of fuels, lubricants or hydraulic oils is to be immediately contained and the contaminated soil removed from the site and properly disposed of.
- Waste oils and hydraulic fluids are to be collected in leak-proof containers and removed from the site for disposal or re-cycling.
- The washing of any plant equipment will be carried out in designated areas to prevent potentially polluting material from contaminating aquifers and soils/subsoils.
- Excavations will be backfilled as soon as possible to prevent any infiltration of potentially polluting compounds to the subsurface and the aquifer.
- There will be no discharge of effluent to groundwater during the construction phase. All wastewater from the construction facilities will be stored for removal off site for disposal and treatment.

For in-river works additional mitigation measures are required. Specific method statements are required for approval by the relevant regulator as the measures required will depend on the construction method proposed and the nature of the open water conditions.

- Measures to minimise the suspension and mobilisation of sediment downstream of the working area will consider silt barriers and cofferdamming to create dry working areas.
- Where feasible, works will allow the river to recover for at least 14 hours on a daily basis meaning that the period of in river work should be about 10 hours maximum.
- A dry working area will be created for pouring of concrete.
- In areas of the river where there are alien species, all plant and machinery will be thoroughly washed before moving to another section of the River.
- All vehicles will be regularly checked for oil leaks, and ruptured hose pipes.

All in-stream works will comply with current best practice, notably the Inland Fisheries Ireland Guidelines on protection of fisheries during construction works in and adjacent to waters (IFI, 2016) and Transport Infrastructure Ireland's Guidelines for the crossing of watercourses during the construction of national road schemes (TII, 2008).

Mitigation measures relate to the protection of the aquatic environment from significant impacts that have been identified during the construction works. In addition to mitigating significant impacts for water quality these mitigation measures will also protect the aquatic species in the river.

The contractor shall be obliged to ensure no deleterious discharges are released from the sites to the River Poddle during excavation de-watering, testing or washing activities. Throughout the period of works the contractor shall also take account of relevant legislation and best practice guidance including but not limited to the following:

- C532 Control of water pollution from construction sites: guidance for consultants and contractors;
- C648 Control of water pollution from linear construction projects;
- SP156 Control of water pollution from construction sites – guide to good practice;
- NRA's 'Guidelines for the Crossing of Watercourses during Construction of National Road Schemes (NRA, 2005);
- The Eastern Regional Fisheries Board guidance document 'Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites' (Murphy, 2004); and
- The Southern Regional Fisheries Board guidance document 'Maintenance and protection of the inland fisheries resource during road construction and improvement works' (Kilfeather, 2007).

At the start of the project the main contractor will hold a series of toolbox talks with the sub-contractors and supervisors to make them aware of the various environmental commitments made in relation to the scheme. It is recommended that responsible personnel and communication lines are agreed in advance of the work starting.

These named responsible people shall be documented in an Environmental Operating Plan for the scheme.

The measures contained in this document and the scheme specific Construction and Environmental Management Plan (CEMP) are communicated and set up prior to the work commencing. The Plan will also incorporate waste management, separation, disposal and documentation for wastes generated on-site, and in the contractor's compound. All contractors working on site will be made aware of the CEMP, its requirements and reporting procedures. A nominated person shall be tasked with maintaining the CEMP, ensuring that training is given to all workers and that all records regarding waste handling and disposal, environmental incidents and emergency procedures are kept in the main site office. It is recommended that an independent audit of the CEMP is carried out before the work commences. Similarly, a review of the CEMP and SWMP shall be carried out during the construction programme.

With regard to the Integrated Constructed Wetland (ICW) at Tymon Park, a temporary river water management system will need to be established during the earthworks. To reduce the impact of construction works on the river flow the ICW will first be constructed outside of the river channel and erecting temporary bunds along the existing river route to contain and maintain river flows.

The stone baffles and stone weir are to be installed at the inlet point and outlet points respectively. Weir and stone baffles are to be constructed from material acquired from site where suitable and available, otherwise locally sourced natural stone can be used.

Control of Suspended Solids

The potential for the release of suspended solids to the river during the construction of the storage embankments will be significantly increased during wet weather. Temporary silt fencing is required erected around working areas adjacent to the river to prevent earth-moving equipment or silt laden run-off from encroaching too close to the River or Lake at Tymon when constructing the walls and embankments.

The risk of erosion will be minimised where possible by planning the construction and construction routes. Topsoil will be stripped from the footprint of the embankment before the construction starts. This will help to key the embankment to its foundation and to reduce settlement. Where the topsoil is stripped and the subsoil removed, a drainage system will be installed to collect run-off water from the excavated/denuded areas. The water will drain to a temporary settlement pond. The overflows for the settlement ponds will be to land rather than the River or the Lake where feasible or tested to assess suitability for discharge to open water.

Sandbags will be used in denuded areas to attenuate runoff and reduce soil erosion. Stockpiles of soil will be situated a minimum of 30 m from the edge of openwater. Sandbags and or silt fencing will be placed around stockpiles to prevent sediment laden runoff to the river.

Only certified soil will be used for the construction of the embankments.

Wash down areas for vehicles and site equipment will be located away from the riparian zone. The wash water should be directed to the settlement pond.

The pouring of the concrete for any instream works or near openwater e.g. the wing walls of the flow control structure will be undertaken in dry weather and the concrete will be allowed to cure for 48 hours minimum. Wash water from the concrete pumps or surplus concrete left in the truck will not be discharged on site.

Control of Other Pollutants

Prior to the storage of any potentially polluting material on site, the site manager will be responsible for ensuring that a material safety data sheet for each product is available for inspection. A copy of all relevant material safety data sheets will be available at storage locations as well as the site office.

Best practice methods will be employed at all stages during the construction. Fuel, lubricants, hydraulic oil, repair equipment used on the construction site will be carefully handled to avoid spillage. All tanks, barrels or containers containing hazardous materials (oils, lubricants, sealants etc.) must be stored in a bunded area within the site boundary, the capacity of which will be 110% of the total volume of liquid to be stored. Spill kits will be

made available in site compound and in site machinery. In the event that a spillage does occur, adsorbent material will be placed on the material to adsorb it. The contaminated adsorbent will be correctly disposed of as a hazardous waste and brought to a licenced waste handling site by a licenced waste contractor. The Site Manager must retain a copy of any waste transport and disposal documentation. In the event of a larger spillage of oil/hydraulic oil then South Dublin County Council and/or Dublin City Council Environment Sections will be contacted immediately. The Emergency Procedures for the site will have a procedure for dealing with large spillages.

All empty diesel/oil/hydraulic oil containers will be drained to a single labelled container. The empty oil containers will be stored in a dedicated labelled totally sealed skip. Waste skips will be collected by a licenced waste carrier and brought to a licenced facility for disposal. All disposal records must be retained at the site offices.

The waste from the chemical toilets will be collected by a licenced waste carrier and brought to a licenced treatment facility.

A supply of oil booms and soak pads must be maintained within the contractor's area.

All machinery will be inspected at the start of each work shift for signs of leaking hydrocarbons. Parking areas will be inspected on a daily basis for evidence of hydrocarbons leaking from machinery. Spills will be cleaned up and corrective action will be taken to prevent future spills.

5.3 Monitoring

Brent geese

The ECoW will monitor activity of brent geese in Tymon Park during the over-wintering season (September to March, inclusive), in order to confirm that construction works do not cause any disturbance. If there is any evidence that brent geese are disturbed by construction works, the ECoW will implement additional mitigation measures as appropriate; e.g. temporarily ceasing works that generate high-intensity noise, or a temporary cessation of all site works when geese are present.

Surface water monitoring

Scheduled environmental monitoring of environmental performance and compliance with planning consents and legislation and regulations will be required throughout the construction phase of the Project. This will enable the overall effectiveness of the environmental controls to be determined and allows areas of non-compliance to be identified so corrective actions can be taken. Environmental monitoring will take place prior to construction to assess the baseline, during construction to assess the impact of the construction on the environment and after construction to assess the impact of the

completed Project. Environmental monitoring will be required at various stages of construction for each environmental aspect as developed in specific environmental sub-plans and the Project. The overall monitoring schedule, including environmental aspects, frequency and monitoring requirements will be developed by the appointed Contractor and approved by the regulator. The monitoring schedule will be a working document and will be amended and updated to reflect works being undertaken and receiving water conditions and management review changes.

The overall monitoring schedule, including environmental aspects, frequency and monitoring requirements will be finalised by the appointed Contractor and approved by the Relevant Authority prior to works commencing on site.

It is recommended that the following monitoring is undertaken at points upgradient and downgradient of each works area:

- A daily visual inspection should be undertaken and recorded.
- The sampling frequency will depend on the works being undertaken but typically should be collected weekly.
- Relevant parameters should include suspended solids, dissolved oxygen and pH.

6 Residual Impacts

The aim of the proposed mitigation strategy is to avoid or minimise the risk of any pollutants reaching the River Poddle, because it has a distant hydrological connection to some European sites in Dublin Bay. It is acknowledged that the risk of significant effects on the qualifying interests of the European sites is very low, even in the absence of best-practice mitigation measures. However, in accordance with the precautionary principle, the mitigation strategy has been developed in order to comprehensively rule out any risk of impacts.

As noted in Section 2.2.6, accidental spills of three categories of pollutant were identified: suspended sediments, concrete / cement products and hydrocarbons. Residual impacts on these categories are discussed below.

Suspended sediments

The risk of impacts will be avoided or minimised using the following components of the mitigation strategy:

- Use of silt fences along river banks;
 - Silt-management measures for all groundworks;
 - Long-term storage of earth / sediments will be within the construction compound and/or designated storage areas, which are all located away from the river
-

These measures will ensure that stockpiles of earth and other sediments are stored in a controlled area away from the watercourse, and that silt is managed during groundworks. They will remove any residual risk of negative impacts from suspended sediments in the River Poddle, and on the European sites in Dublin Bay.

Concrete / cement products

The risk of impacts will be avoided or minimised using the following components of the mitigation strategy:

- Concrete / cement products will be stored in the construction compound or at least 30m from the river
- Pre-cast concrete structures will be used where possible. Poured concrete will be ordered ready-mixed and delivered to site in purpose-built vehicles
- Any concrete pouring near the watercourse will occur in dry conditions
- Concrete mixing / delivery vehicles will be cleaned off site

These measures will ensure the safe storage of concrete / cement products, minimise the use of poured concrete, and avoid any cleaning in sensitive areas. They will remove any residual risk of negative impacts from concrete / cement products on the River Poddle, and on the European sites in Dublin Bay.

Hydrocarbons

The risk of impacts will be avoided or minimised using the following components of the mitigation strategy:

- Careful handling and storage of all fuel, lubricants, hydraulic oil, repair equipment
- Spill kits will be kept in the site compound and all mobile vehicles
- Disposal of hydrocarbon-contaminated products as hazardous waste
- Vehicles will be refuelled over drip trays

These measures will ensure that all hydrocarbons are safely controlled and stored, and that any accidental spills will be intercepted and removed before they can reach the river. They will remove any residual risk of negative impacts from hydrocarbons on the River Poddle, and on the European sites in Dublin Bay.

7 Appropriate Assessment: Conclusion of Stage 2

In this NIS we provide supporting information to assist the competent authority with an AA of the proposed development. We have identified two SACs and two SPAs that have distant hydrological connections to the proposed development site. In a worst-case scenario there is a risk of adverse impacts on the qualifying interests of one or more sites (*e.g.* intertidal mudflats, over-wintering wildfowl). In response, a series of mitigation measures have been

recommended by the project's ecologist and hydrologist. These are best-practice measures that are regularly used on construction sites, and that are known to be effective. Their implementation will be monitored by an Environmental Manager and Ecological Clerk of Works, allowing any issues to be addressed. The results will be documented and made available for third-party review.

The incorporation of these measures in full and their subsequent implementation on site will remove any residual risk of significant effects on the River Poddle or downstream European sites, beyond reasonable scientific doubt. It is therefore the considered opinion of NM Ecology, as the author of this NIS, that, in making its AA in respect of the proposed development, An Bord Pleanála, as the Competent Authority in this case, should determine that, given the full and proper implementation of the mitigation prescribed in this NIS, the proposed development, either individually or in combination with other plans or projects, will not adversely affect the integrity of the South Dublin Bay and River Tolka Estuary SPA, South Dublin Bay SAC, North Bull Island SPA and North Dublin Bay SAC or any other European site.

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