

Greater Dublin Drainage

Alternative Sites Assessment (ASA) Methodology

March 2012



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1 Introduction

1.1 General

The current stage of the Greater Dublin Drainage project which commenced in March 2011 encompasses the full planning stage of the project and is broken down into the following sub-stages:

- Sub – Stage (a): Project Inception
- Sub – Stage (b): Alternative WwTP Site Assessment (ASA) / Pipeline and Marine Route Selection Report
- Sub – Stage (c): Preliminary Report (PR)
- Sub – Stage (d): Environmental Impact Statement (EIS)
- Sub – Stage (e): Wayleave / Land Acquisition
- Sub – Stage (f): Additional Reports
- Sub – Stage (g): Planning Stage
- Sub – Stage (h): Any Other Work

1.2 Core Requirements

The core requirement of the Greater Dublin Drainage project is to safely deliver through the entire planning process a:

- Regional Wastewater Treatment Plant (WwTP) and associated marine outfall located at a site, to be selected as part of this process, in the northern part of the Greater Dublin Area (GDA); and
- An Orbital Drainage System linking the Regional WwTP to the existing regional sewer network and to provide for future connections for identified developing areas within the catchment.

1.3 Previous Reference Studies

- Greater Dublin Strategic Drainage Study (GDSDS) completed in April 2005, and
- Strategic Environmental Assessment of the Greater Dublin Strategic Drainage Study (SEA of GDSDS) completed in 2008.

1.4 Study Area

The study area is shown in Figure 1 included in Appendix A.

1.5 ASA Methodology Report

An Alternative Sites Assessment (ASA) and Route Selection is to be undertaken for the Greater Dublin Drainage project to determine the selection of the preferred WwTP site, orbital drainage system and marine outfall routes.

The purpose of this report is to, insofar as possible, outline clearly the methodology to be used in determining the preferred site for the Regional WwTP and routes for the orbital sewer and marine outfall location. This report assumes the need for the project has been identified and discussed elsewhere. Positive impacts of the project on the GDA as a whole are not specifically highlighted as they are relative to the entire project and have no bearing on the selection of a specific site/route.

The GSDS identified that the existing wastewater network within the GDA was overloaded and additional treatment capacity was required to provide for continued economic growth. The subsequent SEA of the GSDS recommended the location of a Regional WwTP in the northern GDA and that an ASA be undertaken to identify potential sites and the subsequent selection of a preferred site. The SEA, in relation to the ASA, states that *'.....the preferred mitigation is through avoidance of environmental impact. In this regard, it is recommended that an Alternative Sites Assessment (ASA) be progressed to avoid significant environmental impact where possible.....'* Therefore the ASA methodology, and in particular Phase 2: Alternative Sites Assessment and Route Selection, has been developed on the basis of identifying the potential environmental impacts of each shortlisted site, orbital drainage system and marine outfall location and considering the relative level of impact. The selection of an appropriate orbital drainage system and marine orbital routes must be undertaken in tandem with the selection of sites. Where relevant separate reference is provided throughout this document to the pipeline corridors and routes, however in general the characteristics of identified routes will input into the identification of preferred sites.

The ASA methodology details how the sites, orbital drainage system and marine outfall will be assessed relative to each other in terms of impacts on the identified criteria and sub-criteria in order to determine the differentiating criteria. It should be noted that, based on the recommendations of the SEA and as discussed in section 2.3.6 below, the proposed ASA methodology is qualitative and therefore at this stage is discussed in general terms only. The details of the selection methodology can only be determined as the project progresses and will be fully detailed in the *Draft Alternative Sites Assessment Phase 2 Report*.

This ASA Methodology Report details the key phases in the Alternative Sites Assessment (ASA) and Route Selection process, with particular emphasis on the methodology utilised for the selection of the preferred site, orbital drainage system and marine outfall.

2 ASA Methodology

2.1 Introduction

The objectives of the Alternative Sites Assessment (ASA) & Routes Selection sub-stage are to identify the following:

- The optimum location for the proposed Regional WwTP in North County Dublin;
- The optimum location for the treated effluent discharge to the Irish Sea including the route of the outfall pipeline connection to the WwTP; and
- The optimum routes of the Orbital Drainage System connecting existing drainage networks to the proposed Regional WwTP, including trunk/branch sewer connections, and any necessary pumping stations and storm water storage tanks.

Selection of the optimum location/routes will entail consideration of means to minimise potential adverse environmental impacts and optimise environmental benefits.

The ASA/Route Selection process is being undertaken in accordance with the recommendations set out in the Strategic Environmental Assessment (SEA) on the GDSDS, which envisages a process comprising four distinct phases:

- Phase 1: - Preliminary screening of the study area to identify a short list (minimum of 6 No.) of potential alternative land parcels of suitable size to accommodate the proposed Regional WwTP and also to identify marine outfall locations and potential transfer pipeline corridors.
- Phase 2: - Assessment of the short listed potential alternative land parcels, marine outfall locations and transfer pipeline corridors identified in Phase 1 against a range of environmental and technical criteria including but not limited to ecology, cultural heritage, landscape, air quality, climate, traffic, landuse, planning policy, engineering and design constraints, capital and operational costs.
- Phase 3: - Consultation stage during which the emerging preferred sites marine outfall locations and transfer pipeline corridors from Phase 2 will be taken to wider public consultation.
- Phase 4: - The selection of the preferred site, marine outfall location and transfer pipeline corridors based on the assessment findings (Phase 2) and consideration of submissions received during Consultation (Phase 3).

Figure 2.1 overleaf, which has been developed from the SEA of the GDSDS, outlines the key phases in the ASA process.

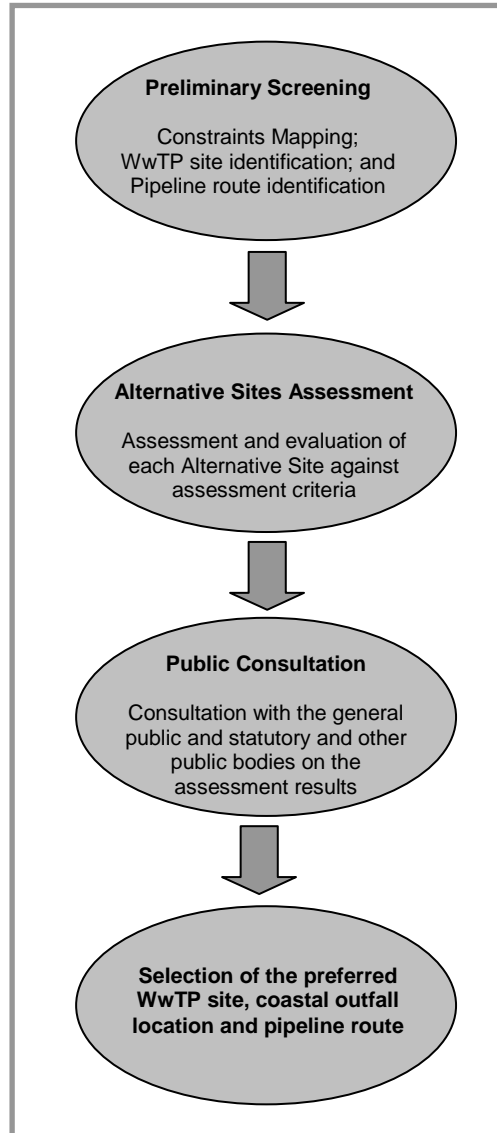


Figure 2.1 – Alternative Sites Assessment Stages (developed from the SEA of the GSDS)

These phases correlate with the overall road map for the project, which is included in Appendix B, and outlined in table 2-A overleaf:

ASA Phase	Project Road Map
Phase 1 – Alternative Sites Identification (Preliminary Screening)	(a) Public Consultation (b) Desk Top Studies (c) Map Constraints (d) Short List of Potential Locations
Phase 2 – Alternative Sites Assessment;	(e) Public Consultation (f) Environmental Studies (g) Publish Alternative Site Assessment Report
Phase 3 – Public Consultation	(h) Public Consultation
Phase 4 - Selection of the Preferred Site and Outfall Location.	(i) Announce Project Location

Table 2-A Correlation of SEA Recommended Phases with the GDD Project Road Map

2.2 Phase 1 - Alternative Sites Identification (Preliminary Screening)

Phase 1 pursued a high level strategy of avoiding known potential environmental impacts by excluding from consideration all areas of land within the study area which either had statutory environmental or Development Plan designations, or otherwise lay within a buffer zone of 300m from identified sensitive receptors, as listed in Table 2-B below.

Constraint	Detail
Ecology	National Heritage Areas (NHA): proposed NHA (pNHA); Special Protection Areas (SPA); Special Areas of Conservation (SAC); candidate SAC (cSAC); RAMSAR Convention on Wetlands; designated Shellfish Waters; Nature Reserves; Annex 1 habitats; Refuge for Fauna; Tree Preservation Orders; Flora Protection Orders; Parks Biodiversity Designations/Nature Development Areas
Cultural Heritage	National Monuments; Record of Monuments and Places (RMP); Record of Protected Structures; Archaeological Inventory and Architectural Conservation Areas
Geology	Geological Heritage Sites
Water	Salmonid waters, SAC, SPA, NHA, recreational waters, designated bathing waters, designated nutrient sensitive waters, designated Shellfish Waters; extremely vulnerable aquifers; areas at risk from fluvial and tidal flooding

Constraint	Detail
Landscape	Highly Sensitive Landscapes
Sensitive Receptors	Residential dwellings, commercial buildings and other known sensitive receptors such as schools; hospitals; nursing homes; places of worship; graveyards; prisons; education facilities; sports clubs and facilities; childcare facilities; historical sites/buildings; museums

Table 2-B – Phase 1 Constraints

This was achieved by applying the layered constraints, agreed with Fingal County Council, to the study area using GIS mapping. An examination of the available residual lands not subject to the constraints outlined above identified land parcels of suitable size to accommodate the proposed Regional WWTP. Initially 22 No. land parcels which had none of the applied constraints associated with them were identified. The land parcels so identified are all in excess of the 20 hectares required.

This was reduced to 9 No. land parcels, through consideration of:

- granted planning permissions;
- proximity to load centres, transfer pipelines and outfall locations; and
- high level defined engineering and design constraints.

In combination route corridors for the orbital drainage system and marine outfalls which avoided known constraints and which were technically feasible were identified.

The entire ASA/Route Selection process is to facilitate the ultimate identification and selection of a preferred site, orbital drainage system and marine outfall location. Therefore in order to achieve this aim, it is necessary to remove from consideration less favourable land parcels and their associated orbital drainage system routes and marine outfall locations. The factors listed above were used to identify a manageable number of land parcels with associated pipeline routes and marine outfall locations to progress to Phase 2 of the assessment.

Phase 1 accordingly resulted in the identification of 9 No. land parcels, with associated pipeline corridors and marine outfall locations, on which potential sites for the Regional WwTP could be situated. Full details of this assessment and the subsequent outcomes are included in the *Alternative Sites Assessment - Phase One Preliminary Screening Outcomes Report* dated October 2011. This report documents the preliminary screening process and compiles the shortlisted land parcels within which the proposed Regional WwTP may be located. The report also identifies potential marine outfall locations and transfer pipeline corridors, associated with the land parcels, to take forward for detailed assessment under a range of environmental and technical criteria in Phase 2 of the ASA methodology.

The nine land parcels, identified in the *Alternative Sites Assessment - Phase One Preliminary Screening Outcomes Report* dated October 2011:

- are free from all of the layered constraints;
- can facilitate feasible Orbital sewer and Outfall routes to and from each of them; and
- are larger than the minimum site area of 20 ha which is needed, to accommodate the proposed WwTP.

Phase 1 of the process also included a period of public consultation held over an eight week period from 10 October 2011 to 02 December 2011 where the short listed parcels were presented to the public at a number of open days. This process generated significant interest in the project resulting in the receipt of approximately 10,000 submissions. Full details of the process, communications received and the issues raised are included in the *Alternative Sites Assessment (ASA) Consultation Report*, currently at draft stage, produced by the project Communication Consultant. The issues raised will be utilised, where relevant, by the project team in identifying preferred sites.

2.3 Phase 2 - Alternative Sites Assessment

2.3.1 General

Phase 2 of the methodology assesses the performance of each of the alternative land parcels, transfer pipeline routes and marine outfalls against a range of environmental and technical criteria. This assessment allowed identification of a 20Ha site within each land parcel, as detailed further in section 2.3.7, step 2, and at this stage the assessment will progress with respect to these sites, and their associated pipeline corridors and marine outfall locations, only. Assessment of the performance of each of the sites, with associated pipeline corridors and marine outfall locations, against the pre-determined criteria will facilitate the identification of emerging preferred site(s), orbital drainage network and marine outfall location(s). Subsequently, with input from Phase 3 and 4, the preferred site, coastal outfall location and transfer pipeline routes will be identified. The Alternative Sites Assessment (ASA) includes desk-top studies, windshield surveys, site visits and impact assessments by both the project team and various engineering and environmental specialists.

2.3.2 Assessment Criteria

The alternative land parcels, transfer pipeline routes and marine outfall locations identified under Phase 1 will be assessed under the environmental and technical criteria outlined in Tables 2-B and 2-C overleaf:

Criteria	Assessment
Environmental Criteria	
Ecology	<p>The route of the orbital sewer, marine outfall and the site of the regional WwTP will be selected to avoid significant direct and indirect impacts on designated nature conservation areas and sites with potential to harbour protected habitats and species, based on sub-criteria to be identified by the relevant specialists as outlined in Section 2.3.6 below.</p> <p>The assessment will examine the potential impacts to each of the sub-criteria from each of the alternatives.</p>
Cultural Heritage	<p>The route of the orbital sewer, marine outfall and the site of the regional WwTP will be selected to avoid significant direct and indirect impacts on archaeological, cultural heritage and architectural heritage designations, based on sub-criteria to be identified by the relevant specialists as outlined in Section 2.3.6 below.</p> <p>The assessment will examine the potential impacts to each of the sub-criteria from each of the alternatives.</p>
Landscape and Visual	<p>The site of the regional WwTP and where relevant the routes of the orbital sewer and marine outfall will be selected to avoid significant direct and indirect impacts on designated areas and sensitive receptors from a landscape and visual perspective, based on sub-criteria to be identified by the relevant specialists as outlined in Section 2.3.6 below.</p> <p>The assessment will examine the potential impacts to each of the sub-criteria from each of the alternatives.</p>
Hydrology and Hydrogeology	<p>The route of the orbital sewer, marine outfall and the site of the regional WwTP and marine outfall will be selected to avoid significant direct and indirect impacts on the surface water and groundwater, based on sub-criteria to be identified by the relevant specialists as outlined in Section 2.3.6 below.</p> <p>The assessment will examine the potential impacts to each of the sub-criteria from each of the alternatives.</p>
Soils and Geology	<p>The route of the orbital sewer, marine outfall and the site of the regional WwTP and marine outfall will be selected to avoid significant direct and indirect impacts on soils and geology, including an assessment of potential contaminated land issued, based on sub-criteria to be identified by the relevant specialists as outlined in Section 2.3.6 below.</p> <p>The assessment will examine the potential impacts to each of the sub-criteria from each of the alternatives.</p>

Criteria	Assessment
Environmental Criteria	
Traffic	<p>The route of the orbital sewer, marine outfall and the site of the regional WwTP will be selected to avoid significant traffic impacts during the construction and operational phases of the development.</p> <p>The assessment will examine the potential impacts of each of the alternatives on the local, regional and national road network including the need to minimise the extent of road improvements required to provide access to each site.</p>
Air Quality and Odour;	<p>The site of the regional WwTP will be selected to avoid areas of significant population density. The route of the orbital drainage system will be evaluated to (a) enable selection of a wastewater transfer system which minimises the potential for odour and (b) minimises disturbance during construction.</p> <p>The assessment will examine the potential impacts on residential and community amenity within the site environs and along the transfer pipeline routes.</p>
Agronomy and Agriculture	<p>The route of the orbital sewer, marine outfall and the site of the regional WwTP will be selected with regard to current land uses.</p> <p>The assessment will consider compatibility with existing and future land uses.</p>
Noise and Vibration;	<p>The site of the regional WwTP will be selected to avoid areas of significant population density. The route of the orbital drainage system will be evaluated to (a) enable selection of a wastewater transfer system which minimises the potential for odour and (b) minimises disturbance during construction.</p> <p>The assessment will examine the potential impacts on residential and community amenity within the site environs and along the transfer pipeline routes.</p>
People and Communities	<p>The site of the regional WwTP will be selected to avoid areas of significant population density. The route of the orbital drainage system will be evaluated to (a) enable selection of a wastewater transfer system which minimises the potential for odour and (b) minimises disturbance during construction.</p> <p>The assessment will examine the potential impacts on residential and community amenity within the site environs and along the transfer pipeline routes.</p>

Table 2-B Environmental Criteria

Criteria	Assessment
Technical Criteria	
Safety	The route of the orbital sewer, marine outfall and the site of the regional WwTP will be selected with regard to construction and operation phase safety issues. The assessment will examine safety risks associated with each option.
Planning Policy	The route of the orbital sewer, marine outfall and the site of the regional WwTP will be selected having regard to the planning policies and objectives, as specified in the Fingal, and where relevant other County and City, Development Plan(s). The assessment will consider compatibility with current planning policy.
Engineering and Design	The route of the orbital sewer, marine outfall and the site of the regional WwTP will be selected having regard to engineering opportunities and constraints with particular emphasis on topography and ground conditions. The assessment will examine key engineering aspects associated with each option which have a significant impact on design and deliverability.
Capital and Operational Costs	The route of the orbital sewer, marine outfall and the site of the regional WwTP will be selected having regard to both capital and operational costs. The assessment will examine indicative whole life costs associated with each of the alternatives.
Sustainability	The route of the orbital sewer, marine outfall and the site of the regional WwTP will be selected to provide the most sustainable scheme for the future with particular emphasis on resource use, waste, energy consumption and carbon emissions.

Table 2-C Technical Criteria

The assessment criteria under which the land parcels, transfer pipelines routes and marine outfall locations will be assessed have been identified with regard to the provisional criteria listed in the SEA with additional criteria included as deemed necessary and relevant. 'Site Ownership and Availability' was listed as an additional technical criterion in the SEA; however this has been eliminated from consideration at this level due to:

The SEA states that 'Sites which are currently in the ownership of the Greater Dublin Area Local Authorities would perform better than those in private ownership, thereby requiring acquisition.' It is not considered appropriate to utilise this criterion, with the meaning described, for selecting the preferred site as this could result in a site being selected which is unsuitable from a number of other aspects. Instead, this issue will be

addressed in terms of cost as a sub-criteria under 'Capital and Operational Costs' and in terms of the number of landowners as a sub-criteria under 'Land Use'.

'Land Use' was also listed as a technical criterion in the SEA. It is considered that 'current and neighbouring land-uses', as specified, have been taken into account as part of the 'Planning Policy' criterion and as the majority of the identified land parcels are located within agricultural land, it was considered appropriate to introduce an 'Agriculture and Agronomy' criterion which has been included in Table 2-B as an environmental criterion.

The above criteria are not definitive and have been identified with regard to the provisional assessment criteria listed in the SEA. Where additional criteria are considered relevant additional assessments will be undertaken.

The assessments under each of the criteria included in table 2-B and 2-C will be undertaken by relevant technical and environmental specialists. As detailed further in section 2.3.7, each of these specialists will identify relevant sub-criteria which define the differentiations between the land parcels, subsequently identified 20 Ha sites, and their associated pipeline routes and marine outfall locations, thereby allowing a comparative assessment to be undertaken.

2.3.3 Orbital Drainage System and Marine Outfall

As outlined above, corridors for the routing of the orbital drainage system and marine outfall have been identified from Phase 1 of the process. These will be further developed and refined from an environmental and technical engineering perspective during this Phase 2. While it was initially expected that a number of routes associated with each land parcel would be identified, further assessment and preliminary design on the pipeline corridors has identified preferred corridors for each pipeline section.

During Phase 2 the selection of optimum locations for the marine outfall within the undesignated marine waters will be facilitated through a 3D hydrodynamic modelling process to assess the impact of the proposed outfall on the receiving waters.

These orbital drainage pipeline and marine outfall routes will be examined by the environmental specialists with respect to impact on and proximity to sensitive receptors and designated sites and by the project team under a number of technical engineering criteria including, for example, length and required pumping head which will allow the initial corridors to be refined further and ultimately a preferred route associated with each site will be identified. The routes will be assessed in a manner similar to that to be used for assessing the identified land parcels.

The nine land parcels do not stand in isolation, they are viewed in conjunction with the marine outfall locations, and their relative merits, and the environmental impacts of pipeline routes, to and from these parcels. The characteristics of the preferred route for each land parcel will constitute sub-criteria of the 'Engineering and Design' criteria and

relevant environmental criteria, outlined in Table 2-C above, to be used in the overall selection process for the most suitable regional WwTP site.

Therefore, each land parcel with its associated orbital transfer pipeline routes and marine outfall location will be referred to as 'land parcel options' throughout the following sections of this report. Each land parcel option consists of a specific land parcel, associated orbital pipeline routes from the load centres to the WwTP, pipeline routes from the WwTP to the coast, marine pipeline routes and marine outfall location.

2.3.4 **Appropriate Assessment**

While Phase 1 of the ASA is designed to screen out any designated sites and mitigate the impact on any such sites, it is possible that Natura 2000 sites could be impacted by works located some distance away.

Following best practise a two tiered approach regarding the potential to impact on Natura 2000 sites and protected species will be undertaken. As part of the *Draft Alternative Sites Assessment Phase 2 Report*, the potential for each of the sites and pipeline routes to impact on Natura 2000 sites will be identified. The level of development of the land parcel options at this stage is not sufficient to adequately complete the Appropriate Assessment (AA) screening process, therefore under the precautionary principle and given the limited project information available, each site and pipeline route would be screened in for AA. As further details emerge and the 20 Ha sites are identified and the options shortlisted, a full AA screening process will be undertaken.

2.3.5 **Mitigation**

The strategy in Phase 1 is founded on deliberate avoidance of impact, by screening out large areas of land which have known environmental constraints and provide relatively more complex technical situations to resolve. The primary strategy in Phase 2 remains avoidance. Therefore while choices are still available; the preferred land parcel option will always be that with the least disadvantages associated with it. These disadvantages will be more nuanced as the process ascends toward a smaller number of preferred land parcel options.

While the implementation of mitigation measures could result in land parcel options remaining in consideration, it should be reiterated that the objective of the process is selection of the best land parcel option and that mitigation, as an approach, is less rigorous than the preferred strategy of avoidance.

However, this distinction cannot remain in place throughout the process. As the selection process proceeds to the identification of emerging preferred land parcel options and ultimately to the selection of the preferred land parcel option, potential mitigation measures may be considered in order to differentiate between the emerging preferred sites as it is possible that the next-to-best land parcel option will bear

favourable comparison with the best one, when cost is taken into account, and the cost of mitigation measures on the less preferred land parcel option are included.

Even then, however, it will have to be recognised that mitigation, in that context, will be an effort to make the presented disadvantage at least acceptable, and that will itself be a value compromise, against the best land parcel option, which does not have the disadvantage at all.

2.3.6 Differentiating criteria

The ASA process will focus on the particular sub-criteria, which emerge as differentiating factors for the land parcel options. However, background data, consultation responses, identified issues and results of the assessment process, will be logged for future use throughout the project. Sub criteria which prove to be largely non-differentiating, because they are reported at similar levels across all the land parcel options, will be omitted from the selection process. However, it should be stressed that if a sub-criterion is omitted or removed during the ASA process, this is undertaken purely on the basis that it is no longer a differentiator across the land parcel options; this will not exclude it from the EIA process. The EIA for the preferred option will comprise a full and comprehensive assessment of all issues, re-visiting all sub-criteria where potential impacts have been identified.

2.3.7 ASA Assessment Methodology

The SEA recommends the following with respect to the assessment methodology for the identified sites: *'It is not recommended that a scoring or rating system be applied to the findings from Phase 2 as it is not possible to accurately weigh the relative merits of one criteria (e.g. ecology or water) against another (e.g. engineering or planning policy). Instead, the selection of the preferred site should be based on an overall assessment of the advantages/positives of each site, against the disadvantages/negative aspects of each site.'*

It should be noted that while the SEA refers to sites, the ASA methodology, determined with reference to the SEA, is being applied to the options identified by the Project Team as discussed previously.

As a result of the above recommendation and additional detailed discussion within the project team, including reference to other large scale, high profile projects, it was proposed to develop a qualitative assessment methodology for the ASA. This methodology has been developed by the project team and is based on industry knowledge and previous experience.

As the nine land parcel options have been identified as a result of an onerous process of environmental screening, the risks of impact have been very significantly reduced by the basic, but powerful policy of 'avoidance'. The nine parcels are not randomly selected available open spaces; rather they form a carefully and objectively selected set, which have the common characteristic that they already meet most of the

environmental attributes required in the best site for the WwTP. Similarly, the pipeline routes and marine outfall locations have avoided known environmental and technical constraints as they have been progressed. Therefore, it is now expected that differences between the land parcel options, in a comparison process on environmental impact, will be less-than-pronounced, and later quite nuanced, as the comparison process is refined in iterative passes.

The screening process to this point has been high level, and it is necessary to specifically review the shortlisted land parcel options for environmental and technical constraints. It is also necessary to bring considerations of cost into the appraisal, at the appropriate stage.

It should be noted that, the entire process is one of selection and although each of the nine land parcel options have been identified as having low potential for environmental impact only one land parcel option is ultimately the most preferred and must be identified. Therefore, it will be necessary to eliminate the majority of the nine land parcel options.

The following paragraphs outline the details of the ASA methodology. The intention of the proposed ASA methodology is to develop an overall matrix which assesses each of the options against the primary environmental and engineering criteria outlined in Tables 2-B and 2-C above. These criteria will be broken down, in conjunction with the relevant specialists, into a number of sub-criteria. A flow-chart has been developed and included in Appendix C which details in diagrammatic format the methodology to be followed and which is outlined as follows:

Step 1:- Refining of site specific environmental and technical constraints

For step 1 desktop studies and impact assessments, supplemented with visual surveys where necessary, will be carried out on each of the nine land parcel options. Such assessments will be undertaken based on the primary assessment criteria identified in Tables 2-B and 2-C above. As noted in section 2.3.2 above, relevant sub-criteria will be determined and developed by the specialists themselves in order to allow clear identification and assessment of the differentiating factors of each of the land parcel options. These sub-criteria will be discussed and agreed with the technical project team in order to ensure their rigour, appropriateness for inclusion and consistency. In addition, the sub-criteria will be discussed with relevant Fingal County Council (FCC) personnel to ensure all potential relevant constraints have been identified. The results are presented in matrix and mapping format and are used in decision making, through a workshop forum.

The individual specialists, in presenting their sub-criteria, will identify those of their selected sub-criteria which are of more, or lesser, importance in terms of impact avoidance in their area of specialism. For environmental criteria this will be based on the specialist's expert knowledge while for technical criteria, identification of relatively important sub-criteria will be based, where relevant, on the specific requirements of the project brief which required particular emphasis to be laid on:

- the control of odours;
- preservation of visual amenity;
- conservation of energy; and
- minimisation of carbon emissions.

This identification of relative importance of sub-criteria is undertaken on the basis that while the SEA recommends that there be no weighting of criteria against each other, it is important to recognise that impacts associated with certain sub-criteria within an overall specialism may be more significant than others for that particular specialism, for example, nationally designated nature conservation sites are more significant than locally designated nature conservation constraints. With respect to Cultural Heritage, the potential for 'impact on a National Monument' would most likely be considered more significant than the potential for 'impact on townland boundaries'.

Five degrees of impact are used to categorise any environmental impacts found. These are:

- Profoundly negative
- Significantly negative
- Moderately negative
- Slight negative
- Imperceptible

Where it is considered, in the expert opinion of the relevant specialists, that there is no environmental impact to a land parcel option for a particular sub-criteria, then this will be recorded as 'none' or 'no impact' within the matrix.

The use of the above five degrees of impact is based on the current National Roads Authority (NRA) environmental assessment methodology and the Environmental Protection Authority (EPA) environmental assessment guidelines and was agreed by all environmental specialists in a workshop forum.

Examples of the above assessment for environmental sub-criteria include:

- Where cultural heritage features are found, or RMPs have been identified, in the external, but adjacent, area, the reasons for the designations are researched, in order to define the complete cultural heritage context of the parcel, and thereby come to a conclusion on the likelihood of finding certain types of features in the land parcel or route corridor.
- The presence of Demesne features, in greater or lesser degrees of integrity, is a further example of the more detailed research in Phase 2, which the high level Phase 1 screening would not have had.

- With ecology, as a second example, the adjacent watercourses are examined and the potential of the habitat to support protected species, birds, mammals or aquatic species. While formally designated sites have already been avoided, the possible linkages, in terms of significance, between the designated sites, at a distance from the land parcels or route corridors, and any listed species and the habitat on the land parcel or route corridor, are investigated.

Technical sub-criteria which provide differentiating factors for the land parcel options will be incorporated into the matrices for the varying technical criteria identified in Table 2-C above. These sub-criteria will be reported in a manner whereby the 'most favourable' and 'least favourable' cell can be clearly identified. Examples of the assessment for technical criteria include:

- Lengths of pipeline will be reported numerically thereby allowing clear identification of the least favourable sites for the sub-criteria i.e. that with the longest associated pipelines.
- With reference to planning policy, the number of local objectives on, or within the appropriate buffer of, the land parcels will be clearly stated, thereby again allowing clear identification of the most and least favourable.

These differentiating technical factors for each of the land parcel options will have to some degree, an implied, or 'surrogate cost' aspect to them, in that less elevated land parcels, or lesser linear pipeline length, or outfall length, are also highly correlated with lesser cost.

The **output(s) of Step 1** are:

- (a) a definitive identification of the potential environmental constraints in each land parcel option, direct and indirect, and a considered opinion on the likelihood of identifying further constraints, from consideration of the entire context of the land parcel option;
- (b) the technical criteria which are likely to be differentiators between the land parcel options; and
- (c) a matrix of appraisals of each land parcel option, on sub-criteria developed and prioritized.

Step 2:- Identifying Sites within land parcels

As a result of the assessments by each of the environmental and technical specialists, it is now deemed possible and appropriate to reduce the land parcels down to the required 20 Ha sites. Step 2, therefore, evaluates each land parcel and identifies the best positioned, and best oriented, 20 ha site area within it.

The constraints identified by each of the specialists and presented in matrix and mapping format in Step 1 will be used to determine the most suitable location within each land parcel, for a WwTP site and also the most appropriate access route to the site in that circumstance.

The optimum location for a site within a parcel (which has already been defined by maximising distance to at least 300m from sensitive receptors), would be as close as possible to the centroid of the land parcel, as that is the greatest possible distance from its own boundaries, and therefore, from the receptors.

However other considerations such as topography, access road routing, avoidance of flood plains; farm viability, existing field boundaries and severance; and prudent buffer space from adjacent watercourses, also come into consideration.

By starting with the most central 20 Ha sites and adjusting due to the identified constraints, the best 20 Ha site within each of the land parcels will be identified. From this point onwards only these sites will be considered as part of each of the overall options.

The **output of Step 2** is:-

- (a) Nine potential sites with appropriate access routes, positioned optimally within the original land parcels.

Step 3:- Reviewing the land parcel option sub-matrices, to focus on the identified 20 Ha site within each

In Step 3, the environmental and technical Specialists examine the sites, and review and update their original sub-matrix for the land parcel options, incorporating any variances arising because the land parcel has now been narrowed to a site. From this point onwards, the options will consist of a 20 Ha site, associated orbital pipeline routes from the load centres to the WwTP, pipeline routes from the WwTP to the coast, marine pipeline routes and marine outfall location and will be referred to as 'site options' throughout the remainder of this report.

The **output of Step 3** is:-

- (a) Specialist sub-matrices revised and focused on the nine site options.

Step 4:- Combine the sub-matrices, into the primary assessment matrix, refine and collate descriptions

Each environmental and technical sub-matrix, is consolidated into a primary matrix, with all the main criteria and sub-criteria, for the nine site options, and with each cell containing the summary text of the Specialists' appraisal. The precise wording of each sub-criterion is again tested for rigour, any terminological differences, or differences in geographic naming, and any issues arising between Specialists are resolved. At this stage, the prioritisation of sub-criteria, within each criterion will also be confirmed.

The **output of Step 4** is:-

- (a) A primary matrix cross referenced and worded unambiguously, without duplication of sub-criteria, covering the nine site options.
- (b) An indication of the relative importance of the sub-criteria within each criterion.

Step 5:- Identification of ‘most favourable’ cells – assignment of green colour

Each Environmental Specialist colours in green those cells in their sub-matrix, which are ‘most favourable’ across each sub-criteria. It is expected that on a first pass, it will be appropriate to accept environmental sub-criteria with either ‘no impact’ or ‘imperceptible impact’ as automatically being coded green. Such a green cell will always remain ‘at least green’ in any subsequent iteration of this process.

In addition the ‘most favourable’ of the cells across each of the technical sub-criteria will also be coloured green.

The **output of Step 5** is:-

- (a) A primary matrix, with either uncoloured or green cells, covering the nine site options.

Step 6:- Identification of ‘least favourable’ cells – assignment of amber colour

Within each criteria the worst or ‘least favourable’ cell, or cells are identified and a determination on whether they should be designated ‘amber’ at this stage in the process is made. Note that such a designation is not mandatory (the worst cell might merely be ‘moderately negative’ in terms of impact). Any cell awarded an amber colour in this earliest pass, has a significant effect. Assigning the colour amber to a cell, assigns it a ‘least preferred’ category based on potential adverse impacts that can be identified and the relative importance of the sub-criteria in question. This is proposed and justified by the project team as a whole within a workshop format.

The **output of Step 6** is:-

- (a) A primary matrix, with uncoloured, amber and green cells covering the nine site options.

Step 7 – Removal of sites from consideration

As a Project Team, each of the columns are reviewed to determine whether the amber cells, which at this stage have been identified as relatively important amber classifications, are impediments which are either:-

- (a) of such significance that it would be comparatively difficult to secure planning permission for this site option; or
- (b) indicative of such environmental disadvantage that, with the range of available site options, prompts removal of this site option from further consideration.

For reasons already explained the strategy is avoidance and mitigation is not an acceptable value-compromise in order for site options to remain in contention at this stage of the process, not least since the primary objective is shortlisting to fewer and eventually to one site option.

The **output of Step 7** is:-

- (a) A refined primary matrix, whereby site options which are no longer suitable for consideration are removed.

Step 8 – Removal of non differentiating sub-criteria

If one or more site options are removed from consideration, sub-criteria with no colour coding across the remaining site options will then be reviewed to re-evaluate whether there are any differentiating levels of impact across the remaining site options. If the re-evaluation concludes there are no differentiating factors, then the sub-criteria can be removed. It should be emphasised however that even though the sub-criteria may not be a differentiator, it will still be fully addressed in the subsequent EIA for the preferred site option. The preferred site option will be subject to a full Environmental Impact Assessment (EIA) which will assess in full all potential impacts of the particular site option.

Removal of any sub-criteria from the matrix, i.e. designating it as not being a differentiating factor, will only be undertaken in full consultation and agreement with all the relevant technical and environmental specialists and with input from the project team.

The **output of Step 8** is:-

- (a) A further refined primary matrix, with site options which are no longer suitable for consideration and sub-criteria which no longer provide differentiating factors across the site options removed.

Iteration – Repeat Steps 6, 7 and 8

Step 6, 7 and 8 will be repeated, involving several iterations which will be developed and debated in a Workshop forum, in order to successively reduce the number of site options remaining, in a process of convergence on the best site option(s).

In each subsequent iteration, the remaining site options will be reviewed for each criteria, and the remaining worst or 'least favourable' cell, or cells, will be identified, and again a determination made as to whether such cells should be coloured 'amber' at this point in the process. Note that again such a declaration is still not mandatory, and it may not be appropriate to declare any site option as 'amber' under a particular sub-criterion, if the degree of impact does not warrant it.

It should be noted that any cell awarded an amber colour in these later iterations, does so for a successively more nuanced degree of impact. As previously noted, it means that cell, or cells, has emerged from the background field of green or uncoloured cells, to assume a significantly differentiating importance for that particular site option, with respect to the remaining site options. It must be expected, and understood, that such later-pass amber designations will be for ever more nuanced reasons, which are nevertheless reasonable, having regard to the degree of choice remaining.

As a Project Team, in a workshop forum, each column will be examined, on each iteration and determinations as to whether the number of site options can be reduced will be made, working towards a point where site options with no or limited differentiating factors remain.

The iterative qualitative evaluation process will be repeated until the overall matrix is sufficiently refined to facilitate the clear identification of an emerging preferred site option(s) as those having the least number of potential constraints from the original nine. It is intended that the process will result in a maximum of three emerging preferred site options at this stage.

For reasons already explained, the strategy right up to this point is purely one of 'avoidance' and mitigation has not been admitted to the process, as with the choices available, to do so, it is not a necessary value-compromise.

However, at this stage, the potential for mitigation measures to be incorporated into the remaining site options (maximum 3 No.) to reduce the potential impact of any remaining constraints will be assessed by the project team and presented as part of the public consultation in Phase 3.

Every decision made, on each site option, for each sub-criterion, and associated impact, will be noted and documented to ensure that a full audit trail of evidence and justification for each decision made is available.

The **output of these iterations** is:-

- (a) A fully refined primary matrix, whereby the differentiating factors between the remaining site options are so nuanced it is not possible to remove any further site options/sub-criteria.
- (b) Identification of the potential for mitigation measures to be incorporated into the remaining site options (maximum 3 No.)

2.4 Phase 3 – Public Consultation

Due to the expected fine characteristic differences between a number of site options, as a result of the original thorough screening at Phase 1, it is envisaged that it will be difficult to identify the one best site option through the above methodology alone. Instead it is expected that a maximum of three site options will be identified as preferred.

At this stage, these site options, with identified mitigation measures, will be taken forward to public consultation to obtain views and feedback from the public and interested parties. Such opinions will subsequently feed into Phase 4.

The public consultation period will be scheduled following publication of the Draft ASA Report and will be managed by the Communications Consultant for the GDD project with relevant input from the technical team.

2.5 Phase 4 – Selection of the Preferred Site Option

In order to select the best site option from the remaining preferred site options, the following inputs will be used:

- Public opinion gathered from Phase 3 (as noted above);
- Further studies on the remaining site options;
- Further comparative costing; and
- Mitigation measures.

Further comparative costing, including the cost of potential mitigation measures, may now enter the process, in considering the remaining site options which have emerged as the best from the original nine.

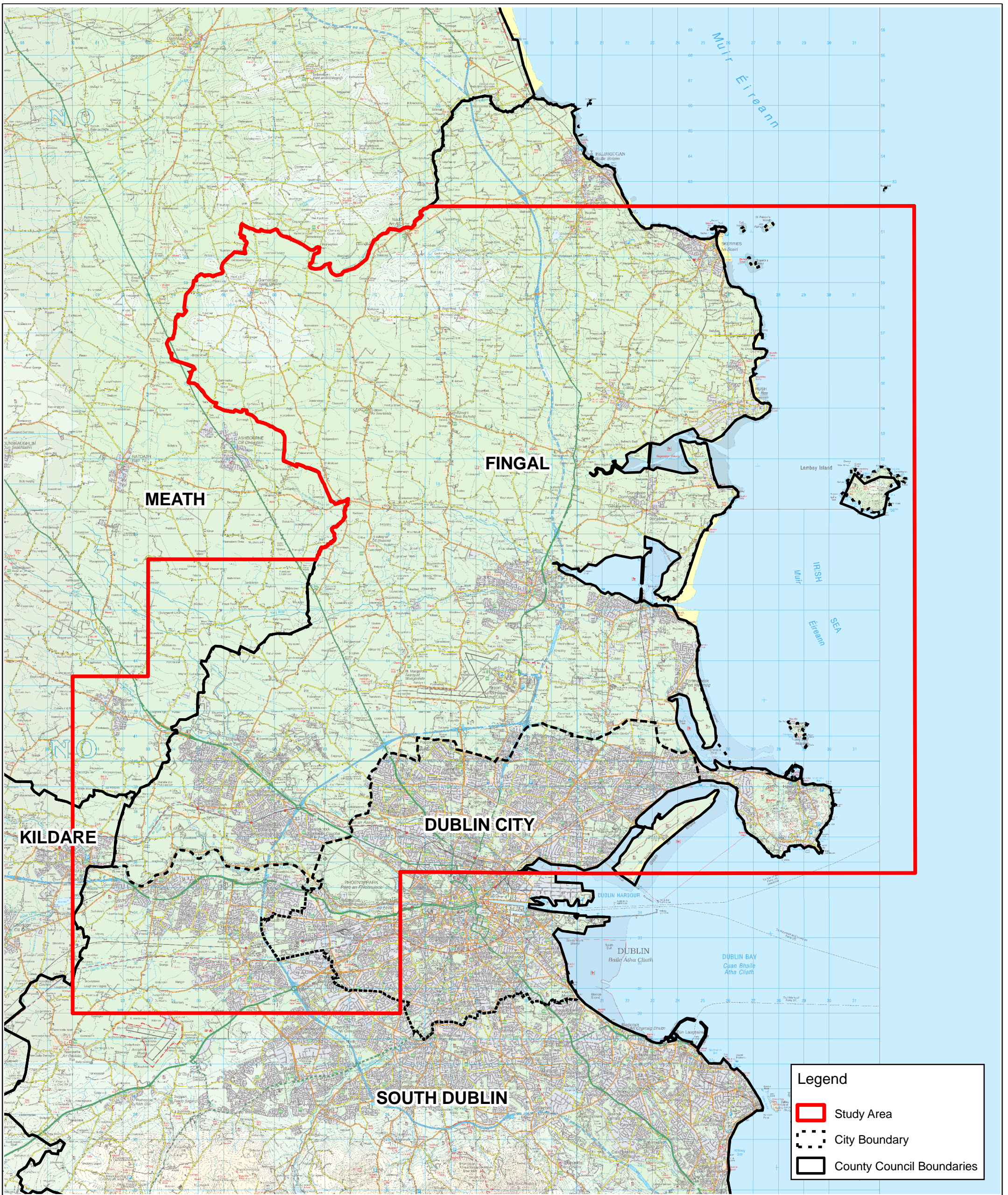
Where a constraint is identified for a particular site option in those remaining, but is of insufficient relative importance to warrant the site options removal entirely from consideration, mitigation measures for that particular impact can be considered. Mitigation has not been considered previously as the initial approach, and the preference always, is to avoid rather than mitigate. However, it is likely to be difficult to identify differentiating factors at this stage and therefore alternative methods to select the best site option must be utilised. Where such a step is undertaken, mitigation measures will have to be considered for that sub-criterion across all the site options being considered under Phase 4. Depending on the nature of the mitigation, additional costs will also need to be considered as outlined above and will be included in the 'Capital and Operational Costs' criteria of the matrix.

In addition, as noted above, it should be recognised that mitigation, in any context, however minor, will be an effort to make the presented disadvantage at least acceptable, and that will itself be a value compromise, against the best site option, which does not have the disadvantage at all.



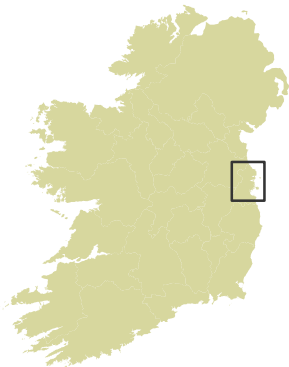
Appendix A - Study Area





Drawing Title

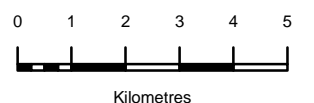
STUDY AREA



Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	App'd
A	12/07/11	ISSUED	JenC	NC	JB	KO

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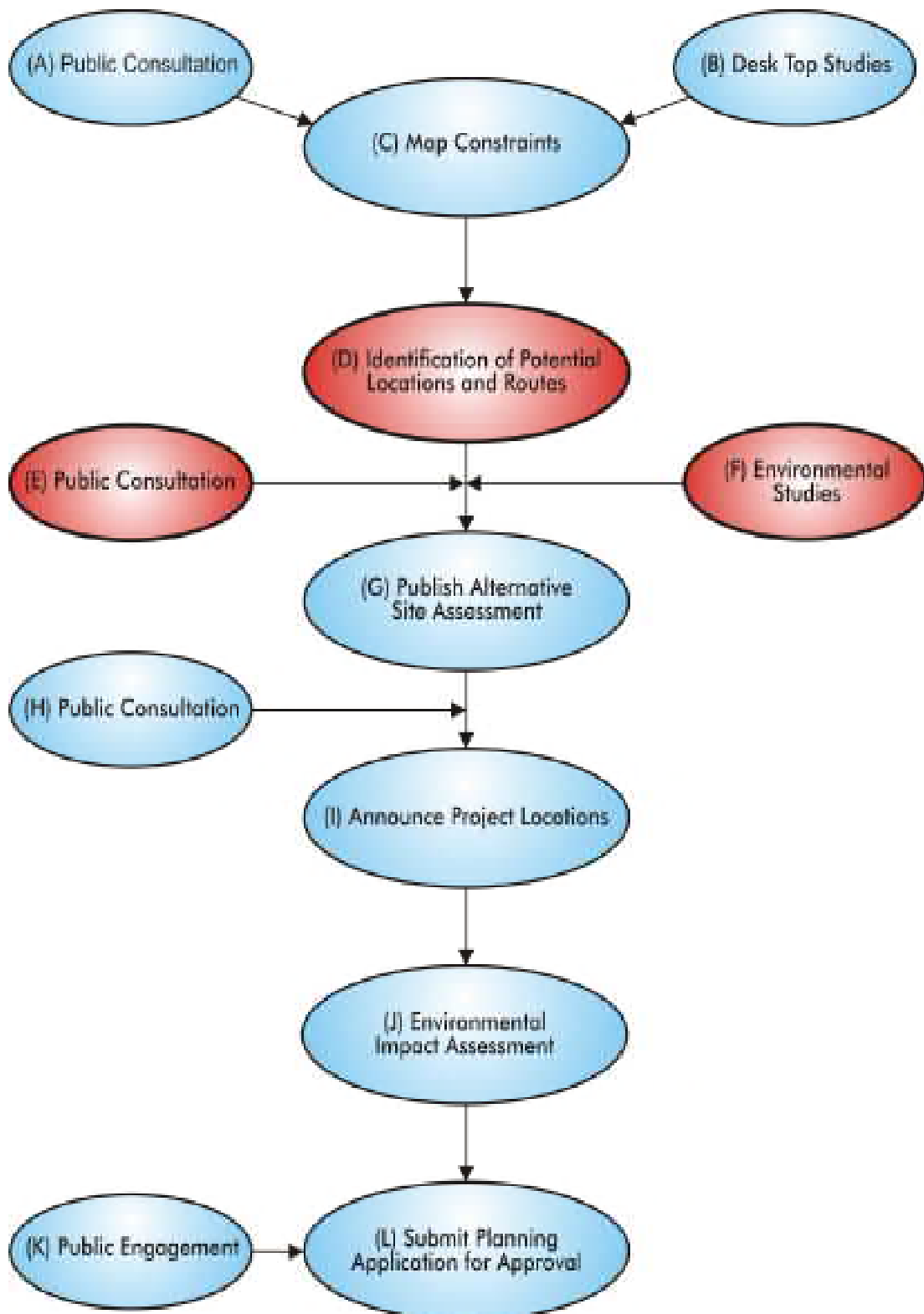


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Scale @ A3	1:140,000	DO NOT SCALE
Job No.	32102900	
Drawing No.	FIGURE 1	

Appendix B - Project Road Map



Greater Dublin Drainage – Project Road Map



 Where we are now.

Appendix C – Methodology Flowchart



Preliminary screening of the study area to identify a short list of potential alternative land parcels of suitable size to accommodate the proposed Regional Wastewater Treatment Plant (WwTP) and also to identify marine outfall locations and potential transfer pipeline corridors.

PHASE 1

STEP 1

Production of individual matrices & mapping of impacts on the land parcel options by the Environmental & Technical Specialists based on desktop studies and visual inspections including identification of the relative importance of the sub-criteria

STEP 2

Identification of the best positioned 20 ha site within the land parcels based on relevant Technical & Environmental Constraints

STEP 3

Update of the individual matrices to reflect the focus from Land parcels to the identified sites

STEP 4

Combination of the individual matrices into one overall primary matrix

STEP 5

Identify the cells which are the most favourable across the sub-criteria. Shade these cells 'green'

STEP 6

Identify the cells which are the least favourable of the sub-criteria considered to be most important by the respective specialists. Shade these cells 'amber'; On subsequent iterations, cells are shaded amber in the same way for the most important sub-criteria

STEP 7

Review the whole matrix to determine whether any site options with 'least favourable' classifications are
a) Of such significance that it would be comparatively difficult to secure planning permission on this site option; or
b) Of such environmental disadvantage that with the range of choice available this site option should not be considered further.

Can any site option be removed from consideration? **NO**

YES (REMOVE SITE OPTIONS)

STEP 8

Review each sub-criteria to determine whether there are any differentiating levels of impact remain across the site options, if not, these sub-criteria can be parked from the evaluation at this stage

Has the matrix been sufficiently refined so that the differentiating factors between the remaining site options are so nuanced that it is not possible to remove any further site options/sub-criteria **NO**

YES

PHASE 2

PHASE 3

Remaining site options, with identified potential mitigation, are taken forward to Public Consultation

PHASE 4

The selection of the preferred site, marine outfall location and transfer pipeline route based on the assessment findings, consideration of submissions received during consultation and further comparative costings