Greater Dublin Drainage

Alternative Sites Assessment and Route Selection Report (Phase 4):
Final Preferred Site and Routes

Appendix 3
Alternative Sites Assessment (ASA) Methodology

June 2013

Document control sheet P 04 F8

Client: Fingal County Council
Project: Greater Dublin Drainage
Job No: 32102900
Document Title: ASA Methodology

	Originator	Checked by	Reviewed by	Approved by
ORIGINAL	NAME **Norita Casey**	NAME **Jillian Bolton**	NAME **Ciarán O'Keeffe**	NAME **Graham McInally**
DATE **August 2011**	SIGNATURE	SIGNATURE	SIGNATURE	SIGNATURE
Document Status- DRAFT				

REVISION	NAME **Jillian Bolton**	NAME **Michael Garrick**	NAME **Ciarán O'Keeffe**	NAME **Graham McInally**
DATE	SIGNATURE	SIGNATURE	SIGNATURE	SIGNATURE
Document Status – DRAFT Rev 1				

REVISION	NAME **Jillian Bolton**	NAME **Steve Mills**	NAME **Ciarán O'Keeffe**	NAME **Graham McInally**
DATE	SIGNATURE	SIGNATURE	SIGNATURE	SIGNATURE
Document Status – DRAFT FINAL				

REVISION	NAME **Jillian Bolton**	NAME **Steve Mills**	NAME **Ciarán O'Keeffe**	NAME **Graham McInally**
DATE **February 2012**	SIGNATURE	SIGNATURE	SIGNATURE	SIGNATURE
Document Status – DRAFT FINAL Rev 1				

REVISION	NAME **Jillian Bolton**	NAME **Jillian Bolton**	NAME **Ciarán O'Keeffe**	NAME **Ciarán O'Keeffe**
DATE **March 2012**	SIGNATURE	SIGNATURE	SIGNATURE	SIGNATURE
Document Status –FINAL				

	Originated by	Checked by	Reviewed by
REVISION 2	NAME	NAME	NAME
	Elaine Casey	Jillian Bolton	Denise Meade
Approved by	NAME	As Project Manager I confirm that the above document(s) have been subjected to Jacobs' Check and Review procedure and that I **approve them for issue**	INITIALS
	Ciarán O' Keeffe		C.O'K.
DATE	**06/06/13**	**Document status: Final Rev 2**	

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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 sewer and outfall pipeline corridor and associated marine outfall location.

The purpose of this report is to, insofar as possible, outline clearly the methodology to be used to determine the preferred site for the proposed Regional WwTP and corridors for the orbital sewer and outfall pipeline and the associated 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 GDSDS 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 GDSDS 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 *Alternative Sites Assessment and Route Selection Report (Phase 2): Emerging Preferred Sites and Routes*, was developed on the basis of identifying the potential environmental impacts of each shortlisted site, orbital sewer and outfall pipeline corridor and associated marine outfall location and considering the relative level of impact. The selection of an appropriate orbital sewer and outfall pipeline corridor and marine outfall location was undertaken in tandem with the selection of sites.

The ASA methodology details how the site, orbital sewer and outfall pipeline corridor and marine outfall location were assessed relative to each other in terms of impacts on the identified criteria and sub-criteria in order to determine the differentiating criteria.

The 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 sewer and outfall pipeline corridor and marine outfall location.

2 ASA Methodology

2.1 Introduction

The objectives of the Alternative Sites Assessment (ASA) and 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 sewer 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.

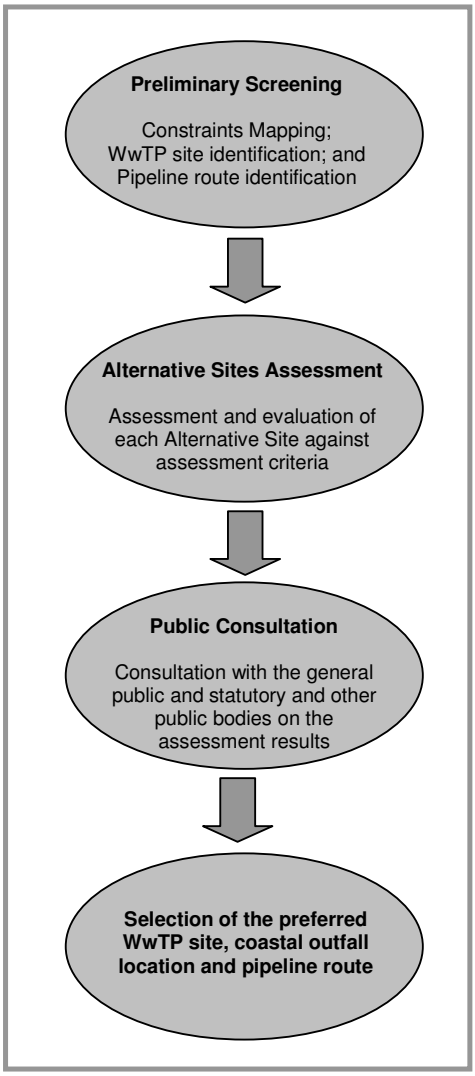


Figure 2.1 – Alternative Sites Assessment Stages (developed from the SEA of the GDSDS)

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 sewer and marine outfall pipelines 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 sewer and outfall pipeline route 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 orbital sewer and outfall pipeline corridors 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 orbital sewer and outfall pipeline corridors and marine outfall locations, on which potential sites for the proposed 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 orbital sewer and outfall 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 Regional 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 and Route Selection Submissions Report*, produced by the project Communication Consultant. The issues raised were 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 assessed the performance of each of the alternative land parcels, orbital sewer and outfall pipeline corridors 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, following which the assessment progressed with respect to these sites, and their associated pipeline corridors and marine outfall locations, only. The assessment of the performance of each of the sites, with associated orbital sewer and outfall pipeline corridors and marine outfall locations, against the pre-determined criteria facilitated the identification of emerging preferred site(s), orbital sewer and outfall pipeline corridors and marine outfall location(s). The Alternative Sites Assessment (ASA) Phase 2 included 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, orbital sewer and outfall pipeline corridors and marine outfall locations identified under Phase 1 were assessed under the environmental and technical criteria outlined in Tables 2-B and 2-C overleaf:

Criteria	Assessment
Environmental Criteria	
Ecology	The proposed Regional WwTP site, route of the orbital sewer and outfall pipeline corridor and associated marine outfall location were 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 identified by the relevant specialists as outlined in Section 2.3.6 below. The assessment examined the potential impacts to each of the sub-criteria from each of the alternatives.
Cultural Heritage	The proposed Regional WwTP site, route of the orbital sewer and outfall pipeline corridor and associated marine outfall location were selected to avoid significant direct and indirect impacts on archaeological, cultural heritage and architectural heritage designations, based on sub-criteria identified by the relevant specialists as outlined in Section 2.3.6 below. The assessment examined the potential impacts to each of the sub-criteria from each of the alternatives.
Landscape and Visual	The site of the proposed Regional WwTP and where relevant the routes of the orbital sewer and outfall pipeline corridor and associated marine outfall location were selected to avoid significant direct and indirect impacts on designated areas and sensitive receptors from a landscape and visual perspective, based on sub-criteria identified by the relevant specialists as outlined in Section 2.3.6 below. The assessment examined the potential impacts to each of the sub-criteria from each of the alternatives.
Hydrology and Hydrogeology	The proposed Regional WwTP site, route of the orbital sewer and outfall pipeline corridor and associated marine outfall location were selected to avoid significant direct and indirect impacts on the surface water and groundwater, based on sub-criteria identified by the relevant specialists as outlined in Section 2.3.6 below. The assessment examined the potential impacts to each of the sub-criteria from each of the alternatives.
Soils and Geology	The proposed Regional WwTP site, route of the orbital sewer and outfall pipeline corridor and associated marine outfall location were selected to avoid significant direct and indirect impacts on soils and geology, including an assessment of potential contaminated land issued, based on sub-criteria identified by the relevant specialists as outlined in Section 2.3.6 below. The assessment examined the potential impacts to

Criteria	Assessment
Environmental Criteria	
	each of the sub-criteria from each of the alternatives.
Traffic	The proposed Regional WwTP site, route of the orbital sewer and outfall pipeline corridor and associated marine outfall location were selected to avoid significant traffic impacts during the construction and operational phases of the development. The assessment examined 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.
Air Quality and Odour;	The site of the proposed Regional WwTP was selected to avoid areas of significant population density. The route of the orbital sewer and outfall pipeline corridor was evaluated to (a) enable selection of a wastewater transfer system which minimises the potential for odour and (b) minimises disturbance during construction. The assessment examined the potential impacts on residential and community amenity within the site environs and along the transfer pipeline routes.
Agronomy and Agriculture	The proposed Regional WwTP site, route of the orbital sewer and outfall pipeline corridor and associated marine outfall location were selected with regard to current land uses. The assessment considered compatibility with existing and future land uses.
Noise and Vibration;	The site of the proposed Regional WwTP was selected to avoid areas of significant population density. The route of the orbital sewer and outfall pipeline corridor was evaluated to (a) enable selection of a wastewater transfer system which minimises the potential for odour and (b) minimises disturbance during construction. The assessment examined the potential impacts on residential and community amenity within the site environs and along the transfer pipeline routes.
People and Communities	The site of the proposed Regional WwTP was selected to avoid areas of significant population density. The route of the orbital sewer and outfall pipeline corridor was evaluated to (a) enable selection of a wastewater transfer system which minimises the potential for odour and (b) minimises disturbance during construction. The assessment examined the potential impacts on residential and community amenity within the site environs and along the transfer pipeline routes.

Table 2-B Environmental Criteria

Criteria	Assessment
Technical Criteria	
Safety	The proposed Regional WwTP site, route of the orbital sewer and outfall pipeline corridor and associated marine outfall location were selected with regard to construction and operation phase safety issues. The assessment examined safety risks associated with each option.
Planning Policy	The proposed Regional WwTP site, route of the orbital sewer and outfall pipeline corridor and associated marine outfall location were 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 considered compatibility with current planning policy.
Engineering and Design	The proposed Regional WwTP site, route of the orbital sewer and outfall pipeline corridor and associated marine outfall location were selected having regard to engineering opportunities and constraints with particular emphasis on topography and ground conditions. The assessment examined key engineering aspects associated with each option which had a significant impact on design and deliverability.
Capital and Operational Costs	The proposed Regional WwTP site, route of the orbital sewer and outfall pipeline corridor and associated marine outfall location were selected having regard to both capital and operational costs. The assessment examined indicative whole life costs associated with each of the alternatives.
Sustainability	The proposed Regional WwTP site, route of the orbital sewer and outfall pipeline corridor and associated marine outfall location were 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, orbital sewer and outfall pipeline corridors and marine outfall locations were assessed were 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 was eliminated from consideration at ASA Phase 2 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 was 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 was 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 was considered that '*current and neighbouring land-uses',* as specified, were 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 assessments under each of the criteria included in table 2-B and 2-C were undertaken by relevant technical and environmental specialists. As detailed further in section 2.3.7, each of these specialists identified relevant sub-criteria which defined the differentiations between the land parcels, subsequently identified 20 Ha sites, and their associated orbital sewer and outfall pipeline corridors 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 sewer and outfall pipeline and marine outfall were identified during Phase 1 of the process. These were further developed and refined from an environmental and technical engineering perspective during 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 identified preferred corridors for each pipeline section.

During Phase 2 the selection of optimum locations for the marine outfall within the undesignated marine waters was facilitated through a 3D hydrodynamic modelling process which assessed the impact of the proposed outfall on the receiving waters.

These orbital sewer and outfall pipeline corridor and marine outfall routes were 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 allowed the initial corridors to be refined further and ultimately a preferred route associated with each site was identified. The routes were assessed in a manner similar to that used for assessing the identified land parcels.

The nine land parcels did not stand in isolation, they were 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 constituted sub-criteria of the 'Engineering and Design' criteria and relevant environmental criteria, outlined in Table 2-C above, used in the overall selection process for the most suitable regional WwTP site.

Therefore, each land parcel with its associated orbital sewer and outfall pipeline corridor and marine outfall location are 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 was 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 identification of the preferred site and routes, an Appropriate Assessment (AA) in accordance with the Habitats Directive will be carried out to determine whether the project may have any impact on any designated areas and whether proposed mitigation measures will be sufficient to facilitate development of that particular site option.

2.3.5 Mitigation

The strategy in Phase 1 was founded on deliberate avoidance of impact, by screening out large areas of land with known environmental constraints and which would provide relatively more complex technical situations to resolve. The primary strategy in Phase 2 remained avoidance. While choices were still available; the preferred land parcel option was that with the least disadvantages associated with it.

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 could not remain in place throughout the process. As the selection process proceeded to the identification of emerging preferred land parcel options and ultimately to the selection of the preferred land parcel option, potential mitigation measures were considered in order to differentiate between the emerging preferred sites.

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

2.3.6 Differentiating criteria

The Phase 2 process focused on the particular sub-criteria, which emerged as differentiating factors for the land parcel options. However, background data, consultation responses, identified issues and results of the assessment process, were logged for future use throughout the project. Sub criteria which proved to be largely

non-differentiating, because they were reported at similar levels across all the land parcel options, were omitted from the selection process. However, it should be stressed that if a sub-criterion was omitted or removed during the ASA process, it was undertaken purely on the basis that it was 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, was 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 was developed by the project team and is based on industry knowledge and previous experience.

As the nine land parcel options were 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 were not randomly selected available open spaces; rather they formed a carefully and objectively selected set, which have the common characteristic that they already met most of the environmental attributes required in the best site for the proposed Regional WwTP. Similarly, the orbital sewer and outfall pipeline corridor and marine outfall locations avoided known environmental and technical constraints as they progressed. Therefore, the differences between the land parcel options, in a comparison process on environmental impact, became less-than-pronounced, and later quite nuanced, as the comparison process was refined in iterative passes.

The screening process at Phase 1 was high level, and during Phase 2 it was necessary to specifically review the shortlisted land parcel options for environmental and technical constraints. It was 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 were identified as having low potential for environmental

impact only one land parcel option is ultimately the most preferred and must be identified. Therefore, it was 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 ASA methodology was to develop an overall matrix which assessed each of the options against the primary environmental and engineering criteria outlined in Tables 2-B and 2-C above. These criteria were broken down, in conjunction with the relevant specialists, into a number of sub-criteria. A flow-chart was developed and included in Appendix C which details in diagrammatic format the methodology that was 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, were carried out on each of the nine land parcel options. The assessments were 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 were 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 were discussed and agreed with the technical project team in order to ensure their rigour, appropriateness for inclusion and consistency. In addition, the sub-criteria were discussed with relevant Fingal County Council (FCC) personnel to ensure all potential relevant constraints had been identified. The results were presented in matrix and mapping format and were used in decision making, through a workshop forum.

The individual specialists, in presenting their sub-criteria, identified those of their selected sub-criteria which were of more, or lesser, importance in terms of impact avoidance in their area of specialism. For environmental criteria this was based on the specialist's expert knowledge while for technical criteria, identification of relatively important sub-criteria was 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 was 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 were used to categorise any environmental impacts found. These are:

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

Where it was considered, in the expert opinion of the relevant specialists, that there was no environmental impact to a land parcel option for a particular sub-criteria, then this was 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 were 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 were examined and the potential of the habitat to support protected species, birds, mammals or aquatic species. While formally designated sites had 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, were investigated.

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

- Lengths of pipeline were 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 were clearly stated, thereby again allowing clear identification of the most and least favourable.

These differentiating technical factors for each of the land parcel options had 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** were:

(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 were 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 was then deemed possible and appropriate to reduce the land parcels down to the required 20 Ha sites. Step 2, therefore, evaluated each land parcel and identified 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 were 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.

It was determined that the optimum location for a site within a parcel (which had 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 came 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 was identified. From this point onwards only these sites were considered as part of each of the overall options.

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

(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 examined the sites, and reviewed and updated their original sub-matrix for the land parcel options, incorporating any variances arising because the land parcels had now been narrowed to a site. From this point onwards, the options consisted 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** was:-

(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, was 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 was again tested for rigour, any terminological differences, or differences in geographic naming, and any issues arising between Specialists were resolved. At this stage, the prioritisation of sub-criteria, within each criterion was confirmed.

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

(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 coloured in green those cells in their sub-matrix, which were 'most favourable' across each sub-criteria. On the first pass, it was considered appropriate to accept environmental sub-criteria with either 'no impact' or 'imperceptible impact' as automatically being coded green. Such a green cell always remained '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 was also coloured green.

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

(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 were identified and a determination on whether they should be designated 'amber' at this stage in the process was made. Note that such a designation was not mandatory (the worst cell might merely be 'moderately negative' in terms of impact). Any cell awarded an amber colour in this earliest pass, had 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 was proposed and justified by the project team as a whole within a workshop format.

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

(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 were reviewed to determine whether the amber cells, which at this stage had been identified as relatively important amber classifications, were impediments which were 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 was avoidance and mitigation was not an acceptable value-compromise in order for site options to remain in contention during Phase 2 of the process, not least since the primary objective was shortlisting to fewer and eventually to one site option.

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

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

Step 8 – Removal of non differentiating sub-criteria

Following the removal of site options no longer suitable for consideration, sub-criteria with no colour coding across the remaining site options were then reviewed to re-evaluate whether there were any differentiating levels of impact across the remaining site options. If the re-evaluation concluded there were no differentiating factors, then the sub-criteria were removed. It should be emphasised however that even though the sub-criteria may not have been 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, was only 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** was:-

(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 were repeated, involving several iterations which were 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 were reviewed for each criteria, and the remaining worst or 'least favourable' cell, or cells, were identified, and again a determination was made as to whether such cells should be coloured 'amber' at this point in the process. Please note that again such a declaration was not mandatory, and in certain incidents it may not have been appropriate to declare any site option as 'amber' under a particular sub-criterion, if the degree of impact did not warrant it.

It should be noted that any cell awarded an amber colour in these later iterations, did so for a successively more nuanced degree of impact. As previously noted, it means that cell, or cells, had 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 were for ever more nuanced reasons, which were nevertheless reasonable, having regard to the degree of choice remaining.

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

The iterative qualitative evaluation process was repeated until the overall matrix was sufficiently refined to facilitate the clear identification of 3 No. emerging preferred site options as those having the least number of potential constraints from the original nine.

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

However, at this stage, the potential for mitigation measures to be incorporated into the remaining 3 No. site options to reduce the potential impact of any remaining constraints was 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, was 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** was:-

(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 3 No. site options

2.4 Phase 3 – Public Consultation

Phase 3 of the ASA process was a consultation stage.

Following completion of Phase 2 and publication of the *Alternative Sites Assessment and Route Selection Report (Phase 2): Emerging Preferred Sites and Routes,* the three emerging preferred site options Annsbrook, Clonshagh and Newtowncorduff were brought through Public Consultation held over an eight week period from 14th May 2012 to 6th July 2012. The primary objective of this phase was to gather public opinion and any additional information on the three emerging preferred site options.

Stakeholder feedback from this third phase of public consultation was documented in the *Public Consultation Report on Alternative Site Assessment Phase Two: Emerging Preferred Sites and Routes,* which was published in October 2012.

The purpose of this consultation report was to document stakeholder feedback and to ensure that the wider Project Team reviewed and considered issues raised by stakeholders, as appropriate.

The Project Team's response to the issues raised was presented in the *Alternative Sites Assessment and Route Selection (Phase 3): Submissions Report,* which is included as Appendix 4 of the Alternative Sites Assessment and Route Selection (Phase 4): Final Preferred Sites and Routes Report.

This stakeholder feedback along with a technical and environmental assessment undertaken as part of ASA Phase 4 assessment aided the decision making process in selecting a single preferred site option which will lead to the eventual planning stage.

2.5 Phase 4 – Selection of the Preferred Site Option

Phase 4 constitutes the final identification of the preferred site option (i.e. WwTP site, its associated orbital sewer and outfall pipeline corridor and marine outfall location), and consisted of the following steps:

Step 1 Review of the assessment findings from the ASA Phase 2 process which is reported in the Alternative Sites Assessment and Route Selection Report (Phase 2): Emerging Preferred Sites and Routes, May 2012.

Step 2 Consideration of the submissions received during ASA Phase 3 (Public Consultation) of the ASA process which was held over an eight week period from 14th May 2012 to 6th July 2012. Full details of this phase are provided in the *Public Consultation Report on Alternative Site Assessment Phase Two: Emerging Preferred Sites and Routes*, which was published in October 2012.

Step 3 Undertake further investigative studies to supplement the data collected and assessed during the ASA Phase 2 and which were also informed by consideration of submissions received.

Step 4 Assessment of the findings of the further investigative studies to determine whether anything of such significance was identified which made the development of any of the three emerging preferred site options unfeasible.

Step 5 Assessment of the individual components of the site options (WwTP site, marine outfall locations and associated orbital sewers and outfall pipelines) against the findings of *Step 1 to Step 3* above. Identification of constraints for the individual components and the identification of potential mitigation measures where the ASA Phase 4 assessment indicated that it was not possible to avoid impacts.

Step 6 Preparation of preliminary cost estimates

Step 7 Combine the assessment of the individual components from *Steps 5 and 6* into one overall emerging preferred site option assessment matrix. Through a comparative assessment assign 'more' and 'less' favourable classifications to the identified constraints.

Step 8 Selection of final preferred site option based on the relative performance of each of the site options against the Environmental, Technical and Cost criteria considered.

In relation to the implementation of mitigation measures, it should be noted that such measures have not previously been considered as the preference always has been to avoid impact rather than mitigate. However, at this stage it is considered appropriate to consider mitigation measures for impacts to the three emerging preferred site options. Such measures were incorporated into the assessment at this stage as differentiating factors across the site options are nuanced and the consideration of mitigation measures may in such instances be cost effective.

Appendix A - Study Area

MEATH COUNTY COUNCIL

FINGAL COUNTY COUNCIL

DUBLIN CITY COUNCIL

KILDARE COUNTY COUNCIL

SOUTH DUBLIN COUNTY COUNCIL

DUN LAOGHAIRE RATHDOWN COUNTY COUNCIL

Legend

Study Area

Local Authority Boundary

Greater Dublin Drainage

Drawing Title

ALTERNATIVE SITES ASSESSMENT AND ROUTE SELECTION REPORT (Phase 4)

STUDY AREA

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
A	17.05.13	ISSUED	MN	AWD	DC	COK

N W E S

0 0.95 1.9 2.85 3.8 4.75

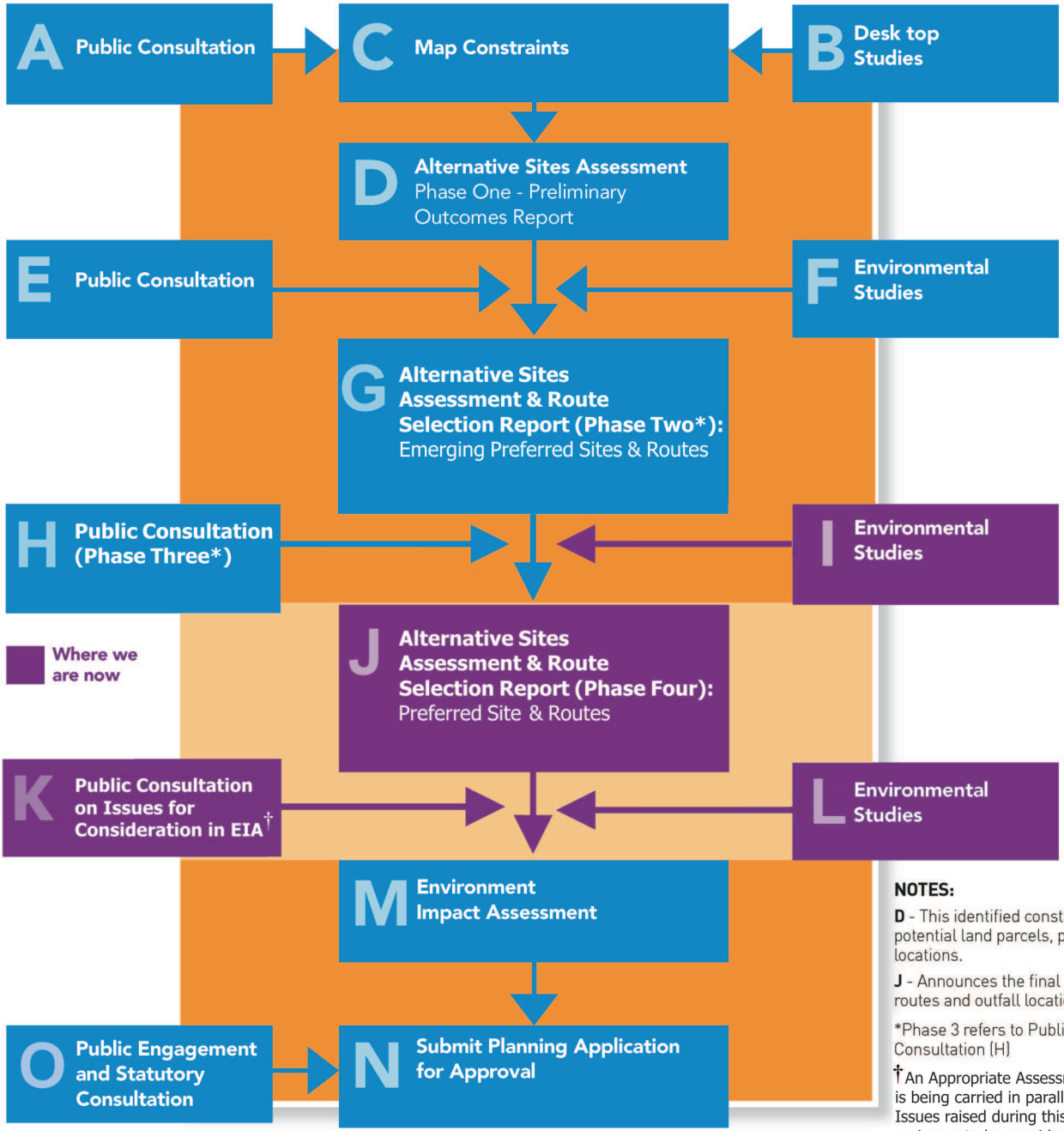
Kilometres

JACOBS TOBIN Patrick J. Tobin & Co. Ltd.

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

Appendix B - Project Road Map

Project Road Map



NOTES:

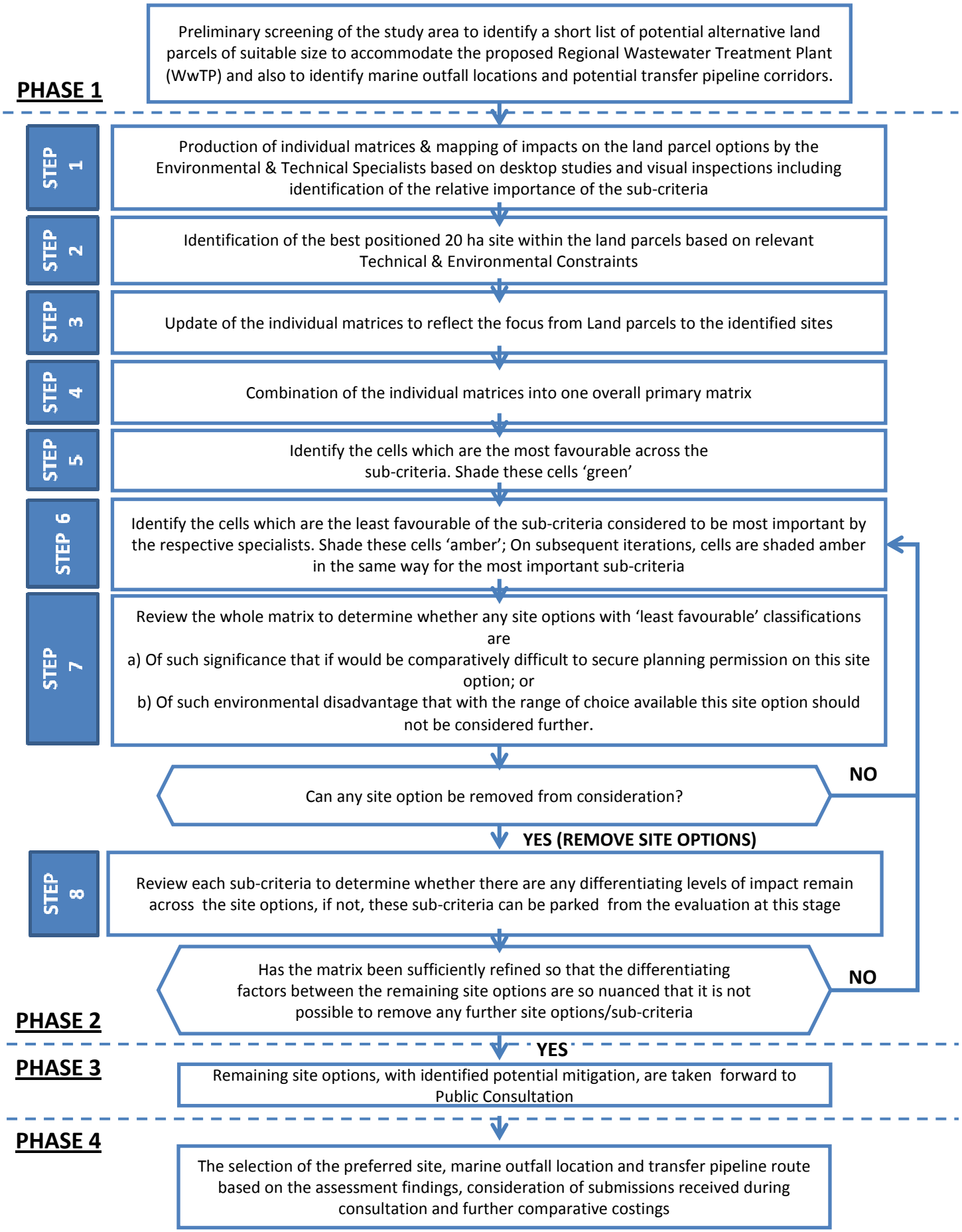
D - This identified constraints, potential land parcels, pipeline locations.

J - Announces the final site, pipeline routes and outfall location.

*Phase 3 refers to Public Consultation (H)

†An Appropriate Assessment (AA) is being carried in parallel to this process. Issues raised during this consultation on issues to be considered, as part of the EIA, will be considered in the AA, where relevant.

Appendix C – Methodology Flowchart


PHASE 1
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.
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 if 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
PHASE 2
YES
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