

Regional Biosolids Storage Facility for Greater Dublin

Stage 1 Report – Site Selection Methodology

February 2017



Table of Contents

Table of Figures	ii
Table of Tables	ii
Executive Summary	1
1.0 Introduction	2
1.1 Biosolids Description	4
1.2 Policy Background & Legislative Requirements	4
1.2.1 National Wastewater Sludge Management Plan (NWSMP).....	5
1.2.2 Legislative Requirements	6
2.0 Project Need	7
2.1 Existing Scenario.....	7
2.2 Proposed Future Scenario.....	9
2.3 Consideration of Storage Alternatives	10
3.0 RBSF Design & Land Requirements.....	11
3.1 Size of Facility Required.....	11
3.2 Site Layout & Operational Requirements	11
3.2.1 Area Required for Site Selection Purposes.....	13
4.0 Study Area & Land Use Classification	14
4.1 Definition of the Facility.....	14
4.2 Proposed Study Area.....	14
4.3 Land Use Classification	15
5.0 Approach to Site Selection	16
5.1 General Siting Considerations and Criteria	16
5.1.1 Environmental	16
5.1.2 Economic.....	17
5.1.3 Planning	17
5.1.4 Social and Community	18
5.2 Designations That May Preclude or Curtail Development.....	18
5.3 Specific Siting Considerations and Criteria	19
5.4 Consultations with Local Authorities.....	20
5.5 Selection Methodology	21
6.0 Next Steps	22
6.1 Stage 1 Non-Statutory Consultation	22
7.0 Conclusion	22
Appendices	23
Appendix A Wastewater Treatment.....	23
Appendix B Greater Dublin Strategic Drainage Study (GDSDS)	24

Table of Figures

Figure 1 Project Roadmap	3
Figure 2 Hierarchy of Irish Planning Frameworks	5
Figure 3 Eight Existing Wastewater Treatment Plants (WwTP) and proposed GDD WwTP within the GDSDS	8
Figure 4 Existing Haul Route from Ringsend WwTP to Thornhill Storage Facility in Co. Carlow	9
Figure 5 Indicative Layout of the Proposed Regional Biosolids Storage Facility	12
Figure 6 Indicative Plan of Proposed Regional Biosolids Storage Facility	13
Figure 7 Indicative Elevation of Proposed RBSF	13
Figure 8 Proposed Study Area within Green Boundary for Proposed RBSF (GDSDS Area)	14
Figure 9 Identification of Environmental Designations within the GDSDS	19

Table of Tables

Table 1 Land use zonings within the four Dublin local authorities considered appropriate for the proposed facility	15
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Note: Reference in this document to ‘greater Dublin’ refers to the area within the Greater Dublin Strategic Drainage Study (GDSDS) Area (See Figure 8).

Executive Summary

The National Wastewater Sludge Management Plan (NWSMP), published in 2016, set out Irish Water's strategy for managing wastewater sludge over the next 25 years. It recommended the development of regional facilities for the storage of treated wastewater sludge (biosolids) from wastewater treatment plants. It also noted that with the establishment of Irish Water, the development of storage facilities will no longer be considered solely on a per-plant or per-county basis.

Irish Water is currently preparing planning applications for two significant wastewater treatment projects in Dublin, the proposed upgrade of Ringsend Wastewater Treatment Plant (WwTP) and the proposed new Greater Dublin Drainage (GDD) project. These projects are essential to support the continued social and economic growth of greater Dublin and will result in a significant increase from current biosolids volumes with a consequent increase in storage requirements.

Irish Water has commenced a site selection process to identify a suitable location for a new Regional Biosolids Storage Facility (RBSF) to serve greater Dublin. It is intended to include the selected site and proposed facility in the planning application for the upgrade of Ringsend WwTP. The proposed RBSF will also be included in the planning application for the proposed new GDD project which includes the development of a regional WwTP in Clonsaugh in north Dublin. Both of these planning applications will be submitted to An Bord Pleanála.

Biosolids is the treated sludge product arising from wastewater treatment processes. The sludge is fully treated so that it is both biologically stable and free of harmful pathogens (bacteria and viruses etc.). This treatment of wastewater sludge to produce biosolids happens before the biosolids is transported to a storage facility. Most of the biosolids produced in Ireland (about 98%) is currently reused on agricultural lands as a soil conditioner and as a fertiliser. The current spread-lands for biosolids arising in the Dublin region are located in south Leinster and it is proposed that these spread-lands will continue to be used. The use of biosolids on agriculture lands is strictly regulated by European and National law. One of the conditions of use is a strict prohibition on spreading biosolids on lands in South Leinster over the winter period (October to January each year). This restriction means that biosolids reused in agriculture needs to be stored for certain periods over each calendar year.

The site selection process for the proposed new facility will include public consultation during 2017 with 3 focused periods of non-statutory consultation. This report will be informed by the initial public consultation on the site selection process. The selected site will comprise an area of approximately eight hectares and it is proposed that the principal development on the site would comprise warehouse buildings capable of storing approximately 48,000m³ of biosolids.

The initial study area for identifying the proposed site is within the Greater Dublin Strategic Drainage Study (GDSDS) area, which includes Dublin city and county and parts of Kildare, Wicklow and Meath. The proposed facility would comply with the planning requirements and guidelines of the local authority area in which it is located. While none of the county development plans for the seven local authorities within the GDSDS refer specifically to a 'Biosolids Storage Facility' as a land use classification, the land use definition which most closely aligns with the proposed development is a 'Transfer Station' or 'Refuse Transfer Station' which is defined as follows; *A structure or land, usually enclosed and screened, and which is used for the temporary storage of refuse and waste materials pending transfer to a final disposal facility or for reuse. The definition includes a baling station, recycling facility, civic amenity facility, materials recovery facility and materials recycling facility.*

The site selection criteria for the facility will include environmental, economic, planning and social considerations. As part of consultation with the public on the selection of the site for the proposed facility, Irish Water invites feedback from all stakeholders on the site selection methodology proposed, which includes the proposed land use classification and site selection criteria. This will allow Irish Water to take on board comments from stakeholders on the proposed site selection methodology.

1.0 Introduction

Irish Water has commenced a site selection process to find a location for a Regional Biosolids Storage Facility (RBSF) to serve greater Dublin. The selected site and proposed facility will be included in the planning application for the upgrade to the Ringsend wastewater treatment plant (WwTP). The RBSF will also be included in the planning application for the proposed Greater Dublin Drainage (GDD) project (See Appendix B) comprising the development of a regional WwTP in Clonshaugh in north Dublin. Both of these planning applications will be submitted to An Bord Pleanála for assessment.

The treatment of the wastewater generated in greater Dublin by homes, schools, businesses and industry produces sludge. Wastewater sludge is made up mainly of organic matter that has been removed from the treated water during the treatment process. Further treatment of this sludge is required to enable its safe and efficient re-use or disposal. The further processing of the sludge results in 'biosolids', a biologically stable product free of harmful pathogens (viruses, bacteria etc.) and containing high levels of plant nutrients, e.g. nitrogen and phosphorus. This treatment of sludge happens before the sludge is transported to a biosolids storage facility. Most of the biosolids produced in Ireland (98%) is currently reused on agricultural lands as a soil conditioner and as a replacement for chemical fertilisers. The use of biosolids on agriculture lands is strictly regulated under European and National law. One of the conditions of use is a strict prohibition on spreading biosolids on land over the winter period (October to January). This restriction means that biosolids reused in agriculture need to be stored for certain periods over each calendar year. The need for a regional storage facility serving greater Dublin has been identified by Irish Water in the National Wastewater Sludge Management Plan published in October 2016.

The spread-lands currently used for application of biosolids produced at the existing Ringsend WwTP are located in south Leinster and these lands will continue to be used for the biosolids that would be stored at the proposed RBSF. There is no proposal to re-locate the spread-lands to the same location as the proposed RBSF. The proposed RBSF would have the capacity to store the sludge arising from the existing Ringsend WwTP, as and when required, when its upgrade is completed.

The purpose of this report is to explain the need for the proposed RBSF, outline what such a facility would look like and how it would operate, outlining the planning and other legislation that applies to the proposed development, and outline the process by which Irish Water is proposing to identify and develop a site for the facility. This report will be informed by the initial public consultation on the site selection process.

The report is structured as follows:

- Section 1. Introduction
- Section 2. Project Need
- Section 3. RBSF Design and Land Requirements
- Section 4. Study Area & Land Use Classification
- Section 5. Approach to Site Selection
- Section 6. Next Steps
- Section 7. Conclusion

This Project Roadmap sets out the steps planned to facilitate engagement by the public and all relevant stakeholders as we progress the project. This incorporates three rounds of non-statutory public consultation:

- on the methodology by which a suitable site will be selected;
- on a number of potentially suitable sites; and
- finally on the preferred location for a site and views on what should be considered as part of the EIS Scoping Report.

Following the completion of consultation on a preferred site, the site will be finalised and submitted as part of the planning application for the upgrade of the Ringsend WwTP. It will separately be included as part of

the planning application for the proposed new GDD project. An Bord Pleanála will undertake statutory consultation on both applications for planning as part of their overall assessment of these projects.

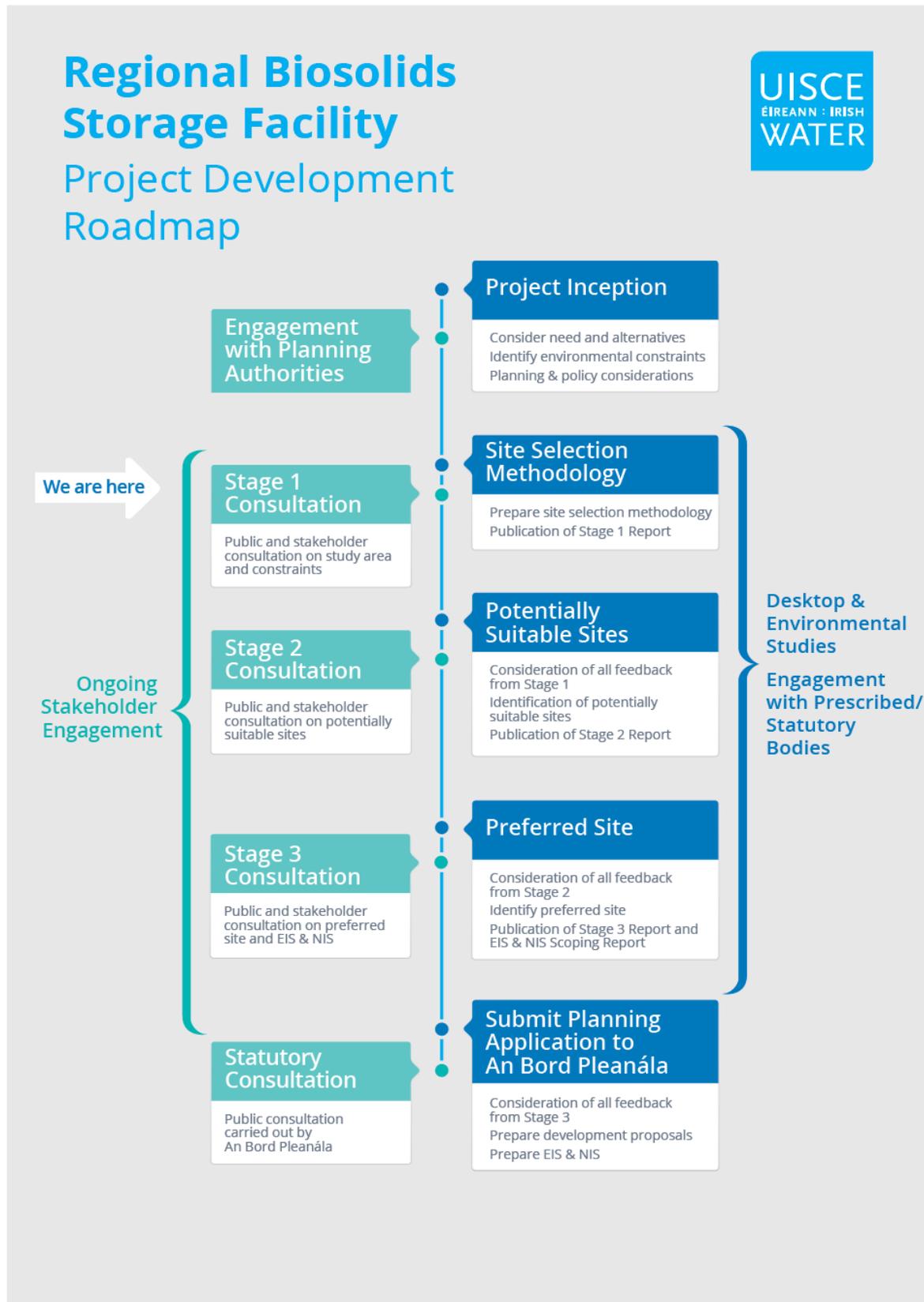


Figure 1 Project Roadmap

1.1 Biosolids Description

Sludge arises during the process of treating wastewater at municipal wastewater treatment plants (WwTP). In essence, the aim of the treatment processes used at WwTPs is to remove both solid and dissolved waste from wastewater and to discharge only clear unpolluted water. Nearly all of the waste originally contained in the wastewater (both solid and dissolved) ends up in a sludge which is subject to further separate treatment on the WwTP site. The sludge is treated to recover gas (whose energy is used to run the plant), to reduce its volume, and to eliminate pathogens (bacteria and viruses). The level of pathogen reduction from the treatment process (99.9999%) is such that the treated sludge material can be transported and stored without any further health protection measures being necessary, subject however to compliance with applicable waste regulation. Finally, the treated sludge is dewatered or dried to give two final products: a wet 'cake' (26% dry solids) or a dry granular material (92% dry solids). Both of these materials are high in nutrients and are used as soil conditioners and organic fertilisers in agriculture. Both are generically termed 'biosolids', i.e. a fully treated sludge product which is biologically stable, has low odour and is free of harmful pathogens (viruses and bacteria). A more detailed note on wastewater treatment and how biosolids arise and is treated is included in Appendix A for information.

1.2 Policy Background & Legislative Requirements

Biosolids, and activities associated with their treatment, storage or disposal, generally fall under the provisions of Waste Management legislation, most of which stems from EU Directives, the primary one being Directive 2008/98/EC known as the Waste Framework Directive.

Under Article 28 of the Waste Framework Directive, EU Member States are required to draw up waste management plans for their entire geographical area. Waste management planning is the cornerstone of national, regional and local policy on waste management. Waste Management Plans (WMPs) take stock of the existing situation, define the objectives that need to be met, formulate appropriate strategies, and identify the necessary implementation means. For the purposes of waste management planning, Ireland is divided into three regions: Southern, Eastern-Midlands and Connacht-Ulster. The Eastern-Midlands Waste Management Plan (EMWMP) was published in May 2015 and is the relevant plan for the purposes of this report.

The Waste Management Plan (WMP) is a statutory planning document setting out the policies for the development of waste treatment infrastructure and sits on the same planning tier as the city and county development plans. The city and county development plans are deemed (under law) to contain the objectives of the relevant WMP in force in that particular area. In the event of a conflict arising between an objective in the WMP and that of a city or county development plan, the WMP objective takes precedence. The EMWMP interacts with other statutory and non-statutory waste planning documents including the National Wastewater Sludge Management Plan (NWSMP) adopted in October 2016 by Irish Water. The NWSMP is recognised as a key component of the EMWMP and key objectives are incorporated into the waste plan. Figure 2 below is taken from the EMWMP and illustrates the national planning framework and where Irish Water's NWSMP fits in this hierarchy. Note that the hierarchy references the Sewage Sludge Waste Management Plan (National) which is the NWSMP.

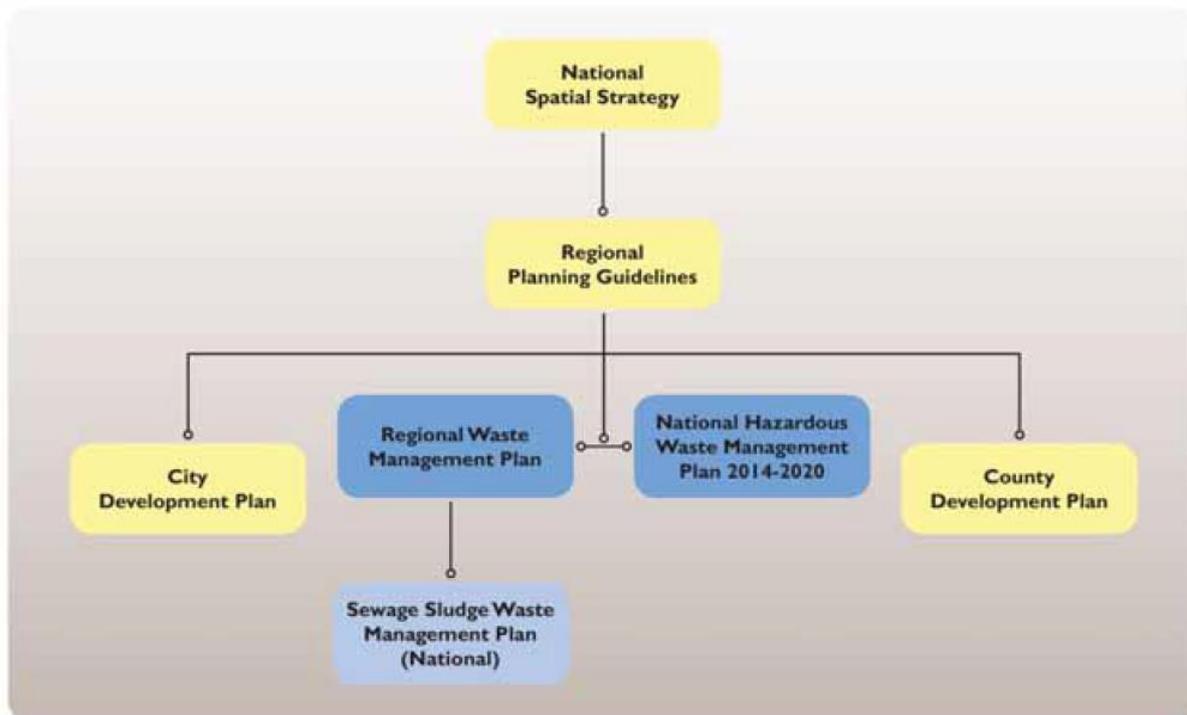


Figure 2 Hierarchy of Irish Planning Frameworks

1.2.1 National Wastewater Sludge Management Plan (NWSMP)

The quantity of wastewater sludge generated nationally is expected to increase significantly by 2040 as new and upgraded plants are completed to treat our wastewater. The management of this wastewater sludge poses economic, planning and environmental challenges. In order to address these challenges and in line with the strategic objectives of the Water Services Strategic Plan (WSSP), Irish Water developed the first National Wastewater Sludge Management Plan (NWSMP). Following completion of a Strategic Environmental Assessment (SEA) and Appropriate Assessment (AA) including two stages of public consultation, this plan was formally adopted by Irish Water in October 2016.

At present over 98% of wastewater sludge is treated to produce a biosolids product which is reused in agriculture. A review of sludge outlets currently in use in Europe shows that the most common outlet for wastewater sludge is agriculture (51% in 2012) with an additional 10% composted and also mainly used in agriculture. There are very limited alternative options currently available in Ireland, the primary one being waste to energy. However, given the current high level of reliance on a single outlet (agriculture), the NWSMP recommended that alternatives be explored as such a need could arise in the short to medium term. While Irish Water is fully confident in the quality of properly treated biosolids, it recognises that issues have been raised by stakeholders in relation to the use of biosolids on dairy and beef pasture, as reflected in the Bord Bia Quality Schemes. Therefore the main focus for future biosolids use is targeted at other crops, such as non-agricultural and crops for animal feed. While the NWSMP considers thermal processes to provide an alternative option for the future, it concluded that the continued recovery of biosolids to lands as a soil conditioner and fertiliser remains the preferred outlet currently and for the medium term.

The NWSMP outlines Irish Water's strategy to ensure a nationwide standardised approach for managing wastewater sludge over the next 25 years. This national and sustainable approach to wastewater sludge management will ensure efficiency and ongoing improvements to the benefit of the public and the environment we all live in.

The NWSMP sets out sustainable proposals for the investment in future treatment, transport, storage, and reuse (or disposal) of the sludge in keeping with the following objectives:

- To avoid endangering human health or harming the environment;
- To maximise the benefits of wastewater sludge as a soil conditioner and source of nutrients;

- To ensure that all regulatory and legislative controls are met, and due regard is given to non-statutory Codes of Practice and industry guidance;
- To establish long term, secure and sustainable reuse/disposal methods;
- To ensure cost-effective and efficient treatment and reuse/disposal techniques;
- To reduce potential for disruption from sludge transport and sludge facilities;
- To extract energy and other resources where economically feasible; and
- To drive operational efficiencies.

1.2.2 Legislative Requirements

Biosolids, and activities associated with its treatment, storage or disposal, generally fall under the provisions of Waste Management legislation. Waste legislation is a particularly complex area but a summary of the main relevant points is set out below. Most of this legislation arises from the EU Waste Framework Directive and other related EU Directives.

- Biosolids are classified as a waste in the current European Waste Catalogue/List of Wastes: Code Ref: 19 08 05 - sludges from treatment of urban waste water.



- The Waste Framework Directive sets out a preferred hierarchy of dealing with waste. At the top of this hierarchy is prevention, i.e. to stop waste being generated in the first place. The next most preferred approach is to re-use the waste material for its original purpose. This is followed by recycling and recovery. Recovery is defined as waste 'serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy' and includes energy recovery where certain minimum efficiencies are achieved. The least favoured (and least sustainable) option is disposal.
- The Waste Framework Directive classifies the use of biosolids in agriculture as a waste recovery operation (Annex II Ref: R 10 Land treatment resulting in benefit to agriculture or ecological improvement).
- The use of biosolids in agriculture is governed by two main pieces of legislation both of which implement aspects of various EU Directives:
 - the Waste Management (Use of Sewage Sludge in Agriculture) Regulations, 1998 (which regulations implement the EU's Sewage Sludge Directive in Ireland) and
 - European Union (Good Agricultural Practice for Protection of Waters) Regulations 2014.
- These regulations provide that only treated sewage sludge (i.e. biosolids) can be recovered in agriculture and only in accordance with a nutrient management plan.
- Subject to compliance with the preceding regulations, the use of biosolids in agriculture is exempt from both planning and a requirement to obtain a waste licence or permit from the Environmental Protection Agency (EPA) or local authority. This is the final step in the management of the biosolids.
- The Good Agricultural Practice regulations place a statutory prohibition on the application of organic fertilisers (incl. biosolids) to lands from 15th October to 12th January on lands in the south Leinster area. This automatically results in the need to store biosolids prior to its use in agriculture.

- The Waste Framework Directive defines the storage of waste pending its use in agriculture as a waste recovery operation – Annex II Ref: R 13 Storage of waste pending any of the operations numbered R 1 to R 12.
- The Waste Management (Registration of Sewage Sludge Facility) Regulations 2010 require facilities for the storage of sewage sludge to be registered with, and operated in accordance with any conditions imposed by, the local authority. These Regulations are in addition to normal planning requirements, i.e. in addition to obtaining the requisite planning consent a Sewage Sludge (or Biosolids) Storage facility requires a ‘Certificate of Registration’ from the local authority under the 2010 Regulations before it may commence operation¹.

2.0 Project Need

The NWSMP considered and addressed all aspects of the wastewater sludge management issue, including treatment, transport, storage and reuse/disposal. In relation to sludge storage in greater Dublin the NWSMP concluded:

‘In line with the approach taken to other facilities in this Plan, the development of Sludge Storage Facilities will no longer be considered solely on a per-plant or per-county basis. Where appropriate, Sludge Storage Facilities will be developed to serve a number of local plants and/or a wider regional need. In particular, the upgrade to the Ringsend WwTP sludge hub and the proposed GDD WwTP will result in a significant increase from current sludge volumes with a consequent increase in storage requirements. Therefore, a dedicated sludge storage facility should be developed in conjunction with the expansion of Ringsend to meet its requirements and take account of other future needs in the region’.

2.1 Existing Scenario

The proposed study area for the site selection process is the area defined by the Greater Dublin Strategic Drainage Study (GDSDS). The study area is discussed further in Section 4 and Appendix B contains additional information regarding the GDSDS.

There are currently 8 large municipal wastewater treatment plants within the Greater Dublin Strategic Drainage Study (GDSDS) area located at: Ringsend, Leixlip, Shanganagh, Osberstown, Malahide, Swords, Portrane and Barnageeragh as per Figure 3 below. Irish Water has considered the treated sludge storage requirements for the GDSDS area as a whole.

¹ Note – other consents may also apply, e.g. under the Building Control Acts & Regulations.
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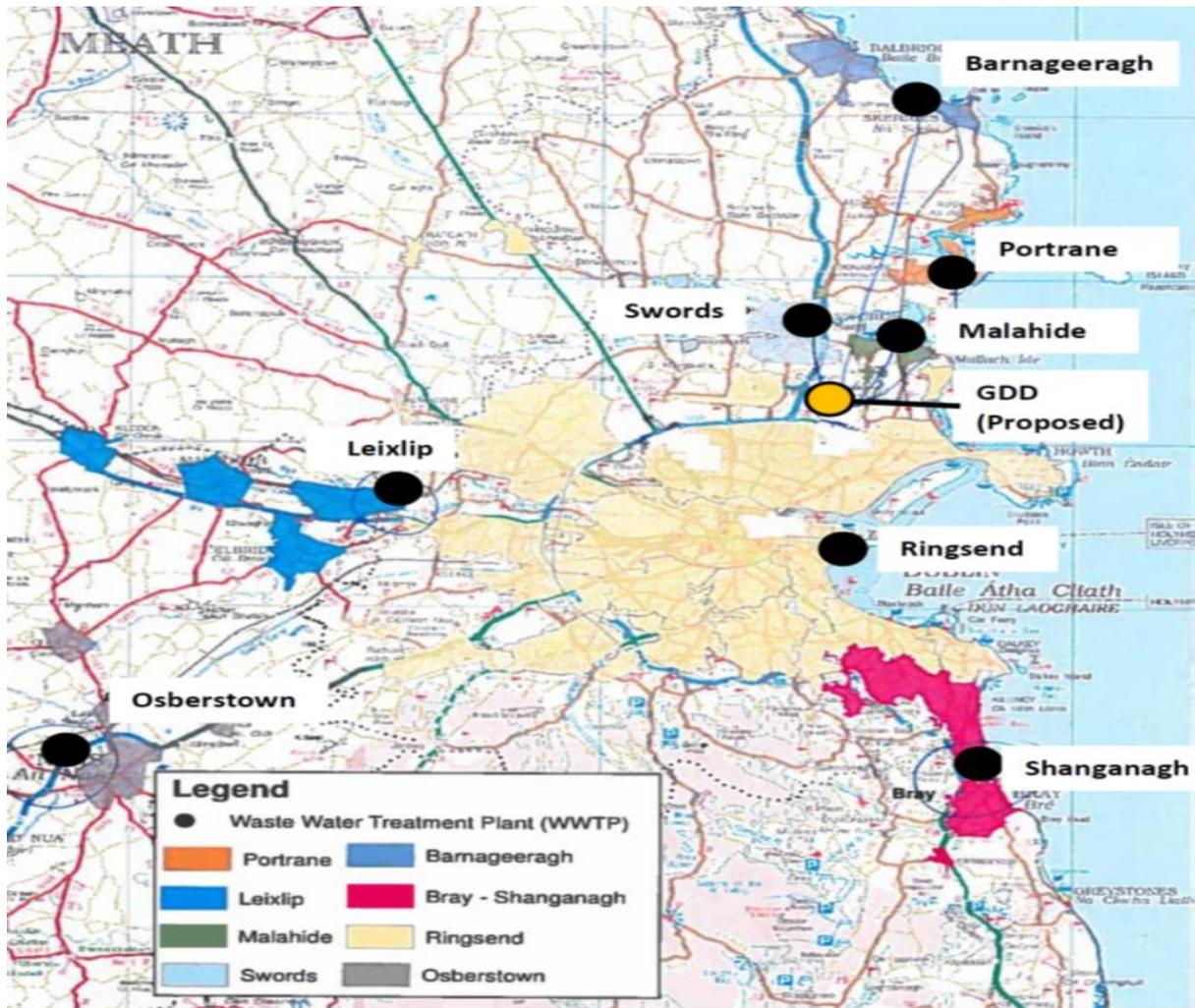


Figure 3 Eight Existing Wastewater Treatment Plants (WwTP) and proposed GDD WwTP within the GDSDS

Biosolids from Ringsend WwTP is currently stored at a facility in Thornhill Co. Carlow. See Figure 4 below for the location of the Thornhill facility, and the haul route from Ringsend WwTP to Thornhill. Truck movements from the Ringsend plant are via the port tunnel, south along the M50 and south along the M7 as indicated in Figure 4 below. The biosolids are then applied to agricultural lands located in south Leinster. These are the “spread-lands”. Land spreading occurs mainly during the spring and autumn periods. There is no proposal to move away from these spread-lands and it is proposed that the biosolids stored at the proposed RBSF would continue to be applied to those lands during the appropriate times of the year.

The storage facility currently used by the Ringsend WwTP is the subject of legal proceedings in relation to its status under planning legislation. The continued use of this facility for biosolids storage is not currently prohibited but its operating capacity was capped at existing levels by the Courts (this is subject to a pending appeal). The Thornhill facility has a certificate from Carlow County Council for a maximum annual throughput of 25,000 tonnes of biosolids. Irish Water considers that the new proposed RBSF represents a more sustainable solution for the seasonal storage of biosolids, arising from the Ringsend WwTP and potentially other facilities in, and planned for, the GDSDS area. It is proposed, subject to all appropriate statutory approvals being in place, to transition to the storage of biosolids arising from the Ringsend WwTP post upgrade, at the proposed RBSF, as and when required.

Sludge from WwTPs at Swords, Barnageeragh, Portrane and Malahide is removed from those plants and is transported to a facility in the midlands from where it is distributed onto agricultural land after treatment. Sludge from Shanganagh, Lexlip and Osberstown WwTPs all undergo treatment before being applied to agricultural land.



Figure 4 Existing Haul Route from Ringsend WwTP to Thornhill Storage Facility in Co. Carlow

2.2 Proposed Future Scenario

A further 'greenfield' regional wastewater treatment plant is required to serve the long-term needs of greater Dublin. This facility has been planned for many years, initially by Fingal County Council and it now forms a key part of Irish Water's WSSP. More information on this is provided in Appendix B of this report. The preferred site for this facility is located at Clonshaugh, Co Dublin, c. 2km to the east of Dublin Airport in the Fingal County Council administrative area. (see proposed location of the new WwTP in Figure 4 above). The new plant, known as the Greater Dublin Drainage (GDD) plant, would ultimately provide up to 80% of the additional wastewater treatment capacity required in the area by the year 2050. The current wastewater

demand of the region is c. 2.3 million PE² but this is expected to grow to approximately 3.6 million PE by the year 2050. This will result in a proportional increase in the associated production of biosolids.

Approximately 85% of the treated wastewater sludge from the GSDS area would therefore be generated by the Ringsend and GDD WwTPs. It is considered that locating the proposed RBSF near these main load sources would be more sustainable and would provide the greatest flexibility in respect of future outlets for recovery.

Following a detailed consideration of alternatives in the NWSMP and as summarised in section 1.4 below, Irish Water has concluded that the preferred strategic approach to providing sludge storage for greater Dublin is to select a site capable of being developed to meet the entire 3.6 million PE demand in the GSDS region (to 2050). Irish Water proposes applying to An Bord Pleanála for planning approval for development of the facility based on a 20 year design horizon (up to 2040), which requires that the facility can store already treated wastewater sludge from Ringsend and the proposed GDD WwTPs, and wastewater sludge from the other Fingal WwTPs (Swords, Malahide, Barnageeragh and Portrane) giving a total requirement of approximately 3.0 million PE. It is proposed that the wastewater sludge from the Fingal WwTPs would be treated at the proposed GDD WwTP, before being stored at the proposed RBSF. Irish Water will review the storage requirements within Greater Dublin in the medium to long term, and develop the proposed RBSF further within the space provided on the selected site if and as required. This further development would require planning consent before it could proceed.

In summary, it is proposed to select a site for the proposed RBSF that is capable of accommodating 3.6 million PE, but to seek planning permission only for buildings to take a capacity of 3.0 million PE for the 2040 design horizon.

2.3 Consideration of Storage Alternatives

Before arriving at its preferred approach to meeting sludge storage needs (as outlined in the previous section), Irish Water considered the findings of the NWSMP and considered further options. Below covers both the findings of the NWSMP and further options considered are set out below:

- Provision of off-site storage facilities serving individual wastewater treatment plants;
 - This approach would go against the principle of the NWSMP of developing strategic facilities that serve a number of plants. It would contradict the principle of increasing operational efficiency as a number of individual facilities would require more investment and more resources. The management and control of facilities to the highest standards is best achieved through a small number of strategic regional, highly controlled facilities rather than a large number of smaller facilities.
- Provision of off-site storage facilities serving groups of wastewater treatment plants (located close to the spread-lands);
 - This option does not provide flexibility for changes to the spread-lands location or for changes to the future disposal outlet.
- Provision of off-site storage facilities serving groups of wastewater treatment plants (located close to the source);
 - This is the preferred approach as it achieves greater capital and operational efficiencies, facilitates high standards of management and control and restricts the number of developments required in various locations.
 - This approach allows for flexibility in the future to changes in the location of the spread-lands or to the changes to the disposal route.
- Colocation of the storage facility with other waste facilities as per the objectives of the Eastern Midlands Waste Management Plan (EMWMP)

² The amount of wastewater received at a treatment plant (and its design capacity) is measured in units known as population equivalent (or PE). The wastewater received from all sources, e.g. industrial, tourism, commercial, residential, etc., is converted into these units, with one unit of PE representing the wastewater load typically generated by a single person.

- This option will be considered where there are existing waste facilities within the GSDS area. Analysis of these facilities will determine if any such facilities could facilitate colocation with the RBSF.
- Irish Water and Ervia owned lands within the GSDS area will be considered to determine if there are any potential suitable locations for the proposed facility.
- On-Site Storage at WwTPs;
 - The Ringsend WwTP could not accommodate additional storage facilities on the scale required.
 - Colocation with wastewater treatment plants within the GSDS will be considered.

3.0 RBSF Design & Land Requirements

3.1 Size of Facility Required

As previously explained, the RBSF is ultimately planned to serve the needs of greater Dublin to the year 2050, which is anticipated to be based upon approximately 3.6 million PE. However, Irish Water intends to apply to An Bord Pleanála for planning approval for the development of the facility based on a design horizon of 2040, which is 3.0 million PE.

Deliveries of biosolids from the WwTPs within the region would occur throughout the year, however removal of biosolids from the RBSF would happen particularly during spring and autumn periods. Assuming that biosolids would need to be stored for a maximum of 4 to 5 months per year (to allow for periods of wet weather either side of the statutory prohibition on land spreading from October to January), the likely maximum storage requirement would be in the region of 48,000 m³ per annum. Assuming an average storage depth of 5m, the storage area required for the maximum expected biosolids quantity would be 9,600 m². Allowing for HGV internal circulation (as all loading and unloading would take place internally) this gives a floor area required of 10,500 m². Additional floorspace of some 200 m² would also be required for administration, laboratories, stores, and staff welfare facilities. This could be provided in a separate building. Space for odour control units would be necessary, and would be sited adjacent to and external to the buildings.

3.2 Site Layout & Operational Requirements

Based on the need outlined above, and for the purposes of presenting a generic layout of the Biosolids Storage Facility for consultation purposes, the total floor space required to accommodate a capacity of 3.0 million PE has been broken down as follows:

- Proposed development – 2 no. buildings (dimensions 50m X 105m) and 1 Administration Building (dimensions 16m X 12m)
- Provision of space on the selected site for future expansion

As explained above, the site should be of sufficient size to accommodate possible future expansion to meet the entire 3.6 million PE demand to 2050. Irish Water recognises that any future expansion of the facility to accommodate this additional storage capacity would require planning permission, but considers it prudent to select a site that is capable of accommodating that extra capacity.

When a final site is selected the detailed design of the facility must take into account the particular circumstances and issues relevant to that site and consequently the final proposed design will vary (perhaps quite significantly) from the 'generic' layout presented in this report.

While odours associated with biosolids are low, it is expected that in order to prevent the risk of odours arising at the facility, the proposed buildings would be required to be fitted with odour control units and all unloading and loading of biosolids would be required to take place internally within the storage buildings. All truck (HGV) loads arriving and leaving the facility would be required to be covered. The buildings would operate under negative air pressure (due to air being continuously extracted to odour control units - OCUs) in order

to minimise the potential for odour emissions. The odour control units would discharge treated air to the atmosphere via one or more stacks. The number, location and height of the stacks would be selected at detailed design stage to minimise possible impacts on sensitive receptors. These matters have been anticipated in the generic site layout.

For maximum efficiency and to reduce total HGV journeys, articulated HGV tipper units are proposed. These result in a maximum building height to eaves being necessary of 12.5m, which results in a building ridge height of c.15m to cater for load tipping. (Note – only the OCU emission stacks would be higher than the building ridge line).

For safety and efficiency reasons one-way HGV circulation within the site is proposed. A landscaped berm is proposed around the site perimeter for screening purposes. Finally, a surface water attenuation tank would be required to limit storm run-off from the site in accordance with regional drainage/flooding policy. This gives the indicative site layout shown in Figures 5, 6 and 7 below.



Figure 5 Indicative Layout of the Proposed Regional Biosolids Storage Facility

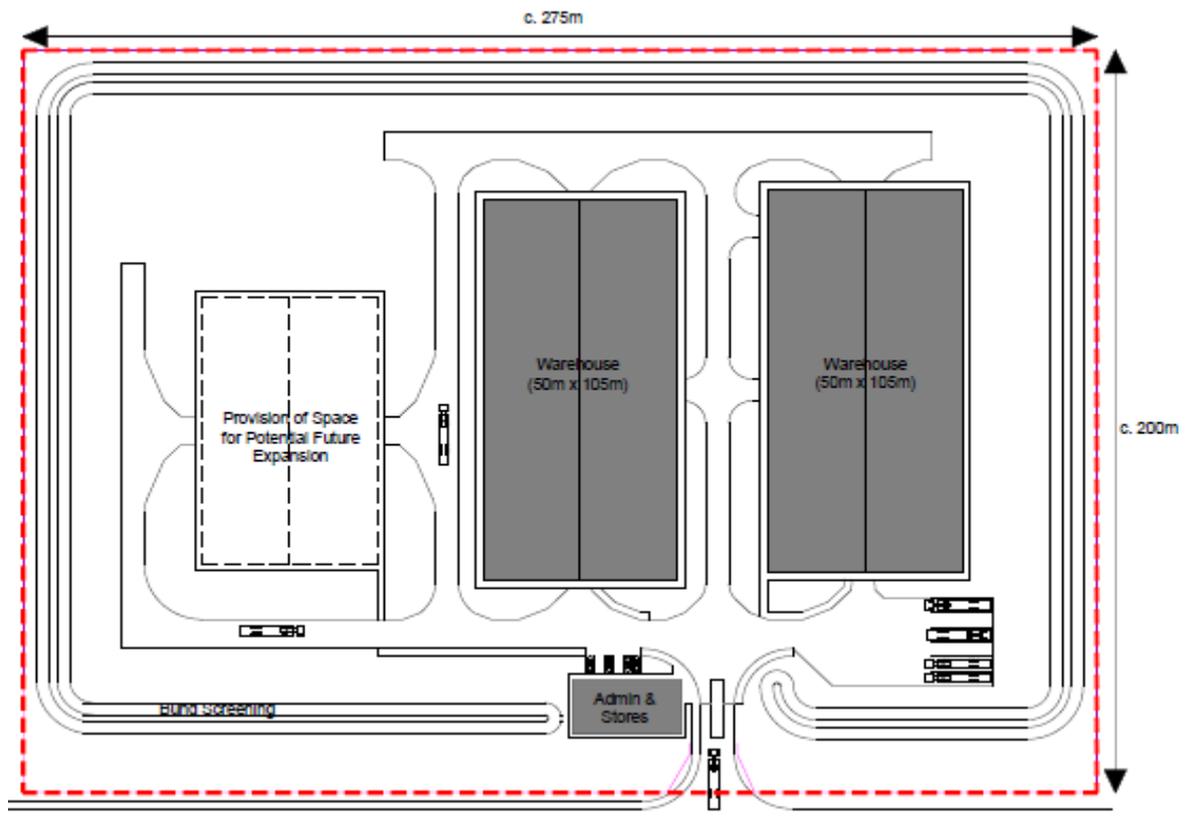


Figure 6 Indicative Plan of Proposed Regional Biosolids Storage Facility

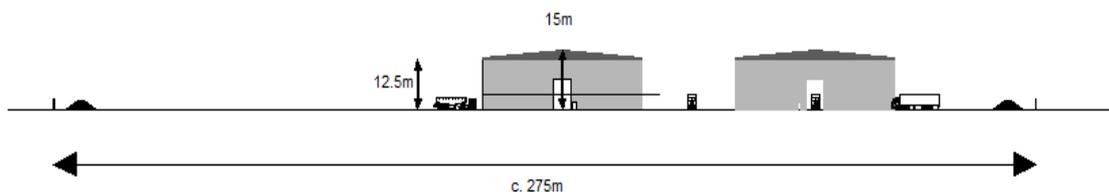


Figure 7 Indicative Elevation of Proposed RBSF

3.2.1 Area Required for Site Selection Purposes

The generic design of the proposed RBSF presented above requires a site area of approximately 5.5 hectares. As it is quite unlikely that such an 'ideally' sized perfectly rectangular site will be located, and to provide layout flexibility and buffering to minimise potential environmental impacts (particularly on sensitive receptors) it is proposed for site selection purposes to seek site locations where a minimum usable area of 8 hectares is available.

4.0 Study Area & Land Use Classification

4.1 Definition of the Facility

The Waste Permit & Registration Regulations do not apply to the proposed RBSF, however biosolids are classified as a waste in the current European Waste Catalogue/List of Wastes: Code Ref: 19 08 05 - sludges from treatment of urban waste water. In terms of land use planning the proposed RBSF can therefore be considered to be a waste storage facility. The activity at the facility is a waste management operation involving the temporary storage of a waste product pending its final recovery to lands, resulting in benefit to agriculture or ecological improvement. The RBSF would be required to obtain and comply with a certificate of registration from the local authority under the Waste Management (Registration of Sewage Sludge Facility) Regulations 2010.

4.2 Proposed Study Area

In identifying potential areas and suitable sites for the proposed facility, the GSDS area is the initial proposed study area as per Figure 8 below. In alternatives considered in section 2.3 of this report, it is stated that a regional storage facility serving greater Dublin would be the most efficient option and that locating the facility close to the source of the biosolids would be the preferred option to allow for future flexibility to any potential changes in the disposal route. The facility would be serving wastewater treatment plants within this area as described in section 2.1 of this report, and therefore it is appropriate to store the waste at a central location within the same area. If no suitable sites are identified within this study area then the study area would be expanded as required.

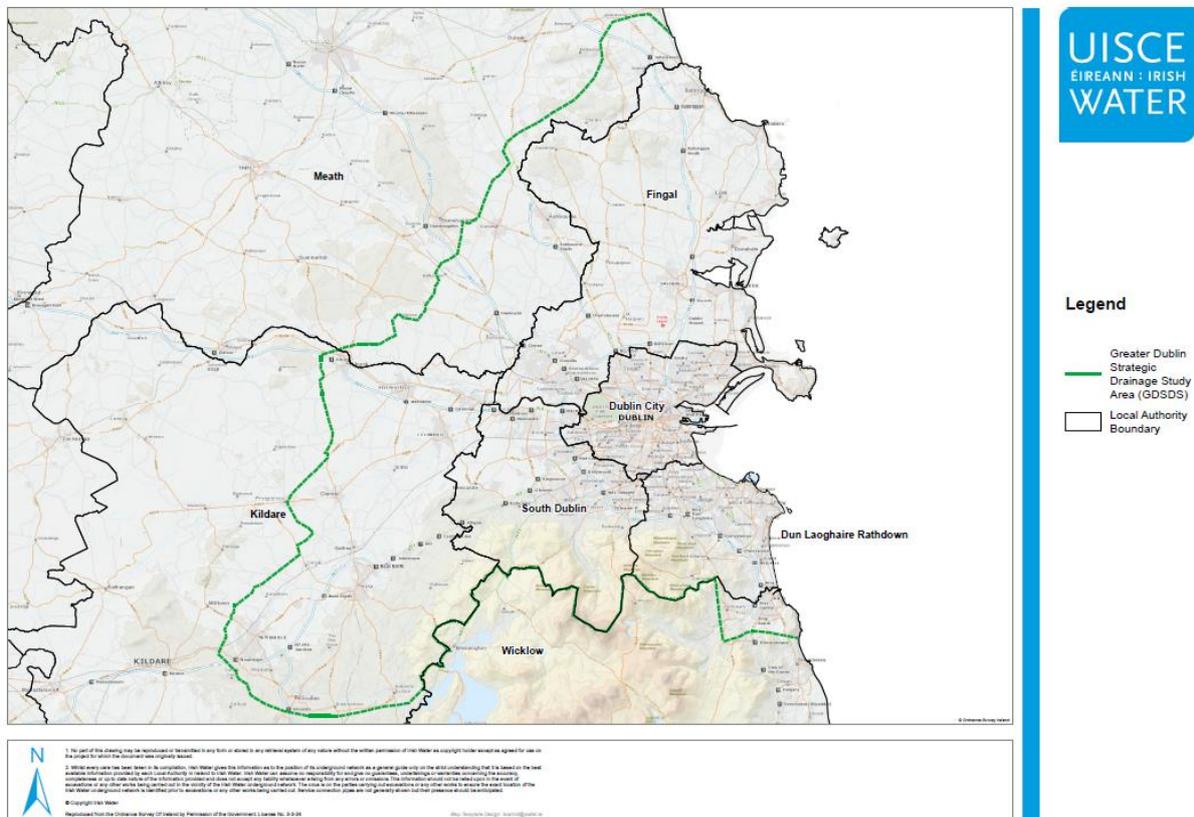


Figure 8 Proposed Study Area within Green Boundary for Proposed RBSF (GSDS Area)

4.3 Land Use Classification

In attempting to identify zones that may prove suitable for the location of the facility the relevant city/county development plans applicable in the GSDS area were reviewed. The GSDS boundary includes the administrative area of seven local authorities, including Dublin City Council, Fingal County Council, South Dublin County Council and Dun Laoghaire Rathdown County Council (the four Dublin Authorities) together with parts of counties Meath, Kildare and Wicklow. The development plans of all seven authorities were examined to determine where such a facility may be acceptable from a zoning perspective. It is recognised that identifying potentially suitable land use zones is only one element of the site evaluation process. A detailed analysis of planning policies, objectives and standards together with environmental, economic and social and community considerations will be required to further refine the selection process. This will be undertaken at the next stage of the site selection process.

While none of the development plans refers specifically to a ‘Biosolids Storage Facility’ as a land use classification, the land use definition which most closely aligns with the proposed development is a ‘Transfer Station’ or ‘Refuse Transfer Station’ which is defined as follows;

- *A structure or land, usually enclosed and screened, and which is used for the temporary storage of refuse and waste materials pending transfer to a final disposal facility or for reuse. The definition includes a baling station, recycling facility, civic amenity facility, materials recovery facility and materials recycling facility.*

With the exception of Fingal, the three other Dublin Authorities use the above term in their zoning / land use classifications. Fingal instead refers to both a ‘Waste Disposal and Recovery Facility (Excluding High Impact)’ and a ‘Waste Disposal and Recovery Facility (High Impact)’.

On the basis of the above and using the Transfer Station and Waste Disposal definitions set out in the relevant statutory development plans it is considered that within the four Dublin Authorities the proposed RBSF may be acceptable in the zones shown in Table 1 below.

Table 1 Land use zonings within the four Dublin local authorities considered appropriate for the proposed facility

Dublin Council	City	Dun Laoghaire Rathdown CC	South Dublin CC	Fingal CC Current Plan	Fingal CC Draft Plan
Z7: Employment (Heavy)		E: To provide for Economic Development and Employment	EE: Enterprise and Employment	GE: General Employment Waste Disposal and Recovery Facility (Excluding High Impact)	GE: General Employment Waste Disposal and Recovery Facility (Excluding High Impact)
				HI Heavy Industry	HI Heavy Industry
				Waste Disposal and Recovery Facility (High Impact)	Waste Disposal and Recovery Facility (High Impact)

Potentially suitable areas within parts of Counties Meath, Wicklow and Kildare within the GSDS area were also reviewed from a land use zoning perspective. The development plans in these Counties are generally less specific than those of the Dublin Authorities and none refers specifically to waste storage facilities, refuse transfer stations or transfer stations.

Reviewing land use classifications that would most closely resemble the proposed RBSF, areas will be identified where the zoning would allow for industry, warehousing, employment, utilities and public services. Suitable sites may be limited as the zoned areas may have insufficient lands to accommodate such a large facility, or will be unsuitable for environmental or other reasons. It is proposed that all rural/agricultural zones, high amenity zones, landscape and environmental designations, town /village centre zones and residential areas should be excluded.

5.0 Approach to Site Selection

As identified earlier in this report, the proposed RBSF is considered, in terms of land use planning, to be a waste management operation involving the temporary storage of waste pending its final recovery to lands resulting in benefit to agriculture or ecological improvement.

Current national guidance in relation to site selection criteria for the development of Biosolids Storage Facilities in Ireland is limited. Various guidelines are provided across a range of policy documents dealing with different types of waste facilities, as set out in regional waste management plans, city and county development plans and regional planning guidelines. However, the Waste Management Plans 2015-2021 include a policy action that waste facility siting guidelines be prepared to guide the development of appropriate waste infrastructure. The guidelines are intended to promote a consistent approach to site selection and will provide local authorities, service providers, An Bord Pleanála and the general public with a comprehensive guide to the matters to be considered when proposing to develop a new waste facility.

These guidelines are currently being drafted and it is understood that they will apply to new facilities that commence operations after 1st March 2017. Such facilities will include the storage of treated sludge. In the interim, pending publication and adoption of the new guidelines it is proposed to apply the siting considerations and criteria set out below. These comprise of matters generally applied to new waste infrastructure development. They will be reviewed following the introduction of the proposed guidelines.

5.1 General Siting Considerations and Criteria

The term 'waste facility' covers a diverse range of land uses and activities from civic amenity sites to waste to energy plants, and each operation may have widely differing impacts. However, there are general siting considerations and criteria which would apply to all facilities, together with more specific elements for particular types of facilities. The general considerations and criteria can be grouped under the following main headings:

- **Environmental**
- **Economic**
- **Planning and**
- **Social and Community.**

5.1.1 Environmental

Key factors:

- Where possible, avoid siting waste infrastructure or related facilities in areas protected for landscape and visual amenity, geological heritage and/or cultural heritage value.
- Avoid European Sites including Special Areas of Conservation (SACs), Special Protection Areas (SPAs).
- Avoid proposed Natural Heritage Areas (pNHAs), Statutory Nature Reserves, Refuges for Fauna and Annex 1 habitats (outside European Sites).
- Ensure proposed facilities are designed and managed to prevent the spread of alien species.
- Through appropriate design measures, protect habitats important to the migration, dispersal and genetic exchange of wild species.
- Protect river habitats and water quality, including surface and ground water quality.
- Ensure sustainable drainage system (SuDS) is applied in design.
- Avoid development of waste infrastructure in flood risk areas.
- Ensure riparian buffer zones are created between all watercourses and any waste facility.
- Take account of the impact of the proposed facility on the biodiversity of the local area.
- Carry out a desk study assessment for each potential site. This should be done utilising a variety of existing data sources including recent aerial imagery, National Parks and Wildlife Service on-line mapping services showing the designated area boundaries and other online data sources including the National Biodiversity Data Centre, Bat Conservation Ireland, Botanical Society of Britain and Ireland and BirdWatch Ireland websites.

- Due consideration should be given to geological and hydrogeological conditions. The site selection study should be undertaken in accordance with the EPA guidance documents on the preparation of an EIS (EPA, 2002 & 2003). An application of these guidelines to Geology, and Hydrogeology is outlined in “Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes” (NRA, 2009).
- Impact on air quality should be assessed. A desktop assessment of air quality for each of the BSF site options should be conducted through a calculation of the index of overall change in exposure of the nearby population to Nitrogen Oxides (NO_x) and dust particles (PM₁₀).
- In order to prevent odours arising at the facility, odour control units should be provided and all loading and unloading activities should take place inside the proposed buildings. The buildings should be maintained under negative pressure with extracted air being treated in the biofilter odour control units. Each site option should be considered in the context of sensitive receptors.
- Noise & Vibrations. General traffic movements of loaded HGVs will generate noise and some low-level vibrations at the facility. Traffic speeds around the site should be controlled to 10 kph in order to minimise local impacts. All loading and unloading activities should be conducted in closed buildings thus limiting noise to the surrounding area. In order to compare the potential sites and to determine any preferences in terms of noise, the assessment of potential impact should be based primarily upon property counts in the vicinity of each site, likely changes in noise environment, and a review of potential mitigation measures.
- Waste facilities may attract vermin in the form of rodents and scavenging birds in search of food. While the biosolids product will not be a source of food in itself, vermin control regimes should be developed for any site option as a precaution. In particular, the design of any surface water attenuation should have regard to its attraction to birds who might become a local nuisance or pose a risk to local commercial activities.
- Undertake an Appropriate Assessment Screening of potential sites.
- Where a proposed facility is likely to have a significant effect on a European Site a full Appropriate Assessment should be undertaken.

5.1.2 Economic

- Transportation costs. High volume, low value materials such as biosolids cannot be transported great distances. The environmental and economic sustainability of transport decisions must be considered, with an objective to minimise travel distance and cost.
- Access to services. These would normally include the transportation network, energy, water and wastewater.
- Site layout and design considerations. These would include provision of adequate site servicing arrangements, room for possible future expansion, etc.
- Where possible and appropriate, avail of opportunities to integrate existing and proposed waste facilities.

5.1.3 Planning

- Regard to be had to the stated policies and objectives of the Regional Waste Management plans.
- Waste facilities should normally be compliant with the policies and objectives of Regional Planning Guidelines, City/County Development Plans and Local Area Plans.
- Wherever possible, waste facilities should be located on suitably zoned land. Suitable zoned sites may be difficult to secure given that waste facilities can be perceived as unpopular, and development plan zoning objectives frequently exclude such uses.
- Adjacent existing and zoned land uses. These should be investigated to identify sensitive areas, and other protected activities that are likely to be adversely impacted by the facility. There is a need to protect sensitive areas from any possible negative impacts due to possible offensive odours, noise, dust, litter, vermin etc.
- Brownfield sites which are appropriately zoned, may be suitable for waste activities and these should be given consideration.
- The geographic distribution of other similar facilities should be considered. While regional spatial imbalances should preferably be avoided, it is nevertheless important to consider clustering, where complementary activities can be co-located in a designated area.

- There are a number of key principles on which current legislation is based and which are relevant to planning considerations for waste facilities. These include: the Proximity Principle; the Precautionary Principle; Self Sufficiency and the Polluter Pays Principle.
- Proximity to consumers of biosolids.
- Anticipated growth and development near the proposed facility.
- Assess transport impact, including road access, network, safety and traffic patterns to and from the proposed facility, impact on neighbours and the wider community.
- Traffic. The traffic volumes of the section of roadway on which any potential site is located or accessed should be considered. Locating the RBSF near regional and national primary roads (enabling ready access to/from Motorway network and all WwTPs in Region) is preferred. This would help minimise the traffic impacts in the vicinity of the site as well as along the haul routes. Location of the facility near regional and national primary roads would contribute to the site's operational flexibility and transport of the biosolids to any future disposal route. The site selection should have regard to the likely patterns of HGV traffic for normal day to day import operations and for exports during the land spread season. The traffic arising from personal car and van use for the staff should be low but must also be considered.
- Road Safety. A desktop Road Safety Impact Assessment should be undertaken for any potential site. This will identify a site preference or ranking in terms of road safety of the potential sites that are being considered.
- Planning history of the site, ownership and usage.
- Landscape & Visual impact. Landscape has two separate but closely related aspects both assessed as part of the site selection process. The first is the visual, i.e. the extent to which any new structures in the landscape can be seen. The second is landscape character impact, i.e. effects on the fabric or structure of the landscape. The methodology for Landscape and Visual Impact assessment should include a desktop review of the study area to identify landscape planning designations and a roadside survey to identify key receptors.
- Archaeology and Cultural Heritage. A walk over and desktop site selection constraints study should be undertaken in accordance with "Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes".

5.1.4 Social and Community

These address impacts that the facility may have on the local community. Key factors include:

- Give consideration to environmental social equity. This should include the cumulative impact of the siting of existing and proposed facilities.
- Public consultation. The need to engage the public in the choice of site.
- Impact on historic and cultural features.
- Impact on neighbourhood character.
- The methodology for the assessment of the potential socio economic impact on human beings should be based on a desktop review of the study area, planning history records and full review of development plans and, where they exist, local area plans.

5.2 Designations That May Preclude or Curtail Development

Certain designations may preclude or curtail development on sites. These would include;

- Special Areas of Conservation (SACs, including candidate SACs) are important nature conservation areas considered to be important on a European and Irish level (Natura 2000 network of sites).
- Special Protection Areas (SPAs, including proposed SPAs). These are part of the Natura 2000 network of European sites for the protection of wild birds.
- Natural Heritage Areas (NHAs, and proposed NHAs). These are areas considered to be important wildlife habitats.

- Areas of High Amenity, Areas of Archaeological Interest and Conservation Areas. These designated areas are commonly set out in city and county development plans and relate to areas of important scenic and visual amenity, or of historic and cultural interest. The protection of the character of these areas is normally a policy objective of statutory land use plans.

At a county and local level it is essential to carefully review the policies and objectives of city and county development plans (and local area plans if applicable) to ensure that any possible exclusionary factors are recognised early in the site selection process. The above designations will normally be reflected in these plans. The plans may give guidance on which areas may potentially be suitable for a waste facility. Figure 9 identifies designations such as Special Areas of Conservation (SACs), Special Protection Areas (SPAs), nutrient sensitive water bodies, bathing water areas, shellfish areas, existing / proposed Natural Heritage Areas (NHAs).

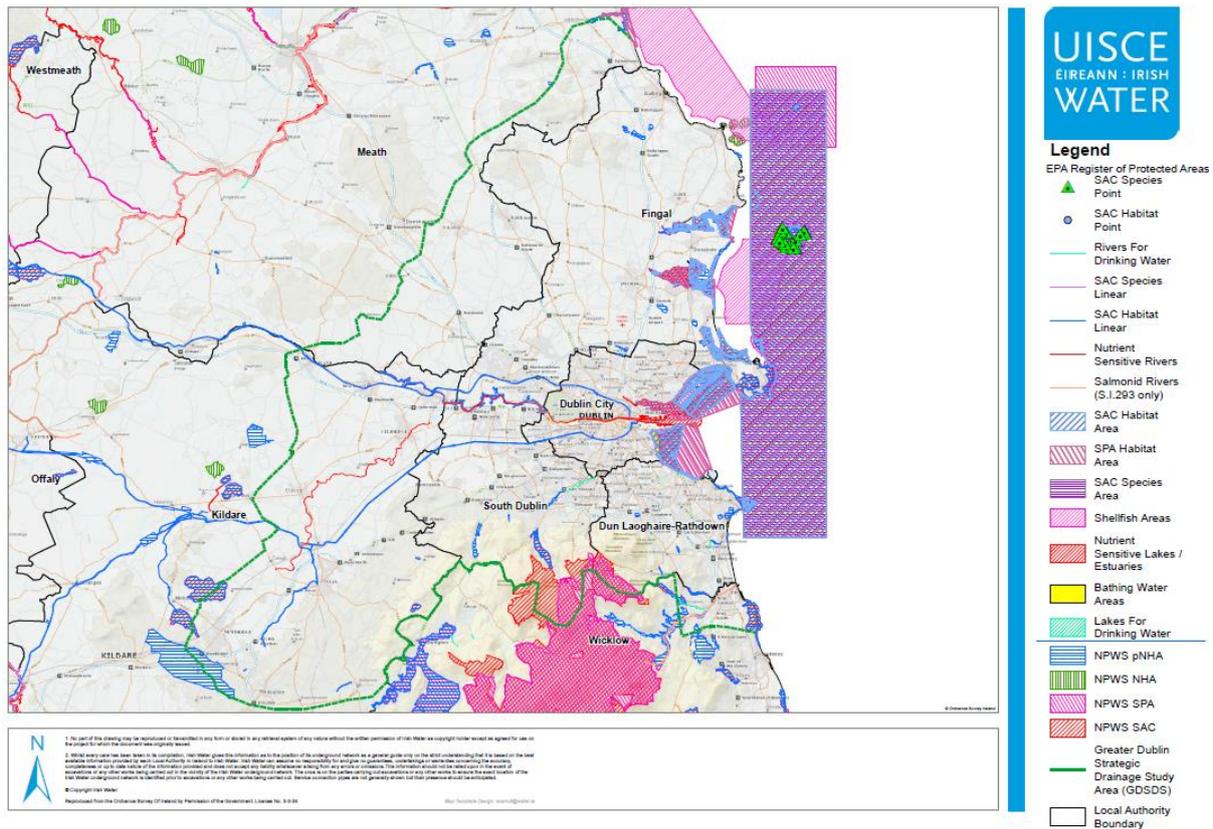


Figure 9 Identification of Environmental Designations within the GDSDS

5.3 Specific Siting Considerations and Criteria

Many of the specific siting and design considerations and criteria that apply more generally to waste facilities sites are also relevant for a Biosolids Storage Facility. These can be considered as follows:

- Land Use Planning. Sites should be suitably zoned to accommodate the proposed development under the relevant city or county development plan in force at the location. There are no national standards for zoning, and definitions and designations vary from county to county. Nevertheless it is important that the proposal complies with the relevant land use objectives applied in each county to avoid any material contravention of the development plan.
- Site Characteristics;
 - Planning history
 - Existing use
 - Site ownership and availability
 - Size and configuration
 - Topography and features

- Ground conditions including hydrogeology
- Hydrology including proximity to rivers, streams, water bodies
- Flooding and flood risk issues
- Surface water features
- Boundary features
- Flora and fauna including protected species
- Road access and vehicular entrance arrangements
- Traffic
- Cultural heritage including archaeology and protected structures
- Characteristics of locality and nature of adjoining development.
- Distance to sensitive receptors.
- Road network including distance from national routes.
- Construction management.
- Location of similar facilities in the locality.
- Impact of the proposed development on the locality and adjoining properties.
- Availability and capacity of services and utilities. This considers the potential for the proposed RBSF to be served by surrounding infrastructure. Key requirements of a RBSF are for water supply, waste water discharge, telecommunications, electrical supply and an outfall for surface water runoff. With respect to the latter, the requirements of the Greater Dublin Strategic Drainage Study – Regional Drainage Policies (SUDS) will apply.
- Distance from WwTP's - Transport economics will be used to select potential sites with regard to proximity, and consequent operational costs, to the existing WwTP locations. Further, consideration will be given to the desire to have the shortest possible travel distance in the event of a prolonged period of poor weather conditions.
- Costs – The Capital and Operating Costs of potential sites will be calculated and used in comparing suitable candidate sites.

5.4 Consultations with Local Authorities

Preliminary discussions regarding site selection have been held with officials of all seven local authorities in the GDSDS area. The purpose of these discussions was to provide background to officials on the proposed facility and receive initial feedback on the relevant siting factors to be considered. Key points raised by officials are set out below:

- Given the likely scale of the proposal, the facility would not generally be acceptable in rural areas.
- Locations with environmental and heritage designations should be avoided.
- Unsuitable land use zonings would include rural / agricultural, amenity, residential, commercial and retail, town and village centres, institutional and open space zones.
- In principle, the facility would be considered more appropriate to locations zoned for industrial and/or warehousing type uses.
- Traffic generation would be a likely significant issue and locations close to the national road network would be preferable to avoid disruption to residential communities.
- Appropriate mitigation measures should be identified to reduce any potential odour.
- A planning application for the facility would be evaluated in accordance with the full range of policies, objectives and standards set out in the relevant city/county development plans and a suitable zoning was not the only planning criteria to consider.

5.5 Selection Methodology

The site selection process will generally involve the following elements:

- Selection of siting criteria;
- Desk study including mapping of exclusionary elements;
- Identifying generally suitable locations;
- Refining the selection to identify shortlisted sites;
- Assessing shortlisted sites in detail and
- Identifying the preferred choice.

Consultation with the public is central to the above and should be carried on throughout the process. It will be core to the siting selection strategy. The process has three key stages as set out below.

Stage 1. Identify Site Selection Methodology.

The initial selection process involves the development of a site selection methodology and the identification of site selection considerations and criteria. It is important that the manner in which the site for the proposed facility will be chosen is clearly explained and that the public be given an early opportunity to input their views and concerns into the process. Public consultation is therefore a key element in Stage 1.

Stage 2. Select Shortlist of Sites

Following completion of Stage 1 and having received feedback on the site selection methodology, potentially suitable locations for the proposed facility will be identified. This will involve the application of the site selection considerations and criteria together with any other relevant factors for assessment. A desk top study will be carried out to secure the removal of clearly unsuitable locations through the application of the factors outlined earlier, (e.g. land use zoning, Natura 2000 sites, conservation areas, areas remote from the national road network, etc.). Areas considered suitable will then be identified and subject to detailed evaluation. From this process a shortlist of potentially suitable sites will emerge. These sites will be subject to further analysis and the shortlist finalised. The second stage of public consultation will then be carried out to ensure public feedback is incorporated.

Stage 3. Identify Preferred Site

Having received feedback from the public on Stage 2, the preferred site will be identified. This will be subject to a detailed assessment to identify any impacts of the proposed development on the local community and wider area. At this stage the design of the facility will be advanced and preliminary architectural and engineering drawings will be prepared. Further public consultation will then be carried out to discuss the proposal with the local community. Depending on community feedback at this stage, final decisions on the location and design of the facility will be made. Should the selected site be advanced for development, the planning application package and associated documentation, including Environmental Impact Assessment and Appropriate Assessment (where required) will be prepared and submitted to An Bord Pleanála for consideration and approval.

Following submission of the Ringsend and GDD planning applications to An Bord Pleanála, statutory public consultation processes will be undertaken to facilitate the input of the public to the final decisions of the Board.

6.0 Next Steps

6.1 Stage 1 Non-Statutory Consultation

Irish Water is developing a Regional Biosolids Storage Facility to serve greater Dublin. The process to identify a suitable site for the facility has commenced and we are currently seeking feedback on the proposed methodology that will be used to shortlist potential suitable sites. The *Stage 1 Report – Site Selection Methodology* has been published and a four week consultation will be held from 2nd February to 2nd March 2017.

Irish Water is seeking feedback on the following:

- Tell us your views on the **approach to site selection**, as described in the *Stage 1 Report – Site Selection Methodology*.
- The general **siting considerations and criteria** set out the Environmental, Economic, Planning and Social & Community factors that will be considered. Are there other criteria that should be included at this stage?
- Are there any additional factors that should be taken into consideration in the **selection methodology** proposed by the project team?
- How would you like Irish Water to communicate with you as the project progresses?

The *Stage 1 Report – Site Selection Methodology* can be viewed online at water.ie and will be available at planning counters and public libraries in greater Dublin.

You can have your say by providing feedback:

- By phone: 1890 44 55 67
- By email: biosolids@water.ie
- By post: Biosolids Consultation, Irish Water, Colvill House, 24-26 Talbot Street, Dublin 1, Ireland.

7.0 Conclusion

Irish Water considers that development of a RBSF for greater Dublin is the most environmentally and economically sound solution for the storage of biosolids (pending recovery) arising in the area, particularly bearing in mind the proposed upgrade at Ringsend WwTP and the proposed GDD WwTP. Submissions on this Stage 1 Report are sought to assist Irish Water in determining how best to approach the selection of a site for the proposed RBSF.

Appendices

Appendix A Wastewater Treatment

The removal of the solid and dissolved pollutants from wastewater is usually a 3-stage process as follows:

1. Screening, Grit and FOG Removal

These processes are normally referred to as preliminary treatment. Screening of the incoming wastewater is undertaken to remove large objects, papers, rags, etc. Grit removal involves removing the larger inert (sand and silt-sized) particles normally carried along in sewers in the wastewater flow. FOG stands for Fats, Oil and Grease. FOG tends to accumulate throughout a WwTP as the wastewater slowly cools during treatment. Screenings, Grit and FOG all cause blockages and different maintenance problems within WwTPs if not removed at the start of the process.

2. Primary Settlement

This involves creating slow, quiescent conditions which facilitate the removal of solids (and the pollutant load) by simple settlement. At Ringsend this process removes 30% of the physical solids and 42% of the pollutant load before the settled wastewater is sent for secondary treatment. The sludge that arises during this stage is termed 'primary sludge'.

3. Secondary Treatment (Biological)

The first part of secondary treatment is to convert the dissolved pollutants in the wastewater into solid biological particles (called a 'biomass'), which can later be separated from the liquid (usually by settlement) to give a sludge and clear water. Secondary treatment uses the naturally-occurring biological processes that takes place in our lakes, rivers and estuaries every day where microorganisms and bacteria breakdown biodegradable pollutants. The only difference is that in a wastewater treatment plant it is engineered to take place under optimum conditions and at a high rate. At the end of secondary treatment the biomass is separated from the treated wastewater (usually by settlement) to give a 'secondary' sludge and a clear effluent which may undergo disinfection before being discharged back into the environment.

The screenings and grit resulting from preliminary treatment are normally washed, compacted, and removed by skip for disposal in landfill. Both the primary and secondary sludges (and the FOG) are then subject to further treatment on site.

Sludge Treatment on WwTP Site

Treatment of the primary and secondary sludges at WwTPs typically involves thermal hydrolysis, followed by anaerobic digestion (referred to as 'advanced anaerobic digestion'). Anaerobic digestion of municipal wastewater sludge has been widely practiced since the early 1900s and is the most widely used sludge treatment method. It comprises a series of biological processes in which microorganisms break down biodegradable material in the absence of oxygen. The sludge is fed into sealed containers (digesters) where it is retained for at least 12 days at a temperature of 35°C (or 20 days at 25°C). Overall, the process converts about 50% of the organic solids to a biogas containing about 70% methane (CH₄) and 30% carbon dioxide (CO₂) plus some small quantities of H₂, N₂, H₂S and H₂O. The biogas is captured during the process and is then used to generate electricity and heat which are used on the WwTP site.

The advanced anaerobic treatment process removes 99.9999% of the pathogens (viruses & bacteria). The digested sludge is biologically stable, has low odour and is rich in plant nutrients (nitrogen and phosphorus) making it a very suitable product for recovery on agricultural lands. An added benefit of digestion is that it makes the sludge much easier to thicken and dewater (by mechanical dewatering, e.g. using centrifuges, or by thermal drying) which helps reduce transport, storage and spreading costs.

Appendix B Greater Dublin Strategic Drainage Study (GSDSDS)

The Greater Dublin Strategic Drainage Study [GSDSDS] was published in 2005 and set out a comprehensive and holistic strategy to address the deficiencies in the Greater Dublin drainage and treatment systems, and to provide a blueprint for the sustainable growth of the region well into the future. The area covered by the study, and the WwTP catchments considered, is shown in Figure 8 within the body of the report. The GSDSDS's recommendations were multi-faceted and involved a wide range of measures at policy, management, and operational level, in addition to a programme of projects at the infrastructure level. The study was subject to a Strategic Environmental Assessment and its final strategy adopted in 2008. To a large extent all of the recommended policy and management measures are being implemented. However, the infrastructure programme was affected by the economic downturn and while a number of the projects have been completed, some of the major projects remain at design or planning stage.

A fundamental principle of the GSDSDS final strategy is that the capacity and potential of all of the existing drainage systems and wastewater treatment plants in the Greater Dublin Area should be maximised first before any additional new infrastructure is provided. The current project to expand the Ringsend Wastewater Treatment Plant (to the maximum capacity achievable within the confines of the existing site) is fully in line with that strategy.

However, the GSDSDS highlighted that a significant shortfall in wastewater treatment capacity would still exist in the region within the lifetime of the plan, even after all existing treatment plants, including Ringsend, had been developed to their maximum potential. The GSDSDS Final Strategy concluded that an additional regional wastewater treatment plant was required in the North Dublin area to meet this future shortfall in capacity. This latter project is known as the Greater Dublin Drainage Project (or GDD).

The GSDSDS strategy envisages that when the Ringsend WwTP approaches its maximum design capacity, wastewater loads would be progressively diverted from Ringsend to the new GDD plant. Accordingly, the GDD WwTP needs to be constructed and ready to accept the first diversion from Ringsend catchment when it is needed. The maximum capacity achievable at Ringsend is estimated at 2.4 million PE annual daily average. This capacity is only expected to meet the region's demand up until the mid-2020's at which point the GDD would need to come on stream.

The site selection process for the GDD project was commenced by Fingal County Council in August 2011 and the preferred site at Clonshaugh, Co Dublin was announced in June 2013. Since that time Irish Water has been undertaking extensive surveys and investigations with a view to finalising the design of the scheme and preparing an Environmental Impact Statement (EIS) and Natura Impact Statement (NIS) to be submitted with the application.