

An Bord Pleanála Oral Hearing

Irish Water

Greater Dublin Drainage

Brief of Evidence

Risk of Major Accidents

Ciarán O'Keeffe

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Qualifications and Role on the Proposed Project

- 1 My name is Ciaran O’Keeffe; I am a Chartered Engineer and a Senior Water Consultant with Jacobs Engineering. I am the Project Manager for the Greater Dublin Drainage Project which is the subject of this Oral Hearing. My involvement in the Proposed Project began in 2011, when Jacobs were appointed by Fingal County Council to commence the Proposed Project and continued in 2014 when Irish Water took over water services generally and for the Proposed Project in particular.
- 2 I graduated from University College Galway (now NUIG) in 1978 with an Honours degree in Civil Engineering, and became a Chartered Engineer registered with Engineers Ireland in 2013.
- 3 I have approximately 30 years’ relevant experience in the planning, design and construction of a variety of major water projects in Ireland. Most recently I was the Project Manager and Design lead for the Lower Liffey Valley Regional Sewerage Scheme, which entailed a major upgrade to, and rehabilitation of, the sewerage infrastructure in Leixlip, Maynooth, Kilcock and Celbridge, including construction of 7km of new foul and surface water sewers, rehabilitation of 4.5km of existing foul sewer and construction of 3 new pumping stations.
- 4 I am the Project Manager and Design lead on the Proposed Project, managing the Site & Route Selection, Preliminary Engineering Design, Environmental Impact Assessment and the Natura Impact Statement. I authored Chapter 22 – Risk of Major Accidents and/or Disasters.
- 5 At the outset it should be noted that the risk of a major accident/natural disaster (MAND) is very remote, however, best practice requires a robust assessment of the risk of a major accident/natural disaster be carried out by the competent authority.
- 6 Chapter 22 in Volume 3 Part A of the Environmental Impact Assessment Report (EIAR) identifies how the potential for accidents and disasters relevant to the Proposed Project have been identified and how those potential risks have been managed. The Chapter considers:
 - Major accidents and/or natural disasters that the Proposed Project may be vulnerable to;
 - The potential for significant adverse environmental impacts resulting from such major accidents and/or natural disasters; and
 - Existing and proposed mitigation measures to prevent or mitigate the likely significant adverse impacts of such events on the environment.
- 7 The identification, control and management of risk is an integral part of the design and assessment process throughout all stages of a project life cycle as it has been for the Proposed Project. For example, a Flood Risk Assessment was carried out during the site selection process to ensure that the selected sites for the proposed Wastewater Treatment Plant at Clonshagh and the proposed Abbotstown pumping station were not located in areas vulnerable to flood risk. The Proposed Project will be designed, built and operated in line with current international best practice and guidelines.
- 8 The various elements of the Proposed Project incorporate technologies and measures that are designed to reduce and eliminate the occurrence of accidents. Measures to control risks associated with Construction Phase activities are incorporated into the Outline Construction Environmental Management Plan submitted with the application. These measures include implementation of a detailed Construction Environmental Management Plan, and the implementation of the Surface Water Management Plan, Vessel Management Plan, Traffic Management Plan, Air Quality and Dust Management Plan and Noise and Vibration

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Management Plan all of which have been developed as part of the application for permission in respect of the Proposed Project.

- 9 Measures to control risks associated with Operational Phase activities identified in the application documentation will be implemented in Operational Phase plans such as the Environmental Incident Response Plan which will be a live document subject to monitoring, review and update throughout the lifetime of the Proposed Project and an Odour Management Plan which will be operated in conjunction with the odour abatement measures which have been embedded into the design of the Proposed Project.
- 10 The scoping criteria for this risk assessment were:
- Identify major accidents and/or natural disasters (i.e. unplanned incidents) that the Proposed Project may be vulnerable to; and
 - Assess the consequent impacts and significance of such incidents in relation to the environmental, social and economic receptors that may be affected.
- 11 Following the initial identification and screening process, remaining MANDs were evaluated with regard to the likelihood of occurrence and the potential impact. The rating criteria adopted for the assessment follows that used in A Guide to Risk Assessment in Major Emergency Management (DoEHLG 2010). The classification and rating of likelihood and consequence are provided in Table 22.1 and Table 22.2 of Chapter 22, Volume 3 Part A of the EIAR. **Likelihood** is classified on a scale of 1 to 5 where 1 is ‘extremely unlikely’ and 5 is ‘very likely’. **Consequence** is classified on a scale of 1 to 4 where 1 is ‘minor’ and 4 is ‘very serious’. In accordance with the DoEHLG’s (2010) Guidelines, the evaluated major accidents/natural disasters were then subject to a risk matrix to determine the level of significance of each risk for each scenario. The output of this assessment is provided in Table 22.6 of Chapter 22 of the EIAR.

Response to Submissions/ Observations

- 12 Submissions relating to Risk were concerned with the potential for pump/plant/system failure during operation and the resultant release of untreated wastewater into the marine environment. I authored the response to these concerns in Part 23 of Irish Water’s Response to Submissions (January 2019) document.
- 13 The risk of a potential discharge of untreated wastewater during Commissioning and the Operational Phase had been identified as a potential risk and was therefore entered on the Risk Register with a Risk ID of "F", in Chapter 22 Risk of Major Accidents and/or Natural Disasters in Volume 3 Part A of the EIAR.
- 14 Post implementation of mitigation measures the risk of a potential discharge of untreated wastewater during Commissioning and Operational Phase of the Proposed Project was assessed in Chapter 22 as ‘unlikely’ with ‘limited’ consequence of impact.
- 15 The mitigation measures embedded into the design of the Proposed Project to mitigate against total or partial failure events at the proposed Wastewater Treatment Plant (WwTP) and Abbotstown Pumping Station, include:
- The proposed WwTP will have three power supply sources (electricity on a looped supply, natural gas and biogas) and will be capable of running off any single one or off a combination of sources;
 - A standby/backup diesel generator will be provided at the proposed Abbotstown Pumping Station;

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- The proposed WwTP is designed to accommodate a planned maintenance regime whereby an individual treatment unit can be taken offline for maintenance without impacting treatment capacity;
- All pumps will be installed in duty/standby configurations to act as a backup in case of pump failure;
- A telemetry system will be installed within the control room located in the proposed WwTP. This will allow operators to control the flows passed forward from the proposed Abbotstown pumping station and the existing Ballymun pumping station. As a result, in the event of a problem arising at the proposed WwTP, flows from the two pumping stations can be slowed or stopped for a period of time, with the large storage volumes available in the network mobilised to retain flows. This storage volume allows for a period of 6 hours at average flow for problems to be rectified.
- All key items of mechanical plant will incorporate alarms to immediately warn of malfunction/failure; and
- The construction of all proposed pipeline routes will be carried out in accordance with best practice and design. Appropriate watertight pipeline materials for the safe transfer of wastewater will be utilised during the construction of the proposed pipeline routes and pipelines will have a limited number of joints to minimise potential leaks. The rising main will be pressurised and will be fitted with a pressure monitor that will stop flows in the event of a burst along the proposed orbital sewer route. A flow meter will be included in the design at the proposed Abbotstown pumping station and at the inlet works for the proposed WwTP, which will allow for flow balance calculations to be monitored. This will aid in the early detection of any potential leaks or bursts along the proposed orbital sewer route.

16 In addition, a full suite of management plans has been designed (including, by way of example, a construction and environmental management plan, traffic management plan, odour management plan, surface water management plan and a vessel management plan) which will all be implemented for the relevant phases of the Proposed Project, as outlined in the schedule of environmental commitments submitted with the application.

17 A short summary of the assessment of the risk of a discharge of untreated sewage resulting from the potential failure mechanisms during operation of the proposed WwTP raised in the submissions is presented hereunder.

Pump Failure

18 The risk of pump failure at either the WwTP or Abbotstown Pumping Station will be mitigated by the installation of all pump sets in a duty/assist/standby configuration. In such a configuration and coupled with the provision of alternate/standby power supply, I am satisfied that the risk of all pumps failing is assessed as ‘very unlikely’ and consequently the risk of a discharge of untreated sewage from pump failure is assessed as ‘very unlikely’. This assessment is an update on the assessment in the EIAR as referenced above and follows the additional review carried out in response to the submissions received.

Partial Failure of elements of the proposed WwTP

19 The proposed WwTP is designed with in-built redundancy to accommodate a planned maintenance regime whereby an individual treatment unit can be taken offline for maintenance without impacting treatment capacity. The implementation of the planned maintenance regime will in itself mitigate against the potential of partial failure events. In the unlikely event of such an occurrence, the WwTP would still continue to meet the discharge emission limit values as flows would be seamlessly distributed to the other treatment units at

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the WwTP. I am satisfied that the risk of a discharge of untreated sewage to the marine environment as a result of a partial failure event at the WwTP is assessed as ‘very unlikely’. This assessment is an update on the assessment in the EIAR as referenced above and follows the additional review carried out in response to the submissions received.

Total failure of the WwTP.

- 20 A total failure of the WwTP would be as a result of total power failure at the WwTP. The proposed WwTP will have three power supply sources (electricity on a looped supply, natural gas and biogas) and will be capable of running off any single one or a combination of sources, thereby mitigating the likelihood of total power failure at the WwTP and consequently mitigating against a total failure of the WwTP itself.
- 21 The Orbital Sewer and the NFS diversion sewer will discharge to the inlet chamber at the WwTP, which is 4.5m below ground level. Duty/standby/assist pump sets at the inlet chamber lift the sewage to the head of the treatment line at the coarse screens. In the unlikely event of a total power failure at the WwTP these inlet pumps would not work and therefore it would not be possible to pass sewage into and through the WwTP. In such an unlikely event the telemetry system would default to instruct the proposed Abbotstown pumping station and the existing Ballymun pumping station to stop pumping flows forward and the large storage volumes available in the network would be mobilised to retain flows. At the same time Irish Water’s emergency response plan would be activated.
- 22 I am satisfied that a discharge of untreated sewage to the marine environment as a result of a total failure of the WwTP cannot occur. This assessment is an update on the assessment in the EIAR as referenced above and follows the additional review carried out in response to the submissions received.

Conclusion

- 23 Chapter 22 has identified and assessed the likely incidents that have the potential to occur during the Construction Phase and Operational Phase of the Proposed Project. These risks have been assessed with regard to the mitigation measures, including those embedded in the design and the implementation of a Traffic Management Plan, Environmental Incident Response Plan, Odour Control Plan, Surface Water Management Plan and Vessel Management Plan. These Management Plans contain mitigation measures and action plans designed to limit the risk of injury to employees, visitors and local residents, damage to facilities and damage to the environment. Through the implementation of the effective suite of mitigation measures identified in the application documents, there are no identified incidents or examples of major accidents and/or disasters that present a sufficient combination of risk and consequence that would lead to significant residual impacts or environmental effects, other than those that have been anticipated, assessed, and planned for. As set out above in paragraphs 18 to 22 I am satisfied that the risk of a discharge of untreated sewage to the marine environment as a result of pump/plant/system failure at the WwTP or Abbotstown pumping station during the Operational Phase is assessed as ‘very unlikely’ or ‘cannot occur’.