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Irish Water

Fethard On Sea Sewerage Scheme.

Foreshore Report

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1 Introduction

1.1 Overview

ByrneLooby were appointed by Irish Water to procure under a design build contract a new wastewater treatment plant (WwTP) for the village of Fethard-On-Sea in County Wexford. As part of this project a 350m long sea outfall is required to facilitate the disposal of treated sewage effluent from a proposed WWTP. This Foreshore Report relates to the construction of the outfall pipeline.

1.2 Background

At present the wastewater treatment facilities in Fethard on Sea are not sufficient, with preliminary treatment only being carried out. The existing drainage system conveys flows to a primary settlement tank located in the village (Tay Lane) and effluent is discharged to the Bannow Bay estuary. The level of treatment, whilst having a PE of less than 2000 and not subject to the requirements of the Urban Waste Water Directive and the Urban Waste Water Treatment Regulations, both of which require secondary treatment, is overloaded and requires updating. This overloading is preventing the expansion of Fethard-On-Sea village.

It is the intention of Irish Water to provide new Waste Water infrastructure and a new Waste Water Treatment Plant for Fethard which will ultimately be designed to cater for a Population Equivalent (P.E.) of 1,800 which will operate to the required statutory standards and regulations.

The provision of adequate wastewater treatment infrastructure is essential to the economic, social, public and environmental development of the Wexford County and to the implementation of
the settlement strategy. In addition the continued improvement and provision of this infrastructure is necessary to meet the requirements of the European Directives.

Irish Water are committed to facilitating the planned, phased expansion of towns and villages dispersed throughout the County in accordance with the strategic objectives of achieving balanced equitable development as outlined in the Wexford County Development Plan 2013-2019.

In support of this CDP, and in its role as the national body for the provision of water and wastewater services, Irish Water will implement an upgrade of the existing wastewater treatment system.

The current wastewater treatment regime - consisting of a gravity fed primary treatment tank - in Fethard whilst in line with the requirements of the Urban Waste Water Directive and the Urban Waste Water Regulations (primary treatment only for a population equivalent of <2000), is overloaded. It is the intention of Irish Water to provide new Waste Water infrastructure and a new Waste Water Treatment Plant for Fethard which will operate to the required statutory standards and regulations.

The principle objective of the Fethard on Sea Main Sewerage Scheme is to promote and facilitate the development of Fethard as a strategic centre for tourism in the Hook Peninsula area, in the South west of County Wexford. The present lack of adequate waste water treatment and discharge facilities is having a restrictive effect on the development of Fethard and the works and discharge whilst currently in line with the requirements (having a P.E of less than 2000) as set out in the Urban Waste Water Directive and the Urban Waste Water Treatment (Amendment) Regulations 2010, is severely overloaded. This new treatment works will ensure that future development is not restricted and that discharges from the works are in line with environmental regulations and legislation.

1.3 Proposed Development Overview

The Fethard on Sea Main Sewerage Scheme includes a proposed Waste Water Treatment Plant, sewers, pipelines, storage tanks, pumping station and two outfall pipes. The treatment works will be designed to cope with both seasonal and future population demands up to a P.E. of approximately 1,400 (Phase 1) with space allowed to facilitate even further expansion to a P.E. of 1800 (Phase 2). The treatment plant will include secondary wastewater treatment processes and may also include tertiary treatment (UV disinfection).

A revised Irish Water Asset Strategy assessment of population figures has been provided, in order to facilitate the selection of process and enable the outline design to be progressed, as follows:

Criteria	Winter PE	Summer PE
10 Year Design Horizon	470	1,400
30 Year Design Horizon	600	1,800

Table 1.1 Approved PE Figures

The proposed site of the treatment plant is approximately 1.4 hectares and is located at Ramstown, approximately 0.9 km south east of Fethard on Sea village centre. The proposed pumping station and storage tank will be located at Tay Lane in Fethard on Sea village, on the site of the existing settlement tank (see Figure 1.1).

The construction works at Tay Lane will require excavation for a pumping station sump and storage tank. The storage tank and pumping station sump will be constructed in reinforced concrete. The pumping station will include a small kiosk above ground.

The waste water will be pumped to the new wastewater treatment plant to the south of Fethard village which will require pipe laying in the road across Fethard Bridge and on to the new wastewater treatment plant and a final treated effluent outfall to the sea approximately 1.1 km southwest of Ingard Point. Construction of the pipeline will be along Sunny Row and Bam Mills Road (600m) with a section from Bam Mills Road to the proposed plant at Ramstown through fields (340m).

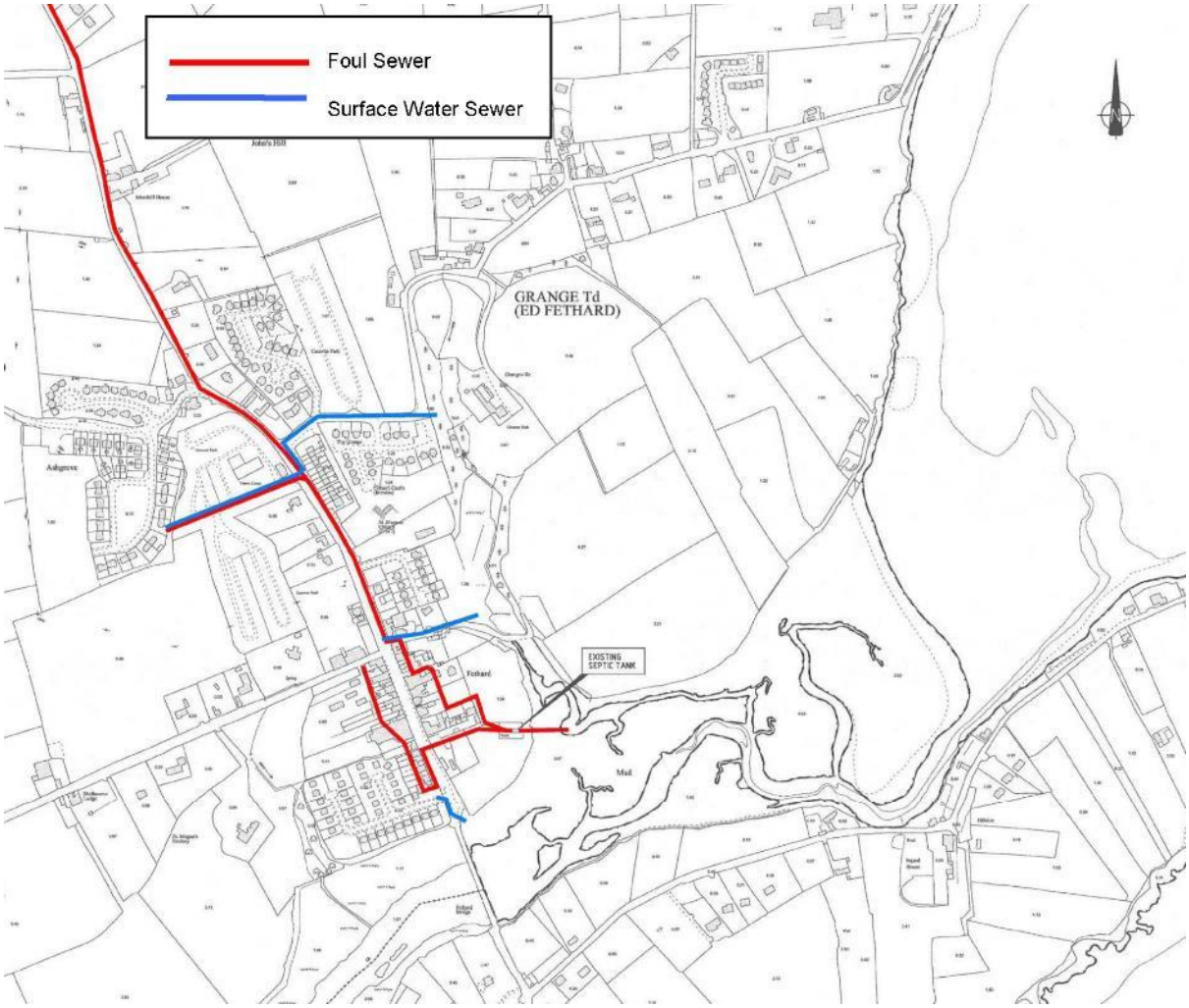


Figure 1.1 Fethard on Sea Existing Collection Systems

The site of the proposed treatment plant is on agricultural land and is currently used for tillage. The site of the proposed pumping station and storage tank is comprised of improved grassland.

Photograph 1.1 Proposed Wastewater Treatment Works Site (Viewing Seaward)

Photograph 1.2 Tay Lane Site (Viewing Bannow Bay)

Tthe proposed outfall will be located on the coast approximately 800 metres southeast of Fethard-on-Sea village and approximately 1 kilometre south of Ingard Point and 1.4 kilometres north of Baginbun Head.

The outfall will consist of a pipeline, approximately 355 metres in length (inclusive of the onshore section) from the coast to the outfall point in the Irish Sea, with diffusers along the last 40 metres of the pipe. Images of the site and foreshore are showing in Photograph 1.4, 1.5 and 1.6.

The proposed outfall will have a diameter of 225mm and will be approximately 355m in length. It is proposed to construct the pipeline from High Performance Polyethylene (HPPE) material. The outfall will extend to a water depth of approximately 1.6m below Mean Low Water Tide (MLWT) and will be constructed through the foreshore area, commencing on the land side of the cliffs and not emerging until a depth of 1 m below Lowest Astronomical Tide (LAT) has been reached. It is proposed that the outfall discharge point will include a diffuser ports, with duckbill type non-return valves (Tideflex or other similar supplier). Navigational markers will be provided at both ends of the outfall.

Photograph 1.3 Typical Outfall Marker Buoy

Photograph 1.4 Proposed Wastewater Treatment Works Site (Viewing Seaward)

Photograph 1.5 View from the cliff edge of the Proposed Site looking Seaward

Photograph 1.6 Treatment Works Cliffs & Foreshore Area

1.4 Receiving Environment

Fethard on Sea is located in southwest County Wexford on the Hook Head peninsula. Based on the Census 2011 data, the current population for Electoral Division of Fethard is 890, as compared with 919 recorded in the 2006 Census. This marks a 3.2% reduction in population since 2006. In terms of the village itself, a population of 270 was recorded in 2011.

There are some tracts of land in the village which have been identified as having development potential. Fethard On Sea has been placed in the Smaller Villages grouping in the Wexford County Development Plan 2013- 2019.

The primary business activity for Fethard is tourism and the village is identified in the Development Plan as having the potential to develop further as a location for seaside tourism. The beach areas south from Wood Village and along Rabbit Burrow and at the southern end of Rabbit Burrow are traditionally used as bathing areas. Fethard and the local surrounding coastline does not have any designated Blue Flag beaches. Dunmore East & Councillors Strand are the nearest beaches which currently have Blue Flag beach statuses.

The harbour, located to the south of the village, is protected by a quay wall near Ingard Point and is a very small sheltered harbour which is principally used by fishing boats at present. Its use could be extended in the future to cater for leisure boats and thus could potentially represent an amenity water use.

1.5 Existing Wastewater Treatment Works

At present the wastewater treatment facilities in Fethard on Sea are not sufficient, with preliminary treatment only carried out. The existing Waste Water Treatment Plant at Fethard on

Sea is located on the south-east of the village and south-west of Fethard Bay. Waste water generated in Fethard on Sea Village and Environs is collected via a combined gravity collection network with one housing estate being partially pumped to the network (see Figure 1.1).

The WwTP is designed to cater for a population equivalent of 1,400 P.E. (Phase 1). The current maximum average weekly loading contributing to the plant is 1,200 P.E. for the Fethard on Sea and environs agglomeration.

The existing Fethard on Sea Waste Water Treatment Plant consists of a Primary Settlement Tank, which provides primary treatment of the effluent. The effluent then discharges into a stream flowing from Grangeville into the marsh via a 225mm diameter outfall pipe. This stream then enters Fethard Bay.

There is an overflow pipe located just before the Primary Settlement Tank at the inlet channel. This rejoins the outfall pipe (Primary Discharge) at a manhole located at the end of the Primary Settlement Tank.

2 Proposed Development

2.1 Waste Water Treatment Works

Based on the projected growth of Fethard on Sea and the seasonal fluctuations that are to be expected it is anticipated that a modular layout for the plant would be the most suitable. A modular layout allows for a phased development of the works in line with future demand.

The treatment process design selection takes into account the range of flows to the works anticipated and the quality of treated effluent required (25 mg/l BOD and 35 mg/l Suspended Solids), providing the most economic process design with regard to capital, operational and maintenance costs.

The preliminary design of the plant comprises of the following elements:

- Combined Sewage Storage Tank/Pumping Station with associated rising main and emergency overflow;
- Rotating Biological Contactor (RBC) process comprising of:
  - Fine Screen;
  - Buffer Tank;
  - Inlet Works;
  - Overflow Facility;
  - Primary Settlement Tanks (3 no. total for ultimate design capacity);
  - RBC;
  - Final Settlement Tanks;
  - Sludge Storage;
  - Operation Building; and,
  - Discharge Point to Sea Outfall.

It is envisaged that three settlement tanks/RBC streams are required for the process to deal with the projected peak design flows and sufficient space would be made available for the fourth stream when the contribution to the works reaches the ultimate design capacity. It is anticipated that the process units will be of GRP construction. It is envisaged that the majority of the structures will be buried and the remaining above ground structures shall be screened and designed to mitigate the visibility of the structures and to be sympathetic to the local indigenous buildings.

It is intended to landscape the site with native trees and shrubs to provide further screening of the site.

Planning permission for the new Waste Water Treatment Works and associated infrastructure will be applied for by Irish Water.

2.2 Pumping Station & Storage Tanks

It will be necessary to pump flows to the proposed Waste water treatment works from the village because of the local topography; therefore a pumping station is proposed at Tay Lane, on the site of the existing settlement tank. A storage tank would also be located at the WwTP site to store and balance the flows being conveyed forward for treatment. The current design for the scheme envisages a storage tank with 8hrs capacity. As the condition of the existing primary treatment tank at Tay lane has been found to be unsuitable, the existing tank is required to be decommissioned, demolished and replaced with a new structure. The pumping station will also incorporate a kiosk to house the associated mechanical, electrical and instrumentation equipment. This pumping station will also include a new emergency overflow pipeline, directly buried along the line of the existing primary treatment tank outfall.

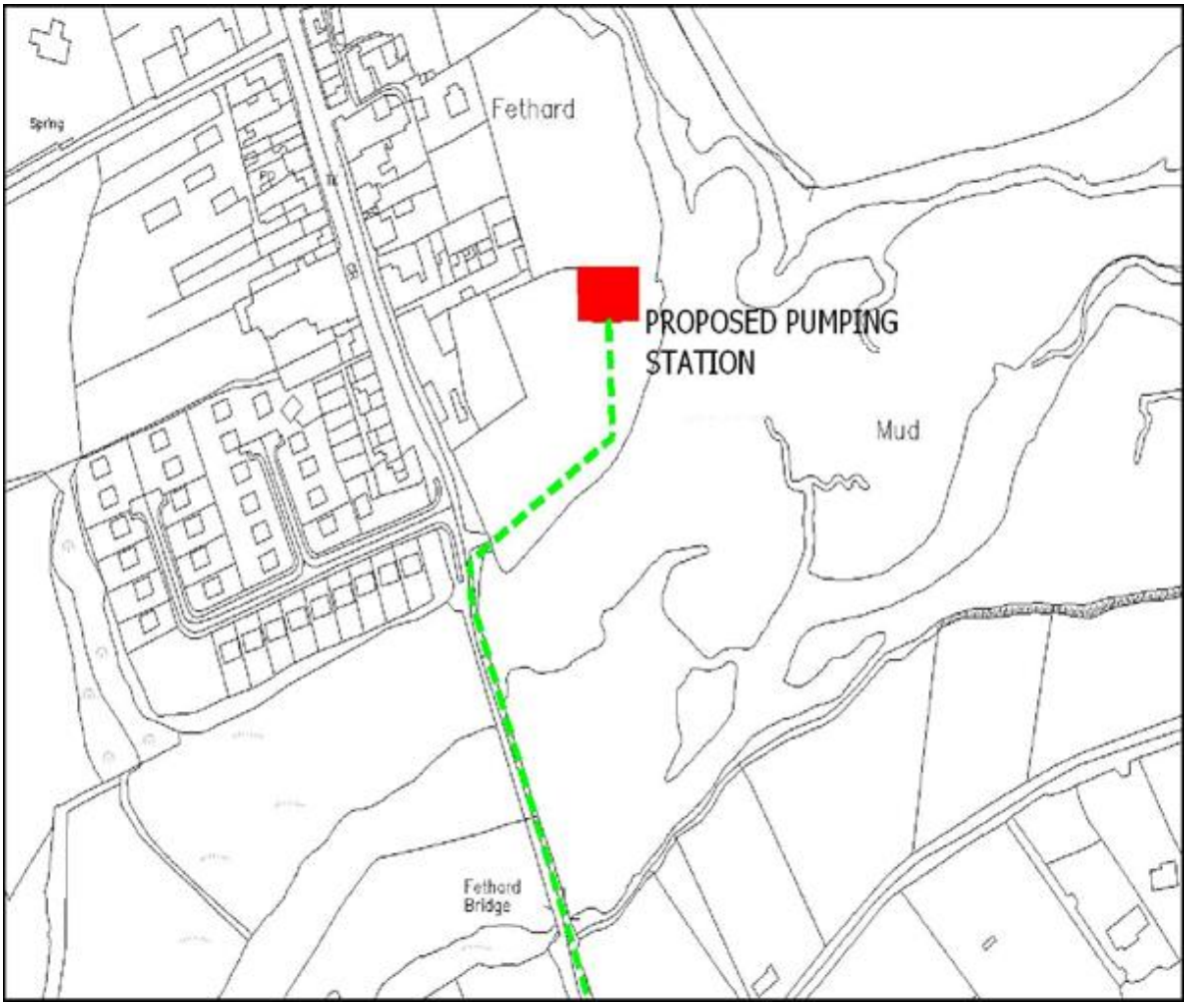


Figure 2.1 Layout of the Proposed Pumping Station at Tay Lane

2.3 Infrastructure Construction

The proposed works will entail the construction of a pumping station and storage tank at Tay Lane. This will require the excavation of the pumping station sump and storage tank. Both structures will be built with reinforced concrete. The rising main to transfer flow to the WwTP will be constructed in roads along Sunny Row and Bam Mills Road for a length of 600m. A section will be constructed from Bam Mills Road to the proposed WwTP, along a boreen/farm track and cross fields for a length of 340m. Depths of the trench for both the rising main will average 1.5m. At the site of the proposed WwTP, a part of a field will be secured for the plant. It will measure 84m long and range in width from 30m to 55m.

Construction will involve excavations, to a suitable formation depth, for treatment process tanks and an administration building, which will contain the interconnecting pipe-work and power requirements.

2.3.1 Tay Lane Pumping Station and Storage Tank

It is proposed to construct a pumping station and storage tank at Tay Lane. This will require excavation for a pumping station sump and storage tank. The storage tank and pumping station sump will be constructed in reinforced concrete. With a small structure above ground which will be designed to be compatible with the local building forms.

All chemical storage areas will also be provided with bunds to prevent discharge to the surface water drainage system.

2.3.2 Transfer Main to Wastewater Treatment Plant

Construction of the pipeline will be along Sunny Row and Bam Mills Road (600m) and then a section from Bam Mills Road to the proposed WwTP at Site B through fields (340m). The rising main will be laid in a trench approximately 1.5m deep depending on topography.

2.3.3 Waste Water Treatment Plant

At the treatment works site construction will involve excavations for treatment process tanks (Rotating Biological Contactors) and an administration building as well as interconnecting pipework and for power requirements.

2.4 WwTP Outfall

2.4.1 Construction

Due to the sensitive nature of the site it is proposed to use "No-Dig" or trenchless technology methods to construct the pipeline through the cliffs. Due to the relatively small diameter of the proposed pipeline directional drilling methods would be suitableA 225mm diameter pipeline is proposed, which will provide adequate capacity for future expansion. The outfall would be constructed by directional drilling through the cliff face and foreshore with the remainder of the works carried out using a backhoe excavator mounted on a barge.

The outfall will include a diffuser system at the end and a surface buoy to mark its location.

2.4.2 Outfall Location

The project brief for the 2009 Site Selection Study required hydrodynamic water quality modelling techniques to be used in order to select an appropriate effluent outfall location, due to the sensitive nature of the receiving waters at Fethard Bay. Other key factors in the selection of appropriate locations for both the WwTP site and the treated effluent discharge point included ecology, land-use, economics, archaeology, ground conditions, site layout visual impact and planning considerations.

2.4.3 Outfall Assessment

The brief for the Site Selection Report, carried out in 2009, identified that a detailed investigation of the possible adverse impacts on the quality of bathing waters and beaches, nutrient enrichment and the possible impact on the designated shellfishery areas was required, in order to select the most appropriate location of the outfall for the treated effluent.

Ideally outfalls should be located a relatively short distance from a WwTP and with a gravity discharge from the WwTP to the outfall. However, the predominant selection criteria for the location of the outfall is based on the possible impacts to the receiving waters.

2.5 WwTP Construction Methodology

2.5.1 The Proposed Site

The site of the proposed treatment works is located within an environmentally sensitive area and statutory designated areas including a Special Area of Conservation (SAC), Special Protection Area (SPA) - Bannow Bay and a Mollusc Production Area –Bannow Bay.

The site is located approximately 240m from the nearest public road (Ban Mill Road) and therefore an access road will be required to access the site. The average ground level on the site is 11m OD and the average slope is 1:28.

Preliminary site investigations identify that the geology of the site consists of weathered mudstone at approximately 3-5m beneath coarse gravel and silts. Groundwater was found to occur intermittently in borehole logs at depths of approximately 6.9m to 7m.

Images of the site and foreshore are showing in Figures 2.2, 2.3 and 2.4.

Figure 2.2 Proposed Wastewater Treatment Works Site (Viewing Seaward)

2.5.2 Marine Outfall at Fethard

The marine outfall proposed in Fethard-on-Sea WwTW will have a diameter of 225mm and will be approximately 355m in length. It is proposed to construct the pipeline from High Performance Polyethylene (HPPE) material. The outfall will extend to a water depth of approximately 1.6m below Mean Low Water Tide (MLWT) and will be constructed through the foreshore area, commencing on the land side of the cliffs and emerging immediately before the diffusers. The proposed outfall is shown in drawing W3137-701 (Appendix A).

The outfall discharge point is to include a diffuser ports, with duckbill type non-return valves (Tideflex or other similar supplier).

Navigational surface markers will be provided at both ends of the outfall.

2.5.3 Ground Condition

The foreshore ground conditions have been investigated with boreholes along the proposed length of the pipeline and a geophysical survey covering the possible extents of the pipeline.

The intrusive investigations indicate a weak slightly weathered Siltstone with closely spaced fractures. RQD values are typically 0 to 30, increasing with depth into the rock. The Siltstone is found at a depth of 0.3 to 7.8m below sea bed level, with greater depths of overburden near the shore.

The overburden has been described variously as Boulder Clay, silt with boulders, sandy Clay with boulders, sandy Gravel with boulders and clayey Sand with boulders. The recurring fraction within the overburden is the boulder content, which are noted to be present wherever overburden was encountered.

A preliminary section along the pipeline is shown in Appendix A. This will be updated to a geological section after issue of the final site investigation results.

2.5.4 Construction Method Options

There are two construction options which are seen to be most advantageous in terms of minimising disturbance in the foreshore during construction works. Both involve using trenchless technology or the 'no dig' method in the form of horizontal directional drilling (HDD). It is considered that this is the preferred method to construct the pipeline from the waste water treatment plant site to the foreshore at the base of the cliff, from where the remaining section of pipeline could be constructed using traditional dredging techniques or alternatively, the contractor could construct the entire pipeline using HDD without any transition in the foreshore, thus negating the need for a receiving pit in the foreshore.

2.5.4.1 No Dig Method

This method uses "no-dig" or trenchless technology methods in the form of horizontal directional drilling to construct the pipeline through the cliffs and under the foreshore to the outfall location. Due to the sensitive nature of the site (which is located in an SAC), this is the preferred construction method as it reduces disturbance within the foreshore area to a minimum.

HDD methods are suitable due to the relatively small diameter of the proposed pipeline and a length which is well within the limits of the available technology.

The procedure for HDD will be as follows:

A pilot hole will be drilled from the treatment works site to the location at a suitable angle (8 to 12 degrees). Bentonite drilling fluid is used to stabilise the hole as well as carrying the cuttings back to the surface.

The designed pipeline vertical alignment will be followed which requires a flattening of the angle of drilling in the foreshore. (3 to 8 degrees at the diffusers)

Break through at the sea bed should be at the location of the outfall discharge point where divers will connect a reamer and secure the breakthrough area to minimise any loss of drilling fluid into the foreshore.

The reamer is pulled back through the hole to achieve the required diameter, usually twice the outer diameter of the required pipe to provide a construction tolerance.

The pipeline will then be pulled from the breakthrough back to the drilling rig. A barge above the location of the outfall discharge point will facilitate the handling of the pipeline.

The diffusers and risers at the end of the outfall pipeline will be constructed under water by divers.

HDD outfall construction works would consist of the following main tasks:

- Monitoring of the head position during drilling is carried out using a cable free steering tool system consisting of survey package which provides feedback on the head position and orientation.
- A bent section of drill rod called the bent housing allows the position of the drill to be manipulated to follow the desired alignment by rotation of the entire drill string.
- A bentonite recycling and cleaning plant will be required at the drilling rig on the waste water treatment plant site. Large volumes of water are required to maintain the volumes of bentonite required to flush the hole during reaming operations.

2.5.4.1.1Risks

The HDD operation is generally carried out continuously from start to finish as a work stoppage can cause problems and reduce the likelihood of the operation being a success. A contractor with experience in such operations will be employed, and will therefore have an awareness of such potentials for problems.

There are no specific ground conditions which exclusively prohibit the use of HDD, however the HDD method can encounter difficulties in drilling through highly weathered or fissured rock or at transitions from rock to mineral soil. Historically, boulders have also caused trouble for contractors carrying out this method of pipeline construction. The contractor will be made aware of the ground conditions and full responsibility for assessing the suitability of the method in the given conditions will be taken by the contractor.

Construction through weathered or fissured rock can cause the drill hole interior surface to be rough. Therefore, it is advisable to open a hole wider than the required tolerance to avoid any tight points which may hinder the pipeline pull-back operation.

There is a potential for the loss of a quantity of bentonite drilling fluid into the foreshore environment following breakthrough of the pilot hole at the outfall location. The contractor should will be required to produce a method statement outlining how he will minimise the loss of bentonite at breakthrough and provide evidence of previous successful implementation of this method in similar circumstances. One such method is the use of a soft plug made of swelling polymers following the initial drill rod breakthrough.

There is also the potential for localised loss of bentonite, or surface bentonite breakthrough during the drilling operation. The Contractor will be cognisant of the provided SI data, and shall take all necessary measures to minimise this risk. The Contractor shall also produce a method statement outlining how he shall mitigate against breakout and the measures he shall take to minimise the loss of bentonite into the foreshore area should a breakout occur.

Benefits

The benefits of installation using HDD techniques need to be balanced against the risks outlined above. Firstly and most obviously the method reduces disturbance and construction activities in the foreshore area to just the location where the outfall and diffusers have to be attached.

Concerns regarding erosion and scour around the pipeline are eliminated as the pipe is an integral part of the ground beneath the seabed, protecting it from the natural forces above. Construction time losses are less likely due to the weather or difficult sea conditions which would cause a work stoppage if traditional methods of installation were used.

Specialised Plant and Equipment

It is anticipated the contractor would use a HDD rig such as the American Auger DD10, Ditch Witch JT7020, Herrenknecht HK150T or a similar power machine.

2.5.4.2 No Dig combined with Dredging and Backfilling

The outfall would be constructed by directional drilling through the cliff face and foreshore with the remainder of the works carried out using a backhoe excavator mounted on a barge. The basic procedure for directional drilling will be as outlined in Section 5.1 with breakthrough occurring in a shaft in the foreshore instead of at the outfall discharge point as follows:

- A shaft will be excavated in the foreshore to receive the HDD pilot hole.
- The pilot hole will then be drilled from the waste water treatment works site to the shaft at a suitable angle (8 to 12 degrees).
- Break through and any loss of drilling fluid will be contained within the shaft.
- A reamer will be pulled back through the hole to achieve the required diameter, usually larger than the required pipe to provide a construction tolerance.
- The first section of pipeline will then be pulled from the shaft back to the drilling rig.

The remainder of the pipeline from the directional drilling reception shaft to the diffusers will be excavated using a combination of dredging an open trench with battered slopes or breaking a trench in rock using a rockbreaker.

A barge above the location of the pipeline will facilitate the excavating or rockbreaking plant and the handling of the pipeline. The pipeline will be installed from the barge using concrete weight collars as outlined below. The diffusers at the end of the outfall will be constructed under water by divers.

Dredging and outfall works would consist of the following main tasks:

- Providing a horizontal positioning control system.
- Providing a vertical control system (tide gauge or similar).
- Execution of pre-dredging survey to establish sea bed geometry.
- Execution of intermediate /progress surveys of dredging and backfilling works.
- Execution of the post-backfill survey to establish the final, as built geometry.

Horizontal positioning controls for the dredger or barge mounted excavator will be achieved using Global Positioning System (GPS). On-board systems on barge mounted excavators or dredgers will be used to determine the correct bucket position.

The rate of excavation using a backhoe dredger or barge mounted excavator depends on many factors, amongst which are ground characteristics, such as in situ density, particle distribution and SPT and/or CPT values, dredging depth, weather conditions, marine traffic, tides, currents, etc.

2.5.5 Pipe Installation

For both methods, the outfall can be welded and towed into position. The HPPE outfall pipe can be welded using butt fusion via a purpose built butt fusion cabin on the barge. In the case of butt fusion, the pipe shall be both internally and externally de-beaded. The beads shall be labelled, and shall be retained along with weld record sheets from the welding process.

In the case of the HDD installation method, once the pipe sections are prepared, the pull head will be connected to the start of the pipeline. Divers will then facilitate the connection of this to the pull line at the breakthrough point. The pipe will be sunk from the barge in stages by pumping water in controlled amounts into it as it is slowly pulled back to the rig.

For those parts of the pipe sections that are outside of the directionally drilled section, continuous concrete weight collars (refer to figure 6.1) can be put on them for on-bottom stability and impact protection.

The installation of the continuous concrete weight collars will be done by a crane mounted on a barge, which slides the collars over the pipe sections.

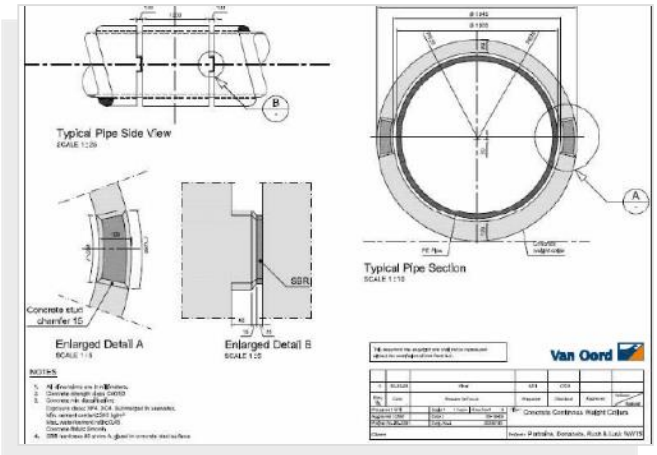


Figure 2.5 Typical Weight Collar

Spacer blocks located between the collars will allow for deflection of the pipe sections during installation.

The pipes will be sunk into position by pumping water in controlled amounts into them. The amount of water will be controlled using a foam pig, pumped water supply and valves control. The pumps will be placed onshore and will have an inline flow meter and manually operated gate valves to control the flow, pig speed and therefore the sinking speed of the pipelines, ensuring full control at all times.

While positioning and installing the outfall pipeline on site, the dredger or barge mounted excavator will be used as an anchor to keep the pipe in tension and correctly position the pipe in the excavated trench. When the first part (foreshore end) of the outfall pipeline is correctly installed, pumping will commence and the pressure release valve on the offshore end (landside end) of the outfall pipeline will be opened.

The outfall pipeline will then be filled with water from the shore end, which results in it sinking into the trench, if and when required the pipe will be pushed / pulled into the right position with the aid of the multipurpose tug. Whilst the pumping progresses, the pipeline will sink in an S-curve into the trench. During the sinking operations the pre-installed foam pig will be pushed through the pipeline. The foam pig will create a seal between the pipe section which is filled with water from the landside and the floating pipe section. The foam pig prevents air from going to the highest point of the pipe. The pig can also be used for contingency operations, when the pipeline has to be re-floated. This can be done by pumping air from the offshore side into the pipe, moving the pig shore wards. The tug will move seaward in progress with the pipeline installation. The process is illustrated in Figures 6.2 below.

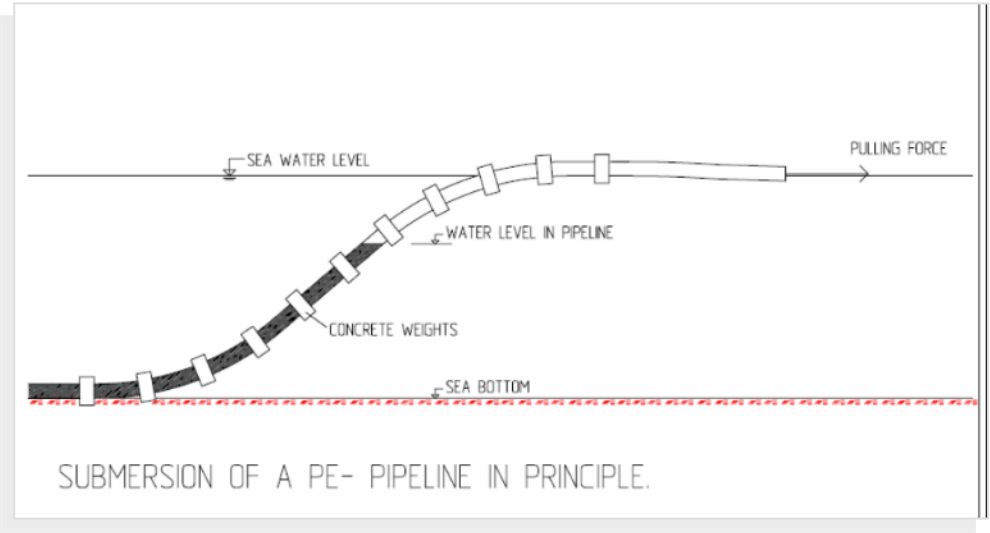


Figure 2.6 Outfall Installation

Once the pipeline has been fully installed, a survey will be performed to confirm the correct position of the pipeline.

Pre and post surveys will be carried out prior to commencing and after completing every major task.

2.5.5.1 Diffusers

Once the outfall pipeline has been laid into the trench the diffusers will be installed by divers. Once the Tideflex or similar valve has been installed the trench will be backfilled.

2.6 Pumping Station Emergency Overflow Construction Methodology

It is proposed that the new pumping station will have a 225mm diameter emergency overflow pipe which will be directly buried along the line of the existing outfall from the current Primary Treatment Tank.

Firstly, the existing outfall shall be removed. This cannot take place until both the new pumping station and the new WwTP have been constructed and are functional. The existing outfall is elevated on timber stanchions and can be removed with minimum effort and with minimum disruption to the saltmarsh.

Figure 2.7 – Location of Outfall from existing Primary Treatment Tank

Protective measures, such as bog matting, may be required during the construction stage to minimise the damage to the marsh by excavators, and the Contractor shall be required to lift existing sods and replace them post construction.

Work shall be carried out at low tide, and this will restrict the amount of time available to the Contractor. The marsh will be reinstated to its original condition on completion of the works.

2.7 Conclusions and Recommendations

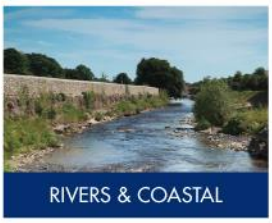
The proposed outfall at Fethard WwTW will be a 225mm diameter pipeline, 355m long and constructed from a HPPE material.

Ground investigations have been completed and issue of the final results are being awaited to finalise the geological section along the pipeline as well as the accurate seabed levels so that a vertical pipeline alignment can be accurately designed.

Two possible methods of construction have been proposed for the pipeline. The full length of pipeline can be constructed using HDD methods, with breakthrough of the drill rod at the diffuser location. Alternatively, HDD can be used to construct the pipeline from the start location at the WwTW to an excavated shaft in the foreshore at the base of the cliffs in shallow water. Using this method, the remainder of the pipeline would be completed using the traditional methods of dredging and sinking the pipeline. In both cases the diffusers would be attached by divers.

The pros and cons of each method have been discussed in the report, following which we recommend the use of horizontal directional drilling (HDD) to construct the full length of the pipeline.

It is considered that the benefits of this construction method to reduce disturbance in the foreshore outweigh any potential downsides. However, the experience and drilling rig size required to carry out this method of construction are not currently operated by any Irish contractors. Therefore, it is expected that the expertise would have to be sourced overseas to carry out the work, with the most likely location being the UK.



Appendix A – Drawings